STS-116 / 12A.1

FD 09 Execute Package

MSG	Page(s)	Title
084A	1 - 14	FD09 Flight Plan Revision **(pdf)**
085	15 - 16	FD09 Mission Summary **(pdf)**
086	17 - 19	FD09 Transfer Message **(pdf)**
087A	20	FD09 Water Summary Message **(pdf)**
089	21 - 23	EVA4 Support Setup **(pdf)**
090	24	EVA 12A.1: SSRMS DOUG Setup Notes for 12A.1 EVA 4 **(pdf)**
091	25 - 36	P6 4B Solar Array Retract EVA Support **(pdf)**
092	37	Logistics Cue Card **(pdf)**
093	38 - 40	ISS HAM KENWOOD MANUAL FREQUENCY INPUT **(pdf)**
095	41	Updated LiOH CC **(pdf)**
096	42	FD9 and FD10 Big Picture words for Robotics Ops **(pdf)**
097	43	EMU SWAP for EVA 4 **(pdf)**
098	44 - 54	Preliminary EVA 4 Procedures **(pdf)**
088A	---	FD08 MMT Summary **(pdf - Electronic Only)**
094	---	FD09 PAO Event Summary Message **(pdf - Electronic Only)**

Approved by FAO: *Terry Clancy*

Last Updated: Dec 17 2006 1:45PM GMT
JEDI *(**J**oint **E**xecute package **D**evelopment and **I**ntegration), v2.04.0003*

MSG INDEX

MSG NO.	TITLE
MSG084	FD09 Flight Plan Revision
MSG085	FD09 Mission Summary (14-0605)
MSG086	FD09 Transfer Message (14-0606)
MSG087	FD09 Water Summary Message
MSG088	FD08 MMT Summary (14-0607)
MSG089	EVA 4 Support Setup – initiated by ISS (14-0608)
MSG090	EVA 12A.1: SSRMS DOUG Setup Notes for 12A.1 EVA 4 (14-0609)
MSG091	P6 4B Solar Array Retract EVA Support (14-0610)
MSG092	Logistics Cue Card (14-0611)
MSG093	ISS HAM KENWOOD MANUAL FREQUENCY INPUT
MSG094	FD09 PAO Event Summary Message
MSG095	Updated LiOH CC
MSG096	FD9 and FD10 Big Picture words for Robotics Ops (14-0613)
MSG097	EMU SWAP for EVA 4 (14-0614)
MSG098	Preliminary EVA 4 Procedures (14-0615)

1. PAO EVENT VOICE TEST

At MET 07/21:15 you have been scheduled for a "PAO Test" on A/G-2 and TDRZ. The Houston ACR is requesting this brief test to establish proper lip sync with the crew in preparation for the PAO Event scheduled for MET 07/22:40. PAO Events taking place on TDRZ require a different lip sync setup, and that is the reason for this test.

This test will consist of the following steps the order below:

1) Please perform your standard PAO Photo/TV Setup.

2) Upon prompting by CAPCOM, please provide a slow count to ten on A/G-2 while looking directly into the camera.

3) CAPCOM will advise you when the test is complete.

2. PHOTO/TV QUESTIONS

At your convenience, could you answer a couple of Photo/TV questions on EVA 3 to help with tracking and troubleshooting?

DCS 760
What equipment remains from Suni's EVA digital camera assembly?

What lens was on the EVA camera that was lost? (We think it was a 28mm)

WVS
Could you summarize the troubleshooting that was done to try to recover the WVS video and command?

3. FD09 SPACEHAB VIEWPORT VIOLATIONS

There are no viewport violations for FD09.

4. LIOH / BATTERY REPLACEMENT NOTE

   At MET 007/20:20 on PLT for EVA SYS: 1.515 METOX/LIOH/BTTRY REPLCMNT:
   Perform Steps 1-10,15-17; REF: MSG092
   Unstow: New LiOH from MD CEIL (Port 1) bag
   New EMU Batteries from earlier STS Charge Term.
   Stow: Used LIOH in EMU SYS Xfr Bag
   Used batts in M-02 bag
   Vent Port Plugs in EMU Equipment Bag

5. REPLACE PAGES 2-30, 2-32 AND 3-92 THROUGH 3-101.

No STS Exercise

12/17/06 07:02:00 **REPLANNED**

GMT 12/17/06 (351) 14 15 16 17 18 19 20 21 22 23 12/18 01

MET Day 007 12 13 14 15 16 17 18 19 20 21 22 23 008/00

FD09

STS-116	CDR/R2 POLANSKY	SLEEP	POST SLEEP; ILLUM OFF; N2 XFER TERM; MCIU^; TRANSFER; FESI-I; TRANSFER; OIU#; MEAL; COND CWC S/U; TRANSFER; EXERCISE; XFER; PAO EVENT; IMU; EVA PROC RVW
STS-116	PLT/IV OEFELEIN	SLEEP	SDBI; POST SLEEP; WCS*; PWR FILL; PWR XFER; XFER; EXERCISE; TRANSFER; EMU SWAP; MEAL; LIOH RPLC; TRANSFER; PAO EVENT; XFER; EVA PROC RVW
STS-116	MS1/R1 PATRICK	SLEEP	SDBI; POST SLEEP; TRANSFER; EXERCISE; XFER; PTV 08 S/U; P/TV08 OPS; MEAL; TRANSFER; PAO P/TV S/U ♣; TRANSFER; PAO EVENT; XFER; EVA PROC RVW
STS-116	MS2/EV1 CURBEAM	SLEEP	ASPRN; POST SLEEP; TRANSFER; EXERCISE; BSA*; BATT*; EMU SWAP; REBA*; REBA C/O; MEAL; E/L PREP; TOOL CONFG; PAO EVENT; TOOL CONFG; EVA PROC RVW
STS-116	MS3/EV2 FUGLESANG	SLEEP	POST SLEEP; TRANSFER; EXPRS ⊕; HAM; ALTEA SETUP; ALTEA ACT; ALTEA EXPERIMENT OPS; ALTEA ACT; ALTEA DEACT; ALTEA; EXERCISE; MEAL; E/L PREP; TOOL CONFG; EVA PROC RVW
STS-116	MS4 HIGGINBOTHAM	SLEEP	POST SLEEP - SHAB; XFR UPDAT; TRANSFER; SSRMS EVA 4 SETUP; EXERCISE; MEAL; TRANSFER; PAO EVENT; XFER; EVA PROC RVW
DN	FE-2 REITER	SLEEP (8.5)	POST SLEEP; SKN; POST SLEEP; PROERP WORK; DPC; PROERP WORK; N2 XFER TERM; PMC; ♦; ALTEA; TRANSFER; ALTEA; TRANSFER; ALTEA; EXERCISE TVIS; MIDDAY-MEAL; ALTEA; HANDOVER; DCS CNFG; DCS; IMS EDIT; TVIS
EXP 14	ISS CDR LOPEZ-ALEGRIA	SLEEP (8.5)	POST SLEEP; PROERP WORK; DPC; PROERP WORK; HANDOVER; SSRMS EVA 4 SETUP; EXERCISE RED; MIDDAY-MEAL; PLCK; TRANSFER; EXERCISE CEVIS; EVA PROC RVW
EXP 14	FE-1 TYURIN	SLEEP (8.5)	POST SLEEP; PROERP WORK; DPC; PROERP WORK; TRANSFER; EXERCISE VELO+RED; СВО-СРВК-БРПК-RPLC; БИТС; БРПК; MIDDAY-MEAL; CSA-CP RSPLY; TRANSFER; EXERCISE TVIS; EVA PROC RVW
UP	FE-2/EV3 WILLIAMS	SLEEP (8.5)	POST SLEEP; PROERP WORK; DPC; PFC; HANDOVER; TRANSFER; CMS; MIDDAY-MEAL; HRM; HANDOVER; EXERCISE RED; PMC; EVA PROC RVW

DAY/NIGHT

ORBIT 119 120 121 122 123 124 125 126 127

TDRS W -171 E -46 Z -275

ORB ATT BIAS -XLV -ZVV

NOTES

*COMPACT
⊕HAM S/U
♦WARN BOOK
^FILTER CK
#DEACT
*TERM
*TERM
*INSTALL
♣PAO TEST

12/17/06 07:02:00 **REPLANNED**

GMT 12/18/06 (352) 02 03 04 05 06 07 08 09 10 11 12 13

MET Day 008 008/00 01 02 03 04 05 06 07 08 09 10 11 12

STS-116	**FD09** CDR/R2 POLANSKY	EVA PROC RVW	FEST-T	PRE SLEEP	PMC A/G	PRE SLEEP							SLEEP **ISS EXTERNAL SURVEY**	
STS-116	PLT/IV OEFELEIN	EVA PROC RVW	PRE SLEEP				MASK PB/ TOOL CONFG	PRE SLEEP					SLEEP	
STS-116	MS1/R1 PATRICK	EVA PROC RVW		PRE SLEEP									SLEEP	
STS-116	MS2/EV1 CURBEAM	EVA PROC RVW	PRE SLEEP				MASK PB/ TOOL CONFG	PB/ 10.2 DPRS	TOOL CONFG	PRE SLEEP			SLEEP	
STS-116	MS3/EV2 FUGLESANG	EVA PROC RVW	PRE SLEEP				MASK PB/ TOOL CONFG	PB/ 10.2 DPRS	TOOL CONFG	PRE SLEEP			SLEEP	
STS-116	MS4 HIGGINBOTHAM	EVA PROC RVW	XFER	TAGUP	XFER	BREF	PRE SLEEP - SHAB						SLEEP	
DN	FE-2 REITER	TVIS	COX MNT	XFER	TAGUP	EXDL	PREP WORK	DPC	PREP	WORK	PRE SLEEP		SLEEP (8.5)	
EXP 14	ISS CDR LOPEZ-ALEGRIA	EVA PROC RVW	CSA		FFQ		PREP WORK	DPC	PREP	WORK	PRE SLEEP		SLEEP (8.5)	
EXP 14	FE-1 TYURIN	EVA PROC RVW	PREP WORK		PRE SLEEP		MASK PB/ TOOL CONFG	PRE SLEEP					SLEEP (8.5)	
UP	FE-2/EV3 WILLIAMS	EVA PROC RVW			PREP WORK	DPC	PREP	WORK	PRE SLEEP				SLEEP (8.5)	

DAY/NIGHT

ORBIT 127 128 129 130 131 132 133 134 135

TDRS W -171 E -46 Z -275

ORB ATT BIAS -XLV -ZVV

NOTES

STS-116 FD09

REPLANNED

GMT Date 12/17 (351) — TDRS W E Z — ORB 119 120 121 122

MET Day 007 — STS ATI — BIAS -XLV -ZVV

CDR Polansky

SLEEP

POST-SLEEP ACTIVITY (ORB OPS, CREW SYS)

TV (ILLUMINATOR OPS) (P/TV, CUE CARDS) ILLUMINATORS OFF - ALL

JNT OPS: 3.103 NITROGEN TRANSFER TERM Perform Steps 1.1-3.3. Skip step 1.3, the MMU GN2 SPLY ISOL VLV A was closed on FD08.

L17 Check MCIU filter screen

TRANSFER REF Transfer List

PLT Outhouse King

SLEEP

SALIVA COLL & SLEEP LOG (ORB OPS, SDBI)

POST-SLEEP ACTIVITY (ORB OPS, CREW SYS)

FD09 EZ ACTIVITES
- Check TEPC Status
- OCAC Filter Inspect
- Hard Reboot PGSCs (Except WVS)

WCS COMPACTOR OPS (CUE CARD, DUAL-VANE)

PWR FILL (ORB OPS, ECLS) Perform WATER FILL Fill SN 1013 (Barcode #15006J) Fill dur ~30 min REF MSG 087

MS1 Patrick

SLEEP

SALIVA COLL & SLEEP LOG (ORB OPS, SDBI)

POST-SLEEP ACTIVITY (ORB OPS, CREW SYS)

TRANSFER REF Transfer List

Notes

UPLINK β21 + Box C1 -18<AZ<46 -65<EL<75 Box C2 -38<AZ<-3 -28<EL<44 Box C3 -72<AZ<-27 -13<EL<40 Box D5 -72<AZ<85 10<EL<76

NO SHUTTLE EXERCISE DURING MT TRANSLATION

UPLINK β21 + Box C1 -18<AZ<46 -65<EL<75 Box C2 -38<AZ<-3 -28<EL<44 Box C3 -72<AZ<-27 -13<EL<40 Box C5 38<AZ<101 10<EL<65

STS-116 FD09

REPLANNED

GMT Date 12/17 (351) | TDRS W E Z | ORB 119 120 121 122 | MET Day 007 | STS ATI BIAS -XLV -ZVV

MS2 Curbeam | MS3 Fuglesang | MS4 Higginbotham | Notes

12:00 — 13:00 — 14:00 — 15:00 — 16:00

SLEEP (MS2, MS3, MS4)

EVA CREW:TAKE 1 ASPIRIN (325mg)
POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

SH POST-SLEEP CONFIG
(SH OPS, ON-ORBIT)

DAILY TRANSFER LIST
UPDATE
REF MSG 086

TRANSFER
REF Transfer List

TRANSFER
REF Transfer List

TRANSFER
REF Transfer List

NO SHUTTLE EXERCISE DURING MT TRANSLATION

STS-116 FD09

REPLANNED

GMT — Date 12/17 (351) — TDRS W E Z — ORB 1 2 2, 1 2 3, 1 2 4

MET — Day 007

STS ATI

BIAS-XLV-ZVV

CDR Polansky

16:00 — TRANSFER REF Transfer List

17:00 — SUPPLY WATER DUMP USING FES [F]

18:00 — TRANSFER REF Transfer List

On MCC Go
SSP1 OIU PWR - OIU 1 OFF, √tb-bp
√SSV PWR - On, Outrate - 3

19:00 — MEAL

SHUTTLE CONDENSATE COLLECTION
(ORB OPS, ECLS)
Perform SETUP
REF MSG 087

20:00 — TRANSFER REF Transfer List

PLT Outhouse King

PWR TRANSFER
Transfer 1 PWR to ISS

TRANSFER REF Transfer List

EXERCISE

TRANSFER REF Transfer List

EMU SWAP FOR EVA4
REF MSG 097

MEAL

MS1 Patrick

TRANSFER REF Transfer List

EXERCISE

TRANSFER REF Transfer List

P/TV08 EXTERNAL SURVEY
(PHOTO/TV, SCENES)
Perform SETUP

P/TV08 EXTERNAL SURVEY
(PHOTO/TV, SCENES)
Perform OPS, Item 2

MEAL

Notes

[F] SUPPLY WATER DUMP USING FES
(ORB OPS, ECLS)
On MCC GO: Step 1
using FES PRI A
REF MSG 087

TFL 184

STS-116 FD09

REPLANNED

GMT Date 12/17 (351) | TDRS W E Z | ORB | MET Day 007 | STS ATI

MS2 Curbeam | MS3 Fuglesang | MS4 Higginbotham | Notes

16:00

TRANSFER
REF Transfer List

PODF:EXPRS RACK:NOMINL:EXPRS LAPTOP COMPUTR PWR UP [A]
HAM RADIO SETUP REF MSG 093
HAM RADIO PASS REF MSG 067,093
AOS/LOS: 15:44-15:53 (GMT 18:19-18:28)

TRANSFER
REF Transfer List

TRANSFER
REF Transfer List

PODF:ALTEA:2.002 ALTEA CENTRAL NERVOUS SYSTEM MONITORING SETUP
Use ELC-4. Skip step 1.1 (video is not required). In step 1.6, Locker 8 Power Bulb is burned out.

[A] Perform steps 1-3 Do not launch EXPRESS application and the Laptop Power LED is burned out for the laptop.

17:00

PODF:ALTEA:2.003 ALTEA CENTRAL NERVOUS SYSTEM MONITORING OPS
Perform Step 1

EVA 4 SUPPORT SETUP
REF MSG 089

ALTEA EXPERIMENT OPERATIONS

BIAS-XLV-ZVV

EXERCISE

18:00

EXERCISE

PODF:ALTEA:2.003 ALTEA CENTRAL NERVOUS SYSTEM MONITORING OPS
Perform steps 3.9-3.20

EVA SYS: 1.605 BSA BATTERY RECHARGE Perform TERM.
Stow HL & PGT batts in M-O2 Bag.REF: MSG 092

PODF:ALTEA:2.005 ALTEA DATA OPS,Use ELC-4,Step 1
Transfer experiment file 'CNSM_Normal_10'

EMU BATTERY RECHARGE (EVA,EMU MAINT/RECHRG)
Perform TERM;Batts are for EVA4;REF MSG 092

EMU SWAP FOR EVA4
REF MSG 097

19:00

EXERCISE

MEAL

EVA SYS: 1.307 REBA INSTALLATN
Install REBA s/n 1011 into EMU 3015

EVA SYS: 1.405 REBA POWERED HARDWARE CHECKOUT
Checkout REBA s/n 1011 on EMU 3015

20:00

MEAL

MEAL

TRANSFER
REF Transfer List

18:00 19:00 20:00 21:00

1 2 2 | 1 2 3 | 1 2 4

STS-116 FD09

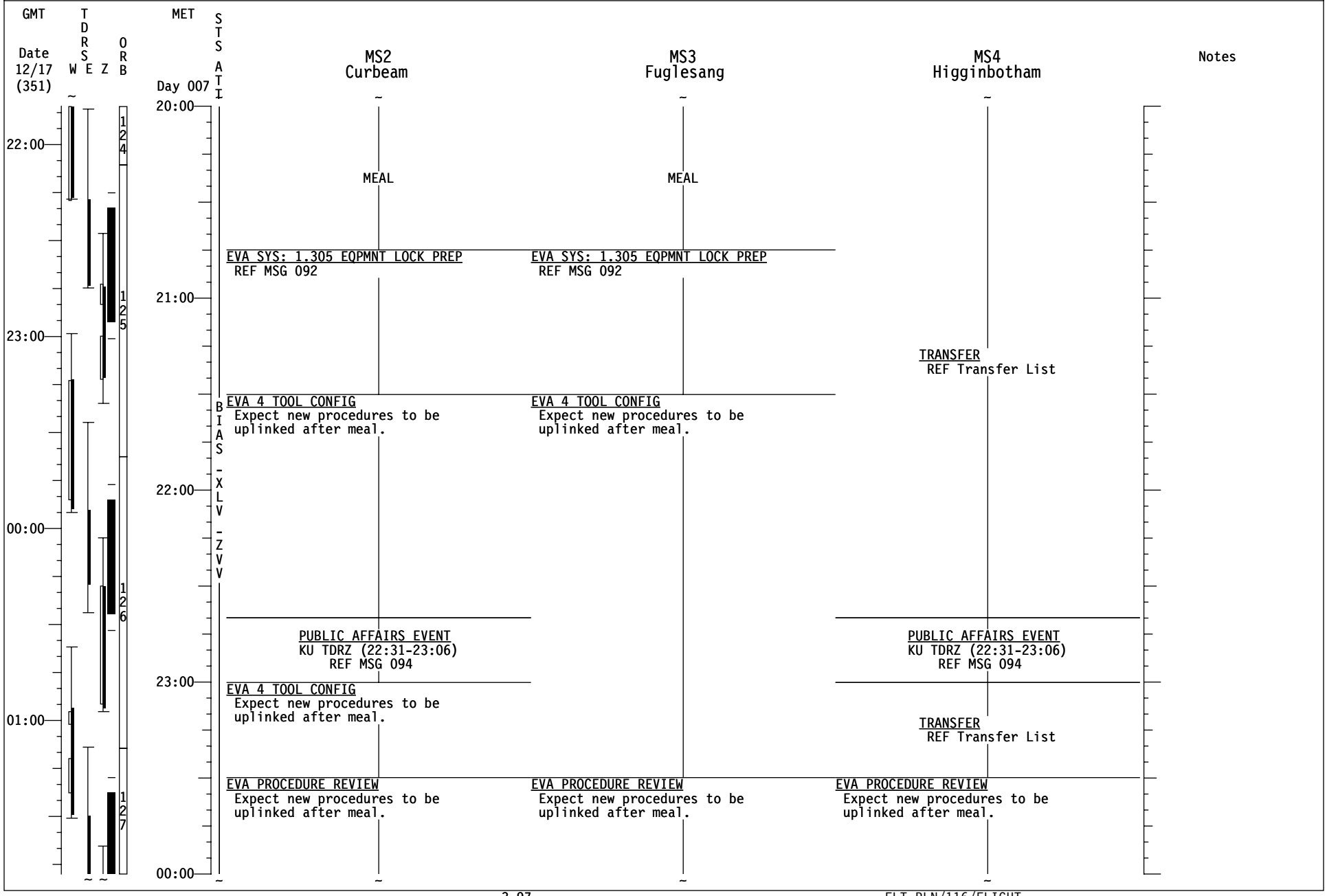
REPLANNED

GMT Date 12/17 (351) | TDRS W E Z | ORB 124 125 126 127 | MET Day 007 | STS ATI BIAS-XLV-ZVV

MET	CDR Polansky	PLT Outhouse King	MS1 Patrick	Notes
20:00		MEAL	MEAL	
	TRANSFER REF Transfer List	EVA SYS: 1.515 METOX/LIOH/BTTRY REPLCMNT REF MSG 084, Item 4; MSG 092	TRANSFER REF Transfer List	
21:00			ANALOG PAO CC (PHOTO/TV, SONY PD100)	
			PAO TEST REF MSG 084, Item 1	
	EXERCISE	TRANSFER REF Transfer List		
22:00			TRANSFER REF Transfer List	
	TRANSFER REF Transfer List			
	PUBLIC AFFAIRS EVENT KU TDRZ (22:31-23:06) REF MSG 094	PUBLIC AFFAIRS EVENT KU TDRZ (22:31-23:06) REF MSG 094	PUBLIC AFFAIRS EVENT KU TDRZ (22:31-23:06) REF MSG 094	
23:00		TRANSFER REF Transfer List	TRANSFER REF Transfer List	
	IMU STAR OF OPPTY ALIGN (ORB OPS, GNC)			
	EVA PROCEDURE REVIEW Expect new procedures to be uplinked after meal.	EVA PROCEDURE REVIEW Expect new procedures to be uplinked after meal.	EVA PROCEDURE REVIEW Expect new procedures to be uplinked after meal.	
00:00				

STS-116 FD09

REPLANNED



STS-116 FD09

REPLANNED

GMT Date 12/18 (352) | T D R S W E Z | O R B | MET Day 008 | STS ATI

02:00 03:00 04:00 05:00

ORB: 127 128 129

BIAS-XLV-ZVV

MET	CDR Polansky	PLT Outhouse King	MS1 Patrick
00:00	EVA PROCEDURE REVIEW Expect new procedures to be uplinked after meal.	EVA PROCEDURE REVIEW Expect new procedures to be uplinked after meal.	EVA PROCEDURE REVIEW Expect new procedures to be uplinked after meal.
01:00	SUPPLY WATER DUMP USING FES F	PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)	
	PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)		PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)
02:00	PRIVATE MEDICAL CONFERENCE Perform PMC using Private A/G 2	EVA SYS: 2.305 10.2 PSIA CAMPOUT MASK PREBRTH Steps 1-16 REF: EVA 4 TOOL CONFIG	
	PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)		
03:00	√HUM SEPs for H2O Accumulation		
		PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)	
04:00			

Notes

F SUPPLY WATER DUMP USING FES
(ORB OPS, ECLS)
On MCC GO: Step 2
w/FES PRI A reqd
REF MSG 087

STS-116 FD09

REPLANNED

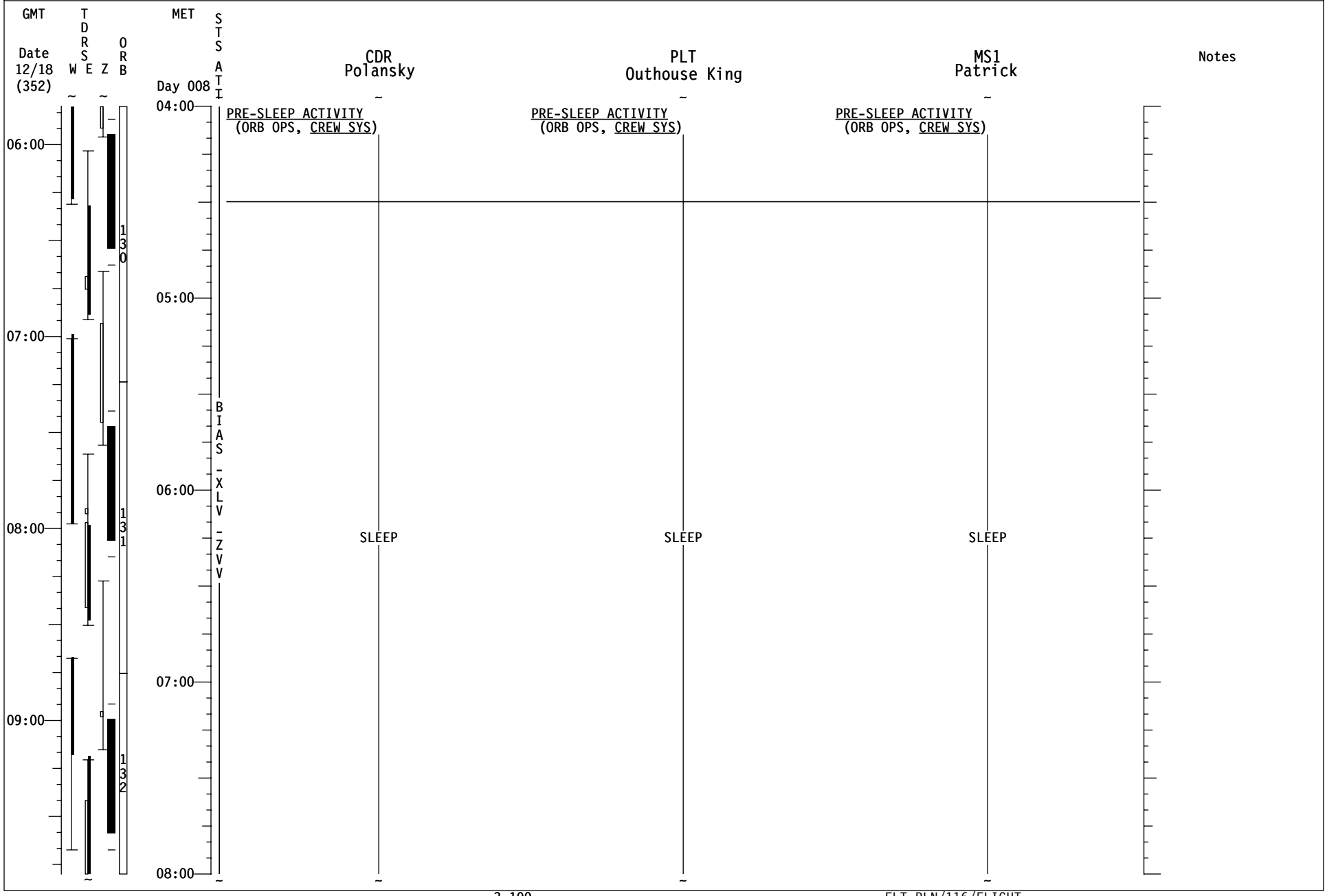
GMT Date 12/18 (352) | TDRS W E Z | ORB 127 128 129

MET Day 008 | STS ATI | BIAS-XLV-ZVV

MS2 Curbeam	MS3 Fuglesang	MS4 Higginbotham	Notes
EVA PROCEDURE REVIEW Expect new procedures to be uplinked after meal.	EVA PROCEDURE REVIEW Expect new procedures to be uplinked after meal.	EVA PROCEDURE REVIEW Expect new procedures to be uplinked after meal.	
PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)	PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)	DAILY STS/ISS CREW TRANSFER TAGUP DAILY TRANSFER BRIEFING PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS) SH PRE-SLEEP CONFIG (SH OPS, ON-ORBIT)	
EVA SYS: 2.305 10.2 PSIA CAMPOUT MASK PREBRTH Steps 1-16 REF: EVA 4 TOOL CONFIG	EVA SYS: 2.305 10.2 PSIA CAMPOUT MASK PREBRTH Steps 1-16 REF: EVA 4 TOOL CONFIG		
EVA SYS: 2.305 10.2 PSIA CAMPOUT MASK PREBREATHE Perform Steps 17-26	EVA SYS: 2.305 10.2 PSIA CAMPOUT MASK PREBREATHE Perform Steps 17-26		
EVA 4 TOOL CONFIG Expect new procedures to be uplinked after meal.	EVA 4 TOOL CONFIG Expect new procedures to be uplinked after meal.		

STS-116 FD09

REPLANNED



STS-116 FD 09

REPLANNED

GMT Date 12/18 (352) | T D R S W E Z | O R B | MET Day 008 | STS ATI

MS2 Curbeam | MS3 Fuglesang | MS4 Higginbotham | Notes

06:00 07:00 08:00 09:00

130 131 132

04:00 05:00 06:00 07:00 08:00

BIAS-XLV-ZVV

EVA 4 TOOL CONFIG
Expect new procedures to be published after meal.
PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

SLEEP

EVA 4 TOOL CONFIG
Expect new procedures to be published after meal.
PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

SLEEP

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

SH PRE-SLEEP CONFIG
(SH OPS, ON-ORBIT)

SLEEP

Good Morning Discovery!

Thanks for another fantastic day for power and thermal. Yesterday was a gigantic step towards station completion. Again, thank you!!!!

The preliminary procedures for tomorrow's EVA are in this morning's mail. Some time after lunch, the final EVA procedures will be uplinked. These are the procedures to use for the evening EVA review.

YOUR CURRENT ORBIT IS: 193 X 177 NM

NOTAMS:

EDWARDS (EDW) - LAKEBEDS YELLOW DUE TO MOISTURE
WHITE SANDS (NOR) – 17/23 GREEN (TOW WAYS DAMP)
AMBERLY (AMB) -CLOSED
ANDERSEN (GUA) -06L/24R CLOSED, ALTERNATE 06R/24L
GANDER TACAN (YQX-74X) - AZIMUTH OUT OF SERVICE, DME AVAILABLE
KEFLAVIK (IKF) – UNUSABLE
ORMOND BEACH TACAN (OMN-73X) - AZIMUTH OUT OF SERVICE
OCEANA (NTU) – 32R/14L CLOSED
RIO GALLEGOS (AWG) – UNUSABLE
SALSBURY TACAN (SBY-49X) - AZIMUTH OUT OF SERVICE
WAKE ISLAND (WAK) - CLOSED

NEXT 2 PLS OPPORTUNITIES:

KSC33 ORB 124 – 7/19:37 (FEW030 SCT120, 090/8P12)
EDW22 ORB 141 – 8/21:31 (FEW050 SCT100, 030/8P14)

OMS TANK FAIL CAPABILITY:

L OMS FAIL: NO
R OMS FAIL: NO

LEAKING OMS PRPLT BURN:

L OMS LEAK: ALWAYS RETROGRADE
R OMS LEAK: ALWAYS RETROGRADE

OMS QUANTITIES(%)

L OMS	OX = 44.1	R OMS	OX = 45.3
	FU = 44.1		FU = 45.8

SUBTRACT I'CNCT COUNTER FOR CURRENT OMS QUANTITIES

DELTA V AVAILABLE:

OMS	422 FPS
ARCS (TOTAL ABOVE QTY1)	52 FPS
TOTAL IN THE AFT	474 FPS
ARCS (TOTAL ABOVE QTY2)	82 FPS
FRCS (ABOVE QTY 1)	34 FPS
AFT QTY 1	84 %
AFT QTY 2	46 %

THERE ARE NO FAILURE/IMPACT/WORK AROUNDS FOR TODAY.

Good morning Joanie, Nick, and STS-116 & Increment 14 crews!

Things have been looking pretty ‘shaky’ up there, but that’s definitely not been the case for your transfer operations. Our mind-melding is working so well that we’ve decided to adopt it as an official method of pre-flight transfer training.

Crew Quarantine Transfer Training

ACO Transfer ‘transferring’ the final details of the Swap tab into the Loadmaster’s mind.

Transfer Status: Based on last night’s calldown, you are currently 90% complete with resupply and 54% complete with return, for a total of 71% complete for all transfer ops.

The Transfer List Excel file, FD09_Transfer_List_STS116.xls, is located on the KFX machine in **C:\OCA-up\transfer.**

For ISS, the Transfer List Excel file, FD09_Transfer_List_STS116.xls, is located in **K:\OCA-up\transfer.**

Transfer Notes

- Several of today’s transfer list updates are due to the changes in the timeline with the addition of EVA 4.

- Since the EVA guys will be going out for a fourth EVA, please hold off on the PGT swap until the PGT C/O.

- You probably noticed a hand-full of final location changes on the Middeck Transfer List today. With the ISS condensate CWC going to Volume H, some bags have been displaced. This will require you to swap the final locations of Bag F and the SH 5 MLE bag. Bag F will now return in the MD FLOOR PORT 1 location, while the SH bag will return at MD FLOOR PORT 2. The Middeck layout we uplinked yesterday is correct.

- Item 801 (Large Cutter) can remain temp-stowed in the Node. Consider item 801 complete.

FD09 Choreography

Items 16 & 412.2: CSA-CP Resupply Kit Checkout

Please incorporate uplink pages as follows (we've listed the updates in the order they printed out for you):

In the Spacehab Transfer List **LAYOUTS** tab
Replace the following page:
L-5
L-6

In the Middeck Transfer List **RESUPPLY** tab
Replace the following pages:
Page Resupply 2
Page Resupply 4
Page Resupply 5

In the Middeck Transfer List **MDDK RSPLY REALTIME ADDITIONS** tab
Replace the following page:
Page Resupply 6

In the Spacehab Transfer List **RESUPPLY** tab
Replace the following page:
Page Resupply 7

In the Middeck Transfer List **RETURN** tab
Replace the following pages:
Page Return 1 thru 3
Page Return 5 thru 7

In the Middeck Transfer List **MDDK RTN REALTIME ADDITIONS** tab
Replace the following page:
Page Return 8

In the Spacehab Transfer List **RETURN** tab
Replace the following pages:
Page Return 11
Page Return 12
Page Return 16
Page Return 19

In the Spacehab Transfer List **SWAP** tab
Replace the following pages:
Page Swap 13
Page Swap 14

Changes to the Transfer List are detailed below:

MIDDECK RESUPPLY
Item 7 – updated constraints
Item 8 – updated constraints
Item 10 – updated constraints
Item 22 – updated constraints
Item 24 – updated constraints

MIDDECK RSPLY REAL TIME ADDITIONS
Item 809 – new item

SPACEHAB RESUPPLY
Item 102 – updated constraints

MIDDECK RETURN
The following items had location updates only: 408, 412, 412.1, 412.2, 414, 415.1, 423, 429, 429.1, 606, and 708.
Item 413.1 – updated constraint
Item 701 – updated comment
Item 702 – updated comment
Item 705.1 – updated S/Ns
Item 707 – updated location and comment

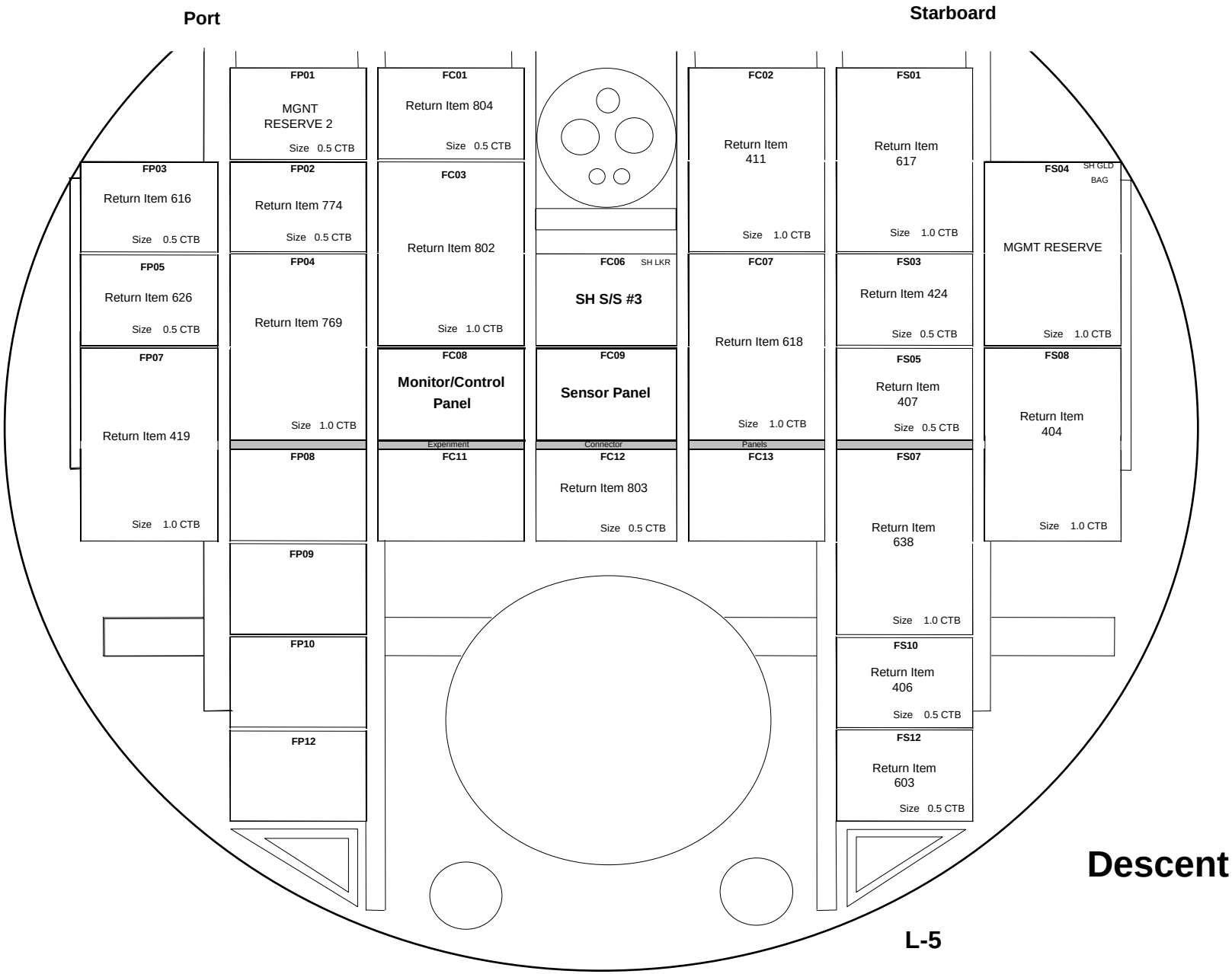
MIDDECK RTN REALTIME ADDITIONS
Item 805 – updated comments
Item 808 – new item

SPACEHAB RETURN
Item 416.2 – item moved from FP08 to AP07
Item 630 – updated constraint
Item 769 and 769.1 – updated location

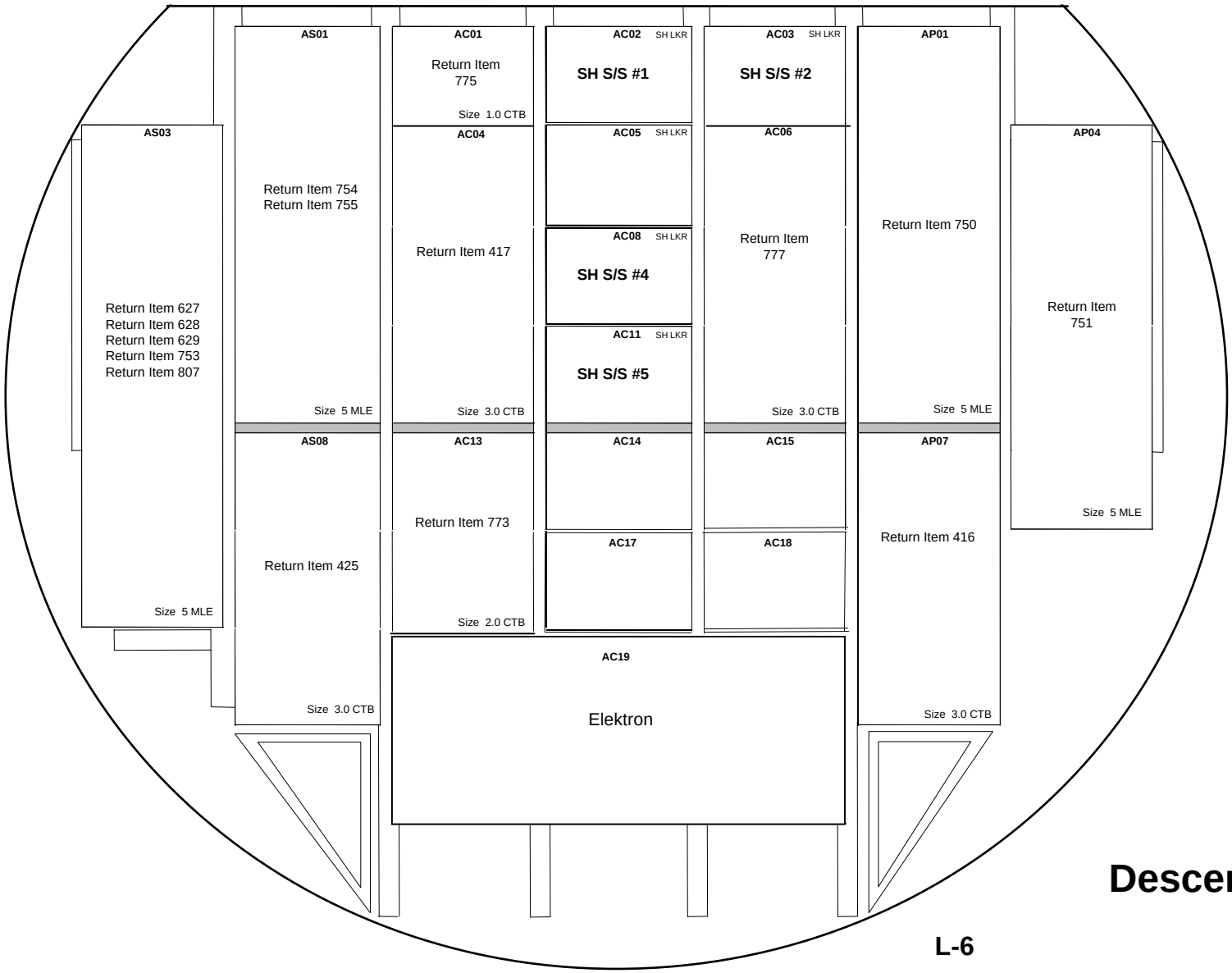
Have a great transfer day!

- The Transfer Team

SPACEHAB Module Layout
Forward Bulkhead



SPACEHAB Module Layout
Aft Bulkhead



Descent

STS-116/12A.1 Resupply Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
X				7	A31p Laptop [labeled STS5-RSAD] [s/n 1073]	1	MA9G	AFD Deployed	NOD1P4_A1	8.00	**Transfer on FD10 ~~FD09~~.** **Remove shuttle tag "RSAD" before transfer to ISS. **Only laptop and internal components transfer; no associated cables/power supplies.
X				8	A31p Laptop [labeled STS9-SPARE] [s/n 1082]	1	MA16G		NOD1P4_A1	8.00	**Transfer on FD10 ~~FD09~~.** **Remove shuttle tag "SPARE" before transfer to ISS. **Only laptop and internal components transfer; no associated cables/power supplies.
				9	A31p 120VDC POWER SUPPLY [s/n 1328]	1	MA16G		NOD1P4_A1	4.50	
X				10	A31p Laptop [AFD PCS]	1	MA16J	AFD Deployed	NOD1P4_A1	8.00	**Transfer on FD10 ~~FD09~~.** **Remove grey tape label "PCS" before transfer to ISS. **Only laptop and internal components transfer; no associated cables/power supplies.
	☑	5	See Swap Tab - CD XFR	11	CD LIBRARY	1	MA16J	See Swap Tab		3.00	
	☑	5		12	CDRA	1 5 MLE	MD FLOOR PORT 1 (Bag A)		AS03	20.00	**~~**~~After removing CDRA from 5 MLE bag, swap this bag with the 5 MLE bag in SH AS03 (ref item 117). **Photo ops with foam.
	☑	5		12.1	CDRA DESSICANT/ADSORBENT BED ASSEMBLY, LAUNCH CONFIGURATION	1	MD FLOOR PORT 1 (in 5 MLE)		LAB1D6	94.00	**Transfer by FD08 for timelined procedure CDRA Dessicant/Sorbent Bed 202 R&R.** **Use both jettison stowage bags wrapped around CDRA for return of old CDRA (ref item 753).

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Resupply Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
	☑	5	See Swap Tab - EMU H2O	18	EMU WATER PROCESSING KIT (Transfer Contents Only)	1	MD FLOOR STBD 1 (Bag C)	See Swap Tab		23.70	
	☑	5	See Swap Tab - EMU H2O	18.1	contents of CTB	all	MD FLOOR STBD 1 (in 1.0 CTB)	See Swap Tab		(in above item)	
	☑	8		19	OGS TOOLS	1.0 CTB	MD FLOOR STBD 2 (Bag D)		LAB1D2 Rack Front	41.00	
	☑	8		20	Ammonia Respirator Kit	5 orange kits	MD FLOOR STBD 2 (Bag D)		FGB_206, 208, and 210 Rack Front	50.00	**Report FGB panel where these are stowed.
	☑	8	See Swap Tab - RCC	21	FEMALE BOLT HOUSING - 1 MALE BOLT HOUSING - 1 DRIVE BOLT - 4	1 ziplock	MD FLOOR STBD 2 (Bag D)	See Swap Tab		2.00	
	☑	8	See Swap Tab - RCC	21.1	FEMALE BOLT HOUSING P/N TD103859-02 s/n 0004	1 ziplock	MD FLOOR STBD 2 (Bag D)	See Swap Tab		(in above item)	
	☑	8	See Swap Tab - RCC	21.2	MALE BOLT HOUSING P/N TD103859-01 s/n 0003	1 ziplock	MD FLOOR STBD 2 (Bag D)	See Swap Tab		(in above item)	
	☑	8	See Swap Tab - RCC	21.3	DRIVE BOLTS P/N TD103856-02 s/n 0000030-0000033	4 ziplocks	MD FLOOR STBD 2 (Bag D)	See Swap Tab		(in above item)	
X				22	BPSMU cables 4 FT BPSMU CABLE [P/N SED16102418-315] 22 FT BPSMU CABLE [P/N SED16102418-321] BPSMU/ODS ADAPTER [P/N SED16102418-309]	1 ASSY	MDDK prerouted	ISS and STS Deployed	LAB FWD ENDCONE (in 0.5 CTB s/n 1397)	2.00	**Transfer ~~on FD10~~ per timelined procedure DRAG THROUGH QD DEACT.** **Hardware deployed on FD03 per timelined P/TV05 SETUP.
	☑	4		23	BPSMU cables [BACKUP] 4 FT BPSMU CABLE [P/N SED16102418-315] 22 FT BPSMU CABLE [P/N SED16102418-321] BPSMU/ODS ADAPTER [P/N SED16102418-309]	1 ASSY	MDDK prerouted		LAB FWD ENDCONE (in 0.5 CTB s/n 1397)	2.00	**Transfer backup by FD10.**

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Resupply Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
X				24	IMV O-RING KIT	1 ziplock	MF28H		PMA2 installed	3.00	**Transfer ~~on FD10~~ for timelined activity ~~FD10~~ FD11 HATCH-CLOSE.**
	☑	7	See Swap Tab - Multimeter	25	Multimeter [new] [b/c 00059824J]	1	MF43G	See Swap Tab		1.40	
	☑	5		26	MODIFIED DIDB	1 ASSY	MF57C		A/L1O1 (in lid of M-O2 bag, s/n 1038)	2.00	**6 DIDBs taped together. **These are not needed for STS-116 EVAs.
	☑	7		27	CHeCS	0.5 CTB	MF57K		LAB1O6 Rack Front	14.00	**Ensure this CTB is easily accessible when stowed on ISS. **Suni will need to access CEVIS Resupply Kit prior to FD09 CEVIS exercise.
	☑	7		28	CREW CARE PACKAGE	0.5 CTB	MF57K		ISS crew pref	17.00	
	☑	8		29	SWAB EXPERIMENT KIT	1 blue kit	MF57O		LAB1S4_G1 rack front	25.00	
	☑	4		30	SODF	0.5 CTB	MF71G		LAB1P6 Rack Front	27.00	**Transfers per FD03 timelined activity SODF Transfer.
	☑	7		31	CGBA-4	1	MF71K		LAB1P2_G1 installed	58.00	**Transfer for FD07 timelined procedure CGBA TRANSFER TO ISS.**

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Resupply Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
			Middeck Resupply Real Time Additions								
	☑	8		800	BCR BATTERY - 4	1 ziplock	MD FLOOR STBD 2 (Bag D)		NOD1O4_A1 (in 0.5 CTB s/n 1189)		
	☑	8		801	LARGE CUTTER [p/n SEG33106915-303]	1	MD FLOOR STBD 1 (Bag C)		~~A/L1 Crewlock (in Crew Lock Staging Bag, s/n 1002)~~ NODE Handrail		**Stage in Crew Lock Staging Bag AFTER EVA 3.
X				809	Tether, Waist (w/slide lock) [P/N SEG33106943-305] [s/n 1058]	1	EXT A/L FLOOR BAG		ISS Airlock Tether Staging Area	1.10	

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Resupply Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
			SpaceHab Resupply								
				Aft Bulkhead							
	☑	4		100	ESEL Tools A31p Power Supplies	1.0 CTB	AC01		NOD1D1	35.00	**EVA hdwe removed from this CTB per FD02 timelined procedure EMU AND EVA TRANSFER PREP.
	☑	4		101	RJMC / OGS / EVA	3.0 CTB	AC04		NOD1D2	125.00	**Torque wrench and torque wrench bag removed per FD02 timelined procedure EMU AND EVA TRANSFER PREP.
X				102	DOUBLE COLDBAG [s/n 1010]	1	AC05 (inside locker)	LAB1O4 (near MELFI)		39.00	**Leave in SH locker until ~~FD09 for~~ timelined procedure 12A.1 SAMPLE TRANSFER TO DOUBLE COLDBAG.** **Coldbag must remain protected due to kickload constraints. **This coldbag will return in mddk containing cold samples (ref item 701).
	☑	4		103	CMG EA H2/N2 Vent Hose Assembly Empty Triple CTB	3.0 CTB	AC06		NOD1D2	76.00	
	☑	4		104	OGS HARDWARE 3	1.0 CTB	AC13		LAB1D2 Rack Front	55.00	
	☑	4		105	Video Baseband Signal Processor A4 Printer Paper - 4 SSPTS EVA Pwr Cable W9300 SSPTS EVA Pwr Cable W9301	2.0 CTB	AC14		LAB1D1 Rack Front	111.00	

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Return Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
			Middeck Return								
				Prepacked Bags/Items							
X	☑	8		402	Return Item 402 [GSCs and samples]	0.5 CTB	LAB1D2		MD FLOOR PORT ~~1~~ 2 (5 MLE from SH)	12.00	**Item 402.1 will be removed from this CTB and in stowed in MF14E.
	☑	8		402.1	Water Samples	4	LAB1D2 (in 0.5 CTB)		MF14E	1.00	**Remove all water samples from CTB and stow in empty food trays. Clamshell trays together.
X				408	Return Item 408 [POEMS foam cushion]	1	LAB1O2_J2		MD FLOOR PORT ~~2~~ 1 (Bag F)	1.50	**Do not stow near a heat source.**
X				412	Return Item 412 [RSP, MAS, CONTROL ASSY, CSA-CP RESUPPLY]	1.0 CTB	LAB1D2		MD FLOOR PORT ~~2~~ 1 (Bag F)	18.00	**Do not transfer from ISS until old RSP (item 412.1) is added to this CTB on FD07.**
X				412.1	Respiratory Support Pack [s/n 1002] [b/c CHCRSP02J]	1 Kit	LAB1D4_D1		MD FLOOR PORT ~~2~~ 1 (Bag F) (in 1.0 CTB)	(in above item)	**Do not stow in CTB until new RSP checks out per FD07 timelined procedure RESPIRATORY SUPPORT PACK - CHECKOUT.**
X				412.2	CSA-CP RESUPPLY KIT [s/n 1003] [p/n SJG46120020-301]	1 Kit	LAB1D4_C2	LAB1D4 Rack Front	MD FLOOR PORT ~~2~~ 1 (Bag F) (in 1.0 CTB)	(in above item)	**Do not stow in CTB until new CSA-CP checks out per FD09 timelined procedure CSA-CP RESUPPLY KIT CHECKOUT.**
	☑	8		413	Return Item 413 [TORQUE WRENCH, HRM, IV PUMP BATTERIES]	0.5 CTB	LAB1D2		MD FLOOR STBD 2	6.00	
X				413.1	Chest Strap/Monitor/ Transmitter Assy [p/n KLST410174-302] [in use]	3	ISS Crew Pref		MD FLOOR STBD 2 (in 0.5 CTB)	(in above item)	**Transfer on ~~FD09~~ FD10 following Reiter's last exercise session.** **These item are HRM equipment currently in use by ISS CDR, ISS FE-1 and ISS FE-2. (includes watches, chest straps and transmitters)
				413.2	CSA-CP/CDM Battery Pack [p/n SED46115802-305] [s/n 1353, 1354] [p/n SED46115802-303] [s/n 1287]	3	LAB1D4_C2 (CSA-CP Resupply Kit, s/n 1003, b/c 00069522J)		MD FLOOR STBD 2 (in 0.5 CTB)	(in above item)	****Add to item 413 for return.** ****These items will be packed per timelined procedure CSA CP Resupply Activity.**
X				414	Return Item 414 [IMAKs, CPD]	0.5 CTB	LAB1D2		MD FLOOR PORT ~~1~~ 2 (5 MLE from SH)	20.00	

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Return Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
X	☑	8		415	Return Item 415 [CEVIS RESUPPLY KIT, SSK, MEDIA SYRINGES, DSTs]	0.5 CTB	LAB1D2		MD FLOOR PORT ~~1~~ 2 (5 MLE from SH)	8.00	
X				415.1	CEVIS PCMCIA cards [p/n WLSJ320226-301] [s/n 1007, 1005]	2	LAB1P3 (in use)		MD FLOOR PORT ~~1~~ 2 (5 MLE from SH)	1.00	**After L-A downloads CEVIS exercise data ~~on FD9~~, stow these cards inside ziplock labeled "CHeCS: CEVIS Resupply Kit" inside return item 415.**
X	☑	8		415.2	Silver Biocide Syringe Kit [s/n 1001]	1	NOD1O1 (in mesh bag)	MDDK	MD FLOOR PORT ~~1~~ 2 (5 MLE from SH)	1.00	**Needed FD05 on Shuttle for CWC fills.** **Retrieve pregathered kit. Ask ISS crew for location. **Add to item 415 before stowing 415.
X	☑	8		415.3	ISS Medical Accessory Kit [p/n SEG52100803-304] [s/n 1039]	1	LAB1D4_D2		MD FLOOR PORT ~~1~~ 2 (5 MLE from SH)		****Add to item 415 for return.**
X	☑	8		421	Return Item 421 [GSCs]	0.5 CTB	LAB1D2		MD FLOOR PORT ~~1~~ 2 (5 MLE from SH)	10.00	
	☑	8		421.1	Water Samples	4	LAB1D2 (in 0.5 CTB)		MF14E	1.00	**Remove all water samples from CTB and stow in empty food trays. Clamshell trays together.
X				423	Return Item 423 [CSA-O2 RESUPPLY, SAMPLE TUBE DISPENSER]	0.5 CTB	LAB1D2		MD FLOOR PORT ~~2~~ 1 (Bag F)	15.00	
	☑	8		427	Return Item 427 [Russian Hardware]	1.0 CTB	LAB1D2		MD FLOOR STBD 1 (Bag C)	12.00	
	☑	8		427.1	SKIN RETURN CONTAINER [p/n LDM-SKN-14]	1	FGB_424		MD FLOOR STBD 1 (Bag C) (in 1.0 CTB)	(in above)	**this item was originally designated as 427g on PPL.
	☑	7		427.2	ERB kit [p/n LDM-ERB-201]	1 bag	LAB1D2 (in 428)		MD FLOOR STBD 1 (Bag C) (in 1.0 CTB)		**Removed from Item 428. **Contains film, hard disks and videocassettes for early destow.

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Return Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
X				429	Return Item 429 [Russian Hardware]	0.5 CTB	LAB1D2		MD FLOOR PORT ~~2~~ 1 (Bag F)	15.00	
X				429.1	PLATON MEMORY CARD KIT [p/n NOA-1304-0000-DA] [b/c 00038978R]	1	DC Upper Hemisphere (in Platon Resupply Bag, b/c 00038989R)		MD FLOOR PORT ~~2~~ 1 (Bag F) (in 0.5 CTB)	(in above)	**This item was originally designated as 426a on PPL.
				431	Return Item 431 [SODF]	0.5 CTB	LAB1D2		MF71G	25.00	**Before stowing this CTB in mddk, remove qty 4 Plug Attach Bolts P/N TD103856-02 (wrapped in clothing) and stow in item 710.**
	☑	5	See Swap Tab -CD XFR	605	Return Item 605 [12A CD Transfer Case]	1		See Swap Tab	MA16J	3.00	
X				606	Return Item 606 [VOA Supplies]	0.5 CTB	LAB1D2		MD FLOOR PORT ~~1~~ 2 (5 MLE from SH)	20.00	
X	☑	8		614	Return Item 614 [ISS Photo TV Resupply Kit]	0.5 CTB	LAB1D3		MD FLOOR PORT ~~1~~ 2 (5 MLE from SH)	21.00	
X	☑	8		614.1	PD-100 Camcorders [s/n 1014, 1019]	2	ISS deployed		MD FLOOR PORT ~~1~~ 2 (in 0.5 CTB)	5.00	**Pack old camcorders after ops complete (crew pref). **New camcorders are in resupply item 132.
X	☑	8		614.2	8mm Video Tapes [p/n SED33103757-324] Mini DVCAM Tapes [p/n SED33111489-305]	~~All used~~ 25-30	ISS deployed		MD FLOOR PORT ~~1~~ 2 (in 0.5 CTB)		**Expect 30 to 50 total used tapes.

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Return Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
				Non-Prepacked Bags/Items							
	☑	7	See Swap Tab - ALSP	700	ALSP [old] [s/n 1001]	1		See Swap Tab	MD FLOOR STBD 1 (Bag C)	37.00	
X				701	DOUBLE COLDBAG [s/n 1010]	1	AC05 (inside locker)	ISS	MF57O	50.00	**Do not stow near a heat source.** **Filled with icepacs and samples per ~~FD09~~ timelined PODF procedure 12A.1 SAMPLE TRANSFER TO DOUBLE COLDBAG. **This coldbag launched in SH (ref item 102). Will remain in SH until required for sample gathering to protect against kickloads.
X				702	EMU [s/n 3015]	1	ISS A/L		EXT A/L	280	**Configured for return per FD07 timelined procedures PRE EVA3 EMU RESIZE and ~~FD09~~ POST EVA TRANSFER AND RECONFIG.
	☑	5	See Swap Tab - EMU H2O	703	EMU WATER PROCESSING KIT [with returning contents]	1.0 CTB		See Swap Tab	MD FLOOR STBD 2 (Bag D)	0.50	
	☑	5	See Swap Tab - EMU H2O	420	Return Item 420 [ISS EMU Water Processing Kit contents]	1 Mesh Bag		See Swap Tab	MD FLOOR STBD 2 (in 1.0 CTB)	24.00	

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STS-116/12A.1 Return Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
	☑	4	See Swap Tab - IELK	704	IELK [T. Reiter]	1		See Swap Tab	MD CEILING PORT 2 (Bag B)	64.00	
X	☑	4	See Swap Tab - IELK	704.1	KENTAVR	1		See Swap Tab	~~MD FLOOR STBD 1 (Bag C)~~ Crew worn	3.00	
				705	LEG SIZING RINGS, 1.5" [white nomex pouch]	1		MA9G	EXT A/L FLOOR BAG	0.25	**Pouch launched in MDDK and was temp-stowed on FD02 per item 4. **Stow item 705.1 in this pouch.
X				705.1	Leg Sizing Rings [s/n ~~141~~ 125and ~~142~~ 126]	1 ziplock	A/L1O1 (staged on outside of M-02 Bag s/n 1010)		EXT A/L FLOOR BAG (inside pouch)	6.00	**Stow leg sizing rings in pouch (ref item 705).
	☑	7	See Swap Tab - Multimeter	706	Multimeter [old] [Henrietta, b/c 4SS00242J]	1		See Swap Tab	MF43G	1.40	
X				707	POEMS foam cushion [s/n 008]	1	LAB1O2_J2		MD FLOOR PORT ~~2~~ 1(Bag F)	0.30	**Do not stow near a heat source.** **Remove POEMS sample (s/n 013) from MELFI ~~on FD09~~ per timelined procedure PODF POEMS SAMPLE CANISTER REMOVAL FROM MELFI.

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Return Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
X				708	RE-ENTRY GARMENTS [empty]	0.5 CTB		MDDK	MD FLOOR PORT ~~2~~ 1(Bag F)	13.00	**Do not stow bag until re-entry garments removed.** **Launched in SH (ref item 172), returns empty in MDDK.
				709	Item Deleted						
			See Swap Tab - RCC	710	FEMALE BOLT HOUSING - 1 MALE BOLT HOUSING - 1 ~~DRIVE BOLT - 4~~	1 ziplock		NODE	MD FLOOR STBD 2 (Bag D)	2.00	
			See Swap Tab - RCC	710.1	FEMALE BOLT HOUSING P/N TD103859-02 s/n unknown	1 ziplock		See Swap Tab	MD FLOOR STBD 2 (Bag D)	(in above item)	
			See Swap Tab - RCC	710.2	MALE BOLT HOUSING P/N TD103899-01 s/n unknown	1 ziplock		See Swap Tab	MD FLOOR STBD 2 (Bag D)	(in above item)	
			See Swap Tab - RCC	710.3	Plug Attach Bolts P/N TD103856-02	4		See Swap Tab	MD FLOOR STBD 2 (Bag D)	(in above item)	

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Return Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
			Middeck Return Realtime Additions								
X				**805**	LAB Condensate CWC [p/n SEG33113140-303] [s/n 1042)	1	NOD1P2		Vol H	71.00	**Place CWC in ~~two~~ one KBO-M bags (p/n 11Φ615.8715-0A15-01) from NOD1O4_B2 before packing in Vol H.** **Fill any remaining open space in Vol H with soft goods. **This CWC will displace Inboard and Outboard Vol H bags. Stow these bags in MD FLOOR PORT 1 for return. **17 pieces of foam will need to be relocated from MD FLOOR PORT 1 to accommodate bags displaced from Vol H. Bag and stow the foam in the external airlock or in other locations (if desired). If all foam from MD FLOOR PORT 1 is stowed in the same location, report location to MCC-H.
X				808	Tether, Waist (w/slide lock) [red stripe] [P/N SEG33106943-305] [s/n 1106]	1	ISS Airlock		EXT A/L FLOOR BAG	2.76	**This tether came in from EVA2. It will be replaced with an STS contingency waist tether (ref item 809).

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Return Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
	☑	6		416	Return Item 416 [21 Progress KURS]	3.0 CTB	FGB FLOOR		AP07	161.00	**This CTB will be used for packing return item 416.2 full condensate CWC on FD06.
	☑	6		416.1	21 Progress KURS	1	FGB FLOOR (in 3.0 CTB)		AS01 (in 5MLE bag)	161.00	**Remove KURS from 3.0 CTB and pack in 5 MLE bag at AS01 per 5MLE bag dwg on page REF-6 in Reference tab of SH Transfer List. **Verify the KURS oval "eyes" are facing the port wall.
X				416.2	CWC [labeled: condensate] [s/n 6008]	1 (inside ~~1.0 CTB and~~ KBO-M bag)		MDDK	AP07 (in 3.0 CTB) ~~FP08~~ ~~(in 1.0 CTB)~~	100.00	**At the end of the flight, place CWC in one KBO-M bag (p/n 11Φ615.8715-0A15-01) from NOD1O4_B2 before packing in 3.0 CTB.** ~~**Then, pack CWC/KBO-M bag in an empty 1.0 CTB from ISS (report s/n of CTB used).**~~ **Fill any remaining open volume in this CTB with clothing or towels. **This CWC launched in MDDK.
	☑	6		417	Return Item 417 [22 Progress KURS]	3.0 CTB	FGB FLOOR		AC04	161.00	**Before strapping to Aft Bulkhead, open CTB and ensure the KURS oval "eyes" are facing the port wall.
	☑	5		419	Return Item 419 [ECLSS/SEM]	1.0 CTB	LAB1D2		FP07	16.00	**Do not stow until item 419.1 and 419.2 have been added to this CTB.**
	☑	5		419.1	PBA Oxygen Reducer/Cylinder Assembly [old] [s/n 1009]	1	NOD1S2-14 (PEP Locker)		FP07 (in 1.0 CTB)	3.42	**Transfer on FD05 per timelined activity FDS-PBA-XFER.** **Remove Mask (s/n 1002) from old PBA [s/n 1009]. Attach mask to new PBA [s/n 1024]. Call MCC-H to confirm mask attached to new PBA.** **New PBAs launch as item 118.1.1 and 118.1.2.
	☑	5		419.2	PBA Oxygen Reducer/Cylinder Assembly [old] [s/n 1012]	1	LAB1P0 (PEP Locker)		FP07 (in 1.0 CTB)	3.42	**Transfer on FD05 per timelined activity FDS-PBA-XFER.** **Remove Mask (s/n 1016) from old PBA [s/n 1012]. Attach mask to new PBA [s/n 1025]. Call MCC-H to confirm mask attached to new PBA.** **New PBAs launch as item 118.1.1 and 118.1.2.

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Return Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
	☑	7		422	Return Item 422 [HRF RENAL STONE]	1.0 CTB	LAB1D2		SF05A	40.00	
	☑	7		424	Return Item 424 [Computer Hardware]	0.5 CTB	LAB1D2		FS03	13.00	
				425	Return Item 425 [12S KURS]	3.0 CTB	FGB FLOOR		AS08	161.00	**Before strapping to Aft Bulkhead, open CTB and ensure the KURS oval "eyes" are facing the port wall.
	☑	0		~~427~~	Item Moved						
	☑	0		~~427.1~~	Item Moved						
				428	Return Item 428	0.5 CTB	LAB1D2		SF10A	28.00	**Remove ERB kit p/n LDM-ERB-201 (1 bag) from CTB prior to stowing CTB. It is an early destow item and will be packed in mddk as 427.2.**
	☑	0		~~429~~	Item Moved						
	☑	0		~~429.1~~	Item Moved						
				430	Return Item 430 [Lower Arm]	1.0 CTB	LAB1D2		PF27	14.00	
				433	Return Item 433 [CWCs]	3.0 CTB	LAB1D2		SF22		**Pack item 630 in this CTB for return.
X				630	Return Item 630 [half full CWC] [S/N 1026]	1	NOD1P2	ISS A/L	SF22 (inside 3.0 CTB)	30.00	**Place CWC in ~~two~~ one KBO-M bag~~s~~ (p/n 11Φ615.8715-0A15-01) from NOD1O4_B2 before packing in 3.0 CTB.** ****Fill any remaining open volume in this CTB with soft goods.** **Pack after final EVA in item 433.

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Return Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
				Non-Prepacked Bags/Items							
X				~~416.2~~	Item moved back to AP07 (Prepack Section) ~~CWC~~ ~~[labeled: condensate]~~ ~~[s/n 6008]~~	~~1 (inside 1.0 CTB and KBO-M bag)~~		~~MDDK~~	~~FP08 (in 1.0 CTB)~~	~~100.00~~	~~**At the end of the flight, place CWC in one KBO-M bag (p/n 11Ф615.8715-0A15-01) from NOD1O4_B2.~~ ~~**Then, pack CWC/KBO-M bag in an empty 1.0 CTB from ISS (report s/n of CTB used).~~ ~~**This CWC launched in MDDK.~~
	☑	5		750	VENT TOOL / DEBRIS COVER	1 5 MLE Bag		NOD1D1	AP01	69.00	**5 MLE bag was temp stowed on ISS per item 110. **Leave all foam in 5 MLE bag for return.
	☑	5		750.1	23P KURS	1	ISS TEMP STOW		AP01 (in 5 MLE Bag)	154.00	**Before placing in 5 MLE bag, ensure the KURS oval "eyes" are facing the port wall. **Launch foam (without ballast) may be dispersed between 5 MLE bags as needed.
	☑	5		751	13S KURS	1	FGB_224		AP04 (in 5 MLE Bag)	154.00	**Before placing in 5 MLE bag, ensure the KURS oval "eyes" are facing the port wall. **Launch foam may be dispersed between 5 MLE bags as needed.
				752	AGB FOAM	5 pcs	SF13	SH crew pref	SF13	39.00	**Resecure empty foam to stowage trays for return.
				753	CDRA [old]	1	LAB1D6		AS03 (in 5 MLE Bag)	96.00	**Removed per FD08 timelined procedure CDRA Dessicant/Sorbent Bed 202 R&R. **Wrap old CDRA in two jettison stowage bags removed from new CDRA (ref item 12.1).
	☑	0		~~754~~	Item changed to 416.2						
	☑	0		~~755~~	Item Deleted						

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Return Transfer List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
X			See Swap Tab - PGT	769	PGT [old]	1.0 CTB		See Swap Tab	FP04 ~~FP10~~	16.00	
X			See Swap Tab - PGT	769.1	PGT [old] [s/n 1003]	1		See Swap Tab	FP04 ~~FP10~~ (in 1.0 CTB)	(in above item)	
			See Swap Tab - PGT	770	PGT [old]	1.0 CTB		See Swap Tab	SF08A	29.00	
			See Swap Tab - PGT	770.1	PGT [old] [s/n 1006, 1007]	2		See Swap Tab	SF08A (in 1.0 CTB)	(in above item)	
	☑	5		772	PTU/CTVC [ETVCG] [old]	1	ISS External	Middeck	PF01	57.00	**Disassembled from items 758.1 and 779 on FD05 per timelined procedure EXTERNAL TELEVISION CAMERA GROUP DISASSEMBLY.
				773	Return item 773	2.0 CTB		NOD1	AC13	99.00	**This 2.0 CTB launched empty in SH (ref item 144.1).
				773.1	Return to Shuttle 1	1 jett stow bag		ISS A/L	AC13 (in 2.0 CTB)	(in above item)	**Place jett stow bag and all contents in CTB (ref item 773).
				773.2	Return to Shuttle 2	1 jett stow bag		ISS A/L	AC13 (in 2.0 CTB)	(in above item)	**Remove P1 DDCU Thermal Cover (p/n 1F82593-1) and stow per item 405.1.** **Place jett stow bag and all REMAINING contents in CTB (ref item 773).
				773.3	Return to Shuttle 3	1 jett stow bag		ISS A/L	AC13 (in 2.0 CTB)	(in above item)	**Remove S1 DDCU Thermal Cover (p/n 1F82593-1), S0 Port Wedge Face DDCU Thermal Cover (p/n 1F77657), and CH 2/3 H-Jumper (p/n R082151-1) and stow per items 405.2, 405.3, and 802 respectively.** **Place jett stow bag and all REMAINING contents in CTB (ref item 773).
				773.4	Adjustable Fuse Tether [s/n 1007]	1	A/L1D2 Tether staging area	ISS A/L	AC13 (in 2.0 CTB)	2.40	**Pack after final EVA.**

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Swap List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
			PGT								
				120	OGS PWR - 1 PGT - 1 EWIS Cable - 1	1.0 CTB	FC02	ISS A/L		28.00	**Use this CTB and foam for return of old PGT (ref item 769 and 769.1). **Behind the CTB yellow label is a green label. Write 'PGT (old)' on green label and stow in front of yellow label.
X				120.1	PGT	1	FC02 (in 1.0 CTB)	ISS A/L	A/L1O10 (in 1.0 CTB: PGT Hardware; s/n 1161).	10.00	**Leave in CTB until reqd for ~~FD09~~ timelined procedure PGT TOOL CHECKOUT.** **Call item complete after stowing PGT following successful PGT Checkout.
	☑	4		120.2	EWIS INTERNAL ANT CABLE	1 ziplock	FC02 (in 1.0 CTB)		LAB1P1 (inside stowage locker)	5.00	
	☑	4		120.3	OGS PWR [s/n 2002]	1	FC02 (in 1.0 CTB)	MDDK	A/L1D1_B2	3.00	**Temp stow on MDDK for FD04 timelined procedure PWR Fill.** **After PWR fill is complete, transfer PWR to ISS.
X				769	PGT [old]	1.0 CTB		ISS A/L	FP04 ~~FP10~~	16.00	**This CTB launched with resupply PGT (ref item 120). **Pack item 769.1 in this CTB with foam for return.
X				769.1	PGT [old] [s/n 1003]	1		ISS A/L	FP04 ~~FP10~~ (in 1.0 CTB)	10.00	**Verify no battery in PGT; if one is installed, remove it from PGT and stow in M-02 bag (s/n 1038) at A/L1O1.**

[ ] - notes included by transfer team, - not on actual label

STS-116/12A.1 Swap List

Chg Flag	☑	FD	Crew Initials	Item #	Item Name	Qty	Initial Stowage	Temp Stowage	Stowage at Undock	Wt (lbs)	PROCEDURES/**Constraints**/ **Comments
X				148	PGT - 2 PWR - 1	1.0 CTB	PF25	ISS A/L		29.00	**Transfer for ~~FD09~~ timelined procedure PGT CHECKOUT.** **Use this CTB and foam for return of old PGTs (ref item 770 and 770.1).
	☑	4		148.1	PWR [s/n 1025]	1	PF25 (in 1.0 CTB)	MDDK	A/L1D1_B2	3.00	**Temp stow on MDDK for FD04 timelined procedure PWR Fill.** **After PWR fill is complete, transfer PWR to ISS
X				148.2	PGT	2	PF25 (in 1.0 CTB)	ISS A/L	A/L1O10 (in 1.0 CTB: PGT Hardware; s/n 1161).	10.00	**Leave in CTB until reqd for ~~FD09~~ timelined procedure PGT TOOL CHECKOUT.** **Call item complete after stowing PGTs following successful PGT Checkout.
				770	PGT [old]	1.0 CTB		ISS A/L	SF08A	29.00	**This CTB launched with resupply PGTs (ref item 148).
				770.1	PGT [old] [s/n 1006, 1007]	2		ISS A/L	SF08A (in 1.0 CTB)	20.00	**Verify no battery in PGT; if one is installed, remove it from PGT and stow in M-02 bag (s/n 1038) at A/L1O1.**

[ ] - notes included by transfer team, - not on actual label

Today you will refill PWR S/N 1013 and perform a Supply Water Dump using the FES. Also, Shuttle Condensate Collection will be reinitiated.

PWR Fill Details

Gather PWR S/N 1013 (it should have been temp stowed in the Middeck after it was dumped on FD07).

Starting at MET 7/15:20, fill PWR S/N 1013 using PWR FILL (ORB OPS, ECLS), p. 5-43, WATER FILL Steps 4-13, 15, and 17-19. Consider the Note before Step 3, and in Step 4 note that SM 66 ENVIRONMENT should be used vice SM 60 TABLE MAINT for monitoring TKA quantity. In step 11, the note should read 'Full charge = 10% change in TKA quantity' (vice 12%). For Steps 18-19, the PWR is to be transferred to ISS A/L1D1_A2.

FES Dump Details

The FES Dump duration will be 8 hours. Due to constraints with ISS momentum management, it is important that the dump initiation and termination occur at the prescribed times. Check MCC prior to initiating and terminating the FES Dump. The following details are required for the dump:

> At MET 7/17:00, initiate SUPPLY WATER DUMP USING FES (ORB OPS, ECLS), p. 5-9, Step 1 DUMP INITIATION, using FES PRI A.
>
> At MET 8/01:00, terminate the FES dump on MCC call using Step 2, DUMP TERMINATION; FES PRI A is req'd.

Shuttle Condensate Collection Details

Perform SETUP of SHUTTLE CONDENSATE COLLECTION (ORB OPS, ECLS) p. 5-36, steps 1-9. The 8 ft Y-Y Condensate Hose and the Condensate CWC (S/N 6008) were temp stowed following the Flight Day 7 water dump. Report condensate collection initiation time to MCC. Shuttle Condensate Collection will remain set up until post undocking.

1. HAND CONTROLLER CALIBRATION

1.1 Translational Hand Controller (THC) Calibration

THC

Deflect [X] Axis to positive hard stop where [X] = X Y Z

Deflect [X] Axis to negative hard stop.

Repeat

1.2 Rotational Hand Controller (RHC) Calibration

RHC

Deflect [X] Axis to positive hard stop where [X] = P Y R

Deflect [X] Axis to negative hard stop.

Repeat

2. SETUP

Configure cameras and overlays as required.

Monitor 1	Monitor 2	Monitor 3	V10
91: Camera B (-15, +5) 09: P1 Lower Outboard (+105, -25)	13: LAB Stbd Zenith (-170, -30)	24: Tip Elbow (0,0) 22: Base Elbow (-40, -15)	SRMS Elbow (+75, +20)

Verify Unloaded Parameters – √
Verify ‘Unloaded Parameters’ (two) – LEE Tip, SR Held

Change Display ▶ W5 ▶ ISSACS (Verify W5>ISSACS)

Verify SSRMS at MT Translate position (within 5 cm/1 deg).

SR	SY	SP	EP	WP	WY	WR
-179.9	+80.0	-20.0	-160.0	-183.1	-188.1	-70.0
X	Y	Z	Pitch	Yaw	Roll	
+627	-516	-346	-148.7	+83.3	-96.6	
FOR	Unloaded – LEE Tip, SR Held					
Disp	W5>ISSACS					

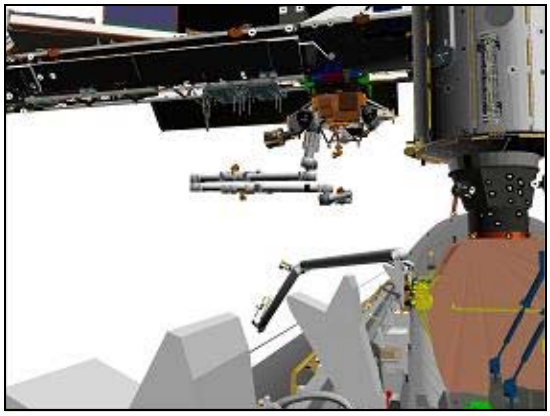


Figure 1.- MT Translate
(91: Camera B: -15, +5).

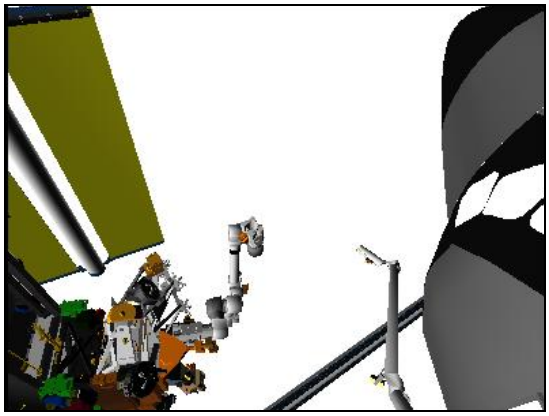


Figure 2.- MT Translate
(13: LAB Stbd Zenith: -170, -30).

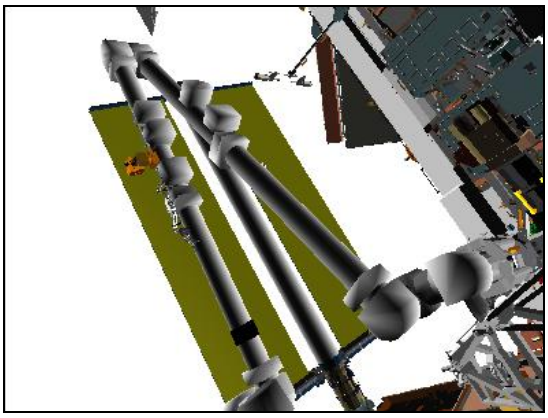


Figure 3.- MT Translate
(V10: SRMS Elbow: +75, +20).

3. SINGLE JOINT FOR EVA4 SETUP
   Verify SRMS at EVA4 Viewing position.

PCS MSS: SSRMS: SSRMS Safing: SSRMS Safing

cmd Remove (Verify Not Safed)

PCS √Coarse

DCP BRAKES SSRMS → OFF (Verify OFF)

PCS MSS: SSRMS: SSRMS

Enter Mode – Single (Verify blue)

NOTE
Expect Cross-Cluster Collision warning to clear at EP > -142 degrees.

WARNING
The active joint must be checked on the PCS before initiating motion. Failure to do so may result in movement of the wrong joint.

THC Perform Single Joint maneuver to EVA4 Setup position (within 1 deg).

	SR	SY	SP	EP	WP	WY	WR
MT Translate	-179.9	+80.0	-20.0	-160.0	-183.1	-188.1	-70.0
1: EP +				-97.7			
2: SY –		+40.0					
3: SP –			-50.0				
4: SY –		-3.9					
EVA4 Setup	-179.9	-3.9	-50.0	-97.7	-183.1	-188.1	-70.0
	X	Y	Z	Pitch	Yaw	Roll	
	+142	-502	-1070	+156.1	-1.0	-65.9	
	FOR	Unloaded – LEE Tip, SR Held					
	Disp	W5>ISSACS					

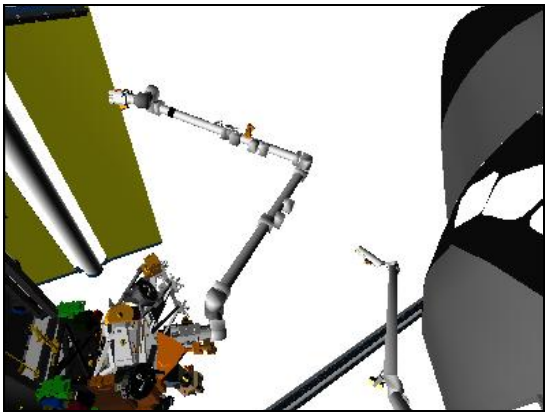


Figure 4.- EVA4 Setup
(13: LAB Stbd Zenith: -170, -30).

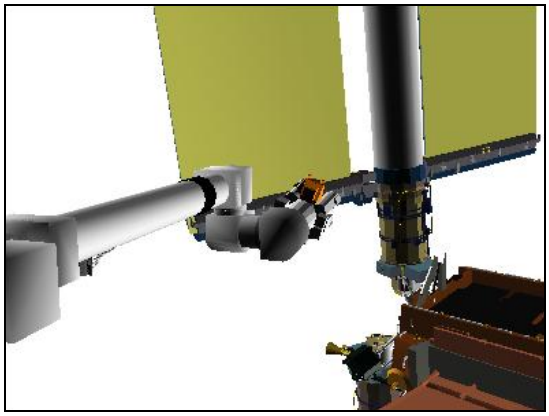


Figure 5.- EVA4 Setup
(22: Base Elbow: -100, -10).

NOTE
Expect the following message when safing is commanded:
'**R3Z - MSS OCS SSRMS Prime(Redun) ACU SRT Cat-1 Brk Stat Fail**' (SCR 17495)
This message should return to Norm.

DCP SAFING → SAFE (Verify ON)

DOUG Setup for (P6 4B Solar Array Retract Contingency)

1. For **stand-alone** procedure review, perform {1.301 DOUG Startup Procedure}, step 2 (SODF: POC: Activation and Checkout: DOUG). Select "STS116>ISS12A.1" for visual load.

2. For **SSRMS real-time support**, perform {1.301 DOUG Startup Procedure}, step 1 (SODF: POC: Activation and Checkout: DOUG). Select "STS116>ISS12A.1" for visual load.

    2.4 Set SSC volume such that tones are audible.

3. Configure for current ISS configuration and bring up displays .
    3.1.1Reconfig ► SSRMS
        3.1.1 In SSRMS Reconfig Dialog box, select 'SSRMS_BASE_A'.
        3.1.2 In SSRMS Reconfig Dialog box, select 'SSRMS ->MBS PDGF 3'.
        3.1.3 In SSRMS Reconfig Dialog box, select 'MT_to_WORKSITE_WS5'.
        3.1.4 Reconfig ►(P5, Ceta Carts etc)
    3.2 Display ► Puddle Plot Shoulder/Wrist
    3.3 For real-time support, Display ► Show SSRMS Target
    3.4 For Real-time support, Options ► SSRMS Proximity, set all distances to 24 (inches)

Notes:
4. Use the Home Key to cycle through the Camera, SSRMS and SRMS Targets.
5. Use Page Up and Page Down keys to scroll through Target selections.

Procedure	***Step***	***Targets***		
		Camera	**SSRMS**	**Comments**
P6 4B Solar Array Retract EVA Support	2		P6 4B Solar Array Retract Step 2	Setup
	3		P6 4B Solar Array Step 3 SJ (SP)	
	4		P6 4B Solar Array Step 4 APFR Install/Ingress	
	5		P6 4B Solar Array Step 5 Ingress Clearance	
	6		P6 4B Solar Array Step 6 and 7.2 Array Clearance	
	7.1		P6 4B Solar Array Step 7.1 Array Access 1	
	7.1		P6 4B Solar Array Step 7.1 Array Access 2	
	7.2		P6 4B Solar Array Step 6 and 7.2 Array Clearance	
	8		P6 4B Solar Array Step 8 JOCAS to Egress Clearance	
	9		P6 4B Solar Array Step 9 APFR Egress	
	10		P6 4B Solar Array Step 10 APFR Hover	
	11		P6 4B Solar Array Step 11 SJ (SP) to Setup	

NOTE

1. Confirm with **MCC**:
   - P6 4B BGA locked at +135
   - ISS Ku antenna parked pointing ISS Aft
2. Do not travel in the ISS Port direction further than Y= - 775 cm to maintain clearance with the Port TRRJ rotation envelope

1. HAND CONTROLLER CALIBRATION

1.1 Translational Hand Controller (THC) Calibration

THC

Deflect [X] Axis to positive hard stop where [X] = [X] [Y] [Z]

Deflect [X] Axis to negative hard stop.

Repeat

1.2 Rotational Hand Controller (RHC) Calibration

RHC

Deflect [X] Axis to positive hard stop where [X] = [P] [Y] [R]

Deflect [X] Axis to negative hard stop.

Repeat

2. SETUP

Configure cameras and overlays as required.

Monitor 1	Monitor 2	Monitor 3	V10
13: LAB Stbd Zenith (+170, -25)	22: Base Elbow (-110, -20)	24: Tip Elbow (+5, 0)	Camera B (-15,+5) SRMS Elbow (+70, -5)

PCS

MSS: SSRMS: [SSRMS]

Change Unloaded Parameters ▶ Unloaded ▶ LEE Tip SYH
Verify ‘Unloaded Parameters’ (two) – LEE Tip, SY Held

Verify Display – W5>ISSACS

Change Command ▶ W5 ▶ ISSACS (Verify W5>ISSACS)

Verify SSRMS at EVA 4 Setup position (within 5 cm/1 deg).

SR	SY	SP	EP	WP	WY	WR
-179.9	-3.9	-50.0	-97.7	-183.1	-188.1	-70.0
X	Y	Z	Pitch	Yaw	Roll	
+142	-502	-1070	+156.1	-1.0	-65.9	
FOR	Unloaded – LEE Tip, SY Held					
Disp	W5>ISSACS					

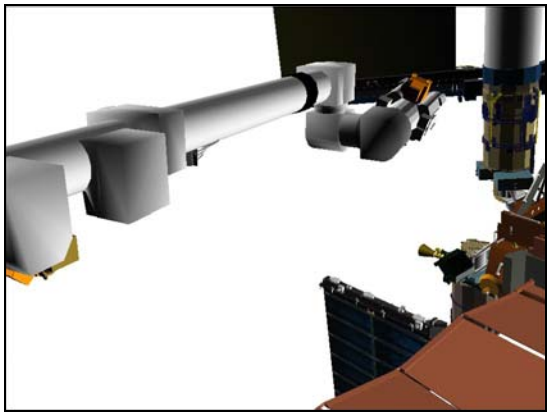


Figure 1.- EVA 4 Setup
(22: Base Elbow: -110, -20).

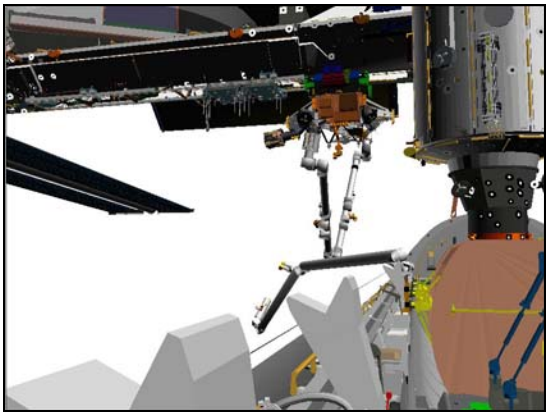


Figure 2.- EVA 4 Setup
(V10: Camera B -15, +5).

3. MANEUVER TO APFR INGRESS SETUP POSITION
Verify SRMS at EVA4 Viewing position.

PCS MSS: SSRMS: SSRMS Safing: SSRMS Safing

cmd Remove (Verify Not Safed)

DCP BRAKES SSRMS → OFF (Verify OFF)

RHC RATE → VERNIER (Verify Vernier on PCS)

PCS MSS: SSRMS: SSRMS

Enter Mode – Single (Verify blue)

WARNING

The active joint must be checked on the PCS before initiating motion. Failure to do so may result in movement of the wrong joint.

DCP JOINT SELECT → SHOULDER PITCH (Verify SP – Selected on PCS)

THC Perform "–" Single Joint maneuver to SP: -74.2 (THC down).

Verify SSRMS at APFR Ingress Setup position (within 5 cm/1 deg).

SR	SY	SP	EP	WP	WY	WR
-179.9	-3.9	-74.2	-97.7	-183.1	-188.1	-70.0
X	Y	Z	Pitch	Yaw	Roll	
-190	-451	-838	-180.0	+0.1	-69.2	
FOR	Unloaded – LEE Tip, SY Held					
Disp	W5>ISSACS					

PCS MSS: SSRMS: SSRMS

Enter Mode – Standby (Verify blue)

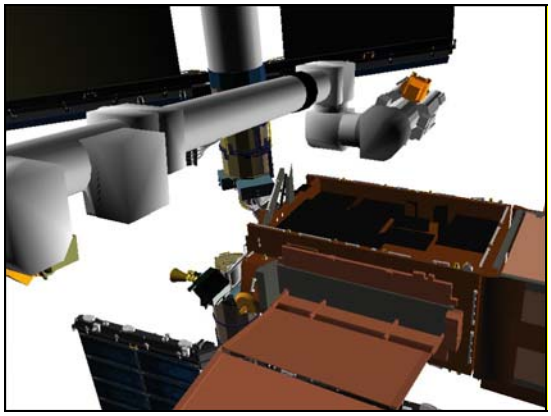


Figure 3.- APFR Ingress Setup
(22: Base Elbow: -110, -20).

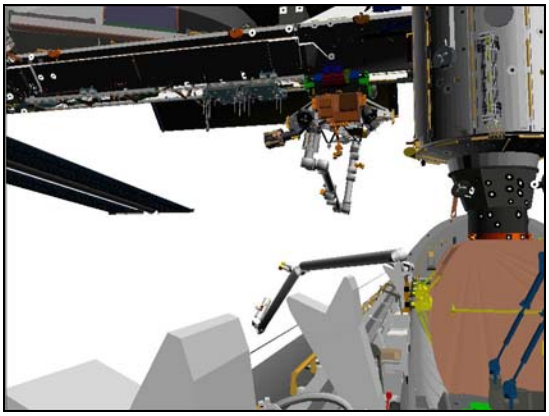


Figure 4.- APFR Ingress Setup
(V10: Camera B: -15, +5).

4. APFR INSTALL AND INGRESS

On EVA GO, ready for maneuver to APFR Install and Ingress position:

PCS MSS: SSRMS: SSRMS

Enter Mode – Manual (Verify blue)

MSS: SSRMS: SSRMS Manual: Joint Lock: Joint Lock

cmd Shoulder Yaw (Verify SY – Locked)

THC/ RHC Maneuver SSRMS to APFR Install and Ingress position (within 5 cm/1 deg).

	Locked					
SR	SY	SP	EP	WP	WY	WR
-165.5	-3.9	-91.7	-76.7	-189.7	-189.0	-55.5
X	Y	Z	Pitch	Yaw	Roll	
-348	-217	-838	-180.0	+0.1	-69.2	
FOR	Unloaded – LEE Tip, SY Held					
Disp	W5>ISSACS					

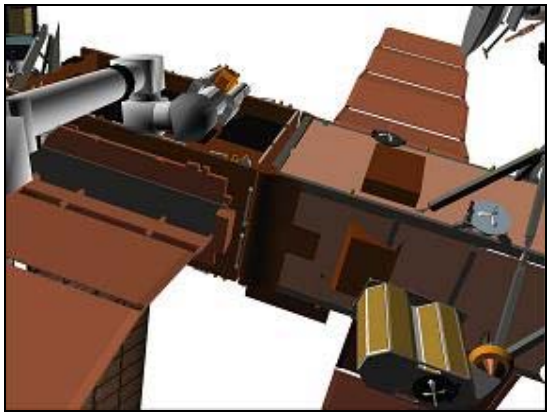


Figure 5.- APFR Install and Ingress
(22: Base Elbow: -110, -20).

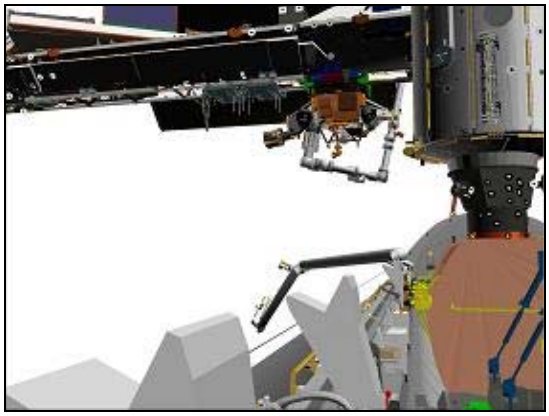


Figure 6.- APFR Install and Ingress
(V10: Camera B: -15, +5).

THC/ RHC — Maneuver SSRMS per EVA GCA to install and ingress the APFR.

NOTE
APFR settings are 12/PP/F/6.

5. MANEUVER TO INGRESS CLEARANCE POSITION
On EVA GO:

PCS — MSS: SSRMS: SSRMS

Enter Mode – Standby (Verify blue)

Change Unloaded Parameters ▶ EVA ▶ Chest 12/PP/F/6 SYH
Verify 'Unloaded Parameters' (two) – Chest 12/PP/F/6, SY Held

Change Command ▶ W5 ▶ ISSACS/Internal (Verify W5>ISSACS/Internal)

Enter Mode – Manual (Verify blue)

MSS: SSRMS: SSRMS Manual: Joint Lock: Joint Lock

cmd Shoulder Yaw (Verify SY – Locked)

THC/ RHC — Maneuver SSRMS to Ingress Clearance position (within 5 cm/1 deg).

	Locked					
SR	SY	SP	EP	WP	WY	WR
-179.9	-3.9	-74.2	-97.7	-183.1	-188.1	-70.0
X	Y	Z	Pitch	Yaw	Roll	
-350	-364	-843	+88.6	+86.2	+1.4	
FOR	Unloaded – Chest 12/PP/F/6, SY Held					
Disp	W5>ISSACS					

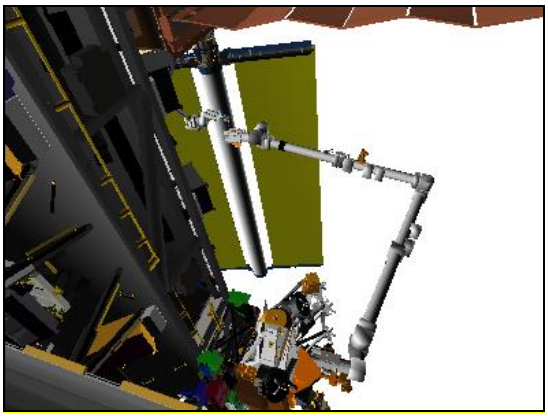


Figure 7.- Ingress Clearance
(13: LAB Stbd Zenith: +160, -25).

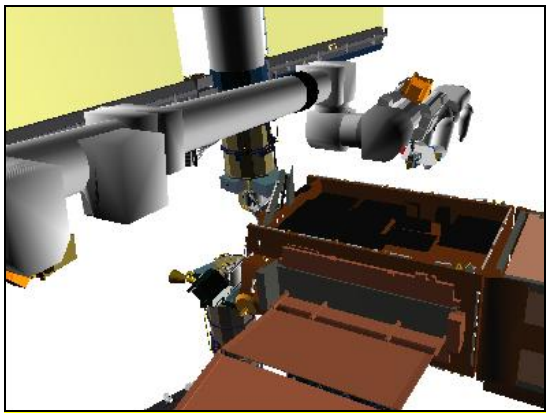


Figure 8.- Ingress Clearance
(22: Base Elbow: -110, -20).

PCS MSS: SSRMS: SSRMS

Enter Mode – Standby (Verify blue)

6. JOCAS TO ARRAY CLEARANCE POSITION
Configure cameras and overlays as required.

Monitor 1	Monitor 2	Monitor 3	V10
13: LAB Stbd Zenith (+160, -25)	22: Base Elbow (-110, -20)	24: Tip Elbow (0,0)	SRMS Elbow (+70, +10)

PCS MSS: SSRMS: SSRMS

Enter Mode – Joint OCAS (Verify blue)

SSRMS Joint OCAS

Input 'Joint Angles' 'Destination' for Array Clearance position.

SR	SY	SP	EP	WP	WY	WR
-178.1	-3.9	-61.5	-80.0	-125.7	-181.1	-171.6

cmd Load (Verify Sequence Status – Confirm or Cancel)

MON Verify joint angles and errors are correct on Joint Angle Position overlay.

	SR	SY	SP	EP	WP	WY	WR
(current)	-179.9	-3.9	-74.2	-97.7	-183.1	-188.1	-70.0
TGT	**-178.1**	**-3.9**	**-61.5**	**-80.0**	**-125.7**	**-181.1**	**-171.6**
ERR	-1.8	0.0	-12.7	-17.7	-57.4	-7.0	+101.6

```
                ********************************************************************************
                * If joint angles/errors are incorrect
PCS             * | cmd Cancel (Verify Sequence Status – Waiting Destination)
                *
                * | Input correct Dest joint angles per table above.
                *
                * | cmd Load (Verify Sequence Status – Confirm or Cancel)
                *
MON             * | Verify joint angles and errors are correct on Joint Angle Position
                * |   overlay.
                ********************************************************************************
```

PCS **cmd** Confirm (Verify Sequence Status – Auto Seq sw - Hot)

DCP AUTO SEQ → PROC

PCS MSS: SSRMS: SSRMS

Verify Posn Hold – orange

Verify SSRMS at Array Clearance position (within 5 cm/1 deg).

SR	SY	SP	EP	WP	WY	WR
-178.1	-3.9	-61.5	-80.0	-125.7	-181.1	-171.6
X	Y	Z	Pitch	Yaw	Roll	
+51	-449	-1500	-178.0	-0.3	+179.8	
FOR	Unloaded – Chest 12/PP/F/6, SY Held					
Disp	W5>ISSACS					

Figure 9.- Array Clearance
(13: LAB Stbd Zenith: +160, -25).

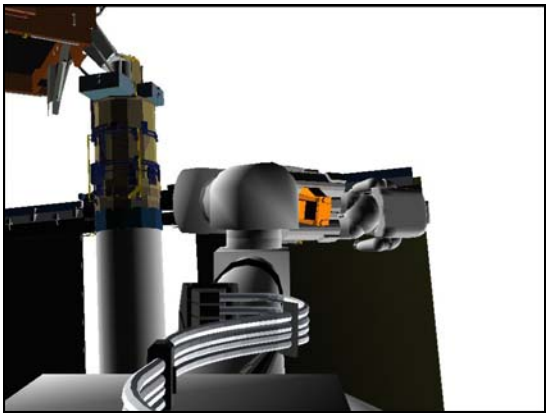


Figure 10.- Array Clearance
(25: Tip Elbow: 0,0).

7. EVA RETRACT ASSIST

Configure cameras and overlays as required.

Monitor 1	Monitor 2	Monitor 3	V10
13: LAB Stbd Zenith (+160, -25)	22: Base Elbow (-110, -20)	24: Tip Elbow (0,0)	SRMS Elbow (+70, +0)

7.1 GCA to access array

NOTE

1. During GCA, limit motion to translation and pitch. Body pitch has been chosen to provide access across width of solar array with translation only. Access to 4B Solar Array outer edges is limited and may require EV knee bends and laybacks.
2. SSRMS EP joint reach limit singularities may be reached when maneuvering to solar array outer edges in certain EV crew orientations. If the EP joint reaches <-15 deg., scale rates to 0.1. Do not continue motion if EP reaches <-5 deg.
3. When maneuvering to the outer edge of 4B Right Solar Array (Aft-Nadir), monitor clearance between Tip Boom and ISS Ku antenna with the Base Elbow camera.
4. When maneuvering between 4B Left and Right Solar Arrays, monitor clearance between EV feet and Mast Canister.

On EVA GO:

PCS — MSS: SSRMS: [SSRMS]

Enter Mode – Manual (Verify blue)

MSS: SSRMS: SSRMS Manual: Joint Lock: [Joint Lock]

cmd Shoulder Yaw (Verify SY – Locked)

THC/RHC — Maneuver SSRMS per EVA GCA to access array.

7.2 Maneuver to Array Clearance

On EVA GO to maneuver to Array Clearance position:

THC/RHC — Maneuver SSRMS to Array Clearance position (within 5 cm/1 deg).

	Locked					
SR	SY	SP	EP	WP	WY	WR
-178.1	-3.9	-61.5	-80.0	-125.7	-181.1	-171.6
X	Y	Z	Pitch	Yaw	Roll	
+51	-449	-1500	-178.0	-0.3	+179.8	
FOR	Unloaded – Chest 12/PP/F/6, SY Held					
Disp	W5>ISSACS					

Figure 11.- Array Clearance
(13: LAB Stbd Zenith: +160, -25).

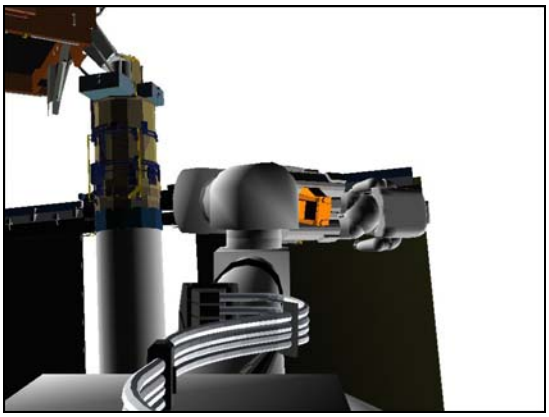


Figure 12.- Array Clearance
(25: Tip Elbow: 0,0).

PCS MSS: SSRMS: SSRMS

Enter Mode – Standby (Verify blue)

Give IV go for Array Retract/Deploy

7.3 ARRAY RETRACTION
If array not fully retracted,

> NOTE
> The GCA retract assist steps will repeat until array fully retracted.

Return to step 7.1

8. JOCAS TO EGRESS CLEARANCE POSITION
Configure cameras and overlays as required.

Monitor 1	Monitor 2	Monitor 3	V10
13: LAB Stbd Zenith (+160, -25)	22: Base Elbow (-120, -20)	24: Tip Elbow (0,0)	SRMS Elbow (+70, +0)

PCS MSS: SSRMS: SSRMS

Enter Mode – Joint OCAS (Verify blue)

SSRMS Joint OCAS

Input ‘Joint Angles’ ‘Destination’ for Egress Clearance position.

SR	SY	SP	EP	WP	WY	WR
-179.9	-3.9	-74.2	-97.7	-183.1	-188.1	-70.0

cmd Load (Verify Sequence Status – Confirm or Cancel)

MON Verify joint angles and errors are correct on Joint Angle Position overlay.

	SR	SY	SP	EP	WP	WY	WR
(current)	-178.1	-3.9	-61.5	-80.0	-125.7	-181.1	-171.6
TGT	**-179.9**	**-3.9**	**-74.2**	**-97.7**	**-183.1**	**-188.1**	**-70.0**
ERR	+1.8	0.0	+12.7	+17.7	+57.4	+7.0	-101.6

PCS **cmd** Confirm (Verify Sequence Status – Auto Seq sw - Hot)

DCP AUTO SEQ → PROC

PCS MSS: SSRMS: SSRMS

Verify Posn Hold – orange

Verify SSRMS at Egress Clearance position (within 5 cm/1 deg).

SR	SY	SP	EP	WP	WY	WR
-179.9	-3.9	-74.2	-97.7	-183.1	-188.1	-70.0
X	Y	Z	Pitch	Yaw	Roll	
-350	-364	-843	+88.6	+86.2	+1.4	
FOR	Unloaded – Chest 12/PP/F/6, SY Held					
Disp	W5>ISSACS					

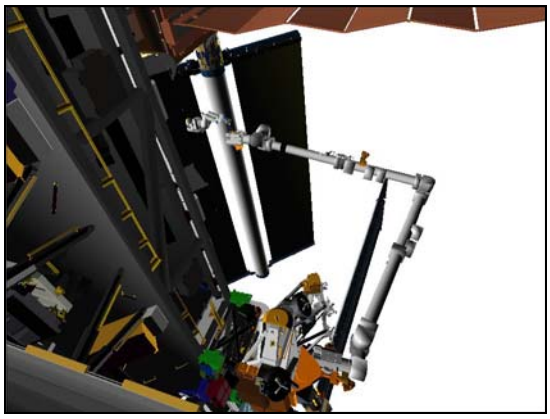


Figure 13.- Egress Clearance
(13: LAB Stbd Zenith: +160, -25).

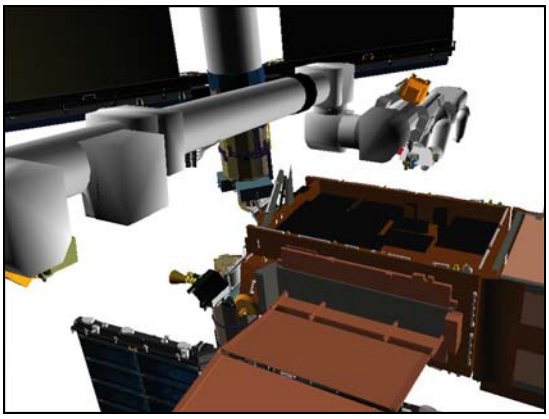


Figure 14.- Egress Clearance
(22: Base Elbow: -110, -20).

9. APFR EGRESS/UNINSTALL
Configure cameras and overlays as required.

Monitor 1	Monitor 2	Monitor 3	V10
13: LAB Stbd Zenith (+160, -25)	22: Base Elbow (-110, -20)	24: Tip Elbow (0,0)	SRMS Elbow (+70, +0)

On EVA GO to Maneuver to APFR Removal and Egress position,

PCS MSS: SSRMS: SSRMS

Enter Mode – Manual (Verify blue)

MSS: SSRMS: SSRMS Manual: Joint Lock: Joint Lock

cmd Shoulder Yaw (Verify SY – Locked)

THC/ RHC Maneuver SSRMS to APFR Egress position (within 5 cm/1 deg).

	Locked					
SR	SY	SP	EP	WP	WY	WR
-167.4	-3.9	-91.0	-78.3	-188.3	-188.9	-57.5
X	Y	Z	Pitch	Yaw	Roll	
-508	-160	-843	+88.8	+86.2	+1.1	
FOR	Unloaded – Chest 12/PP/F/6, SY Held					
Disp	W5>ISSACS					

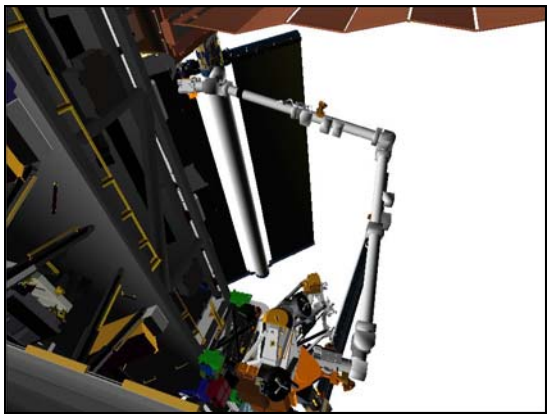


Figure 15.- APFR Egress
(13: LAB Stbd Zenith: +160, -25).

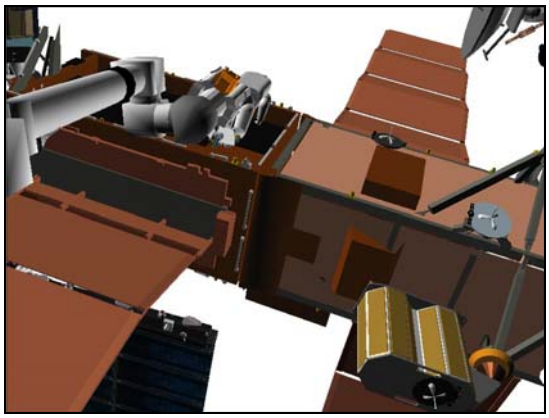


Figure 16.- APFR Egress
(22: Base Elbow: -110, -20).

THC/ RHC Maneuver SSRMS per EVA GCA to egress and remove APFR.

PCS MSS: SSRMS: SSRMS

Enter Mode – Standby (Verify blue)

10. APFR HOVER
When APFR removal is complete and on EVA GO,

PCS MSS: SSRMS: SSRMS

Change Unloaded Parameters ▶ Unloaded ▶ LEE Tip SYH
Verify 'Unloaded Parameters' (two) – LEE Tip, SY Held

Change Command ▶ W5 ▶ ISSACS (Verify W5>ISSACS)

Enter Mode – Manual (Verify blue)

MSS: SSRMS: SSRMS Manual: Joint Lock: Joint Lock

cmd Shoulder Yaw (Verify SY – Locked)

THC/ RHC — Maneuver SSRMS to APFR Hover position (within 5 cm/1 deg).

	Locked					
SR	SY	SP	EP	WP	WY	WR
-179.9	-3.9	-74.2	-97.7	-183.1	-188.1	-70.0
X	Y	Z	Pitch	Yaw	Roll	
-190	-451	-838	-180.0	+0.1	-69.2	
FOR	Unloaded – LEE Tip, SY Held					
Disp	W5>ISSACS					

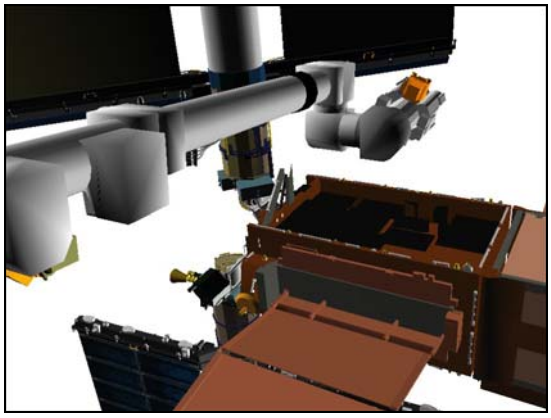


Figure 17.- APFR Hover
(22: Base Elbow: -110, -20).

PCS — MSS: SSRMS: SSRMS

Enter Mode – Standby (Verify blue)

11. MANEUVER TO SETUP POSITION
Configure cameras and overlays as required.

Monitor 1	Monitor 2	Monitor 3	V10
13: LAB Stbd Zenith (+160, -25)	22: Base Elbow (-110, -20)	24: Tip Elbow (0,0)	SRMS Elbow (+70, +0) Camera B (-15, +5)

PCS — MSS: SSRMS: SSRMS

Enter Mode – Single (Verify blue)

WARNING

The active joint must be checked on the PCS before initiating motion. Failure to do so may result in movement of the wrong joint.

DCP JOINT SELECT → SHOULDER PITCH (Verify SP – Selected on PCS)

THC Perform "+" Single Joint maneuver to SP: -50.0 (THC up).

Verify SSRMS at EVA 4 Park position (within 5 cm/1 deg).

SR	SY	SP	EP	WP	WY	WR
-179.9	-3.9	-50.0	-97.7	-183.1	-188.1	-70.0
X	Y	Z	Pitch	Yaw	Roll	
+142	-502	-1070	+156.1	-1.0	-65.9	
FOR	Unloaded – LEE Tip, SY Held					
Disp	W5>ISSACS					

NOTE
Expect the following message when safing is commanded:
'**R3Z - MSS OCS SSRMS Prime(Redun) ACU SRT Cat-1 Brk Stat Fail**' (SCR 17495)
This message should return to Norm.

DCP SAFING → SAFE (Verify ON)

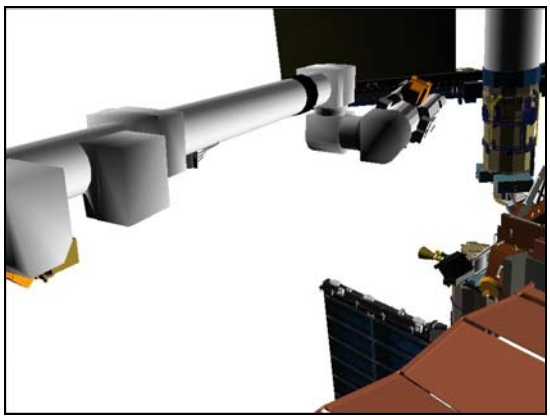


Figure 18.- EVA 4 Park
(22: Base Elbow: -110, -20).

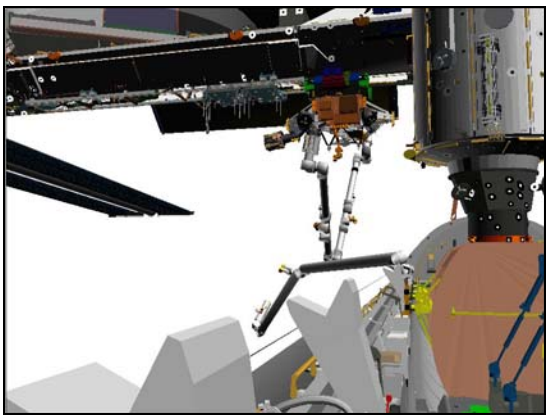


Figure 19.- EVA 4 Park
(V10: Camera B: -15, +5).

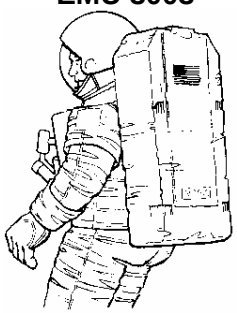
MSG092 (14-0611) – Logistics Cue Card

AIRLOCK Operations

EVA	METOX For 10.2 Ops (S/Ns) (B/Cs)	PWR (EMU Water Bag) (S/N) *Floor Bins*	IRU EMU Fill Quantity; Post EVA (lb)	CWC (for EMU water dump) (S/N)
4	0017/0019 ” 7811J/7807J	1018/1012^		1026

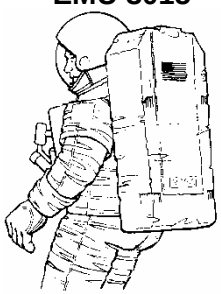
Location Key
- * EMU
- ^ Floor Bins
- ” ISS Airlock
- + EMU XFER bag #1
- ++ MD Ceil Port 1 bag

EV1 – Cr
EMU 3003



EVA	LiOH (S/N) (B/C)	EMU BATTERY	REBA (S/N)	Helmet Light Battery (S/N)	ERCA (Address) (S/N)	SAFER (S/N)	PGT (S/N)	PGT Spare (S/N)
4	2014 ++ EMUF24J	2031 +	1003 *	1015/1017 ”	16 * 1010	1003 ”	5014 ”	5015 ”

EV2 – Fg
EMU 3015



EVA	LiOH (S/N) (B/C)	EMU BATTERY	REBA (S/N)	Helmet Light Battery (S/N)	ERCA (Address) (S/N)	SAFER (S/N)	PGT (S/N)
4	2016 ++ EMUD99J	2036 +	1011 ”	1019/1021 ”	18 * 1007	1005 ”	-

14-0193 ISS HAM KENWOOD MANUAL FREQUENCY INPUT

OBJECTIVE:

This procedure allows the Kenwood radio to be configured for manual frequency operation.

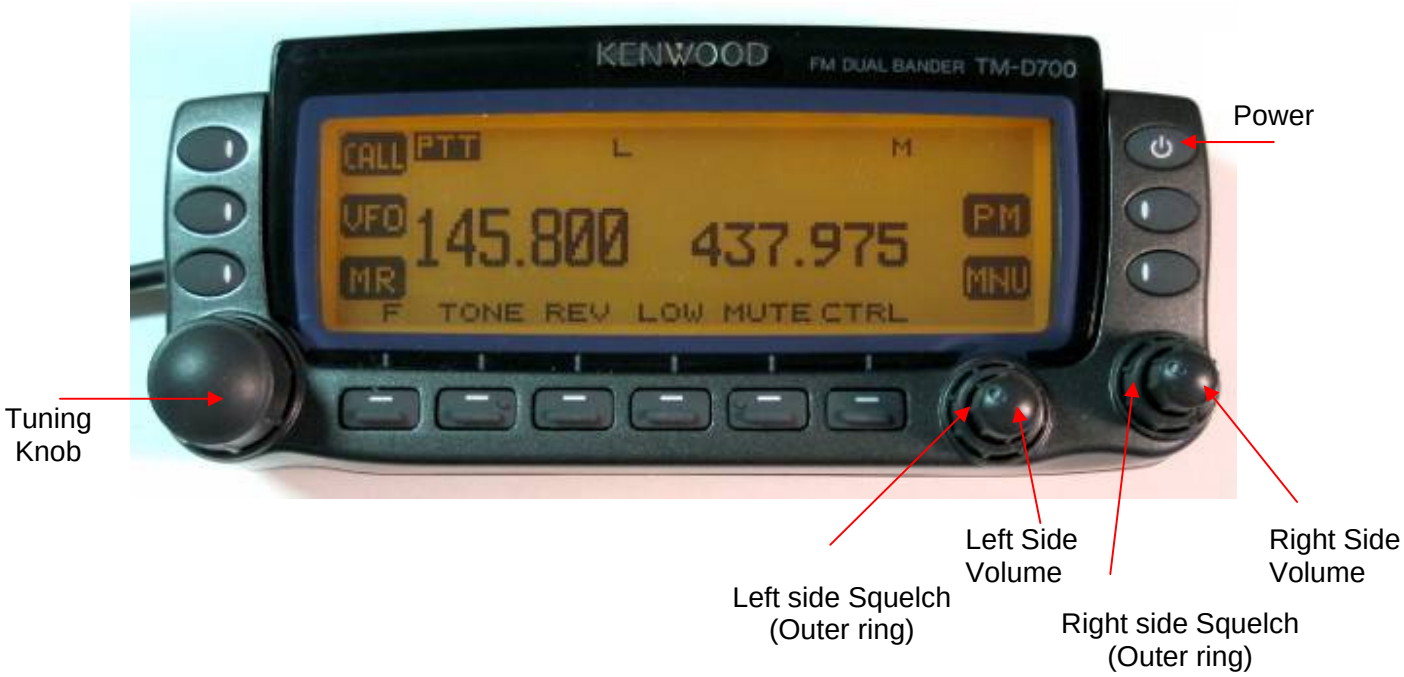


Figure 1.- Kenwood D-700E front panel in PM OFF mode (Actual frequency or Channel display will differ depending on last usage).

1. PREPARE KENWOOD FOR MANUAL FREQUENCY INPUT

SM

1.1 To power on Kenwood radio (if required), press Power button.

1.2 Press ‘PM’ menu button.

1.3 Press ‘OFF’ menu button.

1.4 Check that both sides of the radio display are showing frequencies or memories
If display shows frequencies or memories on one side only.
Press and hold right side volume button for 2 seconds

1.5 Press ‘MNU’ menu button.

1.6 Turn tuning knob to ‘RADIO’.

1.7 Press ‘OK’ menu button.

1.8 Turn tuning knob to ‘MIC’.

1.9 Press ‘OK’ menu button.

1.10 Turn tuning knob to ‘MIC CONTROL’

Figure 2.- Kenwood D-700E front panel showing proper MIC CONTROL configuration.

1.11 Check mic control indicator in lower right of display set to ‘ON’, see Figure 2.
If display indicates ‘OFF’
- Press ‘OK’ menu button
- Turning tuning knob to ‘ON’ (blinking)
- Press ‘OK’

1.12 Press ‘ESC’ menu button.

1.13 Proceed to step 2 for a split frequency contact setup or step 3 for a simplex frequency setup.

2. MANUAL SPLIT FREQUENCY INPUT

SM

NOTE
These steps will allow the crew to manually input the appropriate frequencies when two different frequecies are required for communications such as for school contacts.

2.1 Press left side volume button.

2.2 Check ‘PTT’ on left side of display.

2.3 Press ‘VFO’ menu button.

2.4 Using the Microphone keypad, press ‘**A**’. (Dashes should appear on the display, Example **---.---**)

2.5 Using the numbered keypad on the Microphone enter the uplink (receive) frequency needed (Example 1 4 4 4 9 0).

2.6 Check left side display indicates correct uplink (receive) frequency (If frequency incorrect, repeat steps 2.4 and 2.5).

2.7 Check left side volume and squelch level is sufficient for monitoring.

2.8 Press right side volume button.

2.9 Check 'PTT' on right side of display.

2.10 Press 'VFO' menu button.

2.11 Using the Microphone keypad, press '**A**'. (Dashes should appear on the display, Example **---.---**)

2.12 Using the numbered keypad on the Microphone enter the downlink (transmit) frequency needed. (Example 1 4 5 8 0 0)

2.13 Check right side display indicates correct downlink (transmit) frequency. (If frequency incorrect, repeat steps 2.11 and 2.12)

2.14 Conduct contact

3. MANUAL SIMPLEX FREQUENCY INPUT

SM

NOTE
These steps will allow the crew to manually input the appropriate frequency when only one frequecy is required for communications.

3.1 Press right side volume button.

3.2 Check 'PTT' on right side of display.

3.3 Press 'VFO' menu button.

3.4 Using the Microphone keypad, press **'A'**. (Dashes should appear on the display, Example **---.---**)

3.5 Using the numbered keypad on the Microphone enter the frequency needed. (Example 4 3 7 5 5 0)

3.6 Check right side display indicates correct frequency.

3.7 Check right side volume and squelch level is sufficient for monitoring.

3.8 Conduct contact

FLIGHT DAY 3 DOCKING
ORBITER with ISS
CO2 ABSORBER REPLACEMENT

(7 crewmembers/Single Shift/FD 1-15)

FLIGHT DAY	POS A	POS B	CK CMPLT
LAUNCH	1	2	
PRE FD01	"	"	
POST FD02	3	4	
PRE FD02	5*	6*	
POST FD03	7	8	Dock
PRE FD03	“	9	
POST FD04	10	11	EVA 1
PRE FD04	12	“	
POST FD05	13	14	
PRE FD05	“	15	
POST FD06	16	17	EVA 2
PRE FD06	“	18	
POST FD07	19	20	
PRE FD07	“	21	
POST FD08	22	23*	EVA 3
PRE FD08	“	24	
POST FD09	25	26	
PRE FD09	27	“	
POST FD10	28	29*	EVA 4
PRE FD10	“	30	
POST FD11	31*	32	
MID FD11	**33***		Undock
PRE FD11	34*	35*	
POST FD12	36	37	
PRE FD12	38*	39*	
POST FD13	40	41	
PRE FD13	42*	43*	
POST FD14	44	45	EOM
PRE FD14	46*	47*	
POST FD15	48	49	EOM+1

*Reseal LiOH cans w/Gray Tape and stow.
(Locations of canisters on back)

NOTE:
This card is specifically used for STS-116 mission, with the orbiter conducting single shift operations with a crew size of 7. The changeout scheme reflects FD3 docking with ISS; Vozdukh on during docked ops, CDRA activated in single-bed mode post EVA 2, and undocking on FD10. CDRA will be deactivated the morning of undocking.

LA and Suni: Big Picture for Robotics Ops during FD9 and FD10

FD9 the SSRMS procedure to setup for EVA4 can be found in OCA MSG 14-0608 (MSG 89) and contains a single joint table to “unstow” the SSRMS after the MT translation from Worksite 3 to Worksite 5.

- The Lab Stbd Zenith camera provides a good big picture view.

FD10 the SSRMS procedure to support EVA 4 can be found in OCA MSG 14-0610 (MSG 091) and contains the following maneuvers:

- SP single joint to the APFR Ingress Setup.
- EV GCA to APFR Install and Ingress.
    - After EV Ingress, suggested command frame is ISSACS for translations/Internal for rotation because this is what was used on EVA2. However, internal command frame for both translation and rotation is also acceptable.
- Manual maneuver to an Ingress Clearance position.
- Joint OCAS to an Array Clearance position.
- EV GCA to access the array.
    - EVA access to the solar array will be accomplished using GCA. When retracting or deploying the array, maneuver the EV crew to the clearance position.
    - Expect to use Translation and Pitch commands to access the array. Very little Roll and Yaw inputs should be required.
    - Translation along the array blanket box can be accomplished using X and Z commands. Array is ~45deg in the X/Z plane when parked at the planned BGA angle = +135deg.
    - The SSRMS configuration was optimized to support the maximum safe GCA envelope.
    - The Lab Stbd Zenith camera provides a good big picture view, and the Base Elbow Camera provides a good clearance between the EV crewmember and the solar array.
    - When accessing the furthest edges of the array, the EP joint will approach 0 degrees. When the EP reaches -15 degrees, set the rate scale to 0.1. Do not proceed with manual motion if the EP joint reaches -5 degrees.
- When solar array ops are complete, manual maneuver back to an Array Clearance position.
- Joint OCAS back to an Egress Clearance position.
- EV GCA to egress and remove APFR.
- Manual maneuver to an APFR Hover position.
- SP single joint to the EVA4 park position to end the day.

DOUG setup notes can be found in OCA message 14-0609 (MSG 090), and DOUG targets have been uplinked for FD10 maneuvers.

OBJECTIVE
This procedure will swap **EMU 3018 (S. Williams)** for **EMU 3015 (C. Fuglesang)**. This is in prep for EVA 4.

CAUTION
1. Remove rings and other jewelry before exposing EMU bladder.
2. √ all seals are clean and free of debris before making connections.

EMU 3018

1. Remove ISS Cuff Checklist, stow in EMU Equipment Bag.
2. Install W Gloves (6WS -- s/n 6047).
3. √Wrist mirrors installed.
4. Connect W LTA (waist brief: 01 -- Waist 021)
5. √W Helmet (s/n 1071) installed
6. Remove helmet lights and EMU TV from W helmet (s/n 1071), temp stow in C-Lk.
7. Remove tools and tethers, temp stow for EVA Tool Config.
8. Remove EMU 3018 from EDDA, stow in Node.

EMU3015

9. Install EMU 3015 on EDDA.
10. Remove Fg Helmet (s/n 1063).
11. Install Fg CCA (s/n 1203) from Fg ECOK onto EMU 3015 electrical harness, stow comm cap in arm of EMU.
12. Install Fg Helmet (s/n 1063).
13. Install helmet lights and EMU TV from C-Lk (removed from W helmet) onto Fg Helmet (s/n 1063).
14. √Wrist mirrors installed.
15. Remove Fg Gloves (6FG -- s/n 6197), stow in EMU Equipment Bag.
16. Install ISS Cuff Checklist from EMU Equipment Bag (removed from EMU 3018) onto EMU 3015.
17. Install Fg STS-116 patch and Swedish flag.
18. √White stripe identifier for EV-2 on EMU 3015.
19. Tools and tethers will be configured per EVA Tool Config.

EVA 4 NOTES, CAUTIONS, & WARNINGS

NOTES

1. On MCC Go, other unstated actions may be applied to the SAW troubleshooting (e.g. shaking)
2. Maintain 3 ft clearance around SAW while retracting

CAUTION

ISS Constraints

A. Avoid inadvertent contact with:
   1. Grapple fixture shafts
   2. PIP pins
   3. Passive UMAs
   4. MBS VDU, MCU, CRPCMs & Cameras (taped radiative surfaces, silver Teflon)
   5. Deployed TUS cable
   6. SVS Targets with planned future use [S1, P1]
   7. EETCS/PV Radiator bellows and panels [P6, P4, S4, S6]
   8. SSRMS cameras

B. Electrical cables:
   1. Avoid bend radii < 10 times cable diameter

C. For structural reasons:
   1. Avoid vigorous body motions, quick grabs and kickoffs against tether restraints

   Avoid performing shaking motions (sinusoidal functions) more than four cycles

PRELIMINARY

MSG 098 (14-0615) - PRELIMINARY EVA 4 PROCEDURES

EVA 4 NOTES, CAUTIONS, & WARNINGS (Cont)

WARNING

ISS Constraints

A. Avoid inadvertent contact with:
1. Grapple fixture targets and target pins
2. SSU, ECU, beta gimbal platform, mast canister, SAW blanket boxes unless the beta gimbal is locked and the motor is turned off
3. SABB
- Lower SABB exposed reels (guide wire reels (3) and tensioning mechanisms (2))
- Guide wires
- Tension mechanisms
- Blanket box skirts
- SABB swing bolts
- Solar array panels (possible exposed circuits)
- FCC and kapton part of solar array panels

B. Pinch:
1. Solar array mast during retraction
2. SABB
   - Exposed reels
   - Guide-wire mechanisms
   - Blanket tension mechanisms

C. Other
1. EVA crew will only contact energized surfaces with approved tools that have been insulated to prevent molten metal and shock
2. The solar array to be manipulated will be shunted prior to the EVA crew entering the worksite

WARNING (Cont)

ISS Constraints (Cont)

D. Sharp Edges:
1. Inner edges of WIF sockets
2. Mating surfaces of EVA connectors. Avoid side loads during connector mating
3. Nickel coated braided copper Ground Straps may contain frayed wires [P6, P4]
4. Solar Array [P6]
   - SABB (skirts, swing bolts)
   - Solar cells
   - Springs along tension bar
   - Hinge Pins
   - Guide cable burrs
   - Mast Canister Roller guides
   - Braided cables
   - Hinges on SAW blanket
5. Spring loaded captive EVA fasteners (e.g., 6B-boxes, BMRRM, RTAS ground strap bolt); the end of the spring may protrude

E. Thermal:
1. 2. Turn off glove heaters when comfortable temp reached to prevent bladder damage. Do not pull fingers out of gloves when heaters are on
3. Uncovered trunnion pins may be hot
4. SSRMS/MBS operating cameras/lights may radiate large amounts of heat
5. Do not touch EMU protective visor if temp has been < -134 for > 15 min
6. Stay 1 ft away from PMAs and MMOD shields > 270 degF if EMU sun visor up

WARNING (Cont)

ISS Constraints (Cont)

7. Stay at least 1 ft away for no more than 15 min from PMAs and MMOD shields > 300 degF if EMU sun visor up
8. Stay 0.5 ft away from PMA and MMOD shields > 325 degF
9. No EMU boot contact with foot restraint when temp < -120 degF or > 200 degF
10. No EMU TMG contact of PMAs and MMOD shields when temp > 320 degF

F. RF radiation exposure:
1. Stay 3.6 ft from S-Band (SASA) high gain Antenna when powered [S1,P1,P6]
2. Stay 1.3 ft from S-Band (SASA) low gain Antenna when powered [S1,P1,P6]

PRELIMINARY

EVA 4 BRIEFING CARD

1. EVA Prep
   - ❑ Get-up Plan – clothing and EMU equipment bag
   - ❑ Prebreathe protocol review
   - ❑ Equipment lock activities
   - ❑ Suit donning plan
     - o glove disconnect taping, with tape for quick removal – Reference taping procedures
   - ❑ Airlock depress review

2. Communications
   - ❑ Overall setup: big loop, A/G2, S/G2, ICOM, Hardline, remind EV crew when mode swapping
   - ❑ Use EV1(2) for DCM sw throws (all time in A/L)

3. EVA Procedure Review
   - ❑ Order of tasks (summary timeline)
   - ❑ Egress Plan
   - ❑ Detailed Task Review
   - ❑ Notes, Cautions, and Warnings
   - ❑ Ingress Plan

4. Robotics
   - ❑ SSRMS initial position, maneuvers, clearances
   - ❑ Coordinate Frames
   - ❑ SSRMS/SRMS/IV comm protocol review

5. Post EVA
   - ❑ Cold soak
   - ❑ Airlock Repress review
   - ❑ Suit doffing responsibilities
   - ❑ Post EVA plan

6. Emergencies
   - ❑ Emergency suit doff and power down during EVA prep and post EVA
   - ❑ CUFF checklist
   - ❑ Abort and Terminate review – scenarios/protocols
   - ❑ Hand signals

<u>IV CHECKLIST VERIFICATION ITEMS</u>

- ❑ Day/Night Cycles and extended two-handed ops
  - o √Lights, heaters, visors, tools, tethers, gloves
- ❑ √Load Alleviating Strap on Safety Tethers not damaged
- ❑ √Safety Tether in good config
  - o Crew Report: "**Hook closed, slide locked, reel unlocked**"
- ❑ √Both SAFER valves down at egress
  - o Crew Report: "**Both handles down**"
- ❑ √APFR locking collar Black-on-Black and pull test
  - o Clocking, pitch, roll, yaw
- ❑ √PGT Green light on for bolt engage
  - o program, (C)CW, MTL setting
  - o PGT and sockets – pull test
  - o May get Lo Torque msg at bolt release
  - o Crew Report: "**Torqued out, XX turns (or green light)**"
- ❑ √Connectors for damage, bent pins, EMI band, FOD, cable bend radii
  - o Always receive GO from MCC prior to mating/demating electrical connections, review inhibits as reqd
  - o Crew Report: " **Pins good, EMI band good, no FOD, bend radius OK**"
- ❑ Coordination between IV/EV/Robotics/Ground

PRELIMINARY

EVA 4 INHIBIT PAD

Orbiter

All EVAs

TCS

L12 1. √TCS POWER – OFF

Ku-Band Antenna

MCC-H
1. √KU-BAND Mask – active
2. √KU-BAND EVA Protect Box – active

RCS

If EV crew < 27 ft from FRCS:

IV
1. √DAP: VERN, FREE, LO Z (flt specific √ with GNC)

O14,15,16
2. √RJDF F1, F2, F3, F4 MANF DRIVER (four) – OFF
LOGIC (four) – OFF

MCC-H
3. √Above RCS config

IV
4. √RCS F – ITEM 1 EXEC (*)
√JET DES F1U – ITEM 17 (*)
√F3U – ITEM 19 (*)
√F2U – ITEM 21 (*)

S-Band Antennas

NOTE

Possible loss of comm when forced LL FWD antenna

IV If EV crew < 1.6 ft from S-Band antenna:

A1R
1. S-BAND FM ANT – XMIT LOWER/RCVR UPPER
2. √MCC, lower antenna selected

If no comm, or on MCC call:

C3
3. S-BAND PM ANT – LL FWD

When EVA crewmember at least 1.6 ft away from all S-Band upper antennas:

C3
4. S-BAND PM ANT – GPC

USOS

All EVAs

PCU

MCC-H
1. √PCUs (two) operational in discharge mode and one of the following:
   A. CCS PCU EVA Hazard Control enabled
   B. No more than two arrays unshunted
   C. No more than two arrays pointed < 90 degrees from velocity vector

OR

2. One or no PCUs operational in discharge mode and one of the following:
   A. No more than two arrays unshunted
   B. No more than two arrays pointed < 90 degrees from velocity vector

Ground Radar

MCC-H
1. √TOPO and FDO consoles, ground radar restrictions in place for EVA

Location Dependent Inhibits

SARJ

MCC-H If EV crew working within 2 ft or outboard of SARJ:
1. √DLA (1) – LOCKED
2. All motor setpoints set to zero
3. All motors deselected

OR

4. Both DLAs – LOCKED

RSOS

All EVAs

SM Antennas

MCC-M
1. Global Timing Sys 1(400.1 MHz) [GTS] – Deactivate

PRELIMINARY

MSG 098 (14-0615) - PRELIMINARY EVA 4 PROCEDURES

EVA 4 SUMMARY TIMELINE

TIME	SSRMS	EV1 (SSRMS)	EV2 (FF)
0:00		POST DEPRESS (00:05)	POST DEPRESS (00:05)
0:05		EGRESS/SETUP (00:25)	EGRESS/SETUP (00:25)

0:30	SSRMS MNVR to SABB	P6 SAW 4B RETRACTION (05:00)
		• SSRMS setup and ingress
		• SSRMS GCA to worksite
		• SABB Survey
		• SAW Retraction Troubleshooting
		  o SAW panel problem correction
		  o SAW Retraction
		• SABB Closure
		• SSRMS GCA to egress
		• SSRMS cleanup
			P6 SAW 4B RETRACTION (05:00)

5:30		CLEANUP (00:30)	CLEANUP (00:30)
6:00		INGRESS (00:25)	INGRESS (00:25)
6:25		PRE REPRESS (00:05)	PRE REPRESS (00:05)
6:30			

PRELIMINARY

EVA 4 TOOL CONFIG

AIRLOCK

EMU 1 (keep MWS very low-profile)
- ☐ MWS, right swing arm
  - ☐ Cheater bar with 1.5" bail drive lever (sm-sm RET)
  - ☐ BRT (left)
    - ☐ w/3 wire ties & sm-sm RET
  - ☐ T-Bar
- ☐ D-ring ext – left
- ☐ Waist tether – right
- ☐ Spare 55' safety tether (right D-ring)
- ☐ SAFER

EMU 2
- ☐ MWS, right swing arm
- ☐ Digital Camera (inner right swing arm), with integral RET attached to swing arm
  - ☐ RET swing arm to camera thermal blanket D-ring
- ☐ PGT w/7/16 x 2-in ext w/RET (for SABB latching contingency)
- ☐ BRT (left)
  - ☐ w/3 wire ties & sm-sm RET
- ☐ T-Bar
  - ☐ ISS trash bag (outer right)
  - ☐ Wire ties (2) around T-Bar
  - ☐ Sm-sm RET (left D-ring)
  - ☐ Adj tether (left D-ring)
  - ☐ Sm-sm RET w/PIP pin (right D-ring)
  - ☐ Adj tether (right D-ring)
- ☐ D-ring ext (2)
  - ☐ Spare 55' safety tether (left D-ring ext)
- ☐ Waist tethers (2) (attach 1 to right D-ring extender)
- ☐ SAFER

Total sm-sm RETs used (w/o PIP pin): 8
Total sm-sm RETs (w/PIP Pin) used: 1
Total lg-sm RETs used: 1
Total adj tethers used: 3

AIRLOCK ENDCONE

Staging Bag
- ☐ Fish Stringer #3
- ☐ Connector cleaner tool caddy
- ☐ Wire tie caddy (2)
- ☐ Pin straightener
- ☐ MWS Key strap
- ☐ Velcro/Tape caddy
- ☐ Spare PGT (s/n:_____); battery (s/n:____)
- ☐ Pry Bar
- ☐ EVA Ratchet
- ☐ Probe

- ☐ IV Bag
- ☐ Contamination Detection Kit
  - ☐ Hydrazine Detector (Gold Salt Coupon) (6)
  - ☐ Color Chart (2)
  - ☐ ISS Contamination Detection Sampler (2)
  - ☐ Shuttle Contamination Detection Sampler (2)
  - ☐ Nitrogen Dioxide Detector (Oxidizer Draeger Tube) (6)
  - ☐ Ammonia Detector (NH3 Draeger Tube) (6)
- ☐ 2 towels with wire ties
- ☐ DCM plug (2) (SAFER hardmount)
- ☐ GP caddy (2)
  - ☐ Thermal mittens (2 pr)
- ☐ Socket Caddy (hatch contingencies) w/sm-sm RET
  - ☐ 1/2 X 8-in socket (IV hatch)
  - ☐ 7/16 X 6-in socket (spare)

AIRLOCK INTERNAL D-RING

- ☐ D-ring extender

UIA HANDRAILS

- ☐ Crewlock bag w/adj tether
  - Loop pin puller
  - BRS pin tool
  - Needle nose pliers
  - WIF Adapter (2) with RETs (2)
  - Broom Clip Caddy
    - TPS scraper (w/integral RET)

Crewlock bag with lg-sm RET
- Spare PGT battery: s/n: _____
- Socket caddy with 6-in

PRE-EVA 4 TOOL CONFIG

1. Configure/verify MWSs
2. Verify IV and Staging Bag contents per list
3. Prior to EVA, inspect the following:
   - ❑ RET cords for damage
   - ❑ BRT and MWS toggles: loose fittings/screws
   - ❑ Safety and waist tether load alleviating straps (no red band or damage)
4. Configure the following SAW troubleshooting tools per Overview pitch and stow in crewlock bag:
   - Loop pin puller
   - BRS pin tool
   - Needle Nose Pliers
   - TPS Scraper
   - Cheater Bar and 1.5" Bail Lever
5. Add remaining tools to crewlock bag as listed under UIA HRs

POST EVA 4 TOOL STOW

1. Remove PGT batteries (2) from PGTs and stow in M-02 bag (EVA Prep and Ops, s/n 1038)
2. Retrieve Loop pin Puller (& Caddy) and Needle Nose pliers (& caddy); return items to Shuttle Stow in XXXX

PRELIMINARY

MSG 098 (14-0615) - PRELIMINARY EVA 4 PROCEDURES

EGRESS (00:25)

IV	EV1 (FF)	EV2 (FF)
NOTE For safety tether swaps, expect to hear: 1. Hook closed 2. Slide locked 3. Reel unlocked	√Right waist tether to airlock internal D-ring extender, verify ST config	√Right waist tether to UIA panel fwd D-ring, verify ST config
	1. Thermal cover – open 2. Egress airlock 3. Inspect load alleviating straps on 85' safety tethers (2) 4. Retrieve airlock safety tether from fwd external D-ring, attach to left D-ring extender, verify ST config 5. Release waist tether from internal D-ring extender 6. Receive crewlock bag from EV2, temp stow on port A/L toolbox HR 7. Transfer aft airlock safety tether to EV2	1. Transfer crewlock bag to EV1 2. Receive airlock safety tether from EV1, attach to left D-ring extender, verify ST config 3. Release right waist tether from UIA panel D-ring 4. Egress airlock ◄—— □
1. WVS Software: Select page – RF camera Sel 'Advanced Controls' S-Band Level (two) – Max (required after EV1 and EV2 egress airlock)	8. √EV2's SAFER MAN ISOL vlv – OP (dn) and HCM (dn)	5. Close thermal cover 6. √EV1's SAFER MAN ISOL vlv – OP (dn) and HCM (dn) 7. Retrieve crewlock bag from port A/L toolbox, attach to BRT

P6 4B SOLAR ARRAY WING RETRACT TROUBLESHOOTING (5:00)

IV	EV1 (SSRMS)	EV2 (FF)
1A. BGA angle = 135 deg (+/-0.5) Motor State – OFF Latch 1 Pin Status – Latched 1B. Deploy/retract P6 4B to desired position for start of EVA 1C. √MCC free drift or CMG control prior to mast **retraction** <u>ASSUMPTIONS/INFO</u> 1. Both crew on 85' airlock safety tethers 2. Both crew have spare 55' safety tethers (85' tethers get you close, but perform safety tether swap as reqd) (Verify Safety Tether Config) 3. 4B is port array, and is locked at 135 deg (optimal posn for SSRMS mnvr 4. MT at WS 5	←☐ **<u>WARNING</u>** Sharp edge/pinch point/entrapment/shock hazard: Avoid EMU contact with the following: 1. Lower SABB exposed reels (guide wire reels (3) and tensioning mechanisms (2)) 2. Guide wires 3. Tension mechanisms 4. Blanket box skirts 5. Solar array panels (possible exposed circuits) 6. The P6 S-Band Antenna KOZ is 3.6 feet (antenna is fwd of 2A BGA) 7. FCC and kapton part of solar array panels 1. Retrieve APFR from A/L Toolbox 1 WIF (stbd), attach to BRT 2. Translate to SSRMS APFR setup posn (P6 stbd/fwd edge) via the following translation path: o Translate aft of ISS airlock to Z1 stbd pool handle o Translate zenith to stbd Z1 toolbox and onto P6 o Translate forward on P6 nadir of stbd radiator o Translate zenith on P6 on fwd/stbd edge up to nadir most point on IEA o Translate port on P6 under fwd radiator to IEA fwd/port corner HRs 5340/5343 3. GCA SSRMS for APFR install 4. Receive WIF adapter from EV2 5. Install WIF adapter on SSRMS EE, tether point on WIF adapter points toward EE **6. Install APFR in WIF adapter, config to: [12,PP,F,12]** 7. Perform safety tether swap onto SSRMS with spare safety tether, verify ST config 8. GCA SSRMS for ingress	1. Translate to SSRMS APFR setup posn (P6 stbd/fwd edge) via the following translation path: o Translate aft of ISS airlock to Z1 stbd pool handle o Translate zenith to stbd Z1 toolbox and onto P6 o Translate forward on P6 nadir of stbd radiator o Translate zenith on P6 on fwd/stbd edge up to nadir most point on IEA o Translate port on P6 under fwd radiator to IEA fwd/port corner HRs 5340/5343 2. Temp stow crewlock bag on IEA HR 3. Retrieve WIF adapter from crewlock bag, transfer to EV1 4. Assist EV1 as reqd

IV	EV1 (SSRMS)	EV2 (FF)
	9. Install local waist tether onto APFR as reqd 10. Ingress APFR 11. Receive Broom Clip Caddy from EV2, stow on MWS bayonet 12. Give SSRMS operator GO to Ingress clearance position	5. Retrieve Broom Clip Caddy with TPS scraper from crewlock bag, transfer to EV1
3. √MCC GO to mnvr to P6 4B	←□	
Note: Mnv to nadir aft SABB Goal Goal posts is difficult	13. GCA SSRMS for SABB survey, fwd/zenith end SABB to nadir/aft SABB 14. Perform WVS scan of SABB/SAW including: o Y-guides (4 per SABB) (should not be visible; if visible, workaround will occur at 1 bay) o Middle and outboard guide wire pulleys **(check that the guide wire is not rubbing against cable)** **(don't check inbd because it is covered)** o **Panels, grommets, and guide wires** 15. Determine SABB problem and corresponding <u>SAW WORKAROUND CASE</u> in EV2 column 16. Report condition to MCC 17. Verify glove gauntlets cover glove wrist disconnects	6. Provide clearance calls as necessary <u>SAW WORKAROUND CASES</u> <u>Grommet Reset</u> Use TPS scraper to flip guide wire grommet(s) up so that they are pointing perpendicular to blanket box or up toward upper blanket box cover - OR - Pull guide wire above grommet to allow it to flip up. Avoid contact with Kapton part of panel. If required, and on MCC GO, GCA SSRMS to STE (standard test equip loop) and shake panel to reset grommet <u>Over Center Hinge Reset</u> Use bail drive lever part of cheater bar stack up to press on metal panel hinge into normal hinge configuration. Avoid contact with Kapton part of panel <u>Panel Fluff</u> Use TPS scraper to spread panels equal distance apart (via the hinge line). Place TPS scraper to side of guide wire to avoid moving scraper along length of guide wire. Avoid contact with Kapton part of panel
4. √MCC GO to mnvr to SABB problem	←□	
	18. GCA SSRMS to SABB problem 19. Clear problem using the <u>SAW WORKAROUND CASES</u> in EV2 column 20. When problem cleared, GCA out 3 ft	
5. Give GO for retract of one mast bay	←□	
	21. Verify condition of SAW panels 22. Perform SAW assessments and troubleshooting as reqd until 1 mast bay deployed	

IV	EV1 (SSRMS)	EV2 (FF)
	23. At 1 mast bay deployed and on MCC GO, GCA SSRMS for SABB survey 24. Perform WVS scan of SABB/SAW including: o Verify blanket fully contained within box o Verify hinge lines are parrallel to one another in the blanket stack o Verify outboard FCC STE loops neatly stacked within SABB goal posts o **Verify SABB cover guide pins aligned with base goal posts** o **Verify guide wires (three per SABB) retracted (no excess slack)** 25. If Y-guide problem noted earlier, reference **Y-Guide Reset in EV2 column** 26. Assess final condition of SABB 27. GCA out 3 ft, give GO for final SABB retract and latching 28. Verify successful SABB containment <u>CLEANUP</u> 1. GCA SSRMS to Egress clearance posn 2. GCA SSRMS to APFR egress posn 3. Egress APFR, remove waist tether as reqd 4. GCA SSRMS to APFR removal posn 5. Remove APFR, stow on BRT 6. Remove WIF adapter, stow on MWS 7. Perform safety tether swap onto airlock safety tether, verify ST config, retrieve spare 8. Translate to airlock, stow APFR in A/L Toolbox1 (stbd); config to: [9,MM,F,12]	<u>Y-Guide Reset</u> 1. GCA SSRMS back to P6 IEA 2. MCC – Command SABB to low tension 3. EV2 hand off BPS pin tool to EV1 4. GCA SSRMS into worksite 5. Use TPS scraper and BRS pin tool to lift tension bar. a. Put BRS pin tool on short stiffner section of skirt (stronger), pry up 6. Lower tension bar and monitor Y-guide(Y-guide should seat under tension bar as it is lowered) <u>CLEANUP</u> 1. Retrieve crewlock bag, attach to BRT 2. Translate to airlock

MSG 098 (14-0615) - PRELIMINARY EVA 4 PROCEDURES

INGRESS (00:25)

IV	EV1 (FF)	EV2 (FF)
1. Perform WVS PWRDN (PHOTO/TV, WVS CUE CARD)		← □
		1. Ingress airlock 2. Connect right waist tether UIA panel fwd D-ring, verify ST config
	1. Disconnect EV2's 85' safety tether from airlock external aft D-ring, transfer to EV2 2. Connect right waist tether to D-ring extender on airlock internal D-ring, verify ST config 3. Disconnect 85' safety tether from airlock external fwd D-ring, stow on MWS	3. Receive 85' safety tether from EV1, stow in airlock
	4. Ingress airlock 5. Retrieve SCU, remove DCM cover 6. Connect SCU to DCM, √locked 7. DCM: water – OFF 8. Hatch thermal cover – close; attach Velcro strap	4. Retrieve SCU, remove DCM cover 5. Connect SCU to DCM, √locked 6. DCM: water – OFF
	CAUTION Do not close hatch until EMU water – OFF for 2 min	
	9. Verify hardware clear of hatch 10. Outer hatch – close and lock 11. Go to PRE REPRESS	7. Go to PRE REPRESS

The objective of the FD 8 MMT was to understand the implications of a fourth EVA to assist with retraction of the P6 array with respect to the remainder of the STS-116 mission timeline. As a result of these discussions, the MMT decided to add EVA 4 on FD 10 to assist and troubleshoot retraction of the P6 solar array. Both the Shuttle and Station Programs felt it was important to understand the issues with P6 retract in order to increase the probability of success of STS-117/13A which retracts the other P6 array. While the team is confident of the crew's execution of the newly developed techniques on EVA 4, due to the inherent design of the solar array, it may not be possible to fully retract the array with the tools in place on this mission. Regardless of the outcome of EVA 4, the techniques developed and tested during this EVA will prove extremely beneficial to both Programs.

The timeline impact for adding EVA 4 resulted in a trade between Late Inspection and the EOM weather wave-off day since consumables constrain the mission to 12+2. The limiting consumable is cryo which only supports through EOM+2. The MMT decided to keep Late Inspection in the timeline due its ability to further mitigate MMOD risk. The MMT also concurred with the plan to activate all three CONUS landing sites on EOM in order to increase the probability of a safe landing and mitigate the risk of using the last day of consumables. The site priority would be the usual KSC/EDW/NOR. Summary timeline details for the new plan will be provided as soon as they are available.

At the MMT on your behalf, Steve Lindsey complemented the MCC, MER, Damage Assessment, and all other teams for the outstanding support that the ground teams have provided during all mission related activities including the three EVAs and the Solar Array troubleshooting. All of the teams very much appreciated the compliment!

EVA 4 Requirement - The ISS MMT met prior to the Shuttle MMT and decided that EVA 4 was required to be performed prior to undocking. This discussion centered on understanding why EVA 4 is required during this mission versus waiting to gather more data and develop procedures for implementation on STS-117/13A. In addition to retracting the array on STS-116, the team decided that the lessons learned on EVA 4 relative to techniques, tools, and array hardware access will help increase the probability of success for having both P6 arrays retracted during STS-117/13A. There was significant discussion on performing the solar array retract during a Stage EVA. The downside to the Stage EVA is fewer crew members available to perform the complex robotics, commanding, and IV tasks which are required for the solar array retraction. Additionally, reduced KU band coverage will significantly decrease the ability of MCC to assist with array issues and provide the SRMS and orbiter crew cabin views of the array. For all these reasons it became obvious that a shuttle docked EVA was a better option to assist with final array retraction.

EVA 4 P6 Array Retract Plan- The team 4 activities led by Flight Director/Dana Weigel were presented to the FD 08 MMT. Details of this plan will be discussed with you by the Flight Control Team, but the overall plan is to have one EV crewmember on the SSRMS and one crewmember free-float. The SSRMS will be positioned near the P6 IEA to perform a survey along the blanket boxes. The overall concept would be to iterate with the EV crewmember to attempt to manipulate the grommets with several tools to release snags and/or for less severe snags manipulate the guide wires. It was obvious to the team that there might be some learning curve to find techniques that will work to allow final retraction of the array. As each blanket is free and placed in a good configuration to retract, the EV crewmembers would move out of the way such that the IV crew could send the retract commands one bay at a time. This would be very similar to the “array shake” followed by retract tasks performed during EVA 3 today.

P6 Loads Analysis - The ISS team has finalized analysis of the P6 solar array in the current configuration. The STS-116 shuttle undocking and STS-117 docking loads are not a concern. Progress docking loads are acceptable as is a Soyuz docking to the FGB nadir port. This basically means that there are no loads constraints through the STS-117/13A mission and the ISS can execute reboost maneuvers as required for debris avoidance and/or altitude adjustments.

At the current 56% deployed position, the loads are unacceptable for a reboost using a Progress docked at the FGB Nadir port or with the Service Module Main Engine. With the current visiting vehicle plan this means that debris avoidance maneuvers and altitude adjustments are unavailable from April 8, 2007 (23 Progress) to August 2007 (ATV Docking).

Transfer Status - As of the MMT approximately 61% of the Middeck and Spacehab transfer is complete. Based on our assessment transfer is slightly ahead of schedule.

ISS N2 Transfer - As of the end of FD 8 a total of 47 lbs of N2 has been transferred to the ISS.

DAIU Troubleshooting- The DAIU troubleshooting plan procedures are still being finalized. The procedure requires 2 crewmembers for 3.5 hours. Because of mission priorities and transfer being a higher priority task, it may not be possible to fit this troubleshooting into the timeline.

Cryo Margins- The cryo margins are approximately 4 hours O2 limited for a 12+2 day mission and 2 deorbit opportunities each day. The margins for 13+1 day mission with the addition of EVA 4 are being evaluated with the goal of protecting 3 deorbit opportunities each day.

Solar Activity - The good news is that the solar activity has subsided from the higher levels that were encountered during the last few days although levels continue to remain slightly elevated. The Space Radiation Analysis Group continues to closely monitor Solar Region 930 since that region continues to have a magnetic complexity that could be favorable for future solar activity.