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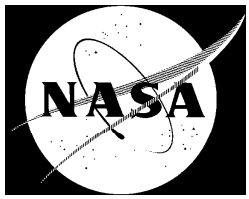
Post Increment Evaluation Report Increment 10

International Space Station Program

Baseline

April 2006

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



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REVISION AND HISTORY PAGE

REV.	DESCRIPTION	PUB. DATE
-	Initial Release (Reference per SSCD XXXXXX, EFF. XX-XX-XX)	XX-XX-XX

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POST INCREMENT EVALUATION REPORT
INCREMENT 10

CHANGE SHEET

Month XX, XXXX

Baseline

Space Station Control Board Directive No. XXXXXX/(X-X) dated XX-XX-XX. (X)

CHANGE INSTRUCTIONS

SSP 54310, Post Increment Evaluation Report Increment 10, has been baselined by the authority of SSCD XXXXXX. All future updates to this document will be identified on this change sheet.

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INCREMENT 10

Baseline (Reference SSCD XXXXXX, dated XX-XX-XX)

LIST OF EFFECTIVE PAGES

Month XX, XXXX

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

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SSCB APPROVAL NOTICE

INTERNATIONAL SPACE STATION PROGRAM

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INCREMENT 10

APRIL 2006

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INCREMENT 10**

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INCREMENT 10**

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INCREMENT 10**

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INCREMENT 10**

LIST OF CHANGES

APRIL 2006

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

MIOCB	Entry Date	Change	Paragraph(s)
	May 2006	Baseline	All

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1.0 INTRODUCTION

SSP 54310, Post Increment Evaluation Report (PIER) for Increment 10 documents the as flown execution as opposed to the pre-increment plan. This report includes a summary of actual launch dates with major milestones that occurred within the stage and comparative summaries of the resource and accommodations, including transfer of power, cargo, and propellant for the International Space Station (ISS). A listing of the utilization objectives achieved and modifications to mission requirements are also included in this report. Detailed scientific and technical results, crew consensus reports, and material that only apply to a single country's programs or operations are published separately.

1.1 SCOPE

This report covers Increment 10, and includes both joint ISS/mated vehicle operations and ISS-only continuous operational phases (i.e., stages) of the increment. The Increment began in October 2004 with the docking of Soyuz Flight 9S and the arrival of the tenth ISS crew, and ended in April 2005 with the docking of Soyuz Flight 10S and the arrival of the eleventh ISS crew.

1.2 PRECEDENCE

This document takes precedence over SSP 54010, Increment Definition and Requirements Document for Increment 10 since this document reflects the actual events that took place during the mission and documents those events that deviated or were deleted from the planned events.

1.3 DELEGATION OF AUTHORITY

The Space Station Control Board (SSCB) has formal control and approval of this document. All changes to this document will be processed in accordance with the procedures as specified in SSP 50123-01, Configuration Management Handbook Volume 1.

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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 supercede the order of precedence identified in Paragraph 1.2 of this document.

DOCUMENT	TITLE	TYPE
SSP 50448	Station Development Test Objective (SDTO) Catalog	Multilateral
SSP 54009-08S	Increment Definition and Requirements Document for Increment 9, Annex 1: Station Manifest, Flight 8S (Soyuz 214) (Post-Flight)	Multilateral
SSP 54009-015P	Increment Definition and Requirements Document for Increment 9, Annex 1: Station Manifest, Flight 15P (Progress 350) (Post-Flight)	Multilateral
SSP 54010	Increment Definition and Requirements Document for Increment 10	Multilateral
SSP 54010-09S	Increment Definition and Requirements Document for Increment 10, Annex 1: Station Manifest, Flight 9S (Soyuz 215) (Post-Flight)	Multilateral
SSP 54010-10S	Increment Definition and Requirements Document for Increment 10, Annex 1: Station Manifest, Flight 10S (Soyuz 216) (Post-Flight)	Multilateral
SSP 54010-016P	Increment Definition and Requirements Document for Increment 10, Annex 1: Station Manifest, Flight 16P (Progress) (Post-Flight)	Multilateral
SSP 54010-017P	Increment Definition and Requirements Document for Increment 10, Annex 1: Station Manifest, Flight 17P (Progress) (Post-Flight)	Multilateral
SSP 54010-ANX 5	Increment Definition and Requirements Document for Increment 10, Annex 5: Payload Tactical Plan	Multilateral
SSP 54309	Post Increment Evaluation Report: Increment 9	Multilateral

<TBD 2-1>

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SSP 54311 **<TBD 2-2>**	Post Increment Evaluation Report: Increment 11	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 54009	Increment Definition and Requirements Document for Increment 9	Multilateral
SSP 54010-ANX 2	Increment Definition and Requirements Document for Increment 10, Annex 2: On-Orbit Maintenance Plan	Multilateral
SSP 54010-ANX 3	Increment Definition and Requirements Document for Increment 10, Annex 3: Imagery Requirements	Multilateral
SSP 54010-ANX 4	Increment Definition and Requirements Document for Increment 10, Annex 4: Medical Operations and Environmental Monitoring	Multilateral
SSP 54011	Increment Definition and Requirements Document for Increment 11	Multilateral
SSP 54100	Increment Definition and Requirements Document Flight Program	Multilateral
NAS15-10110	Contract NAS15-10110 between the National Aeronautics and Space Administration of the United Stages 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

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3.0 DESCRIPTION

Figure 3.0-1, Overview, is a graphical view of Increment 10 showing when and where vehicles docked to the ISS as well as other major events associated with the Increment.

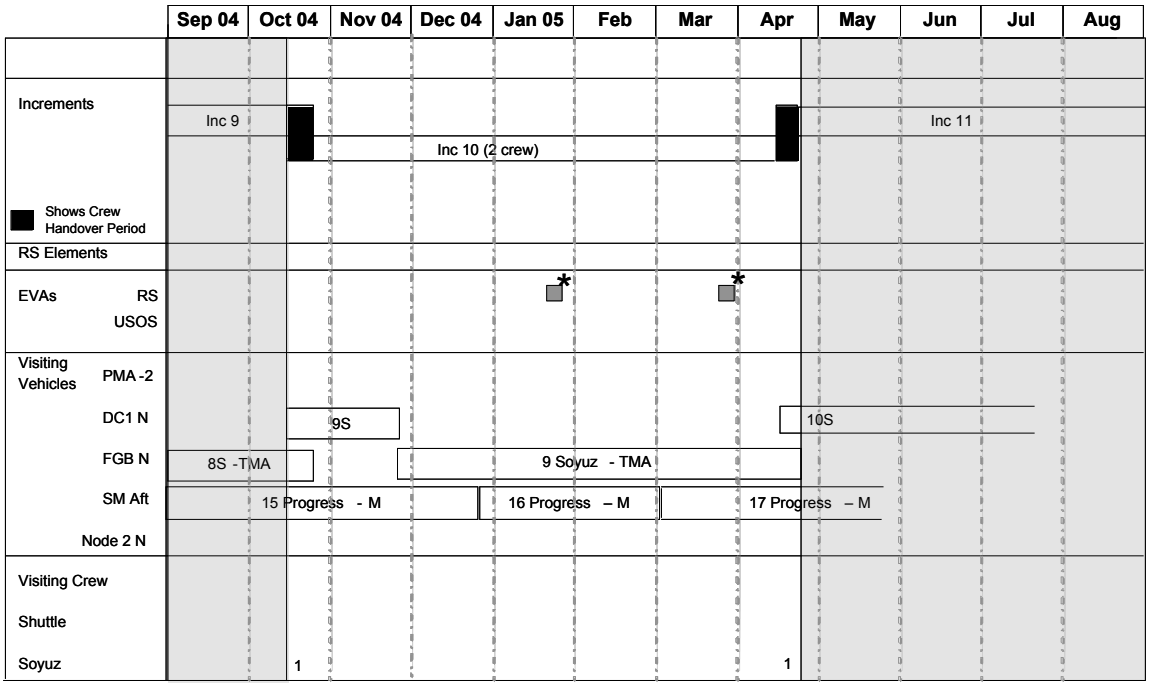

FIGURE 3.0-1 OVERVIEW

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Table 3.0-1, As Flown Flight Summary, identifies the actual dates and mission data for all flights that visited the ISS during this Increment.

TABLE 3.0-1 AS FLOWN FLIGHT SUMMARY

ISS Flight Name	Launch Vehicle Flight Name	Launch Vehicle Crew Size	Launch Date (GMT)	Mission Duration (days)	Docking Date (GMT)	Docked Duration (days)	Undock Date (GMT)	Landing/ De-Orbit Date (GMT)
Increment 10								
8S [c]	Soyuz-TMA	2+1 [3]	[1]	189	[1]	186	23 Oct 04	24 Oct 04
15P	Progress-M	Unmanned	[1]	134	[1]	131	22 Dec 04	22 Dec 04
9S [c]	Soyuz-TMA	2+1 [3]	14 Oct 04	193	16 Oct 04	191	24 Apr 05	24 Apr 05
16P	Progress-M	Unmanned	24 Dec 04	75	25 Dec 04	65	27 Feb 05	09 Mar 05
17P	Progress-M	Unmanned	28 Feb 05	[2]	02 Mar 05	[2]	[2]	[2]
10S [c]	Soyuz-TMA	2+1 [3]	15 Apr 05	[2]	17 Apr 05	[2]	[2]	[2]

NOTES:

[c] Crew Rotation Flight.

[1] Vehicle was attached to ISS from previous Increment and departed during Increment 10.

[2] Vehicle launched during Increment 10; however, some information will be documented in SSP 54311 **<TBD 2-2>**.

[3] Soyuz ascent/descent crew size is denoted using the following convention: x+y, where x=number of Expedition crew members and y = number of Soyuz crewmembers.

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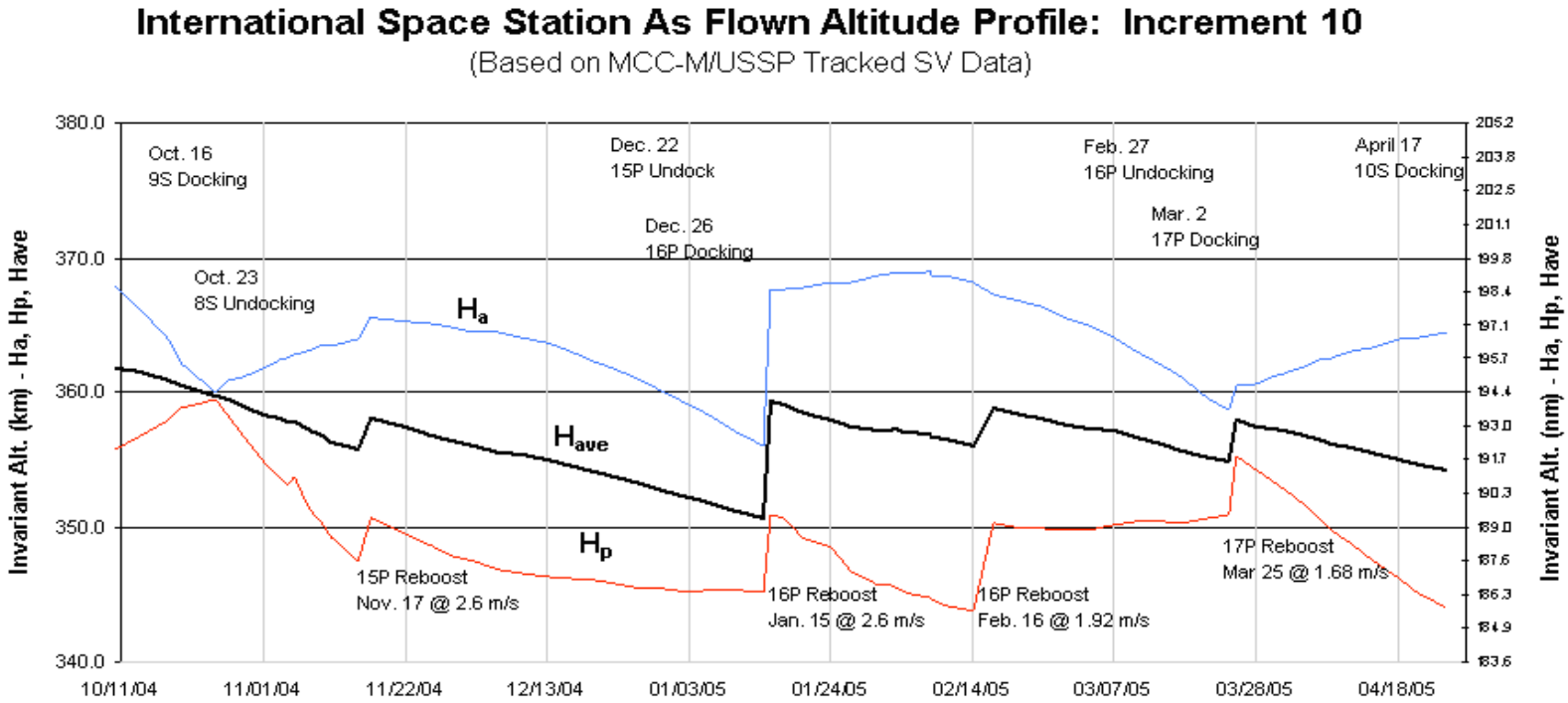
Figure 3.0-2, ISS As Flown Altitude Profile, is a graphical representation of the ISS altitude showing where specific height adjustments were made during Increment 10. The figure is derived from data recorded realtime on an irregular frequency, and as a result, several days may pass between data points. It is understood that reboost events occurred on a single day as noted in the figure.



H_a = Apogee Altitude
H_p = Perigee Altitude
H_{ave} = Average Altitude

FIGURE 3.0-2 ISS AS FLOWN ALTITUDE PROFILE

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4.0 ON-ORBIT RESOURCES

The following tables reflect a summary of all the on-orbit power, stowage, transfers and crew time during this Increment.

4.1 ELECTRICAL POWER TRANSFERRED

Figure 4.1-1, Electrical Power Transferred, and Table 4.1-1, Average Power Transfer, compare SSP 54010, Increment Definition and Requirements Document for Increment 10, planned power transfer from the United States (U.S.) to the Russian segment versus actual power transfer from telemetry. In general, Increment Definition and Requirements Document (IDRD) planned predictions overestimated actual levels. Predictions overestimated actual transfers due to worst-case planning for maximum American to Russian (Power) Converter Unit (ARCU) use, and a change in flight attitude from X-Axis Perpendicular to the Orbit Plane (XPOP) to YVV for high beta.

Hardware operational constraints and baseline flight attitudes were used to determine planned transfers. Differences exist between predicted and actual power transfer due to the power regulation hierarchy in the Russian Electrical Power System (EPS) architecture. The IDRD requires planning with a minimum number of active American-to-Russian Converter Units (ARCUs) to meet the Russian power deficit, but does not account for ARCU cycling during eclipse/insolation periods. Therefore, the predictions at times result in an additional kilowatt over the actual value.

Figure 4.1-1 also depicts the Russian Power Deficit profile, which shows power planning data at specific beta angles (instead of the maximum power transfer of a beta range) without the ARCU saturation constraint. In general, the Russian Deficit profile better approximates the actual transfer; however, this method is not recommended for planning purposes due to uncertainty in many parameters (i.e. inaccuracies from telemetry data and sampling criteria, attitude transitions outside of the flight attitude plan, etc).

In summary, the conservative IDRD planned power transfer inputs are adequate for tactical planning. These planned transfer values provide enough power margins for Russian Core systems operations within hardware constraints. IDRD Allocation is in multiples of 1.8 kW.

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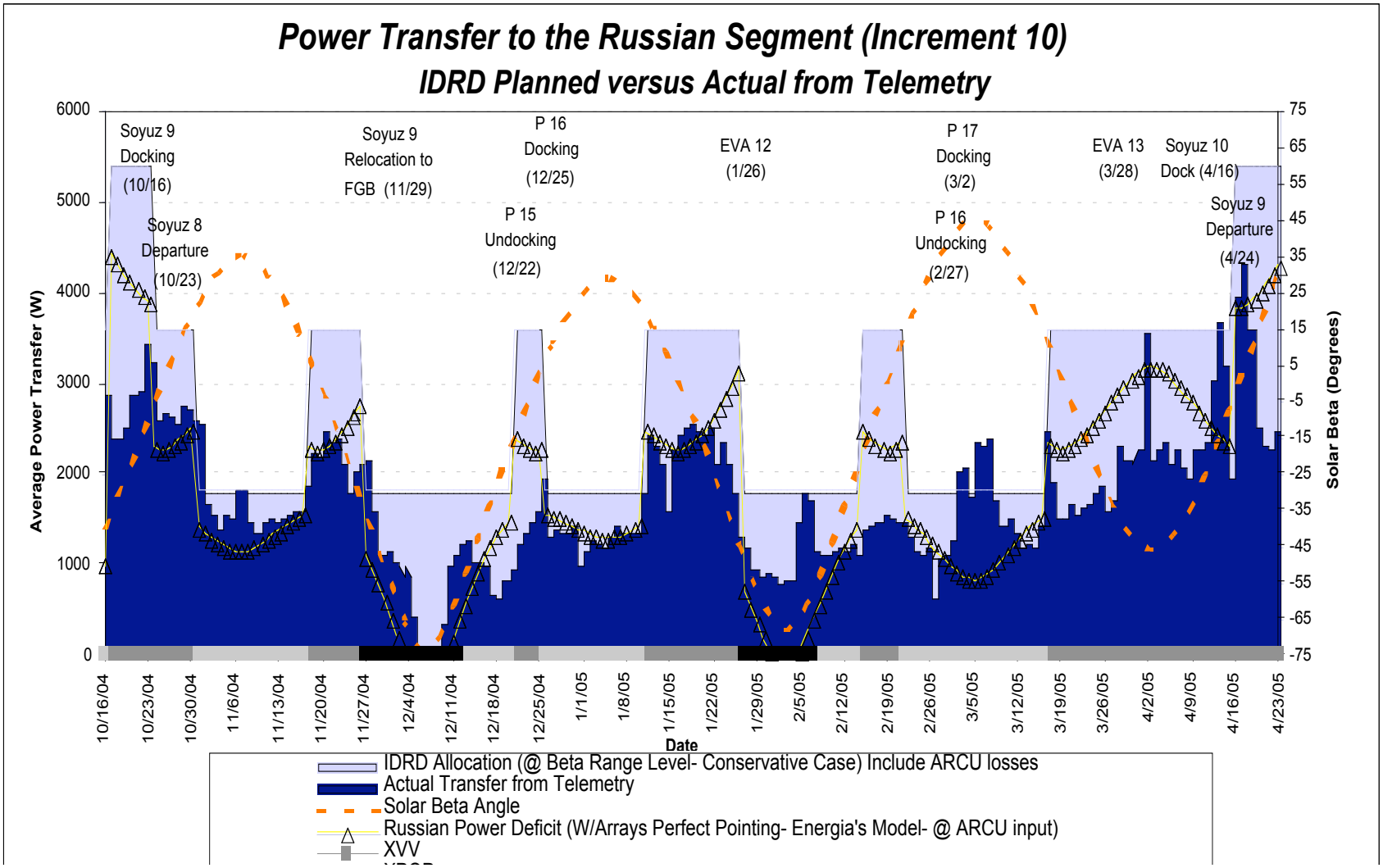

FIGURE 4.1-1 ELECTRICAL POWER TRANSFERRED

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TABLE 4.1-1 AVERAGE POWER TRANSFER

		IDRD Allocation [1]		Actual [2]	
Flight/Stage	**Operation**	**USOS to FGB Transfer (kW)**	**USOS to RS Transfer (kW)**	**USOS to FGB Transfer (kW)**	**USOS to RS Transfer (kW)**
R Sz 9S [3]	Soyuz Rotation	0	5.4/3.6	0	3.3/2.7
S 9S [4]	Research/Standard	0	3.6/1.8/1.8	0	2.6/1.6/0.6
S 16P [5]	Research/Standard	0	3.6/1.8/1.8	0	2.2/1.4/1.0
S 17P [6]	Research/Standard	0	3.6/1.8	0	1.7/1.7

NOTES:

[1] Insolation/Eclipse average from IDRD allocations computed during periods below.

[2] Actual data collected during periods below (from October 2004 to April 2005).

[3] XVV Low Beta 10/23 to 10/23
XPOP Mid Beta 10/17 to 10/22

[4] XVV Low Beta 10/24 to 10/27
XPOP Mid Beta 10/31 to 11/17
YVV High Beta 12/02 to 12/12

[5] XVV Low Beta 01/13 to 01/18
XPOP Mid Beta 12/26 to 01/10
YVV High Beta 01/30 to 02/06

[6] XVV Low Beta 03/17 to 03/21
XPOP Mid Beta 03/02 to 03/16

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4.2 STOWAGE

Table 4.2-1, U.S. Hardware Stowed in RS During Increment 10, provides the U.S. hardware either deployed for operations or stowed in the Russian Segment (RS) (Service Module or Docking Compartment 1).

TABLE 4.2-1 U.S. HARDWARE STOWED IN RS DURING INCREMENT 10

Type	TOTAL						FGB				Russian Seg.			
	m^3	____	Stowed		Installed		Stowed		Installed		Stowed		Installed	
			m^3	____	m^3	____	m^3	____	m^3	____	m^3	____	m^3	____
***1 TOTAL**	**0.278 / 1.164**	**5.267 / 21.987**	**0.170**	**3.227**	**0.108 / .994**	**2.04 / 18.76**	**0.000**	**0.000**	**0.000**	**0.000**	**0.170**	**3.227**	**0.108 / .994**	**2.04 / 18.76**
CHeCS	0.057	1.079	0.057	1.079							0.057	1.079		
Crew Clothing/Crew Provisions	0.027	0.513	0.027	0.513							0.027	0.513		
Hygiene/Personal and Sanitary	0.037	0.695	0.037	0.695							0.037	0.695		
ECLSS	0.006	0.120	0.006	0.120							0.006	0.120		
Water	0.002	0.032	0.002	0.032							0.002	0.032		
Laptops (stowed hardware)	0.002	0.033	0.002	0.033							0.002	0.033		
*Laptops (deployed + space)	0.108 / .746	2.04 / 14.07	0.000	0.000	0.108 / .746	2.04 / 14.07							0.108 / .746	2.04 / 14.07
L&M/Spares/IVA Tools	0.013	0.251	0.013	0.251							0.013	0.251		
ODF	0.009	0.170	0.009	0.170							0.009	0.170		
EVA	0.000	0.002	0.000	0.002							0.000	0.002		
Stowage Restraints and Mobility Aids	0.017	0.329	0.017	0.329							0.017	0.329		
Photo TV	0.000	0.003	0.000	0.003							0.000	0.003		

NOTE:

*1 There are 3 U.S. laptop computers in the SM (1 in the Russian crewmember's quarters and 2 at the center command post). NASA does not acknowledge the computer in crew quarters, since this is not stowage volume (2 Laptops = 2.04 CTBE). NASA also does not acknowledge the work area volume occupied by a potential crew member positioned in front of a computer as usable stowage volume. The Russians acknowledge the volume for each computer as being 1.02 CTBE per deployed computer and 3.67 CTBE per computer work zone in front of each deployed computer. (3 Laptops = 3.06 CTBE, 3 Laptop work zones = 11.01 CTBE; for a total of 14.07 CTBE).

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Table 4.2-2, Russian Non-LSS Hardware Stowed in USOS During Increment 10, provides the non-Life Support System (LSS) Russian hardware either deployed for operations or stowed in the U.S. segment (Node, United States Laboratory (U.S. Lab), Joint Airlock and Functional Cargo Block (FGB)):

TABLE 4.2-2 RUSSIAN NON-LSS HARDWARE STOWED IN USOS DURING INCREMENT 10

Type	TOTAL						FGB				US Seg.			
	m^3	____	Stowed		Installed		Stowed		Installed		Stowed		Installed	
			m^3	____	m^3	____	m^3	____	m^3	____	m^3	____	m^3	____
***[2] TOTAL**	**4.597**	**84.569**	**4.597**	**84.569**	**0.000**	**0.000**	**3.451**	**65.111**	**0.000**	**0.000**	**1.146**	**19.458**	**0.000**	**0.000**
Ancillary (Cables)	0.047	0.886	0.047	0.886			0.000				0.047	0.886		
EVA (___)	1.021	19.267	1.021	19.267			0.486	9.164			0.535	10.103		
IVA Tools (_____)	0.281	5.309	0.281	5.309			0.074	1.394			0.207	3.915		
Laptops (____)	0.122	2.317	0.122	2.317			0.105	1.987			0.017	0.330		
On-Board Complex Control (____)	0.125	2.355	0.125	2.355			0.000				0.125	2.355		
On-Board Measurement (___ ____2-12)	0.055	1.030	0.055	1.030			0.000				0.055	1.030		
Payloads (___)	1.159	21.861	1.159	21.861			1.150	21.689			0.009	0.172		
Photo TV	0.113	2.135	0.113	2.135			0.099	1.871			0.014	0.264		
Power Supply System (not FGB)	0.349	6.590	0.349	6.590			0.349	6.590			0.000			
Stowage Restraints and Mobility Aids	0.064	1.215	0.064	1.215			0.064	1.215			0.000			
Miscellaneous	0.122	2.293	0.122	2.293			0.122	2.293			0.000			
Structure	0.102	1.938	0.102	1.938			0.081	1.535			0.021	0.403		
Thermal Control (_____)	1.037	17.373	1.037	17.373			0.921	17.373			0.116			

NOTE:

*[2] In addition to items listed in the above table, 33 CTBE of KURS (11 Kurs and associated hardware) were stowed in the USOS awaiting return on shuttle. Protocol Between NASA and the Federal Space Agency on Accounting of On-Orbit Items, June 2004.

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Table 4.2-3, Russian LSS Hardware Stowed in USOS During Increment 10, provides the Life Support System (LSS) Russian hardware either deployed for operations or stowed in the U.S. segment (Node, United States Laboratory (U.S. Lab), Joint Airlock, and Functional Cargo Block (FGB)):

TABLE 4.2-3 RUSSIAN LSS HARDWARE STOWED IN USOS DURING INCREMENT 10

Type	TOTAL						FGB				US Seg.			
	m^3	____	Stowed		Installed		Stowed		Installed		Stowed		Installed	
			m^3	____	m^3	____	m^3	____	m^3	____	m^3	____	m^3	____
TOTAL	**9.154**	**172.730**	**9.154**	**172.73**	**0.000**	**0.000**	**6.276**	**118.427**	**0.000**	**0.000**	**2.878**	**54.313**	**0.000**	**0.000**
Atmosphere Revitalization System (____)	1.238	23.360	1.238	23.36	0.000		0.719	13.572	0.000		0.519	9.788	0.000	
Crew Provisions/Crew Support (___)	1.768	33.350	1.768	33.35	0.000		1.700	32.069	0.000		0.068	1.279	0.000	
Fire Protection (____)	0.596	11.240	0.596	11.24	0.000		0.596	11.240	0.000		0.000		0.000	
Food Ration Container (___)	1.194	22.540	1.194	22.54	0.000		0.453	8.553	0.000		0.741	13.990	0.000	
Hygiene	0.060	1.130	0.060	1.13	0.000		0.060	1.134	0.000		0.000		0.000	
Life Support (____)	0.000	0.000	0.000	0.00	0.000		0.000		0.000		0.000		0.000	
Medical Support Countermeasures/Monitoring (_____)	0.259	4.900	0.259	4.90	0.000		0.251	4.737	0.000		0.008	0.160	0.000	
Sanitary Hygiene / Toilet (____ ___)	0.722	13.620	0.722	13.62	0.000		0.722	13.622	0.000		0.000		0.000	
Towel Napkin (____ ___)	1.092	20.600	1.092	20.60	0.000		1.092	20.602	0.000		0.000		0.000	
Housekeeping	0.019	0.360	0.019	0.36	0.000		0.019	0.363	0.000		0.000		0.000	
LSS FGB	0.039	0.740	0.039	0.74	0.000		0.039	0.744	0.000				0.000	
Waste Equipment (____)	1.192	22.490	1.192	22.49	0.000		0.369	6.958	0.000		0.823	15.530	0.000	
Water Processor/Water Supply System (___)	0.975	18.400	0.975	18.40	0.000		0.256	4.833	0.000		0.719	13.566	0.000	

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Table 4.2-4, Russian LSS Hardware Stowed in RS During Increment 10, provides the Russian Life Support System (LSS) hardware either deployed for operations or stowed in the Russian Segment (Service Module or Docking Compartment 1):

TABLE 4.2-4 RUSSIAN LSS HARDWARE STOWED IN RS DURING INCREMENT 10

Type	TOTAL						SM				DC-1			
	m^3	____	Stowed		Installed		Stowed		Installed		Stowed		Installed	
			m^3	____	m^3	____	m^3	____	m^3	____	m^3	____	m^3	____
TOTAL	**2.540**	**47.911**	**2.540**	**47.911**	**0.000**	**0.000**	**2.479**	**46.747**	**0.000**	**0.000**	**0.061**	**1.164**	**0.000**	**0.000**
Crew Provisions/Crew Support (___)	0.103	1.937	0.103	1.937	0.000		0.103	1.937	0.000		0.000		0.000	
Sanitary Hygiene (____)	0.268	5.061	0.268	5.061	0.000		0.268	5.061	0.000		0.000		0.000	
Water Processor/Water Supply System (___)	0.726	13.692	0.726	13.692	0.000		0.726	13.692	0.000		0.000		0.000	
Hygiene Toilet (___)	0.132	2.494	0.132	2.494	0.000		0.132	2.494	0.000		0.000		0.000	
Food System (___)	0.306	5.770	0.306	5.770	0.000		0.306	5.770	0.000		0.000		0.000	
Medical (_____)	0.204	3.853	0.204	3.853	0.000		0.171	3.223	0.000		0.033	0.630	0.000	
Waste Equipment (____)	0.179	3.375	0.179	3.375	0.000		0.151	2.841	0.000		0.028	0.534	0.000	
Atmosphere Revitalization System (____)	0.394	7.426	0.394	7.426	0.000		0.394	7.426	0.000		0.000		0.000	
Housekeeping	0.228	4.303	0.228	4.303	0.000		0.228	4.303	0.000		0.000		0.000	

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Table 4.2-5, US LSS Hardware Stowed in USOS During Increment 10, provides the US Life Support System (LSS) hardware either deployed for operations or stowed in the U.S. segment (Node, United States Laboratory (U.S. Lab), Joint Airlock, and Functional Cargo Block (FGB)):

TABLE 4.2-5 US LSS HARDWARE STOWED IN USOS DURING INCREMENT 10

Type	TOTAL						FGB				US Seg.			
	m^3	____	Stowed		Installed		Stowed		Installed		Stowed		Installed	
			m^3	____	m^3	____	m^3	____	m^3	____	m^3	____	m^3	____
TOTAL	**6.321**	**119.230**	**6.321**	**119.230**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**6.321**	**119.230**	**0.000**	**0.000**
Food	0.413	7.800	0.413	7.800	0.000	0.000	0.000		0.000		0.413	7.800		
Crew Provisions/Crew Preference	1.352	25.500	1.352	25.500	0.000	0.000	0.000		0.000		1.352	25.500		
Office/Printer Supply	0.170	3.200	0.170	3.200	0.000	0.000	0.000		0.000		0.170	3.200		
Hygiene/Housekeeping	0.198	3.730	0.198	3.730	0.000	0.000	0.000		0.000		0.198	3.730		
Towel/Napkin	0.318	6.000	0.318	6.000	0.000	0.000	0.000		0.000		0.318	6.000		
Battery Pantry	0.027	0.500	0.027	0.500	0.000	0.000	0.000		0.000		0.027	0.500		
CHeCS	1.431	27.000	1.431	27.000	0.000	0.000	0.000		0.000		1.431	27.000		
Waste Equipment	0.795	15.000	0.795	15.000	0.000	0.000	0.000		0.000		0.795	15.000		
ECLSS	1.060	20.000	1.060	20.000	0.000	0.000	0.000		0.000		1.060	20.000		
Water Transfer	0.557	10.500	0.557	10.500	0.000	0.000	0.000		0.000		0.557	10.500		

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Table 4.2-6, FGB Specific Hardware Stowed in USOS During Increment 10, provides the FGB-specific hardware either deployed for operations or stowed in the U.S. Segment (Node, United States Laboratory (U.S. Lab), Joint Airlock, and Functional Cargo Block (FGB)):

TABLE 4.2-6 FGB SPECIFIC HARDWARE STOWED IN USOS DURING INCREMENT 10

Type	TOTAL						FGB				US Seg.			
	m^3	____	Stowed		Installed		Stowed		Installed		Stowed		Installed	
			m^3	____	m^3	____	m^3	____	m^3	____	m^3	____	m^3	____
***[3] TOTAL**	**0.516**	**9.740**	**0.516**	**9.740**	**0.000**	**0.000**	**0.463**	**8.740**	**0.000**	**0.000**	**0.053**	**1.000**	**0.000**	**0.000**
FGB Power Supply System	0.463	8.740	0.463	8.740			0.463	8.74						
M34-30 Gyroscopic angular velocity measuring device (GIVUS)	0.053	1.000	0.053	1.000							0.053	1.000		

*[3] NOTE: Table 4.2-6 is for information only and is not considered a Russian obligation.

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4.3 CARGO, WATER AND PROPELLANT TRANSFER

Table 4.3-1, Mass NASA Vehicles Delivered to ISS, is the summary of the items NASA vehicles have provided to the ISS each flight in this increment, including delivery of Russian cargo, delivery of water to ISS, and providing additional altitude via Shuttle reboost. No NASA vehicles delivered cargo to ISS during Increment 10.

TABLE 4.3-1 MASS NASA VEHICLES DELIVERED TO ISS

(All weights in kilograms)

Flight - Element/Cargo	US			Russian								
	Assembly Element	Cargo	Payloads	Assembly Element	Cargo				Payloads	Water (liters)	Propellant (kg)	Gases (kg)
					FGB		Other					
					Chargeable	Non-Chargeable	Chargeable	Non-Chargeable				
Increment 10 Total Mass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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Table 4.3-2, Mass NASA Vehicles Returned from ISS, is the summary of the items NASA vehicles have returned to the ground from the ISS for each flight in this Increment, including return of Russian cargo, payloads, and disposal of trash. No NASA vehicles returned cargo from ISS during Increment 10.

TABLE 4.3-2 MASS NASA VEHICLES RETURNED FROM ISS

(All weights in kilograms)

Flight - Element/Cargo	US					RUSSIAN									
	Assembly Element	Cargo	Payloads	Disposed		Assembly Element	Cargo				Payloads	Disposed		FGB Disposed	Total Disposed
				Non-common	Common		FGB		OTHER			Non-common	Common		
							Chargeable	Non-chargeable	Chargeable	Non-chargeable					
Increment 10 Total Mass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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Table 4.3-3, Mass Roscosmos Vehicles Delivered to ISS, is the summary of the items Roscosmos vehicles have provided to the ISS each flight in this Increment, including delivery of NASA cargo, payloads, water, propellant and gases to ISS.

TABLE 4.3-3 MASS ROSCOSMOS VEHICLES DELIVERED TO ISS

(All weights in kilograms)#

Flight - Element/Cargo	US				Russian						
	Assembly Element	Cargo		Payloads	Assembly Element	Cargo		Payloads	Water (liters)	Propellant (kg) [1]	Gases
		Chargeable	Non-Chargeable			FGB	Other				
9S	0.0	14.1	0.0	0.0	0.0	0.0	100.7	14.2	22.0	0.0	0.0
16P	0.0	67.0	0.0	8.3	0.0	22.3	1129.0	81.9	464.0	735.0	49.0
17P [2][3]	0.0	332.0	0.0	8.6	0.0	23.5	833.8	84.3	486.0	558.0	109.0
Increment 10 Total Mass	**0.0**	**413.1**	**0.0**	**16.9**	**0.0**	**45.8**	**2063.4**	**180.4**	**972.0**	**1293.0**	**158.0**

NOTES:

[1] Does not include Progress residuals.

[2] Obligations towards the original Balance of Contributions agreement and the 1.7 MT “Addendum to the 1996 Balance of Contributions Protocol for services to be provided through December 2005 and crew rescue through April 2006.” will be worked in the Balance of Contributions discussions and protocol.

[3] Final changes to 17P Total Russian Payloads Mass to be incorporated in Post-Flight CR.

Differences between data in this table and actual manifest data are due to arithmetic round off error.

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Table 4.3-4, Mass Roscosmos Vehicles Returned from ISS, is the summary of the items Roscosmos vehicles have returned to the ground or disposed of from the ISS for each flight in this Increment, including return of NASA cargo, payloads, and disposal of trash.

TABLE 4.3-4 MASS ROSCOSMOS VEHICLES RETURNED FROM ISS

(All weights in kilograms)*

Flight - Element/ Cargo	US						RUSSIAN							
	Assembly Element	Cargo		Payloads	Disposed		Assembly Element	Cargo		Payloads	Disposed		FGB Disposed	Total Disposed
		Chargeable	Non-chargeable		Non-common	Common		FGB	OTHER		Non-common	Common		
8S	0.0	3.6	0.0	0.0	27.1	33.5	0.0	0.3	13.4	38.4	69.7	33.5	0.0	163.8
15P	0.0	0.0	0.0	0.0	0.0	439.7	0.0	0.0	0.0	0.0	444.7	439.7	15.0[1]	1339.1
16P	0.0	0.0	0.0	0.0	185.1	396.6	0.0	0.0	0.0	0.0	516.3	396.6	5.8[1]	1500.5
Increment 10 Total Mass	**0.0**	**3.6**	**0.0**	**0.0**	**212.3**	**869.9**	**0.0**	**0.3**	**13.4**	**38.4**	**1030.7**	**869.9**	**20.8**	**3003.4**

NOTES:

[1] Responsibility for FGB hardware return and disposal will be worked in the Balance of Contributions discussion and protocol.

* Differences between data in this table and actual manifest data are due to arithmetic round off error.

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4.4 CREW TIME

Table 4.4-1, Crew Time, is the summary of the pre-Increment planned and actual Increment crew time spent on various mission categories.

The actual Increment duration was 192 days. Actual increment duration is based on the docking and undocking of Flight 9 Soyuz.

TABLE 4.4-1 CREW TIME (PAGE 1 OF 2)

Category	Planned Increment 10 Crew Hours (191 days)	Actual Increment 10 Scheduled Crew Hours (192 days)	Actual Increment 10 Task List Crew Hours (192 days)	Total Completed Increment 10 Crew Hours (192 days)
1.0 Traffic Operations	331	396.3	1.2	397.5
1.1 Shuttle	70	65.3	0	65.3
1.1.1 Preparation for Shuttle Arrival	25	25.1	0	25.1
1.1.2 Shuttle Pre-Pack	45	40.2	0	40.2
1.1.3 Shuttle Docking	0	0	0	0
1.1.4 Shuttle Undocking	0	0	0	0
1.1.5 Final Stow after Shuttle Departure	0	0	0	0
1.2 Soyuz	83	130.0	0	130.0
1.2.1 Soyuz Docking	12	19.2	0	19.2
1.2.2 Soyuz Crew Overhead	0	9.4	0	9.4
1.2.3 Soyuz Undocking	12	34.5	0	34.5
1.2.4 Soyuz Redocking	39	49.2	0	49.2
1.2.5 Crew Rotation – new crew familiarization	20	17.7	0	17.7
1.3 Progress	178	201.0	1.2	202.2
1.3.1 Progress Offloading	68	82.9	0	82.9
1.3.2 Progress Loading	48	61.9	0	61.9
1.3.3 Progress Docking	34	35.3	0	35.3
1.3.4 Progress Undocking	28	20.9	0	20.9
2.0 Medical Operations	211	146.8	1.3	148.1
3.0 Onboard Training	68	67.6	0	67.6
4.0 Routine Operations	94	157.0	17.8	174.8
4.1 Public Relations	30	61.2	0	61.2
4.2 SSC Upgrade (SSC Refresh)	4	1.5	0	1.5
4.3 IMS Activities	40	29.7	8.0	37.7
4.4 Crew Tag Ups	0	1.5	0	1.5
4.5 USOS Routine Operations	10	46.3	7.5	53.8
4.6 RSOS Routine Operations	10	16.8	2.3	19.1
5.0 Maintenance	432	466.8	22.3	489.1
5.1 USOS Maintenance	150	164.0	17.5	181.5
5.1.1 Preventative	100	69.2	0	69.2
5.1.2 Corrective	50	82.2	6.3	88.5
5.1.3 Contingency		3.2	5.2	8.4
5.1.4 Software Troubleshooting		9.4	6.0	15.4
5.2 RS Maintenance	282	302.8	4.8	307.6

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TABLE 4.4-1 CREW TIME (PAGE 2 OF 2)

Category	Planned Increment 10 Crew Hours (191 days)	Actual Increment 10 Scheduled Crew Hours (192 days)	Actual Increment 10 Task List Crew Hours (192 days)	Total Completed Increment 10 Crew Hours (192 days)
6.0 Assembly	86	92.7	4.7	97.4
6.1 USOS Assembly	6	21.6	0	21.6
6.2 RS Assembly	80	71.1	4.7	75.8
7.0 EVA				
7.1 EMU EVA	0	0	0	0
7.2 Orlan EVA	216	242.42	0	242.42
8.0 Utilization				
8.1 USOS Utilization	91	89.4	42.2	131.6
8.2 RS Utilization	91	102.9	42.0	144.9
9.0 Exercise	--	834.43	0	834.43[1]

NOTES:

Crew time based upon crew activities during the 8S/9S and 9S/10S Joint Missions and 9S, 16P, and 17P Stages.

Roscosmos and NASA agree on the Utilization crewtimes in this table. Roscosmos and NASA may have different crewtimes for non-utilization categories because of a lack of joint agreement between MCC-H and MCC-M for tracking and recording crewtime.

[1] This time includes 30.1 hours of RS Utilization activities that were completed by the crew concurrently with exercise.

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5.0 UTILIZATION

The Expedition 10 Payload Program continued the use of the International Space Station as a platform for collaborative research for international partners, by continuing experiments which had begun on previous increments, providing new subjects for ongoing human research, and initiating new investigations whose hardware had been either prepositioned or delivered during the increment. Expedition 10 concluded with a high level of valuable science return.

All of the high priority utilization objectives were met during the increment. In order to satisfy the high priority needs of the utilization community and complete tasks required to maintain vehicle functionality and crew health and safety, the Increment Management Team along with the Payload Operations Integration Center (POIC), ISS Mission Evaluation Room (MER), and the Operations Teams at Mission Control Center - Houston (MCC-H) and Mission Control Center - Moscow (MCC-M) worked closely to define the relative priority of daily activities for the on-orbit crew. This teamwork provided the necessary means to ensure the continuing success of the ISS and its science programs. Details of the International Partner Utilization programs are contained in the following tables:

The percent completion status of the NASA and Russian experiments performed during Increment 10 are contained in the tables in this section. Descriptions of the NASA supported experiments are contained in Increment Definition and Requirements Document for Increment 10, Annex 5: Payload Tactical Plan (SSP 54010-ANX5).

The specific tables and a description of their content are listed below:

Table 5.0-1, NASA ISS Utilization Complement, provides information on payloads activities supported by NASA, and

Table 5.0-2, Roscosmos ISS Utilization Complement, provides information on payloads activities supported by Roscosmos.

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Table 5.0-1, NASA ISS Utilization Complement, depicts the USOS on-orbit utilization conducted during Increment 10. For Utilization description, see SSP 54010 IDRD for Increment 10, Annex 5.

TABLE 5.0-1 NASA ISS UTILIZATION COMPLEMENT (PAGE 1 OF 3)

Facility or Payload Name (Acronym)	Location	Delivery Flight	Return Flight	Percentage of Operational Objectives Accomplished	Notes
Facility - HRF-1	LAB1S2	5A.1	Remains on-orbit	100	Intermittent operations to support experiments and conduct periodic subsystem checkouts- 6 GASMAP, 1 Advanced Diagnostic Ultrasound in Microgravity (ADUM).
Facility - ER1	LAB1O2	6A	Remains on-orbit	100	Intermittent operations to support MAMS and SAMS, SNFM, and CBOSS-FDI, as well as other payload hardware
Facility - ER2 with ARIS	LAB1O1	6A	Remains on-orbit	100	Intermittent operations to support SNFM data capture activities.
Facility - ER3	LAB1O3	UF-2	Remains on-orbit	100	The rack was used for stowage of a number of payload hardware items and to support the ARIS Hyperextension Tests.
Facility - ER4	LAB1P2	7A.1	Remains on-orbit	100	Continued support of continuously powered payloads. Currently holds BSTC1, GSM1, PCG-STES10, CGBA2, ARCTIC1, ADVASC-SS2, SAMS-II-ICU hardware as well as the KU Receiver.
Facility - ER5	LAB1S4	7A.1	Remains on-orbit	Inactive	Used for stowage of a number of payload hardware items.
Facility - MSG	LAB1S3	UF-2	Remains on-orbit	Inactive	The yearly re-certification of pressure sensors was performed during the 10S joint mission. Completion of the objectives will be recorded in PIER 11.
Facility – ARIS-POP	LAB101		Remains on-orbit	100	Unique operations were not planned for this increment, however, the hardware was used in conjunction with the SNFM payload activities.
Facility – ARCTIC	LAB1P2		Remains on-orbit	Inactive	Hardware failed during Increment and is awaiting return on the Shuttle.
Physical Sciences					
BCAT-3	MWA	13P	Remains on-orbit	100	Six photo sessions were performed during the increment.
CBOSS-FDI	Deployed in Lab when necessary	7A.1	Remains on-orbit	100	No activities were planned, this was a reserve payload for this increment. However, bubble removal operation and a Principle Investigator conference were conducted when the CDR asked to perform the experiment during his weekend off duty time.
GAP-Yeast	MWA	13P	Remains on-orbit	N/A	No activities planned. Investigation completed during Increment 9. Awaiting return on Shuttle.
ISSI	MWA	N/A	Remains on-orbit	100	No activities were planned, however, the in-flight ISS operations for this no-up mass investigation were completed when crewtime became available during Stage 9S.

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TABLE 5.0-1 NASA ISS UTILIZATION COMPLEMENT (PAGE 2 OF 3)

Facility or Payload Name (Acronym)	Location	Delivery Flight	Return Flight	Percentage of Operational Objectives Accomplished	Notes
MFMG	MWA	N/A	Remains on-orbit	200	No activities planned, however, two sessions were accomplished when the CDR asked to perform the experiment during his weekend off duty time
PCG-STES	EXPRESS #4	STES #7 9A STES #10 11A	STES #7 11A STES #10 Remains on-orbit	100	Lack of opportunity to return samples from Increment 6 may result in loss of science. Continuous power requirements were met and crew status checks were accommodated throughout Increment 10.
MAMS	EXPRESS #1	6A	Remains on-orbit	100	Low and high frequency acceleration measurements of the ISS structure were captured during nominal events of visiting vehicle dockings and separations, station reboosts, and crew inducted exercise loads.
SAMS II	EXPRESS #1 EXPRESS #2	6A	Remains on-orbit	100	The vibration acceleration (transient) environment within the ISS during visiting vehicle dockings and separations, EVA activities, reboosts, and quiescent periods were measured.
Bioastronautics					
ADUM	HRF-1	8S	Remains on-orbit	95	10 and _ scan activities were completed of the 11 planned pre-increment. The _ scan activity was accomplished during the 10S joint mission.
Journals	HRF ELC	7S	Remains on-orbit	100	This written journal-based study used to obtain behavioral and human factors data was completed through multiple comment entries on a laptop computer during each week of the increment.
MOBILITY	N/A	N/A	N/A	100	Pre- and Post-Baseline Data Collection only.
CHROMOSOME	N/A	N/A	N/A	100	Pre- and Post-Baseline Data Collection only.
BIOPSY	N/A	N/A	N/A	100	Primarily pre- and post-increment only. Diet logs were collected in-flight at certain time periods.
FOOT	HRF-1 U.S. Lab	UF2	Remains on-orbit	N/A	Foot was planned for the Increment but subsequently removed when the investigation hardware was not included on the 15 Progress or 9 Soyuz manifest.
Space Operations					
CEO	Deployed	Resupply every flight	Resupply every flight	100	Handheld photography of weekly uplinked selected ground sites were completed over the entire increment.
EarthKAM	LAB1D3	5A.1	Remains on-orbit	100	Two sessions performed as planned.
EPO		UF-2	Remains on-orbit	100	Lessons recorded included: Laboratory Tour Demo and Living Area Demo.

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TABLE 5.0-1 NASA ISS UTILIZATION COMPLEMENT (PAGE 3 OF 3)

Facility or Payload Name (Acronym)	Location	Delivery Flight	Return Flight	Percentage of Operational Objectives Accomplished	Notes
MISSE	Externally attached to Joint Airlock endcone and HPGT	7A.1 (EVA)	Remains on-orbit	100	The MISSE Passive Experiment Containers #1 and #2 continued to collect data through the exposure of the 1500 coupon samples of paints, metals, and biological samples to the external space environment.
Space Operations					
SEM	Deployed in Lab near forward endcone	16P	Remains on-orbit	100	The SEM satchel containing 20 small vials of material beta cloth, plant seeds, dosimeters, and clothing material was photographed on a number of occasions while it was deployed in the U.S. Laboratory. A video was also completed by the crew providing a general introduction to SEM's history and objectives, and a brief description of its experiments for students K-12.
SNFM	Installed as needed	13P	Remains on-orbit	100	SNFM activities involving EXPRESS rack Local Area Network data traffic was successfully performed

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Table 5.0-2, Roscosmos ISS Increment 10 Utilization Complement, depicts RS On-Orbit utilization conducted during Increment 10.

TABLE 5.0-2 ROSCOSMOS ISS INCREMENT 10 UTILIZATION COMPLEMENT (PAGE 1 OF 6)

Category	Experiment Code	Experiment Name	Hardware Description	Research Objective	Unique Payload Constraints
Commercial	KHT-1	GTS	Electronics unit Antenna assembly with attachment mechanism	Global time system test development	Unattended
Commercial	KHT-2	MPAC/SEED	Equipment for catching micro particles and for exposing MPAC/SEED materials Special returnable cassette Transfer rack with interface	Study of meteoroid and man-made environment and of the outer space factor effects on exposed materials	During EVA activity
Commercial	KHT-20	GCF-JAXA	Crystallization Unit GCF-02, GCF-02V Thermostat TBU	Protein crystallization	
Commercial	KHT-29	Rokviss	ROBOTIK arm monoblock, Onboard controller, Transceiver with antenna on mechanical adapter	Development test for joint elements	During EVA activity
Commercial	NEU-3	Neurocog-3	Kogni kit Gallei kit Neurocog kit Control unit for EGE2 experiments	Study of the cerebral potential generated when concentrating in a virtual 3-dimensional environment in weightlessness	Joint activity with ESA
Commercial	CAR-3	Cardocog-3	Cardionauka kit Control unit for EGE2 experiments DSR PD-1P Sony videocamera Sphygmomanometer Tensoplus (for measuring blood pressure)	Study of the particular reactions of the cardiovascular system to long-term space flight	Joint activity with ESA
Commercial	ETD-2	ETD	ETD hardware	The influence of long-term micro-gravity on the orientation of Listing's plane and the coordination of head and eye movements.	Joint activity with ESA
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TABLE 5.0-2 ROSCOSMOS ISS INCREMENT 10 UTILIZATION COMPLEMENT (PAGE 2 OF 6)

Category	Experiment Code	Experiment Name	Hardware Description	Research Objective	Unique Payload Constraints
Geophysical	___-1	Relaksatsiya	"Fialka-MV-Kosmos" spectrozonal ultraviolet system	Study of chemiluminescent chemical reactions and atmospheric light phenomena that occur during high-velocity interaction between the exhaust products from spacecraft propulsion systems and the Earth atmosphere at orbital altitudes and during the entry of space vehicles into the Earth upper atmosphere	Using OCA
Geophysical	___-8	Uragan	Nominal hardware: Kodak 760 camera; Nikon D1 LIV video system	Experimental verification of the ground and space-based system for predicting natural and man-made disasters, mitigating the damage caused, and facilitating recovery	Using OCA
Geophysical	___-10	Molniya-SM	_ardware LSO	Study of the electrodynamic interaction between the Earth atmosphere, ionosphere, and magnetosphere associated with thunderstorm or seismic activity using a video photometric system	
Biomedical	___-1	Sprut-MBI	Sprut-K kit Nominal Hardware: Tsentr power supply; Central Post Laptop	Study of human bodily fluids during long-duration space flight	This experiment was performed by ISS-10 flight engineer during ISS-10, and by visiting crew 7 flight engineer during ISS-9, ISS-10 crew rotation
Biomedical	___-2	Diurez	Urine receptacle kit; KB-03 container; Nominal Hardware: Kriogen-03 freezer; Plazma-03 kit; Hematocrit kit	Study of fluid-electrolyte metabolism and hormonal regulation of blood volume in microgravity	During ISS-10, ISS-11 crew rotation
Biomedical	___-4	Farma	Saliva-F kit	Study of specific pharmacological effects under long-duration space flight conditions	Subject is not to take any pharmacological substances 3 days prior to the experiment. The experiment is conducted 10 days prior to landing.
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TABLE 5.0-2 ROSCOSMOS ISS INCREMENT 10 UTILIZATION COMPLEMENT (PAGE 3 OF 6)

Category	Experiment Code	Experiment Name	Hardware Description	Research Objective	Unique Payload Constraints
Biomedical	___-5	Kardio-ODNT	Standard Hardware: PLASMA-03 KIT Chibis countermeasure vacuum set (___)	Comprehensive study of the cardiac activity and blood circulation primary parameter dynamics with exposure to LBNP in microgravity	
Biomedical	___-7	Biotest	Nominal Hardware: Gamma-1M equipment; Hematocrit kit	Biochemical mechanisms of metabolic adaptation to space flight environment	During ISS-9, ISS-10 crew rotation During ISS-10, ISS-11 crew rotation
Biomedical	___-8	Profilaktika	TEEM-100M gas analyzer; Accusport device; Nominal Hardware: Reflotron-4 kit; TVIS treadmill; __-3 cycle ergometer; Force Loader Computer; Tsentr equipment power supply	Study of the action mechanism and efficacy of various countermeasures aimed at preventing locomotor system disorders in weightlessness	Time required for the experiment should be counted toward physical exercise time
Biomedical	___-9	Pulse	Pulse set, Pulse kit; Nominal Hardware: Computer	Study of the autonomic regulation of the human cardiorespiratory system in weightlessness	The experiment was done by ISS-10 FE-1 during Inc 10 and by FE-1 of VC-7 during the ISS-9/ISS-10 crew rotation
Biomedical	___-11	Gematologia	Erythrocyte kit Zashchita-MBI (Biomed Protection) kit Plazma-03 consumables __-03 container Nominal hardware: Kriogen-03 freezer Plazma-03 kit Hematocrit kit Reflotron-4 kit	Obtaining new data about the outer space factor effects on human blood system in order to extend its diagnostic and prognostic capabilities, studying the mechanism of appearance of changes in hematological values (space anemia, lymphocytosis)	During ISS-10, ISS-11 crew rotation
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TABLE 5.0-2 ROSCOSMOS ISS INCREMENT 10 UTILIZATION COMPLEMENT (PAGE 4 OF 6)

Category	Experiment Code	Experiment Name	Hardware Description	Research Objective	Unique Payload Constraints
Biomedical	___-15	Pilot	Right Control Handle Left Control Handle Synchronizer Unit (__) Nominal hardware: Laptop No.3	Researching for individual features of state psychophysiological regulation and crewmembers professional activities during long space flights.	
Biomedical	___-2	Biorisk	Biorisk-KM set Biorisk-MSV containers Biorisk-MCN set	Study of space flight impact on microorganisms-substrates systems state related to space technique ecological safety and planetary quarantine problem	During EVA activity
Biomedical	___-5	Rasteniya-2	Lada greenhouse; Nominal Hardware: Sony DVCam; Water container	Study of the space flight effect on the growth and development of higher plants	
Biomedical	___-11	Statoconia	ULITKA incubator container APT kit	Study of growth potency of statoconia in the organ of equilibrium of gastropods under conditions of microgravity	
Biomedical	___-1	Prognoz	Nominal Hardware for the radiation monitoring system: P-16 dosimeter; __-8 dosimeters Pille-ISS Personal Radiation Dosimeter	Development of a method for real-time prediction of dose loads on the crews of manned spacecraft	Unattended
Biomedical	___-2	Bradoz	Bradoz kit Nominal Hardware: PELLE-ISS dosimeter	Bioradiation dosimetry in space flight	
Biomedical	___-3	Matryoshka-R		Study of radiation environment dynamics along the ISS RS flight path and in ISS compartments, and dose accumulation in anthropomorphic phantom, located inside and outside ISS	
	___-3-1 (1 stage)		Passive detectors assembly Phantom set (spherical phantom)		
	___-3-3_ (3 stages) (SDTO 16006A)		Matryoshka equipment (tissue-equivalent phantom)		Joint activity with ESA
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TABLE 5.0-2 ROSCOSMOS ISS INCREMENT 10 UTILIZATION COMPLEMENT (PAGE 5 OF 6)

Category	Experiment Code	Experiment Name	Hardware Description	Research Objective	Unique Payload Constraints
Study of Earth natural resources and ecological monitoring	___-2	Diatomea	Diatomea kit; Nominal hardware: Nikon F5 camera; DSR-PD1P video camera	Study of the stability of the geographic position and form of the World Ocean boundaries; biologically active water areas observed by space station crews	This experiment was performed by ISS-10 flight engineer during ISS-10, and by visiting crew 7 flight engineer during ISS-9, ISS-10 crew rotation
Biotechnology	___-2	Mimetik-K	Luch-2 biocrystallizer Kriogen-03M freezer	Anti-idiotypic antibodies as adjuvant-active glycoproteid mimetic	
Biotechnology	___-4	Vaktsina-K		Structural analysis of proteins-candidates for anti-AIDS vaccine	
Biotechnology	___-20	Interleukin-K		Obtaining of high-quality 1_, 1_ interleukins crystals and interleukin receptor antagonist - 1	
Biotechnology	___-10	Konyugatsiya (Conjugation)	Rekomb-K hardware Biocont-T hardware Kriogem-03M freezer Nominal hardware: - Kriogem-03 freezer	Working through the process of genetic material transmission using bacteria conjugation method	This experiment was performed by visiting crew 7 flight engineer during ISS-9, ISS-10 crew rotation
Biotechnology	___-11	Biodegradatsiya	Bioproby kit	Assessment of the initial stages of biodegradation and biodeterioration of the surfaces of structural materials	
Biotechnology	___-12	Bioekologiya	Bioekologiya kit	Generation of high-efficiency strains of microorganisms to produce petroleum biodegradation compounds, organophosphorus substances, vegetation protection agents, and exopolysaccharides to be used in the petroleum industry	
Technical Studies	___-5 (SDTO 16002-R)	Meteoroid	Nominal micrometeoroid monitoring system: MMK-2 electronics unit; Stationary electrostatic sensors __1, __2, __3, and __4; Removable electrostatic sensor ___	Recording of meteoroid and man-made particles on the ISS RS Service Module exterior surface	Unattended
Technical Studies	___-8	Toksichnost	Biotox-10K testing system	Creating an express monitoring system for water toxicity in space flight	This experiment was performed by ISS-10 flight engineer during ISS-10, and by visiting crew 7 flight engineer during ISS-9, ISS-10 crew rotation
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TABLE 5.0-2 ROSCOSMOS ISS INCREMENT 10 UTILIZATION COMPLEMENT (PAGE 6 OF 6)

Category	Experiment Code	Experiment Name	Hardware Description	Research Objective	Unique Payload Constraints
Technical Studies	___-20	Plazmennyi Kristall	Plazmennyi kristall-3 equipment Telescience flight equipment	Study of the plasma-dust crystals and fluids under microgravity	
Technical Studies	___-22 (SDTO 13001-R)	Identifikatsiya	Nominal Hardware: ISS RS ___ accelerometers	Identification of disturbance sources when the microgravity conditions on the ISS are disrupted	Unattended
Technical Studies	___-25	Skorpion	Skorpion equipment	Development, testing, and verification of a multi-functional instrument to monitor the science experiment conditions inside ISS pressurized compartments	
Technical Studies	___-42	Nanosatellite	Nanosatellite TNS-0 No.1	Preparing and launching a test nanosatellite from the ISS RS	During EVA activity
Complex Analysis. Effectiveness Estimation	___-3	Econ	“Econ” kit Nominal Hardware: Nikon D1 digital camera, Laptop _3	Experimental research on evaluation of ISS RS utilization availabilities for ecological monitoring	This experiment was performed by ISS-10 flight engineer during ISS-10, and by visiting crew 7 flight engineer during ISS-9, ISS-10 crew rotation
Space energy systems	___-1_	Kromka	Tray with materials to be exposed	Study of the dynamics of contamination from liquid-fuel thruster jets during burns, and verification of the efficacy of devices designed to protect the ISS exterior surfaces from contamination	During EVA activity
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6.0 EXTRAVEHICULAR ACTIVITY

This section contains a summary table of the extravehicular activity (EVA) events that occurred during Increment 10. Table 6.0-1, Extravehicular Activity Summary, lists the EVA by number and shows the crew members who performed the EVA, which mission the EVA was performed, the date of the EVA, duration of the EVA, and the EVA's purpose.

During Increment 10 the expedition crew performed 2 Russian Segment EVAs from the Docking Compartment (DC)-1 using the Orlan suits, as well as activities to recover the Joint Airlock Extravehicular Mobility Unit (EMU) cooling loop. The crew also prepared EMU 3005 for return by installing a new water pump, and performed LF1 EVA preparation activities.

TABLE 6.0-1 EXTRAVEHICULAR ACTIVITY SUMMARY

ISS EVA Activity	Crew	Mission	Date	Duration	Description
RS EVA#12	Salizhan Sharipov (EV1) Leroy Chiao (EV2)	Stage 16P	26 Jan 2005	5 hours 28 minutes	During this EVA the crew successfully installed the Universal Work Platform on the SM Large Diameter (including the connection of power and data cables with the SM), installed the ROKVISS payload on the Universal Work Platform, relocated the MPAC/SEEDs on the SM aft end, and installed the ROKVISS antenna on the MPAC/SEEDS truss. The crew also installed the BIORISK experimental payload on the Russian Segment Docking Compartment. During the EVA ISS attitude control was handed over from the U.S. CMG's to Russian thrusters in order to perform a desaturation on three occasions. During the first case where control was handed over to the Russian segment, the crew was observed to be in the thruster keep out zone. A joint U.S and Russian investigation was conducted and the results were recorded in "Joint results of RS EVA 12 Investigation", dated February, 2005, located in the Russian Joint Operations Plan (RJOP) website (http://mod.jsc.nasa.gov/gov/da8/jop/rjop/index.htm). The corrective actions identified in the report were applied to RS EVA #13 during Stage 17P with successful results.
RS EVA#13	Salizhan Sharipov (EV1) Leroy Chiao (EV2)	Stage 17P	28 March 2005	4 hours 30 minutes	All of the planned tasks were successfully completed. These tasks included the installation of ATV proximity antennas (WALs 4-6), jettisoning of the NanoSat, installation of the ATV GPS antenna (ASN), and observation of the ONA high-gain antenna as it transitioned from position 2 to position 1.

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7.0 REQUIREMENTS SUMMARY

This section lists any modifications, with rationale, to the preflight requirements documented in the SSP 54010, Increment Definition and Requirements Document for Increment 10, for Flight 9S, Stage 9S, Stage 16P, and Stage 17P. The SSP 54010 task requirements that were approved pre-flight and completed per the nominal plan are not documented in this section. The SSP 54010 requirements that were not completed or that were modified are documented in this section.

The SSP 54010 is used to define tasks during the mission planning timeframe. After the Stage Operations Readiness Review (SORR), the ISS Management Center (IMC) uses another process, called the Current Stage Requirements Document (CSRD) to manage Stage requirements during realtime operations. If new requirements are identified after the SORR, ISS Mission Evaluation Room (MER) and Mission Control Center (MCC) Flight Controllers submit their CSRD requirements via the MCC-H and MCC-M Chit process. IMC personnel consolidate and integrate these requirements with the approved SSP 54010 requirements and release a CSRD Chit for review by the realtime operations community. Approval of the new integrated requirements package rests with the ISS Mission Management Team (IMMT) Chairperson.

Due to the complexities of realtime operations, some tasks are required to be performed by the crew before they can be explicitly documented in the CSRD. These types of tasks are generally documented on an MCC Chit by flight controllers and are reviewed and approved by the IMMT Chair, the Increment Manager, the Flight Director, the ISS MER Manager, and MCC-M (if applicable) before being approved for crew execution. These tasks are also documented in this section.

Task reporting for the PIER is sub-divided into the following categories:

1. Tasks Completed in Addition to the IDRD Requirements
   These tasks are requirements that are not documented in the SSP 54010 pre-increment, but were added realtime to a particular flight or stage.

2. Tasks Not Completed
   These tasks are defined as requirements that are documented in the IDRD or CSRD, but were not accomplished due to technical problems, a lack of crew time, or other circumstances. Tasks in this category are valid only for the applicable flight or stage and cannot be deferred. It should be noted that adding a requirement to a stage or flight does not guarantee completion of the requirement due to the complexity of realtime spaceflight, competing priorities, and limited on-orbit resources.

3. Tasks Deferred
   These tasks are defined as requirements that are documented in the SSP 54010 or CSRD, but were deferred to a later flight or Stage due to various circumstances at that time.

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4. Tasks Deleted
   These tasks are defined as tasks that were documented in the SSP 54010 or CSRD but were deleted during realtime operations due to circumstances at that time.

During the 192 day Increment 10 mission, the Expedition 10 crew addressed a total of 338 requirements. Of these 338 requirements, 260 were categorized as completed, 29 requirements were withdrawn or not complete, 49 requirements were deferred to a future Stage/Increment.

The flight and stage-specific requirements summary sections have summary data tables that outline the number of requirements that were completed during those timeframes. Adding the totals for each Stage/Flight provides a sum of 338 requirements (including all levels of completion, deferral, not complete or withdrawn). Subtracting the 23 duplicate requirements (as tracked across the stages) provides a true total of 315 requirements addressed for the Increment. Of the completed requirements, totaling 260, 147 were IDRD baseline requirements planned prior to the start of the Increment. The remaining 113 completed requirements were added during Increment 10 by: 1) previous increment deferrals, 2) an increment 9 CSRD, or 3) realtime chit.

This realtime and near realtime requirement growth was due to several factors, namely the addition of contingency requirements such as Elektron and toilet recovery operations, the Service and Performance Checkout Unit (SPCU) Heat Exchanger Remove and Replace (R&R), changes to the EVA 13 tasks, and changes to the Soyuz and Progress flight schedules.

In addition to the large crew time impacts, the nature of adding realtime requirements gives the impression of a high level of requirements being added, as there is a deeper level of detail in CSRD requirements than in IDRD requirements. Whereas one IDRD requirement may encompass multiple numbers of crew activities, CSRD requirements tend to encompass one single activity. Thus the nature of realtime requirements documentation will appear to greatly add to the total number of increment requirements.

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7.1 FLIGHT 9 SOYUZ

Soyuz Flight 9S, Transportation Modified Anthropometric (TMA-5, #215) lifted off from Baikonur Cosmodrome in Kazakhstan at 06:06 am Decreed Moscow Tim (DMT) on October 14, 2004 (288/03:06 Greenwich Mean Time (GMT)). The Expedition 10 Crew Commander Leroy Chaio, Flight Engineer Salizhan Sharipov, and Joint Mission Visiting Crewmember, Yuri Shargin docked to the nadir port of the Functional Cargo Block (FGB) on October 16, 2005 at 11:15 pm Central Daylight Time (CDT) (290/04:15 GMT) to begin the 8 Soyuz/9 Soyuz docked mission.

During the computer controlled portion of the final rendezvous one of the primary braking thrusters did not activate as expected, exhibiting less than 20% of is nominal chamber pressure. Due to this anomaly, the 9S spacecraft was docked manually by the 9S commander, Salizhan Sharipov, using the backup braking thrusters.

Primary mission objectives for the 8 Soyuz/9 Soyuz joint mission included the change out of Expedition 9 crewmembers Mike Fincke and Gennady Padalka, critical hardware transfer, and the Visiting crewmember Science Program.

On October 19, 2004 (GMT 293), the crew performed the removal of the EMU 3005 pump rotor, downlinking over 80 photos to the ground for analysis. The crew reported that the impeller was difficult to turn without excessive pressure, and there was a considerable amount of orange residue present. Ground teams determined that the residue was not out of family to what has been seen on other EMU units on the ground. The crew cleaned the cup and rotor, and noted that the rotor turned freely. They took samples of the residue and particulate for return. The installation of the new pump rotor (delivered on 15P) was deferred to the 9S Stage. However, the reassembly of the pump was not performed since the water pump shim could not be located on board. A new shim was flown on 16P and this task was deferred to Stage 17P.

During the joint mission, the Expedition 10 Commander (Chaio) and the Expedition 9 Flight Engineer (Fincke) completed 11.2 and 10.25 hours of dedicated handover time, respectively. This was supplemented by over 18 hours of functional handover activities such as Space Station Remote Manipulator System (SSRMS) operations, EMU resizing, and payload operations. The Expedition 10 Flight Engineer (Sharipov) and the Expedition 9 Commander (Padalka) each completed 5.25 hours of dedicated handover and 5.5 hours of functional handover time. The lack of handover time was due to scheduling other high priority tasks during the Joint Mission.

8 Soyuz performed a nominal undock and separation on October 24 at (GMT 297/21:05). The deorbit burn, module separation, entry, parachute deployment and landing were all executed nominally. The descent module landed northeast of Arkalyk, Kazakhstan on October 24 at 03:36 DMT (GMT 298/00:36). The crew was removed from the Soyuz capsule approximately 24 minutes after landing and was determined to be fit and healthy.

The Increment 10 PIER Summary Task Roll-up for Flight 9S is shown below.

Flight 9S	Baselined	Completed	Withdrawn	Deferred	Not Completed
IDRD	27	23	1	0	3
CSRD	0	0	0	0	0
Added Real-time	3	3	0	0	0
TOTALS	**30**	**26**	**1**	**0**	**3**

Twenty-one of the twenty-five tasks identified in the IDRD were accomplished during this mission. Four IDRD tasks were not completed. In addition to the requirements specified in the IDRD, two requirements were added and accomplished during the mission.

A. Tasks Completed in Addition to the IDRD requirements

1. Perform EMU 3013 flush.

   This task was added to the joint mission per the real time planning process as additional EMU troubleshooting in place of the Airlock (AL) Water (H_2O) Sample (see Section D, #1 below). It was completed on October 18, 2004 (GMT 292). The intent of this requirement was to verify the functionality of the EMU 3013 cooling pump, flush the loop with clean water, and recover the EMU EVA capability out of the Joint Airlock. Another goal was to better understand the cause of the loss of cooling on the EMU. The crew noted contamination products in the water flush, which contributed to the eventual decision to R&R the SPCU heat exchanger.

2. Elektron Vent Line Installation

   This requirement was added to the Joint Mission timeline during the real time planning process. After docking, the crew performed the semi-permanent installation of the Elektron overboard vent line into the Micropurification System (___) overboard vent. This work around was performed since the Elektron vent valve was not functional due to plugging with Potassium Hydroxide (KOH). During Increment 9, a temporary vent line was installed, and in order to operate the Elektron, the automatic shutdown software responses were masked. To maintain crew safety, the Elektron was only operated during crew awake periods, and the crew monitored the unit each hour. The crew performed this activity on October 18, 2004 (GMT 292), combining the overboard vents of the Elektron and ___ systems. The Elektron was activated and observed to function nominally. International Partner (IP) Russia uplinked a patch to restore the automatic shutdown capability. The only operational impact of this new configuration was that IPRussia had to coordinate the venting operations of Elektron and ___ to avoid simultaneous venting. This resulted in deactivating the Elektron during ___ regeneration activities for the remainder of the Increment. The Elektron operated nominally through the remainder of 2004 until it started exhibiting shutdowns during the 16P Stage.

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3. Troubleshoot Service Module Laptop #3

   This requirement was added during the realtime planning process. The crew performed troubleshooting on the Service Module (SM) Laptop #3. During a conference with ground controllers on October 18, 2004 (GMT 292) the crew discovered there was a misconfiguration in the Microsoft Windows settings. The crew corrected the problem within Windows and put Laptop #3 in a nominal configuration to support the Conjugation experiment, which was being performed by the Visiting Crewmember.

B. Tasks Not Completed

1. Perform minimum crew handover of 12 hours per crewmember. **[Intravehicular Activity (IVA)]**

   Complete for L. Chiao who had 29:20 of handover time. Not complete for S. Sharipov who had only 10:55 of handover.

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

   Complete for L. Chiao who had 29:20 of handover time. Not complete for S. Sharipov who had only 10:55 of handover.

3. Perform Station Development Test Objective (SDTO) 13004-U, Russian Vehicle Docking/Undocking Loads on ISS, for 8-Soyuz undocking from FGB Nadir. **[Ground] [IVA]**

   The intent of this requirement was to obtain ISS Internal Wireless Instrumentation System (IWIS) data for the 8S Undock event. IWIS data was not obtained, and would have provided more complete insight into the undocking loads experienced by the ISS structure. IWIS sensors are located in the pressurized modules (both US and Russian). The Russian vehicles dock directly to Russian pressurized modules so these sensors are in the direct load path of the docking. Structural Dynamic Measurement System (SDMS) data was obtained, but does not satisfy the intent of this requirement. SDMS data is still useful and its collection required no crew time. It provided insight to determine whether the structure exhibited high loads during the event.

C. Tasks Deferred

N/A

D. Tasks Deleted

1. Collect Airlock (A/L) H_2O sample (6 day dwell post flush).

   Due to timeline constraints created as a result of adding the above mentioned EMU 3013 flush activity, this task was deleted from the 9S Flight timeline. Stage 9S

Following the successful 8S/9S joint mission, the Expedition 10 crew took control of the ISS. Stage 9S began with the undocking of the 8 Soyuz vehicle on October 23, 2004 (GMT 297) and ended with the docking of 16 Progress on December 25, 2004 (GMT 360).

7.2 STAGE 9 SOYUZ

During the first week of Increment 10, the ground initiated reconditioning operations on the P6 4B2 Battery set. The intent was to improve battery performance and to assess battery health. During this activity, the Battery Charge/Discharge Unit (BCDU) 4B2 was off line and the 4B power channel was supported in eclipse by the other two BCDUs. In this configuration, the channel 4B power levels were managed to a maximum of 9.5 kiloWatt (kW) (normally limited to 12.2 kW). After the reconditioning concluded, the battery set was returned to service. New battery charging software parameters were developed (to compensate for aging effects) then uploaded to the vehicle. Battery data determined the 4B2 battery set capacity improved by approximately 10 ampere (amp)-hours.

The major payload activity performed by the crew during this Stage 9S was the Advanced Diagnostic Ultrasound in Microgravity (ADUM). Each crewmember acted as both a subject and as an ultrasound operator collecting data on bone and chest scans, downlinking realtime video of ultrasound images to the ground science team. ADUM demonstrates the capability of non-medical personnel to downlink diagnostic information (ultrasound images) for evaluation by medical specialists on the ground.

Global Positioning System 2 (GPS2) Space Integrated Global Positioning System/Inertial Navigation System (SIGI) Firmware revision 2 was uploaded. The initial attempt on November 3, 2004 was unsuccessful due to a misconfiguration of the Station Support Computer (SSC) Communication (COM) PORTS. After correcting the configuration, the GPS2 firmware upload was successfully completed on November 11, 2004. The GPS2 was activated for nominal operations. The initial data indicated the GPS2 was tracking correctly and the ground was receiving good state vectors. However, within several days, the GPS2 antennae began shutting down due to a high signal-to-noise ratio believed to be caused by cold temperatures. Since GPS1 was still operating on the previous firmware and producing good state vectors, so the decision was made to delay the GPS1 software upload until the problem was better understood. The GPS1 upload was finally performed during Stage 16P.

Mission Controllers in Moscow uplinked a software patch to the SM Central Computer ___ on November 10th, 2004 (GMT 315). This patch was designed to suppress Russian Segment panel alarms after United States On-orbit Segment (USOS) alarm cancellation and change the parameter generation algorithm received by the ___ from the FGB. A filter was added to the FGB signal receipt function to ensure protection from false alarm data coming from the FGB whenever fire and smoke statuses are generated erroneously. This patch will prevent the generation of false smoke FGB alarms.

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The crew re-labeled fireports on the USOS with temporary labels. The objective of this activity is to label all fireports on the USOS with a consistent labeling scheme. The crew also printed and incorporated updates to the Emergency procedures book to account for the new fireport labeling.

The ISS underwent a scheduled reboost with 15 Progress on November 17, 2004, at 9:12 am Eastern Standard Time (EST). The actual thrust of the Progress engines was lower than planned, and the Station's altitude gain was not as high as expected. The actual altitude increase was 2.9 kilometer (km) instead of 4.4 km. IPRussia investigated the cause of the anomalous reboost and determined that Flight Controllers had misconfigured a propellant valve and propellant flowed from 15P tanks into the Service Module propellant tanks. This resulted in an underburn, since propellant flow to the 15P thrusters was insufficient to achieve the planned delta velocity and altitude. Another result was that 15P was drained of propellant. Not enough propellant remained for the 15P vehicle to perform a nominal undocking and deorbit burn with a full load of trash and disposable material. Therefore, the trash that had been gathered for disposal was left onboard ISS until it could be disposed of on 16P. 15P undocked on December 22, 2004 (GMT 357) with a relatively small load of disposable items.

The 9 Soyuz Relocation was performed on November 29, 2004 (GMT 334). The crew configured the ISS for unmanned operations, ingressed the Soyuz 9 vehicle and prepared for the relocation activities. The Soyuz 9S vehicle was manually relocated by the Expedition 10 crew from the Russian Docking Compartment to the Russian Functional Cargo Block (FGB) nadir docking port. The Expedition 10 crew undocked and backed away to approximately 30 meters from ISS, translated to the FGB nadir docking port, aligned with the FGB docking mechanism and successfully redocked. All subsequent leak checks were successfully performed and the crew ingressed the ISS. The crew completed the reconfiguration of the US and RS segments for manned operations. Soyuz relocation imagery activities were provided by the Tip Elbow, Laboratory (Lab) Starboard external camera and S1 Lower Outboard Camera external camera.

Based upon water inventory and food audits performed midway through Stage 9S, it was determined that food and water consumables would fall well below the skip cycle at 16P docking, on December 26. Both US and Russian sides jointly developed menus to provide the crew nutritionally balanced meals to January 3, 2005. Without 16P, the food remaining on board after January 3 would have been high in carbohydrates and sweets. The US and Russian sides developed integrated strategies in the event 16P did not arrive, including decrewing of the ISS.

A zero- Control Moment Gyroscope (CMG) torque attitude hold controller, or "Zero Torque Controller", was used successfully during the ISS maneuver from XPOP to XVV on December 21. This controller was developed to perform an attitude maneuver under US control utilizing Russian thrusters. All required control torque was diverted to Russian thrusters and CMG gimbal rates were maintained within current CMG constraints. This type of controller may also facilitate the use of US CMG attitude

control for a potential Orbiter Repair Maneuver (ORM) or future ISS attitude maneuvers. The maneuver used 15.5 kilogram (kg) of propellant. The same maneuver performed with the nominal method under Russian Segment control would have been expected to use up to 20 kg.

The 15 Progress vehicle successfully undocked from the ISS at 22:35 DMT on December 22, 2004 (GMT 357/19:35). The separation was nominal as the Progress vehicle drifted away from ISS. The Crew reported a clean separation of Progress with all O-rings visible on the Progress. A fifteen second separation burn was completed nominally at 19:40 GMT. The Russian segment returned to thruster mode at 19:42 GMT. The crew used Russian payload Relaksatsia hardware (a Geophysical Experiment) to observe and photograph the 15P thruster operations during the deorbit burn, which was initiated at 01:32 DMT on December 23, 2004 (GMT 357/22:32).

The 16 Progress vehicle launched successfully at 01:20 DMT on December 24, 2004 (GMT 358/22:20). The antennas and solar arrays deployed nominally. Docking occurred at 02:31 DMT on December 26, 2004 (GMT 360/23:31).

The Increment 10 PIER Summary Task Roll-up for Stage 9S is shown below.

Stage 9S	Total	Completed	Withdrawn	Deferred	Not Completed
IDRD	34	32+1	1	1*	0
CSRD	48	35	2	9	2
Added Realtime	7	7	0	0	0
TOTALS	**89**	**74+1**	**3**	**9+1***	**2**

*Represents a partial requirement

Of the 34 tasks identified in the IDRD for Stage 9S, 33 were completed and one was deleted. In addition to the IDRD tasks, the Expedition 10 crew completed 40 of the 53 additional tasks of significance that were added to the Stage requirements either to the CSRD or during realtime operations, with 9 of these tasks deferred to a later stage.

The total requirements rollup for this Stage indicates 73 of 87 tasks were completed, 3 tasks were withdrawn, 9 tasks deferred to a later stage in Increment 10, and 2 tasks were not completed.

A. Tasks Completed in Addition to the IDRD Requirements

1. Perform functionality check of the Orlan Suit #27

   This activity verified that Orlan suit #27, which was delivered to ISS by 15P in May 2004, was functional prior in preparation for the Increment 10 EVAs #12 and 13. IPRussia wanted to ensure the functionality of this suit prior to preparing Orlan Suit #12 for disposal (see below). This requirement was added per IPRussia input to Stage 9S CSRD Chit 2342. The task was successfully completed on November 17, 2004 (GMT 322), and included the verification of the communication and telemetry systems. Upon completion of the functional

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checkout of Orlan Suit #27, the crew prepared the used Orlan #12 for disposal on 15 Progress.

2. Perform Carbon Dioxide Removal Assembly (CDRA) Sock filter installation and activate the CDRA for 24 hours **[IVA] [RRF 2004-01-002A] (From Inc. 9)**

   This task was deferred to Increment 10 from Increment 9 and added the Stage 9S CSRD chit 2342. This requirement was necessary because, during past CDRA operations, zeolite desiccant particles were released from the Desicant/Sorbent beds into the CDRA internal air ducting and selector valves, fouling the operation of the air selector valves and limiting CDRA operations. Three sock filters were installed in April 2003, to protect the previously failed valves. On December 10, 2004 (GMT 345), the Increment 10 crew installed sock filters to provide protection for two additional "at-risk" valves. One large filter was installed between one of the two Desicant/Sorbent Beds and the inlet of one air selector valve. Two small filters were installed in the inlet ducts of a second air selector valve. The CDRA was then tested and verified to function nominally.

3. Perform Heart Rate Monitor (HRM) battery swap

   This requirement was added by the MER input to the Stage 9S CSRD Chit 2342. As documented during Increment 9 in Chit 2144, Verification of Heart Rate Monitor Battery Procedure, the crew was using 1 (one) Heart Rate Monitor Watch with expired batteries. During the HRM audit, the remaining 3 (three) HRM watches were all reported to have dead batteries. This requirement requested that the crew attempt this replacement of one of the watches with dead batteries to ensure this activity can be performed on-orbit. If successful, batteries can be replaced on-orbit instead of manifesting and replacing the watches. The Increment 10 crew successfully completed this activity on November 8, 2004, (GMT 313).

4. ACH-M Hardware A78 Antenna Feed Line Maintenance

   This request was added to the Stage 9S CSRD chit 2342 per IPRussia request. The intent of the task was to repair a cable in the Antenna Feed Line unit of the RS Motion Control System. The Increment 10 crew successfully completed this activity on November 9, 2004 (GMT 314).

5. Inspection and cleaning of Atmospheric Revitalization (AR) rack Avionics Air Assembly (AAA)

   This task was deferred from Increment 9 and was added to the Stage 9S CSRD chit 2342. During Increment 9, the Crew Health Care Systems (CHeCS) rack Avionics Air Assembly (AAA) was noted to have a progressive reduction in heat transfer rate. On inspection, the Expedition 9 crew found lint build up at the air inlet of the fan and considerable dust in the CHeCS rack ducting. After the fan and the ducts had been cleaned, the airflow and heat transfer rate improved

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significantly. Due to suspicions that the Atmosphere Revitalization (AR) rack AAA may be in a similar condition, a similar activity was planned for that unit. The Increment 10 crew performed the AR Rack AAA inspection and cleaning of the AR rack on November 15, 2004 (GMT 320). The velocicalc was used to measure air velocity at the AAA inlet before and after the inspection and cleaning, and showed significant improvements.

6. Laptop 3 Hardware Components Check-up with BIOS

   This request was added to the Stage 9S CSRD chit 2342 at the request of IPRussia. The intent of the requirement was to restore payload data to the newly upgraded Laptop 3. The Increment 10 crew completed this activity on November 16, 2004 (GMT 321).

7. Upload version 07.02 _BC on to Laptop 3 Hard Drive

   This request was added to the Stage 9S CSRD chit 2342 at the request of IPRussia. The intent of the requirement was to upgrade the Service Module Laptop 3 with the new software. The Increment 10 crew completed this activity on November 16, 2004 (GMT 321).

8. Perform troubleshooting of the 760XD laptop shell s/n 6076

   This task was a deferral from Increment 9 and was added to the Stage 9S CSRD chit 2342. Due to the limited number of 760XD Laptops available to use as Portable Computer System (PCS), the Increment 10 crew performed this activity to determine if the failure observed on the Laboratory (LAB) Robotic Workstation (RWS) PCS Laptop (s/n 6076) was a hard failure or if the laptop could be recovered. When the Increment 10 crew applied power to the laptop shell, the indicator lights and Liquid Crystal Display (LCD) were non-functional. This signature indicated a shell failure, most likely on the motherboard, which was not recoverable on orbit. The Increment 10 crew completed this activity on December 3, 2004 (GMT 338).

9. Perform maintenance on EVA Nickel Metal Hydride (NiMH) Batteries (Rechargeable EVA Battery Assembly (REBA), Pistol Grip Tool (PGT) and EVA Helmet Interchangeable Portable Light (EHIP).

   This activity was added to the Stage 9S CSRD chit 2342 so the battery conditioning activity would start earlier in the Increment and allow schedule flexibility for future battery conditioning activities later in the Increment. The Increment 10 crew started this activity on November 19, 2004 (GMT 324) and completed it on December 7, 2004 (GMT 342). The intent of this activity is to extend the life of these batteries until they can be replaced after Shuttle Return to Flight.

10. Perform LAB General Luminaire Assembly (GLA) and Node Baseplate Ballast Assembly (BBA) Checkouts

    This requirement was added to the Stage 9S CSRD by chit 2368. Each GLA consists of two parts, the Lamp Housing Assembly (LHA) mounted onto the Baseplate Ballast Assembly (BBA). A failure within a BBA would result in no power transfer to the GLA, and result in the same failure signature as a failed LHA. The Increment 10 crew completed this activity on GMT 343, allowing hardware specialists to determine that two Lab LHAs, two Node LHAs, and one Node BBA were failed. This data was used to support LHA/BBA manifesting efforts for 16P.

11. Perform Onboard Equipment Control System (____) and Onboard Measurement System (___) cable installation for use with ___-_ during ___ restart.

    This task was a deferral from Increment 9 and added to the Stage 9S CSRD chit 2342. The Increment 10 crew started this activity on GMT 341 and completed this activity on GMT 344.

12. Intermodular Ventilation (IMV) Velocity Measurement **[IVA] [RRF 2004-09-001]**

    This task was last performed on September 15, 2004. It was added to the Stage 9S CSRD, chit 2342. The crew performed air-flow and Carbon Dioxide (CO_2) measurements on GMT 344 to verify the ventilation flow rates between the Russian segment and the USOS. Degradation of air flow could be caused by a build up of particulates in the ventilation fan assemblies or collapsed air ducts. CO_2 measurements were taken in the SM near the Vozdukh and in the Lab mid cabin area. The velocicalc unit was used to measure the velocity at the Lab Aft Port area. The data was provided to MCC-H and all data points were determined to be within nominal ranges.

13. Install the sealed switching unit (___) for ISS SM air-to-air communication line (____)

    This request was added to the Stage 9S CSRD at the request of IPRussia per chit 2342. The intent of the requirement was to install a sealed switching unit to be used for communication between Orlan suits during Russian EVAs. The Increment 10 crew completed this activity on GMT 349.

14. Prepare Orlan Suit #12 for disposal on 15P **[IVA]**

    This Orlan suit was used and expired. It had no functional life remaining. The items below were removed from the suit because they were to be retained onboard as spares, or were to be returned to the ground for failure analysis. This requirement was added per the Russian input to the Stage 9S CSRD chit 2342. The crew completed all these activities on November 17 and 18, 2004

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(GMT 322 and 323), and Orlan suit 27 was disposed of on 15P when it undocked and de-orbited on December 22, 2004 (GMT 357).

a. Remove Beta-08 Unit

This unit is the Medical Measurement Unit which collects, amplifies and convert biomedical data of the crewmember. It was removed from Suit 27 and kept onboard as a spare. The crew completed this activity on November 18, 2004 (GMT 323).

b. Remove the Spare Oxygen Cylinder

This breathing oxygen bottle was removed from Orlan suit 27 and stowed onboard as a spare. The crew completed this activity on November 18, 2004 (GMT 323).

c. Remove the ____-1_ Unit

This unit is the Radio Telemetry Apparatus Unit that contains Communications and Telemetry radios, batteries, and associated hardware for the Orlan suit. It was removed from Suit 27 and kept onboard as a spare. The crew completed this activity on November 17, 2004 (GMT 322).

d. Remove the Pressure Gauge of the Oxygen Cylinder BK-3

This pressure sensor was located on Orlan oxygen bottle #50. The sensor malfunctioned prior to Russian EVA #9 (during Increment 9). It was removed from the oxygen bottle and stowed for return to the ground for analysis by Russian specialists. The oxygen bottle was stowed and disposed of on 15P. The crew completed this activity on November 18, 2004 (GMT 323).

e. Remove flight gear bag with Liquid Cooling Garment (LCG) and the headset from the spacesuit

This unit was removed from suit 27 and kept as an onboard spare. The crew completed this activity on November 18, 2004 (GMT 323).

15. Transfer Urine into the Progress 15P tanks **[IVA]**

This activity was added per IPRussia input to the CSRD chit 2342. The crew completed this activity on November 19, 2004 (GMT 324). The urine was disposed of on 15P when it undocked and de-orbited on December 22, 2004 (GMT 357).

16. Perform Global Timing System (GTS) cable test using FSH3 spectrum analyzer. **[IVA]**

This task was added per IPRussia input to the Stage 9S CSRD chit 2342. The intent was to verify the continuity of two cable channels associated with a

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European commercial payload, Global Timing System (GTS). The test was performed twice on each cable, once at 400 MHz and again at 1428 MHz. The crew successfully completed this task on November 4, 2004, (GMT 309).

17. Perform audits as required to verify manifests and waste requirements **[IVA]**

Most of these the audits, as noted below, were completed during Stage 9S. Some were only partially completed, with the remaining parts deferred until later stages or to Increment 11. These audit requirements were added per MER and Mission Operations Directorate (MOD) inputs to the Stage 9S CSRD chit 2342.

a. Airlock Audit

The purpose of this task was to determine that all LF1 tools were available, that return items matched the LF1 manifest, and basic AL housekeeping. This activity was scheduled as 4 separate tasks, and begun December 17, 2004 (GMT 352). The crew completed approximately the first half of the Priority 1 tasks (half of Section A of Orbital Communications Adapter (OCA) message 10-0338) on GMT 352. The remainder of the Priority 1 task and Priority 2, 3 and 4 tasks were deferred to 16P. Priority 1, 2 and 3 were completed in Stage 16P. Priority 4 was deferred to Increment 11.

b. Rack consolidation and cleanup in preparation for 16P

This requirement cleared space for items to be delivered on 16P and gained space to prep for LF1 Prepack and to make crew operations more efficient. The crew completed this activity on November 19, 2004 (GMT 324) and gained approximately 9 Cargo Transfer Bag Equivalent (CTBE) of onboard stowage volume.

c. Computer Pantry Audit

The intent of this requirement was for the crew to consolidate the equipment in the Computer Pantry into a more operationally efficient configuration, and to segregate items to be disposed of that were no longer required on orbit. The crew began this task on December 1, 2004 (GMT 336), and continued it GMT 337, 338, 341, 343 and 348. This resulted in a savings of approximately _ Cargo Transfer Bag (CTB) equivalent of volume. Approximately 70% of the computer pantry audit was completed, and the remainder was deferred to 16P, where it was performed on February 8, 2005 (GMT 039).

d. Pressurized Mating Adapter (PMA)1 Audit

The intent of this requirement was for the crew to verify the status of crew clothing and towels that were stowed in PMA1, and to update Inventory Management System (IMS) for the actual quantities remaining onboard. The crew completed this activity on November 24, 2004 (GMT 329), and located and segregated some clothing items for disposal.

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e. Hygiene Item Audit/Consolidation

The intent of this requirement was to have the crew status crew hygiene items such as shampoo, toothpaste, shaving supplies, etc. The results were used by Crew Provisions personnel to determine excess items for disposal and to determine 17P resupply. This activity was completed November 22, 2004 (GMT 327).

f. Flight Crew Equipment (FCE) Audit

The intent of this requirement is to audit the contents of the two 0.5 CTBs of FCE. The Expedition 9 crew had reported that both 0.5 CTBs of FCE were completely full. During Increment 10, the ground needed to know the contents including any broken/damaged hardware to plan for trash items and consolidation of remaining FCE. The Expedition 10 Crew reported contents of FCE bags on November 1, 2004 (GMT 306). The results of this audit are proprietary.

g. Ambulatory Medical Pack (AMP) Audit

During Increment 8, it was reported that the AMP medications were out of order and that when opening a lid pocket, white powder from a crushed medication came out, getting into a crewmember's face and eyes. The purpose of this audit was for the crew to audit the medicines, verify that the correct medications are present, and to dispose of any damaged medications. The crew performed this activity on December 2, 2004 (GMT 337). They found 3 discrepancies out of approximately 90 medications (one medication was missing and two others were incorrect). The crew surgeons were given this information so they could accurately direct the crew to the appropriate medications in an emergency. All other medications in the AMP were verified to be present and undamaged.

h. Vent closeout Panel Audit

The purpose of this activity was to locate four stowed vent closeout panels that had been reported missing. The crew located these panels on November 25, 2004 (GMT 330). Two of these panels are required (per EXpedite the PRocessing of Experiments to the Space Station (EXPRESS) Rack Guidelines and Constraints) in preparation for ARTIC 1 removal and return on LF1. These panels will be used to cover the empty ventilation openings after ARTIC 1 is removed from LAB1P2_D2. All four closeout panels were stowed for this future use, and IMS was updated.

18. LF1 Preparation

The two requirements below were added to the Stage 9S CSRD by comments from IMC, to begin early preparations for Logistics Flight (LF)-1, thereby

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alleviating some of the expected schedule pressure in the later Stages of Increment 10 and the early stage of Increment 11.

a. Perform stowage consolidation with approved stowage behind Node 1 Zero-gravity Stowage Racks (ZSRs)

The intent of this requirement was to move infrequently used, large items into the "back area" of the NOD1O4 ZSR to give them a more permanent stowage location (the ZSR back area is the area between the ZSR insert and the ZSR shell). The crew performed this activity on December 7, 2004 (GMT 342), per OCA message 10-0223, stowing 4 panel covers, 5 empty half CTBs and 3 empty single CTBs in the ZSR.

b. Perform Pre-breathe Hose Assembly (PHA) Quick Disconnet (QD) torquing, inspection and audit.

Deferred to 16P (see Section C below).

19. Perform P6 battery reconditioning **[Ground] [RRF 2004-07-002A] (from Inc. 9)**

This requirement was added to the Stage 9S CSRD as a rollover task from Increment 9. The 4B2 battery reconditioning was a ground only activity that required the battery to be taken off line so repetitive deep-discharging and recharging could be performed. The intent was to restore capacitance to the battery. While the battery was off-line, the ground managed the power loads on the affected channel. The results indicated that the 4B2 battery recovered approximately 10 amp-hours of capacity.

20. Perform Imagery of S1 and P1 Hrs deployed radiator panel surfaces from ISS RS windows **[IVA] [RRF 2004-01-003B]**

This requirement was added to the Stage 9S CSRD per input from the MER. The intent of this requirement was to inspect, photo-document and evaluate the S1 and P1 Radiator panels for Micrometeoroid Orbital Debris (MMOD) damage. This activity was performed to follow up on the MMOD damage observed and reported by the Expedition 7 crew in August, 2003 on a section of the P1 Radiator. The requirement was completed on December 23, 2004 (GMT 358), and the photographs were downlinked on December 27, 2004 (GMT 362). A total of 95 images were taken. The largest 11 strikes were identified and the dimensions of the strikes were approximated. The damage is limited to surface dents, and has not penetrated into the internal radiator honeycomb structure. The thermal control coating is in excellent condition. The Radiators are currently filled with nitrogen, and no leaks have been observed. At this time, no problems are expected with the Ammonia Fill operations that are scheduled during Flight 12A.1. Should a leak occur in the radiator tubing after activation, ammonia would vent to space and the loop would be lost.

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21. Perform U.S. Lab Debris Shield Dent Inspection **(Inc10/2305)**

    This requirement was added to the Stage 9S CSRD and is documented in chit Inc 10/2305. Post flight review of images during the Shuttle approach to ISS on STS-113/11A revealed a possible dent, or "flat spot" in the LAB1/04-08 MMOD shield located on the Nadir side of the Lab. The purpose of this requirement was to use the SSRMS inspect and photo-document this area for evaluation on the ground. The results of the evaluation reveal that the dent is not the result of an MMOD strike, since there was no penetration mark on the Debris Shield. Possible causes are: a kick by a crewmember during an EVA, cold temperature deformation, or nominal manufacturing processes. There is impact to the ISS from this "flat spot".

22. Active Rack Isolation System (ARIS) Rack Hyper-Extension Check

    The (ARIS) hyperextension test was added per the realtime planning process per inputs from Payloads. The hyperextension test was a ground-commanded test, where each ARIS actuator was cycled through its range of motion until the snobbery stopped the rack motion. The ground issued motion commands to the rack, while the crew observed and provided information about the direction of the rack movement. The ground monitored the sensor readings from each actuator to verify the actuators did not overextend. The data indicated that the rack did not have the range of motion as expected. New configuration files were uplinked that expanded the range of motion of the actuators, and the test was repeated. Additional snubber adjustments and ground commanded hyperextension tests yielded the same results. The remaining tests were aborted. The crew was instructed to return snubber adjustments to default values and to return the rack to steady state. The data accumulated will be utilized in the future when Payloads require the ARIS environment.

23. R&R the Moderate Temperature Loop (MTL) and Low Temperature Loop (LTL) Fine Filter Assemblies and Fill the LTL Accumulator to Configure ISS for Unmanned Operations.

    The crew was reaching critical levels of onboard food, and the delivery of additional food on 16P was required to maintain crewed operations. Should 16P fail to arrive/dock with ISS as planned on December 25, 2004 (GMT 360), the projected crew departure date was December 29, 2004 (GMT 364). The crew performed this task to prepare the Internal Thermal Control System (ITCS) System for potential unmanned ISS operations should 16P fail to dock to ISS. This task was added per the WLP process and is documented in chit 2475. Technical specialists had observed increasing pressure drop across the MTL filter and expected a similar delta pressure on the LTL filter. The crew installed new fine filters were installed and the LTL system was "topped off" on December 21, 2004 (GMT 356) to avoid the necessity of performing this activity during a potential post-contingency timeframe.

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24. Perform 9 Soyuz Motion Control Test

    This intent of this task was to investigate the anomalous braking thruster observed during 9S docking. It was added per IPRussia input to the WLP, and documented per r/g 9337. The crew completed this test on November 23, 2004 (GMT 328). Per MCC-M request, acceleration data was provided by the ISS Internal Wireless Instrumentation System (IWIS), Station Acceleration Measurement System (SAMS) and Microgravity Acceleration Measurement System (MAMS). Imagery data was also provided through the SSRMS. The test was successfully completed and all data was delivered to Moscow for review. The test confirmed, and MCC-M verified, the off-nominal performance of Thruster 18. MCC-M had been planning to test Thruster 18 during the 9 Soyuz Relocation, but sent a fax on November 26 reporting the cancellation of that test. The docked thruster firing test provided sufficient data for the Russian specialists to complete their evaluations. The effect of this failure was a loss of redundancy which did not impact either the 9 Soyuz relocation activity or crew return.

25. Soyuz Neptune Panel Test

    This requirement was added per the real time planning process (WLP) as a result of unexpected readings experienced during Flight Day 2 of the 9 Soyuz ascent. This panel monitors Soyuz telemetry and sends commands to the Soyuz. The test was completed on November 10, 2004 (GMT 315), and demonstrated that the panel readings operate nominally when the screens are configured nominally. Procedural changes to the ascent procedures were implemented by the Russian ground control team for future Soyuz launches.

26. SSRMS Sticky Grapple Fixture Release Troubleshooting

    This requirement was deferred from Increment 7 chit 1053 and Increment 8 chit 1487. This task was completed in conjunction with SSRMS Proficiency operations added per the realtime planning process. The main objective was to perform engineering tests to troubleshoot the "sticky grapple fixture" problem, and gather date to analyze whether or not the "dither" technique is a viable solution to the sticky Grapple Fixture release issue. This problem appeared during the 6A stage and re-occurred frequently since then. It is believed to be caused by friction inside the Wrist Roll (WR) motor. On December 15, 2004 (GMT 350) the crew maneuvered the SSRMS to the LAB Flight Releasable Grapple Fixture (FRGF), and captured it with one end of the SSRMS. They then tested Rotational Hand Controller (RHC) release techniques to gather data for the sticky Grapple Fixture (GF) release resolution. The crew then maneuvered the SSRMS and captured the Mobile Base System (MBS) Power Data Grapple Fixture (PDGF) #3. This task completed the first of four Sticky Grapple Fixture Release tests.

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27. Perform Troubleshooting of Remote Power Controller Module (RPCM) LA2A3B-C (powers Utility Outlet Panel (UOP)-4)

    On November 11, 2004 (GMT 316), the Remote Power Controller Module (RPCM) LA2A3B-C tripped due to a current spike. This RPCM supplies power to Utility Outlet Panel (UOP) #4. Components attached to that UOP at the time of the trip were: Cycle Ergometer with Vibration Isolation System (CEVIS) and associated cables, Station Support Computer (SSC) 9, a Portable Utility Light (PUL), a PS120 Junction Box, a US Direct Current (DC) Power Supply and a 120v Power Cable. The crew exonerated UOP-4 on November 19, 2004 (GMT 324). The CEVIS and ancillary cabling was exonerated on November 21, 2004 (GMT 326). Troubleshooting was performed on the Portable Utility Light, SSC9 Laptop, PS120 Junction Box on December 9, 2004 (GMT 344). Troubleshooting was added per the realtime planning process and is documented per chits 2393, 2401, 2463, 2694, 2704 and 2713. Each set of the components were checked for a short circuit by measuring continuity. No shorts were detected. The remaining hardware (US DC Power Supply and 120v Power Cable attached to the Power Supply (PS) 120 Junction Box) was not verified before the end of Increment 10, and was rolled over into Increment 11.

28. Respiratory Support Pack (RSP) Troubleshooting

    On December 13, 2004 (GMT 348), the crew successfully performed troubleshooting on RSP serial number (S/N) 1004. The RSP is designed to "breathe" for an incapacitated crewmember in the event of a respiratory health event. S/N 1004 failed its initial on-orbit Breaths per Minute (BPM) checkout, so S/N 1003 functioned as the prime unit. The objective of the troubleshooting activity was to correct the problem with the BPM knob and verify nominal performance of S/N 1004. The BPM performance of S/N 1003 was also evaluated. The data was evaluated by specialists and both units were determined to be functional. S/N 1004 has been designated as the prime unit, with S/N 1003 the backup. This requirement was added per the realtime planning process and is documented in chits 2410 and 2474.

B. Tasks Not Completed

1. Convert 760XD laptop for PCS use and perform hard drive ghosting when required due to loss of existing PCS **[IVA].**

   This task was deferred from Increment 9 and added to the Stage 9S CSRD chit 2342. It is intended to satisfy the Flight Rule B7-110 for future PCS failures. This requirement was not performed since PCS failures did not occur that would have violated the Flight Rule.

2. Photovoltaic Module Thermal Control System (PVTCS) Pump Flow Control Subassembly (PFCS) Pump Swap **(Ground Only)**

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This task was added to the Stage 9S CSRD per chit 2379. The intent was to perform a redundancy check of the inactive PFCS "B", since the system is currently operating on the primary PFCS pump "A". The task was not performed during Increment 10, even though the risk of a failed pump was very low. If both pumps A and B were to fail, an entire power channel would be lost, placing the ISS in a critical power situation. Also, performing the pump checkout now would not guarantee it would function during later assembly flights, during critical assembly operations. Rationale for not performing this requirement until flight 12A1 is detailed in Chit 2784.

C. Tasks Deferred

1. Perform Space Integrated Global Positioning System/Inertial Navigation System (SIGI) software upgrade for GPS1. **[IVA]**

   This IDRD activity specified that new firmware was to be loaded in both the SIGI 1 and the SIGI 2 units onboard the ISS. The intent was to fix several anomalies (SCRs) detected in ground testing and during on-orbit operations. The anomalies impacted performance and increased the operational workload. Reference RRF# 2004-01-004C SIGI Firmware Loading. The Expedition 10 crew began the upgrade November 3, 2004 (GMT 308). However, the upgrade could not be completed that day, due to misconfigured COM PORTS of the Station Support Computer (SSC) being used to perform the upload. After this issue was corrected, SIGI R2 was uploaded to GPS2 on November 11, 2004 (GMT 316). During the interim period, SIGI 2 remained off, but total system redundancy requirements were maintained with US and Russian motion control assets. The upgrade for GPS1 was deferred to Stage 16P.

2. AOK ____ -4M calibration **[IVA]**

   This task was added to the 9S CSRD per IPRussia input to chit 2342. The ____ is a Russian supplied device that measures Hydrogen Flouride (HF), Hydrogen Cyanide (HCN), Carbon Monoxide (CO) and Ammonia (NH_3). It was delivered to ISS on flight 13P on January 31, 2004. The intent of this requirement was to test and calibrate the atmospheric readings of the device. The initial activation of the unit occurred on May 26, 2004 (GMT 147), however the unit emitted Radio Frequency (RF) radiation at unacceptable levels. To prevent the RF radiation from interfering with other hardware, a shielded power cable was developed and scheduled to be delivered on 16P. Therefore, this requirement was deferred to Stage 16P. It was then deferred to Stage 17P, and was completed on March 9, 2005 (GMT 068).

3. Perform PHA QD torquing, Inspection and audit.

   This activity was deferred from Increment 9 and added to the Stage 9S CSRD per input from the MER. The intent of this task is to ensure the Pre-breathe Hose Assembly (PHA) Quick Disconnects are properly torqued. These PHAs are used during the EVA prebreathe protocol when preparing for ISS based

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EVAs. This activity was added to the Stage 9S CSRD per chit 2342, and deferred to Stage 16P due to the scheduling of higher priority tasks during Stage 9S. It was completed on February 9, 2005 (GMT 40).

4. Perform speed regulating unit (_P__) installation onto cabin fans in SM including installation of cable inserts in the manual velocity control unit. **[IVA] (from Inc. 9)**

   The intent of this activity is to install speed regulators on the SM cabin fans. This task was added per IPRussia input to the Stage 9S CSRD. It was deferred to Stage 16P, then to Stage 17P, and then to Increment 11, due to the scheduling of higher priority tasks during Increment 10.

5. Microgravity Sciences Glovebox (MSG) Audit

   This requirement was added to the Stage 9S CSRD by the IMC. The intent of this requirement was for the crew to audit MSG hardware for the payloads community, and to organize items for return. This requirement was deferred to Stage 16P and was not completed during Increment 10, due to higher priority Payload activities such as ADUM, which took precedence.

6. Perform Ghosting of PCS Harddrive to maintain a minimum of spares in the 12A.011 configuration **(per chit 018/ISS0063 and chit Inc8/1294) [IVA]**

   This task was added to the Stage 9S CSRD per input from the MER, as a rollover task. The intent of this requirement was to ghost PCS hard drives so that a fully loaded hard drive would be available for installation when the next PCS hard drive fails. It required one hour of crew time per hard drive, and was deferred to 16P, due to higher priority tasks that required the crew's time.

7. Apply Yellow Tag to the Pistol Grip Tool (PGT) programming cable. **[IVA] [Inc9/2133]**

   This task was added to the Stage 9S CSRD as a rollover task from Increment 9. The intent was to prevent the crew from using this cable, since one lot of connectors that was used to make the cable was found to have fractured sleeves, and mating the cable could result in bending connector pins on the laptop side. This requirement was deferred to 16P, due to the fact that the cable was not scheduled for use, and higher priority tasks were scheduled to be performed by the crew.

8. Perform SDTO 13006-U/R, Forcing Function Definition and Microgravity Allocation of Crew Resistive Exercises, for a nominal HC-1 (Russian Force Loader) exercise session. **[Ground] [IVA] (IWIS Required) [Imagery] [Inc9 IDRD Change Request (CR) 8359A-15P CSRD]**

   This task was added to the Stage 9S CSRD as a rollover task from Increment 9. The intent was to obtain actual ISS microgravity disturbance data during a crew resistive exercise session. This data would be used to improve the math

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models and the predictions of ISS structural life usage, to validate the impact of resistive exercise on the micro-g environment, to expand ISS operations, and to increase the life of the structure. This requirement was deferred to 16P, due to the scheduling of higher priority tasks.

9. Perform SDTO 15003-U, Microgravity Environment Definition, for a Nominal SM ergometer exercise session. **[Ground] [IVA] (IWIS Required) [Imagery] [Inc 9 IDRD CR 8359A-15P CSRD]**

   This task was added to the Stage 9S CSRD as a rollover task from Increment 9. The intent was to obtain actual ISS microgravity disturbance data during a crew exercise session on the Service Module Ergometer. This data would be used to verify the impact of this type of exercise on the microgravity environment, to ensure that ISS operations are consistent with the microgravity requirements. This requirement was deferred to 16P, due to the scheduling of higher priority tasks.

10. Complete EMU 3005 Water Pump Installation **[IVA]**

    This task was deferred from Flight 9S since the pump shim could not be located during the re-assembly of the pump. The task was added to the Stage 9S CSRD chit 2342. The purpose of the task was to re-assemble the pump and to verify the functionality of the re-installed fan/pump separator during the Dry/Wet Test. The crew found the missing shim onboard ISS during Stage 9S, but the task was not performed since the shim cleanliness could not be verified. This shim is used in a water loop that is exposed to a 100% oxygen environment, and contamination posed a combustion hazard. A replacement shim was flown on 16P, and the task was deferred and performed during Stage 17P to prepare the EMU for return to the ground on Flight LF1. The pump was assembled to avoid leaking water once it re-entered a 1 gravity (G) environment.

D. Tasks Withdrawn (Deleted)

1. Recurrently pressurize BX #7 of the Elektron-VM with Nitrogen **[IVA]**

   The task was added to the Stage 9S CSRD chit 2342 per IPRussian input. It was intended to be performed if the used Liquid Unit #7 was assembled into the Elektron system. This task was deleted since Liquid Unit #7 was not installed. The Elektron continued using Liquid Unit 5, and remained operational until Stage 16P. After it began shutting down in January, 2005, Liquid Unit 7 was used to recharge the electrolyte in Liquid Unit 5 during Stage 16P, thereby recovering the Elektron.

2. Perform EMU #3005 Separator/Dry/Wet Test **[IVA]**

   The purpose of this IDRD task was to verify the functionality of the re-installed fan/pump separator. During Flight 9S, the crew could not find the shim that makes up part of the fan/pump assembly, so this task could not be performed. The crew found the missing shim onboard ISS during Stage 9S, but the task

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was not performed since the shim cleanliness could not be verified. This shim is used in a water loop that is exposed to a 100% oxygen environment, and contamination posed a combustion hazard. A replacement shim was flown on 16P, and the fan/pump installation was performed during Stage 17P to prepare the EMU for return to the ground on Flight LF1. This task was deleted due to the higher priority SPCU Heat Exchanger R&R task that was performed during Stage 17P. This Wet/Dry Test will be performed on the ground after EMU 3005 return.

3. Perform Flush on EMU 3005

   This task was deferred from Increment 9 and was added per the Stage 9S CSRD chit 2342. The purpose of this task was to attempt to recover the EMU so it could provide an ISS EVA capability. However, ground analysis of EMU coolant samples returned on 8 Soyuz revealed contamination from the SPCU heat exchanger. This task was deleted due to risks of performing EMU EVAs from Joint AL until the SPCU could be R&R'd. The EMU is scheduled for return to the ground on Flight LF1, where this flush is planned to be performed.

7.3 STAGE 16P

The 16 Progress vehicle launched successfully on December 24, 2004 at 01:20 DMT (GMT 358/22:20). The antennas and solar arrays deployed nominally. Docking occurred on December 25, 2004 (GMT 360) at 23:31 GMT.

16P Progress docked to the ISS at the SM Aft port, and delivered much needed food, water and maintenance items to the crew. The crew completed the cargo transfer in the first two weeks after arrival.

The Space Experiment Module (SEM) Payload was an educational program for students and has been flying aboard the shuttle since STS-80 in 1996. Expedition 10 participated in the 14th SEM mission. The SEM satchel was delivered on 16P. It is a passive payload containing 20 experiment vials from 11 schools that are stowed in a soft satchel. The vials contain biological materials, medications, and other inorganic substances that are under investigation for effects due to the space environment. The satchel was opened and deployed in the U.S. Lab. The Crew took photos of the experiments so students could examine visual changes. Additional photos were taken periodically throughout the expedition to monitor additional changes in the experiments.

The Elektron began shutting down on January 1, 2005. The crew performed extensive troubleshooting operations to restore Elektron functionality. They removed the bubbles using manual and electrical pumps, but Elektron re-starts were not successful. MCC-M determined that the electrolyte concentration was too low, so the crew transferred electrolyte from a previously used Elektron unit into the current unit. The Elektron then operated, but only at the high oxygen production setting. (see Section A items 22 and 22A below).

To maintain stable Elektron operation in 50 amp mode, the Russian Segment needed to provide additional power to the system. Therefore, the Vozdukh (Russian carbon dioxide removal system) was deactivated and the Carbon Dioxide Removal Assembly (CDRA) in the U.S. Lab was activated to provide carbon dioxide control while the Vozdukh was inactive. The USOS was unable to transfer additional power to the Russian segment for the Elektron because of the 4B1 Battery Reconditioning operations. The CDRA ran until for two days until the Elektron operations were stable at lower amperages. The Vozdukh was then reactivated.

During monthly Robotics Proficiency operations in January, the crew moved the Canadarm2 (Space Station Remote Manipulator System, SSRMS) to the viewing position for Russian EVA #12, which was performed on January 26. The ground also performed a checkout of the Umbilical Mating Assembly (UMA) #1 and #2 mating sensor indications. The UMA #2 sensor presented an unmated indication, so the Integrated Motor Control Assemblies (IMCAs) were commanded to reacquire the sensor mating indication. Without losing electrical connectivity, UMA #2 typically loses its mated indication over time. There are no near term impacts to ISS operations.

The Command and Controls System (CCS) Rev 4 Upload activities were performed in early January. The first step loaded the new software into the Backup and Standby Command and Control (C&C) Multiplexer/Demultiplexers (MDM). The remaining Prime C&C MDM (with the old R3 Software load) was transitioned to standby mode and the newly loaded CCS R4 C&C MDMs were transitioned to Prime and Backup configurations. The ISS remained in this configuration for approximately 24 hours to ensure nominal operation. The crew installed the previously ghosted PCS R8 hard drives into the PCSs and re-connected the laptops into the system. Then, the standby MDM, with the old R3 software, was loaded with the new CCS R4 software. The CCS R4 software was successfully completed on all 3 of the C&C MDMs and exhibited nominal operations. This new software retired a number of Station Program Notes (SPNs) and added USOS Command and Control functionality.

The crew then completed the update of the Emergency and Warning book procedures affected by the CCS R4 transition. The new Emergency 2 and Warning books, flown on 16P, were deployed on ISS. The Emergency 1 book change pages flown on 16P were incorporated into the onboard documentation. In addition, pen and ink changes and additional procedure updates to the documents were incorporated by the crew. The Emergency and Warning Systems Operations Data File (SODF) was made consistent with the CCS R4 and PCS software loads.

During the 3-month maintenance performed on the Cycle Ergometer with Vibration Isolation System (CEVIS), the crew inspected the isolators and reported one wire broken and several frayed. Per procedures, the crew wrapped the frayed wires with grey tape to provide protection. There are a total of 16 wires per CEVIS corner. Per the flight rule, CEVIS was in a safe configuration and no action was required until 8 wires have been broken on one side of the CEVIS.

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The ground performed a checkout of the new Mobile Servicing System (MSS) R3 software uploaded to the Primary C&C MDM. Both SSRMS strings and both Robotic Work Stations checked out nominally. A problem was discovered on both the Prime and backup MBS strings with a watchdog timer going into alarm. This condition would prevent the cancellation of the safing of MBS. There was no impact to the upcoming EVA #12 and the MBS was not scheduled for mission operations until the ULF1.1 timeframe. The cause of the anomaly was determined and a software patch was delivered and uplinked (see Section A, item 28 below). The Backup and Standby C&C MDMs were also loaded with the MSS R3.

On Saturday, January 15, a reboost of the ISS was successfully completed. The planned ISS velocity increase was 5.0 meter/second with a planned altitude increase of 8.5 km. The actual results were 5.2 meter/second, and 8.9 km respectively. Propellant utilization for the reboost was 353.3 kg from the 16 Progress tanks, and 21 kg were used from the Service Module tanks for attitude control. Thruster performance was nominal during the 19.75 minute maneuver.

The crew spent most of the two weeks prior to Russian EVA #12 preparing for the EVA. Conferences between the crew and the ground were held to discuss tools, the EVA timeline, Service Module thruster Keep-Out Zones (KOZ) and EVA operation sequences and procedures. The crew built the hardware bundles for EVA transportation and readied the Orlan suits for EVA testing. The configuration of the hardware bundles were confirmed by the ground via video downlink. The Orlan battery packs were charged and the Orlan suits were successfully leak checked. The DC-1 and Service Module transfer compartment (backup Airlock) were configured and the interfaces were successfully verified and tested by the crew. One anomaly was seen with all of the testing performed. The crew tested the EVA support communication panel in DC-1 and was unable to hear the alarm from the speakers. The alarms could be heard on the headsets. This problem did not affect the EVA since it only concerns the DC-1 cabin speakers. The crew completed preparations for the EVA by performing stowage transfers from the primary and secondary Russian Segment Airlocks to the Service Module (relocating hardware not required for the EVA), completing the charge and installation of the Orlan helmet light battery and transferring to the Docking Compartment (DC)-1 final items required for the EVA. The crew then donned the Orlan suits, tested and adjusted the suit for fit and performed a successful dry run in the pressurized suits. The crew verified the suits did not leak and practiced operations in the DC-1 including moving to the EVA hatch and control panel with the hardware bundles, testing EVA tools accessibility on the Orlan Tether Assembly (OTA), and working with the camera. The crew and ground teams prepared the ISS for decrewed operations. The crew sleep shifted the day before the EVA.

On Thursday, January 20, the International Space Station Mission Management Team (IMMT) reviewed the readiness of operations products, safety assessments, applicable program documentation and ground teams to support the Russian Segment EVA scheduled for January 26. A poll was conducted and all members were GO for the EVA.

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The ground team monitored radiation from several solar events that occurred during the week. The crew was informed of the times when the ISS would be passing through regions with elevated radiation levels. Crew exposures did not reach Flight Rule response levels. As a precautionary step, the crew was told to sleep in sheltered areas of the ISS, specifically the Temporary Sleep Station (TeSS) in the U.S. Lab and in the aft end of the Service Module between the Rodnik tanks, in case additional solar events occurred during crew sleep.

The Increment 10 crew successfully completed RS EVA #12 with an official EVA time of 5 hours 29 minutes on January 26. During the EVA, the crew completed all planned tasks which included installation of the Universal Work Platform, Rokviss payload and its antenna on the Service Module, installation of the Biorisk payload on the exterior of the DC-1 and photography of the Elektron vent. The Moscow ground controllers confirmed good communication between Rokviss and the Universal Work Platform.

The crew also inspected the external vacuum vents for the Elektron, Vozdukh and BMP (Micro purification unit) on the Service Module. Deposits around the vents were verbally described and photographs of the vents were taken for evaluation by the ground teams. The film was returned on 9S in April, 2005.

The crew unexpectedly jettisoned the soft protective cover for the Rokviss antenna. This cover was not on the original list of items identified to be jettisoned during this EVA, but a real-time analysis of the re-contact risk resulted in no concern.

During the EVA, the USOS Control Momentum Gyroscopes (CMGs) approached saturation three times. On the first two occasions ISS attitude control was manually handed over to Russia thrusters, and on the third occasion the Failure Detection Isolation and Response (FDIR) commanded the ISS to Loss of Attitude Control (LOAC) or “Free Drift” while the crew completed ROKVISS antenna connector trouble-shooting.

On the first occasion, during the re-location of the Micro-PArticles Capturer/Space Environment Exposure Device (MPAC/SEED) payload (part of the Rokviss Antenna installation task), video showed that the crew may have been in a work site that included a thruster plume KOZ before the Service Module roll thrusters were inhibited. The crew was not observed directly touching a thruster, but was possibly in an area that their suits could incur contamination from the thruster plume. The US and Russian Flight Controllers worked together to disable the thrusters, per the approved plan. According to analysis and pre-approved procedures, there was sufficient time for any potential contamination to sublimate. As a precaution prior to DC-1 ingress, the crew inspected each other’s suits for signs of propellant contamination and reported that none was found.

After ingressing the ISS, the US Flight Control team and the crew reconfigured the ISS to the crewed configuration. The crew restowed EVA tools and supplies and dried and stowed the Orlan suits. A repress from Progress 16 air tanks was performed to return the ISS atmosphere to normal levels following the EVA.

A complete review of this EVA was conducted by the joint US and Russian Operations teams, focusing on the KOZ issue. This was performed to review plans and executed procedures and identify improvements for future activities. The team specifically addressed changes to the KOZ for EVA 13.

As part of Saturday Science, the crew worked with the Biotechnology Cell Science Stowage - Fluid Dynamics Investigation (BCSS-FDI) experiment. The BCSS-FDI is comprised of a series of experiments aimed at characterizing the bioreactor tissue cultures in terms of fluid dynamics in Microgravity. During the experiment, the crew removed bubbles from a Tissue Culture Module (TCM) with a syringe. Bubbles were an unexpected feature in the TCM, which were discovered in imagery obtained during previous increments. Bubbles are known to kill cells, so the focus of the session was to develop a method to remove them from the TCM. Two methods were developed, and each method was determined to be effective. The Saturday Science activity resulted in removing a large quantity of bubbles from the TCM. The crew also conducted a crew conference to convey their observations to the Principle Investigator.

The crew performed a camera firmware update, set up the hardware and activated the payload Earth Knowledge Acquired by Middle School Students (EarthKAM). Following the activation, 4 to 5 orbits were used to test the system. This experiment engages the educational community in inquiry-based learning, using tools on board ISS to explore our home planet. The program enabled students to conduct Earth science research, using remotely sensed data, including imagery. On February 3, as part of the nominal protocol, the crew replaced the 50mm lens with the 180mm lens. This session had 137 schools participating with over one thousand images taken.

Russian Payload PLASMA CRYSTAL-3: The crew completed the set up of the Russian payload Plasma Crystal-3 including: leak checks of the electronics box, evacuation of the work chamber, software upload and verification of the readiness of the experiment. The crew performed 3 experiment runs with small variations in the procedures for each run. The main purpose of the experiment was to study plasma dust at various pressures and quantities of particles with and without the presence of a low frequency harmonic electrical field. Video was taken by the crew at designated times and downlinked to the ground.

The crew started the pre-pack for Shuttle LF-1, and packed approximately 65% of the items approved for prepacking in the first week of the activity. Prepacking continued until the end of the Increment.

The crew completed Onboard Training (OBT) for emergency descent to the ground via the Soyuz vehicle. The crew reviewed their responsibilities during Soyuz flight, studied the onboard descent procedures, practiced in-flight communications, and examined other off nominal procedures that could lead to an emergency descent.

In preparation for the undocking of 16 Progress, the crew transferred urine to the 16P Rodnik tanks. Russian water containers (EDV-U) filled with urine were emptied

(pumped) into the 16P Rodnik tanks 1 and 2. Other EDV-U's were transferred into the dry cargo compartment of 16P.

The crew performed the monthly photography of 5 experiment samples on the Binary Colloidal Alloy Test (BCAT) 3. The experiment investigates the long-term behavior of binary colloidal alloys (crystals) in the microgravity environment where the effects of sedimentation and convection are removed. The purpose was to allow a better understanding of colloids and how to engineer their properties. The objective of the experiment was to determine if the samples would form crystals in microgravity conditions. One of the ground based samples (used for comparison with the microgravity samples) was recently and unexpectedly found to form crystals. The corresponding on-orbit sample was not observed to have crystals.

The crew performed Advanced Diagnostic Ultrasound in Microgravity (ADUM) Scan telescience operations, successfully completing abdominal and bone ultrasound scans. During the abdominal scan, the crew also practiced as if a medical contingency had occurred and the subject was incapacitated. During the bone scans, the crewmembers took turns as the operator and the subject. All activities were completed nominally, and images were downlinked for realtime evaluation by ground specialists.

Satellite Navigation Equipment (Russian Segment Global Positioning System (GPS)) Installation: The crew performed multiple installation activities for the Russian segment GPS equipment designed specifically for Automated Transfer Vehicle (ATV) operations. The goal was to complete installation and cable routing so that functional testing of this hardware can occur when the ISS maneuvers to an Local Vertical Local Horizontal (LVLH) attitude. The crew removed the old Navigation Receiver Modules (___) GPS units, stowed them for return, and installed four new units. Then the crew connected the Navigation Receiver Modules (___) to the onboard cable network and performed associated cable routing. The crew also installed two Navigational Computation Modules in the Service Module and completed the associated power, data, and telemetry cable routing. The crew completed the cable connections of the GPS (Russian ACH-M) hardware to the RS Command and Data Handling System (____) and to the data storage and telemetry system hardware [___]. During the planned March 25, 2005 Russian EVA #13, two additional antennae were installed externally, completing the installation of GPS system.

The crew performed stowage consolidation and disposal activities in the Lab1P4 Rack, the Flight Crew Equipment bag, and the Hygiene Pantry. These activities resulted in packing items for disposal, including hygiene products that contain alcohols. Alcohols have an adverse effect on the condensate recovery system and alcohol containing products have been removed from the ISS. The Lab1P4 rack contains pre-packed return items which will be transferred to the Multi-Purpose Logistics Module (MPLM) for return on Flight LF1.

The ISS transitioned from +YVV to XPOP, and during the handover from the USOS to the Russian Segment, a command error to the Control Moment Gyroscopes (CMGs) caused a momentary USOS Loss of Attitude Control (LOAC) until the Russian Segment

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took control. The ISS stayed under Russian thruster control for one additional orbit while recovering from the LOAC. This resulted in using additional propellant: approximately 27 kg of propellant instead of the nominal 13 kg. The ISS propellant supplies remain at levels higher than planned.

Microbial air and surface samples were taken in the US and Russian segments. The crew took surface samples specifically on three FGB panels and one SM panel where previously analyzed stains had shown fungal contamination. The microbial analysis of the inoculated samples will be completed next week, after a five day incubation period. Air samples, using both Russian and US hardware, were also taken in the SM, LAB and FGB. These samples will be returned to the ground on 9 Soyuz for post flight analysis.

The crew performed the nominal 6-month maintenance of the Treadmill Vibration Isolation System (TVIS) and chassis inspection. On the first day, the TVIS was powered down and removed from the TVIS “pit” in order to perform the inspections. Inspection for wear of several of the internal components were completed including the Gyroscope Wire Ropes, belts, rollers, cables and inlet/outlet screens. The preliminary data indicates that inspections of the chassis were nominal and the components are in good shape. The crew temporarily stowed the TVIS in the Service Module “pit” overnight to maintain proper cabin airflow and to protect the hardware. On the second day, the crew completed the lubrication of components, checking for damage, cleaning screens and checking for loose fasteners. Upon completion of these activities, the plan was for the crew to activate the TVIS and perform a speed characterization. When the crew was to replace a battery in the electronics box, the crew reported the battery was not there. The ground was concerned that the possible missing battery may be loose in the electronics box. The crew searched for the missing battery in the electronics box but did not find it and returned the TVIS to its nominal configuration. The crew completed the speed characterization task and returned to nominal exercise operations on the TVIS.

ISS Maneuver and Reboost: A maneuver of the ISS vehicle to XVV and a successful reboost was completed. The actual burn duration was 7 minutes 37 seconds (planned 7 minutes 37 seconds), the actual delta velocity was 1.9 meters/second (planned 1.9 meters/second), the pre-burn altitude was 355.8 kilometers, and the post-burn altitude was 359.2 kilometers. The ISS altitude was increased by 3.4 kilometers (planned 3.3 kilometers).

During each increment the crew is required to perform various on-board training activities to maintain certifications and emergency response readiness. The crew performed nominal training for Emergency Response to Fire On-board ISS. The MCC-H and MCC-M participated in the training exercise as well. There was a short debrief with the crew immediately after the drill. The crew reported the training went well and there was good coordination with MCC-H and MCC-M.

The first run of the Dust and Aerosol Measurement Feasibility Test (DAFT) Payload was successfully performed. The objective of this experiment was to perform a microgravity demonstration test of the P-Trak ultrafine particle counter as a risk mitigation to future

spacecraft fire safety detection. The P-Trak is capable of counting particles whose mean diameter is below the wavelength of visible light. The DAFT data was downlinked and reviewed by specialists on the ground. The assessment indicated that the conditions onboard ISS rival that of a ground-based clean room.

In preparation for the undocking of 16P on February 27, the crew completed several activities. The crew completed the gathering of US hardware for disposal and completed loading the 16P vehicle with both US and Russian disposal items. The crew also transferred urine from four Russian fluid containers (___) into the 16P Rodnik tanks. The crew emptied the 16P air and oxygen tanks by repressing the ISS twice this week with the last amount of gases in the tanks. The remaining propellant was also transferred from 16P to the FGB propellant tanks. The crew demated the telemetry connector from the Progress and removed the matching unit YC-21 (telemetry interface between the Progress and the Russian Segment). On February 25, the crew removed the air ducting between the 16 Progress and the Service Module, removed and inspected the quick disconnect screw clamps and then closed hatches between the 16 Progress and the Service Module. The leak checks were successfully performed with no leakage observed.

Service Module Battery #5 failed over the weekend of February 19-20 and was replaced on Monday, February 21. It had been operating past its service life and was exhibiting low energy capacity at peak charge. The old battery was disposed of on 16 Progress. The new battery was an onboard spare. Four additional 800A spare batteries remain onboard for use in the FGB and Service Module.

Manual Rendezvous and Docking System (____) Testing and OBT: The crew tested the ____ system with the currently docked 16 Progress, to verify the system is operational for the 17 Progress docking on March 2. During the test, the 16P Motion Control System was not activated to prevent thruster firings in response to manual ____ commands. The checkout was nominal and the crew reported that the appropriate command responses were received. If the Progress is unable to perform an automatic docking the crew can manually control the Progress docking to ISS using the ____ equipment.

On February 25, the crew successfully performed the final cleaning and installation of the water pump in EMU suit 3005. The objective of the activity was to prepare the EMU for return to the ground in a safe configuration, to prevent water leakage and damage to Primary Life Support System (PLSS) components. The EMU is planned for return on Shuttle Flight LF1.

16P successfully undocked at 19:07 DMT on February 27, 2005 (GMT 058/-16:07). Deorbit into the Pacific Ocean occurred at 02:10 GMT March 10, 2005 (20:10 CST March 9).

Progress M-52 (17P) successfully launched on time at 22:09 DMT on February 28, 2005 (GMT 059/-19:09). Ascent was nominal.

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Stage 16P ended with the docking of Flight 17P at 23:10 DMT on March 2, 2005 (GMT 061/-20:10). Docking video was successfully downlinked via NASA assets and transmitted to MCC-M. This video transfer enabled the first nominally planned Russian ISS vehicle docking outside of Russian ground site coverage. Structural Dynamic Measurement System (SDMS) data and Microgravity Acceleration Measurement System (MAMS) data were obtained for docking. This data is used to provide long term loads data on ISS structures for fatigue analysis.

The Increment 10 PIER Summary Task Roll-up for Stage 16P is shown below.

Stage 16P	Baselined	Completed	Withdrawn	Deferred	Not Completed
IDRD	62	57	5	0	0
CSRD	37	22	1	14	0
Added Real-time	15	13	1	0	1
TOTALS	**114**	**92**	**7**	**14**	**1**

Fifty-seven of the sixty-two tasks identified in the IDRD were accomplished during this stage. The remaining IDRD tasks were withdrawn. In addition to the requirements specified in the IDRD, 37 requirements were added per the CSRD, twenty-two of them were completed, 14 were deferred to Stage 17P, and one was withdrawn. There were 14 requirements added real time during Stage 16P. Twelve of these were completed, one was withdrawn and one was not completed.

A. Tasks Completed in Addition to the IDRD Requirements

1. Replace the SM Toilet (___) **[IVA]**

   This requirement was added per the real time planning process. Following the removal and replacement of the pre-treat container of the ___ on Friday, February 11 (GMT 042), the crew reported that a chemical reaction within the toilet system was generating heat. Troubleshooting over the weekend (February 12 and 13, GMT 043 and 044), showed that the pre-treat had contaminated components of the ___ system. All of the toilet components were changed out and the system operated nominally. The contaminated components were triple bagged and placed in 16P. The crew reported that air sampling in the vicinity of the toilet indicated no ammonia or formaldehyde in the atmosphere as a result of the ACY activities. Russian specialists evaluated their 17P manifest which already included ACY spares and added only one additional hose to the manifest. Russian engineering has concluded their investigation of this anomaly and found that was caused by a failure of the internal automatic control system, which did not send a signal to stop the preservative and flush water pump.

2. Remove 16 Progress KURS Hardware **[IVA]**

   This requirement was added per Russian response to the Stage 16P CSRD chit 2499. The intent was to document the removal of the KURS hardware from

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16P even though this activity is already accounted for under 16P Undocking. It was completed on February 18, 2005 (GMT 049).

3. Perform Food Audit **[IVA]**

   This requirement was added to the Stage 16P CSRD chit 2499 by the ISS Program. The intent was to provide status on open food containers and to verify food consumption was tracking to plan, in case adjustments to the food on 17P manifest were needed. The crew completed this audit on February 2, 2005 (GMT 033), and results indicated that the crew was consuming food at the planned rate.

4. Complete SIGI R2 Firmware Upgrade for GPS 1 **[IVA]**

   This requirement was rolled over from Stage 9S, when GPS 2 was loaded with the new SIGI R2 Firmware. The upgrade of GPS 1 was added to the Stage 16P CSRD chit 2499 by the ISS Program. The crew uploaded the SIGI firmware to GPS 1 on February 3, 2005 (GMT 034). Three firmware modules were updated as was previously done on for GPS 2. The intent of the firmware upgrade is to provide more accurate data acquisition capability, calculate more accurate navigation solutions, and transfer this data between the GPS and the Guidance, Navigation and Control (GNC) Multiplexer/Demultiplexer (MDM). In order to perform the task the crew first rearranged the Ops Lan hardware in front of the ITCS Moderate Temperature rack and then rotated the rack to get easy access to the GPS 2 box. The crew performed the upload and the ground repowered the GPS. Several transaction errors were seen and cleared after the ground swapped channels several times. The GPS was then observed to be working nominally. The crew restored the rack and the Ops Lan hardware back to their nominal configurations. When the crew rotated the rack back to its nominal position, however, the crew was only able to latch one side securely. There was no impact to the crew and the ISS with only one side securely latched. The re-latching of this rack was performed during Stage 17P.

5. Perform Pre-breathe Hose Assemblies (PHA) QD Torquing, Inspection, Mask Cleaning and Audit **[IVA] [Inc8/1316, Inc9/1996] (Deferred from Stage 9S)**

   This requirement was rolled over from Stage 9S, and was added to the Stage 16P CSRD chit 2499 by the ISS Program. The intent of this requirement is to verify that the PHA were ready to support EVA activities for LF1 and ULF1.1. The crew completed this task on February 9, 2005 (GMT 40), verifying that the hardware components were free of damage, that the hose fittings were properly torqued, and that the hardware was properly configured. The crew was unable to locate three components of the PHA Spares kit: an oxygen hose, an extension hose and a mask holder. The absence of these redundant items does not prevent the crew from performing an ISS based EVA. Specialists on the ground believe these items are on board, and that the crew will locate them during the remaining Airlock Audit activities.

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6. Complete Joint Airlock Configuration and Stowage Optimization

   The purpose of this task was to determine that all LF1 tools were available, that return items matched the LF1 manifest, and to perform basic AL housekeeping. This requirement was rolled over from Stage 9S, and was added to the Stage 16P CSRD chit 2499 by the ISS Program. It was formerly called Airlock Audit and was initiated during Stage 9S in four parts with a priority order (reference OCA message 10-0338). The crew completed the first half of the Priority 1 tasks during Stage 9S. The remainder of the Priority 1 tasks were completed February 9, 2005 (GMT 040). The activity consisted of validating, consolidating and stowing EVA consumables, EMU gear, airlock stowage bins, EVA Cargo Transfer Bags (CTBs), tool kits, and maintenance kits. Priority 2 and 3 tasks were completed on February 16, 2005 (GMT 047). The activities included pre-packing of hardware to return on shuttle and verifying hardware to stay on ISS. These tasks were performed on the EMU equipment bags, EMU hardware and the EMU servicing kit. Part 4 was deferred to Stage 17P, where it was not completed and deferred to Increment 11.

7. Perform Metal Oxide (METOX) canister regeneration **[IVA]**

   This requirement was added to the Stage 16P CSRD chit 2499 per EVA input. This requirement was originally in the Stage 17P IDRD, and was moved up due to the expected lack to time during Stage 17P. The intent of this requirement was to regenerate two METOX canisters in preparation for Shuttle Flight LF1. These will be used in the US Extravehicular Mobility Units (EMU) to provide carbon dioxide removal during Extravehicular Activities (EVAs). The crew completed this activity on February 8, 2005 (GMT 039). During the METOX regeneration operation, carbon dioxide is released from the canisters into the ISS cabin, so the Carbon Dioxide Removal Assembly (CDRA) was activated during the regeneration to remove this additional load from the atmosphere. The CDRA performed nominally during the regeneration, and at the completion of the activity, it was deactivated. During the METOX regeneration, the Common Cabin Air Assembly (CCAA) experienced a wet indication which resulted in the hardware shutting down. The Common Cabin Air Assembly (CCAA) is nominally designed to do this during CDRA operations to prevent excess water from getting into the CDRA. As a result of the CCAA shutdown the Trace Contaminate Control System (TCCS) was expected to shut down and it did. With no active CCAA in the U.S. Lab the crew provided smoke detection until the CCAA was activated. The CCAA was successfully reactivated, the METOX regeneration successfully completed, and all systems returned to their nominal configuration.

8. Perform Plasma Krystall Experiment

   This requirement was added per IPRussia input to the 16P CSRD chit 2499. The intent was to provide added visibility even though it is included as a Russian Payload under the IDRD/CSRD category: Perform High Priority

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US/Russian Payload Operations. The experiment was set up on January 31 and February 1, 2005 (GMT 031 and 032). It was executed between February 2 and 8, 2005 (GMT 033, 034, 035, 038, 039). The main purpose of the experiment is to study plasma dust at various pressures and quantities of particles with and without the presence of a low frequency harmonic electrical field.

9. Convert 760XD laptop for PCS use and perform hard drive ghosting when required due to loss of existing PCS. **[IVA] (Deferred from Stage 9S)**

   This requirement was rolled over from Stage 9S, and was added to the Stage 16P CSRD chit 2499 by the ISS Program. On February 25, 2005 (GMT 056), the crew configured the Medical Experiment Computer (MEC) for PCS use and cold stowed it onboard.

10. Perform SM PCS Troubleshooting **[IVA]**

    Added per MOD input to the Stage 16P CSRD chit 2499. The intent was to repair the SM PCS due to low numbers of workable 760XD machines to function as a PCS. The crew changed out the SM PCS hard drive on January 28, 2005 (GMT 028).

11. Perform Stowage Optimization Activities as required

    The following requirements were added to the Stage 16P CSRD chit 2499 by the ISS Program.

    a. Computer Pantry Audit

       The intent of this audit was for the crew to remove items for disposal and to consolidate remaining Computer equipment. It was continued from Stage 9S, where approximately 70% of the activity was completed. The crew performed this activity on February 8, 2005 (GMT 039), completed approximately 25% more of it. The remaining 5% of the activity was deferred to Increment 11 as part of Rack Cleanup activity.

    b. FCE Audit Follow-up/Consolidation

       The intent of this requirement was to consolidated 2 bags of FCE items into 1. The crew completed approximately half of this activity on February 7, 2005 (GMT 038) and gained 0.25 CTBE Stowage volume. Reference OCA message 10-0529. The remainder of the task was handed over to Increment 11.

12. Perform Commissioning of Ground Based Commanding of Space Station Remote Manipulator System (SSRMS) **[IVA] [Robotics] [Ground]**

    This requirement was added per Canadian Space Agency (CSA) input to 16P CSRD chit 2499. The activity was broken down into two phases. Phase 1

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was completed during Stage 16P, and is documented below per item 12A. Phase 2 was deferred to Stage 17P (see #3 below under C. Tasks Deferred).

a. Perform Free Space Motion using Ground Control **[IVA] [Robotics] [Ground]**

The crew completed Phase 1 on February 24 and 25, 2005 (GMT 055, 056). Phase 1 was executed in 2 parts over a 2 day period. The objective was to effectively and safely exercise the ground command control capability. The test demonstrated the ability of the ground to execute uploaded free space maneuvers while managing all the communications and video constraints required for safe operations of the SSRMS. The Mobile Servicing System (MSS) software upgrades uplinked in January (MSS 3.1) allowed the ground to execute limited auto-sequence maneuvers and Latching End Effector (LEE) operations. The MBS mast camera was originally planned for use during the commissioning operations, however, due to the failure of the camera on GMT 49, alternate cameras were used to monitor clearance between the P1 truss and the SSRMS. During Part 1, executed on GMT 055, the ground successfully performed a series of joint auto sequences as well as the LEE checkout. During Part 2, executed on GMT 056, the ground positioned the end of the SSRMS into the final position approximately 5 feet from the Lab Power Data Grapple Fixture (PDGF). The onboard crew monitored the SSRMS movement and was prepared to emergency stop the SSRMS if necessary. Crew action was not required and all maneuvers were executed as planned.

13. Perform SSRMS Sticky Grapple Fixture Release Test **[IVA] [Robotics] [Ground]**

This requirement was deferred from Increment 7 chit 1053 and Increment 8 chit 1487. It was added to the Stage16P CSRD chit 2499 per input from CSA. The main objective was to perform engineering tests to troubleshoot the "sticky grapple fixture" problem, and gather date to analyze whether or not the "dither" technique is a viable solution to the sticky Grapple Fixture release issue. This problem appeared during the 6A stage and re-occurred frequently since then. It is believed to be caused by friction inside the WR motor. The crew completed this task on February 11, 2005 (GMT 042) as part of monthly SSRMS Proficiency Operations. The activity was designed to test solutions to the "sticky grapple fixture" problem that has been observed numerous times in the past. The crew maneuvered the SSRMS to a Lab Flight Releasable Grapple Fixture (FRGF), and grappled it with the end effector of the SSRMS. They then successfully released the FRGF and backed out the end effector using a special dither technique with the wrist roll joint to counteract the loads-and-friction-induced sticking phenomenon. At the completion of the activity, the SSRMS was maneuvered back to the original position. This task completed the second of four tests designed to resolve the problem.

14. Perform CMG-2 Wheel Speed Characterization Test **[Ground] (Chit 1979)**

    This ground-only requirement was added per MOD input to the Stage 16P CSRD chit 2499. CMG-2 was be used for attitude control throughout the test The intent of this activity was to gather data on the CMG vibrations and spin motor currents at 16 different CMG Wheel speeds. This data was to be used to aid CMG evaluations, should the CMGs have to be operated at any operational speed other than the nominal 6600 RPM. The ground initiated a CMG wheel speed test on January 18, 2005 (GMT 018). This test was performed over 4 days since a minimum of 4 hours was required at each speed. After the test was completed on January 21, 2005 (GMT 021), the CMG-2 Wheel speed was returned to the nominal 6600 RPM. The results of the test were not used to make changes to the operation of the CMGs, but are part of a data collection effort to gather baseline on the CMG operation.

15. Perform the Cover Duplicate Fireport activity **[IVA]**

    This requirement was added to the Stage 16P CSRD chit 2499 per input from the MER. This activity completed the "Install Airlock Fireport Labels" activity performed during Stage 9S. The intent was to correct the nomenclature of one fireport label and to cover one of two duplicate fireports that service the same interior volume behind an Airlock Closeout panel. The crew completed this activity on February 1, 2005 (GMT 032).

16. Perform P6 Battery Re-Conditioning and Capacity Test **[Ground] (Inc10/chit 2464) (deferred from Stage 9S)**

    This requirement was rolled over from Stage 9S, and added to the Stage 16P CSRD chit 2499 by the IMC. The P6 battery reconditioning was a ground only activity that required the battery to be taken off line so repetitive deep-discharging and recharging could be performed. The intent of reconditioning was to restore capacitance to the battery, improve battery performance and provide insight into data to assess battery health. There are a total of 6 battery sets that provide power to the US Segment during night passes, and are recharged while the ISS is in daylight. While the battery set was off-line being reconditioned, the ground managed the power loads on the affected channel at reduced levels. The ground completed the reconditioning of the 4B1 Battery Set on January 10, 2005 (GMT 010), achieving a 13.3% improvement in battery capacitance. The 4B3 battery set reconditioning was completed February 21, 2005 (GMT 052). The battery set gained capacitance, but this gain could not be quantified since no capacity test was run.

17. UOP Power Out Switch Troubleshooting for RPCM LA2A3B-C RPC 4 Trip **[IVA] (Inc10/chit 2463)**

    This task was carried over from Stage 9S and added to the Stage 16P CSRD chit 2499 by MER input. Additional troubleshooting was initiated on January 5, 2005 (GMT 005), and continued on January 6, 2005 (GMT 006) per OCA

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10-0403 and 0414. The intent was to power cycle the UOP-4 Power Out Switch and to leave it powered for an extended period to check for a repeat of the trip that occurred during Stage 9S. The crew also checked the 120V power cable and PS120 Junction Box. The trip did not re-occur and the remainder of the troubleshooting was placed on the task list and deferred to Stage 17P.

18. Troubleshoot 760XD and A31P Laptops **[IVA] (Inc10/chit 2460 and 2515)**

    This task was added to the Stage 16P CSRD per input from the MER and is documented in chit 2460. The requested troubleshooting was accomplished on January 6, 2005 (GMT 006), but did not recover any functional 760XD laptops. Shells 6006 and 6076 were found to be failed and stowed in LAB1P4 G location. The Station Support Computer (SSC) 1 did not recognize any batteries installed, so it was operated without a battery on ISS DC power. The crew stowed two batteries removed from SSC1. The additional troubleshooting requested per chit 2515 was deferred to Stage 17P and then to Increment 11.

19. Perform Ghosting of PCS Harddrive to maintain a minimum of spares to support the current CCS configuration. (per chit 018/ISS0063 and chit Inc8/1294) (Deferred from Stage 9S)

    This task was deferred from Stage 9S and added to the Stage 16P CSRD by the IMC. The CCS R4 upload activities were completed on January 13, 2005 (GMT 013). The crew installed PCS hard drives containing the matching PCS R8 software load. The crew then ghosted four PCS hard drives on January 14, 2005 (GMT 014), giving the ISS a total of 6 ghosted PCS hard drives. This was consistent with flight rule requirements.

20. 16P SSC Network Reconfiguration

    This requirement was added per the real time planning process. The crew loaded five (5) A31p laptops with upgraded SSC software loads on January 13, 2005 (GMT 013). Two of the laptops were to be used as SSC clients in the Service Module, one was to be used as an SSC router in the FGB, and two were intended for use as SSC clients in the US Segment. The 3 SSCs to be deployed in the Russian Segment will replace existing 760XD SSC laptops. The SSC software upgrades support the new and improved Inventory Management System (IMS) and the Plug-in-Plan (PiP) tool. These new laptops could not be deployed until the certification was completed (see #21 below).

21. Deploy A31P Laptops (3 each)

    This requirement was added per the real time planning process. These laptops were delivered on 16P, but could not be deployed immediately pending certification. The review and approval of the joint US and Russian safety data package was completed and the US received written approval from Russian safety for the deployment of the A31p laptops in late January, 2005. The A31P laptops replaced the 760XD laptops in the Russian Segment as server and

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client Space Station computers (SSCs). The new laptops provide improved performance, increased speed and have greater capability than the old units. The deployment was completed on January 31, 2005 (GMT 031).

22. Troubleshoot and Recover Nominal Elektron Operation

This requirement was added per the real time planning process, Planning Product Change Request (PPCR) 10-0569. The intent of this activity was to return the Elektron to an operable state to continue providing atmospheric oxygen by hydrolyzing water. The Elektron failed on January 1, 2005 (GMT 001). Initial troubleshooting was performed by the crew on January 3 and 4, 2005 (GMT 003 to 004) to remove air bubbles from the Liquid Unit, which was thought to be the cause of the malfunction. This activity was not successful in recovering the Elektron. This led to the decision to replenish the electrolyte in the Liquid Unit (see #22a below).

a. Troubleshoot Elektron by Transferring Electrolyte from Liquid Unit 7 into Liquid Unit 5.

This requirement was added per the real time planning process. On January 6, 2005 (GMT 006), the crew transferred electrolyte from old Liquid Unit 7 into the Liquid Unit 5 installed on the Elektron. After this, the system operation was recovered, but only at high production rates, i.e. 50 Amp Mode. On January 8, 2005 (GMT 008), another electrolyte transfer was performed, and the system operated nominally at lower production rates, i.e., 32 Amp Mode. The Elektron operated like this until it was deactivated just prior to Russian EVA 12 on January 26, 2005 (GMT 026). This deactivation was performed as part of nominal ISS configuration for unmanned operations. After EVA 12, the Elektron was reactivated, but would only operate in 50 Amp Mode. In lower modes, it would shut down. After two days operating in 50 Amp Mode, the atmospheric oxygen levels were approaching the flammability limits, so the Elektron was deactivated. It remained off for the remainder of the month so all the oxygen in the 16P oxygen tanks could be used for metabolic purposes prior to 16P undock on February 27, 2005 (GMT 58).

23. Replace Failed Lamp Housing Assemblies (LHAs)

This requirement was added per the real time planning process. The intent was to recover lighting in the Lab and Node by replacing failed LHAs with new ones delivered on 16P. The crew completed this activity on January 5, 2005 (GMT 005). Two were replaced in the U.S. Lab and one in the Node. Troubleshooting of another recently failed Node General Luminaire Assembly (GLA) was also performed. The GLA failure was attributed to a failed ballast assembly instead of the LHA. As a result of this work, the Lab recovered full lighting and the Node had 4 of 8 working GLAs. The 4 failed GLA locations in the Node required new LHAs and ballast assemblies which were not onboard at the time.

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24. Test Operational Workaround for Known Error on Beta Gimble Assembly (BGA) 4B Display

    This requirement was added per the real time planning process. During ground testing prior to the PCS R8 software upload, PCS display pages would terminated unexpectedly for the 2B and 4B displays. The crew requires these pages for LOAC contingencies when the BGAs must be manually controlled. The intent of this activity was for the crew to test a workaround to the procedure to bring up the BGA display pages. The crew tested this operational workaround following the CCS R4 and PCS R8 software activation completed on January 12, 2005 (GMT 012). The initial testing was not successful. Additional troubleshooting procedures were then executed by the crew which restored the BGA data on the PCS display. The workaround stayed in place until a new software patch was uplinked on January 19, 2005 (GMT 019) and loaded on the LAB PCS and SM PCS. Following the upload, the crew successfully tested the displays and verified nominal operations of the displays.

25. Transfer Condensate From Lab Condensate Tank into Contingency Water Container (CWC) For Use as Flush Water

    This requirement was added per the real time planning process. The intent was to remove condensate which had been residing in the Lab Condensate for extended period of time. On January 7, 2005 (GMT 007), the crew transferred 22.4 liters of US condensate from the U.S. Lab Condensate tank into a CWC. Fluid from this CWC was used as flush water in the Service Module hygiene compartment.

26. Perform Pressure Check on SM Attitude Control Thruster Manifold (Ground Only)

    This ground only activity was added per the real time planning process. The intent was to verify the functionality of two pressure transducers in the SM Propellant system and verify that the manifold had good pressure integrity. The ground team initiated a leak check of the SM Propulsion System (___) Attitude Control Thrusters (__) Manifold 1 (__1) on January 31, 2005 (GMT 031). The leak check was terminated February 4th. The data indicated that the validity of transducer data was questionable. The only impacts identified were the need to open manifold valves to the Main Engine transducers to verify the actual manifold pressure, that the pressure is stable, and that the manifold has no leaks.

27. Troubleshoot and Recover Nominal Service Module (SM) Air Conditioner (___) 1 Operation

    This requirement was added per the real time planning process. The intent was to recover nominal ___1 Operation and condensate production. The ___1 had been deactivated since December 24, 2004 (GMT 359). Prior to deactivation, the unit was unable to collect condensate. The ground specialists theorized that

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a film had developed on the surface of the wicks and that it prevented nominal condensate collection. On February 16, 2005 (GMT 047) the crew flushed the evaporator wicks with water and manually pumped water from a Russian Water Container (___) (approximately 4 or 5 liters) into the C_B1 heat exchanger evaporator-condenser unit until it was completely full, and allowed it to soak overnight. On February 17, 2005 (GMT 048), the crew pumped the water from the C_B1 heat exchanger evaporator-condenser into the condensate collection tank. C_B1 was then activated. The C_B1 functioned nominally until Stage 17P.

28. Mobile Base System (MBS) Diagnostics Downgrade Patch for Watch Dog Timer Anomaly

    This requirement was added per the real time planning process. The intent was to collect diagnostic data on the Watch Dog Timer anomaly discovered in January, 2005. The MBS software patch was successfully uplinked February 18, 2005 (GMT 049) to downgrade the Watch Dog Timer alarm from Category 1 to Category 2. Data downlinked from the MBS confirmed that the root cause of the anomaly was the Safing Timing test. The MBS remained operational for camera checkout in preparation for the Space Station Remote Manipulator System (SSRMS) Ground Control commissioning scheduled the following week. However, during the checkout, the MBS Mast Camera failed to transmit a video signal. Subsequent troubleshooting procedures exonerated the software patch as being the cause of this video failure. The MBS Mast Camera was determined to have failed, but caused no impacts to the Ground Commissioning activity.

29. Take Video of 2B Solar Array During XPOP Transition (Ground Only)

    This requirement was added per the real time planning process. The intent was to assess the shoulder bolts on the 2B Beta Gimbal Assembly (BGA) housing, which were thought to be at risk of loosening due to longeron shadowing in certain attitudes. During the ISS maneuver from XVV to XPOP on February 22, 2005 (GMT 053), the flight control team videotaped the 2B Solar Array to collect imagery to assess the shoulder bolts. This imagery was downlinked for subsequent evaluation by ground specialists. Analysis determined that the fundamental mode of the 2B Array matched the baseline natural frequency taken during 7A docked ops, which indicates the shoulder bolts have not loosened and that the structure is healthy.

30. Perform Maintenance on USOS Video Tape Recorder (VTR) System

    This requirement was added per the real time planning process to clean the VTR 1, which began delivering jittery video on January 30, 2005 (GMT 030). This activity was mainly performed by the ground, with the crew only inserting the cleaning tape into the VTR. Initial cleaning of the VTR 1 head did not improve the quality of the video. Troubleshooting was completed by the ground (as documented in chit 2578) on February 9, 2005 (GMT 040), to verify that it

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was not a signal routing problem. Additional VTR head cleaning was documented in chit 2600, and was performed on February 23 and 25, 2005 (GMT 053 and 056). This activity resulted in minimal imagery improvement, and further head cleaning was requested to continue into Stage 17P.

B. Tasks Not Completed

1. Airlock Temperature Measurements during Metal Oxide (METOX) Canister Regeneration **(Chit 2334)**

   This requirement was added per the real time planning process as a tag-on to the METOX Regeneration activity. During previous METOX regenerations, crewmembers commented that the Airlock Cabin temperature was cold. This occurs because the Airlock cabin temperature is set to 65°F during METOX regenerations to ensure proper air temperatures inside the METOX/CCAA rack. The intent of this requirement was for the crew to perform a temperature survey inside the METOX/CCAA rack during METOX regeneration, for ground evaluation to determine whether the cabin temperature set point could be raised. The temperature survey was attempted on February 8, 2005 (GMT 039) but the ground teams did not ensure the ISS was properly ISS configured for this temperature survey, which could not be completed due to set point discrepancies and procedure errors that prevented cabin temperatures from reaching the required steady state condition.

C. Tasks Deferred

1. Apply Yellow Tag to the PGT programming cable **[IVA] [Inc 9/2133]**

   This requirement was rolled over from Stage 9S, and was added to the Stage 16P CSRD chit 2499 by the ISS Program. The intent was to prevent the crew from using this cable, since one lot of connectors that was used to make the cable was found to have fractured sleeves, and mating the cable could result in bending connector pins on the laptop side. It was accepted based upon the caveat that it would be added to the crew's timeline only in the event that the crew must handle the PGT programming cable for another scheduled task. During Stage 16P, there were none of these tasks scheduled. It was deferred to Stage 17P.

2. Perform FGB Stowage Clean up activity **[IVA]**

   The intent of this activity was to alleviate the onboard stowage situation by identifying which items stowed in the FGB could be disposed of, and by gaining stowage efficiencies by re-arranging the remaining stowage. The Russian side did not schedule this activity for completion during Stage 16P. It was deferred to Stage 17P, and then to Increment 11.

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3. Perform Power Data Grapple Fixture (PDGF) Capture/Release Operation using Ground Control **[IVA] [Robotics] [Ground]**

   This requirement was added per CSA input to 16P CSRD chit 2499. The intent of this requirement was to perform a capture release of a PDGF with the SSRMS end effector under ground control. The plan called for the crew to stand by to safe the system during this operation as a precautionary measure. This activity would complete the proof-of-concept for the SSRMS ground control capability. It could not be scheduled during Stage 16P and was deferred to Stage 17P. It was then deferred to Increment 11.

4. Microgravity Sciences Glovebox (MSG) Audit **(Deferred from Stage 9S)**

   This requirement was deferred from Stage 9S and added to the Stage 16P CSRD chit 2499 by the IMC. The intent of this requirement was for the crew to audit MSG hardware for the payloads community, and to organize items for return. This requirement was deferred to Stage 17P and was not completed during Increment 10, due to higher priority Payload activities such as ADUM, which took precedence.

5. ___ ____-4_ calibration. **[IVA] (Pending Certification) (deferred from Stage 9S)**

   This task was deferred from Stage 9S, and added to the Stage 16P CSRD chit 2499 by IPRussia. The ____ is a Russian-supplied hand-held device that measures HF, HCN, CO and NH_3. It was delivered to ISS on flight 13P on January 31, 2004. The intent of this requirement was to test and calibrate the atmospheric readings of the device. The initial activation of the unit occurred on May 26, 2004 (GMT 147), however the unit emitted Radio Frequency (RF) radiation at unacceptable levels. To prevent the RF radiation from interfering with other hardware, a shielded power cable was developed and scheduled to be delivered on 16P. This requirement was deferred to Stage 16P, and it was then deferred to Stage 17P. It was successfully completed on March 9, 2005 (GMT 068).

6. Perform speed regulating unit (_P__) installation onto cabin fans in SM including installation of cable inserts in the manual velocity control unit. **[IVA] (deferred Inc. 9 and Stage 9S)**

   This requirement was deferred from Increment 9 and Stage 9S. It was added to the Stage 16P CSRD chit 2499 by IPRussia. The intent of this activity is to install speed regulators on the SM cabin fans. It was deferred to Stage 17P, and then to Increment 11, due to the scheduling of higher priority tasks during Increment 10.

7. Install Telvision (TV) Cables in FGB

   This requirement was added by IPRussia to the Stage 16P CSRD chit 2499. The intent of this activity is to improve the quality and reliability of TV images of Russian vehicles docking and undocking operations transmitted by USOS Ku Band assets. It was not scheduled during Stage 16P due to higher priority activities taking precedence, and was deferred to Stage 17P, and then to Increment 11.

8. Node 1 Smoke Detector Cleaning (Inc10/2478) **[IVA]**

   The data from this smoke detector indicated that the reflecting mirror internal to the unit had become contaminated, probably with dust particles. This requirement was added to the Stage 16P CSRD chit 2499 per input from the MER as documented in chit 2478. The intent was to use air from a syringe or nitrogen from the Connector Cleaning kit to remove the dust. Since a redundant smoke detector was operational in the Node, this requirement was deferred to Stage 17P.

9. P6 Solar Array Photo Survey **[IVA] (Inc10/chit 2461)**

   This task was added to the Stage 16P CSRD per input from the MER and is documented in chit 2461. The intent of this requirement was for the crew to perform a detailed imagery survey of the P6 solar arrays, to photo-document the condition of both the 2B and 4B solar arrays through ISS windows. This task was requested in response to Problem Reporting and Corrective Action (PRACA) 3165, which documents the failure of 2B Solar Array Wing (SAW) Right Blanket String #5. This anomaly was traced to an open braze joint on the SAW, with the secondary effect of a failed adhesive bond between the blanket panel and the Flat Circuit Connector (FCC). This photo survey will aid in monitoring the integrity of the bonds on the remaining panels by mapping the back (non-cell) side of the array with enough overlap so that the entire array is photographed. Due to scheduling higher priority tasks, this activity was deferred to Stage 17P and then to Increment 11.

10. Perform Leak Check of LAB1P4 VES QDs **[IVA] (Inc10/chit 2428)**

    This task was added to the Stage 16P CSRD per input from the MER and is documented in chit 2428. During Mission 5A.1, a leak was noticed at the LAB1S2 location while the Human Research Facility (HRF)-1 payload was connected to the VRS. (Reference PRACA 2788). Troubleshooting using the VES/VRS jumper determined the leak was in the VRS half of the QD, which leaked only when mated. The intent of this task is to leak check 12 Vacuum System Quick Disconnects (QDs) which have not been mated since ground testing prior to the launch of the Lab Module. The most urgent of these is the LAB1P4 VES QD, which the HRF-2 payload will require during LF-1. Due to higher prior tasks scheduled during Stage 16P, this task was deferred to Stage 17P, and then to Increment 11.

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11. Install KSK Network Channel Controller

    This activity was added per IPRussia input to the Stage16P CSRD chit 2499. The task was not scheduled during Stage 16P due to higher priorities and was deferred to Stage 17P and then to Increment 11.

12. Perform SDTO 13006-U/R, Forcing Function Definition and Microgravity Allocation of Crew Resistive Exercises, for a nominal HC-1 (Russian Force Loader) exercise session. **[Ground] [IVA] (IWIS Required) [Imagery] [Inc 9 IDRD CR 8359A – 15P CSRD] (Deferred from Stage 9S)**

    This requirement was deferred from Stage 9S. It was added to the Stage 16P CSRD chit 2499 by IMC. There were inadequate IWIS battery resources available during Increment 10, so this activity could not be performed during Increment 10. It was deferred to Stage 17P and then to Increment 11.

13. Perform SDTO 15003-U, Microgravity Environment Definition, for a Nominal SM ergometer exercise session. **[Ground] [IVA] (IWIS Required) [Imagery] [Inc 9 IDRD CR 8359A – 15P CSRD] (Deferred from Stage 9S)**

    This requirement was deferred from Stage 9S. It was added to the Stage 16P CSRD chit 2499 by IMC. There were inadequate IWIS battery resources available during Increment 10, so this activity could not be performed during Increment 10. It was deferred to Stage 17P and then to Increment 11.

14. Install brackets for installation of fans (___8 and ___9) on vibration isolators.

    This IDRD task was deferred to Stage 17P and then to Increment 11. The intent of this requirement was to install equipment that would lower the noise levels in the Russian Segment.

D. Tasks Withdrawn

1. Perform USOS stowage reconfiguration of PMA3, PMA2, and Zenith 1 (Z1) dome access. **[IVA]**

   This task was added to the Stage 16P CSRD chit 2499 by the ISS Program. The intent of this requirement was to alleviate the onboard stowage situation by emptying PMA2 in preparation for LF-1, transferring items into PMA3 (that met certain criteria) and repacking the Z1 Dome to achieve stowage efficiencies. The ISS Program identified several items that met the PMA3 stowage criteria, primarily items that could survive in a vacuum at extreme temperatures, and would not be required for long periods of time. The stowage gain was estimated to 24 CTBE. However, performing this requirement was predicted to use nitrogen such that the onboard quantity would be at or below the skip cycle quantity by LF-1. The crew time estimate required to perform this task was estimated to be 17 hours. Therefore, the IMMT Chair decided not to perform this activity during Increment 10, in order to preserve the consumables and crew

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time. The requirement was withdrawn. The requirement and this decision is documented in chit 2532.

2. Perform Russian acoustic hardware installations. **[IVA]**

   None of the Russian acoustic hardware installation IDRD tasks were completed during Increment 10. Two of the three tasks were deleted and the third task was deferred to Increment 11 (see item #14 in Section C above, and items #3 and 4 below).

3. Install vibration isolators and air ducts with acoustic shielding on fans ___1, ___2. **[IVA]**

   This IDRD requirement was deleted per IPRussia input to 16P CSRD chit 2499, because the necessary hardware was re-scheduled for delivery on 18P, which would be during Increment 11. The intent was to install equipment that would lower the noise levels in the Russian Segment.

4. Install fans ___1 – ___-4, ___1 – ___2 on vibration isolators.

   The intent of this IDRD requirement was to install equipment that would lower the noise levels in the Russian Segment. The delivery of the necessary was re-scheduled for delivery on 17P, so the requirement was deleted per IPRussia input to the Stage 16P CSRD chit 2499.

5. Perform recharge of NiMH (helmet light, REBA, Pistol Grip Tool (PGT) batteries. **[IVA]**

   This IDRD requirement was deleted by input to the Stage 16P CSRD chit 2499 from the EVA Project Office. The intent of this requirement was to maintain the batteries in operational states by periodic charging and discharging to maintain battery health. This was accomplished during Russian EVA 12, since the equipment was used and the batteries received a charging cycle.

6. [A__-_] tests using two antennas

   This requirement was requested per email from Marina Sycheva to Katy Leary on January 17, 2005, SS28799. The test could not be scheduled or accomplished during Increment 10 and was not deferred to Increment 11, so the task was deleted.

7. Prepare the docking TV camera power circuits (install onboard equipment control system (____)) plugs __-12_ and test check of the TV camera circuits. **[IVA]**

   This IDRD requirement was withdrawn since the TV camera was not delivered on 16P. It was found to be defective during bench review, and was sent for repair.

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7.4 STAGE 17P

17 Progress Launch/Docking: Progress M-52 (17P) successfully launched on time February 28, 2005 at 22:09 DMT (GMT 059/-19:09). Ascent was nominal. Docking occurred nominally on March 2 at GMT 20:10 (14:10 CST). Docking video was successfully downlinked via NASA assets and transmitted to MCC-M. This video transfer enabled the first nominally planned Russian ISS vehicle docking outside of Russian ground site coverage. Structural Dynamic Measurement System (SDMS) data and Microgravity Acceleration Measurement System (MAMS) data were obtained for docking. This data is used to provide long term loads data on ISS structures for fatigue analysis.

The crew completed the 17P cargo transfers by March 10, 2005.

As Saturday Science for March 5, the ISS Commander (CDR) photographed several Binary Colloidal Alloy Test (BCAT)-3 samples. The main objective of the photography is to compare the re-crystallization of a microgravity sample to an identical sample on the ground. The results indicated that the majority of these samples had crystallized.

The crew performed the US Payload Advanced Diagnostic Ultrasound in Microgravity (ADUM) scan as the major US payload during Stage 17P. ADUM demonstrated the capability of non-medical personnel to downlink diagnostic information (ultrasound images) for evaluation by medical specialists on the ground.

Equipment for the Russian Payload Specular Point-like Quick Reflector (SPQR) experiment arrived on 17 Progress. The crew installed the SPQR hardware, a Cube Corner Reflector (CCR) and a window shield (to block sunlight), on the nadir facing Service Module Window #3 on March 11. A laser was directed towards the ISS from a ground station located in Brookline, Massachusetts. The light was reflected from the CCR and treated as a point light source for re-acquisition on the ground. The objective of SPQR was to process images with better resolution compared to traditional methods. The laser sessions started on March 17. Fourteen 5 minute sessions were performed and required no crew involvement. Special instructions were given to the crew regarding eye safety during the laser events, but the Payload Safety Review Panel (PSRP) Hazard Reports indicated that the laser power at the ISS was well below the threshold for injury.

The crew unstowed the Russian Payloads BIOECOLOGIYA and BRADOZ from 17 Progress. The payloads were transferred and installed in designated locations in the Russian segment. Once installed, the crew photographed the installed position of both experiments and downlinked photos to the ground. The BIOECOLOGIYA experiment studies the generation of high-efficiency strains of microorganisms to produce petroleum biodegradation compounds, organophosphorus substances, vegetation protection agents, and exopolysaccharides to be used in the petroleum industry. The BRADOZ experiment studies bioradiation dosimetry in space flight.

The crew performed planned Station Remote Manipulator System (SSRMS) proficiency operations on March 9. The objective of the operations was to maneuver the SSRMS to the EVA 13 viewing position. Upon completion of the proficiency operations, the crew used the SSRMS cameras to review the EVA 13 workspaces. All systems performed nominally. After the crew completed the review of the workspaces, the ground attempted to power up the previously failed MBS Mast camera without success. This reconfirmed a hard camera failure.

The SPCU Heat Exchanger was replaced on March 14 (see write-up in Section A below)

On March 17, the crew started preparations for EVA 13, executed on March 28th. The crew verified that all the US EVA Tools were available in the expected locations and prepared the Docking Compartment as the Airlock by moving non-EVA related stowed cargo to the SM and FGB and installing the supplemental portable repress tank. The purpose of this installation is to provide repress capability in the DC-1 in the event the pressure equalization valve fails to open during the nominal repress. The crew reviewed the EVA 13 timeline/procedures and collected all the Russian tools to be used for the EVA. Over the next ten days, the crew continued preparations for EVA 13. They built the hardware bundles for EVA transportation and readied the Orlan suits for EVA testing. The Orlan battery packs were charged and the Orlan suits were successfully leak checked. The DC-1 and Service Module transfer compartment (backup Airlock) were configured and the interfaces were successfully verified and tested by the crew. The crew also performed a successful dry run in the pressurized suits.

The crew detected the odor of “hot plastic” in the Russian Segment on March 17. Atmospheric readings were taken with the Compound Specific Analyzer - Combustion Products (CSA-CP) and indicated no smoke or elevated levels of combustion gases. The crew identified the source of the odor as a fluorescent light unit in the Service Module. They reported that the light was operating significantly hotter than the other units. After turning off the light, the crew reported that the odor dissipated.

On March 18, the crew performed additional runs Biotechnology Cell Science Stowage Fluid Dynamics Investigation (BCSS-FDI). BCSS-FDI is comprised of a series of experiments aimed at characterizing the bioreactor tissue cultures in terms of fluid dynamics in Microgravity. During a previous Saturday Science Activity on January 29 (GMT 029), the crew observed a larger amount of air than expected in the Tissue Culture Modules (TCM). Upon further investigation on the ground, it was thought the TCM might have experienced fluid loss after being on-board the ISS for two years. The loss of fluid in the TCMs would interfere with the image analysis of the FDI experimental images. This Saturday Science activity confirmed there was fluid loss in the TCM, and the crew added fluid to the TCMs for future operations.

An ISS reboost was completed March 25 using 17 Progress Thrusters. The maneuver consumed 123.1 kg of propellant and increased the ISS velocity by 1.686 meters/second. The ISS altitude was increased by 2.92 km. The purpose of this burn was to phase the ISS for 10 Soyuz docking.

The Increment 10 crew successfully completed RS EVA#13 on March 28 with an EVA time of 4 hours 30 minutes. All planned tasks were completed with no issues. These tasks included the installation of Automated Transfer Vehicle (ATV) proximity antennas (WALs 4-6), jettisoning of the NanoSatellite, installation of the ATV Global Positioning Satellite (GPS) antenna, and observation of the ONA high-gain antenna as it transitioned from position 2 to position 1. During the EVA the camera ran out of film so the ATV video target meter task was not performed. Additionally, MCC-H observed an unexplained object depart the vicinity of the Docking Compartment (DC)-1 during hatch opening. Both MCC-M and MCC-H are evaluating the video in order to determine the identity of the object. The crew also reported that the arm length and gloves were a much better fit during this EVA than during RS EVA#12.

Near the end of EVA 13, when the ISS attitude was being transitioned from the Russian Thrusters to the USOS momentum management, the ground observed a large vibration spike in Control Moment Gyroscope (CMG) 3. A Failure Investigation Team meeting was conducted soon after the event and the specialists requested that the ISS remain in the XVV attitude and not maneuver to XPOP as originally planned. The XVV attitude requires only 25% of the CMG gimbal rates that XPOP needs to provide attitude control, and is therefore less stressful on the CMG. The Flight Control team re-assessed the ISS communications predictions and developed a new attitude plan. The ISS completed a small roll maneuver on the CMGs to a new LVLH attitude. The purpose of this maneuver is to help alleviate Ku-band thermal issues. The ISS maneuvered 11.22 degrees and took approximately 31 hours to complete. This was a maneuver rate of 0.0001 degrees per second (deg/sec). The last CMG maneuver was a maneuver to the docking attitude for UF2 on June 1, 2002. The CMG 3 experienced another disturbance of eight minute duration late in Stage 17P. The cause of these disturbances was theorized to be related to crew exercise, but a direct link was never definitively established before the end of Increment 10.

The week of March 29 to April 1, the crew performed post EVA activities. This included removing storage batteries from the Orlan Suits, drying both Orlan suits, refilling the Orlan feedwater bladders, and preparing them for storage. They also transferred US and RS hardware, payloads and medical hardware from the Service Module back to their respective locations in the ___, DC-1 and US Segment. The crew provided the Russian radiation dosimeter readings to the ground specialists. The crew also removed the Internal Thermal Control System (ITCS) jumpers and reconfigured the ITCS back to a single low temperature loop. The crew stowed EVA tools back to a nominal configuration. The Orlan suit batteries were discharged.

The Remote Power Controller (RPC) that provides power to Control Moment Gyroscope (CMG) #2 failed on March 16, and the ISS Attitude Control has been in the minimum 2-CMG configuration since then. To troubleshoot this RPCM, MCC-H closed the failed RPC and two other spare RPCs (without loads). The spare RPCs closed nominally, but the failed RPC would not close. CMG-2 was not recovered by the end of Stage 17P.

The crew performed the Miscible Fluids in Microgravity (MFMG) Thermal Test 3 during the Saturday Science session on April 2. The task involved pulling tinted water from a syringe, through a drinking straw, and into another syringe containing a honey/water (20%/80%) mixture. The fluid interaction was documented both via digital still pictures (total of 42) (using the intervalometer software for a series of unattended photos) and recorded to a Camcorder video tape which was downlinked later. The objective of MFMG was to determine if isothermal miscible fluids can exhibit transient interfacial phenomena similar to that observed with immiscible fluids and if miscible fluids in a thermal gradient can exhibit transient interfacial phenomenal similar to that observed with immiscible fluids.

The crew performed the final Advanced Diagnostic Ultrasound in Microgravity (ADUM) Z (bone) scan sessions the week of April 4 to 8. The crew also had a conference with the principal investigator to review the data as the scans were performed. Once all the data was received by the ground, the experiment hardware was disassembled and stowed. The Experiment Team compares the scans to evaluate learning curves and if the procedures need to be adjusted. ADUM demonstrates the capability of non-medical personnel to downlink diagnostic information (ultrasound images) for evaluation by medical specialists on the ground. With the completion of this week's scan, in depth comparison of all bone data collected across Increments 9 and 10 (total of 22 scans) will be performed by the Experiment Team.

The crew also performed the Russian Payload Biodegradation experiment on April 7. The objectives were to assess the initial stages of microbial induced degradation and deterioration of structural surfaces on the ISS. The crew collected microbial surface samples from selected metallic areas in the ISS and documented with photographs. The samples were stowed for return and analysis by ground specialists.

Payload Executive Processor (PEP) R5 Payload Software Upload was successfully completed on April 7. PEP R5 adds Crew Health Care Systems (CHeCS) and Payload Operations Integration Center (POIC) functionality and modifications. Ground controllers successfully completed all phases of the PEP R5 software transition on the primary and backup Payload Multiplexer/Demultiplexers (MDMs).

Activities: Crew successfully installed and checked out the Automated Transfer Vehicle (ATV) Proximity Communication Equipment (PCE) Antenna Feeder Unit and cables. This equipment will enable communication between the Russian Segment and the approaching ATV during docking.

During the week of April 4 to 8, the crew performed several activities related to pre-packing items for return in preparation for Flight LF1 (STS-114). Most of the prepacking for LF-1 occurred during Increment 10. Completion of the Increment 10 prepacking was essential for the readiness of ISS for an LF-1 launch date that had been scheduled for May 15.

To prepare for 10S docking, Mission Control Moscow conducted a test of the Soyuz KURS sets 1 and 2 on April 6. This test achieved a nominal readiness signal from both

KURS with no errors. The KURS is an S-band radar based system that allows the Soyuz to complete an automated rendezvous and docking.

The crew performed the Space Experiment Module (SEM) as part of the Saturday Science Program on April 13. The SEM payload photographs were completed by the crew and downlinked (17 photos). The SEM is a passive experiment that provides students the opportunity to conduct research on the effects of microgravity, radiation and space flight using various materials. The photographs taken by the crew will be utilized to show students the current status of the SEM satchels and their experiments. The crew also responded to specific questions from the students after completion of the photographs and described any observations seen in the different experiments.

On April 12, the ground pointed the elbow cameras of the Space Station Remote Manipulator System (SSRMS) away from 9-Soyuz to protect the camera lenses from plume erosion during the 9 Soyuz thruster test performed on Thursday, April 14. The activation of the SSRMS used the new ground-control capability so no crew interaction was required. The crew also started preparations for the Visiting Crew (VC) member to arrive on 10 Soyuz. They transferred scientific hardware, food, clothing and tools to the Docking Compartment (DC) for his use, to reduce the time he will spend on experiment preparation during the Joint 9S/10S Mission.

The 9 Soyuz Commander, Salizhan Sharipov, performed a successful test of the 9 Soyuz motion control system on April 14. The test ensured functionality of the hand controller and thrusters of the 9 Soyuz vehicle, in preparation for undock and landing. Moscow reported that the test was nominal.

10 Soyuz successfully launched from the Baikonur Cosmodrome at 03:46 DMT on April 15 (GMT 105/00:46). Solar arrays and antennas deployed nominally, and the vehicle achieved a stable orbit. The Soyuz TMA-6 (10S) docked to the International Space Station (ISS) at GMT 107/02:21 (9:21 pm CDT) at the Docking Compartment (DC)-1 port. All Soyuz and ISS systems operated normally throughout the rendezvous and docking maneuvers including the activation of the KURS Active and Passive systems which provide measurement of the vehicle range and closure rate with the station. All four vehicle braking thrusters were enabled during the docking sequence as a precaution for a failure of one braking thruster as occurred on the Soyuz TMA-5 (9S) vehicle. Following contact, capture, and probe retraction the Soyuz vehicle hooks were closed at GMT 107/02:31:30.

The 9S undocking was different than previous Soyuz undockings due to concerns related to the reserve battery capacity of the Soyuz vehicle. In an effort to conserve battery power, the undocking plan included keeping the Soyuz on combined power with the ISS until just prior to undocking. However, approximately 1 hour prior to undocking a test was performed while the vehicle was on autonomous power. Following the test, the ground was unable to command the vehicle back to the combined ISS power mode. The Russian Flight Director then instructed the crew to leave the vehicle in the internal power configuration for the remainder of the undocking activities. There was also some difficulty with obtaining pressure integrity on the Soyuz taxi crewmember’s suit, but

ultimately the issue was resolved by opening and reconnecting all pressure sealing interfaces. The 9 Soyuz vehicle successfully undocked from the International Space Station (ISS) at 13:44 CDT and landed approximately 85 kilometers outside of the town of Arkalyk, Kazakhstan at 17:08 CDT. The vehicle systems operated normally during the entire undocking, deorbit and landing phases of flight. Due to wet conditions at the landing site, the medical examinations were held at Arkalyk airport. The crew arrived via helicopter at the Arkalyk at approximately 18:15 CDT. They were found to be in excellent health and in good spirits.

The Increment 10 PIER Summary Task Roll-up for Stage 17P is shown below.

Stage 17P	Baselined	Completed	Withdrawn	Deferred	Not Completed
IDRD	46	34	6	5	1
CSRD	47	21	4	20	2
Added Real-time	12	11	0	1	0
TOTALS	**105**	**66**	**10**	**26**	**3**

Thirty-four of the forty-six tasks identified in the IDRD were accomplished during this mission. The remaining IDRD tasks were either withdrawn, not completed or deferred. In addition to the requirements specified in the IDRD, fifty-nine requirements were added during the mission. Thirty-three of these were completed, three were withdrawn, twenty-one were deferred, and two were not completed.

A. Tasks Completed in Addition to the IDRD Requirements

1. Remove and Replace the ISS Joint Airlock Service and Performance Checkout Unit (SPCU) Heat Exchanger **[IVA] [Imagery]**

This requirement was added to the Stage 17P CSRD by the ISS Program. The SPCU Heat Exchanger transfers heat from the Extravehicular Mobility Unit (EMU) water loops to the ISS Internal Thermal Control System (ITCS) Low Temperature Loop (LTL). The intent of this requirement was to recover functionality of the SPCU and re-establish the Joint Airlock EVA capability. During manufacture, the installed SPCU Heat Exchanger was single brazed internally with a Nickel process. Ground testing has shown that corrosion of the Nickel could cause rupture of the Heat Exchanger. The water samples returned on 8S indicated that the old Heat Exchanger was showing signs of corrosion. The new Heat Exchanger was delivered on 17P and was manufactured using a double brazing process that will extend the on orbit life. On March 10 and 11, 2005 (GMT 069 and 070), the crew performed activities in preparation for the SPCU Heat Exchanger R&R. The preparation tasks included: camcorder setup in the Airlock, procedure print and review, hardware familiarization, conferencing with ground specialists and preparing the worksite and the Fluid System Servicer (FSS). The FSS was prepared to perform a leak-check of the replacement SPCU. The crew removed the stowage from the Airlock, and setup up the Portable Fan Assembly (PFA) to provide air circulation in the crew work volume. They also disconnected the QDs in the Airlock and Node to isolate the

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Airlock LTL loop and accessed the SPCU by rotating down the Airlock cabin air rack. The SPCU Heat Exchanger R&R was successfully conducted from March 14, 2005 (GMT 073). The system was refilled with water and passed post-installation leak checks. The crew successfully reconfigured the thermal system and verified overall cooling system integrity. The crew then reconfigured the Airlock to the nominal configuration. Photographs were taken throughout the process and downlinked to the ground.

2. Refill the BZh of the Elektron (005) system with electrolyte **[IVA] [Completed GMT 063]**

   This requirement was added to the Stage 17P CSRD by input from IPRussia. The Elektron began exhibiting intermittent operations on January 1, 2005 (see Stage 16P, Section A above). The crew performed extensive troubleshooting operations to restore Elektron functionality during Stage 16P. The major success occurred when the crew transferred electrolyte from a previously used Elektron unit into the current unit. MCC-M determined that the electrolyte concentration was too low, and launched additional electrolyte on 17P to attempt to replenish the electrolyte in the Elektron Liquid Unit and recover Elektron functionality. The Elektron had been inactive for an extended period to allow for transfer/usage of oxygen reserves from 16 Progress. On March 4, 2005 (GMT 063), the crew performed the electrolyte transfer into the installed Liquid Unit #5. However, this activity was not successful in recovering Elektron operations.

3. Dock Soyuz TMA-10 to ISS **[IVA] [Imagery]**

   This requirement was added to the Stage 17P CSRD per input from IPRussia. The intent of this requirement is to document the major crew rotation activity of docking the new Soyuz bringing Expedition 11 to the ISS. The Soyuz TMA-6 (10S) docked to the Docking Compartment (DC)-1 port on April 17, 2005 (GMT 107/02:21) at 9:21 pm CDT.

4. Perform Volatile Organics Analyzer (VOA) Diagnostic In-Flight Maintenance (IFM) **[IVA]**

   This requirement was added to the Stage 17P CSRD by the ISS Program. The intent of this requirement was to determine the cause of the failure of the VOA, which had been failed since July 2003. The VOA detects trace organic compounds in the atmosphere using a Gas Chromatograph and Ion Mobility Spectrometer (IMS) detector. This capability is highly desirable to provide the ground with continuous insight into the contaminant levels of the ISS atmosphere, and to avoid reliance on down-manifesting atmospheric samples. On April 4, 2005 (GMT 094), the diagnostic in-flight maintenance (IFM) activity was successfully performed on the VOA to confirm the root cause of its premature failure. The IFM confirmed that two thermal fuses failed causing open circuits to the heaters. A future repair is planned to replace the thermal fuses with thermal switches.

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5. Deploy the NanoSatellite Experiment

   This requirement was added to the Stage 17P CSRD per input from IPRussia. The intent of this requirement was to deploy this small satellite from the ISS during EVA 13, which would then be used to develop satellite control techniques, monitor satellite operation, and develop new attitude system sensors and other components. The nanosatellite was deployed during EVA 13 on March 28, 2005 (GMT 087). The deployment was performed from the aft end of the SM in a retrograde direction relative to ISS. Ground tracking determined the nanosatellite was moving away from ISS and posed no recontact threat to the ISS.

6. Inspect 24 Contingency Water Containers (CWC) Inlet Fittings **[IVA] [Imagery] [Documented per chit 2649]**

   This requirement was added to the Stage 17P CSRD per input from the MER. The intent of the requirement was to determine how many of the CWCs on ISS had cracks in the plastic inlet fittings. This information would then be used to plan for water filling/transfer operations on LF-1. Cracks in the inlet fittings of the CWCs were noted on ground units. Testing determined that while not all cracked fittings leaked, any fitting that did leak was cracked. Therefore, CWCs with large cracks in the inlet fittings were to be considered leaky. The crew completed this activity on March 30, 2005 (GMT 089), and found no cracks in 11 of the 24 CWCs inspected. All others had large cracks and were stowed in mesh bags for return and repair.

7. A/L Audit, Tool configuration and EMU 3005 Preparation for Return. **[Completed reassembly of EMU 3005 water pump GMT 056]**

   The requirement to prepare EMU 3005 for return was added to the Stage 17P CSRD by the MER. The intent of this requirement was to assemble the water pump of EMU 3005 so it would not leak upon return on LF-1. Without the pump installed, the EMU water loop would be open, causing leaks upon re-entry. The crew completed reassembly of EMU 3005 water pump during Stage 16P, on February 25, 2005 (GMT 056). Tool Configuration was completed during EVA 13 preparation on March 17, 2005 (GMT 076), and part 4 of the Airlock audit was not completed. 3 of the 4 Airlock Audit activities were complete during the 16P Stage, and the 4th audit was not performed since the bag is planned to be returned without being audited.

8. Perform Vacuum Bag Prep for Return

   The requirement was added to the Stage 17P CSRD by the MER. The intent is to stow the vacuum cleaner bag for return to the ground and subsequent toxicological analysis. This analysis will be used to assess the ISS onboard environment for toxic materials such as cadmium oxides associated with electrical connectors. The task was completed by the crew on April 9, 2005,

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(GMT 109), in conjunction with the nominal vacuum cleaner bag change out activity.

9. Configure 760XD Laptop Shells for PCS Sparing **[Deferred from Stage 16P]**

   This requirement was added to the Stage 17P CSRD by the MER. The Express Rack 3 Laptop was supposed to be swapped for the old SSC router, and the Medical Experiments Computer (MEC) was supposed to be swapped with the old SSC1 (reference chit 2545). The SSC router and SSC1 were then to be configured for cold stowage onboard. Since the MEC failed and was recovered using the old SSC router shell, the Express Rack (ER) 3 Laptop was left unpowered and stowed, effectively serving as a cold stowed spare. The crew completed this activity on April 3, 2005 (GMT 093).

   a. Swap Medical Experimental Computer (MEC) with old SSC1 Laptop.

   This activity was added to the Stage 17P CSRD by the MER. The intent of this requirement was to convert the old MEC for PCS use and stow it as a spare for future PCS failures. This activity was deemed necessary due to the observed high PCS failure rate and the fact that no more 760XD laptops were being launched. The MEC was one of two 760XD laptops that remained onboard that could be used as PCS, which are Criticality-1 certified to provide crew command and control capability of the ISS. The other laptops were not certified as Criticality-1 and could not serve this purpose. The crew completed this activity on February 26, 2005 (GMT 056).

10. Perform LAB1S6 Rack Upper Right Latch Troubleshooting **[IVA] [Imagery]**

    This activity was added to the Stage 17P CSRD by the MER. The intent was to close the rack latch that the crew was unable to close after the SIGI R2 Software upload to GPS 1 during Stage 16P. This activity was completed by the crew on April 9, 2005 (GMT 098). The crew reported that after performing the troubleshooting procedure, both pins were engaged on either side, and that the mechanism worked smoothly.

11. Perform Crew Conference on General Luminaire Assembly (GLA) Status **[Documented per Chit 2589]**

    This activity was added to the Stage 17P CSRD by the MER. The intent was to ensure the crew had the opportunity to review the GLA recommendations from the ground and to ask questions of the experts. The ground recommendations involved in techniques to extend the life of GLAs on orbit, such as turning off lights when not in use and using the brightest setting when they are in use. The recommended response to lighting failures was also reviewed, and consisting of removing power from failed or dim light assemblies, in order to save the Base Ballast Assembly life. The constraints for swapping out failed lights for good ones and maintaining were also reviewed, which consist of evenly distributing

lights on each power channel. The crew reviewed these recommendations, and confirmed that they understood them on March 25, 2005 (GMT 084).

12. Perform Maintenance on USOS Video Tape Recorder (VTR) System **[Chit 2659, 2660]**

    This activity was added to the Stage 17P CSRD by the MER. The intent of the requirement was to recover the functionality of the VTR 1 and VTR 2. The image quality of both VTRs was noted to have degraded during Stage 16P. The crew performed VTR 1 extended head cleanings during Stage 16P which had given some indication of improved video quality. These cleanings were continued during Stage 17P. The ground performed eight 15 second head cleaning of VTR 1 at 30 minute intervals to avoid frictional heating of the VTR head. This was performed on March 18, 2005 (GMT 077) and failed to recover viewable imagery. VTR 2 was also showing significantly degraded picture quality, but the imagery was still viewable. The ground performed VTR 2 troubleshooting March 14, 2005 (GMT 073) but was unable to correct the degraded imagery. Both VTR 1 and 2 are planned for replacement on ULF1-1.

13. ___ ____-4_ calibration. **[IVA] (Pending Certification) (deferred from Stage 9S)**

    This task was deferred from Stage 16P, and added to the Stage 17P CSRD chit 2585 by IPRussia. The ____ is a Russian-supplied hand-held device that measures HF, HCN, CO and NH_3. It was delivered to ISS on flight 13P on January 31, 2004. The intent of this requirement was to test and calibrate the atmospheric readings of the device. The initial activation of the unit occurred on May 26, 2004 (GMT 147), however the unit emitted Radio Frequency (RF) radiation at unacceptable levels. To prevent the RF radiation from interfering with other hardware, a shielded power cable was developed and scheduled to be delivered on 16P. This requirement was deferred to Stage 16P, and it was then deferred to Stage 17P. It was successfully completed on March 9, 2005 (GMT 068).

14. Perform sample analysis of SM cabin air with ___ ____-4_ analyzer **[Complete GMT 068]**

    This task was deferred from Stage 16P, and added to the Stage 17P CSRD chit 2585 by IPRussia. The crew performed a functional test on the ____-4_ realtime gas analyzer which was launched on 13P and is used to monitor harmful contaminants on board ISS. The initial activation of the unit occurred on May 26, 2004 (GMT 147), however the unit emitted Radio Frequency (RF) radiation at unacceptable levels. To prevent the RF radiation from interfering with other hardware, a shielded power cable was delivered on 16P. The purpose of this test was to check out the functionality of the hardware with this new cable. All of the combustion product values, which include Methane, Ammonia, Carbon Monoxide, Nitrogen Oxides, Hydrogen Chloride, Hydrogen Fluoride and Hydrogen Cyanide, were calibrated nominally. The ground

considered the test successful. At the completion of the test, the crew disassembled and restowed the unit.

15. Perform the photography of the space behind the panel 101 SM (in order to evaluate a feasibility of the installation the Electron hydrogen line back-up hardware)

    This task was added to the Stage 17P CSRD chit 2585 by IPRussia. The crew completed this activity on March 17, 2005 (GMT 076), as instructed in radiogram #12 and downlinked the photos for review by ground specialists.

16. Perform the maintenance of ___-1_ device

    This task was added to the Stage 17P CSRD chit 2585 by IPRussia. The objective was to replace the nozzle on seven of these masks onboard the ISS with new hardware brought up on 17P. During a previous training exercise with the crew it was discovered the mask was vulnerable to damage if the crew was to pull on the hose of the mask. This upgrade provides a more durable nozzle in the event the hose is pulled. Video of the upgrades were recorded by the crew, downlinked to the ground and provided to MCC-M. One of these masks were upgraded were by the crew on each of the following days: March 19, 2005 (GMT 069), March 25, 2005 (GMT 084), April 6, 2005 (GMT -96). Three of the remaining 4 completed on April 11, 2005 (GMT 101). The remaining mask upgrade was deferred to Increment 11.

17. Perform the maintenance of the force loader (__-1)

    This task was added to the Stage 17P CSRD chit 2585 by IPRussia. The crew completed this activity on February 25, 2005 (GMT 056), successfully replacing four rollers on the HC-1.

18. Troubleshoot 760XD and A31P Laptops **[IVA] (Inc10/chit 2460 and 2515)**

    This requirement was rolled over from Stage 16P into the Stage 17P CSRD by the IMC to troubleshoot any additional failed laptops that occurred during Stage 17P. This task was completed with the swap of Spare SSC Router Shell with failed MEC shell on April 3, 2005 (GMT 093).

19. Perform Battery Set 2B2 Re-conditioning **[Ground]**

    This Ground only test was added per the real time planning process. The intent of the requirement is to recover battery set capacitance by a series of deep discharge and recharge cycles. Battery reconditioning for Battery Charge/Discharge Unit (BCDU) set 2B2 was complete March 15, 2005 (GMT 74). Reconditioning the batteries improves battery performance and also allows insight into data that helps assess battery health. The battery reconditioning took one week to complete, and was followed by a capacity test. The results indicate that the BCDU 2B2 gained 4.3% capacitance as a result of

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the re-conditioning process. This was the fourth of six BCDU sets on the ISS to be reconditioned.

20. Perform Elektron Troubleshooting

    This requirement was added per the real time planning process, with the intent of recovering Elektron operations. The crew performed this round of troubleshooting between March 5 - 11, 2005 (GMT 064 - 070). The Elektron would not operate consistently after reactivation post EVA 12. The crew performed Elektron troubleshooting by flushing out the lines to remove bubbles in the electrolyte/water mixture. The Elektron was reactivated and operated nominally for two days, when the primary and backup pumps failed. The crew successfully reactivated the unit, and it operated nominally until Friday, when both pumps failed again. The crew was unable to successfully re-start the unit, which led to the decision by MCC-H to attempt to clear potential obstructions in the Elektron Vent lines (see #22 below).

21. Clear Obstruction in Elektron Vent Lines

    This requirement was added per the real time planning process, with the intent of recovering Elektron operations. Over the weekend of March 12-13 (GMT 071 - 072), the crew performed troubleshooting on the Elektron to remove air bubbles from inside the unit and activated the Elektron in 50 Amp mode. The Elektron failed due to obstruction in either the Hydrogen (H_2) or Oxygen (O_2) vent lines. The crew purged the O_2 and H_2 vent lines with Nitrogen (N_2) in an attempt to clear the obstruction. After the crew performed the N_2 purge, the valve was not fully closed and N_2 leaked from the Elektron N_2 tank to the ISS volume. The additional N_2 in the ISS atmosphere did not significantly affect the ISS total pressure. This week, the crew continued Elektron troubleshooting. The N_2 tank was replaced with a unit that was launched on 17P, and the crew measured resistance on the Hydrogen and Oxygen lines. They reported no blockage. The Elektron was restarted several times but did not operate for more than 20 hours before shutting down. No other troubleshooting was performed until after EVA 13. While the Elektron was non-operational, 17P oxygen resources were used to provide for the crew metabolic needs.

22. Perform Elektron Water Feed Reconfiguration For Deionized Water

    This requirement was added per the real time planning process, with the intent of recovering Elektron operations. The Elektron had been off since before the EVA #13. On March 31, 2005 (GMT 090), the crew attempted to reactivate the Elektron after trying to remove bubbles from the system by purging the buffer tank with nitrogen, filling with water and performing another purge. During the first two attempts of Elektron activation, the Elektron operated for several minutes before failing. A third attempt was made, and it operated for 80 minutes before both the primary and backup pumps failed again. During crew sleep, MCC-M attempted to reactivate the Elektron in order to bypass the automatic purge. Both sets of pumps of the Elektron failed. The crew successfully

reactivated the Elektron in 64 amp mode on April 1, 2005 (GMT 091). The Elektron ran in 64 amp mode for approximately 30 hours until April 2 (GMT 092) before failure of the primary and backup pumps shut the unit down. There were no further attempts at Elektron activation operations before April 13 due to power concerns at the then current solar beta and with the scheduled Russian Service Module battery cycling operations. The oxygen resources on 17P were used to provide for the crew metabolic needs.

23. Perform Elektron Liquid Unit (__) 6 Functionality Checks

    This requirement was added per the real time planning process, with the intent of recovering Elektron operations. Liquid Unit 6 was kept on board as a spare for the Elektron. The crew performed functionality tests April 6 and 8, 2005 (GMT 096 and 098) to determine if it would be a suitable replacement for Liquid Unit 5, which was currently installed in the Elektron. The test results indicated that the Liquid Unit 6 (__ 6) separators were performing satisfactorily, but the primary and backup micro pumps contained air bubbles and could not maintain fluid line pressure. The crew attempted to flush the air bubbles out of the pumps, but were unsuccessful. The bubbles caused both pumps to fail. The second test also attempted to remove air bubbles, prior to re-starting the pumps, but neither pump could generate sufficient operating pressure. After analyzing the data from the testing of Liquid Unit 6, Moscow reported that it looks promising for use as a spare. However, due to schedule constraints, they decided not to replace the currently installed Liquid Unit 5 until after 9S/10S docked operations.

24. Control Moment Gyroscope (CMG) 2 Remote Power Controller Module (RPCM) Trip:

    This requirement was added per the real time planning process. The intent was to recover the RPC, and therefore recover CMG-2, so the ISS would not rely on only 2 CMGs for attitude control. The Remote Power Controller (RPC) which provides power to the Control Moment Gyroscope (CMG) 2 tripped open on March 16, 2005 (GMT 075), causing the loss of the CMG 2. Preliminary assessments indicated the anomaly was most likely due to a failed Hybrid Field Effect Transistor (FET) driver. This is the same RPCM position that was replaced during EVA 9 (Summer 2004) after exhibiting the same signature. Initial trouble shooting resulted in the RPC tripping again with no current spikes observed. The teams assessed the impacts of having only 2 CMGs for ISS momentum control and identified no impacts were that would have required an immediate RPCM R&R. The MCC-H teams determined that the only impact to EVA 13, on March 28th, was that CMG saturation will occur more quickly while the crew is at the aft end of the SM. Procedures and flight rules were coordinated by the US and Russian teams to perform the EVA expecting the CMG saturation. The ISS remained stable in the minimum 2 CMG configuration. Troubleshooting was performed by the ground to recover the RPC, but repeated attempts to close it resulted in the RPC tripping open each

time. The team was unable to recover the RPC, and CMG 2 remained off line through the end of Increment 10.

25. Replace SM Toilet Manual Separator Valve

    This requirement was added per the real time planning process. The intent was to recover nominal operations of the SM Toilet, which failed on March 17, 2005 (GMT 076). The crew performed troubleshooting and corrective action the same day, and was able to isolate the failure to the separator manual valve. The crew was instructed to use the Soyuz ___ until the SM ___ operations were restored. After replacing the valve assembly with an on-board spare the crew reported the problem was corrected and the SM ___ was operating nominally.

26. Replace Failed Lamp Housing Assembly (LHA)

    This requirement was added per the real time planning process. The intent was to recover adequate lighting in the Node, which had been reduced to only operational LHA. On March 15, 2005 (GMT 074), the crew replaced a light assembly in the Node, but it would not illuminate. On April 1, 2005 (GMT 091), they transferred a lamp from the Lab (which had been installed in a failed Base Ballast Assembly location, and was not providing any illumination) and installed it in the Node, where it illuminated successfully. The Node then had two operational lights operating on separate power channels.

27. Troubleshoot 760 Digital Still Camera

    This requirement was added per the real time planning process. The intent was to recover nominal DCS 760 camera operations. One the 760 cameras delivered on 17 Progress was not saving photos on a continuous basis causing pictures to be lost. The crew recovered the 760 Digital Still Camera (DSC) camera functionality over the weekend of April 2-3 by reloading the firmware. On Monday, April 4, the camera started to exhibit the same anomalous signatures as the week before and was progressively degrading. Ground testing to see if the photos could be stored directly on a laptop showed that the rate the photos need to be taken for the RBAR Pitchover Maneuver (RPM) cannot be supported by this technique. No other troubleshooting of this camera will be pursued and the camera will be returned to the ground for evaluation. The ground was to develop procedures to characterize the quality of the images by of the three 760 DCS cameras brought up on UF2. The results of these analyses will determine the prime and backup camera usage plan for the RPM.

28. Perform Lithium Hydroxide Canister Checkout

    This requirement was added per the real time planning process. The purpose of the task was to test the efficiency of CO_2 removal using onboard expired Russian Lithium Hydroxide (LiOH) canisters. This task began on April 5, 2005 (GMT 095) and concluded on April 9 (GMT 099). During the test the Vozdukh was turned off and the Partial Pressure of Carbon Dioxide ($ppCO_2$) was

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monitored via the Major Constituent Analyzer (MCA). On April 7 (GMT, the crew replaced the expended canister that was inserted on April 5 with another expired canister and repeated the test. On Saturday, April 9, the second LiOH canister was removed and the Vozdukh reactivated. The expired LiOH canisters effectively scrubbed the ISS atmosphere of CO_2 for the duration of the test.

29. Perform Service Module Air Conditioner (___) Troubleshooting

    This requirement was added per the real time planning process. The purpose of the task was to recover nominal operation of the SM Air Conditioners. The crew performed troubleshooting on ___ 1 on April 12, 2005 (GMT 102), filling the unit with water to wet the wicks of the condensate evaporator. The intent was to initiate condensate collection, which had not been occurring on ___ 1. 2 days after the wick was wetted, the unit was re-activated, but failed to collect condensate. Condensate was collected on the USOS (via the Lab Common Cabin Air Assembly (CCAA)) while the SM Air Conditioner was not operating properly. ___ 2 also stopped collecting condensate at this time. The Joint Airlock CCAA was also activated on April 14 (GMT 104), prior to the arrival of Expedition 11, to provide additional cooling and dehumidification of the ISS atmosphere while the visiting crew was onboard.

30. Conduct the activities on the installation and configuration of Operating System (OS) Windows version 07.02

    This requirement was added per Russian input to the Stage 17P CSRD chit 2585. The intent was to upgrade the Service Module laptop software to the 7.03 version. This requirement was completed by the crew for Laptops 2 and 3 on April 12, 2005 (GMT 102). The remainder of the upgrades were deferred to Increment 11.

31. Conduct a data transmission test via ___-__ and ____

    This activity was Added per Russian input to the Stage 17P CSRD chit 2585. This intent of this task is to test the transmission of data from the telemetry system. It was completed by the crew during Stage 17P on April 1, 2005 (GMT 091).

B. Tasks Not Completed

1. Swap old SSC Router with Express Rack (ER) 3 Laptop.

   This activity is part a of Configure 760XD Laptop Shells for PCS Sparing in Section A above. It was added to the Stage 17P CSRD by the MER. The intent of this requirement was to convert the ER 3 Laptop for PCS use and stow it as a spare for future PCS failures. This activity was deemed necessary due to the observed high PCS failure rate and the fact that no more 760XD laptops were being launched. The ER 3 Laptop was one of two 760XD laptops that remained onboard that could be used as PCS, which are Criticality-1 certified to provide

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crew command and control capability of the ISS. The other laptops were not certified as Criticality-1 and could not serve this purpose. This activity was originally scheduled for April 15, 2005 (GMT 105). However the newly converted MEC (see Section A, #9, part b above) failed on April 3, 2005 (GMT 093). The old SSC Router shell was used as a spare to Recover the new MEC. The new MEC hard drive was installed in the old SSC Router shell. This requirement was not completed since the ER 3 Laptop was cold stowed, effectively serving as the spare PCS.

2. Perform SDTO 13004-U, Russian Vehicle Docking/Undocking Loads on ISS, for 10 Soyuz docking to DC-1. **[Ground] [IVA]**

   The intent of this IDRD requirement was to obtain ISS Internal Wireless Instrumentation System (IWIS) data for the 10S docking event. IWIS data was not obtained, and would have provided more complete insight into the undocking loads experienced by the ISS structure. IWIS sensors are located in the pressurized modules (both US and Russian). The Russian vehicles dock directly to Russian pressurized modules so these sensors are in the direct load path of the docking. Structural Dynamic Measurement System (SDMS) data was obtained, but does not satisfy the intent of this requirement. SDMS data is still useful and its collection required no crew time. It provided insight to determine whether the structure exhibited high loads during the event.IDRD Stage 17P

3. Photograph the Laser Retroreflectors' pyramids in support of the ATV.

   This requirement was added to the Stage 17P CSRD per email from Galina Kaportseva to Kathy Leary, reference SS29203, dated March 04, 2005. It was requested by the ATV team to ensure proper orientation and installation of these reflectors which support ATV docking. It was intended to be performed during Russian EVA 13. However, during the EVA, it could not be completed due to failure of the US F5 Camera, which was supposed to be used for this imagery.

C. Tasks Deferred

1. Perform SSRMS Sticky Grapple Fixture Release Test (2 times) **[IVA] [Robotics] [Ground] [Inc 7/1053 Inc 8/1487]**

   This requirement was deferred from Increment 7 chit 1053 and Increment 8 chit 1487. It was added to the Stage17P CSRD chit 2585 per input from CSA. The main objective was to perform engineering tests to troubleshoot the "sticky grapple fixture" problem, and gather date to analyze whether or not the "dither" technique is a viable solution to the sticky Grapple Fixture release issue. This problem appeared during the 6A stage and re-occurred frequently since then. It is believed to be caused by friction inside the WR motor. The crew completed a previous run of this task on February 11, 2005 (GMT 042) as part of monthly SSRMS Proficiency Operations. The activity was designed to test solutions to

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the "sticky grapple fixture" problem that has been observed numerous times in the past. This task requests the third of four tests designed to resolve the problem. It was not scheduled during Stage 17P due to competing priorities at the end of the Increment, and was deferred to Increment 11.

2. Perform LEE A Prime String Force Movement Sensor (FMS) Saturation characterization. **[IVA] [Robotics] [Ground]**

   This requirement was added to the Stage17P CSRD chit 2585 per input from CSA. The intent was to characterize the thermal effects on the failure of the FMS sensor ring. The FMS sensor will not calibrate if it is not warm enough. This test would determine a "threshold" temperature below which the FMS sensor would not function. Specific thermal conditions must be achieved in order to perform this test. It was not scheduled for completion due to competing priorities at the end of the Increment and was deferred to Increment 11.

3. Perform remaining MSS Onboard Checkout Requirements (OCRs) per the priorities in Appendix H. **[IVA] [Robotics] [Ground]**

   This requirement was added to the Stage17P CSRD chit 2585 per input from CSA. The intent was to complete the checkout of the SSRMS. It could not be scheduled during Increment 10 due to competing priorities, and was deferred to Increment 11.

4. Perform FGB Stowage Cleanup Activity **[IVA] [Deferred from Stage 16P]**

   This requirement was deferred from Stage 16P. The intent of this activity was to alleviate the onboard stowage situation by identifying which items stowed in the FGB could be disposed of, and by gaining stowage efficiencies by re-arranging the remaining stowage. The Russian side did not schedule this activity for completion during Stages 16P or 17P. It was deferred to Increment 11.

5. Install the ATV control panel (__), route and connect the onboard cable network (___).

   This IDRD task was not completed during Stage 17P. The intent of this task to install the ATV control panel and cables for the Proximity Communications Equipment for the ISS to ATV RS radio channels. This task was deferred to Increment 11.

6. Install and connect the antenna switch control unit (____).

   This IDRD task was not completed during Stage 17P. The intent of this task to install the antenna switch control unit of the Proximity Communications Equipment for the ISS to ATV RS radio channels. This task was deferred to Increment 11.

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7. Install noise mufflers on fans ___5, ___6, ___8 - ___12; ____1, ___1, ___2, air ducts on the inlet and outlet of fans __1__ and __2__, and on the air outlet from the cabin air ducts. **[IVA]**

   This IDRD task was intended to reduce the noise levels in the Service Module by installing acoustic mitigation hardware on the fans and ducting. This activity was deferred Increment 11 because the equipment was not delivered to ISS on 17P as originally scheduled.

8. Perform Node 1 Smoke Detector Cleaning **(Inc 10 chit 2478) [IVA] [Deferred from Stage 16P]**

   The data from this smoke detector indicated that the reflecting mirror internal to the unit had become contaminated, probably with dust particles. This requirement was deferred from Stage 16P, and added to the Stage 17P CSRD chit 2585 per input from the MER as documented in chit 2478. The intent was to use air from a syringe or nitrogen from the Connector cleaning kit to remove the dust. Since a redundant smoke detector was operational in the Node, this requirement was deferred to Increment 11.

9. Perform Maintenance on USOS Video Tape Recorder (VTR) System **[Chit 2723]**

   This activity was requested late in Stage 17P CSRD by the MER. The intent of the requirement was to recover the functionality of the VTR 1 and VTR 2. The image quality of both VTRs was noted to have degraded during Stage 16P. The crew performed VTR 1 extended head cleanings during Stage 16P which had given some indication of improved video quality. These cleanings were continued during Stage 17P. The ground performed eight 15 second head cleaning of VTR 1 at 30 minute intervals to avoid frictional heating of the VTR head. This was performed on March 18, 2005 (GMT 077) and failed to recover viewable imagery. VTR 2 was also showing significantly degraded picture quality, but the imagery was still viewable. The ground performed VTR 2 troubleshooting March 14, 2005 (GMT 073) but was unable to correct the degraded imagery. Additional VTR head cleaning was requested late in Stage 17P, using compressed nitrogen and a vacuum cleaner. This is documented per chit 2723. There was no available crew time to schedule this activity prior to the arrival of Expedition 11 crew, and this task was deferred to Increment 11.

10. Perform Node 1 Hyzod cover inspection.

    This IDRD task was intended to inspect the Hyzod Cover on the Node 1 Nadir window for visibility. The concern was that atomic oxygen could have caused the cover to become opaque, limiting visibility for MPLM berthing operations. Performing this activity would have required inordinate crew time to move large amounts of stowed items from the Node nadir port to gain access. The activity was deferred to Increment 11, since the stowage would be removed as part of LF-1 preparation.

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11. Perform Phase 2 of Commissioning of Ground Based Commanding of SSRMS - Power Data Grapple Fixture (PDGF) Capture/Release Operation using Ground Control **[IVA] [Robotics] [Ground]**

    This requirement was added per CSA input to 17P CSRD chit 2585. It was deferred from Stage 16P. The intent of this requirement was to perform a capture release of a PDGF with the SSRMS end effector under ground control. The plan called for the crew to stand by to safe the system during this operation as a precautionary measure. This activity would complete the proof-of-concept for the SSRMS ground control capability. It could not be scheduled during Stage 17P and was deferred to Increment 11.

12. Install the FGB cargo containers

    This requirement was added to the Stage 17P CSRD chit 2585 by IPRussia. The intent was to install stowage containers behind FGB panels, to enhance the stowage capabilities of ISS. This task was not scheduled during Stage 17P and was deferred to Increment 11.

13. Perform a replacement of __1_ FGB

    This activity was Added per Russian input to the Stage 17P CSRD chit 2585. This intent of this task is to replace a Loss Of Signal (LOS) Communication data recorder in the FGB. It was not scheduled during Stage 17P and was deferred to Increment 11.

14. Perform an inventory of the crew hygiene consumables

    This requirement was added to the Stage 17P CSRD by the ISS Program to improve resupply planning of crew hygiene items. Due to scheduling higher priority tasks, this task was deferred to Increment 11.

15. Perform routine checks of __-103_ camera

    This requirement was added per Russian input to the Stage 17P CSRD chit 2585. The intent of this activity is to verify the functionality of the closed circuit TV camera used in the Service Module. Due to scheduling higher priority tasks, this task was deferred to Increment 11.

16. Pull a TV cable across FGB for TV transmission via Ku-Band, test

    This requirement was added per Russian input to the Stage 17P CSRD chit 2585. The intent of this task is to set up cabling to improve the quality of the TV downlink from the Russian Segment via USOS Ku Band assets. Due to scheduling higher priority tasks, this task was deferred to Increment 11.

17. Perform the inspection and photography of the windows glass

    This requirement was added per Russian input to the Stage 17P CSRD chit 2585. The intent was to obtain insight into the amount and degree of damage to

the Service Module windows. This task was proposed to be performed every three months by US and Russian engineering specialists. Due to scheduling higher priority tasks, and the need to develop better techniques to photograph the window, this task was deferred to Increment 11.

18. Perform Leak Check of LAB1P4 VES QDs **[IVA] (Inc10/chit 2428)**

    This task was deferred from Stage 16P and added to the Stage 17P CSRD per input from the MER. The task is documented in chit 2428. During Mission 5A.1, a leak was noticed at the LAB1S2 location while the HRF-1 payload was connected to the VRS. (Reference PRACA 2788). Troubleshooting using the VES/VRS jumper determined the leak was in the VRS half of the QD, which leaked only when mated. The intent of this task is to leak check 12 Vacuum System Quick Disconnects (QDs) which have not been mated since ground testing prior to the launch of the Lab Module. The most urgent of these is the LAB1P4 VES QD, which the HRF-2 payload will require during LF-1. Due to higher prior tasks scheduled during Stage 17P, this task was deferred to Increment 11.

19. Install ___ Network Channel Controller

    This task was added to the Stage 17P CSRD per input from IPRussia. The intent of this task to to install the Network Channel Controller for the Proximity Communications Equipment for the ISS to ATV RS radio channels. The task was not scheduled during Stage 17P, and it was deferred to Increment 11.

20. Perform speed regulating unit (_P__) installation onto cabin fans in SM including installation of cable inserts in the manual velocity control unit. **[IVA] (deferred Inc. 9 and Stage 9S)**

    The intent of this activity was to install speed regulators on the SM cabin fans. This task was deferred from Stage 9S to Stage 16P, then to Stage 17P. Due to the scheduling of higher priority tasks during Stage 17P, this task was deferred to Increment 11.

21. P6 Solar Array Photo Survey **[IVA] (Inc10/chit 2461) [Deferred from Stage 16P]**

    This task was deferred from Stage 16P and added to the Stage 17P CSRD per input from the MER and is documented in chit 2461. The intent of this requirement was for the crew to perform a detailed imagery survey of the P6 solar arrays, to photo-document the condition of both the 2B and 4B solar arrays through ISS windows. This task was requested in response to PRACA 3165, which documents the failure of 2B Solar Array Wing (SAW) Right Blanket String #5. This anomaly was traced to an open braze joint on the SAW, with the secondary effect of a failed adhesive bond between the blanket panel and the Flat Circuit Connector (FCC). This photo survey will aid in monitoring the integrity of the bonds on the remaining panels by mapping the back (non-cell)

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side of the array with enough overlap so that the entire array is photographed. Due to scheduling higher priority tasks, this activity was deferred to Increment 11.

22. Apply Yellow Tag to the PGT programming cable. **[IVA] [Inc 9/2133]**

    This requirement was rolled over from Stage 16P, and was added to the Stage 17P CSRD chit 2585 by the ISS Program. The intent was to prevent the crew from using this cable, since one lot of connectors that was used to make the cable was found to have fractured sleeves, and mating the cable could result in bending connector pins on the laptop side. It was accepted based upon the caveat that it would be added to the crew's timeline only in the event that the crew must handle the PGT programming cable for another scheduled task. During Stage 17P, there were none of these tasks scheduled. It was deferred to Increment 11.

23. Perform SDTO 17005-U Clarissa Conversational Procedure Viewer and Navigator **[IVA] [Ground] [Partially deferred from Stage 16P]**

    This requirement was added to the Stage 17P CSRD chit 2585 by the ISS Program. The purpose of the Clarissa SDTO is to study the use of a spoken dialogue system to navigate and read procedures on ISS to determine how effective such speech-based systems are in the ISS environment. The system allows astronauts to focus on the task with their hands and eyes, while the procedure is read and navigated by voice commands. Clarissa also has a graphical user interface, like a paper procedure. In the case where the crew member can see the screen easily, then he can easily read the procedure as well as listen to it. It is anticipated that the Clarissa system will allow a single ISS crew member to carry out a complicated procedure, instead of the two that are often used currently. The experiments will show how long it takes to complete the procedures using Clarissa as compared with the normal methods using the Manual Procedure Viewer (MPV) or hard copy. The initial part of this SDTO was performed during Stage 16P for a Microbial Sampling procedure, but no crew time was available during Stage 17P, due to higher priority tasks which took precedence. This requirement was deferred to Increment 11.

24. Perform IVA Toolbox Screwdriver Consolidation **[IVA]**

    This requirement was added to the Stage 17P CSRD chit 2585 by MOD. The ISS commander commented in December that some of the jewelers screwdrivers located in the IVA Toolbox had damaged tips. He also reported that he could not find some of the other jewelers' screwdrivers that were supposed to be located in the IVA tool box. The purpose of this requirement was to take other jewelers screwdrivers from the Strange Tool bag and relocate to the IVA Toolbox. This requirement was deferred to Increment 11 due to higher priority tasks which took precedence during Stage 17P.

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25. Complete Remaining Troubleshooting for RPCM LA2A3B-C RPC 4 Trip **[IVA] (Inc10/chits 2417, 2463) (Partially deferred from Stage 16P)**

    This task was carried over from Stage 16P and added to the Stage 17P CSRD chit 2585 by the MER. The intent of this task was to complete troubleshooting of RPCM LA2A3B-C RPC 4 (which powers UOP-4) that was initiated during Stages 9S and 16P. The task would have the crew re-check the 120V power cable, the US DC power supply and PS120 Junction Box to exonerate them as being the cause of the trip. Due to higher priority tasks that were scheduled to prepare for Expedition 10 crew handover to Expedition 11 crew, the remainder of the troubleshooting was deferred to Increment 11.

26. Change the cover on the flange of the _x_ fan

    This requirement was added per Russian input to the Stage 17P CSRD chit 2585. The intent was to reduce the acoustic levels of the SM ventilation system in the Transfer Compartment. This requirement was deferred to Increment 11.

The following tasks were accounted for as completed tasks, but had remaining work to be deferred into Increment 11. They are included here for completeness.

A. Install the onboard computer system (___) network channel controller [___-2] in the nominal location for relaying multiplex exchange channel [___] interface signals to the SM ____ hardware.

   This IDRD requirement was partially completed during Stage 17P. The intent of this task to install the Proximity Communications Equipment for the ISS to ATV RS radio channels. Approximately half of the work was completed. On April 1, 2005 (GMT 091), the ___ was partially installed, but not all the bolts were fastened. The crew could not find labels to make the appropriate cable connections for the ___. The remainder of task was deferred to Increment 11.

B. Route the onboard cable network (___), install and connect the ____ monoblock.

   This IDRD task was partially completed during Stage 17P. The intent of this task to install the Proximity Communications Equipment for the ISS to ATV RS radio channels. The crew completed cable routing and installation on April 4 and 5, 2005 (GMT 094 and 095). The Monoblock connection was not completed and was deferred to Increment 11.

C. Perform the maintenance of ___-1_ device

   This task was added to the Stage 17P CSRD chit 2585 by IPRussia. The objective was to replace the nozzle on seven of these masks onboard the ISS with new hardware brought up on 17P. During a previous training exercise with the crew it was discovered the mask was vulnerable to damage if the crew was to pull on the hose of the mask. This upgrade provides a more durable nozzle in the event the hose is pulled. Video of the upgrades were recorded by the

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crew, downlinked to the ground and provided to MCC-M. One of these masks were upgraded were by the crew on each of the following days: March 19, 2005 (GMT 069), March 25, 2005 (GMT 084), April 6, 2005 (GMT -96). Three of the remaining 4 completed on April 11, 2005 (GMT 101). The remaining mask upgrade was deferred to Increment 11.

D. Conduct the activities on the installation and configuration of OS Windows version 07.02

This requirement was added per Russian input to the Stage 17P CSRD chit 2585. The intent was to upgrade the Service Module laptop software to the 7.03 version. This requirement was completed by the crew for Laptops 2 and 3 on April 12, 2005 (GMT 102). The remainder of the upgrades were deferred to Increment 11.

D. Tasks Withdrawn

1. Complete FCE Audit Follow-up/Consolidation **[IVA] [Partially deferred from Stage 16P]**

   This requirement was added to the Stage 17P CSRD per comment from the MOD Cargo Integration Officer (CIO) as a partial deferral from Stage 16P. This activity was intended to complete the Flight Crew Equipment Audit of the remaining bag. However, it was decided to withdraw this task since the bag will be audited on orbit, and then returned to the ground.

2. [___-_] Satellite Navigation System Test with Four Antennas.

   This requirement was added to the Stage 17P CSRD per email from Galina Kaportseva to Kathy Leary, January 17, 2005, TTI reference SS28799. The intent is to test the functionality of four Satellite Navigation antennas. This test and the 2-antenna test from Stage 16P were not accomplished during Increment 10 and will not be deferred. These tests were withdrawn.

3. Complete SM PCS Troubleshooting

   This requirement was rolled over from Stage 16P, added to the Stage 17P CSRD by IMC. The requirement was withdrawn since there was never a need to perform additional troubleshooting on the SM PCS. After Stage 17P, the screen was noted to be blanking out. Unit was cold stowed during Increment 11 on April 27, 2005 (GMT 117).

4. Install TV Camera at Aft end of Service Module (SM)

   This IDRD requirement was withdrawn since the TV camera was not delivered on 17P. This camera was to be installed as part of the ATV docking modification on the Service Module aft. During bench review, the camera was found to be damaged (cracked lens) and was sent for repair.

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5. Photograph and then Remove KROMKA 1, Frame 3 (if time permits)

   This IDRD requirement was planned to be performed during EVA 13. However, when the EVA tasks were adjusted to accommodate the ATV Docking TV Camera that was not delivered on 17P, the decision was made to withdraw this task and substitute the NanoSatellite deployment in its place.

6. Perform Airlock Water Loop Maintenance

   This IDRD requirement was withdrawn when the decision was made to replace the SPCU Heat Exchanger (see Section A, #1 above).

7. Perform Recharge of NiMH (helmet light, REBA, PGT) batteries

   This IDRD requirement was withdrawn per input to the Stage 17P CSRD chit 2585 from the EVA Project Office. The intent of this requirement was to maintain the batteries in operational states by periodic charging and discharging to maintain battery health. This was accomplished during Stage 17P by Russian EVA 13, since the equipment was used for that EVA, and the batteries received a charging cycle.

8. Perform MSS Pre-Launch checkout Space Station Remote Manipulator System (SSRMS) move from Work Site (WS) 4 to Laboratory (Lab). **[IVA] [Ground]**

   This IDRD requirement was withdrawn by the ISS Program per input to the Stage 17P CSRD. This was done so the SSRMS could be positioned to the EVA 13 Viewing position, enabling better views of the crew from the SSRMS cameras than if the SSRMS had been located on the Lab.

9. Perform Carbon Dioxide Removal Assy (CDRA) Sock Filter Installation and checkout

   This IDRD task was accomplished during Stage 9S and was withdrawn from Stage 17P by the MER. The intent of this requirement was to prevent zeolite desiccant particles from fouling the operation of the air selector valves and limiting CDRA operations (see above Section 7.2, A, #2 above).

10. Perform the troubleshooting of the false telemetry of the __-_x_ hatch position

    This requirement was added per Russian input to the Stage 17P CSRD chit 2585. The intent was to correct the false hatch telemetry being received for the SM hatch located between the Transfer and Working compartments. This requirement was withdrawn.

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APPENDIX A

ACRONYMS AND ABBREVIATIONS

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APPENDIX A - ACRONYMS AND ABBREVIATIONS

ACH	(Russian) Satellite Navigation Equipment
___	(Russian) Service Module Toilet
BMP	(Russian) Micro purification unit
BX	(Russian) Elektron Liquid Unit
CBO	(Russian) Water Container System
___	(Russian) Air Conditioner
____	
EDV	(Russian) Water Container
FSH	(Russian) Spectrum analyzer
HC-1	(Russian) Force Loader
___	
KHT	(Russian) Hardware
KURS	(Russian) Automatic Rendezvous and Docking System
OHA	(Russian) High Gain Antenna
____	(Russian) Lower Body Negative Pressure
ORLAN	(Russian) EVA Suit
___	(Russian) Transfer Compartment
____	(Russian) Manual Rendezvous and Docking System
____	(Russian) Russian-supplied hand-held device that measures HF, HCN, CO and NH_3
%	Percent
AAA	Avionics Air Assembly
A/L	Airlock
ADVASC-SS	Advanced Thermoelectric Refrigerator/Freezer
ADUM	Advanced Diagnostic Ultrasound in Microgravity
AIDS	Acquired Immune Deficiency Syndrome
amp	ampere
AMP	Ambulatory Medical Pack
AR	Atmospheric Revitalization
ARCU	American to Russian (Power) Converter Unit
ARCTIC	Advanced Thermoelectric Refrigerator/Freezer
ARIS	Active Rack Isolation System
ATV	Automated Transfer Vehicle
BBA	Baseplate Ballast Assembly
BCAT	Binary Colloidal Alloy Test
BCDU	Battery Charge/Discharge Unit
BCSS-FDI	Biotechnology Cell Science Stowage - Fluid Dynamics Investigation
BGA	Beta Gimble Assembly
BPM	Breaths Per Minute
BSTC	Biotechnology Specimen Temperature Controller

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CBBA	Commercial Generic Bioprocessing Apparatus
CBOSS	Cellular Biotechnology Operations Support System
C&C	Command and Control
CCAA	Common Cabin Air Assembly
CCR	Cube Corner Reflector
CCS	Command and Controls System
CDR	Commander
CDRA	Carbon Dioxide Removal Assembly
CDT	Central Daylight Time
CEO	Crew Earth Observation
CEVIS	Cycle Ergometer with Vibration Isolation System
CheCS	Crew Health Care System
CHIT	Mission Action Request System
CIO	Cargo Integration Officer
CMG	Control Moment Gyroscope
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COM	Communication
CR	Change Request
CSA	Canadian Space Agency
CSA-CP	Compound Specific Analyzer - Combustion Products
CSRD	Current Stage Requirements Document
CST	Central Standard Time
CTB	Cargo Transfer Bag
CTBE	Cargo Transfer Bag Equivalent
CWC	Contingency Water Container
DAFT	Dust and Aerosol Measurement Feasibility Test
DC	Docking Compartment Direct Current
DCS	Digital Camera System
deg/sec	Degrees per second
DMT	Decreed Moscow Time
DSC	Digital Still Camera
EarthKAM	Earth Knowledge Acquired by Middle School
ECG	Electrocardiogram
ECLSS	Environmental Control Life Support System
EHIP	EVA Helmet Interchangeable Portable Light
EMU	Extravehicular Mobility Unit
EPO	Educational Payload Opportunity
EPS	Electrical Power System
ER	EXPRESS Rack
ESA	European Space Agency
EST	Eastern Standard Time
EV	Extravehicular

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EVA	Extravehicular Activity
EXPRESS	EXpedite the PRocessing of Experiments to the Space Station
FCC	Flat Circuit Connector
FCE	Flight Crew Equipment
FDI	Fluid Dynamics Investigation
FDIR	Failure Detection Isolation and Response
FE	Flight Engineer
FET	Field Effect Transistor
FGB	Functional Cargo Block
FMS	Force Movement Sensor
FRGF	Flight Releasable Grapple Fixture
FSS	Fluid System Servicer
G	Gravity
GASMAP	Gas Analysis System for Metabolic Analysis of Physiology
GCF	Grenada Crystallization Box
GF	Grapple Fixture
GIVUS	Gyroscopic Angular Velocity Measuring Device
GLA	General Luminaire Assembly
GMT	Greenwich Mean Time
GNC	Guidance Navigation and Control
GPS	Global Positioning System
GTS	Global Timing System
H_2	Hydrogen
H_2O	Water
HCN	Hydrogen Cyanide
HF	Hydrogen Fluoride
HPGT	High Pressure Gas Tank
HRF	Human Research Facility
HRM	Heart Rate Monitor
Hrs	hours
ICU	Interim Control Unit
IDRD	Increment Definition and Requirements Document
IELK	Individual Equipment Liner Kit
IFM	In-Flight Maintenance
IMC	ISS Management Center
IMCA	Integrated Motor Control Assembly
IMMT	ISS Mission Management Team
IMS	Inventory Management System
IMS	Ion Mobility Spectrometer
IMV	Intermodular Ventilation
Inc	Increment
IP	International Partner
IRED	Interim Resistive Exercise Device

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ISS	International Space Station
ISSI	In Space Soldering Investigation
ITCS	Internal Thermal Control System
IVA	Intravehicular Activity
IWIS	Internal Wireless Instrumentation System
JAXA	Japan Aerospace Exploration Agency
kg	kilogram
km	kilometer
KOZ	Keep-Out Zone
KU	K-Band Frequency Sub-Band
Ku-Band	15.250 to 17.250 Gigahertz
kW	kiloWatt
Lab	Laboratory
LAB	Laboratory
LCG	Liquid Cooling Garment
LEE	Latching End Effector
LF	Logistics Flight
LiOH	Lithium Hydroxide
LHA	Lamp Housing Assembly
L&M	Logistic and Maintenance
LOS	Loss of Signal
LSO	Lightning and Sprites Observation
LSS	Life Support Systems
LTL	Low Temperature Loop
LVLH	Local Vertical Local Horizontal
m3	cubic meter
M	Modified
MAMS	Microgravity Acceleration Measurement System
MBS	Mobile Base System
MCA	Major Constituent Analyzer
MCC	Mission Control Center
MCC-H	Mission Control Center - Houston
MCC-M	Mission Control Center - Moscow
MDM	Multiplexer/Demultiplexer
MEC	Medical Equipment Computer
MER	Mission Evaluation Room
METOX	Metal Oxide
MFMG	Miscible Fluids in Microgravity
Micro-g	Micro-Gravity
MIOCB	Mission Integration and Operations Control Board
MISSE	Materials International Space Station Experiment
MMOD	Micrometeoroid Orbital Debris
MOD	Mission Operations Directorate

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MPAC/SEED	Micro-PArticles Capturer/Space Environment Exposure Device
MPLM	Multi-Purpose Logistics Module
MPV	Manual Procedure Viewer
MSG	Microgravity Sciences Glovebox
MSS	Mobile Servicing System
MT	Metric Ton
MTL	Moderate Temperature Loop
MWA	Maintenance Work Area
N	Nadir
N_2	Nitrogen
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
NH_3	Ammonia
NiMH	Nickel Metal Hydride
O_2	Oxygen
OBT	Onboard Training
OCA	Orbital Communications Adapter
OCR	Onboard Checkout Requirements
ODF	Operations Data File
ORM	Orbiter Repair Maneuver
OS	Operating System
OTA	Orlan Tether Assembly
P	Progress
PCE	Proximity Communication Equipment
PCG-STES-II	Protein Crystal Growth-Single Thermal Enclosure System-II
PCMCIA	Portable Computer Memory Card Interface Adapter
PCS	Portable Computer System
PDGF	Power Data Grapple Fixture
PEP	Payload Executive Processor
PFA	Portable Fan Assembly
PFCS	Pump Flow Control Subsystem
PGT	Pistol Grip Tool
PHA	Pre-breathe Hose Assembly
PIER	Post Increment Evaluation Report
PiP	Plug-in-Plan
PLSS	Primary Life Support System
PMA	Pressurized Mating Adapter
POIC	Payload Operations Integration Center
POP	Payload On Orbit Processor
$ppCO_2$	Partial Pressure of Carbon Dioxide
PPCR	Planning Product Change Request
PRACA	Problem Reporting and Corrective Action
PS	Power Supply
PSR	Physical Science Research

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PSRP	Payload Safety Review Panel
PVTCS	Photovoltaic Module Thermal Control System
PUL	Portable Utility Light
QD	Quick Disconnect
R&R	Remove and Replace
REBA	Rechargeable EVA Battery Assembly
RF	Radio Frequency
RHC	Rotational Hand Controller
RJOP	Russian Joint Operations Plan
RPC	Remote Power Controller
RPCM	Remote Power Controller Module
RPM	Rbar Pitchover Maneuver
rpm	revolutions per minute
RRF	Requirements Request Form
RS	Russian Segment
RSA	Russian Space Agency
RSP	Respiratory Support Pack
RWS	Robotic Workstation
S	Soyuz
SAMS-II	Space Acceleration Measurement System - II
SAW	Solar Array Wing
SDMS	Structural Dynamic Measurement System
SDTO	Station Development Test Objective
Sec	Second
SEM	Space Experiment Module
SIGI	Space Integrated Global Positioning System/Inertial Navigation System
SM	Service Module
S/N	Serial Number
SNFM	Serial Network Flow Monitor
SODF	Systems Operations Data File
SORR	Stage Operations Readiness Review
SPD	Subject Positioning Device
SPCU	Service and Performance Checkout Unit
SPN	Station Program Note
SPQR	Specular Point-like Quick Reflector
SSC	Station Support Computer
SSCB	Space Station Control Board
SSRMS	Space Station Remote Manipulator System
STS	Space Transportation System
SV	State Vector
TBD	To Be Determined
TBR	To Be Resolved

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TCCS	Trace Contaminate Control System
TCM	Tissue Culture Module
TeSS	Temporary Sleep Station
TEX	Technical Experiment
TMA	Transportation Modified Anthropometric
TRRJ	Thermal Radiator Rotary Joint
TTI	Tech Trans International
TV	Television
TVIS	Treadmill Vibration Isolation System
UF	Utilization Flight
ULF	Utilization Logistics Flight
UMA	Umbilical Mating Assembly
UOP	Utility Outlet Panel
U.S.	United States
U.S. Lab	United States Laboratory
U.S. Seg	U.S. Segment
USOS	United States On-orbit Segment
USSP	United States Space Command
V	Volts
VC	Visiting Crew
VES	Vacuum Exhaust System
VOA	Volatile Organics Analyzer
VRS	Vacuum Resource System
VTR	Video Tape Recorder
WAL	Wallops
WLP	Weekly Look-ahead Plan
WR	Wrist Roll
WS	Work Site
XPOP	X-Axis Perpendicular to the Orbit Plane
XVV	X-Axis into the Velocity Vector
YVV	Y-Axis Pointed Along Velocity Vector
Z1	Zenith 1
ZSR	Zero-gravity Stowage Rack

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APPENDIX B

GLOSSARY OF TERMS

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APPENDIX B - GLOSSARY OF TERMS

ASSEMBLY ELEMENT

Includes both the assembly element and items (i.e., racks, installed spares/backups), which are part of the initial outfitting of an element even if they are launched separate from the element. Cargo packing material mass may be included.

CARGO

Any item (including spares for corrective or preventative maintenance) that is not installed as part of the first-time outfitting task.

CHARGEABLE

A cargo item that is an entry against the balance of contribution account. Typically, chargeable items are requested by an International Partner (IP) to be delivered or returned by another IP's vehicle.

EXECUTED

To carry out according to a plan. Note: Because it is difficult to determine if an experiment has been completed due to the continuous evaluation of data and new responses to that data, the term executed is used. Executed indicates that an experiment (i.e., SDTO) was performed during the Increment as originally planned pre-increment.

IDRD TASKS NOT ACCOMPLISHED

Requirements that are documented in SSP 54010, but were not accomplished due to technical problems, a lack of crew time, or other circumstances.

NON-CHARGEABLE

A cargo item that is not subject to balance of contribution accounting.

NON-STANDARD STOWAGE

Onboard areas that do not conform to certification requirements for permanent stowage, but are multi-laterally accepted by relevant IPs to be used as temporary locations for stowage.

STANDARD STOWAGE

Onboard areas that are multi-laterally accepted by relevant IPs as conforming to certification requirements for permanent stowage purposes.

TASKS IN ADDITION TO THE IDRD

Requirements that are not documented in the referenced IDRD, but were later added to a particular stage or flight. Note: Adding a requirement to a stage or flight does not guarantee completion of this requirement.

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APPENDIX C

OPEN WORK

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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 removed from this table. As new TBD items are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBDs will not be renumbered.

TABLE C-1 TO BE DETERMINED ITEMS

TBD	Section	Description	Status
2-1	2.1	PIER 9 not baselined at release of this document.	Open
2-2	2.2	PIER 11 not baselined at release of this document.	Open

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 removed from this table. As new TBR issues are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBRs will not be renumbered.

TABLE C-2 TO BE RESOLVED ISSUES

TBR	Section	Description	Status

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APPENDIX D

MANIFEST DETAILS

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APPENDIX D - MANIFEST DETAILS

D-1 FLIGHT 8S RETURN HARDWARE (PAGE 1 OF 11)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
1	***SOYUZ 214***			***219.50***	
2	**____ 214**				
3					
4	**TOTAL RUSSIAN CARGO**			**13.36**	
5	**_____ _____**				
6	***WATER SUPPLY SYSTEM FOR WATER RESERVES***			***0.12***	
7	**_____ _____ __ _____ ____ (___-3_)**				
8	WATER SAMPLE FROM WATER SUPPLY EQUIPMENT IN A 100 ML DRINKING BAG	1	0.12	0.12	21
9	_____ ____ __ ___-3_ _ _____ ___ _____ _____ 100 __				
10	***CONDENSATE WATER RECOVERY SYSTEM (___- 2_)***			***1.03***	
11	**_____ _____ ____ __ _____ ___- 2_**				
12	WATER SAMPLE FROM CONDENSATE WATER PROCESSOR "HOT" TAP IN 100 ML DRINKING BAG	1	0.12	0.12	22
13	_____ ____ __ _____ "___." ___-_2_ _ _____ ___ _____ _____ 100 __				
14	SAMPLE OF CONDENSATE PRIOR TO PURIFICATION COLUMN UNIT IN 100 ML DRINK BAG	1	0.12	0.12	23
15	_____ _____ _____ ___ _ _____ ___ _____ _____ 100 __				
16	SAMPLE OF CONDENSATE IN A 100 ML DRINKING BAG	2	0.23	0.46	24
17	_____ _____ _ _____ ___ _____ _____ __ 100 __				
18	WATER SAMPLE FROM CONDENSATE WATER PROCESSOR "WARM" TAP IN 100 ML DRINK BAG	1	0.12	0.12	25
19	_____ ____ __ _____ "____." ___-_2_ _ _____ ___ _____ _____ 100 __				
20	SAMPLE CONTAINER	1	0.22	0.22	22
21	_____ ____ ____				
22	***ATMOSPHERE REVITALIZATION SUBSYSTEM (____)***			***1.50***	
23	**____**				
24	AK-1M SAMPLER KIT	8	0.19	1.50	
25	_____ _ _____ __-1_				

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D-1 FLIGHT 8S RETURN HARDWARE (PAGE 2 OF 11)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
26	***LIFE SUPPORT SYSTEM (___)***			***1.23***	
27	___				
28	***EQUIPMENT CLEAN UP & AMBIENT ATMOSPHERE CONTROL***			***0.80***	
29	_____				
30	EKOSFERA KIT	1	0.80	0.80	
31	_____ _____				
32	***MEDICAL SUPPORT SYSTEM (CMO)***			***0.10***	
33	___				
34	ISS PERSONAL RADIATION DOSIMETER (__-3 ___)	2	0.05	0.10	
35	_____ __3_____ __-3 ___				
36	***EQUIPMENT CLEAN UP & AMBIENT ATMOSPHERE CONTROL***			***0.28***	
37	_____				
38	SAMPLE TUBE KIT (SURFACES)	1	0.14	0.14	
39	_____ _ _____ (_____.)				
40	TEST TUBE KIT (OPER)	1	0.14	0.14	
41	_____ _ _____ (____.)				
42	***CARDIORECORDER 90205***			***0.05***	
43	_____ **90205**				
44	CARDIORECORDER CASSETTE	1	0.05	0.05	
45	_____ _____ 90205				
46	***MOTION CONTROL AND NAVIGATION SYSTEM (____)***			***0.90***	
47	____				
48	***SATELLITE NAVIGATION HARDWARE***			***0.90***	
49	_____ _____ _____ ___				
50	NAVIGATIONAL RECEIVING MODULE	1	0.80	0.80	
51	_____ _____ _____				
52	FLASH-CARD (ACH)	1	0.10	0.10	
53	____-____				
54	***ONBOARD EQUIPMENT CONTROL SYSTEM***			***1.20***	
55	____				
56	MSD-CARTRIDGE	1	0.60	0.60	
57	MSD-_____				
58	MSD-CARTRIDGE	1	0.60	0.60	
59	MSD-_____				
60	***TELEVISION SYSTEM (TBC)***			***0.80***	
61	_____ _____ (___)				
62	TV BROADCASTING CAMERA KL-152	2	0.40	0.80	
63	_____ __-152				
64	***CREW ONBOARD SUPPORT KIT (____)***			***3.15***	

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D-1 FLIGHT 8S RETURN HARDWARE (PAGE 3 OF 11)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
65	____				
66	CREW PREFERENCE ITEMS	2	1.15	2.30	
67	_____ ____				
68	CREW PREFERENCE ITEMS	1	0.85	0.85	36
69	_____ ____				
70	***SANITARY HYGIENE SUPPORT (____)***			***0.80***	
71	_____ _____-_____ _____ (____)				
72	***WASTE MANAGEMENT SYSTEM***			***0.80***	
73	_____-_____ _____				
74	DUST COLLECTOR (KIT)	1	0.30	0.30	
75	_____ (_____)				
76	DUST FILTER CARTRIDGE	1	0.50	0.50	
77	_____ _____ _____				
78	***INDIVIDUAL PROTECTION GEAR (___)***			***0.30***	
79	___				
80	UNIT	1	0.30	0.30	
81	____ ___				
82	***SYSTEMS (___)***			***2.33***	
83	___				
84	**REMOVABLE CASSETTE-CONTAINER (CKK)**	**1**	**2.33**	**2.33**	
85	_____ ___ _1-__				
86	TRANSPORT COVER	1			
87	_____ _____				
88					
88	**TOTAL RUSSIAN PAYLOADS**			**38.41**	
89	_____ ___._____ (___)				
90	***VIDEO AND PHOTO EQUIPMENT***			***1.85***	
91	_____ _ ____/_____				
92	DIGITAL MEMORY CARD	2	0.02	0.04	
93	_____ _____ _____ Compact flash				
94	CASE FOR HARD DRIVE	1	0.10	0.10	
95	_____ ___ _____ _____				
96	SM-FOTO HARD DRIVE	1	0.17	0.17	
97	_____ ____				
98	35 MM FILM IN A CASE	16	0.03	0.48	
99	_____ _ _____35__				
100	DV-CAM VIDEO CASSETTES	9	0.08	0.72	
101	_____ DVCAM (mini-DV)				
102	VIDEOCASSETTE BETACAM SP	1	0.34	0.34	
103	_____ Betacam SP				

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D-1 FLIGHT 8S RETURN HARDWARE (PAGE 4 OF 11)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
104	***PAYLOADS***			***31.70***	
105	_____ ___. _____				
106	***CONTRACT EXPERIMENT (___)***			***8.07***	
107	___				
108	GCF-02 CRYSTALLIZATION EQUIPMENT	2	1.60	3.20	
109	-_____ _____ GCF-02				
110	JCF-02V CRYSTALLIZATION DEVICE	1	1.60	1.60	
111	_____ _____ JCF-02V				
112	HARD DISK DRIVE RETURN KIT	1	0.45	0.45	
113	_____ "_____ _____ _____"				
114	HALLEY-INF KIT	1	0.55	0.55	
115	_____ "_____-___"				
116	ETD HARD DRIVE CONTAINER	1	0.30	0.30	
117	_____ "ETD _____ ____"				
118	RETURN CONTAINER	1	0.95	0.95	
119	_____ ___ _____ _____				
120	LATCH	1	0.90	0.90	
121	_____				
122	COVER ASSEMBLY	1	0.12	0.12	
123	_____ _ _____				
124	"TOPAZ CUBE" ELECTRONICS BLOCK	1	1.63	1.63	
125	____ _____ "_____ _____"				
126	"AMBER CUBE" ELECTRONICS BLOCK	1	1.55	1.55	
127	____ _____ "_____ _____"				
128	CASE (TOKSICHNOST EXPERIMENT)	2	0.04	0.08	
129	_____ (_. "_____")				
130	KB-03 CONTAINER	1	2.60	2.60	
131	_____ _____ __-03				
132	SALIVA-F KIT	1	0.13	0.13	
133	_____ "_____-_____"				
134	PROFILAKTIKA DATA KIT	1	0.05	0.05	
135	_____ "_____-_____"				
136	PULSE DATA KIT	2	0.05	0.10	
137	_____ "_____-_____"				
138	ERYTHROCYTE KIT	1	0.25	0.25	
139	_____ _____				
140	BIORISK-MCB CONTAINER	1	2.02	2.02	
141	_____ _____-___				
142	BIORISK-KM TRAY	1	0.62	0.62	
143	_____ _____-__				
144	RASTENIYA [PLANTS] KIT	1	0.70	0.70	
145	_____ "_____"				

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D-1 FLIGHT 8S RETURN HARDWARE (PAGE 5 OF 11)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
146	***INTERCELLULAR INTERACTION EXPERIMENT***			***2.70***	
147	_____ "_____ _____ "				
148	THE LOOSE LEAF "FILTERS"	1	0.10	0.10	
149	_____ "_____"				
150	KB-03 CONTAINER	1	2.60	2.60	
151	_____ _____ __-03				
152	LUCH-2 HARDWARE	1	0.85	0.85	
153	_____ ___-2				
154	BIOSAMPLE KIT	1	0.22	0.22	
155	_____ _____				
156	***KROMKA-1 EXPERIMENT***			***2.30***	
157	___-_ _____**-1:**				
158	KROMKA TRANSPORT CONTAINER	1	2.30	2.30	
159	_____ _____ "_____"				
160	PLATAN-M UNIT	1	2.20	2.20	
161	____ _____-_				
162	"BRADOZ-1" ASSEMBLY (BRADOZ EXPERIMENT)	5	0.18	0.90	
163	_____ "_____-1" (_. "_____")				
164	***MATRESHKA-R EXPERIMENT***			***0.47***	
165	__ _____-_				
166	SPD SET	1	0.37	0.37	
167	_____ ___				
168	PCMCIA CARD	2	0.05	0.10	
169	_____ PCMCIA				
170	MEMORY CARD CF 2 MB	1	0.02	0.02	
171	_____ _____ CF 2 MB				
172	***URAGAN EXPERIMENT***			***0.40***	
173	_____ _____				
174	HARD DRIVE (URAGAN EXPERIMENT)	1	0.10	0.10	
175	____ HDD (_."_____")				
176	HDD DISK	3	0.10	0.30	
177	_____ ____ HDD (_."_____")				
178	***EXPERIMENT "RELAXATION"***			***0.19***	
179	_____ "_____ "				
180	MINI DV VIDEO CASSETTE	1	0.04	0.04	
181	_____ mini DV				
182	3.5" FLOPPY DISK	5	0.03	0.15	
183	_____ 3.5"				
184	***MOLNIYA-SM EXPERIMENT***			***0.80***	
185	_____ _____				

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D-1 FLIGHT 8S RETURN HARDWARE (PAGE 6 OF 11)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
186	MAGNETO-OPTICAL DISK	2	0.10	0.20	
187	_____ ____				
188	REMOVABLE HARD DISK DRIVE	3	0.20	0.60	
189	_____ _____ ____				
190	***PLASMA CRYSTAL EXPERIMENT***			***0.60***	
191	_____ _____				
192	PLASMA CRYSTAL KIT NO. 7	1	0.60	0.60	40
193	_____ No7 "_____ _____"				
194	***KIT WITH COMMEMORATIVE ITEMS***			***2.25***	
195	_____ _ _____				
196	KIT OF FSA COMMEMORATIVE ITEMS	1	2.00	2.00	
197	_____ "_____ ___"				
198	KIT OF 8P COMMEMORATIVE ITEMS	1	0.25	0.25	
199	_____ "_____ 8_"				
200	***PAYLOADS (___)***			***0.73***	
201	_____ ___._____ (___)				
202	***COMPLEX TBU (UNIVERSAL BIOTECHNOLOGICAL THERMOSTAT)***			***0.60***	
203	_____ ___ (_____ _____ _____)				
204	SELF-CONTAINED TEMPERATURE LOGGER [APT] IN A CASE ("BIOEKOLOGIYA" EXPERIMENT)	1	0.30	0.30	
205	_____ _____ _____ _ ____				
206	BIO ECOLOGICAL KIT	1	0.30	0.30	
207	_____ "_____"				
208	EKON KIT	1	0.13	0.13	
209	_____ "___"				
210	***PAYLOADS (___)***			***3.63***	
211	_____ ___._____ (___)				
212	***BIOKONT-T EQUIPMENT WITH REKOMB-K EQUIPMENT***			***3.30***	
213	_____ "_____-_" _ _____ "_____-_"				
214	BIOKONT-T EQUIPMENT REKOM-K HARDWARE	1	3.30	3.30	
215	_____ "_____-_" _ _____ "_____-_"				
216	**REKOMB-K ("KONYUGATSIYA" EXPERIMENT)**	**1**			
217	"_____-_" (_. "_____")				
218	THE WINCHESTER UNIT HARD DRIVE	1	0.33	0.33	
219	___ _____				

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D-1 FLIGHT 8S RETURN HARDWARE (PAGE 7 OF 11)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
220	***PAYLOADS (___)***			***0.50***	
221	_____ ___._____ (___)				
222	SPD SET	1	0.11	0.11	
223	_____ ___				
224	***PHANTOM***			***0.39***	
225	_____				
226	KIT	1	0.22	0.22	
227	_____				
228	CASE (MATRESHKA-R EXPERIMENT)	1	0.17	0.17	
229	_____ (_._____-_")				
230					
231	**FGB CARGO**			**0.28**	
232	_____				
233	SAMPLE TUBE KIT (SURFACES)	2	0.14	0.28	Z
234	_____ _ _____ (_____.)				
235					
236	**TOTAL US CARGO**			**3.60**	
237	_____ _____				
238	***CHECS EHS HARDWARE***			***2.35***	
239	____-__ _____ _____ _____ **(EHS)** _____ _____ _____ _____ **(CHECS)**				
240	CREW PASSIVE DOSIMETER (CPD) ASSEMBLY	2	0.01	0.02	
241	_____ _____ _____ _____ (CPD)				
242	DUAL SORBENT TUBE ASSEMBLY	12	0.11	1.32	
243	_____ _____ _____				
244	CONTROL ASSEMBLY	1	0.23	0.23	
245	_____ _____ _____ _____				
246	FORMALDEHYDE MONITOR ASSY	24	0.01	0.12	
247	_____ _____ _____				
248	CONTROL ASSY	1	0.02	0.02	
249	_____ _____				
250	BAG ASSY., TOC WATER SAMPLE (300 ML)	1	0.32	0.32	
251	_____ ___ ____ ____ ___ _____ __ _____ _____ (300 __)				
252	BAG ASSY., TOC WATER SAMPLE (300 ML)	1	0.32	0.32	
253	_____ ___ ____ ____ ___ _____ __ _____ _____ (300 __)				

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D-1 FLIGHT 8S RETURN HARDWARE (PAGE 8 OF 11)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
254	***CHECS EHS HARDWARE***			***0.16***	
255	**____-__ _____ _____ _____ (EHS) _____ _____ _____ _____ (CHECS)**				
256	RADIATION AREA MONITOR (RAM) ASSEMBLY	16	0.01	0.16	
257	_____ _____ (RAM)				
258	***ITCS COOLANT SAMPLING***			***0.06***	
259	**_____ ____ _____ _____ _____ _____ (ITCS)**				
260	**ZIPLOCK BAG ASSY**	**1**	**0.01**	**0.02**	
261	**_____ ZIPLOG**				
262	PORT FLUSH BAG	1	0.01	0.01	
263	_____ ___ _____ _____				
264	**ZIPLOCK BAG ASSY**	**1**	**0.01**	**0.02**	
265	**_____ ZIPLOG**				
266	PORT FLUSH BAG	1	0.01	0.01	
267	_____ ___ _____ _____				
268	TEST STRIP BAG - NH3	1	0.01	0.01	
269	_____ _ _____ _____ ___ _____ _____ (NH3)				
270	***EVA EQUIPMENT***			***1.03***	***10***
271	_____ ___ _____				
272	ROTOR, WATER PUMP	1	0.01	0.01	28,36
273	_____ _____ _____				
274	ROTOR, WATER PUMP	1	0.01	0.01	29,36
275	_____ _____ _____				
276	LINT FREE WIPES	10	0.00	0.01	34,36
277	_____ _____				
278	EMU PUMP INLET FILTER (I-127)	1	0.09	0.09	33,36
279	_____ _____ _____ ___ _____ EMU (I-127)				
280	EMU GAS TRAP (1-141)	1	0.32	0.32	32,36
281	_____ [_____] _____ EMU (1-141)				
282	RESIDUE/PARTICULATE SAMPLES	1	0.01	0.01	26,36
283	_____ _____/_____				
284	RESIDUE/PARTICULATE SAMPLES	1	0.23	0.23	27,36
285	_____ _____/_____				
286	BAG ASSY,. WASTE, SMALL (FLUSH 300 mL)	2	0.18	0.36	
287	_____ ___ _____ _____, _____ (_____ ____, 300 __)				

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D-1 FLIGHT 8S RETURN HARDWARE (PAGE 9 OF 11)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
288					
289	**TOTAL COMMON WASTE**			**67.00**	
290	____ _____				
291	**TOTAL US COMMON WASTE**			**33.50**	
292	**TOTAL RUSSIAN COMMON WASTE**			**33.50**	
293	EDV	2	26.50	53.00	41
294	_____ __ ____ __				
295	FOOD RATIONS CONTAINERS	14	1.00	14.00	
296	_____ _ _____ _____ (____.)				
297					
298	**TOTAL RUSSIAN NON-COMMON WASTE**			**69.72**	
299	_____ _____				
300	KURS ELECTRONIC CONTROL UNIT WITH RT-VKA UNIT	1	64.00	64.00	
301	_____ _____ _1-___-03 _____ _____ __-___				
302	KURS AMPLIFIER 2_4-___	1	1.05	1.05	
303	_____ _____ 2_4-___				
304	LOCAL TEMPERATURE SWITCH TA251M	1	2.00	2.00	
305	_____ _____ _____ ___ __251_				
306	SOFT TRASH BAGS (___-_)	1	2.67	2.67	
307	_____ ___ _____ _____ _____ ___-_				
308					
309	**TOTAL US NON-COMMON WASTE**			**27.12**	
310	**U.S. _____**				
311	SOFT TRASH BAGS (___-_)	2	0.30	0.60	
312	_____ ___ _____ _____ _____ ___-_				
313	CUSHION ASSY., SEAT BACK, CEVIS	1	0.32	0.32	
314	_____ _____ _____ ___ _____CEVIS				
315	LAMP HOUSING ASSEMBLY, GENERAL	4	1.25	5.00	
316	_____ _____ _____ _ _____				
317	ADAPTER ASSEMBLY, AIR FILTER, 0.22µm	8	0.05	0.36	
318	_____ ___ _____ _____				
319	PALLET DETAIL ASSEMBLY PSYCH CD CASE	1	0.78	0.78	

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D-1 FLIGHT 8S RETURN HARDWARE (PAGE 10 OF 11)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
320	_____-_____ ___ _____- _____ _____ _____				
321	REMOVABLE CD-ROM DRIVE	1	0.23	0.23	
322	_____ _____ ___ _____				
323	FOAM FROM AIR FILTER ADAPTER	1	0.18	0.18	
324	_____ __ _____ _____ _____				
325	ASSEMBLY, IBM THINKPAD FLIGHT LAPTOP COMPUTER SYSTEM MODEL 760XD	1	2.70	2.70	
326	_____				
327	ASSEMBLY, BATTERY PACK - PCS	1	0.36	0.36	
328	____ _____ _____ ___ _____ PCS				
329	IVA 12V NIMH BATTERY	1	0.68	0.68	
330	_____ _____- _____ ___ _____, 12 _				
331	SYRINGE ASSEMBLY, MEDIA	4	0.01	0.04	
332	_____ _____ _ _____ _____				
333	BAG ASSY., MICRO SAMPLE ANALYSIS (300ML)	12	0.09	1.09	
334	_____ ___ _____ _____ ____ ____ (300 __)				
335	CLIO PDA ASSEMBLY	1	1.45	1.45	
336	_____ _____ _____ (PDA), _____ CLIO				
337	PACKET ASSEMBLY, PETRI DISH	3	0.10	0.30	
338	_____ _ _____ _____				
339	REMOVABLE MASS STORAGE CARTRIDGES	8	0.09	0.73	
340	_____ _____ __ _____ _____				
341	DIAMOND RIO PMP300 ASSEMBLY	3	0.25	0.76	
342	_____ _____ MP3, _____ DIAMOND RIO				
343	SODIUM CHLORIDE 0.9% 1 LITER	2	1.10	2.20	
344	0,9% _____ _____ _____, 1 ____				
345	SPARE THREE-WAY VALVE	1	0.03	0.03	
346	_____ ____-_____ _____				
347	PACKET ASSY, SURFACE SAMPLER	8	0.06	0.51	
348	_____ _____ ___ _____ ____ _ _____ _____				
349	SYRINGE PUMP	1	0.95	0.95	

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D-1 FLIGHT 8S RETURN HARDWARE (PAGE 11 OF 11)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
350	_____ _____				
351	**PROGRESS KIT FOR MCA ANALYZER ASSEMBLY**	**1**	**7.80**	**7.80**	
352	_____ ___ _____ _____ _____ ___ _ ___ "_____"				
353	SPECIAL CUSHION, SWITCHGUARD	1	0.05	0.05	
354	_____ _____ ___ _____ _____ _____				
355	SMARTMEDIA FLASH CARD	3	0.00	0.01	
356	____-_____ SMARTMEDIA				

NOTES	
Z	FGB HARDWARE

FLIGHT SPECIFIC NOTES	
10	All hardware to be double contained in a Ziplock Bag
21	Water sample from Water Supply Equipment [___-__] - _____ ____ __ ___-3_
22	Water sample from Condensate Water Processor [___-_2_] "hot" tap - _____ ____ __ _____ "___." ___-_2_
23	Sample of condensate prior to the Purification Column Unit (_KO) - _____ _____ _____ ___
24	Sample of condensate - _____ _____
25	Water sample from the Condensate Water Processor [___-_2_] "warm" tap - _____ ____ __ _____ "____." ___-_2_
26	Residue from 3013 pump removal.
27	Residue from 3005 pump removal.
28	3013 Rotor
29	3005 Rotor
32	From 3005.
33	From 3013.
34	Wipes used to clean pump and seal cup.
36	Mike Fincke has agreed to reduce his personal items to accomodate return of EMU hardware.
40	6 ea. Hi-8 videocassette - (_/_____ Hi-8 - 6 __.)
41	EDV with urine. _____ ___ ____ _ _____

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D-2 FLIGHT 9S LAUNCH HARDWARE (PAGE 1 OF 10)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
1	***SOYUZ 215***			***150.99***	
2	**____ 215**				
3					
4	**TOTAL RUSSIAN CARGO**			**100.69**	
5	_____ _____				
6	***LIFE SUPPORT SYSTEM (___)***			***69.28***	
7	___				
8	***ATMOSPHERE REVITALIZATION SUBSYSTEM (____)***			***0.38***	
9	____				
10	AK-1M SAMPLER KIT	2	0.19	0.38	
11	_____ _ _____ __-1_				
12	***WATER SUPPLY SYSTEM (CBO)***			***6.23***	
13	___				
14	EDV	1	28.23	6.23	
15	_____ ___ ____ ___				
16	***FOOD SUPPLY SYSTEM (___)***			***7.04***	
17	___				
18	SELECTION OF FRESH PRODUCE	1	7.04	7.04	
19	_____ _____ _____				
20	***FOOD SUPPLY SYSTEM (___)***			***6.70***	
21	___				
22	FOOD RATIONS CONTAINERS	1	6.70	6.70	7
23	_____ _ _____ _____				
24	***ATMOSPHERE REVITALIZATION SUBSYSTEM (____)***			***21.57***	
25	____				
26	GAS ANALYZERS BTP1187	1	2.40	2.40	
27	____ _____ ___1187				
28	GAS ANALYZER __5188 (O2 IN H2)	3	1.04	3.13	
29	_____ __5188 (_2 _ _2)				
30	BASE	1	0.93	0.93	
31	_____				
32	PRESSURE DIFFERENTIAL REGULATOR	1	2.32	2.32	
33	_____ _____ _____ ___				
34	RUBBER RING FOR PRESSURE DIFFERENTIAL REGULATOR	2	0.01	0.02	
35	_____ _____ _ ___				
36	RUBBER RING FOR PRESSURE DIFFERENTIAL REGULATOR	2	0.01	0.02	
37	_____ _____ _ ___				
38	JUMPER	1	0.10	0.10	
39	_____				
40	JUMPER	1	0.10	0.10	
41	_____				

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D-2 FLIGHT 9S LAUNCH HARDWARE (PAGE 2 OF 10)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
42	RUBBER RING	8	0.00	0.01	
43	_____ _____				
44	RUBBER RING	8	0.00	0.01	
45	_____ _____				
46	ELECTRON KIT #3	1	6.13	6.13	
47	_____ _3 ___ _____				
48	AEROSOL FILTER	2			
49	_____ _____				
50	CABLE INSERT	1			
51	_____-_____ __3__				
52	HOSE	6	0.31	1.86	
53	_____				
54	ELECTROPNEUMATIC VALVE	1	1.31	1.31	
55	_____				
56	ADAPTER	1			
57	_____				
58	ADAPTER	1			
59	_____				
60	NUT	1			
61	_____				
62	ELECTRON COMPONENTS FOR ELECTRON IN A COVER	1	1.94	1.94	
63	_____ ___ "_____" _ _____ 11_615 4040-2410_12				
64	FILTER	2			
65	_____				
66	ELBOW	4			
67	_____				
68	COMBINATION ELBOW	4			
69	_____ _____				
70	ADAPTER	4			
71	_____				
72	ADAPTER	1			
73	_____				
74	CAP	1			
75	_____				
76	NUT	2			
77	_____				
78	ADAPTER	6			
79	_____				
80	RUBBER RING SET	1			
81	_____ _____ _____				
82	RUBBER RING SET	1			
83	_____ _____ _____				
84	RUBBER RING SET	1			

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D-2 FLIGHT 9S LAUNCH HARDWARE (PAGE 3 OF 10)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
85	_____ _____ _____				
86	RUBBER RING SET	1			
87	_____ _____ _____				
88	LUBRICANT	1			
89	_____				
90	ADAPTER	1	0.26	0.26	
91	_____				
92	CABLE INSERT	1	0.12	0.12	
93	_____-_____				
94	CABLE INSERT	1	0.07	0.07	
95	_____-_____				
96	FOR ELVK _1 KIT	1	0.84	0.84	
97	_____"___ _____ ____ _1"				
98	CONTAINER	1			
99	____				
100	TRIOL COOLANT	1			
101	_____"_____"				
102	REAGENT/TEST PAPER	1			
103	_____ _____ _____				
104	***MEDICAL SUPPORT SYSTEM (CMO)***			***0.65***	
105	___				
106	"UBIM-10U" KIT	1	0.09	0.09	
107	_____"____-10_"				
108	SET OF MEASURING STRIPS	1	0.56	0.56	
109	_-_ _____ _____ _____-4				
110	***CREW ONBOARD SUPPORT KIT (____)***			***4.71***	
111	____				
112	CREW PREFERENCE ITEMS	2	1.96	3.91	
113	_____ ____				
114	CREW PREFERENCE ITEMS	1	0.80	0.80	
115	_____ ____				
116	***CREW ONBOARD SUPPORT KIT (____)***			***2.40***	
117	____				
118	***COMPLETE SET OF RUSSIAN DOCUMENTATION***			***2.40***	
119	_____ _____ _/_____				
120	ACTIVATION/DEACTIVATION	2			
121	_____/_____				
122	CHANGE LOG ON PT 2 BK 3 ATMOSPH. REVITALIZATION SUBSYSTEM	1			
123	_____ _____ __ 17__.0000_-0__80_.2__.3____				

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D-2 FLIGHT 9S LAUNCH HARDWARE (PAGE 4 OF 10)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
124	ATMOSPHERE REVITALIZATION SUBSYSTEM	1			
125	_____ _____ _____ _ _____ _____				
126	FIRE DETECTION AND SUPPRESSION SUSBYSTEM	1			
127	_____ _____, _____ _ _____				
128	CHANGE LOG ON PART 4 BOOK 1 MANUAL CONTROLS (RSU)	1			
129	_____ _____ __ 17__.0000_-0__80 _.4 __.1 ___				
130	ORLAN OPERATIONS (RSK)	2			
131	_____ _ __ _____ (___)				
132	RECOMMENDATIONS ON CREW ROTATION	2			
133	_____ __ _____ _____				
134	CHANGE LOG FOR PART 2, ENGINEERING EXPERIMENTS	1			
135	_____ _____ __ 17__.0000_-0__81 _.2 _____ _____				
136	CHANGE LOG FOR PART 3, BIOTECHNOLOGY	1			
137	_____ _____ __ 17__.0000_-0__81 _.3 _____				
138	CHANGE LOG FOR PART 10, SCIENTIFIC EXPERIMENTS	1			
139	_____ _____ __ 17__.0000_-0__81 _.10 _____ _____				
140	COMPACT DISK	2			
141	CD-____				
142	***ONBOARD EQUIPMENT CONTROL SYSTEM (____)***			***0.02***	
143	____				
144	CABLE	1	0.02	0.02	
145	_____				
146	***COUNTERMEASURES SYSTEM (_____)***			***25.60***	
147	_____				
148	TREADMILL STAND	1	25.60	25.60	
149	_____ "_____ _____"				
150	***CREW ONBOARD SUPPORT KIT (____)***			***0.40***	
151	____				
152	***FLIGHT CREW EQUIPMENT***			***0.40***	
153	____				
154	STANDARD AA ALKALINE BATTERY	16	0.03	0.40	
155	_____ _____ ___ __ Alkaline				

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D-2 FLIGHT 9S LAUNCH HARDWARE (PAGE 5 OF 10)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
156	***U.S. CARGO DELIVERED UNDER THE RUSSIAN ALLOCATION***			***14.84***	
157	_____ _____ _____ _ _____ _____ ____				
158	***FOOD SUPPLY SYSTEM (___)***			***14.84***	
159	___				
160	FOOD RATIONS CONTAINERS	2	7.42	14.84	8
161	_____ _ _____ _____				
162	***U.S. CARGO DELIVERED UNDER THE RUSSIAN ALLOCATION***			***10.15***	
163	_____ _____ _____ _ _____ _____ ____				
164	***CREW PROVISIONING***			***10.15***	
165	_____ _____				
166	ATHLETIC SHOES	1	0.74	0.74	R
167	_____ _____				
168	ATHLETIC SHOES	1	0.97	0.97	R
169	_____ _____				
170	SENSOR EXCEL CARTRIDGES	20			R
171	_____ _____ _ _____ ___ _____ Sensor				
172	SHOES ASSY, CYCLING	1	0.82	0.82	
173	_____ _____				
174	SHORTS, NYLON RUNNING, ATHLETIC	11	0.11	1.21	R
175	_____ _____ _____, ___ ____				
176	CHIAO CLOTHING-1	1	2.39	2.39	RB
177	_____-1 ___ ____				
178	CHIAO CLOTHING-2	1	1.45	1.45	RB
179	_____-2 ___ ____				
180	SHARIPOV CLOTHING-1	1	0.82	0.82	RB
181	_____-1 ___ _____				
182	SHARIPOV CLOTHING-2	1	1.76	1.76	RB
183	_____-2 ___ _____				
184					
185	**TOTAL RUSSIAN PAYLOADS**			**14.18**	
186	_____ ___._____ (___)				
187	KIT OF FSA COMMEMORATIVE ITEMS	1	1.50	1.50	
188	_____ "_____ ___"				
189	KIT OF 8P COMMEMORATIVE ITEMS	1	0.30	0.30	
190	_____ "_____8_"				
191	HDD DISK	1	0.13	0.13	
192	_____ ____ HDD (_."_____")				
193	PROFILAKTIKA KIT	1	0.95	0.95	
194	_____ _____				
195	ERYTHROCYTE KIT	1	0.08	0.08	

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D-2 FLIGHT 9S LAUNCH HARDWARE (PAGE 6 OF 10)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
196	_____ _____				
197	**FIBROPLAST-1 KIT**	**1**	**1.00**	**1.00**	
198	_____ "_____-1"				
199	CARDIOCOG ASSEMBLY	1	0.57	0.57	
200	_____ "_____"				
201	HDD RETURN KIT	1	0.24	0.24	
202	_____ "_____ _____ _____"				
203	GALLEY-PM KIT	1	2.31	2.31	
204	_____ "_____-__"				
205	ETD HARD DISC DRIVE CONTAINER	1	0.32	0.32	
206	_____ "ETD _____ ____"				
207	TOPAZ ELECTRONICS UNIT RETURN KIT	1	0.77	0.77	
208	_____ _____ _____ _____ "_____"				
209	***PAYLOADS (___)***			***1.12***	
210	_____ ___.____ (___)				
211	**CASE FOR HARD DRIVE**	**1**	**0.22**	**0.22**	
212	_____ ___ _____ _____				
213	SM-FOTO HARD DRIVE	1			
214	_____ ____				
215	DIGITAL MEMORY CARD	2	0.03	0.06	
216	_____ _____ _____ Compact flash				
217	35 MM FILM IN A CASE	18	0.03	0.54	
218	_____ _ _____ 35__				
219	**KIT (DIATOMEA EXPERIMENT)**	**10**	**0.03**	**0.30**	
220	_____ (_."_____")				
221	***PAYLOADS (___)***			***0.28***	
222	_____ ___.____ (___)				
223	PULSE KIT	1	0.23	0.23	
224	_____ _____				
225	MEMORY CARD CF 2 MB	2	0.02	0.05	
226	_____ _____ CF 2 MB				
227	***PAYLOADS (___)***			***4.61***	
228	_____ ___.____ (___)				
229	SELF-CONTAINED TEMPERATURE LOGGER [APT] IN A CASE ("BIOEKOLOGIYA" EXPERIMENT)	1	0.30	0.30	
230	_____ _____ _____ _ _____				
231	BIO ECOLOGICAL KIT	3	0.29	0.88	1
232	_____ "_____"				
233	**BIOKONT-T EQUIPMENT REKOM-K HARDWARE**	**1**	**3.30**	**3.30**	
234	_____ "_____-_" _ _____ "_____-_"				
235	**EKON KIT**	**1**	**0.13**	**0.13**	

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D-2 FLIGHT 9S LAUNCH HARDWARE (PAGE 7 OF 10)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
236	_____ "___"				
237					
238	**TOTAL US CARGO**			**14.12**	
239	_____ _____				
240	***CHECS HMS HARDWARE***			***0.85***	
241	_____ _____ _____ _____ (HMS) _____ CHECS				
242	ISS MEDICAL ACCESSORY KIT ASSEMBLY	1	0.85	0.85	HZ
243	_____ _ _____ _____				
244	**CTB, HALF-SIZE**	**1**	**1.37**	**7.90**	
245	_____ _____				
246	***HMS ACCESSORY PACK***			***0.35***	
247	_____ _____ HMS (HAP)				
248	TEMPADOT ORAL DISPOSABLE THERMOMETERS 35.5-40.4 C	18	0.00	0.02	
249	_____ _____ _____ TEMPADOT __ 35,5-40,4 °C				
250	EC8+ CARTRIDGE ASSEMBLY	15	0.01	0.09	4
251	_____ _____ __8+				
252	CREATININE CARTRIDGE ASSEMBLY	7	0.01	0.04	4
253	_____ _____ ___ _____ __ _____				
254	SUBPACK ASSY, PROPHONICS MOLDED EAR PLUG SET	4	0.04	0.15	R
255	_____ _____ _____ _____ "Prophonics"				
256	ETYMOTIC EAR PLUG SET	4	0.01	0.05	R
257	_____ _____ "Etymotic"				
258	***CHECS EHS HARDWARE***			***0.28***	
259	____-__ _____ _____ _____ (EHS) _____ _____ _____ _____ (CHECS)				
260	FORMALDEHYDE MONITOR KIT ASSY	1	0.11	0.11	HZ,R
261	_____ _____ _____ _____ (FMK)				
262	RADIATION AREA MONITOR (RAM) ASSEMBLY	17	0.01	0.17	R
263	_____ _____ _____ (RAM)				
264	**EMU GLOVES, 12V HEATED, PHASE VI**	**1**	**1.35**	**1.40**	
265	_____ _____ EMU ____ VI, _ _____, 12 _				
266	COVER, PROTECTIVE, LOWER ARM WRIST DISCONNECT	1	0.05	0.05	

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D-2 FLIGHT 9S LAUNCH HARDWARE (PAGE 8 OF 10)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
267	_____ _____ _____ _____ _____ _____ _____ EMU				
268	**EMU GLOVES, 12V HEATED, PHASE VI**	**1**	**1.35**	**1.40**	**6**
269	**_____ _____ EMU ____ VI, _ _____, 12 _**				
270	COVER, PROTECTIVE, LOWER ARM WRIST DISCONNECT	1	0.05	0.05	
271	_____ _____ _____ _____ _____ _____ _____ EMU				
272	**EMU GLOVES, 12V HEATED, PHASE VI**	**1**	**1.35**	**1.40**	
273	**_____ _____ EMU ____ VI, _ _____, 12 _**				
274	COVER, PROTECTIVE, LOWER ARM WRIST DISCONNECT	1	0.05	0.05	
275	_____ _____ _____ _____ _____ _____ _____ EMU				
276	**EMU GLOVES, 12V HEATED, PHASE VI**	**1**	**1.35**	**1.40**	**6**
277	**_____ _____ EMU ____ VI, _ _____, 12 _**				
278	COVER, PROTECTIVE, LOWER ARM WRIST DISCONNECT	1	0.05	0.05	
279	_____ _____ _____ _____ _____ _____ _____ EMU				
280	***CRITICAL EVA EMU FOR E10***			***0.30***	
281	**_____ _____ _____ _____ EMU __ _____ _____ 10**				
282	GLOVE, CUSTOM COMFORT	1	0.00	0.00	
283	_____ _____, _____ __ _____				
284	GLOVE, CUSTOM COMFORT	1	0.00	0.00	
285	_____ _____, _____ __ _____				
286	COMFORT GLOVES	1	0.03	0.03	
287	_____ _____				
288	TUBE SOCKS	1	0.08	0.08	
289	_____ __ _____				
290	SOCK LINERS	1	0.08	0.08	
291	_____ _____				
292	TUBE SOCKS	1	0.08	0.08	
293	_____ __ _____				
294	VALSALVA DEVICE	4	0.00	0.02	
295	_____ _____				
296	MICRO DRIVE ASSY, PCMCIA, 1GB	2			
297	_____ __ _____ PCMCIA, _____ 1 _____				

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D-2 FLIGHT 9S LAUNCH HARDWARE (PAGE 9 OF 10)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
298	***CHECS EHS HARDWARE***			***0.01***	
299	**____-__ _____ _____ _____ (EHS) _____ _____ _____ _____ (CHECS)**				
300	CREW PASSIVE DOSIMETER (CPD) ASSEMBLY	1	0.01	0.01	R
301	_____ _____ _____ _____ (CPD)				
302	***CHECS CMS HARDWARE***			***3.79***	
303	**_____ _____ _____ _____ (CMS) _____ CHECS**				
304	EXTENSION ASSEMBLY, SUBJECT POSITIONING DEVICE ASSY	2	1.90	3.79	5,R
305	_____ _____- _____ ___ _____ _____				
306	***PCS/SSC***			***1.17***	
307	**_____ _____ _____ (PCS)/ _____ _____ ___ (SSC)**				
308	**PALLET DETAIL ASSEMBLY PSYCH CD CASE**	**1**	**1.17**	**1.17**	
309	**_____-_____ ___ _____- _____ _____ _____**				
310	ASSEMBLY, PCS/OCA WRITABLE CD	2			
311	_____ _____ _____ (CD), _____ ___ _____ PCS/OCA				
312	WRITEABLE DVD ASSEMBLY	4			
313	_____ _____ _____ _____ (DVD)				
314	WRITABLE CD, ADUM OPE SOFTWARE LOAD	1			
315	_____ _____-____ _ _____ _____ ___ ADUM OPE				
316	ASSEMBLY, PCS/OCA WRITABLE CD	16			
317	_____ _____ _____-_____ ___ _____ PCS/OCA				
318	ASSEMBLY, PCS/OCA WRITABLE CD	1			
319	_____ _____ _____ (CD), _____ ___ _____ PCS/OCA				
320	***PHOTO/TV EQUIPMENT***			***0.19***	

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D-2 FLIGHT 9S LAUNCH HARDWARE (PAGE 10 OF 10)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
321	_____ ___ ____/ __- _____				
322	DIGITAL CASSETTE	10	0.02	0.19	3
323	_____ _____				
324	***C&DH-PCS***			***0.21***	***3***
325	**_____ PCS _____** _____ _____ **_____ (C&DH)**				
326	HP 5550 PDA ASSEMBLY	1	0.21	0.21	BT,HZ
327	_____ _____ _____ __5550 (PDA)				
328	SD MEMORY CARD ASSEMBLY	2	0.00	0.00	
329	_____ _____ SD				

Notes Legend

NOTES	
BT	ITEM INCLUDES BATTERIES
HZ	ITEM CONTAINS CHEMICAL, BIOLOGICAL, OR RADIOACTIVE MATERIALS OR BATTERIES
R	THIS HARDWARE CAN BE OPERATED IN THE RUSSIAN SEGMENT ONLY AFTER CERTIFICATION AND ACCEPTANCE IS COMPLETE.
RB	CONTENTS OF THE BAG TO BE USED IN THE RUSSIAN SEGMENT

FLIGHT SPECIFIC NOTES	
1	Kit NO. 5,6,7
3	Crew Preference Allocation to be reduced by the mass of this item.
4	30 day Scrub Turnaround
5	Installed On-orbit during Increment
6	Due to packing configuration volume for this glove is included in the glove listed above.
7	Container with Russian Food
8	Container with US Food

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D-3 FLIGHT 15P RETURN HARDWARE (PAGE 1 OF 9)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
1	***PROGRESS 350***			***1339.06***	
2	**_____ 350**				
3					
4	**TOTAL COMMON WASTE**			**879.41**	
5	**____ _____**				
6	**TOTAL RUSSIAN COMMON WASTE**			**439.71**	
7	**TOTAL US COMMON WASTE**			**439.71**	
8	***SANITARY HYGIENE SUPPORT (____)***			***676.50***	
9	_____ _____-_____ _____ (____)				
10	SOFT TRASH BAGS (___-_)	3	8.00	24.00	
11	_____ ___ _____ _____ _____ ___-_				
12	KTO	10	11.50	115.00	
13	___				
14	EDV	7	26.50	185.50	
15	_____ ___ ____ ___				
16	URINE IN RODNIK TANKS	2	176.00	352.00	
17	_____ _ _____ _____"_____"				
18	***SANITARY HYGIENE SUPPORT MEDICAL SUPPORT SYSTEM***			***192.15***	
19	___ ____				
20	PENGUIN-3 SUIT	5	3.00	15.00	
21	_____ _____-3				
22	CAMELIA-C UNDERWEAR	4	0.35	1.40	
23	_____ _____-_				
24	CAMELIA-CM UNDERWEAR	17	0.35	5.95	
25	_____ _____-__				
26	AELITA KIT	6	0.60	3.60	
27	_____ _____				
28	BUNGEES	3	2.00	6.00	
29	_____ _____				
30	LIGHT-WEIGHT SET	3	0.80	2.40	
31	_____ _____				
32	SET OF CLOTHES	1	0.28	0.28	
33	_____ _____				
34	PERSONAL HYGIENE ARTICLES- WET NAPKINS	12	0.90	10.80	
35	___ (_____ _____)				
36	PERSONAL HYGIENE ARTICLES- WET TOWELS	42	0.45	18.90	
37	___-_ (_____ _____)				
38	PERSONAL HYGIENE ARTICLES- DRY TOWELS	10	0.40	4.00	
39	___-_ (_____ _____-_)				

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D-3 FLIGHT 15P RETURN HARDWARE (PAGE 2 OF 9)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
40	PERSONAL HYGIENE AIDS- DRY TOWELS	2	0.40	0.80	
41	___-_ (_____ _____)				
42	COMFORT-1M CASE	1	0.90	0.90	
43	_____ _____-1_				
44	SET FOR PERSONAL HYGIENE COMFORT-3M	2	1.30	2.60	
45	_____ ___ _____ _____ _____-3_				
46	COMFORT SET-1M	2	1.50	3.00	
47	_____ ___ _____ _____ _____-1_				
48	CALF VOLUME METER (____) KIT	2	0.25	0.50	
49	_____ _____ _____ ____				
50	FUR STOCKINGS	2	0.34	0.68	
51	_____ _____				
52	SLEEPING BAG INSERT	1	0.40	0.40	
53	_____ _ _____ _____				
54	ASSEMBLER'S KIT	1	0.58	0.58	
55	_____ _____				
56	OPERATOR'S COVERALLS	3	1.00	3.00	
57	_____ _____				
58	HEAVY COVERALLS	1	1.00	1.00	
59	_____-_____				
60	SPARE COVERALLS	2	1.20	2.40	
61	_____ _____				
62	BRACELET-_ DEVICE	5	0.11	0.55	
63	_____ _____-_				
64	FOOTWEAR MODEL 270M	1	0.60	0.60	
65	_____ _____ 270_				
66	SPORTS SHOES	2	0.90	1.80	
67	C_____ _____				
68	WHITE BAG	12	8.00	96.00	20,21
69	_____ _____				
70	FINCKE HYGIENE MACH3 ASSY	1	0.60	0.60	
71	_____ _____ _____ ___-3				
72	PADALKA CLOTHING	1	2.65	2.65	
73	_____ _____				
74	PADALKA CLOTHING-3	1	1.40	1.40	
75	_____ ___ _____ -3				
76	PADALKA CLOTHING-4	1	1.15	1.15	
77	_____ ___ _____ -4				
78	PADALKA CLOTHING-2	1	1.20	1.20	
79	_____ _____-2				
80	ATHLETIC SHOES	1	0.75	0.75	

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D-3 FLIGHT 15P RETURN HARDWARE (PAGE 3 OF 9)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
81	_____ _____				
82	CREW PREFERENCE, SHIRT, SHORT SLEEVE	1	0.30	0.30	
83	_____ "____" _ _____ _____				
84	PROPHONICS MOLDED EARPLUG, SUBPACK ASSEMBLY	2	0.05	0.10	
85	_____ _____ _____ _____ _____ "Prophonics"				
86	ETYMOTIC EAR PLUG SET	2	0.02	0.04	
87	_____ _____ "Etymotic"				
88	CREW PREFERENCE, SHIRT, LONG SLEEVE	1	0.50	0.50	
89	_____ _____ _____, _____ c _____ _____				
90	MAXIMUM ABSORPTION GARMENT III (MEDIUM)	2	0.16	0.32	
91	_____ _ _____ ___-__ _____ ("_____") III, _____ Medium				
92	***FOOD SUPPLY SYSTEM (___)***			***10.20***	
93	___				
94	SELECTION OF FRESH PRODUCE	6	1.00	6.00	
95	_____ _____ _____				
96	NAPKINS FOR SPP	20	0.21	4.20	
97	_____ ___ ___				
98	***EVA EQUIPMENT***			***0.56***	
99	_____ ___ _____				
100	INSUIT DRINK BAG (IDB), DISPOSABLE	4	0.14	0.56	
101	_____ _____ ___ _____ ____ __ EMU				
102					
103	**TOTAL RUSSIAN NON-COMMON WASTE**			**444.70**	
104	_____ _____				
105	***SANITARY HYGIENE SUPPORT (____)***			***52.70***	
106	_____ _____-_____ _____ (___)				
107	URINE RECEPTACLE WITH HOSE	3	1.60	4.80	
108	_-_____ __ _____				
109	EDV	3	5.50	16.50	
110	_____ ___ ____ ___				
111	***SET OF TOILET HOSES***			***12.87***	
112	_____ _____ ___:				
113	RECEPTACLE	2	2.10	4.20	

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D-3 FLIGHT 15P RETURN HARDWARE (PAGE 4 OF 9)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
114	_____				
115	HOSE	1	0.80	0.80	
116	_____				
117	HOSE	1	0.72	0.72	
118	_____				
119	HOSE	1	0.60	0.60	
120	_____				
121	HOSE	1	0.55	0.55	
122	_____				
123	T-JOINT	1	0.25	0.25	
124	_____				
125	ANGULAR PIPE CONNECTOR	1	0.25	0.25	
126	_____ _____				
127	INDICATOR	11	0.50	5.50	
128	_____				
129	PRETREAT CONTAINER WITH A HOSE	2	5.50	11.00	
130	_____ _ _____ _-_ __ _____				
131	COLLECTOR WITH CLAMP	1	7.53	7.53	
132	_____ _ _____ ___				
133	***ATMOSPHERE REVITALIZATION SUBSYSTEM (____)***			***25.35***	
134	____				
135	ELECTRON KIT #3	1	6.10	6.10	
136	_____ 3 ___ _____				
137	GAS ANALYZER __5188 (O2 IN H2)	3	1.05	3.15	
138	____ __5188 (_2 _ _2)				
139	NITROGEN PURGE UNIT	1	15.00	15.00	
140	____ _____ _____ ___-1_				
141	CARTRIDGE BELT WITH DRAEGER TUBE AIR SAMPLER (___)	2	0.45	0.90	
142	_____ _ _____ _____ ___				
143	RUBBER RING FOR PRESSURE DIFFERENTIAL REGULATOR	1	0.10	0.10	
144	_____ _____ _ ___				
145	RING	1	0.10	0.10	
146	_____				
147	***CONDENSATE WATER RECOVERY SYSTEM (___-_2_)***			***42.70***	
148	_____ _____ ____ __ _____ ___-_2_				
149	WATER PURIFICATION COLUMN UNIT (___)	2	17.50	35.00	
150	____ _____ _____ ___				

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D-3 FLIGHT 15P RETURN HARDWARE (PAGE 5 OF 9)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
151	GAS-LIQUID MIXTURE FILTER	1	5.40	5.40	
152	_____ _____ _____ ___				
153	PRESSURE DIFFERENTIAL REGULATOR	1	2.30	2.30	
154	_____ _____ _____ ___				
155	***MEDICAL SUPPORT SYSTEM (CMO)***			***10.41***	
156	___				
157	TOILET PAPER PACKAGE	8	0.65	5.20	
158	_____ _____				
159	SANITARY NAPKINS FOR SURFACES (10)	2	0.93	1.86	
160	_____ _____ ___ _____ (10__.)				
161	EKOSFERA KIT	1	0.75	0.75	
162	_____ _____				
163	FUNGISTAT KIT	3	0.30	0.90	
164	_____ _____				
165	SET OF ACCESSORIES	1	0.30	0.30	
166	_____ _____ _____ 90205				
167	BATTERIES KIT	1	1.40	1.40	BT,HZ
168	_____ _____ _____				
169	***THERMAL CONTROL SYSTEM (COTP)***			***44.60***	
170	_____ _____ _____ _____ (____)				
171	FAN UNIT	1	2.46	2.46	
172	____ _____				
173	DUST FILTER CARTRIDGE	14	0.30	4.20	
174	_____ _____ _____				
175	AIR CIRCULATION VIBRATION ISOLATION	1	0.20	0.20	
176	_____				
177	ASSEMBLY WRENCH	1	0.16	0.16	
178	____ _____				
179	PANEL 204, PORT WC	1	4.00	4.00	
180	_____ 204 _____ _____ __				
181	PANEL 204, STARBOARD WC	1	4.00	4.00	
182	_____ 404 _____ _____ __				
183	CONDENSATE CONTAINER	1	2.90	2.90	
184	_____ _____				
185	DUST COLLECTOR REPLACEABLE FILTER	6	0.28	1.68	
186	_____ _____ _____ (__)				
187	REPLACEABLE PUMP PANEL	1	25.00	25.00	

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D-3 FLIGHT 15P RETURN HARDWARE (PAGE 6 OF 9)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
188	_____ _____ _____				
189	***MOTION CONTROL SYSTEM***			***5.25***	
190	___				
191	SOYUZ TMA-4 NO. 214 KURS-A DEVICE	5	1.05	5.25	
192	_____ _____ ____-_ ____ ___-4 _214				
193	***IN-FLIGHT MAINTENANCE (____)***			***5.20***	
194	____				
195	TOOL BELT	4	0.50	2.00	
196	____ _____				
197	CONTAINER WITH RESTRAINTS	1	3.20	3.20	
198	_____ __ _____ _____				
199	***ONBOARD EQUIPMENT CONTROL SYSTEM (____)***			***5.49***	
200	____				
201	LAPTOP THINKPAD	1	3.24	3.24	
202	Laptop Thinkpad				
203	LAMP WITH CABLE	1	0.92	0.92	
204	_____ __1-7 _ _____				
205	FLOODLIGHT UNIT	1	0.92	0.92	
206	_____ ____				
207	LAMP WITH LIGHT	1	0.41	0.41	
208	_____ __1-5_ __ _____ _____ __				
209	***ONBOARD MEASUREMENT SYSTEM (___)***			***2.20***	
210	_____ _____ _____ (___)				
211	MICROACCELEROMETER ___-128	2	1.10	2.20	
212	_____ _____ ___-128				
213	***INDIVIDUAL PROTECTION GEAR (___)***			***172.92***	
214	___				
215	OXYGEN UNIT __-3_	7	6.30	44.10	
216	____ _____ __-3_				
217	WATER CONTAINER	2	1.60	3.20	
218	_____ 5__				
219	ABSORBER CARTRIDGE __-9	4	2.48	9.92	
220	_____ _____ __-9				
221	ZIP-2M KIT	2	1.30	2.60	
222	_____ ___-2_				
223	SPARE PARTS KIT ___-2_	1	2.60	2.60	
224	___-2_				
225	SOFT TRASH BAGS (___-_)	2	2.90	5.80	
226	_____ ___ _____ _____ _____ ___-_				

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D-3 FLIGHT 15P RETURN HARDWARE (PAGE 7 OF 9)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
227	"ORLAN-M" SPACESUIT	1	94.20	94.20	
228	_____ "_____-_"				
229	REPLACEABLE ELEMENTS KIT	3	3.50	10.50	
230	_____ _____ _____				
231	***FIRE PROTECTION EQUIPMENT (____)***			***5.80***	
232	____				
233	SMOKE ALARM	10	0.58	5.80	
234	_____ _____ ____ __-7_				
235	***CREW ONBOARD SUPPORT KIT (____)***			***38.01***	
236	____				
237	35 MM FILM IN A CASE	8	0.03	0.24	
238	_____ _ _____ 35__				
239	35MM FILM KIT	1	0.30	0.30	
240	_____ /_____ 35__				
241	PACKAGE FOR THE CREW	5	4.50	22.50	
242	_____ ___ _____				
243	COMMEMORATIVE ITMS AND FOOD KIT	1	0.44	0.44	
244	_____ "_____ _ _____"				
245	SET OF CREW PROCEDURES (BOOKS AND CDS)	1	6.25	6.25	
246	_-_ _/_____				
247	CREW PREFERENCE	1	1.50	1.50	
248	_____ ____				
249	LATCH	5	1.00	5.00	
250	_____				
251	COVER ASSEMBLY	6	0.12	0.72	
252	_____ _ _____				
253	AA BATTERIES	22	0.05	1.06	BT,HZ
254	_____ Alkaline ___ __				
255	***SCIENCE HARDWARE***			***34.07***	
256	_____ _____				
257	SET OF CONSUMABLES	1	0.10	0.10	
258	_____ _____ _____ "_____-03"				
259	URINE RECEPTACLE KIT	1	0.90	0.90	
260	_____ _-_____				
261	KARDIOCASSETTE 3.5" DISKETTE	4	0.07	0.28	
262	_____ 3.5"				
263	**FIBROPLAST-1 KIT**	**1**	**1.00**	**1.00**	
264	**_____ "_____-1"**				
265	**"DIATOMEYA" KIT**	**1**	**0.50**	**0.50**	
266	**_____ "_____"**				
267	PK-3 SEALANT FOR MAINTENANCE AND REPAIR WORK [RVR] KIT	1	0.12	0.12	

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D-3 FLIGHT 15P RETURN HARDWARE (PAGE 8 OF 9)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
268	-_____"__-3._____ ___ ___"				
269	KIT WITH MATERIALS FOR REPAIR AND RECOVERY	1	0.02	0.02	
270	__-3 _____ ___ ___				
271	BIOTOX-10K ACCESSORIES KIT	1	2.18	2.18	
272	_____ "_____ _____-10_"				
273	CASE (TOKSICHNOST EXPERIMENT)	2	2.18	4.36	
274	_____ (_."_____")				
275	LAUNCH CONTAINER JCF	1	1.10	1.10	
276	_____ _____ JCF				
277	LAUNCH CONTAINER GCF	1	1.10	1.10	
278	_____ _____ GCF				
279	LAUNCH CONTAINER GCF	1	1.10	1.10	
280	_____ _____ GCF				
281	MEDICAL EXPERIMENTS	1	0.10	0.10	
282	_____ _____				
283	HALLEY-RM KIT	1	2.05	2.05	
284	_____"_____-__"				
285	ADAPTER EGE 01 (POWER UNIT)	1	0.50	0.50	
286	_____ EGE 01 (____ _____)				
287	VIDEO TAPE __-3	2	0.08	0.16	
288	_/_____ __-3				
289	PROMISS 3 KIT 2	1	4.00	4.00	
290	_____2 "_____ 3"				
291	HEAT KIT 1	1	2.10	2.10	
292	_____ 1 HEAT				
293	HEAT EXPERIMENT BOX	1	10.30	10.30	
294	_____ ____ HEAT				
295	HEAT KIT 1	1	2.10	2.10	
296	_____ 1 HEAT				
297					
298	**TOTAL FGB WASTE**			**14.95**	
299	_____ ___				
300	***FGB FIRE DETECTION AND SUPPRESSION SYSTEM (_____ ___)***			***7.20***	
301	_____ ___				
302	SMOKE DETECTOR ___-2	3	2.40	7.20	
303	_____ ____ _____-_____ ___-2				
304	***FGB STRUCTURAL ELEMENTS***			***7.75***	
305	_____ _____				
306	PART	1	1.48	1.48	
307	_____				
308	FLANGE	3	0.10	0.30	

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D-3 FLIGHT 15P RETURN HARDWARE (PAGE 9 OF 9)

Line No.	Name	Qty Down	Unit Mass (Kg)	Return Total Mass (Kg)	Notes
309	_____				
310	PACKAGE	1	3.45	3.45	
311	_____				
312	**KIT WITH ASSEMBLY COMPONENTS FOR 25A, 25B, 28A, AND 29**	**1**	**2.45**	**2.45**	
313	_____ _ _____ _____ **25_,25_,28_,29**				
314	SMOKE SENSORS CLEANING UNIT	1	0.07	0.07	
315	_____ _ _ _____				

NOTES	
BT	ITEM INCLUDES BATTERIES
HZ	ITEM CONTAINS CHEMICAL, BIOLOGICAL, OR RADIOACTIVE MATERIALS OR BATTERIES
R	THIS HARDWARE CAN BE OPERATED IN THE RUSSIAN SEGMENT ONLY AFTER CERTIFICATION AND ACCEPTANCE IS COMPLETE.
RB	CONTENTS OF THE BAG TO BE USED IN THE RUSSIAN SEGMENT
Z	FGB HARDWARE

FLIGHT SPECIFIC NOTES	
20	Numbers: _III-3 248-26, 2/247-2, 245, 249-14, 3/247-1, I-1/247, I-3/247, III-1/246-2, III-4/258-1, 249-25, I-1/246-3, II-3/258-2.
21	One PALLET DETAIL ASSEMBLY PSYCH CD CASE - WLSD210116-301 is inside one of the COMMON WASTE BAGS.

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 1 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
1	***PROGRESS 351***				***1352.45***	***1500.47***	
2	_____ 351						
3							
4	**TOTAL RUSSIAN CARGO**				**1128.97**		
5	_____ _____						
6	***LIFE SUPPORT SYSTEMS(LSS)***				***466.33***		
7	___						
8	***ATMOSPHERIC REVILITIZATION SUBSYSTEM (ARS)***				***2.50***		
9	____						
10	***GAS ANALYZER HARDWARE***				***2.50***		
11	_____ _____						
12	AK-1M SAMPLER KIT	4	0	0.20	0.80		
13	_____ _ _____ __-1_						
14	GAS ANALYZER __1187 (H2 IN O2)	1	0	0.90	0.90		
15	____ __1187 (_2 _ _2)						
16	KIT ACCESSORIES FOR AOK	1	0	0.50	0.50		
17	_____._____ _ ___						
18	ADAPTER	1	0	0.30	0.30		
19	_____						
20	***WATER SUPPLY SYSTEM (CBO)***				***71.33***		
21	___						
22	***CONDENSATE WATER RECOVERY SYSTEM (___-_2_)***				***50.45***		
23	_____ _____ ____ __ _____ ___-_2_						
24	WATER PURIFICATION COLUMN UNIT (___)	2	0	16.90	33.80		
25	____ _____ _____ ___						
26	SEPARATOR	4	0	4.00	16.00		
27	_____ ____						
28	HOSE T2-DISPENSER	1	0	0.65	0.65		
29	_____ _2-___						
30	***"RODNIK" SYSTEM***				***20.88***		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 2 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
31	_____ "_____"						
32	"RODNIK" SYSTEM ACCESSORIES	1	0	6.62	6.62		
33	_____ _____-1						
34	"RODNIK-2" SYSTEM ACCESSORIES	1	0	2.26	2.26		
35	_____ _____-2						
36	EDV	2	0	28.00	12.00		12
37	_____ ___ ____ ___						
38	***SANITARY HYGIENE SUPPORT (____)***				***77.27***		
39	_____ _____- _____ _____ (____)						
40	***TOILET (ACY)***				***77.27***		
41	_____- _____ _____ (___)						
42	COLLECTOR WITH CLAMP	1	0	7.33	7.33		
43	_____ _ _____ ___						
44	TOILET (ACY) INSERTS	10	0	1.03	10.30		
45	_____ ___						
46	**EDV**	**10**	**0**		**51.00**		
47	_____ ___ ____ ___						
48	EDV BUCKET	10	0	1.70	17.00		
49	_____						
50	EDV LID	10	0	3.40	34.00		
51	_____						
52	EDV ADAPTER	1	0	0.36	0.36		
53	_____ ___						
54	EDV FILL INDICATOR	1	0	0.01	0.01		
55	_____ _____ ___						
56	URINE RECEPTACLE WITH HOSE	2	0	1.63	3.26		
57	_-_____ __ _____						
58	TOILET PAPER PACKAGE	6	0	0.61	3.66		
59	_____ _____						
60	HOSE	1	0	0.35	0.35		
61	_____						
62	COVER	1	0	0.55	0.55		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 3 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
63	_____						
64	FILTER-INSERT	3	0	0.15	0.45		
65	_____-_____						
66	***FOOD SUPPLY SYSTEM (___)***				***216.46***		
67	___						
68	FOOD RATIONS CONTAINERS	29	0	6.65	192.95		
69	_____ _ _____ _____						
70	***UTENSILS:***				***0.32***		
71	_____ _____ ___						
72	UTENSILS	2	0	0.08	0.16		
73	___-1						
74	UTENSILS	2	0	0.08	0.16		
75	___-4-1						
76	NAPKINS FOR SPP	10	0	0.21	2.10		
77	_____ ___ ___						
78	FOOD WASTE BAGS	100	0	0.06	5.70		
79	_____ ___ _____ _____						
80	SELECTION OF FRESH PRODUCE	1	0	5.77	5.77		
81	_____ _____ _____						
82	SELECTION OF FRESH PRODUCE	1	0	4.96	4.96		
83	_____ _____ _____						
84	SELECTION OF FRESH PRODUCE	1	0	4.48	4.48		
85	_____ _____ _____						
86	RUBBER TIES / STRAPS	100	0	0.00	0.18		
87	_____ _____						
88	***PERSONAL HYGIENE AIDS (___ ___)***				***60.96***		
89	_____ _____- _____ _____ (___ ___)						
90	PERSONAL HYGIENE ARTICLES- WET NAPKINS	6	0	0.94	5.64		
91	___ (_____ _____)						
92	PERSONAL HYGIENE ARTICLES- WET TOWELS	20	0	0.84	16.80		
93	___- (_____ _____)						
94	PERSONAL HYGIENE ARTICLES- DRY NAPKINS	4	0	0.27	1.08		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 4 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
95	___-_ (_____ _____)						
96	PERSONAL HYGIENE ARTICLES- DRY TOWELS	6	0	0.39	2.34		
97	___-_ (_____ _____-_)						
98	DENTAL HYGIENE AIDS	2	0	0.61	1.22		
99	___ (___ _____ ___)						
100	SET FOR PERSONAL HYGIENE COMFORT-3M	1	0	1.37	1.37		
101	_____ ___ _____ _____ _____-3_						
102	AELITA KIT	2	0	0.62	1.24		
103	_____ _____						
104	CAMELIA-A UNDERWEAR	8	0	0.53	4.24		
105	_____ _____-_						
106	CAMELIA-C UNDERWEAR	16	0	0.36	5.76		
107	_____ _____-_						
108	CAMELIA-CM UNDERWEAR	32	0	0.38	12.16		
109	_____ _____-__						
110	SPARE COVERALLS	2	0	1.16	2.32		
111	_____ _____						
112	OPERATOR'S COVERALLS	1	0	1.04	1.04		
113	_____ _____						
114	LIGHT-WEIGHT SET	3	0	0.81	2.43		15
115	_____ _____						
116	LIGHT CLOTHING	5	0	0.52	2.60		
117	_____ _____						
118	THIN SOCKS	9	0	0.05	0.48		
119	_____ _____						
120	SLEEPING MASK	6	0	0.04	0.24		
121	_____ __ _____						
122	***MEDICAL SUPPORT SYSTEM (CMO)***				***12.42***		
123	___						
124	***COUNTERMEASURES SYSTEM (_____)***				***9.32***		
125	_____						
126	PENGUIN-3 SUIT	2	0	2.87	5.74		
127	_____ _____-3						
128	TNK-U-1	2	0	1.49	2.98		
129	_____ ___-_-1						
130	CABLE	1	0	0.10	0.10		
131	_____						
132	**PACKAGE WITH REPLACEABLE ROLLERS**	**1**	**0**	**0.50**	**0.50**		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 5 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
133	_____ _ _____ _____						
134	PACKAGE WITH REPLACEABLE ROLLERS	4	0				
135	_____ _ _____ _____						
136	***MEDICAL KITS***				***2.97***		
137	____						
138	NUTRITIONAL SUPPLEMENT KIT	1	0	0.49	0.49		
139	_____ _ _____ _____						
140	PSYCHOTROPIC REMEDIES KIT (PT)	1	0	0.49	0.49		
141	_____ _____ __						
142	DRESSING PACK KIT (PS)	1	0	0.38	0.38		
143	_____ _____ __						
144	GASTROINTESTINAL AND UROLOGICAL REMEDIES KIT	1	0	0.55	0.55		
145	_____ _____ ___						
146	ANTISEPTIC MEDICAL KIT [AS]	1	0	0.48	0.48		
147	_____ _____ __						
148	MEDICAL KIT WITH OINTMENTS	1	0	0.58	0.58		
149	_____ _____ __						
150	***MEDICAL MONITORING EQUIPMENT***				***0.14***		
151	___						
152	***KARDIOCASSETTE 2000***				***0.14***		
153	**_____ 2000**						
154	SET OF CONSUMABLES	1	0	0.14	0.14		
155	_____ _____ _____ _____-2000						
156	***EQUIPMENT CLEAN UP & AMBIENT ATMOSPHERE CONTROL***				***5.35***		
157	_____						
158	SANITARY NAPKINS FOR SURFACES (10)	4	0	0.92	3.68		
159	_____ _____ ___ _____ (10__.)						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 6 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
160	FUNGISTAT KIT	3	0	0.31	0.93		
161	_____ _____						
162	***EKOSEFERA SET***				***0.74***		
163	_____ "_____"						
164	EKOSFERA KIT	1	0	0.74	0.74		
165	_____ _____						
166	***CREW ONBOARD SUPPORT KIT (____)***				***20.04***		
167	____						
168	***FLIGHT PROCEDURES AND ANCILLARY MATERIALS***				***20.04***		
169	_/___ _ _____						
170	SET OF CREW PROCEDURES (BOOKS AND CDS)	1	0	4.90	4.90		
171	_-_ _/_____						
172	PACKAGE FOR THE CREW	1	0	6.45	6.45		
173	_____ ___ _____						
174	PACKAGE FOR THE CREW	1	0	3.12	3.12		
175	_____ ___ _____						
176	PACKAGE FOR THE CREW	1	0	5.07	5.07		
177	_____ ___ _____						
178	LETTERS	1	0	0.50	0.50		
179	_____						
180	***INDIVIDUAL PROTECTION GEAR (___)***				***57.62***		
181	___						
182	OXYGEN UNIT __-3_	5	0	6.30	31.50		
183	____ _____ __-3_						
184	ABSORBER CARTRIDGE __-9	2	0	2.50	5.00		
185	_____ _____ __-9						
186	WATER CONTAINER	2	0	6.62	13.24		
187	_____ 5__						
188	SPARE PARTS KIT ___-2_	1	0	2.70	2.70		
189	___-2_						
190	REPLACEABLE ELEMENTS KIT	1	0	3.84	3.84		
191	_____ _____ _____						
192	SET OF UNDERWEAR	2	0	0.67	1.34		
193	_____ _____						
194	***THERMAL CONTROL SYSTEM (COTP)***				***38.48***		
195	_____ _____ _____ _____ (____)						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 7 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
196	***REPLACEABLE PUMP PANEL***				***26.54***		
197	_____ _____ _____ (___)						
198	STATIONARY PANEL	1	0	11.00	11.00		
199	_____ _____						
200	REPLACEMENT UNIT	2	0	6.00	12.00		
201	____ _____						
202	JUMPER	3	0	1.18	3.54		
203	_____						
204	ARM	2	0	0.32	0.64		
205	_____						
206	CONDENSATE CONTAINER	2	0	2.95	5.90		
207	_____ _____						
208	DUST FILTER CARTRIDGE	20	0	0.27	5.40		
209	_____ _____ _____						
210	***TELEVISION SYSTEM (TBC)***				***2.55***		
211	_____ _____ (___)						
212	CABLE INSERT	1	0	0.03	0.03		
213	_____-_____						
214	CABLE	2	0	1.26	2.52		
215	_____						
216	***SM AUDIO SUBSYSTEM (CTTC)***				***0.14***		
217	____						
218	RECOVERY DEVICE	2	0	0.07	0.14		
219	_____ (_____ 6 __.)						
220	***ONBOARD EQUIPMENT CONTROL SYSTEM (____)***				***38.59***		
221	____						
222	ONBOARD CONTROLLER (OBC)	1	0	8.00	8.00		
223	_____ _____ OBC						
224	BSKE5-32	1	0	11.50	11.50		
225	____5-32						
226	**BONDING SET**	**1**	**0**	**0.10**	**0.10**		
227	_____ _____						
228	STRAP	1	0				
229	_____						
230	WASHER	2	0				
231	_____						
232	SCREW	1	0				
233	____						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 8 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
234	NUT	1	0				
235	_____						
236	WASHER A6	6	0				
237	_____ _6						
238	CAP SCREW M6	6	0				
239	____ _6						
240	KIT FOR BSKE5-32 UNIT (THERMAL RADIATOR)	1	0	0.45	0.45		
241	_____ ___ ____5-32 (_____ _____)						
242	**HARD DRIVE CONTAINER**	**1**	**0**	**0.20**	**1.62**		
243	_____						
244	HARD DRIVE	1	0	1.40	1.40		
245	_____						
246	CABLE	1	0	0.01	0.01		
247	_____						
248	HDD POWER CABLE	1	0	0.01	0.01		
249	_____ _____ HDD						
250	CABLE	1	0	0.72	0.72		
251	_____						
252	CABLE	1	0	0.77	0.77		
253	_____						
254	CABLE	1	0	0.72	0.72		
255	_____						
256	CABLE	1	0	0.51	0.51		
257	_____						
258	CABLE	1	0	0.16	0.16		
259	_____						
260	CABLE	1	0	0.64	0.64		
261	_____						
262	CABLE	1	0	0.93	0.93		
263	_____						
264	CABLE	1	0	0.52	0.52		
265	_____						
266	CABLE	1	0	0.52	0.52		
267	_____						
268	CABLE	1	0	2.85	2.85		
269	_____						
270	CABLE	1	0	1.35	1.35		
271	_____						
272	CABLE	1	0	4.14	4.14		
273	_____						
274	CABLE	1	0	0.09	0.09		
275	_____						
276	CABLE	1	0	1.53	1.53		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 9 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
277	_____						
278	CABLE	1	0	0.54	0.54		
279	_____						
280	CABLE (ON [ACH] CABLE REEL)	1	0				
281	_____(_ _____ _____ ___)						
282	***KIT WITH PLUGS***				***0.28***		
283	_____ _ _____						
284	PLUG	2	0	0.02	0.04		
285	_____						
286	FUSIBLE INSERT PV-12R	2	0	0.12	0.24		
287	_____ _____ __-12_						
288	ASSEMBLY, DC POWER SUPPLY PGSC 486	1	0	0.65	0.65		
289	____ _____ ____. ____, PGSC 486						
290	***ONBOARD COMPUTER SYSTEM (___)***				***0.04***		
291	_____ _____ _ _____ (___)						
292	PLUG	1	0	0.02	0.02		
293	_____						
294	PLUG	1	0	0.02	0.02		
295	_____						
296	***MOTION CONTROL AND NAVIGATION SYSTEM (____)***				***27.10***		
297	____						
298	NAVIGATIONAL RECEIVING MODULE	4	0	0.95	3.80		
299	_____ _____ _____						
300	NAVIGATIONAL COMPUTING MODULE	2	0	1.65	3.30		
301	_____ _____ _____						
302	**SATELLITE NAVIGATION ANTENNA ASSEMBLY**	**1**	**0**	**12.97**	**13.85**		
303	_____ ____						
304	CABLE (IN STRUCTURE AB)	1	0	0.20	0.20		
305	_____ (_ _____ __)						
306	CABLE (IN STRUCTURE AB)	1	0	0.20	0.20		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 10 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
307	_____ (_ _____ __)						
308	CABLE (PART OF SATELLITE NAVIGATION ANTENNA UNITS)	1	0	0.48	0.48		
309	_____ (_ _____ _____ _____ _____)						
310	CABLE	1	0	0.55	0.55		
311	_____						
312	CABLE	1	0	0.56	0.56		
313	_____						
314	CABLE	1	0	0.54	0.54		
315	_____						
316	CABLE	1	0	0.52	0.52		
317	_____						
318	CABLE	1	0	0.52	0.52		
319	_____						
320	CABLE	1	0	0.52	0.52		
321	_____						
322	CABLE	1	0	0.47	0.47		
323	_____						
324	CABLE	1	0	0.47	0.47		
325	_____						
326	CABLE	1	0	0.08	0.08		
327	_____						
328	CABLE	1	0	0.08	0.08		
329	_____						
330	CABLE	1	0	0.25	0.25		
331	_____						
332	CABLE	1	0	0.08	0.08		
333	_____						
334	CABLE	1	0	0.08	0.08		
335	_____						
336	CABLE	1	0	0.07	0.07		
337	_____						
338	CABLE	1	0	0.06	0.06		
339	_____						
340	CABLE	1	0	0.21	0.21		
341	_____						
342	CABLE	1	0	0.09	0.09		
343	_____						
344	CABLE	1	0	0.90	0.90		
345	_____						
346	CROSSPIECE	1	0	0.04	0.04		
347	_____						
348	CROSSPIECE	1	0	0.02	0.02		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 11 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
349	_____						
350	STRAP	1	0	0.04	0.04		
351	_____						
352	***POWER SUPPLY SYSTEM (___)***				***90.50***		
353	___						
354	PTAB-1M STORAGE BATTERY CURRENT CONVERTER	1	0	13.50	13.50		
355	_____ ____ _____ _____ ____-1_						
356	800A STORAGE BATTERY	1	0	77.00	77.00		BT,HZ
357	_____ _____ (____ 800A)						
358	***FLIGHT DATA TELEMETRY SYSTEM (____2-12)***				***2.50***		
359	**____2-12**						
360	PROGRAMMABLE MEMORY UNIT (___) __ 114_	2	0	0.45	0.90		
361	_____ _____ _____ ___ __114_						
362	CABLE	1	0	0.45	0.45		
363	_____						
364	CABLE	1	0	0.07	0.07		
365	_____						
366	CABLE	1	0	1.08	1.08		
367	_____						
368	***IN-FLIGHT MAINTENANCE (____)***				***30.69***		
369	____						
370	CARTRIDGE BELT WITH TOOLS	1	0	0.98	0.98		
371	_____ _ _____						
372	CARDRIDGE BELT WITH EXTENSION PIECES	1	0	0.73	0.73		
373	_____ _ _____						
374	BAG FOR CONTAINER	2	0	0.10	0.20		
375	_____ ___ _____						
376	BAG FOR CONTAINER	2	0	0.10	0.20		
377	_____ ___ _____						
378	BAG FOR CONTAINER	2	0	0.10	0.20		
379	_____ ___ _____						
380	BAG FOR CONTAINER	2	0	0.10	0.20		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 12 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
381	_____ ___ _____						
382	BAG FOR CONTAINER	1	0	0.10	0.10		
383	_____ ___ _____						
384	BAG FOR CONTAINER	1	0	0.10	0.10		
385	_____ ___ _____						
386	BAG FOR CONTAINER	1	0	0.10	0.10		
387	_____ ___ _____						
388	BAG FOR CONTAINER	1	0	0.10	0.10		
389	_____ ___ _____						
390	BAG FOR CONTAINER	3	0	0.15	0.45		
391	_____ ___ _____						
392	BAG FOR CONTAINER	3	0	0.15	0.45		
393	_____ ___ _____						
394	BAG FOR CONTAINER	3	0	0.15	0.45		
395	_____ ___ _____						
396	BAG FOR CONTAINER	3	0	0.15	0.45		
397	_____ ___ _____						
398	BAG FOR CONTAINER	3	0	0.15	0.45		
399	_____ ___ _____						
400	BAG FOR CONTAINER	3	0	0.15	0.45		
401	_____ ___ _____						
402	BAG FOR CONTAINER	3	0	0.15	0.45		
403	_____ ___ _____						
404	FASTENERS KIT	5	0	0.05	0.25		
405	_____ _ _____						
406	CABLE RESTRAINTS	8	0	1.60	12.80		
407	_____ _____						
408	THE COIL OF CABLE ASN	1	0	5.50	5.50		
409	_____ _____ ___						
410	**STACKING OF ELASTIC CLAMPS**	**1**	**0**	**2.33**	**4.00**		
411	_____ _____ _____						
412	ELASTIC CLAMP WITH HOOKS	5	0	0.13	0.65		
413	_____ _____ _ _____						
414	ELASTIC CLAMP WITH HOOKS	5	0	0.13	0.65		
415	_____ _____ _ _____						
416	WRENCH	2	0	0.18	0.37		
417	____						
418	HOLDER	4	0	0.52	2.08		
419	_____						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 13 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
420	***CREW ONBOARD SUPPORT KIT (____)***				***0.48***		
421	____						
422	***VIDEO AND PHOTO EQUIPMENT***				***0.48***		
423	_____ _ ____/_____						
424	AA BATTERIES	16	0	0.03	0.48		BT,HZ
425	_____ Alkaline ___ __						
426	***DELIVERABLE***				***87.02***		
427	_____						
428	**COMMON WORK STATION**	**1**	**0**		**87.02**		
429	_____ _____ _____ ___-_						
430	BASE	1	0	31.60	31.60		
431	_____						
432	PLATFORM	1	0	47.50	47.50		
433	_____						
434	LEFT PLATE	1	0	2.95	2.95		
435	_____ _____						
436	RIGHT PLATE	1	0	2.97	2.97		
437	_____ _____						
438	ADJUSTABLE TETHER	2	0	1.00	2.00		
439	___ _ _____						
440	***U.S. CARGO DELIVERED UNDER THE RUSSIAN ALLOCATION***				***286.93***		
441	_____ _____ _____ _ _____ _____ ____						
442	***US PROVIDED FOOD AND CREW PROVISIONS***				***286.93***		
443	_____ _____-_ _____ _____ _ _____ _____-_ _____						
444	***CREW PROVISIONS***				***24.33***		
445	___						
446	***PRINTER SUPPLY PANTRY***				***8.48***		
447	_____ _____ _____						
448	**PACKING MATERIAL**	**1**	**0**	**0.09**	**8.48**		**42**
449	_____ _____						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 14 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
450	PRINTER ASSEMBLY, DTO AND ISS	1	0	8.39	8.39		13,16,R
451	_____ ___ _____ __ _____ _____ ____. __ ___ _ _____ _____						
452	BATTERY, ALKALINE	35	0	0.03	1.05		11,33,B T,HZ,R
453	_____ _____ _____						
454	CHIAO CREW CLOTHING	1	0	3.70	3.70		44,RB
455	_____ ___ ____						
456	CHIAO CLOTHING-3	1	0	1.40	1.40		44,RB
457	_____-3 ___ ____						
458	CREW PREFERENCE, SHIRT, SLEEP	6	0	0.23	1.38		33,44,R
459	_____ ___ ___ __ _____ _____ _____						
460	CREW PREFERENCE, SHIRT, SLEEP	6	0	0.23	1.38		33,45,R
461	_____ ___ ___ __ _____ _____ _____						
462	SHORTS, NYLON RUNNING, ATHLETIC	35	0	0.11	3.85		33,44,R
463	_____ _____ _____, ___ ____						
464	SHARIPOV CLOTHING-3	1	0	1.40	1.40		45,RB
465	_____-3 ___ _____						
466	**HYGIENE PANTRY-1**	**1**	**0**	**0.10**	**1.19**		
467	**_____ _____ -1**						
468	TOOTHBRUSH, ORAL B-40 (SOFT)	7	0	0.01	0.10		33,R
469	_____ _____, _____ ORAL B-40 (_____)						
470	TOOTHBRUSH, ORAL B-40	10	0	0.01	0.10		33,R

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 15 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
471	_____ _____, _____ ORAL B-40						
472	COTTON SWAB ASSEMBLY	4	0	0.04	0.15		33,R
473	_____ _____						
474	RAZOR, CARTRIDGES SENSOR	20	0	0.02	0.30		33,R
475	_____ _____ _ _____ ___ _____ Sensor						
476	ASTRO-EDGE SHAVING GEL	4	0	0.10	0.40		33,R
477	____ ___ _____ ASTRO-EDGE						
478	ZIPLOCK/ZIP-LIP BAG/PRESS 'N' SEAL	8	0	0.00	0.01		33,R
479	_____ Ziplock/Zip-lip/Press 'N' Seal						
480	ZIPLOCK, MINIGRIP	8	0	0.00	0.03		33,R
481	_____ "_____" MINIGRIP						
482	CAN OPENER	2	0	0.25	0.50		R
483	_____						
484	***FOOD SUPPLY SYSTEM (___)***				***262.60***		
485	___						
486	***AMERICAN FOOD***				***262.60***		
487	_____ _____ _____						
488	FOOD RATIONS CONTAINERS	14	0	5.71	79.88		34
489	_____ _ _____ _____						
490	US NON-COLLAPSIBLE FOOD CONTAINER	22	0	6.94	152.77		35,R
491	_____ _____ _____ _____						
492	CTB, HALF-SIZE	1	0	10.00	10.00		40,R
493	_____ _____ ___						
494	CTB, HALF-SIZE	1	0	10.35	10.35		40,R
495	_____ _____ ___						
496	CTB, HALF-SIZE	1	0	9.60	9.60		40,R
497	_____ _____ ___						
498							
499	**TOTAL RUSSIAN PAYLOADS**				**81.94**		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 16 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
500	_____ ___._____ (___)						
501	CD-ROM	7	0	0.10	0.70		
502	CD-____						
503	***CONTRACT EXPERIMENT (___)***				***51.96***		
504	___						
505	ROBOTIK MONOBLOCK	1	0	31.80	31.80		
506	_____ ROBOTIK						
507	TM/TC MONOBLOCK	1	0	12.82	12.82		
508	_____ __/__						
509	CABLE	1	0	1.98	1.98		
510	_____						
511	CABLE	1	0	1.51	1.51		
512	_____						
513	CABLE	1	0	1.45	1.45		
514	_____						
515	CABLE	1	0	2.01	2.01		
516	_____						
517	CD DISK	1	0	0.07	0.07		39
518	____ CD						
519	CD DISK	1	0	0.10	0.10		41
520	____ CD						
521	PCMCIA CARD WITH CABLES	1	0	0.08	0.08		
522	PCMCIA-_____ _ _ _____						
523	CABLE	1	0	0.12	0.12		
524	_____						
525	[PO-3] PLUG	1	0	0.02	0.02		
526	_____ __-3						
527	***BIO-MEDICAL RESEARCH EXPERIMENT (___)***				***0.30***		
528	___						
529	SET OF CONSUMABLES	1	0	0.14	0.14		
530	_____ _____ _____ _____-2000						
531	MBI PROTECTION KIT	1	0	0.16	0.16		
532	_____ _____-___						
533	***EXPERIMENT (___)***				***14.56***		
534	___						
535	STACKING BIORISK-MSN	1	0	0.57	0.57		
536	_____ _____-___						
537	CONTAINER BIORISK-MSN	3	0	2.22	6.66		
538	_____ _____-___						
539	PLATFORM ADJUSTING	1	0	1.67	1.67		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 17 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
540	_____ _____						
541	***RASTENIYA EXPERIMENT***				***5.66***		
542	__ "_____"						
543	ROOT MODULE	1	0	5.12	5.12		
544	_____ _____						
545	RASTENIYA [PLANTS] KIT	1	0	0.54	0.54		
546	_____ "_____"						
547	***HIGH DEFINITION EQUIPMENT [ABP]***				***14.32***		
548	_____ _____ _____ _____ **17__.600_ 2004_-0**						
549	WINDOW 9 BRACKET	1	0	1.02	1.02		
550	_____ _ _____ _9						
551	**KIT ABP-2. TELESCOPE WITH DRIVE, ELECTRONIC VIEWFINDER, COVERS**	**1**	**0**		**8.57**		
552	_____ ___**-2** _____ _ _____ _ _____ _____ _ _____						
553	TELESPCOPE SOFT COVER	1	0	0.30	0.30		
554	_____ _____ _____						
555	TELESCOPE WITH DRIVE, ELECTRONIC VIEWFINDER	1	0	8.27	8.27		
556	_____ _ _____, _____. _____						
557	**KIT ABP-3. NIKON D100 CAMERA KIT**	**1**	**0**		**0.85**		
558	_____ ___**-3.** _____ _____ **Nikon D100**						
559	SOFT CONTAINER FOR CAMERA	1	0	0.15	0.15		
560	_____ _____ _____						
561	NIKON D100 CAMERA	1	0	0.70	0.70		
562	_____ Nikon D100						
563	**KIT ABP-4. SET OF ABP SYSTEM ACCESSORIES**	**1**	**0**	**0.27**	**3.88**		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 18 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
564	_____ ___-4. _____ _____ _____ __						
565	SOFT CONTAINER WITH [ABP] ACCESSORIES	1	0	0.30	0.30		
566	_____ _____ _____ ABP						
567	NIKON BATTERY	1	0	0.08	0.08		
568	_____ Nikon						
569	CAMERA RESTRAINT SCREW	1	0	0.01	0.01		
570	____ _____ _____						
571	WINDOW BRACKET SCREW	6	0	0.03	0.20		
572	____ _____ _ _____						
573	TELESCOPE/BRACKET SCREW	2	0	0.01	0.01		
574	____ _____ _ _____						
575	UNIROSS CHARGER	1	0	0.10	0.10		
576	_____ _____ Uniross						
577	CAMERA DATA CABLE, MINI USB	1	0	0.05	0.05		
578	_____ _____ _____ mini USB						
579	CONTROLLER TWISTED CABLE (8 PIN)	1	0	0.09	0.09		
580	_____ _____ _____(8pin)						
581	CONTROLLER CONTROL CABLE	1	0	0.05	0.05		
582	_____ _____ _____						
583	POWER CABLE 12V DC	1	0	0.30	0.30		
584	_____ _____ 12B DC						
585	MEMORY CARD	1	0	0.02	0.02		
586	_____ _____ Compact Flash, 1 __						
587	BAYONET RING NIKON	1	0	0.03	0.03		
588	_____ _____ Nikon						
589	AUTOSTAR CONTROLLER	1	0	0.13	0.13		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 19 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
590	_____ Autostar						
591	BARLOW LENSE	1	0	0.08	0.08		
592	_____ _____						
593	MANIPULATOR	1	0	0.90	0.90		
594	_____						
595	12 MM EYEPIECE	1	0	0.09	0.09		
596	_____ 12__						
597	BIOTOX-10K KIT	1	0	0.10	0.10		
598	_____"_____-10_"						
599	CASE (TOKSICHNOST EXPERIMENT)	1	0	0.10	0.10		
600	_____ (_."_____")						
601	PHOTO ADAPTER	1	0	0.08	0.08		
602	_____ _____						
603	EXTENSION PIECE FOR VISUAL OBSERVATIONS	1	0	0.08	0.08		
604	_____ ___ _____ _____						
605	CAMERA SECURING BRACKET	1	0	0.30	0.30		
606	_____ _____ __ __						
607	UV PROTECTION COVER	1	0	0.32	0.32		
608	_____ __ _____						
609	USB COUPLER	1	0	0.08	0.08		
610	USB-_____						
611	[ABP]-5 SOFTWARE	2	0	0.06	0.12		
612	_____ _____ Compact Flash, 1 __						
613	***EKON KIT***				***0.10***		
614	_____"___"						
615	EKON KIT	1	0	0.10	0.10		
616	_____"___"						
617							
618	**TOTAL FGB CARGO**				**22.29**		
619	___-_____						
620	***FGB LIFE SUPPORT SYSTEM (___ ___)***				***8.16***		
621	**C__ ___**						
622	DUST COLLECTOR REPLACEABLE FILTER	12	0	0.22	2.64		
623	_____ _____ _____ (__)						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 20 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
624	SANITARY NAPKINS FOR SURFACES (10)	6	0	0.92	5.52		
625	_____ _____ ___ _____(10__.)						
626	***FGB STRUCTURAL ELEMENTS***				***5.43***		
627	_____ _____						
628	CONTAINER 38	1	0	2.50	2.50		
629	_____38						
630	CONTAINER 38	1	0	2.93	2.93		
631	_____38						
632	***FGB RADIO TELEMETRY SYSTEM***				***8.70***		
633	**__-9__-8**						
634	MEMORY UNIT	1	0	8.70	8.70		
635	_____ _____ __ 1_-__025_;__ 2_-__025_						
636							
637	**TOTAL US CARGO**				**66.99**		
638	_____ _____						
639	***PCS***				***17.22***		
640	_____ _____ _____**PCS**						
641	LAPTOP COMPUTER ASSY, IBM A31P	3	0	3.70	11.10		16,18,BT,HZ,R
642	_____ _____IBM A31P						
643	POWER SUPPLY ASSEMBLY-28VDC POWER SUPPLY	3	0	2.04	6.12		R
644	_____ _____ __ ____. _____28 _						
645	***LOGISTICS & MAINTENANCE***				***3.69***		
646	_____ ___ _____ _____ _____**SPCU (TCS-ITCS)**						
647	LAMP HOUSING ASSEMBLY, GENERAL	3	0	1.23	3.69		16
648	_____ _____ _____						
649	***ODF***				***4.90***		
650	_____ _____ ___**(ODF)**						
651	OPERATIONS DATA FILE ASSEMBLY OPS	5	0	0.98	4.90		36,37,38,R

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 21 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
652	_____ _____ ___ __ _____ _____						
653	***PCS***				***1.19***		
654	_____ _____ _____ **PCS**						
655	**PALLET DETAIL ASSEMBLY PSYCH CD CASE**	**1**	**0**	**0.78**	**1.19**		
656	_____-_____ ___ _____-_____ _____ _____						
657	ASSEMBLY, PCS/OCA WRITABLE CD	8	0	0.02	0.14		
658	_____ _____ _____ (CD), _____ ___ _____ PCS/OCA						
659	ASSEMBLY, PCS/OCA WRITABLE CD	11	0	0.02	0.19		
660	_____ _____ _____-_____ ___ _____ PCS/OCA						
661	WRITEABLE DVD ASSEMBLY	5	0	0.02	0.09		
662	_____ _____ _____ _____ (DVD)						
663	***CHECS CMS HARDWARE***				***0.90***		
664	_____ _____ _____ _____ **(CMS)** _____ **CHECS**						
665	SERIES BUNGEE SYSTEM ASSEMBLY	2	0	0.45	0.90		28,33,R
666	_____ _____ __ _____ _____						
667	***CHECS HMS HARDWARE***				***2.34***		
668	_____ _____ _____ _____ **(HMS) _____ CHECS**						
669	ISS MEDICAL ACCESSORY KIT ASSEMBLY	2	0	1.17	2.34		28,30,31,D,HZ
670	_____ _ _____ _____ ___ ___						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 22 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
671	**CTB, HALF-SIZE**	**1**	**0**	**1.40**	**4.63**		**46**
672	_____ _____ ___						
673	***CHECS EHS HARDWARE***				***1.54***		
674	____-__ _____ _____ _____ **(EHS)** _____ _____ _____ _____ **(CHECS)**						
675	BAG ASSY., MICRO SAMPLE ANALYSIS (300ML)	6	0	0.02	0.12		16,28,33,HZ,R
676	_____ ___ _____ _____ ____ ____ (300 __)						
677	CAPTURE DEVICE ASSY., MICROBIAL	2	0	0.02	0.04		16,28,33,R
678	_____ _____						
679	SYRINGE ASSEMBLY, MEDIA	5	0	0.00	0.02		16,28,33,R
680	_____ _____ _ _____ _____						
681	INCUBATION BAG ASSEMBLY	4	0	0.07	0.28		16,28,33,R
682	_____ _____						
683	PACKET ASSY, SURFACE SAMPLER	8	0	0.06	0.48		16,28,32,33,D
684	_____ _____ ___ _____ ____ _ _____ _____						
685	PACKET ASSEMBLY, PETRI DISH	5	0	0.10	0.50		16,28,33
686	_____ _ _____ _____						
687	SPARE BATTERY ASSY	1	0	0.10	0.10		16,28,BT,HZ
688	_____ _____ _____ _____						
689	***CHECS CMS HARDWARE***				***0.32***		
690	_____ _____ _____ _____ **(CMS)** _____ **CHECS**						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 23 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
691	SUBPACK ASSEMBLY	8	0	0.04	0.32		20,28,D
692	_____ _ _____ [___ _____ __/___]						
693	***ITCS COOLANT SAMPLING***				***1.20***		
694	_____ ____ _____ _____ _____ _____ **(ITCS)**						
695	**COOLANT QUALITY MONITORING KIT**	**1**	**0**	**0.08**	**1.20**		**Q**
696	_____ ___ _____ _____ _____						
697	FLUID SAMPLE BAG ASSY	8	0	0.04	0.32		Q
698	_____ ___ _____ ____ _____						
699	PORT FLUSH BAG ASSY	8	0	0.02	0.16		Q
700	_____ ___ _____ ___À						
701	TEST STRIP BAG ASSY-NH3	8	0	0.03	0.24		Q
702	_____ _____ _ _____ _____ CHEMSTRIP - NH3						
703	RETURN ZIPLOCK BAG ASSY	8	0	0.05	0.40		Q
704	_____ _____ ZIPLOCK ___ _____						
705	***CHECS CMS HARDWARE***				***0.17***		
706	_____ _____ _____ _____ **(CMS)** _____ **CHECS**						
707	#2 FASTENER SET ASSY	1	0	0.04	0.04		28,R
708	_____ _____ _____ _2						
709	ROPE ASSEMBLY	10	0	0.01	0.05		28,33,R
710	____ _ _____						
711	CLAMP ROPE FASTENERS	20	0	0.00	0.06		28,33,R

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 24 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
712	_____ _____ ____ "____-____"						
713	SCREW	40	0	0.00	0.01		28,33,R
714	____						
715	**CTB, HALF-SIZE**	**1**	**0**	**1.33**	**9.58**		**49**
716	_____ ____ __						
717	***CHECS HMS HARDWARE***				***8.25***		
718	_____ _____ _____ _____ **(HMS) _____ CHECS**						
719	SODIUM CHLORIDE 0.9% 1 LITER	6	0	1.10	6.60		24,27,28
720	0,9% _____ _____ _____, 1 ____						
721	SODIUM CHLORIDE 0.9% 500 ML	3	0	0.55	1.65		25,28,29
722	0,9% _____ _____ _____, 500 __						
723	**CTB, HALF-SIZE**	**1**	**0**	**0.32**	**5.49**		**50**
724	_____ ____ __						
725	***EVA EQUIPMENT***				***1.66***		
726	_____ ___ _____						
727	EQUIPMENT TETHER 75/30 ASSY	2	0	0.26	0.52		33
728	_____ ___ 75/30						
729	EQUIPMENT TETHER 75/30 ASSY	3	0	0.38	1.14		33
730	_____ ___ 75/30						
731	***CHECS CMS HARDWARE***				***0.06***		
732	_____ _____ _____ _____ **(CMS)** _____ **CHECS**						
733	CHEST STRAPS	1	0	0.06	0.06		28,R
734	_____ ____						
735	***US IVA TOOLS***				***2.36***		
736	_____ _____ ____						
737	TORQUE ANALYZER KIT	1	0	2.36	2.36		HZ
738	_____ ___ _____ _____ _____						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 25 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
739	***EVA EQUIPMENT***				***0.50***		
740	_____ ___ ____						
741	WIRE, EVA TIE	10	0	0.05	0.50		33
742	_____ _____ ___ ____						
743	***CHECS HMS HARDWARE***				***0.59***		
744	_____ _____ _____ _____ **(HMS) _____ CHECS**						
745	TONOPEN TIP COVERS	18	0	0.03	0.54		21,28,33
746	_____ _____ ___ _____ TONOPEN						
747	POPE POSTERIOR NASAL PACKING	3	0	0.01	0.03		22,28,33
748	_____ ___ _____ _____ _____						
749	NASOGASTRIC TUBE	1	0	0.02	0.02		23,28
750	_____ ____						
751	**CTB, HALF-SIZE**	**1**	**0**	**0.81**	**9.25**		**52**
752	_____ _____ ___						
753	***CHECS CMS HARDWARE***				***2.27***		
754	_____ _____ _____ **_____ (CMS) _____ CHECS**						
755	TREADMILL HARNESS	1	0	2.27	2.27		28,R
756	_____ _____-_____ _____ ___ _____ _____						
757	***PCS***				***0.69***		
758	_____ _____ **_____ PCS**						
759	CABLE ASSEMBLY, A31P 16V DC POWER	3	0	0.23	0.69		R
760	_____ _____ _____ A31P __ _____ 16 _ ____. ____						
761	***CHECS CMS HARDWARE***				***5.12***		

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 26 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
762	_____ _____ _____ _____ (CMS) _____ CHECS						
763	IRED SUPPORT BLOCK & PAD ASSY., AFT-RIGHT	1	0	2.31	2.31		16
764	_____ ____ _ _____ ___ _____ IRED, _____-_____						
765	IRED SUPPORT BLOCK & PAD ASSY., FWD	1	0	2.81	2.81		16
766	_____ ____ _ _____ ___ _____ IRED, _____						
767	***PHOTO/TV EQUIPMENT***				***0.36***		
768	_____ ___ ____/__-_____						
769	FIREWIRE CABLE ASSY.	2	0	0.18	0.36		33
770	_____ _____ FIREWIRE						
771	**CTB, HALF-SIZE**	**1**	**0**	**1.39**	**7.80**		**48**
772	_____ _____ ___						
773	***CHECS HMS HARDWARE***				***0.22***		
774	_____ _____ _____ _____ (HMS) _____ CHECS						
775	EC8+ CARTRIDGE ASSEMBLY	15	0	0.01	0.15		26,28
776	_____ _____ __8+						
777	CREATININE CARTRIDGE ASSEMBLY	7	0	0.01	0.07		26,28
778	_____ _____ ___ _____ __ _____						
779	***CHECS EHS HARDWARE***				***6.17***		
780	____-__ _____ _____ _____ (EHS) _____ _____ _____ _____ (CHECS)						
781	DUAL SORBENT TUBE ASSEMBLY	12	0	0.08	0.96		16,28,R
782	_____ _____ _____						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 27 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
783	CONTROL ASSEMBLY	1	0	0.17	0.17		16,28,R
784	_____ _____ _____ _____						
785	VALVE ASSEMBLY, GRAB SAMPLER	2	0	0.50	1.00		16,20,28,D,R
786	_____-_____ Grab						
787	CSA-CP STOWAGE KIT ASSEMBLY	1	0	4.04	4.04		16,28,32,BT,D,HZ,R
788	_____ ___ _____ _____ CSA-CP						
789	***EVA EQUIPMENT***				***0.02***		
790	_____ ___ _____						
791	SOLID SHIM	1	0	0.02	0.02		
792	_____ _____						
793	**TOTAL US PAYLOADS**				**8.26**		
794	_____ _____						
795	***DAFT 1***				***2.05***		
796	_____ _____ **DAFT 1**						
797	**PACKING MATERIAL**	**1**	**0**	**0.62**	**2.05**		**43**
798	_____ _____						
799	P-TRAK ULTRAFINE PARTICLE COUNTER	1	0	1.43	1.43		
800	_____ _____ _____P-TRAK						
801	***UTILIZATION***				***0.60***		
802	_____ _____						
803	***ADUM GEL (INC. 10)***				***0.60***		
804	**____ ADUM (___-10)**						
805	ECHO GEL BOTTLE	3	0	0.20	0.60		19,33
806	_____ _ _____ ___ ___						
807	***UTILIZATION***				***1.11***		
808	_____ _____						
809	***SEM***				***1.11***		
810	_____ ___ _____ _____						
811	**SEM SATCHEL**	**1**	**0**	**1.11**	**1.11**		
812	_____ _____ **SEM**						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 28 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
813	SEM VIALS	20	0				
814	_____ _____ SEM						
815	**CTB, HALF-SIZE**	**1**	**0**	**1.46**	**4.50**		**47**
816	_____ _____ ___						
817	***UTILIZATION***				***3.04***		
818	_____ _____						
819	***DAFT 1***				***1.41***		
820	_____ _____ **DAFT 1**						
821	P-TRAK ALCOHOL WICK CONTAINER-01	1	0	0.36	0.36		
822	_____-01 _ _____ _____ __ _____ _____ ___ _____ P-Trak						
823	**DAFT ACCESSORY KIT**	**1**	**0**	**0.60**	**0.60**		
824	_____ _____ ___ _____ **DAFT**						
825	P-TRAK HEPA FILTER	1	0				
826	_____ [HEPA] ___ _____ P-TRAK						
827	P-TRAK HOSE ADAPTER	1	0				
828	_____ ___ _____ _____ P-TRAK						
829	DAFT DATA CABLE	1	0				
830	_____ _____ ___ _____ DAFT						
831	DAFT HEPA FILTER	1	0				
832	_____ [HEPA] ___ _____ DAFT						
833	DUSTTRAK 10UM ADAPTER	1	0				
834	_____ 10-___ ___ _____ DUSTTRAK						
835	DUSTTRAK 2.5UM ADAPTER	5	0				

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Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
836	_____ 2,5-___ ___ _____ DUSTTRAK						
837	DUSTTRAK 1UM ADAPTER	3	0				
838	_____ 1-___ ___ _____ DUSTTRAK						
839	DUSTTRAK PREFILTER	2	0				
840	_____ _____ _____ _____ DUSTTRAK						
841	DAFT LABELS	15	0				
842	_____ ___ _____ DAFT						
843	DUSTTRAK INLET REMOVAL TOOL	1	0				
844	_____ ___ _____ _____ _____ _____ DUSTTRAK						
845	DUSTTRAK CLEANING TOOL	1	0				
846	_____ ___ _____ _____ DUSTTRAK						
847	P-TRAK SAMPLE HOSE	1	0				
848	_____ _____ ___ _____ P-TRAK						
849	DAFT SAMPLE HOSE	1	0				
850	_____ _____ ___ _____ DAFT						
851	P-TRAK BATTERIES	12	0	0.03	0.36		33,BT,HZ

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 30 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
852	_____ _____ ___ _____ P-TRAK						
853	14P PAYLOAD UNIQUE LAPTOP APPLICATION SOFTWARE	1	0	0.09	0.09		
854	_____ _____ ___ _ _____ ___ _____ ___ _ _____ 14P						
855	***DAFT 2***				***1.63***		
856	_____ **_____ DAFT 2**						
857	**DUSTTRAK**	**1**	**0**	**1.27**	**1.35**		**51**
858	_____ **DUSTTRAK**						
859	PACKING MATERIAL	1	0	0.08	0.08		
860	_____ _____						
861	DUSTTRAK BATTERIES	4	0	0.07	0.28		33,BT,HZ
862	_____ _____ _____ DUSTTRAK						
863							
864	**TOTAL COMMON WASTE**					**793.27**	
865	_____ _____						
866	**TOTAL US COMMON WASTE**					**396.64**	
867	**TOTAL RUSSIAN COMMON WASTE**					**396.64**	
868	***SANITARY HYGIENE SUPPORT*** (___)					***588.50***	
869	_____ _____- _____ _____ (___)						
870	SOFT TRASH BAGS (___-_)	0	5	8.00		40.00	
871	_____ ___ _____ _____ _____ ___-_						
872	KTO	0	4	11.50		46.00	
873	___						
874	EDV	0	9	26.50		238.50	
875	_____ ___ ____ ___						
876	URINE IN RODNIK TANKS	0	2	132.00		264.00	90
877	_____ _ _____ _____ "_____"						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 31 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
878	***SANITARY HYGIENE SUPPORT MEDICAL SUPPORT SYSTEM***					***125.42***	
879	___ ___						
880	PERSONAL HYGIENE ARTICLES- WET NAPKINS	0	9	0.90		8.10	
881	___ (_____ _____)						
882	CAMELIA-A UNDERWEAR	0	2	0.50		1.00	
883	_____ _____-_						
884	CAMELIA-C UNDERWEAR	0	1	0.35		0.35	
885	_____ _____-_						
886	CAMELIA-CM UNDERWEAR	0	20	0.35		7.00	
887	_____ _____-__						
888	THIN SOCKS	0	9	0.06		0.54	
889	_____ _____						
890	LIGHT-WEIGHT SET	0	2	0.80		1.60	
891	_____ _____						
892	TOILET PAPER PACKAGE	0	11	0.60		6.60	
893	_____ _____						
894	PERSONAL HYGIENE ARTICLES- DRY NAPKINS	0	2	0.40		0.80	
895	___-_ (_____ _____)						
896	SLEEPING BAG INSERT	0	4	0.40		1.59	
897	_____ _ _____ _____						
898	WHITE BAG	0	1	0.10		0.10	89
899	_____ _____						
900	WHITE BAG	0	3	3.50		10.50	
901	_____ _____						
902	HYGIENE PANTRY-2/FEMALE HYGIENE PANTRY, SKIP CYCLE	0	1	3.70		3.70	
903	_____ _____, _____ – 2/_____, __ _____ ___						
904	SHORTS	0	221	0.09		20.11	
905	_____						
906	CREW PREFERENCE, SHIRT-T	0	18	0.35		6.30	
907	_____ __ _____ _____ _____						
908	TUBE SOCKS	0	107	0.05		4.82	
909	_____ ___ _____						
910	TUBE SOCKS	0	8	0.05		0.36	
911	_____ ___ _____						
912	TOWEL	0	52	0.15		8.01	

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Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
913	_____						
914	HYGIENE, TOWEL, WASHCLOTH	0	172	0.04		7.74	
915	_____ _____, _____, _____ ___ _____						
916	SOCKS, SLIPPER	0	1	0.27		0.27	
917	_____ _ _____ _____						
918	SOCKS, POLARTEC	0	1	0.05		0.05	
919	_____ _____ __ _____ Polartec						
920	CREW PREFERENCE, SHIRT, SLEEP	0	5	0.23		1.15	
921	_____ ___ ___ __ _____ _____ _____						
922	ATHLETIC, HEADBAND	0	1	0.05		0.05	
923	_____ _____ __ _____						
924	CREW PREFERENCE, SHIRT, SHORT SLEEVE	0	1	0.35		0.35	
925	_____ "____" _ _____ _____						
926	WHITE HANDERCHEIF	0	54	0.02		1.08	
927	_____ _____ _____						
928	ATHLETIC SUPPORTER	0	14	0.05		0.70	
929	_____ _____, _____						
930	SHORTS, NYLON RUNNING, ATHLETIC	0	5	0.11		0.55	
931	_____ _____ _____, ___ ____						
932	CREW PREFERENCE, SHIRT, LONG SLEEVE	0	1	0.50		0.50	
933	_____ _____ _____, _____ c _____ _____						
934	CREW PREFERENCE, SWEATER	0	1	0.90		0.90	
935	_____ _ _____ _____						
936	CREW PREFERENCE, SWEATER	0	1	0.80		0.80	
937	_____ _ _____ _____						
938	FLIGHT, CREW PREF, TROUSERS	0	32	0.58		18.40	

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Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
939	_____ _____ (_____ _____ _____)						
940	FLIGHT, CREW PREFERENCE, SLEEP SHORTS	0	40	0.26		10.40	
941	_____ _____ _____, _____ ___ ___						
942	CREW PREFERENCE ITEMS	0	1	1.00		1.00	88
943	_____ ____						
944	***FOOD SUPPLY SYSTEM (___)***					***79.35***	
945	___						
946	FOOD RATIONS CONTAINERS	0	39	1.00		39.00	91
947	_____ _ _____ _____						
948	FOOD RATIONS CONTAINERS	0	11	2.50		27.50	92
949	_____ _ _____ _____						
950	US NON-COLLAPSIBLE FOOD CONTAINER	0	1	1.72		1.72	
951	_____ _____ _____ _____						
952	NAPKINS FOR SPP	0	13	0.21		2.73	
953	_____ ___ ___						
954	FOOD WASTE BAGS	0	6	0.90		5.40	
955	_____ ___ _____ _____						
956	SELECTION OF FRESH PRODUCE	0	3	1.00		3.00	
957	_____ _____ _____						
958							
959	**TOTAL RUSSIAN NON-COMMON WASTE**					**516.26**	
960	_____ _____						
961	***SANITARY HYGIENE SUPPORT (___)***					***95.41***	
962	_____ _____- _____ _____ (___)						
963	URINE RECEPTACLE WITH HOSE	0	2	1.60		3.20	
964	_-_____ __ _____						
965	FILTER-INSERT	0	2	0.24		0.48	
966	_____-_____						

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Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
967	SOFT TRASH BAGS (___-_)	0	5	13.90		69.50	93
968	_____ ___ _____ _____ _____ ___-_						
969	PRETREAT CONTAINER WITH A HOSE	0	1	9.50		9.50	
970	_____ _ _____ _-_ __ _____						
971	EDV FILL INDICATOR	0	13	0.01		0.13	
972	_____ _____ ___						
973	HOSE WITH TWO MATED ADAPTERS	0	1	0.40		0.40	
974	_____						
975	COVER	0	1	0.60		0.60	
976	_____						
977	VACUUM CLEANER	0	1	11.60		11.60	
978	_____ __-70						
979	***ATMOSPHERE REVITALIZATION SUBSYSTEM (___)***					***27.03***	
980	____						
981	NITROGEN PURGE UNIT	0	1	15.00		15.00	
982	____ _____ _____ ___-1_						
983	FILTER CO2	0	1	0.39		0.39	
984	_____ __2						
985	CARTRIDGE BELT WITH DRAEGER TUBE AIR SAMPLER (___)	0	1	0.40		0.40	
986	_____ _ _____ ___-_____ ___						
987	CARTRIDGE BELT WITH DRAEGER TUBE AIR SAMPLER (___)	0	1	0.40		0.40	
988	_____ _ _____ _____ ___						
989	ELECTRIC HEATER FOR FILTER PKF-T	0	2	0.19		0.38	
990	_____ ___ _____ ___-_						
991	PIN CLEANING TOOL FOR FILTER PKF-T	0	1	0.07		0.07	
992	_____ ___ _____ ___-_						
993	FITTING	0	1	0.02		0.02	
994	_____						
995	CAP	0	1	0.02		0.02	
996	_____						

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Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
997	ABSOLUTE PRESSURE MANOMETER	0	1	2.50		2.50	
998	_____ _____ _____ __-316_						
999	SPARE VACUUM VALVE UNIT	0	1	7.85		7.85	
1000	_____ ____ _____ _____ ___						
1001	***CONDENSATE WATER RECOVERY SYSTEM (___-_2_)***					***5.40***	
1002	_____ _____ ____ __ _____ ___-_2_						
1003	WATER CONDITIONING UNIT WATER PURIFICATION COLUMNS (__ ___)	0	1	3.80		3.80	
1004	____ _____ _____ _____-_____ ____ __ ___						
1005	LIQUID CARRYOVER INDICATOR (FOR THE ____ SEPARATOR)	0	4	0.40		1.60	
1006	_____ _____ _____ ___ (___ _____ ____)						
1007	***WATER SUPPLY SYSTEM (CBO)***					***0.57***	
1008	___						
1009	PERSONAL MOUTHPIECE	0	11	0.03		0.33	
1010	_____ _____						
1011	WATER SUPPLY3	0	2	0.03		0.06	
1012	_4-9220-125-03						
1013	WATER SUPPLY4	0	2	0.03		0.06	
1014	_4-9220-125-04						
1015	WATER SUPPLY6	0	2	0.03		0.06	
1016	_4-9220-125-06						
1017	WATER SUPPLY7	0	2	0.03		0.06	
1018	_4-9220-125-07						
1019	***MEDICAL SUPPORT SYSTEM (CMO)***					***17.23***	
1020	___						
1021	SET OF CONSUMABLES	0	2	0.25		0.50	
1022	_____ _____ _____ _____-2000						
1023	WHITE BAG	0	2	4.00		8.00	94

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Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
1024	_____ _____						
1025	PROFILAKTIKA KIT	0	1	1.50		1.50	
1026	_____ _____						
1027	EMERGENCY MEDICAL KIT	0	1	1.80		1.80	
1028	_____ __-2						
1029	ANTISEPTIC REMEDIES KIT [AC]	0	1	0.72		0.72	
1030	_____ __						
1031	MEDICAL KIT	0	1	0.60		0.60	
1032	_____ _____ (__)						
1033	DATA OUTPUT DEVICE	0	3	0.30		0.90	
1034	___ ____-08						
1035	DATA OUTPUT DEVICE BETA-08	0	9	0.30		2.70	
1036	___ ____-08						
1037	ECG LEAD CABLE BELT (PKO)	0	3	0.17		0.51	
1038	____ _ _____ _____ (___)						
1039	***THERMAL CONTROL SYSTEM (COTP)***					***6.15***	
1040	_____ _____ _____ _____ (____)						
1041	DUST FILTER CARTRIDGE	0	14	0.30		4.20	95
1042	_____ _____ _____						
1043	CONDENSATE EVACUATION PUMP (HOK)	0	1	1.90		1.90	
1044	_____ _____ _____ ___						
1045	FITTING	0	1	0.05		0.05	
1046	_____						
1047	***ONBOARD EQUIPMENT CONTROL SYSTEM (____)***					***9.84***	
1048	____						
1049	ONBOARD CONTROLLER (OBC)	0	1	8.00		8.00	
1050	_____ _____ OBC						
1051	LAMP WITH CABLE	0	2	0.92		1.84	
1052	_____ __1-7 _ _____						
1053	***KURS***					***72.47***	
1054	_____ _____ ____						
1055	KURS ELECTRONIC CONTROL UNIT WITH RT-VKA UNIT	0	1	70.70		70.70	

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Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
1056	_____ _____ _1-___-03 _____ _____ __-___						
1057	TEMPERATURE REGULATOR (ATTACHED TO _1-___-03)	0	1				
1058	_____ _____ _____ __-___						
1059	KURS SCANNING ANTENNA ELECTRONIC COMMUTATOR 2___1-___	0	1	1.77		1.77	
1060	_____ _____ 2___1-___						
1061	***POWER SUPPLY SYSTEM (___)***					***150.00***	
1062	___						
1063	800A STORAGE BATTERY	0	2	75.00		150.00	
1064	_____ _____ (____ 800A)						
1065	***ONBOARD MEASUREMENT SYSTEM (___)***					***2.99***	
1066	_____ _____ _____ (___)						
1067	PROGRAMMABLE MEMORY UNIT (___) ___ __765_	0	1	0.06		0.06	
1068	_____ _____ _____ ___ ___ __765_						
1069	PROGRAMMABLE MEMORY UNIT (___) __ 114_	0	2	0.45		0.90	
1070	_____ _____ _____ ___ __114_						
1071	LOCAL ANALOG SWITCH TA249M	0	1	1.80		1.80	
1072	_____ _____ _____ ___ __249_						
1073	AUX LOCAL DIGITAL SWITCHING DEVICE	0	1	0.23		0.23	
1074	_____ _____ _____ ___ __253						
1075	***INDIVIDUAL PROTECTION GEAR (___)***					***104.52***	
1076	___						
1077	OXYGEN UNIT __-3_	0	8	6.30		50.40	
1078	____ _____ __-3_						

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Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
1079	WATER CONTAINER	0	1	6.60		6.60	
1080	_____5__						
1081	ABSORBER CARTRIDGE __-9	0	2	2.50		5.00	
1082	_____ _____ __-9						
1083	4 FILTER	0	2	0.11		0.22	
1084	_____ ___-4						
1085	825M1 UNIT CURRENT SOURCE	0	6	5.70		34.20	
1086	____825_1						
1087	WATER SEPARATOR	0	2	0.35		0.70	
1088	_____						
1089	SET OF UNDERWEAR	0	4	0.60		2.40	
1090	_____ _____						
1091	GREEN BAG	0	1	5.00		5.00	
1092	_____ _____ _____						
1093	***FIRE PROTECTION EQUIPMENT (____)***					***5.10***	
1094	____						
1095	ISOLATION GAS MASK INSTALLATION KIT IPK-1	0	2	2.55		5.10	
1096	_____ _____ ___-1						
1097	***CREW ONBOARD SUPPORT KIT (____)***					***5.75***	
1098	____						
1099	35 MM FILM IN A CASE	0	25	0.03		0.75	
1100	_____ _ _____35__						
1101	COMPLETE ONBOARD INSTRUCTIONS	0	1	5.00		5.00	
1102	_____ _____ _____						
1103	***PAYLOADS***					***13.80***	
1104	_____ ___._____						
1105	PARODONT SALIVA-A KIT	0	1	0.13		0.13	
1106	_____ "_____-_._____"						
1107	PARODONT TUBE KIT	0	1	0.17		0.17	
1108	_____ _ _____ "_____"						
1109	MBI PROTECTION KIT	0	1	0.21		0.21	
1110	_____ _____-___						
1111	PULSE KIT	0	2	0.21		0.42	
1112	_____ _____						
1113	35 MM FILM IN A CASE	0	9	0.03		0.27	

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Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
1114	_____ _ _____ 35__						
1115	**STARTING MECHANISM**	**0**	**1**	**1.00**		**1.00**	
1116	_____ _____ __						
1117	**CARDIOCOG SET**	**0**	**1**	**1.10**		**1.10**	
1118	_____ _ _____						
1119	DELIVERY CONTAINER	0	1	10.00		10.00	
1120	_____ _____						
1121	TUBE FOR VIDEOCAMERA	0	1	0.30		0.30	
1122	_____ ___ _____						
1123	SUPPORT FOR VIDEOCAMERA	0	1	0.20		0.20	
1124	_____ ___ _____						
1125							
1126	**TOTAL US WASTE**					**185.14**	
1127	**U.S. _____**						
1128	CREWMEMBER CASSETTE PLAYER	0	1	0.30		0.30	
1129	_____ _____ _____						
1130	DVD PLAYER ASSEMBLY	0	1	0.68		0.68	
1131	DVD-_____						
1132	CREWMEMBER CD KIT ASSY	0	1	1.64		1.64	
1133	_____ _ _____-_____ _____						
1134	SOFT TRASH BAGS (___-_)	0	4	0.20		0.80	
1135	_____ ___ _____ _____ _____ ___-_						
1136	FILTER, SAMPLING PUMP	0	1				
1137	_____ _____ ___ _____ ____						
1138	LAMP HOUSING ASSEMBLY, GENERAL	0	3	1.25		3.75	
1139	_____ _____ _____						
1140	TONOPEN TIP COVERS	0	18	0.00		0.04	
1141	_____ _____ ___ _____ TONOPEN						
1142	CUSHION, DUST TRAK ASSEMBLY	0	1	0.36		0.36	
1143	_____ ___ _____ "Dust Trak"						
1144	CUSHION, P TRAK	0	1	0.50		0.50	
1145	_____ ___ _____ "P-Trak"						
1146	SPECIAL CUSHION, DTO & ISS PRINTER	0	1	0.95		0.95	

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Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
1147	_____ _____ ___ _____ DTO ___						
1148	DYCAL BASE/CATALYST	0	1	0.03		0.03	
1149	_____ _____ _ _____ _____						
1150	WINDOW ASSY - HATCH	0	1	1.80		1.80	
1151	_____ ____						
1152	ECOMM HATCH REFURBISH KIT	0	1	6.90		6.90	
1153	_____ ___ _____ ____ _____ ECOMM						
1154	PASSIVE PROBE	0	1				
1155	_____ ____						
1156	O-RING	0	1				
1157	_____ _____						
1158	ECOMM WINDOW HATCH PLATE	0	1	0.55		0.55	
1159	_____ _____ ECOMM _____ ____						
1160	SPACER RING	0	1				
1161	_____ _____						
1162	SEAL, WINDOW PANE	0	2	0.13		0.26	
1163	_____ ___ _____ _____						
1164	BRACKET ASSY, ANTENNA (ECOMM)	0	1	3.40		3.40	
1165	_____ _____ _____ ECOMM						
1166	WIRE HARNESS ASSY - C&T UHF JUMPER	0	2	0.77		1.53	
1167	_____ ____ - _____ _____ _____ ___						
1168	NASOGASTRIC TUBE	0	1	0.03		0.03	
1169	_____ ____						
1170	LEVEL 1 CONTROL SOLUTION	0	1	0.03		0.03	
1171	_____ _____ 1- __ _____						
1172	LEVEL 2 CONTROL SOLUTION	0	1	0.03		0.03	
1173	_____ _____ 2- __ _____						
1174	BATTERY PACK, IV PUMP ASSEMBLY	0	1	0.17		0.17	
1175	____ _____ ___ IV-_____						
1176	ANKLE CUFF ASSEMBLY	0	2	0.07		0.14	
1177	_____ _____ ___ _____						

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Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
1178	KIT ASSEMBLY, CANISTER MAINTENANCE	0	1	0.25		0.25	
1179	_____ ___ ___-_____ _____ IRED						
1180	KIT ASSEMBLY, HARNESS MAINTENANCE	0	1	0.25		0.25	
1181	_____ ___ ___-_____ _____ _____ _____ IRED						
1182	ECG ELECTRODE	0	7	0.01		0.06	
1183	_____ ___						
1184	CRIM-M MUFFLER	0	2	0.16		0.32	
1185	_____ ____ ___ _____ CRIM-M						
1186	CRIM-M RS422 ADAPTER CABLE	0	2	0.11		0.22	
1187	_____ _____ _____ RS422 ___ _____ CRIM-M						
1188	BATTERY PACK	0	1	0.45		0.45	
1189	____ _____						
1190	PROPELLANT CARTRIDGE, CONNECTOR CLEANER TOOL	0	1	0.14		0.14	
1191	_____ _____ _____, _____ ___ _____ _____						
1192	EC8+ CARTRIDGE ASSEMBLY	0	39	0.01		0.23	
1193	_____ _____ __8+						
1194	CREATININE CARTRIDGE ASSEMBLY	0	21	0.01		0.13	
1195	_____ _____ ___ _____ __ _____						
1196	ASSEMBLY, IBM THINKPAD FLIGHT LAPTOP COMPUTER SYSTEM MODEL 760XD	0	2	2.99		5.98	HZ
1197	_____ IBM Thinkpad, _____ 760XD, _____ _____						
1198	REMOVABLE CD-ROM DRIVE	0	5	0.23		1.16	
1199	_____ _____ ___ _____						
1200	BAG ASSEMBLY, JETTISON STOWAGE	0	15	0.34		5.03	
1201	_____ _____ ___ _____						
1202	PROSHARE BOARD	0	1	0.27		0.27	
1203	_____ Proshare						
1204	CASSETTE, FILM-ASSEMBLY 35MM	0	84	0.02		1.91	

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 42 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
1205	_____ 35 __, _ _____						
1206	FILM CANNISTER ASSY 35MM	0	84	0.01		0.76	
1207	_____ ___ _____ 35 __						
1208	FILM CONTAINER, 70mm, LRG CAPACITY	0	18	0.12		2.16	
1209	_____ _____ _____ _ _____ 70 __						
1210	PCMCIA SCSI CARD	0	1	0.05		0.05	
1211	_____ PCMCIA _____ _____ _____ _____						
1212	LENS, 350MM FE	0	1	2.00		2.00	
1213	350 __ _____ _ _____, ___ FE						
1214	LENS ASSY, 110MM, F/2 F, HASSELBLAD	0	1	0.76		0.76	
1215	110 __ _____ (F/2 F) _____ ___ _____ "Hasselblad"						
1216	CAMERA, BODY 70MM 203S	0	2	1.05		2.10	
1217	_____ 70 __ _____, ___ 203S						
1218	LENS, 250MM FE	0	2	0.92		1.84	
1219	250 __ _____ _ _____, ___ FE						
1220	LENS, 50mm FE	0	1	1.24		1.24	
1221	50 __ _____ _ _____, ___ FE						
1222	ASSEMBLY, DC POWER SUPPLY PGSC 486	0	1	0.68		0.68	
1223	____ _____ ____. ____, PGSC 486						
1224	MEDICAL EQUIPMENT COMPUTER - 2	0	1	3.67		3.67	
1225	_____ _____ _____ - 2						
1226	ASSEMBLY, CAFRAMO FAN	0	5	1.36		6.80	
1227	_____ _____ "Caframo"						
1228	CALLUNA CARD ASSY	0	3	0.08		0.23	
1229	_____ _____ "Calluna"						
1230	BATTERY PACK ASSY	0	3	0.68		2.04	
1231	____ _____						
1232	WVS OUTER BAG ASSY	0	1	1.10		1.10	
1233	_____ _____ _____ _____						
1234	WVS THERMAL GARMENT	0	1	1.30		1.30	

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 43 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
1235	_____ _____ _____ _____						
1236	**CTB, HALF-SIZE**	**0**	**3**	**1.00**		**2.99**	
1237	_____ _____ **CTB**						
1238	**CTB, HALF-SIZE**	**0**	**11**	**1.00**		**10.98**	
1239	_____ _____ ___						
1240	**CTB, FULL SIZE WITH WINDOWS**	**0**	**2**	**1.68**		**3.36**	
1241	_____ _____ **CTB** _ _____						
1242	**CTB, FULL SIZE W/O WINDOWS**	**0**	**3**	**1.81**		**5.44**	
1243	_____ **CTB** _____, ___ _____						
1244	LAPTOP NIMH BATTERIES	0	1	0.52		0.52	
1245	_____ _____						
1246	ASSEMBLY, BATTERY PACK – PCS	0	1	0.36		0.36	
1247	____ _____ _____ ___ _____ PCS						
1248	IRED ASSEMBLY, FORE	0	1	21.77		21.77	
1249	_____ ____ _____ IRED						
1250	IRED ASSEMBLY, AFT	0	1	24.95		24.95	
1251	_____ _____ ___ _____ _____ ___ _____ _ _____ (IRED)						
1252	SUBPACK ASSEMBLY	0	13	0.04		0.55	
1253	_____ _ _____ [___ _____ __/___]						
1254	BATTERY ASSEMBLY	0	1	0.04		0.04	
1255	_____ EB _____ TVIS						
1256	KIT ASSEMBLY, MEDICAL EQUIPMENT COMPUTER	0	1	1.36		1.36	
1257	_____ _____ _____ _____						
1258	**MICROBIOLOGY WATER ANALYSIS KIT**	**0**	**12**	**0.18**		**2.18**	
1259	_____ ___ _____ _____ _____ _____ _____						
1260	PC CARD ASSEMBLY	0	6	0.00		0.03	

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 44 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
1261	_____ ___ _____ _____						
1262	ASSEMBLY, PCS/OCA WRITABLE CD	0	42	0.02		0.71	
1263	_____ _____ _____-_____ ___ _____ [OCA] __ ____ _____ PCS						
1264	PRINTER ASSEMBLY (STATION AND ORBITER)	0	1	6.53		6.53	
1265	_____ (__ _____ ___ _ "_____ _____")						
1266	FLEXPAC ASSEMBLY, FORE	0	1	8.62		8.62	
1267	_____ ____ _ _____ _____ _____ ___ _____ IRED						
1268	IRED FLEX PACK AFT	0	1	8.16		8.16	
1269	_____ ____ _ _____ _____ _____ ___ _____ IRED						
1270	ISS-HAM EVA FRAME	0	1	2.27		2.27	
1271	____ _____ _____ ___ ___ _____ _____ ___						
1272	FLEXPAC RING, RIGHT ASSY.	0	9	0.31		2.79	
1273	_____ FLEXPACK, _____						
1274	INTERNAL CHASSIS SUPPORT ASSEMBLY KIT, TVIS (ICSA)	0	1	14.34		14.34	
1275	_____ _____ _____ _____ _____						
1276	ASSEMBLY, REMOVABLE HARD DISK (760XD) - PCS	0	5	0.22		1.10	
1277	_____ __ _____ _____ _____ (____), _____ (760XD) - ___ PCS						
1278	ASSEMBLY, REMOVABLE FLOPPY DIS - PCS (760)	0	1	0.45		0.45	
1279	_____ _____ ___ _____ _____ PCS (760)						
1280	PCMCIA SLIMSCSI 1460D ASSEMBLY	0	3	0.15		0.45	
1281	____ 1460D ___ SlimSCSI PCMCIA						
1282	ASSEMBLY, FLASH MEMORY PCMCIA CARD	0	1	0.01		0.01	
1283	____ _____ 85MB						
1284	PCMCIA ADAPTER ASSEMBLY	0	1	0.04		0.04	
1285	_____ ___ ____ PCMCIA						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 45 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
1286	PCS GROUNDING ADAPTER	0	14	0.05		0.70	
1287	_____ _____ _____ PCS						
1288	POWER CABLE ASSEMBLY, PCS - UOP 28VDC - RUSSIAN SEGMENT PCS-UOP	0	1	0.22		0.22	
1289	_____ _____ _____ PCS - ___ _____ ____ _____ 28_ __ - PCS __ – ___						
1290	INCUBATION BAG ASSEMBLY	0	4	0.07		0.27	
1291	_____ _____						
1292	SYRINGE ASSEMBLY, MEDIA	0	7	0.00		0.03	
1293	_____ _____ _ _____ _____						
1294	PACKET ASSEMBLY, PETRI DISH	0	2	0.10		0.20	
1295	_____ _ _____ _____						
1296	PACKET ASSY, SURFACE SAMPLER	0	14	0.07		0.91	
1297	_____ _____ ___ _____ ____ _ _____ _____						
1298							
1299	**TOTAL FGB WASTE**					**5.80**	
1300	_____ ___						
1301	***FGB-SERVICING***					***5.80***	
1302	___-_____						
1303	***FGB LIFE SUPPORT SYSTEM (___ ___)***					***5.80***	
1304	**C__ ___**						
1305	DUST COLLECTOR REPLACEABLE FILTER	0	4	0.30		1.20	
1306	_____ _____ _____ (__)						
1307	FAN	0	1	2.50		2.50	
1308	_____						

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 46 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
1309	STACKING - HERMETIC SEALING	0	1	2.10		2.10	
1310	_____ __ _____ ___ _____						

Notes Legend

NOTES	
BT	ITEM INCLUDES BATTERIES
D	LATE STOWAGE
HZ	ITEM CONTAINS CHEMICAL, BIOLOGICAL, OR RADIOACTIVE MATERIALS OR BATTERIES
Q	LOGISTICS & MAINTENANCE (L&M) ALLOCATION – INCLUDES SYSTEM SPARES AND IVA TOOLS
R	THIS HARDWARE CAN BE OPERATED IN THE RUSSIAN SEGMENT ONLY AFTER CERTIFICATION AND ACCEPTANCE IS COMPLETE.
RB	CONTENTS OF THE BAG TO BE USED IN THE RUSSIAN SEGMENT
Z	FGB HARDWARE

FLIGHT SPECIFIC NOTES	
11	Hardware not manifested for a specific crewperson.
12	EDV with disinfecting solution (___ _ _____)
13	To replace SM printer.
15	2 Shirts, 1 Shorts (2 _____, 1 _____)
16	Installed On-Orbit during Increment
18	Requires on-orbit power
19	The gel is used in conjunction with the ADUM ultrasound probes.
20	Late stow - L - 6 weeks
21	Exp. 12/04
22	Exp. 11/04
23	Manufacturer's exp date is 5/31/04. Surgeon recommends continued use past expiration and replacement when it is approx. 6 months past expiration (11/30/04).
24	These items are to go into the HASP to replace expired saline solutions.
25	These items have the new over wrap & are to go into the ALSP.
26	These items will be stowed inside the AMP and will not impact on-orbit stowage.
27	Exp. 03/31/04
28	Scrub Turnaround 30 days.
29	Exp. 09/30/04
30	Item contains medicines.
31	Late stow - L-10 days
32	Late stow - L - 2 weeks
33	The width is the total package width divided by the total qty.
34	Potentially reduced to qty of 10 due to exchange with non-collapsible containers.
35	Potentially increased to qty of 17 due to exchange with collapsible containers.
36	Warning Books.

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D-4 FLIGHT 16P LAUNCH AND RETURN HARDWARE (PAGE 47 OF 47)

Line No.	Name	Qty Up	Qty Down	Unit Mass (Kg)	Launch Total Mass (Kg)	Return Total Mass (Kg)	Notes
37	Emergency Procedure Book 2 (EMER2) updates.						
38	Emergency Procedure Book 1 (EMER-1) updates.						
39	PO ISS Wiener Experiment Rokviss "__ ISS Wiener _____ Rokviss"						
40	Soft stow food containers						
41	BSV-M insertion Program "_____ _____ ___-_"						
42	SEG32108638-301 Top Assy with a 528-38477-1 Cushion.						
43	SEG32108460-301 Top Assy with a 528-38460-1 Cushion.						
44	Chiao (____)						
45	Sharipov (_____)						
46	SEG32108631-301 Top Assy.						
47	SEG32108636-302 Top Assy.						
48	SEG32108663-301 Top Assy.						
49	SEG32108635-301 Top Assy.						
50	SEG32108634-302 Top Assy.						
51	SEG32108456-301 Top Assy with 528-38456-1 Pad.						
52	SEG32108632-304 Top Assy.						
88	Pettit (_____)						
89	Empty						
90	12 EDV x 22 litre = 264 litres						
91	39 US ___						
92	10 Russian ___ + 1 US partially filled with expired food						
93	Equipped with MIS						
94	3+5 Kg with the medical equipment						
95	4 pieces stacked in white mesh III-1/258-1						

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 1 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
1	***PROGRESS 352***			***1348.21***	
2	_____ **352**				
3					
4	**TOTAL RUSSIAN CARGO**			**833.77**	
5	_____ _____				
6	***LIFE SUPPORT SYSTEM (___)***			***623.76***	
7	___				
8	***ATMOSPHERIC REVITALIZATION SYSTEM***			***121.57***	
9	____				
10	CONTAINER WITH O2 CANDLES	4	22.15	88.60	
11	_____ _ ___				
12	***SOLID FUEL OXYGEN GENERATOR (SFOG)***			***10.06***	
13	_____ _____ _____ ___				
14	SOLID FUEL OXYGEN GENERATOR (___) (SFOG)	1	7.36	7.36	
15	_____ _____ _____ ___				
16	SOLID FUEL OXYGEN GENERATOR (___) (SFOG) CONTROL UNIT (__)	1	2.36	2.36	
17	__ ___				
18	CABLE	1	0.34	0.34	
19	_____				
20	CONNECTING UNIT	1	0.26	0.26	
21	____ _____				
22	***VOZDUKH CARBON DIOXIDE REMOVAL SYSTEM***			***7.95***	
23	_____ _____ _____ ____ _____				
24	SPARE VACUUM VALVE UNIT	1	7.95	7.95	
25	_____ ___ _____ ___				
26	***ELEKTRON-VM SYSTEM***			***2.50***	
27	_____ "_____-__"				
28	CONTAINER WITH ELECTROLYTE	1	2.50	2.50	
29	_____ _ _____				
30	***OXYGEN SUPPLY SYSTEM ASSEMBLIES***			***12.20***	
31	_____ ___				
32	NITROGEN PURGE UNIT	1	12.20	12.20	
33	____ _____ _____ ___-1_				
34	***WATER SUPPLY SYSTEM (CBO)***			***50.86***	
35	___				
36	WATER PURIFICATION COLUMN UNIT (___)	2	17.09	34.18	
37	____ _____ _____ ___				
38	EDV	3	27.56	16.68	7

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 2 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
39	_____ ___ ____ ___				
40	***SANITARY HYGIENE SUPPORT (____)***			***60.82***	
41	_____ _____-_____ _____ (____)				
42	***TOILET (ACY)***			***44.31***	
43	_____-_____ _____ (___)				
44	TOILET (ACY) INSERTS	4	1.02	4.08	
45	_____ ___				
46	**SOLID WASTE CONTAINER KTO**	**7**		**24.43**	
47	_____ _____ _____ ___				
48	SOLID WASTE CONTAINER - BODY	7	2.55	17.85	
49	_____ _____ _____ _____				
50	SOLID WASTE CONTAINER (KTO) LID	7	0.94	6.58	
51	_____				
52	**EDV**	**3**		**15.51**	
53	_____ ___ ____ ___				
54	EDV BUCKET	3	1.74	5.22	
55	_____				
56	EDV LID	3	3.43	10.29	
57	_____				
58	EDV ADAPTER	1	0.28	0.28	
59	_____ ___				
60	EDV FILL INDICATOR	1	0.01	0.01	
61	_____ _____ ___				
62	URINE RECEPTACLE WITH HOSE	2	1.61	3.22	
63	_-_____ __ _____				
64	TOILET PAPER PACKAGE	5	0.60	3.00	
65	_____ _____				
66	RECEPTACLE	1	2.06	2.06	
67	_____				
68	INDICATOR	1	0.55	0.55	
69	_____				
70	HOSE	1	0.95	0.95	
71	_____				
72	HOSE	2	0.65	1.30	
73	_____				
74	HOSE	1	0.70	0.70	
75	_____				
76	HOSE	1	0.73	0.73	
77	_____				
78	T-JOINT	1	0.22	0.22	
79	_____				
80	ANGULAR PIPE CONNECTOR	1	0.22	0.22	

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 3 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
81	_____ _____				
82	HOSE	1	0.34	0.34	
83	_____				
84	COVER	2	0.55	1.10	
85	_____				
86	FILTER-INSERT	2	0.16	0.32	
87	_____-_____				
88	DUST COLLECTOR (KIT)	1	1.80	1.80	
89	_____ (_____)				
90	***FOOD SUPPLY SYSTEM (___)***			***311.78***	
91	___				
92	FOOD RATIONS CONTAINERS	47	6.19	291.00	
93	_____ _ _____ _____				
94	***UTENSILS:***			***0.16***	
95	_____ _____ ____				
96	UTENSILS	2	0.08	0.16	
97	___-1				
98	FOOD WASTE BAGS	100	0.04	4.00	
99	_____ __ _____ _____				
100	SELECTION OF FRESH PRODUCE	1	3.66	3.66	42
101	_____ _____ _____				
102	SELECTION OF FRESH PRODUCE	1	4.38	4.38	43
103	_____ _____ _____				
104	SELECTION OF FRESH PRODUCE	1	4.55	4.55	44
105	_____ _____ _____				
106	SELECTION OF FRESH PRODUCE	1	3.83	3.83	45
107	_____ _____ _____				
108	RUBBER TIES / STRAPS	100	0.00	0.20	
109	_____ _____				
110	***PERSONAL HYGIENE AIDS (___ ____)***			***44.80***	
111	_____ _____-_____ _____ (___ ____)				
112	PERSONAL HYGIENE ARTICLES- WET NAPKINS	5	0.93	4.65	
113	___ (_____ _____)				
114	PERSONAL HYGIENE ARTICLES- WET TOWELS	10	0.83	8.30	
115	___-_ (_____ _____)				
116	DENTAL HYGIENE AIDS	1	0.62	0.62	
117	___ (___ _____ ___)				
118	COMFORT SET-1M	1	1.44	1.44	
119	_____ ___ _____ _____ _____-1_				
120	COMFORT-1M CASE	1	1.10	1.10	
121	_____ _____-1_				
122	SET FOR PERSONAL HYGIENE COMFORT-3M	2	1.00	2.00	

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 4 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
123	_____ ___ _____ _____ _____-3_				
124	AELITA KIT	2	0.62	1.24	
125	_____ _____				
126	FOOTWEAR MODEL 270M	2	0.76	1.52	
127	_____ _____ 270_				
128	CAMELIA-A UNDERWEAR	2	0.48	0.96	
129	_____ _____-_				
130	CAMELIA-CM UNDERWEAR	25	0.32	8.00	
131	_____ _____-__				
132	CAMELIA-C UNDERWEAR	14	0.30	4.20	
133	_____ _____-_				
134	SPARE COVERALLS	3	1.17	3.51	
135	_____ _____				
136	OPERATOR'S COVERALLS	2	0.98	1.96	
137	_____ _____				
138	HEAVY COVERALLS	2	0.83	1.66	
139	_____-_____				
140	LIGHT-WEIGHT SET	4	0.76	3.04	
141	_____ _____				
142	LIGHT CLOTHING	1	0.48	0.48	
143	_____ _____				
144	LIGHT-WEIGHT SET	3	0.04	0.12	
145	_____ _____				
146	***MEDICAL SUPPORT SYSTEM (CMO)***			***19.96***	
147	___				
148	***COUNTERMEASURES SYSTEM (_____)***			***10.67***	
149	_____				
150	PENGUIN-3 SUIT	4	2.59	10.36	
151	_____ _____-3				
152	***STRUCTURAL ELEMENTS FOR INSTALLING CP-2 LIGHT***			***0.31***	
153	_____ _____ _____ _____ __***-2***				
154	PLATE	1	0.28	0.28	
155	_____				
156	SCREWS OST1 31543-80 (6 PIECES)	1	0.02	0.02	
157	_____ ___1 31543-80(_-_ 6 __.)				
158	NUTS ___1 33026-80 (6 PIECES)	1	0.01	0.01	
159	_____ ___1 33026-80(_-_ 6 __.)				
160	***MEDICAL KITS***			***2.35***	
161	____				
162	PREVENTIVE REMEDIES MEDICAL KIT P-1	1	0.53	0.53	
163	_____ _____ _-1				
164	PREVENTIVE REMEDIES MEDICAL KIT P-2	1	0.44	0.44	

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 5 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
165	_____ _____ _-2				
166	PREVENTIVE REMEDIES MEDICAL KIT P-3	1	0.43	0.43	
167	_____ _____ _-3				
168	ANTISEPTIC MEDICAL KIT [AS]	1	0.48	0.48	
169	_____ _____ __				
170	_____ KIT	1	0.47	0.47	
171	_____ _____				
172	***MEDICAL MONITORING EQUIPMENT***			***2.26***	
173	___				
174	CALF VOLUME METER (____) KIT	1	0.23	0.23	
175	_____ _____ _____ ____				
176	***PLASMA-3 UNIT***			***0.17***	
177	_____ _____**-03**				
178	SET OF PLASMA-03 ACCESSORIES	1	0.17	0.17	
179	_-_ _____ _____-03				
180	***REFLOTRON UNIT***			***0.70***	
181	_____ _____				
182	REFLOTRON KIT	1	0.70	0.70	
183	_____ _____-4				
184	***CARDIORECORDER 90205***			***0.13***	
185	_____**90205**				
186	SET OF ACCESSORIES	1	0.13	0.13	
187	_____ _____ _____ 90205				
188	***CARDIOCASSETTE SET***			***0.57***	
189	_____ _____				
190	SET OF CONSUMABLES	1	0.14	0.14	
191	_____ _____ _____ _____-2000				
192	BATTERY KIT (___) FOR THE M-1100	1	0.43	0.43	
193	_____ _____ _____ (___) ___ _- 1100				
194	***UROLUKS SET __2.893.636***			***0.36***	
195	**_-_ _____ __2.893.636**				
196	UROLUKS KIT	1	0.36	0.36	
197	_____ _____				
198	POWER SUPPLY FOR TENZOPLUS	1	0.10	0.10	
199	_____ _____ ___ _____				
200	***EQUIPMENT CLEAN UP & AMBIENT ATMOSPHERE CONTROL***			***4.68***	
201	_____				
202	SANITARY NAPKINS FOR SURFACES (10)	4	0.92	3.68	
203	_____ _____ ___ _____ (10__.)				
204	TEST TUBE KIT (OPER)	1	0.13	0.13	

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 6 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
205	_____ _ _____ (____.)				
206	SAMPLE TUBE KIT (SURFACES)	1	0.12	0.12	
207	_____ _ _____ (_____.)				
208	***EKOSEFERA SET***			***0.75***	
209	_____ "_____"				
210	EKOSFERA KIT	1	0.75	0.75	
211	_____ _____				
212	***FIRE PROTECTION SYSTEM***			***1.02***	
213	____				
214	NOZZLE	7	0.02	0.14	
215	_____				
216	ASSEMBLY BELT	10	0.01	0.10	
217	____ _____				
218	BAG	7	0.11	0.77	
219	_____				
220	CLAMP	1	0.01	0.01	
221	_____				
222	***CREW ONBOARD SUPPORT KIT (____)***			***12.95***	
223	____				
224	***CREW CARE PACKAGES***			***12.95***	
225	_____ __ _____				
226	PARCEL FOR ISS CREW (CREW CARE PACKAGE)	1	3.71	3.71	42
227	_____ __ _____ __				
228	PARCEL FOR ISS CREW (CREW CARE PACKAGE)	1	4.86	4.86	43
229	_____ __ _____ __				
230	PARCEL FOR ISS CREW (CREW CARE PACKAGE)	1	4.38	4.38	44
231	_____ __ _____ __				
232	***INDIVIDUAL PROTECTION GEAR (___)***			***17.01***	
233	___				
234	825M3 UNIT	3	5.67	17.01	
235	____ 825_3				
236	***ACOUSTIC NOISE MONITORING SYSTEM (____)***			***1.45***	
237	_____ _____ _____ ____ (____)				
238	BATTERIES KIT	1	1.45	1.45	
239	_____ _____ _____				
240	***THERMAL CONTROL SYSTEM (COTP)***			***14.09***	
241	_____ _____ _____ _____ (____)				
242	DUST FILTER CARTRIDGE	20	0.28	5.60	
243	_____ _____ _____				

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 7 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
244	***WATER SUPPLY SYSTEM FOR WATER RESERVES***			***8.49***	
245	_____ _____ __ _____ ____ (___-3_)				
246	MO-2-5008 FAN KIT	1	2.45	2.45	
247	_____ ___ _____ __-2-5008				
248	CREW QUARTER FAN KIT	1	1.42	1.42	
249	_____ ___ ___				
250	VVRO KIT	1	4.62	4.62	
251	_____ ___ ____				
252	***COMMAND & DATA HANDLING SYSTEM***			***1.15***	
253	____				
254	***TELEVISION SYSTEM (TBC)***			***1.15***	
255	_____ _____ (___)				
256	CD-ROM	2	0.05	0.10	
257	CD-ROM				
258	ONBOARD COMPUTER SYSTEM SOFTWARE DOCUMENTATION SET, VERSION 07.03	1			
259	_____ _____ __ ___ _____ 07.03				
260	CABLE	1	1.05	1.05	
261	_____				
262	***ONBOARD EQUIPMENT CONTROL SYSTEM***			***9.94***	
263	____				
264	***MOTION CONTROL & NAVIGATION SYSTEM (____)***			***9.94***	
265	____				
266	ATV HAND CONTROLLER (PU)	1	6.17	6.17	
267	_____ _____ __ ATV				
268	ATV HAND CONTROLLER STAND	1	0.57	0.57	
269	_____ _____ _____ ___ _TV				
270	CABLE	1	1.20	1.20	
271	_____				
272	CABLE	1	1.20	1.20	
273	_____				
274	CABLE	1	0.10	0.10	
275	_____				
276	CABLE	1	0.70	0.70	
277	_____				
278	***POWER SUPPLY SYSTEM (___)***			***76.90***	
279	___				
280	800A STORAGE BATTERY	1	76.90	76.90	BT,HZ
281	_____ _____ (____ 800A)				
282	***FLIGHT DATA TELEMETRY SYSTEM (____2-12)***			***0.20***	

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 8 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
283	**___2-12**				
284	CABLE	1	0.20	0.20	
285	_____				
286	***MAINTENANCE AND REPAIR EQUIPMENT***			***8.47***	
287	____				
288	TOOL BELT	2	0.52	1.04	
289	____ _____				
290	BAG FOR CONTAINER	2	0.09	0.18	
291	_____ ___ _____				
292	BAG FOR CONTAINER	2	0.09	0.18	
293	_____ ___ _____				
294	BAG FOR CONTAINER	2	0.09	0.18	
295	_____ ___ _____				
296	BAG FOR CONTAINER	2	0.09	0.18	
297	_____ ___ _____				
298	BAG FOR CONTAINER	1	0.09	0.09	
299	_____ ___ _____				
300	BAG FOR CONTAINER	1	0.09	0.09	
301	_____ ___ _____				
302	BAG FOR CONTAINER	1	0.09	0.09	
303	_____ ___ _____				
304	BAG FOR CONTAINER	1	0.09	0.09	
305	_____ ___ _____				
306	BAG FOR CONTAINER	3	0.15	0.45	
307	_____ ___ _____				
308	BAG FOR CONTAINER	3	0.15	0.45	
309	_____ ___ _____				
310	BAG FOR CONTAINER	3	0.15	0.45	
311	_____ ___ _____				
312	BAG FOR CONTAINER	3	0.15	0.45	
313	_____ ___ _____				
314	BAG FOR CONTAINER	3	0.15	0.45	
315	_____ ___ _____				
316	BAG FOR CONTAINER	3	0.15	0.45	
317	_____ ___ _____				
318	BAG FOR CONTAINER	3	0.15	0.45	
319	_____ ___ _____				
320	CREWMEMBER RESTRAINTS FOR WORKSTATION	1	3.20	3.20	
321	_____ _____ _____ __ _____ _____				
322	***CREW ONBOARD SUPPORT KIT (____)***			***6.13***	
323	____				
324	***FLIGHT PROCEDURES AND ANCILLARY MATERIALS***			***2.70***	

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 9 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
325	_/___ _ _____				
326	SET OF CREW PROCEDURES (BOOKS AND CDS)	1	0.40	0.40	
327	_-_ _/_____				
328	SET OF CREW PROCEDURES (BOOKS AND CDS)	1	2.30	2.30	
329	_-_ _/_____				
330	***VIDEO AND PHOTO EQUIPMENT***			***3.43***	
331	_____ _ ____/_____				
332	***COMPLETE NIKON D1x CAMERA SET***			***2.95***	
333	_____ _____ **Nikon D1x**				
334	**CAMERA BAG**	**1**	**2.95**	**2.95**	
335	_____ ___ _____ _____				
336	NIKON D1X DIGITAL STILL CAMERA KIT	1			
337	Nikon D1X _____ _____ _____				
338	STORAGE BATTERY EN-4 NIKON	2			47,HZ
339	_____ _____ _N-4 Nikon				
340	STORAGE BATTERIES NP-F950	2			47,HZ
341	_____ NP-F950				
342	LENS CLEANING SET	1			
343	_____ ___ _____ _____				
344	CASE FOR HARD DRIVE	1			
345	_____ ___ _____ _____				
346	SM-FOTO HARD DRIVE	1			
347	_____ ___				
348	ADAPTER	1			
349	_____				
350	AA BATTERIES	16	0.03	0.48	HZ
351	_____ Alkaline ___ __				
352	***DOCKING AND INTERNAL TRANSFER SYSTEM (____)***			***74.67***	
353	____				
354	EXTENSION PIECE	2	0.69	1.38	
355	_____				
356	***PROXIMITY COMMUNICATION EQUIPMENT (PCE)***			***73.29***	
357	_____				
358	S/S RADIO (MBRL) MONOBLOCK	1	54.88	54.88	
359	_____ ____				
360	SET OF PROTECTIVE COVERS, 18EA., (DELIVERED AS PART OF MBRL KIT)	1	1.32	1.32	
361	_____ _____ _____, 18__. (_____ _ _____ ____)				

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 10 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
362	STORAGE CONTAINER FOR MBRL MONOBLOCK	1	2.32	2.32	
363	_____ ___ _____ _____ ____				
364	CONTAINER FOR CONNECTOR PROTECTOR COVERS	1	4.20	4.20	
365	_____ ___ _____ _____ _____				
366	CARTRIDGE BELT	1	0.09	0.09	
367	_____				
368	CABLE	1	0.35	0.35	
369	_____				
370	CABLE	1	0.40	0.40	
371	_____				
372	CABLE	1	3.53	3.53	
373	_____				
374	CABLE	1	0.43	0.43	
375	_____				
376	CABLE	1	0.23	0.23	
377	_____				
378	CABLE	1	0.24	0.24	
379	_____				
380	CABLE	1	1.03	1.03	
381	_____				
382	CABLE	1	0.90	0.90	
383	_____				
384	CABLE	1	0.16	0.16	
385	_____				
386	CABLE	1	0.16	0.16	
387	_____				
388	CABLE	1	0.42	0.42	
389	_____				
390	CABLE	1	0.43	0.43	
391	_____				
392	CABLE	1	0.40	0.40	
393	_____				
394	CABLE	1	0.50	0.50	
395	_____				
396	CABLE	1	0.10	0.10	
397	_____				
398	CABLE	1	0.25	0.25	
399	_____				
400	CABLE	1	0.14	0.14	
401	_____				
402	FUSE	2	0.03	0.06	
403	_____				
404	PLUG	2	0.04	0.08	

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 11 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
405	_____				
406	DONGLE (KEY)	2	0.03	0.06	
407	_____ _____ (____)				
408	***PCE ANTENNA FEEDER UNIT***			***0.61***	
409	___ ____				
410	RF ADAPTER	4	0.08	0.32	
411	__ _____				
412	RF ADAPTER	4	0.06	0.24	
413	__ _____				
414	RF ADAPTER	1	0.05	0.05	
415	__ _____				
416					
417	**TOTAL RUSSIAN PAYLOADS[1]**			**84.32**	
418	_____ ___._____				
419	***TEX***			***5.30***	
420	___				
421	MICROSATELLITE THC-0	1	5.30	5.30	
422	_____ ___-0				
423	***PAYLOADS***			***79.02***	
424	_____ ___._____				
425	35 MM FILM IN A CASE	10	0.03	0.30	
426	_____ _ _____ 35__				
427	CD-ROM	7	0.08	0.56	46
428	CD-___				
429	***CONTRACT EXPERIMENT (___)***			***24.30***	
430	___				
431	***GCF EXPERIMENT***			***8.70***	
432	_____ **GCF**				
433	**THERMAL INSULATED TRANSPORT CONTAINER**	**3**	**2.90**	**8.70**	
434	_____ _____ **GCF-01**				
435	GCF-02 CRYSTALLIZATION EQUIPMENT	1			
436	_____ _____ GCF-02				
437	***COMPLEX TBU (UNIVERSAL BIOTECHNOLOGICAL THERMOSTAT)***			***15.60***	
438	_____ ___ (_____ _____ _____)				
439	**COMPLEX TBU (UNIVERSAL BIOTECHNOLOGICAL THERMOSTAT)**	**1**		**15.60**	
440	_____ ___				
441	THERMOSTAT TBU	1	15.25	15.25	
442	_____ ___				
443	THE COMPLETE SET OF CABLES IN A BAG	1	0.35	0.35	
444	_____ _____ _ _____				

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 12 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
445	***GEOPHYSICAL EXPERIMENTS***			***0.24***	
446	___				
447	***RELAKSATSIYA KIT***			***0.24***	
448	_____ __ _____				
449	3.5" FLOPPY DISK	5	0.03	0.17	
450	_____ 3.5"				
451	MINI DV VIDEO CASSETTE	2	0.03	0.07	
452	_____ mini DV				
453	***BIO-MEDICAL RESEARCH EXPERIMENT (___)***			***16.88***	
454	___				
455	SALIVA-F KIT	1	0.09	0.09	
456	_____ "_____-_ _____"				
457	PULSE KIT	1	0.26	0.26	
458	_____ _____				
459	SET OF CONSUMABLES	2	0.05	0.10	
460	_____ _____ _____ "_____-03"				
461	KB-03 CONTAINER	2	2.32	4.64	
462	_____ _____ __-03				
463	URINE RECEPTACLE KIT	1	0.90	0.90	
464	_____ _-_____				
465	**STATOKONIYA HARDWARE**	**1**		**1.30**	
466	_____ **"**_____**"**				
467	ULITIKA CONTAINER	1	1.00	1.00	
468	_____ _____				
469	SELF-CONTAINED TEMPERATURE LOGGER [APT] IN A CASE ("BIOEKOLOGIYA" EXPERIMENT)	1	0.30	0.30	
470	_____ _____ _____ _ _____				
471	***EXPERIMENT BEO***			***5.67***	
472	___				
473	***LADA GREENHOUSE***			***5.67***	
474	_____ ____ **(__2.390.600)**				
475	ROOT MODULE	1	5.10	5.10	
476	_____ _____				
477	RASTENIYA [PLANTS] KIT	1	0.57	0.57	
478	_____ "_____"				
479	***EXPERIMENT (___)***			***1.07***	
480	___				
481	BRADOZ KIT	1	1.07	1.07	
482	_____ "_____"				
483	***EXPERIMENT (___)***			***2.85***	
484	___				

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 13 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
485	BIOEKOLOGIA KIT	1	2.00	2.00	
486	_____ _____				
487	LUCH-2 HARDWARE	1	0.85	0.85	
488	_____ ___-2				
489	***CONTRACT EXPERIMENT (KNT)- ITALY***			***36.74***	
490	___-_____				
491	***SPQR EXPERIMENT (SET)***			***2.80***	
492	_____ _____ **SPQR**				
493	BAG	1	2.80	2.80	
494	_____				
495	RETROFLECTOR UNIT	1			
496	____ _____ _____				
497	PROTECTIVE SCREEN	1			
498	_____ _____				
499	PACKET	1			
500	_____				
501	PACKET	1			
502	_____				
503	MEMORY CARD	1			
504	_____ _____				
505	PAS-01 SHIPPING CONTAINER	1	0.78	0.78	
506	_____ _____ PAS-01				
507	***MICROSPACE EXPERIMENT***			***0.70***	
508	_____ **MICROSPACE**				
509	KIT-1	1	0.35	0.35	
510	_____-1				
511	KIT-2	1	0.35	0.35	
512	_____-2				
513	***ASIA EXPERIMENT***			***3.03***	
514	_____ **ASIA**				
515	ASIA KIT	1	3.03	3.03	
516	_____ ASIA				
517	***HPA EXPERIMENT***			***0.11***	
518	_____ **HPA**				
519	HPA TRANSPORTATION CONTAINER	1	0.11	0.11	
520	_____ _____ HPA				
521	***ETD EXPERIMENT***			***0.64***	
522	_____ **ETD**				
523	ETD CONTAINER HARD DISK	1	0.32	0.32	
524	_____ ETD _____ ____				
525	ETD CONTAINER HARD DISK	1	0.32	0.32	
526	_____ ETD _____ ____				
527	***AGROSPACE EXPERIMENT***			***0.35***	
528	_____ **AGROSPACE**				
529	AES CONTAINER	1	0.35	0.35	

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 14 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
530	_____ ___ AES				
531	***LAZIO EXPERIMENT (WITH ACT SPECTROMETER EQUIPMENT)***			***28.33***	
532	**_____ LAZIO (_ _____- ___ ACT Spectrometer):**				
533	MAIN ELECTRONIC UNIT	1	23.83	23.83	
534	_____ _____ ____				
535	***LAZIO KIT NO. 1***			***1.13***	
536	**_____ _1 LAZIO**				
537	**MAGNETOMETER COVER**	**1**	**1.13**	**1.13**	
538	_____ _____, _ ___ _____				
539	MAGNETOMETER UNIT (MB)	1			
540	____ _____ (__)				
541	POWER CABLE	1			
542	_____ _____				
543	MAGNETOMETER CABLE (MEB-MB)	1			
544	_____ _____ (___-__)				
545	BONDING STRAP	1			
546	_____ _____				
547	***MAGNETOMETER HEAD KIT***			***0.51***	
548	_____ _____ _____				
549	**MAGNETOMETER HEAD (MH) COVER**	**1**	**0.51**	**0.51**	
550	_____ _____ _____(__)				
551	MAGNETOMETER HEAD (MH) WITH CABLE MB-MH	1			
552	-_____ _____ (__) _____ __-__				
553	SCREEN EGLE-MH	1			
554	_____ EGLE-MH				
555	***LAZIO KIT NO. 1***			***1.27***	
556	**_____ _1 LAZIO**				
557	**LAZIO KIT NO. 1 (BLUE COVER)**	**1**	**1.27**	**1.27**	
558	**_____ _1 LAZIO (_____ _____), _ ___ _____**				
559	**KIT FOR VISITING CREW (ORANGE COVER)**	**1**			
560	_____ ___ __(_____ _____)				
561	PCMCIA 1 GB MEMORY CARD	1			
562	_____ _____ PCMCIA 1 GB				
563	PCMCIA 1 GB MEMORY CARD	1			
564	_____ _____ PCMCIA 1 GB				
565	PCMCIA 1 GB MEMORY CARD	1			
566	_____ _____ PCMCIA 1 GB				
567	PCMCIA 1 GB MEMORY CARD	1			
568	_____ _____ PCMCIA 1 GB				

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 15 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
569	PCMCIA 1 GB MEMORY CARD	1			
570	_____ _____ PCMCIA 1 GB				
571	PCMCIA 1 GB MEMORY CARD	1			
572	_____ _____ PCMCIA 1 GB				
573	PCMCIA 1 GB MEMORY CARD	1			
574	_____ _____ PCMCIA 1 GB				
575	PCMCIA 1 GB MEMORY CARD	1			
576	_____ _____ PCMCIA 1 GB				
577	PCMCIA 1 GB MEMORY CARD	1			
578	_____ _____ PCMCIA 1 GB				
579	PCMCIA 1 GB MEMORY CARD	1			
580	_____ _____ PCMCIA 1 GB				
581	CF 256MB MEMORY CARD	1			
582	_____ _____ CF 256 MB				
583	PCMCIA 1 GB MEMORY CARD	1			
584	_____ _____ PCMCIA 1 GB				
585	AUDIO CASSETTE	1			
586	_____				
587	AUDIO CASSETTE	1			
588	_____				
589	AUDIO CASSETTE	1			
590	_____				
591	AUDIO CASSETTE	1			
592	_____				
593	AUDIO CASSETTE	1			
594	_____				
595	**KIT FOR ISS-11 (ORANGE COVER)**	**1**			
596	**_____ ___ ___-11 (_____ _____)**				
597	PCMCIA 1 GB MEMORY CARD	1			
598	-_____ _____ PCMCIA 1 GB				
599	PCMCIA 1 GB MEMORY CARD	1			
600	_____ _____ PCMCIA 1 GB				
601	PCMCIA 1 GB MEMORY CARD	1			
602	_____ _____ PCMCIA 1 GB				
603	PCMCIA 1 GB MEMORY CARD	1			
604	_____ _____ PCMCIA 1 GB				
605	PCMCIA 1 GB MEMORY CARD	1			
606	_____ _____ PCMCIA 1 GB				
607	PCMCIA 1 GB MEMORY CARD	1			
608	_____ _____ PCMCIA 1 GB				
609	CF 256MB MEMORY CARD	1			
610	_____ _____ CF 256 MB				
611	PCMCIA 1 GB MEMORY CARD	1			
612	_____ _____ PCMCIA 1 GB				

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 16 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
613	PCMCIA 1 GB MEMORY CARD	1			
614	_____ _____ PCMCIA 1 GB				
615	***LAZIO KIT NO. 2***			***0.69***	
616	_____ _2 LAZIO				
617	**LAZIO KIT NO. 2 (BLUE COVER)**	**1**	**0.69**	**0.69**	
618	_____ _2 LAZIO (_____ _____)				
619	AA ALKALINE BATTERY	1			
620	_____ _____ __				
621	AA ALKALINE BATTERY	1			
622	_____ _____ __				
623	AA ALKALINE BATTERY	1			
624	_____ _____ __				
625	AA ALKALINE BATTERY	1			
626	_____ _____ __				
627	AIWA TP-VA300 DICTAPHONE WITH JOYSTICK AND CABLE	1			
628	_____ AIWA TP-VA300 c _____ _ _____				
629	AIWA TP-VA300 DICTAPHONE WITH JOYSTICK AND CABLE	1			
630	_____ AIWA TP-VA300 c _____ _ _____				
631	LIGHT PROTECTIVE MASK	1			
632	_____ _____				
633	SPARE FUSE	1			
634	_____ _____				
635	***KIT FOR ESCHILO PROTECTIVE PLATES***			***0.90***	
636	_____ ___ _____ _____ **ESCHILO**				
637	**COVER FOR PROTECTIVE PLATES**	**1**	**0.9**	**0.90**	
638	_____ ___ _____ _____				
639	SET WITH MATERIAL KITS	1			
640	_____ _ _____ _____				
641	SET OF DOSIMETERS FOR ESCHILO	1			
642	_____ _____ ___ ESCHILO				
643	SET OF DOSIMETERS FOR ESCHILO	1			
644	_____ _____ ___ ESCHILO				
645					
646	**TOTAL FGB CARGO**			**23.51**	
647	___-_____				
648	***FGB LIFE SUPPORT SYSTEM (___ ___)***			***0.26***	
649	**C__ ___**				
650	SAMPLE TUBE KIT (SURFACES)	2	0.13	0.26	
651	_____ _ _____ (_____.)				
652	***FGB FIRE DETECTION AND SUPPRESSION SYSTEM (_____ ___)***			***23.15***	

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 17 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
653					
654	SMOKE DETECTOR ___-2	10	2.31	23.10	
655	___-2				
656	SMOKE SENSORS CLEANING UNIT	1	0.05	0.05	
657					
658	***FGB STRUCTURAL ELEMENTS***			***0.10***	
659					
660	CLOSEOUT PANEL	1	0.1	0.10	
661					
662					
663	**TOTAL US CARGO[2]**			**331.99**	
664					
665	***US PROVIDED FOOD AND CREW PROVISIONS***			***302.09***	
666					
667	***FOOD SUPPLY SYSTEM (___)***			***278.14***	
668					
669	***AMERICAN FOOD***			***278.14***	
670					
671	US NON-COLLAPSIBLE FOOD CONTAINER	39	7.13	278.14	R
672					
673	***CREW PROVISIONS***			***23.95***	
674					
675	***KRIKALEV CLOTHING***			***7.10***	
676					
677	KRIKALEV CLOTHING-1	1	4.3	4.30	RB
678	_____-1 _____				
679	KRIKALEV CLOTHING-2	1	1.1	1.10	RB
680	_____-2 _____				
681	KRIKALEV ATHLETIC SHOES	1	0.8	0.80	R
682					
683	SHOES ASSY, CYCLING	1	0.9	0.90	R
684					
685	***PHILLIPS CLOTHING***			***9.80***	
686					
687	PHILLIPS CLOTHING-1	1	6.4	6.40	RB
688	_____-1 _____				
689	PHILLIPS CLOTHING-2	1	1.6	1.60	RB
690	_____-2 _____				
691	PHILLIPS ATHLETIC SHOES	1	0.85	0.85	R
692					
693	SHOES ASSY, CYCLING	1	0.95	0.95	R

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 18 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
694	_____ _____				
695	**HYGIENE PANTRY-1**	**1**		**0.85**	
696	_____ _____ **-1**				
697	MACH3 TURBO RAZOR ASSY	2	0.05	0.10	R
698	_____ _____ MACh3 TURBO				
699	MACH 3 TURBO CARTRIDGE ASSY	26	0.02	0.55	R
700	_____ _____ _ _____ ___ _____ MACH3 TURBO				
701	DEODORANT, RIGHT GUARD	1	0.1	0.10	R
702	_____ Right Guard				
703	DEODORANT, GILLETTE POWER STRIPE	1	0.1	0.10	R
704	_____ Gillette Power Stripe				
705	**OFFICE SUPPLY PANTRY-1**	**1**		**1.40**	
706	_____ _____ ___ **____-1** _____ _____				
707	GENERAL PURPOSE TAPE,POLYETHYLENE/COTTON	1	1.05	1.05	R
708	_____ _____ _____ _____, _____, _/_ _____				
709	KAPTON TAPE	2	0.1	0.20	R
710	_____ _____				
711	COLOR INK CARTRIDGE	2	0.08	0.15	R
712	_____ _ _____ _____ ___ _____				
713	**BATTERY PANTRY-1**	**1**		**4.80**	**BT,HZ**
714	**____-1** _____ _____ _____ _____				
715	BATTERY, ALKALINE	51	0.03	1.55	BT,HZ,R
716	_____ _____ _____				
717	BATTERY, ALKALINE	12	0.07	0.85	BT,HZ,R
718	_____ _____ _____				
719	BATTERY, ALKALINE	16	0.15	2.40	BT,HZ,R
720	_____ _____ _____				
721	***ODF***			***0.20***	
722	_____ _____ ___ **(ODF)**				
723	OPERATIONS DATA FILE ASSEMBLY OPS	1	0.2	0.20	40,R
724	_____ _____ ___ __ _____ _____				
725	***PHOTO/TV EQUIPMENT***			***12.84***	
726	_____ ___ ____/ __-_____				
727	**CTB, HALF-SIZE**	**1**	**1.04**	**12.84**	
728	_____ _____ ___				
729	LENS ASSY, 400 MM, F2.8, AF-1, ED, NIKON	1	7.1	7.10	40,R

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 19 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
730	_____, 400__ _____ (F/2,8) ___ _____ ____ AF-1, ED, NIKON				
731	TELECONVERTER LENS ASSY	1	0.35	0.35	40,R
732	_____				
733	DCS 760 CAMERA ASSEMBLY	2	1.65	3.30	40,HZ,R
734	_____a _____ DCS 760				
735	DCS NIMH RECHARGEBLE BATTERY PACK	4	0.23	0.91	40,BT,HZ,R
736	_____-_____-_____ _____ _____ __ _____ _____ (DCS)				
737	MICRO DRIVE ASSY, PCMCIA, 1GB	4	0.04	0.15	33,40,R
738	_____ __ _____ PCMCIA, _____ 1 _____				
739	DRY WIPE BAG ASSEMBLY	1			40,R
740	_____ _ _____ _____				
741	DIVIDER ASSY, CTB	4			
742	_____ _____ CTB				
743	DIVIDER ASSY, CTB	4			
744	_____ ___ _____ CTB				
745	FOAM CUSHION FOR PACKING EQUIPMENT IN CTB	1			
746	_____ _____ __ _____ ___ _____ _____ _ ___				
747	***LOGISTICS & MAINTENANCE***			***4.22***	
748	_____ ___ _____ _____ **_____ SPCU (TCS-ITCS)**				
749	**SPECIAL CUSHION, HEAT EXCHANGER, SPCU**	**1**	**0.64**	**4.22**	**Q**
750	_____ _____ _____ ___ **_____ SPCU**				
751	HEAT EXCHANGER, SPCU	1	3.2	3.20	11,40,Q
752	_____ _____ SPCU				
753	3/8 INCH GAMAH PLUG	3	0	0.00	11,40,Q
754	_____ _____ GAMAH, 3/8 _____				
755	INSULATION	2	0	0.00	40,Q
756	_____ _____				
757	INSULATION	2	0	0.00	40,Q
758	_____ _____				
759	INSULATION	1	0	0.00	40,Q
760	_____ _____				
761	INSULATION	1	0	0.00	40,Q
762	_____ _____				
763	INSULATION	1	0	0.00	40,Q
764	_____ _____				
765	INSULATION	8	0.02	0.18	40,Q
766	_____ _____				
767	INSULATION	4	0.02	0.09	40,Q

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 20 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
768	_____ _____				
769	RETAINING RING	8	0	0.02	11,40,Q
770	_____ _____				
771	SCREW, CAPTIVE	4	0	0.01	11,40,Q
772	_____ ____				
773	SCREW, CAPTIVE	3	0	0.01	11,40,Q
774	_____ ____				
775	SHUTTLE PEV WASHERS	8	0	0.02	11,40,Q
776	_____ _____PEV _____A				
777	WASHER, PLAIN	4	0	0.01	11,40,Q
778	_____ ____				
779	TAPE	10	0	0.01	40,Q
780	_____				
781	TAPE	10	0	0.01	40,Q
782	_____				
783	NUT, LOCK	4	0	0.00	11,40,Q
784	_____ _____				
785	***CHECS HMS HARDWARE***			***1.43***	
786	**_____ _____ _____ _____ (HMS) _____ CHECS**				
787	ISS MEDICAL ACCESSORY KIT ASSEMBLY	1	0.62	0.62	12,40,HZ
788	_____ _ _____ _____ ___ ___				
789	ISS MEDICAL ACCESSORY KIT ASSEMBLY	1	0.81	0.81	12,40,HZ
790	_____ _ _____ _____ ___ ___				
791	16G X 1.25 IV CATHETER	1	0.01	0.01	40
792	_____ ___ _____ _____, 16G X 1.25				
793	SYRINGE,3CC,22G	1			40
794	_____ , 3CC, 22G				
795	AIR TEMPERATURE MONITOR	1			40
796	_____ ___ _____ _____ _____				
797	PCBA BULB ASSY.	3			40
798	_____ ___ _____ PCBA				
799	**CTB, HALF-SIZE**	**1**	**2.58**	**8.62**	
800	_____ _____ ___				
801	***CHECS EHS HARDWARE***			***0.76***	
802	**____-__ _____ _____ _____ (EHS) _____ _____ _____ _____ (CHECS)**				
803	VALVE ASSEMBLY, GRAB SAMPLER	1	0.5	0.50	11,12,40,R
804	_____-_____ Grab				
805	SYRINGE ASSEMBLY, MEDIA	4	0	0.02	11,12,40,R

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 21 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
806	_____ _____ _ _____ _____				
807	MICROBIOLOGY WATER ANALYSIS KIT	1	0.17	0.17	11,12,40,R
808	_____ ___ _____ _____ ____				
809	BAG ASSY., MICRO SAMPLE ANALYSIS (300ML)	4	0.02	0.08	40,HZ,R
810	_____ ___ _____ _____ ____ ____ (300 __)				
811	***CHECS HMS HARDWARE***			***0.09***	
812	**_____ _____ _____ _____ (HMS) _____ CHECS**				
813	EC8+ CARTRIDGE ASSEMBLY	15	0.01	0.09	12,40
814	_____ _____ __8+				
815	***PCS***			***0.09***	
816	**_____ _____ _____ PCS**				
817	WRITEABLE DVD ASSEMBLY	1	0.04	0.04	40
818	_____ _____ _____ _____ (DVD)				
819	ASSEMBLY, PCS/OCA WRITABLE CD	1	0.04	0.04	40
820	_____ _____ _____ (CD), _____ ___ _____ PCS/OCA				
821	***CHECS CMS HARDWARE***			***0.09***	
822	**_____ _____ _____ _____ (CMS) _____ CHECS**				
823	HEART RATE MONITOR BATTERY	2	0.04	0.09	11,12,40,BT,HZ,R
824	_____ _____ _____ ___				
825	***CHECS EHS HARDWARE***			***1.96***	
826	**____-__ _____ _____ _____ (EHS) _____ _____ _____ _____ (CHECS)**				
827	CSA-CP RESUPPLY KIT	1	1.96	1.96	11,40,BT,HZ,R
828	_____ _____ _____ _____ _____ (CSA-CP)				
829	***CHECS CMS HARDWARE***			***3.05***	
830	**_____ _____ _____ _____ (CMS) _____ CHECS**				
831	SERIES BUNGEE SYSTEM ASSEMBLY	2	0.51	1.02	16,40,R
832	_____ _____ __ _____ _____				
833	SERIES BUNGEE SYSTEM ASSEMBLY	4	0.51	2.03	17,40,R
834	_____ _____ __ _____ _____				
835	DIVIDER ASSY, CTB	1			

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 22 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
836	_____ _____ CTB				
837	***CHECS EHS HARDWARE***			***2.59***	
838	**____-__ _____ _____ _____ (EHS) _____ _____ _____ _____ (CHECS)**				
839	RESUPPLY KIT ASSEMBLY (CARBON DIOXIDE MONITOR KIT ASSEMBLY)	1	2.59	2.59	11,12,40,BT,HZ,R
840	_____ _____ (_____ _____ _____ _____ ____)				
841					
842	**TOTAL US PAYLOADS**			**8.62**	
843	**_____ _____**				
844	***HRF FOOT(INC. 11)***			***8.62***	***40,41***
845	**_____ _____ FOOT _____ HRF (___-11)**				
846	**HRF LEMS KIT 6**	**1**	**6.67**	**6.67**	**40,41**
847	**___. _6 _____ ___ _____ _____-_ ____. _____ (LEMS) _____-_ HRF**				
848	LEMS POUCH ASSY	1			40,41
849	_____ _____ LEMS				
850	ZIP LOCK BAG	2			40,41
851	_____ Ziplock				
852	OPSITE SURGICAL DRESSING	100			40,41,HZ
853	_____ _____ OpSite				
854	RAZOR, CARTRIDGES SENSOR	1			40,41
855	_____ _____ _ _____ ___ _____ Sensor				
856	ATHLETIC SUPPORTER	4			40,41
857	_____ _____, _____				
858	EMG ELECTRODES (GOLD FOIL 10 PACK-CONSUMABLE)	10			40,41
859	_____ ___ (_____ _____ - _____ _____, __ 10 __. _ _____)				
860	**BIOCIDE WIPE POUCH ASSEMBLY**	**1**			**40,41**
861	**_____ _ _____ _____**				
862	WIPES, BENZALKONIUM	15			40,41
863	_____ _ _____ _____				
864	ANKLE COVER ASSEMBLY, LEMS	1			40,41
865	_____ _____ (_____ LEMS)				
866	PANT ASSEMBLY, LOWER EXTREMITY MONITORING SUIT	2			40,41

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 23 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
867	_____ _____ LEMS				
868	SHOE ASSEMBLY, LEMS (LEFT)	1			40,41
869	_____ _____ _____ LEMS (_____)				
870	SHOE ASSEMBLY, LEMS (RIGHT)	1			40,41
871	_____ _____ _____ LEMS (_____)				
872	ARMBAND ASSEMBLY, LEMS	1			40,41
873	_____ _____ ___ _____ LEMS				
874	CABLE ASSEMBLY, LEMS DATA	1			40,41
875	_____ _____ _____ LEMS				
876	Z RIGHT INSOLE ASSY	2			40,41
877	_____ _____, _____ _____ _____ _____ _ _____ (TF-FGI)				
878	Z LEFT INSOLE ASSY	2			40,41
879	_____ _____, _____ _____ _____ _____ _ _____ (TF-FGI)				
880	LEFT PEDAL PLATFORM ASSEMBLY	1			40,41
881	_____ _____ _____ HRF (_____)				
882	RIGHT PEDAL PLATFORM ASSEMBLY	1			40,41
883	_____ _____ _____ HRF (_____)				
884	**HRF ADAS FLASH CARD KIT, 440MB**	**4**			**40,41**
885	**_____ _____ ____-_____ _____ ADAS, 440 M____, _____ HRF**				
886	ANTI-STATIC BAG	4			40,41
887	_____ _____				
888	HRF ADAS FLASH CARD, 440 MB	4			40,41
889	_____ ____-_____ _____ ADAS, 440 M____, _____ HRF				
890	FLEX WRAP ASSY	1			40,41
891	_____ _____ _____				
892	CO FLEX	6			40,41
893	_____ _____ «Co Flex»				
894	ZIP LOCK BAG	1			40,41
895	_____ Ziplock				
896	**HRF 9V BATTERY KIT**	**2**	**0.62**	**1.25**	**40,41,BT,HZ**
897	**_____ _____ __ 9_, _____ HRF**				
898	POUCH ASSY, HRF 9V BATTERY	2			40,41
899	_____ _ _____, ___ _____ _____ 9 _, _____ HRF				
900	BATTERY, ALKALINE	24			40,41,BT,HZ
901	_____ _____ _____				
902	**HRF AA BATTERY KIT**	**1**	**0.7**	**0.70**	**40,41,BT,HZ**

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TABLE D-5 FLIGHT 17P LAUNCH HARDWARE (PAGE 24 OF 24)

Line No.	Name	Qty Up	Unit Mass (Kg)	Launch Total Mass (Kg)	Notes
903	_____ _____ _____ _____ __, _____ HRF				
904	POUCH ASSY, HRF AA BATTERY	1			40,41
905	_____ _ _____, ___ _____ _____ AA, _____ HRF				
906	BATTERY, ALKALINE	24			40,41,BT,HZ
907	_____ _____ _____				

Notes Legend

NOTES	
BT	ITEM INCLUDES BATTERIES
HZ	ITEM CONTAINS CHEMICAL, BIOLOGICAL, OR RADIOACTIVE MATERIALS OR BATTERIES
Q	LOGISTICS & MAINTENANCE (L&M) ALLOCATION – INCLUDES SYSTEM SPARES AND IVA TOOLS
R	THIS HARDWARE CAN BE OPERATED IN THE RUSSIAN SEGMENT ONLY AFTER CERTIFICATION AND ACCEPTANCE IS COMPLETE.
RB	CONTENTS OF THE BAG TO BE USED IN THE RUSSIAN SEGMENT

FLIGHT SPECIFIC NOTES	
7	Contains disinfectant solution
11	Install On-Orbit during increment
12	Scrub turnaround of 30 days
16	For CRES System
17	For TVIS System
33	To be used only with US equipment
40	Included if mass and volume allow (_____ ___ _____ _____ _ _____).
41	To be included with main cargo for shipment to Baikonour. (____ _____ _ _____ _____ ___ _____ _ _____.)
42	_1
43	_2
44	_3
45	_4
46	Includes DVD-Disk
47	Item in Ziploc Bag
[1]	Final change to 17P Total Russian Payloads Mass to be incorporated in Post-Flight CR
[2]	US Cargo delivered on 17P is counted towards the 1.7MT "Addendum to the 1996 Balance of Contributions Protocol for services to be provided through December 2005 and crew rescue through April 2006.