

# PDRS Operations Checklist

## STS-119 Flight Supplement

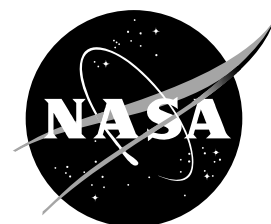
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**Mission Operations Directorate  
EVA, Robotics, & Crew Systems  
Operations Division**

**Final  
January 5, 2009**

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas



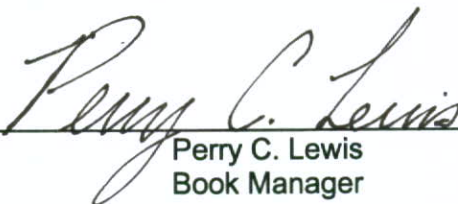


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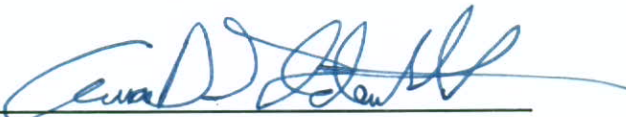
**PDRS OPERATIONS CHECKLIST  
STS-119 FLIGHT SUPPLEMENT**

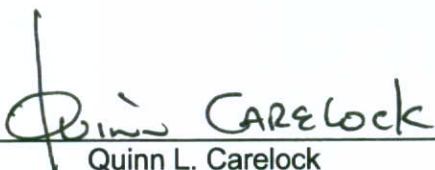
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January 5, 2009

PREPARED BY:

  
Perry C. Lewis  
Book Manager

APPROVED BY:

  
Aaron D. Goldenthal  
Lead, Shuttle and Exploration Robotics  
Operations Group

  
Quinn L. Carelock  
Chief, Robotics Operations Branch

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AREAS OF TECHNICAL RESPONSIBILITY

Book Manager/Mission Designer	DX22/P. Lewis	281-483-6273
Lead PDRS	DX22/S. Riley	281-483-7019
Lead Analyst	DX24/A. Covarrubia	281-483-8748
Mission Designer	DX26/M. Walworth	281-483-5761

PDRS OPERATIONS CHECKLIST  
 STS-119 FLIGHT SUPPLEMENT

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**S6  
NOMINAL**

# S6 UNBERTH VIEWING

S6  
NOMINAL

## 1. SETUP

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 0

√INIT ID, ITEM 24: 0

R12 Green Jumper – ISS

V10/L	P1 LOOB
V10/R	Elbow
MON 1	A
MON 2	B

## 2. MNVR TO S6 UNBERTH VIEWING POSN

RHC √RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – SINGLE, ENTER

Mnvr to S6 UNBERTH VIEWING posn:

Pre-Cradle  
1: SY +  
2: SP +  
3: EP –  
S6 Unberth  
Viewing

SY	SP	EP	WP	WY	WR	
0.0	+25.0	-25.0	+5.0	0.0	0.0	
+80.0						
	+43.0					
		-50.0				
+80.0	+43.0	-50.0	+5.0	0.0	0.0	
X	Y	Z	PITCH	YAW	ROLL	PL ID
-773	-653	-396	296	66	46	0

BRAKES – ON (tb-ON)

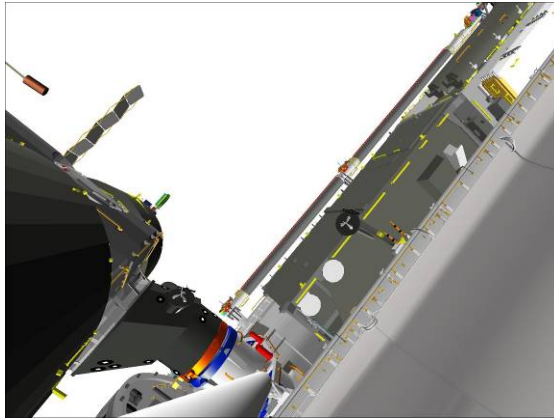
Notify SSRMS Operator that SRMS at S6 UNBERTH VIEWING posn



CCTV A (40,10)



CCTV B (-25,5)



**ELBOW (-140,-10)**

3. ACTIVATE LATCHES

On SSRMS Operator GO for PRLA Release

NOTE

When MCA LOGIC switches taken OFF, KU will mode to standby. MPM and MRL tbs – bp

MA73C:A MCA LOGIC MNC MID 2 – OFF  
:B MNB MID 4 – OFF

A6U √PL RETEN LAT (five) – OFF  
√PL SEL – MON  
R13L BAY MECH PWR SYS 1,2 (two) – ON  
A6U RETEN LOGIC PWR SYS 1,2 (two) – ON

SM 97 PL RETENTION

√PL SEL 1 RDY-FOR-LAT 1,2,3,4 (eight) – 1  
√LAT 1,2,3,4 (eight) – 1  
√2 RDY-FOR-LAT 1,2 (four) – 1  
√LAT 1,2 (four) – 1

\* If any REL msw shows '1', expect \*  
\* single motor time (60 sec) \*

4. AKA RELEASE

PL RETEN PL SEL – 2  
√LAT 1,2 tb – LAT  
√RDY 1,2 tb – gray

Note single motor times (> 30 sec)

PL RETEN LAT 1,2 (two) – REL (tb-REL), 60 sec max  
– OFF

5. PRLA RELEASE  
PL RETEN PL SEL – 1  
√LAT 1,2,3,4 (four) tb – LAT  
√RDY 1,2,3,4 (four) tb – gray

Note single motor times (> 30 sec)

PL RETEN LAT 1,2 (two) – REL (tb-REL), 60 sec max  
– OFF  
3,4 (two) – REL (tb-REL), 60 sec max  
– OFF

6. DEACTIVATE LATCHES  
PL RETEN LOGIC PWR SYS 1,2 (two) – OFF  
R13L BAY MECH PWR SYS 1,2 (two) – OFF

MA73C:A MCA LOGIC MNC MID 2 – ON  
:B MNB MID 4 – ON

Give SSRMS Operator GO for S6 Unberth

## S6 HANDOFF FROM SSRMS TO SRMS

### 1. SETUP

On SSRMS Operator GO for S6 Grapple

**SM 94 PDRS CONTROL**

√PL ID, ITEM 3: 0

√INIT ID, ITEM 24: 0

V10/L	C
V10/R	Elbow
MON 1	A
MON 2	B

### 2. MNVR TO S6 PRE-GRAPPLE POSN

RHC

√RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – SINGLE, ENTER

Mnvr to S6 PRE-GRAPPLE INTERMEDIATE posn:

S6 Unberth  
Viewing  
1: SY –  
S6 Pre-Grapple  
Intermediate

SY	SP	EP	WP	WY	WR		
+80.0	+43.0	-50.0	+5.0	0.0	0.0		
+60.0							
+60.0	+43.0	-50.0	+5.0	0.0	0.0		
X	Y	Z	PITCH	YAW	ROLL	PL ID	
-949	-593	-418	327	54	18	0	

**SM 94 PDRS CONTROL**

END POS – ITEM 18 -1 0 8 9 -2 3 5 -5 2 8 EXEC

ATT – ITEM 21 +6 5 +3 4 0 +3 5 8 EXEC

CMD CK – ITEM 25 EXEC (GOOD)

RHC

RATE – VERN (RATE MIN tb-ON)

MODE – OPR CMD, ENTER (READY It on)

AUTO SEQ – PROCEED (IN PROG It on)

When AUTO SEQ IN PROG It – off:

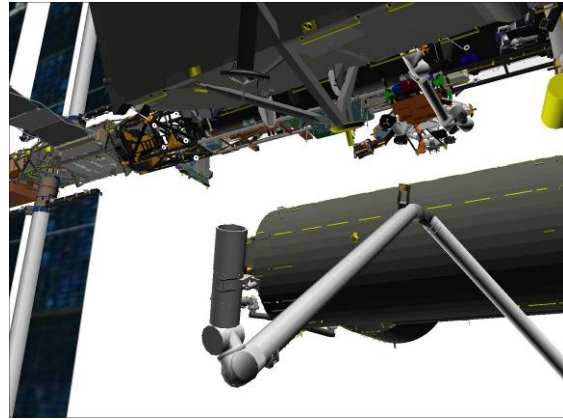
BRAKES – ON (tb-ON)

S6 PRE-GRAPPLE posn:

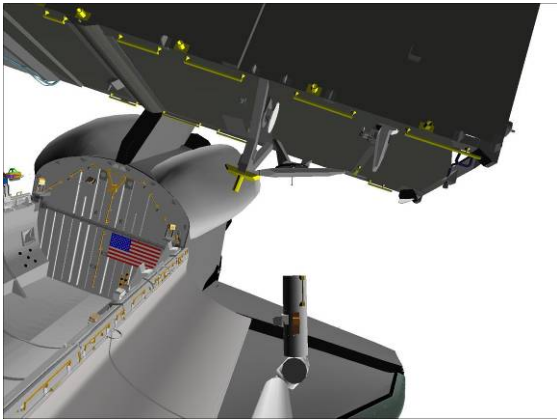
X	Y	Z	PITCH	YAW	ROLL	PL ID
-1089	-235	-528	65	340	358	0
SY	SP	EP	WP	WY	WR	
+18.1	+52.7	-82.0	+103.8	-44.3	+29.2	



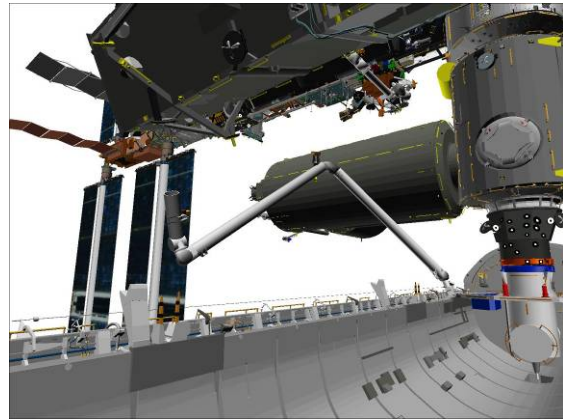
**CCTV A (20,20)**



**CCTV B (-30,20)**



**ELBOW (0,20)**



**CCTV C (-40,10)**

3. SETUP FOR S6 GRAPPLE

V10/L	D
V10/R	A
MON 1	EE
MON 2	B

A7U

CCTV – config for grapple

– install PDRS TARGET OVERLAY FOR CTVM

– RMS WRIST, zoom 34.0 HFOV  
focus 5 ft

Maintain eyepoint approx 18 in when using grapple overlay

4. S6 GRAPPLE

Notify SSRMS Operator, going in for S6 grapple

√RATE – VERN (RATE MIN tb-ON)

BRAKES – OFF (tb-OFF)

MODE – END EFF, ENTER

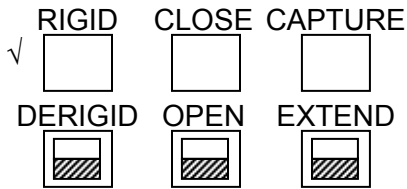
Mnvr to grapple envelope

<b>CAUTION</b> Monitor EE tb timing to prevent EE motor burnout
--

**SM 169 PDRS STATUS**

EE MODE – AUTO

CAPTURE sw – depress (mom)



**CRITICAL TIMES (28 sec total):**

CAPTURE tb – gray, then  
 CLOSE tb – gray, 3 sec max, then  
 RIGID tb – gray, 25 sec max

EE MODE – OFF

MODE – TEST, ENTER

Wait 5 sec

BRAKES – ON (tb-ON)

MODE – not DIRECT (It off)

**SM 94 PDRS CONTROL**

PL ID – ITEM 3 +3 EXEC

INIT ID – ITEM 24 +3 EXEC

Expected S6 HANDOFF posn:

	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-1105	-19	-661	346	272*	280	3
	SY	SP	EP	WP	WY	WR	
✓	+11.4	+53.9	-73.0	+88.1	-42.1	+21.4	

\* Display Singularity

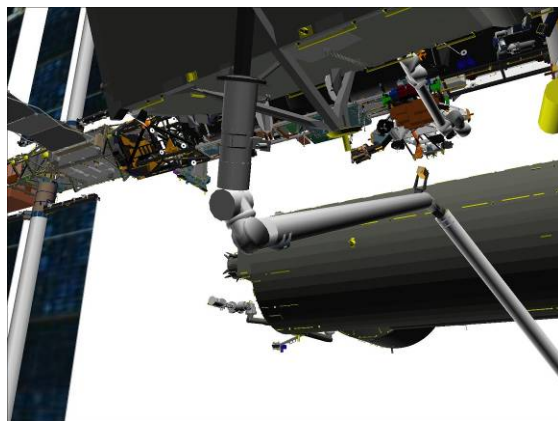
PARAM – PORT TEMP

JOINT – CRIT TEMP

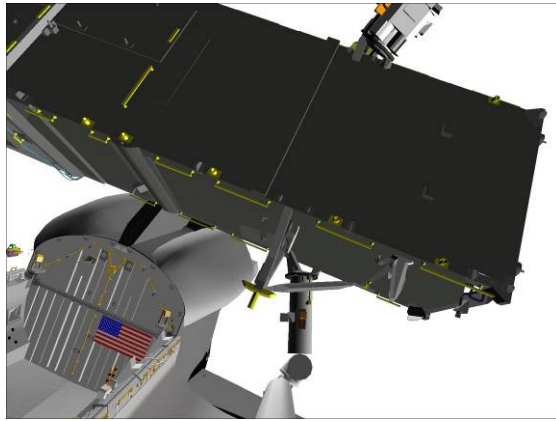
Notify SSRMS Operator grapple complete and Brakes On, GO for S6 Release



**CCTV A (20,20)**



**CCTV B (-30,20)**



**ELBOW (0,20)**

Review GENERIC END EFFECTOR CUE CARD – ISS/SHUTTLE DOCKED OPS



# S6 HANDBACK FROM SRMS TO SSRMS

## 1. SETUP

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 3

√INIT ID, ITEM 24: 3

AUTO MODES – ITEM 13 +7 EXEC

V10/L	B
V10/R	S1 LOOB
MON 1	A → Elbow
MON 2	D

### ATTITUDE CONTROL CONFIGURATION

If using shuttle attitude control:

Verify in attitude, then

DAP: FREE

## 2. MNVR TO S6 SRMS TO SSRMS HANDBACK POSN

On MCC GO for maneuver to S6 SRMS to SSRMS Handback posn

SM 94 PDRS CONTROL

END POS – ITEM 18 -1 1 0 5 -1 9 -6 6 1 EXEC

ATT – ITEM 21 +3 4 6 +2 7 2 +2 8 0 EXEC

CMD CK – ITEM 25 EXEC (GOOD)

RHC

RATE – VERN (RATE MIN tb-ON)

BRAKES – OFF (tb-OFF)

MODE – OPR CMD, ENTER (READY It on)

AUTO SEQ – PROCEED (IN PROG It on)

S6 HANDOFF posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
√ -1105	-19	-661	346	272	280	3
	SY	SP	EP	WP	WY	WR
√ +11.4	+53.9	-73.0	+88.1	-42.1	+21.4	

When AUTO SEQ IN PROG It – off:

MODE – AUTO 1, ENTER (READY It on)

\* If unable to enter AUTO Mode (no AUTO READY It): \*

\* √Joint angles and adjust as reqd \*

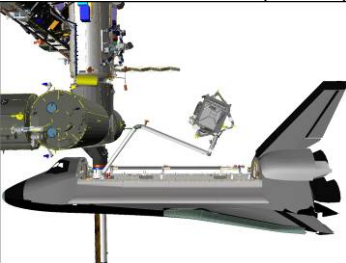
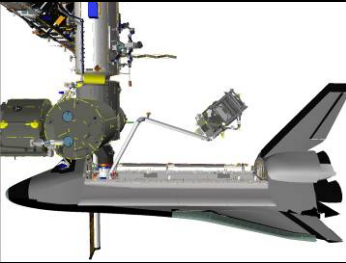
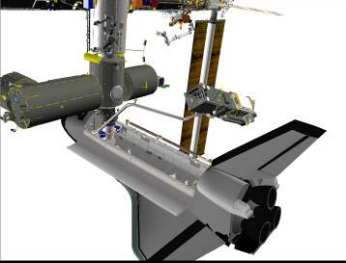
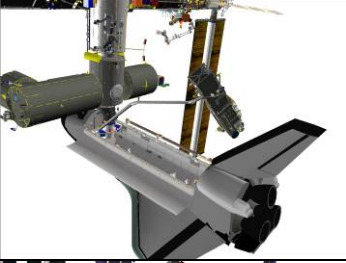
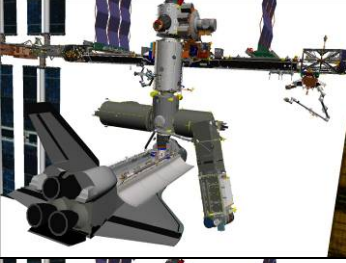
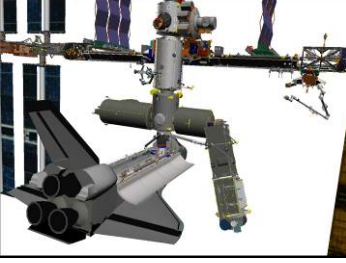
SM 94 PDRS CONTROL

√START PT, ITEM 17: 148

SM 169 PDRS STATUS

Monitor ACAS progress

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	
<b>148P</b>	<b>-1105</b>	<b>-19</b>	<b>-661</b>	<b>346</b>	<b>272</b>	<b>280</b>	
149	-1134	+116	-660	269	280	229	
150	-1129	+372	-630	290	290	246	
151	-1057	+443	-587	281	316	210	
152	-978	+465	-447	281	343	192	
<b>153P</b>	<b>-924</b>	<b>+523</b>	<b>-417</b>	<b>284</b>	<b>341</b>	<b>185</b>	

When AUTO SEQ IN PROG It – off:  
BRAKES – ON (tb-ON)

	X	Y	Z	PITCH	YAW	ROLL	PL ID
√	-924	+523	-417	284	341	185	3
	SY	SP	EP	WP	WY	WR	
√	-62.9	+14.8	-31.1	-4.5	-20.4	-91.5	

**ATTITUDE CLEANUP**

If using shuttle attitude control and attitude maintenance required:

DAP: √A12/FREE/VERN

DAP Update: CA 3 (ITEM 28 +3)

DAP: (Wait 30 sec) LVLH

When rates damped:

DAP: FREE > 2 sec

DAP: AUTO

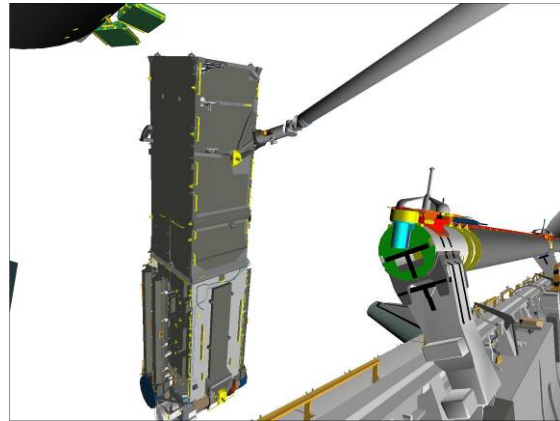
When in attitude and rates damped:

DAP: FREE

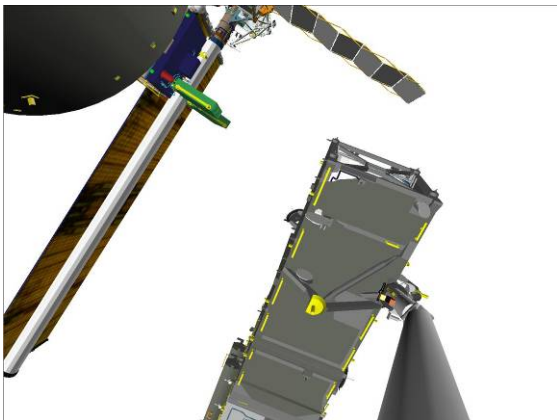
Notify SSRMS Operator SRMS at S6 SRMS to SSRMS Handback posn with Brakes On, GO for S6 Grapple



**CCTV B (20,15)**



**CCTV D (-40,5)**



**ELBOW (-20,10)**



**S1 LOOB (50,25)**

3. S6 UNGRAPPLE

On SSRMS Operator GO for S6 Release

V10/L	B
V10/R	US LAB(S1 LOOB)
MON 1	EE(Elbow)
MON 2	D

CCTV – config for ungrapple  
 – RMS WRIST, ZOOM: 34.0 HFOV  
 FOCUS: 5 ft

NOTE

CONTR ERR It and 'S96 PDRS CNTL' msg may occur due to Consistency/Envelope Check error

RHC RATE – COARSE (RATE MIN tb-OFF)

SM 94 PDRS CONTROL

AUTO BRAKE INH – ITEM 10 EXEC (\*)

A8U BRAKES – OFF (tb-OFF)  
 MODE – TEST, ENTER  
 Wait 5 sec

BRAKES – ON (tb-ON)

SM 94 PDRS CONTROL

AUTO BRAKE ENA – ITEM 9 EXEC (\*)

PL ID – ITEM 3 +0 EXEC

INIT ID – ITEM 24 +0 EXEC

RATE – VERN (RATE MIN tb-ON)

BRAKES – OFF (tb-OFF)

MODE – END EFF, ENTER

CAUTION

Monitor EE tb timing to prevent EE motor burnout

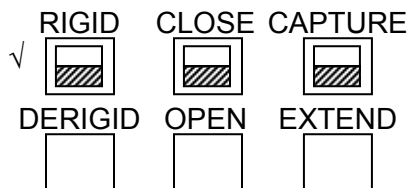
SM 169 PDRS STATUS

EE MODE – AUTO

RELEASE sw – depress (mom)

NOTE

When OPEN tb – gray, mnvr arm clear of grapple pin



CRITICAL TIMES (28 sec total):

DERIGID tb – gray, 5 sec max, then

OPEN tb – gray, 3 sec max, then

EXTEND tb – gray, 20 sec max

EE MODE – OFF

- \* If manual release reqd: \*
- \* EE MODE – MAN \*
- \* MAN CONTR – DERIGID (hold until DERIGID tb-gray, \*
- \* 5 sec max) \*
- \* RELEASE sw – depress (hold until OPEN tb-gray, \*
- \* 3 sec max) \*
- \* Mnvr arm clear, then \*
- \* EE MAN CONTR – DERIGID (hold until EXTEND tb-gray, \*
- \* 20 sec max) \*
- \* MODE – OFF \*

THC/RHC

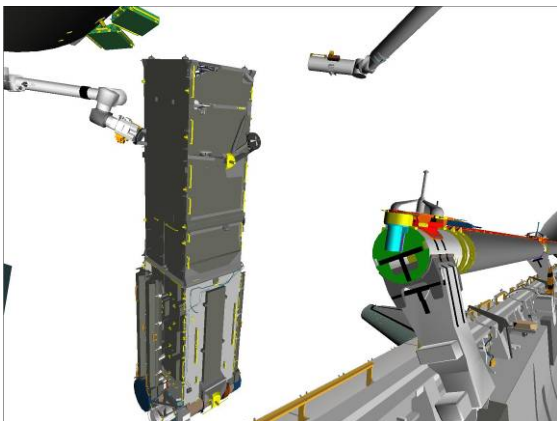
Mnvr to S6 INSTALL VIEWING posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-908	+298	-647	141	296	70	0
SY	SP	EP	WP	WY	WR	
-58.1	+41.4	-64.4	+19.3	-51.8	-50.6	

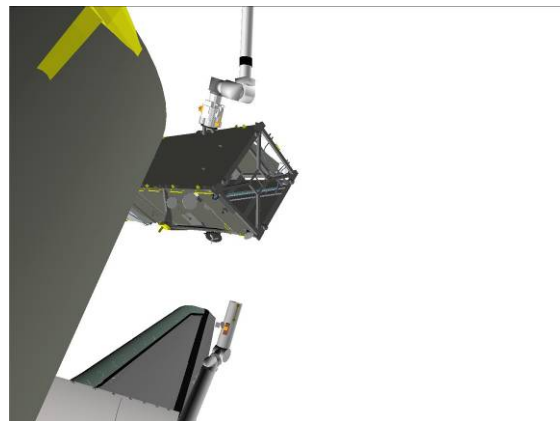
BRAKES – ON (tb-ON)

PARAM – PORT TEMP  
JOINT – CRIT TEMP

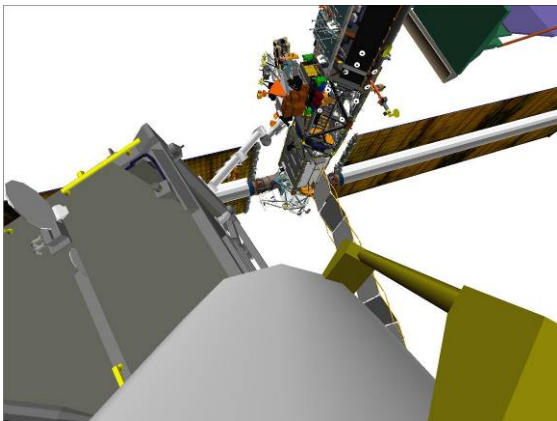
Notify SSRMS Operator that SRMS at S6 INSTALL VIEWING posn, GO for maneuver to OVERNIGHT PARK posn



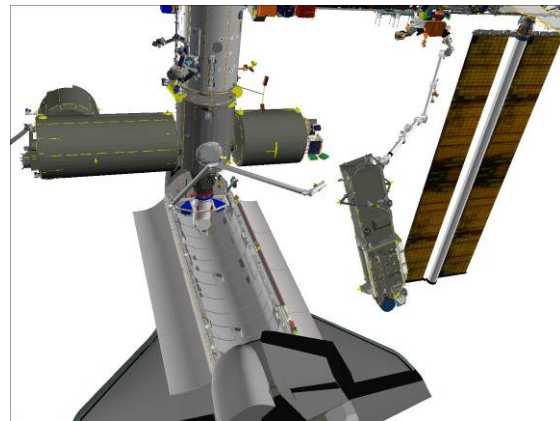
**CCTV D (-40,5)**



**US LAB (-20,15)**



**EE**



**BIRD'S EYE**

## MNVR FROM S6 INSTALL VIEWING TO PRE-CRADLE POSN

### 1. SETUP

SM 94 PDRS CONTROL

√ PL ID, ITEM 3: 0

√ INIT ID, ITEM 24: 0

R12

√ Green Jumper – ISS

V10/L	Elbow
V10/R	S1 LOOB
MON 1	B → C
MON 2	A

Verify at S6 INSTALL VIEWING posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-908	+298	-647	141	296	70	0
SY	SP	EP	WP	WY	WR	
-58.1	+41.4	-64.4	+19.3	-51.8	-50.6	

### 2. MNVR TO PRE-CRADLE POSN

SM 94 PDRS CONTROL

END POS – ITEM 18 -1 2 6 1 -1 4 6 -5 5 1 EXEC

ATT – ITEM 21 +5 +2 +0 EXEC

CMD CK – ITEM 25 EXEC (GOOD)

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – OPR CMD, ENTER (Ready It on)

AUTO SEQ – PROCEED (IN PROG It on)

When AUTO SEQ IN PROG It – off:

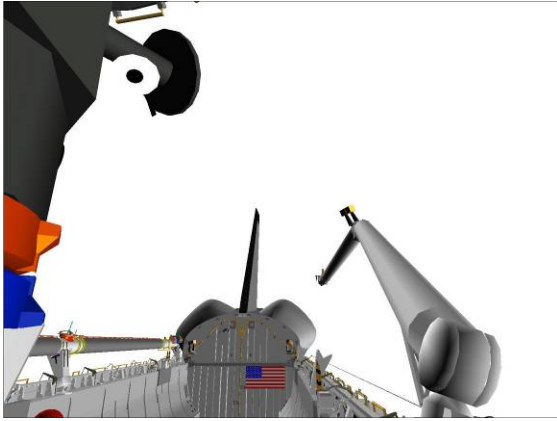
BRAKES – ON (tb-ON)

PRE-CRADLE posn:

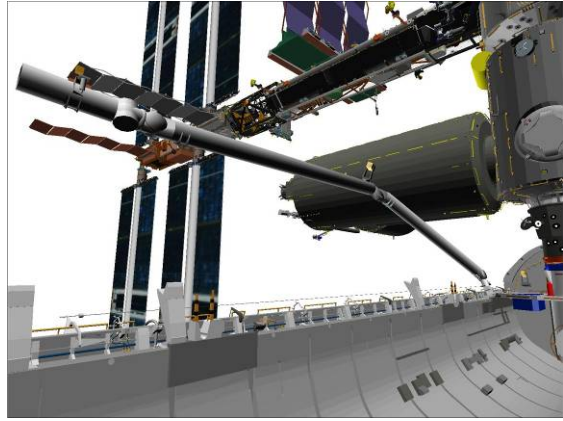
X	Y	Z	PITCH	YAW	ROLL	PL ID
√ -1261	-146	-551	5	2	0	0
√ SY	SP	EP	WP	WY	WR	
√ 0.0	+25.0	-25.0	+5.0	0.0	0.0	

PARAM – PORT TEMP

JOINT – CRIT TEMP



**CCTV A (0,20)**



**CCTV C (-45,10)**

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S6 OFF-NOMINAL

S6 UNBERTH VIEWING.....	FS 2-2
HANDOFF FROM SSRMS TO SRMS .....	FS 2-6
HANDBACK FROM SRMS TO SSRMS.....	FS 2-15
MNVR FROM S6 INSTALL VIEWING TO PRE-CRADLE POSN.....	FS 2-30
S6 REBERTH .....	FS 2-34

S6  
OFF-NOMINAL

## S6 UNBERTH VIEWING

### 1. SETUP

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 0

√INIT ID, ITEM 24: 0

R12

Green Jumper – ISS

V10/L	P1 LOOB
V10/R	Elbow
MON 1	A
MON 2	B

### 2. MNVR TO S6 UNBERTH VIEWING POSN

PARAM – Joint Angle

If SINGLE MODE available:

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – best available

Mnvr to S6 UNBERTH VIEWING posn:

Pre-Cradle  
1: SY +  
2: SP +  
3: EP –  
S6 Unberth  
Viewing

SY	SP	EP	WP	WY	WR	
0.0	+25.0	-25.0	+5.0	0.0	0.0	
+80.0						
	+43.0					
		-50.0				
+80.0	+43.0	-50.0	+5.0	0.0	0.0	
X	Y	Z	PITCH	YAW	ROLL	PL ID
-773	-653	-396	296	66	46	0

If SINGLE MODE:

BRAKES – ON (tb-ON)

MODE – not DIRECT (It off)

Notify SSRMS Operator that SRMS at S6 UNBERTH VIEWING posn

S6  
OFF-NOMINAL

Step 1:

Drive SY+ (for 80.0°)  
From 0.0° to +80.0°



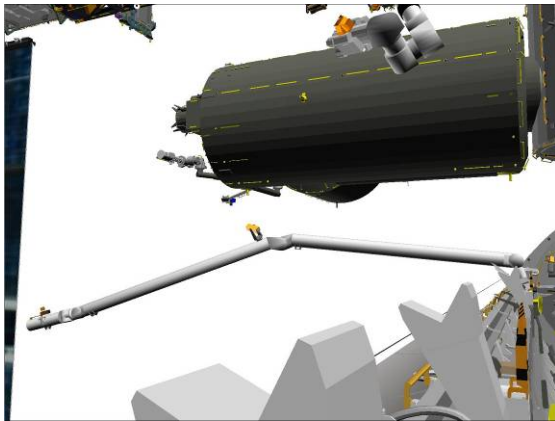
**CCTV A (40,10)**

Step 2:

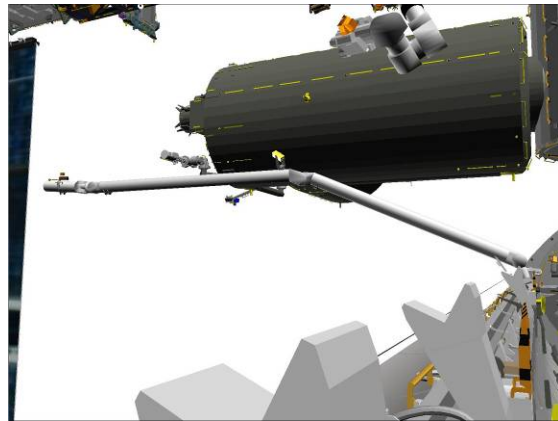
Drive SP+ (for 18.0°)  
From +25.0° to +43.0°



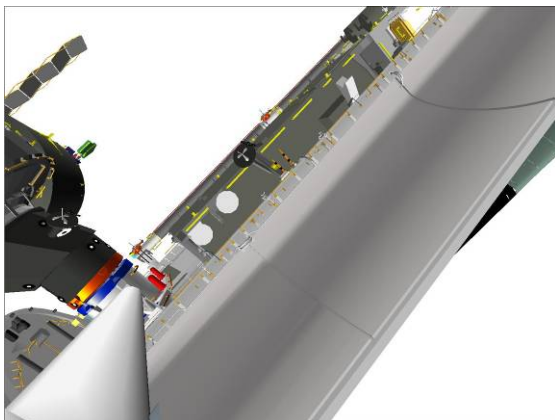
**CCTV A (40,10)**



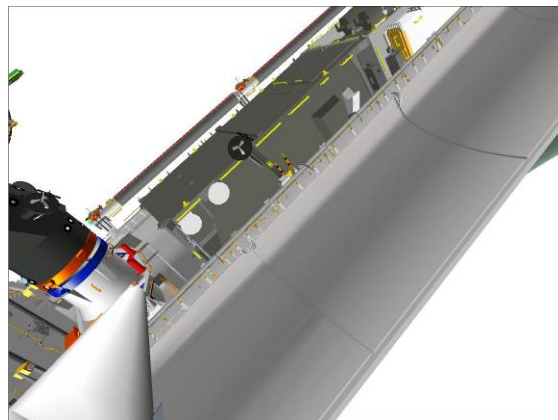
**CCTV B (-25,5)**



**CCTV B (-25,5)**



**ELBOW (-140,-10)**



**ELBOW (-140,-10)**

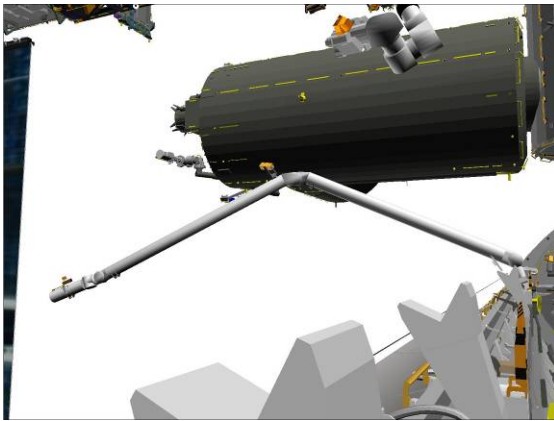
Step 3:

Drive EP- (for 25.0°)

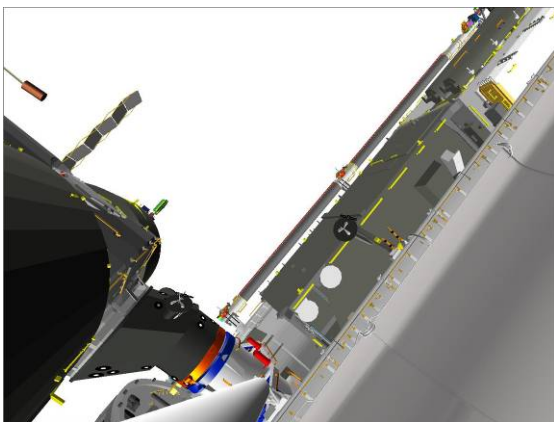
From (-25.0° to -50.0°)



**CCTV A (40,10)**



**CCTV B (-25,5)**



**ELBOW (-140,-10)**

3. ACTIVATE LATCHES

On SSRMS Operator GO for PRLA Release

NOTE

When MCA LOGIC switches taken OFF, KU will mode to standby. MPM and MRL tbs – bp

MA73C:A MCA LOGIC MNC MID 2 – OFF  
:B MNB MID 4 – OFF

A6U  $\sqrt{\text{PL RETEN LAT}}$  (five) – OFF  
 $\sqrt{\text{PL SEL}}$  – MON  
R13L BAY MECH PWR SYS 1,2 (two) – ON  
A6U RETEN LOGIC PWR SYS 1,2 (two) – ON

SM 97 PL RETENTION

$\sqrt{\text{PL SEL 1 RDY-FOR-LAT}}$  1,2,3,4 (eight) – 1  
 $\sqrt{\text{LAT 1,2,3,4}}$  (eight) – 1  
 $\sqrt{2 \text{ RDY-FOR-LAT}}$  1,2 (four) – 1  
 $\sqrt{\text{LAT 1,2}}$  (four) – 1

\* If any REL msw shows '1', expect \*  
\* single motor time (60 sec) \*

4. AKA RELEASE

PL RETEN PL SEL – 2  
 $\sqrt{\text{LAT 1,2 tb}}$  – LAT  
 $\sqrt{\text{RDY 1,2 tb}}$  – gray

Note single motor times (> 30 sec)

PL RETEN LAT 1,2 (two) – REL (tb-REL), 60 sec max  
– OFF

5. PRLA RELEASE

PL RETEN PL SEL – 1  
 $\sqrt{\text{LAT 1,2,3,4}}$  (four) tb – LAT  
 $\sqrt{\text{RDY 1,2,3,4}}$  (four) tb – gray

Note single motor times (> 30 sec)

PL RETEN LAT 1,2 (two) – REL (tb-REL), 60 sec max  
– OFF  
3,4 (two) – REL (tb-REL), 60 sec max  
– OFF

6. DEACTIVATE LATCHES

R13L PL RETEN LOGIC PWR SYS 1,2 (two) – OFF  
BAY MECH PWR SYS 1,2 (two) – OFF

MA73C:A MCA LOGIC MNC MID 2 – ON  
:B MNB MID 4 – ON

Give SSRMS Operator GO for S6 Unberth

## S6 HANDOFF FROM SSRMS TO SRMS

### 1. SETUP

On SSRMS Operator GO for S6 grapple

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 0

√INIT ID, ITEM 24: 0

V10/L	P1 LOOB
V10/R	Elbow
MON 1	A
MON 2	B

### 2. MNVR TO S6 PRE-GRAPPLE POSN

PARAM – Joint Angle

If SINGLE MODE available:

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – best available

Mnvr to S6 PRE-GRAPPLE posn:

	SY	SP	EP	WP	WY	WR	
S6 Unberth Viewing	+80.0	+43.0	-50.0	+5.0	0.0	0.0	
1: SY –	+40.0						
2: SP +		+52.7					
3: EP –			-82.0				
4: WP +				+103.8			
5: WY –					-44.3		
6: WR +						+29.2	
7: SY –	+18.1						
S6 Pre-Grapple	+18.1	+52.7	-82.0	+103.8	-44.3	+29.2	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-1089	-235	-528	65	340	358	0

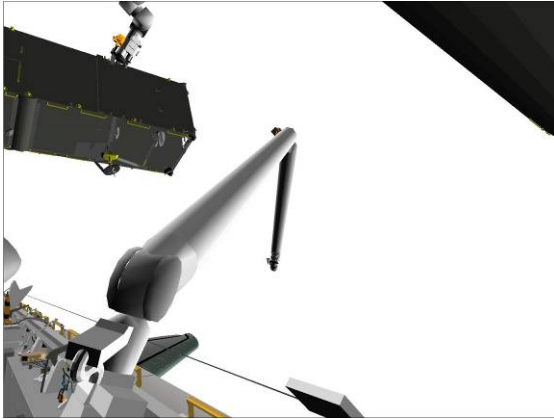
If SINGLE MODE:

BRAKES – ON (tb-ON)

MODE – not DIRECT (It off)

Step 1:

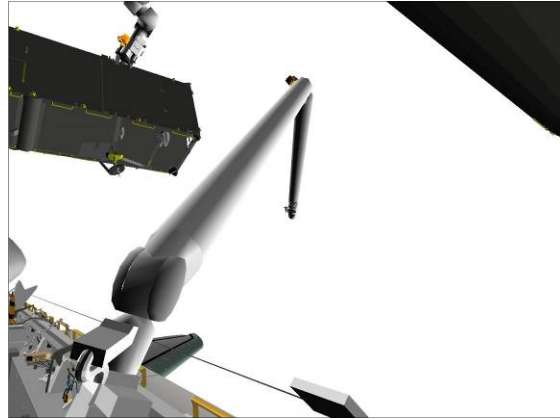
Drive SY- (for 40.0°)  
From +80.0° to +40.0°



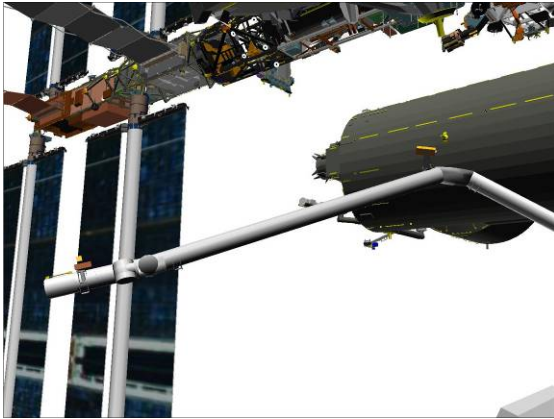
**CCTV A (40,10)**

Step 2:

Drive SP+ (for 9.7°)  
From +43.0° to +52.7°



**CCTV A (40,10)**



**CCTV B (-40,10)**



**CCTV B (-40,10)**



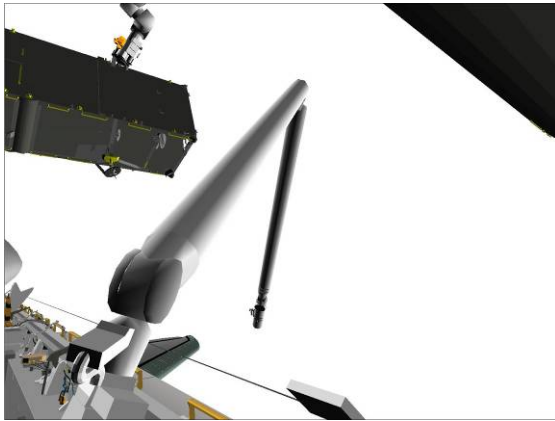
**P1 LOOB (135,20)**



**P1 LOOB (135,20)**

Step 3:

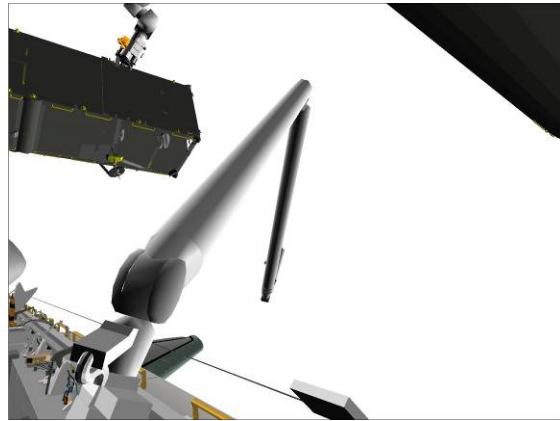
Drive EP- (for 32.0°)  
From -50.0° to -82.0°



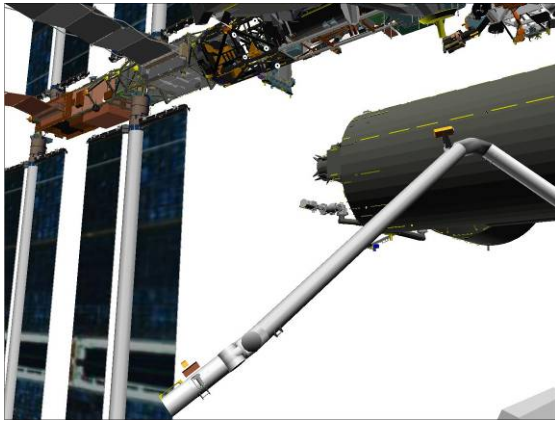
**CCTV A (40,10)**

Step 4:

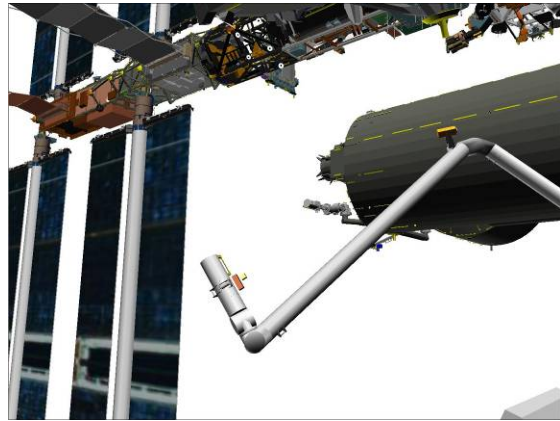
Drive WP+ (for 98.8°)  
From +5.0° to +103.8°



**CCTV A (40,10)**



**CCTV B (-40,10)**



**CCTV B (-40,10)**



**P1 LOOB (135,20)**

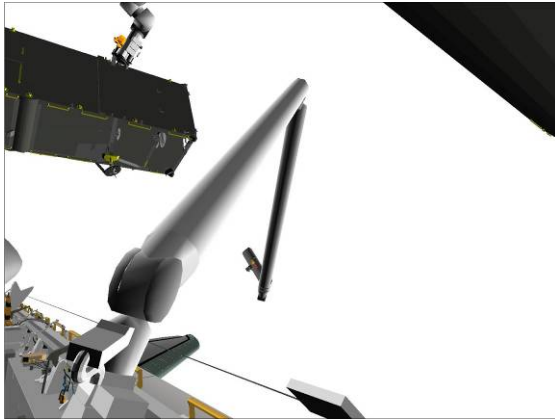


**ELBOW (0,10)**



Step 5:

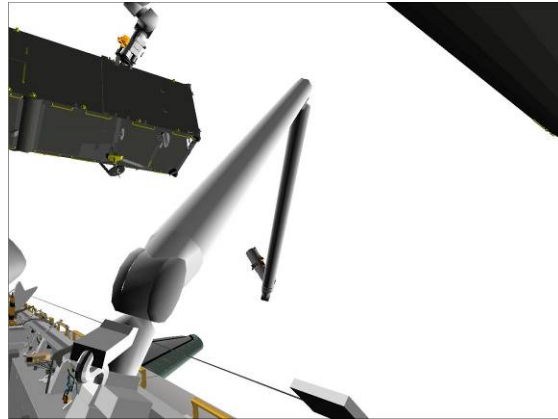
Drive WY- (for 44.3°)  
From 0.0° to -44.3°



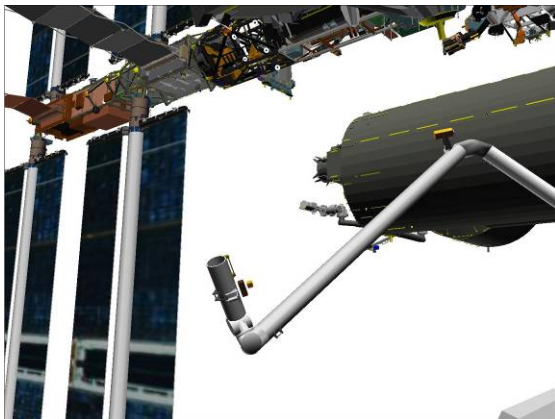
**CCTV A (40,10)**

Step 6:

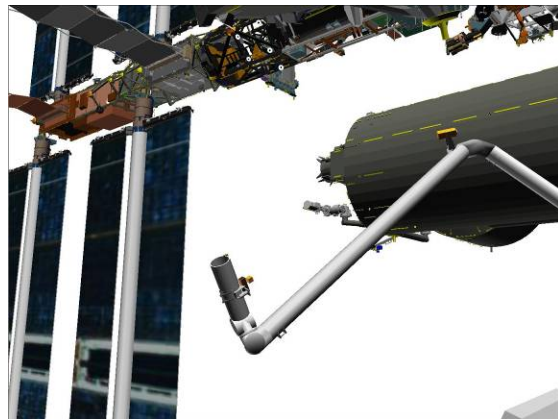
Drive WR+ (for 29.2°)  
From 0.0° to +29.2°



**CCTV A (40,10)**



**CCTV B (-40,10)**



**CCTV B (-40,10)**



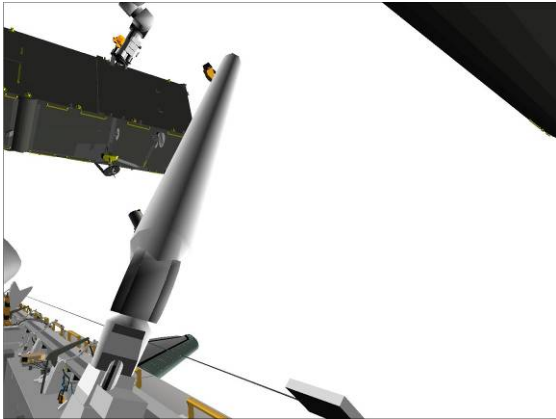
**ELBOW (0,10)**



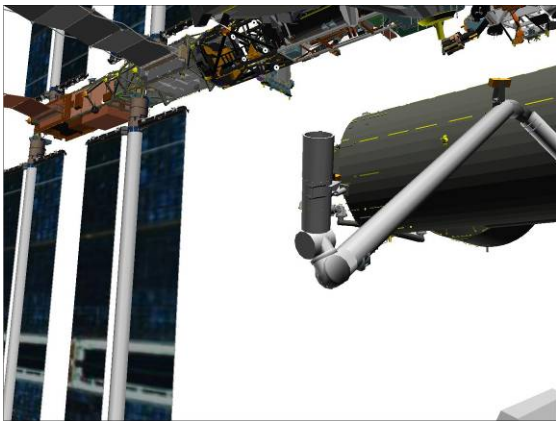
**ELBOW (0,10)**

Step 7:

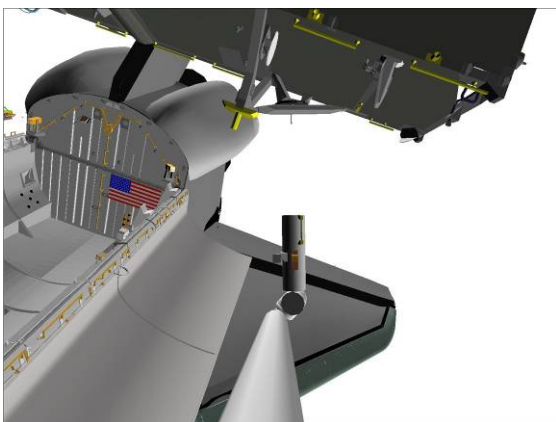
Drive SY- (for 21.9°)  
From +40.0° to +18.1°



**CCTV A (40,10)**



**CCTV B (-40,10)**



**ELBOW (0,10)**

3. SETUP FOR S6 GRAPPLE

V10/L	P1 LOOB
V10/R	A
MON 1	EE
MON 2	B

A7U

CCTV – config for grapple  
– install PDRS TARGET OVERLAY FOR CTVM  
– RMS WRIST, zoom 34.0 HFOV  
focus 5 ft  
Maintain eyepoint approx 18 in when using grapple overlay

4. MNVR TO S6 GRAPPLE

Notify SSRMS Operator, going in for S6 Grapple

ATTITUDE CONTROL CONFIGURATION

If using shuttle attitude control:

Verify in attitude, then  
DAP: FREE

RHC

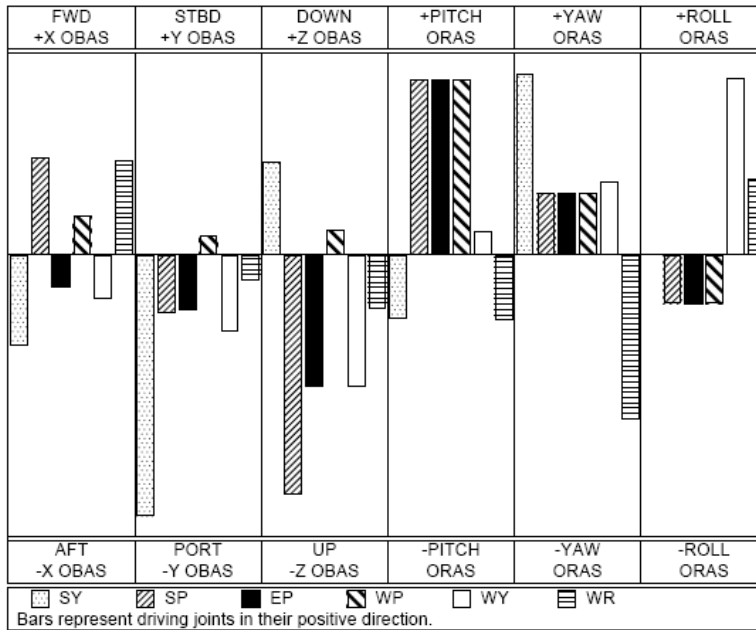
If SINGLE MODE available:

√RATE – VERN (RATE MIN tb-ON)  
BRAKES – OFF (tb-OFF)

MODE – best available

Drive joints per S6 SJ GRAPPLE AT HANDOFF – CCTV OVERLAY and diagram until EE within grapple envelope

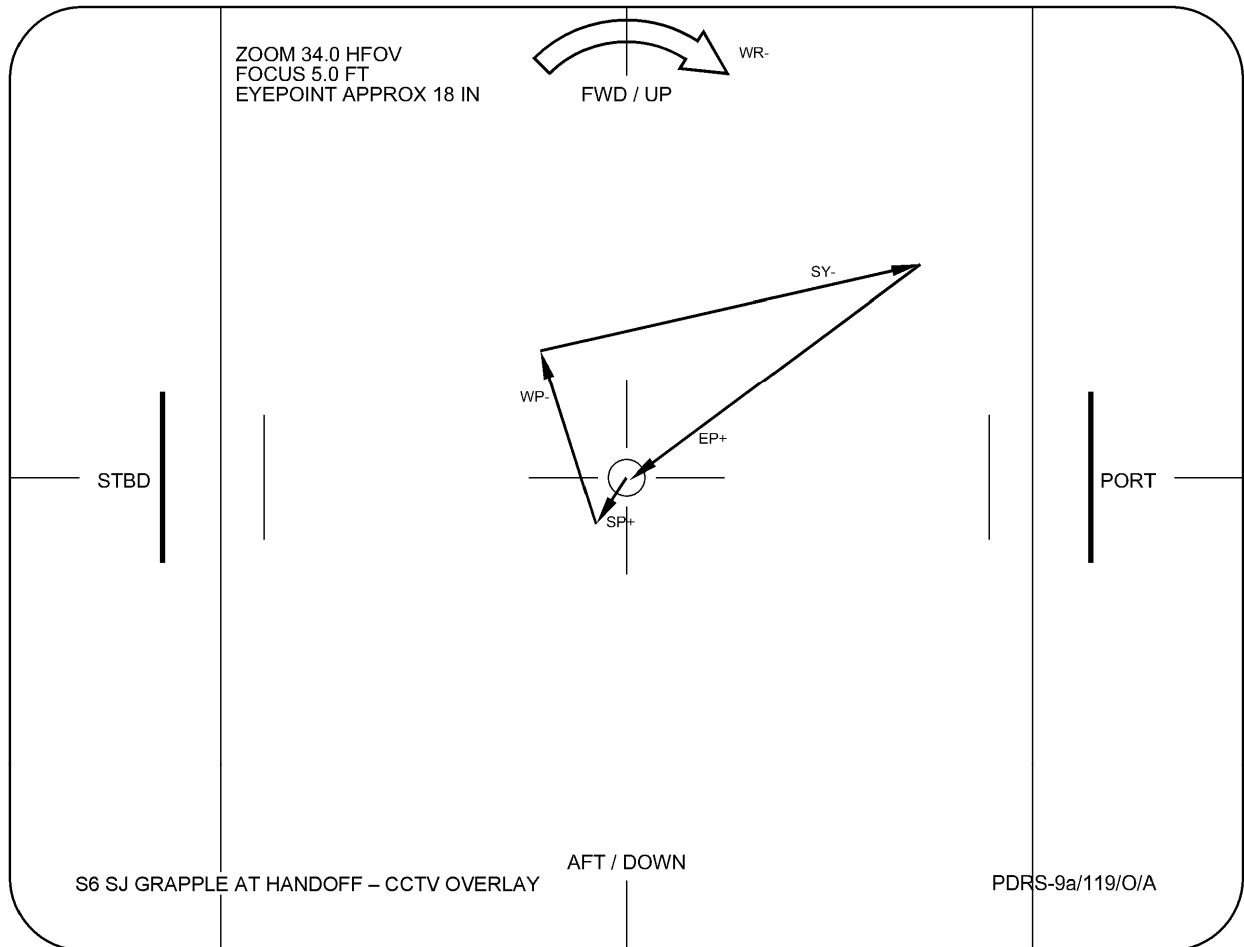
### S6 SJ GRAPPLE



To get:	Drive:	To get:	Drive:
+X (fwd)	+WR, +SP	+PITCH	+WP, +EP
+Y (stbd)	-SY	+YAW	-WR, +SY
+Z (down)	-SP, -EP	+ROLL	+WY, +WR

Driving:	Results In:	Driving:	Results In:
+SY	-Y (port), +YAW	+WP	+X (fwd), +PITCH
+SP	-Z (up), +PITCH	+WY	-Z (up), +ROLL
+EP	-Z (up), +PITCH	+WR	+X (fwd), -YAW

$\Delta SY$	$\Delta SP$	$\Delta EP$	$\Delta WP$	$\Delta WY$	$\Delta WR$
-6.7	+1.3	+9.0	-15.7	+2.2	-7.8

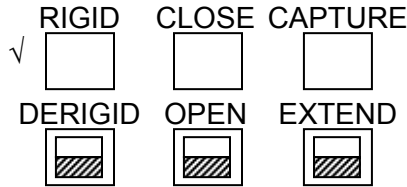


5. S6 GRAPPLE

**CAUTION**  
Monitor EE tb timing to prevent EE motor burnout

**SM 169 PDRS STATUS**

EE MODE – AUTO  
CAPTURE sw – depress (mom)



CRITICAL TIMES (28 sec total):  
 CAPTURE tb – gray, then  
 CLOSE tb – gray, 3 sec max, then  
 RIGID tb – gray, 25 sec max

EE MODE – OFF

- \* If manual capture required: \*
- \* EE MODE – MAN \*
- \* CAPTURE sw – depress (hold until CLOSE tb-gray, 3 sec max) \*
- \* MAN CONTR – RIGID (hold until RIGID tb-gray, 25 sec max) \*
- \* MODE – OFF \*

If TEST MODE available:  
 MODE – TEST, ENTER  
 Wait 5 sec  
 BRAKES – ON (tb-ON)  
 MODE – not DIRECT (It off)

If SINGLE MODE available:  
SM 94 PDRS CONTROL  
 PL ID – ITEM 3 +3 EXEC  
 INIT ID – ITEM 24 +3 EXEC

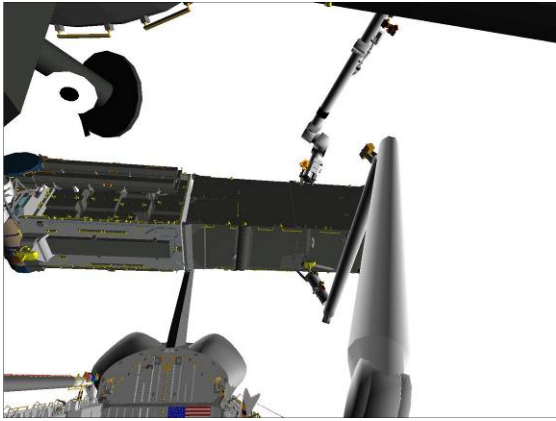
Expected S6 HANDOFF posn:

	X	Y	Z	PITCH	YAW	ROLL	PL ID
√	-1105	-19	-661	346	272*	280	3
	SY	SP	EP	WP	WY	WR	
√	+11.4	+53.9	-73.0	+88.1	-42.1	+21.4	

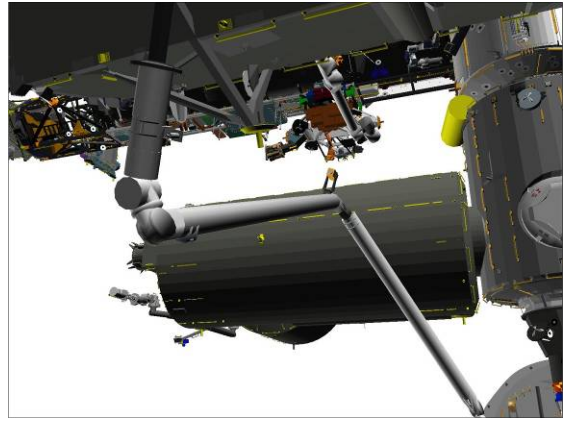
\* Display Singularity

PARAM – PORT TEMP  
 JOINT – CRIT TEMP

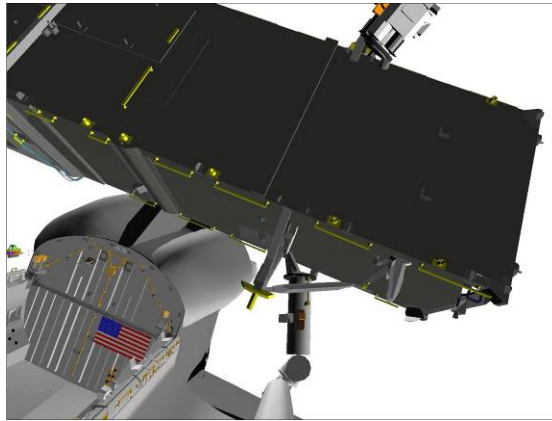
Notify SSRMS Operator grapple complete and Brakes On, GO for S6 Release



**CCTV A (10,25)**



**CCTV B (-20,20)**



**ELBOW (0,20)**

Review GENERIC END EFFECTOR CUE CARD – ISS/SHUTTLE DOCKED OPS

## S6 HANDBACK FROM SRMS TO SSRMS

### 1. SETUP

If SINGLE MODE available:

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 3

√INIT ID, ITEM 24: 3

R12

√Green Jumper – ISS

V10/L	C
V10/R	P1 LOOB
MON 1	A
MON 2	Elbow

### ATTITUDE CONTROL CONFIGURATION

If using shuttle attitude control:

Verify in attitude, then

DAP: FREE

### 2. MNVR TO S6 SRMS TO SSRMS HANDBACK POSN

On MCC GO for maneuver to S6 SRMS to SSRMS Handback posn

PARAM – Joint Angle

If SINGLE MODE available:

RHC

RATE – COARSE (RATE MIN tb-OFF)

BRAKES – OFF (tb-OFF)

MODE – best available

Mnvr to S6 SRMS TO SSRMS HANDBACK posn:

	SY	SP	EP	WP	WY	WR	
S6 Grapple	+11.4	+53.9	-73.0	+88.1	-42.1	+21.4	
1: EP +			-31.1				
2: WP -				-4.5			
3: WY +					-20.4		
4: SY -	-30.0						
5: WR -						-91.5	
6: SY -	-50.0						
7: SP -		+14.8					
8: SY -	-62.9						
S6 Handback	-62.9	+14.8	-31.1	-4.5	-20.4	-91.5	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-924	+523	-417	284	341	185	3

If SINGLE MODE:

BRAKES – ON (tb-ON)

MODE – not DIRECT (It off)

If using shuttle attitude control and attitude maintenance required:

DAP: √A12/FREE/VERN

DAP Update: CA 3 (ITEM 28 +3)

DAP: (Wait 30 sec) LVLH

When rates damped:

DAP: FREE > 2 sec

DAP: AUTO

When in attitude and rates damped:

DAP: FREE

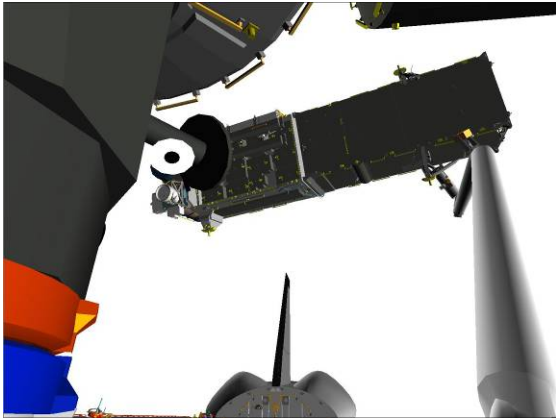
Notify SSRMS Operator SRMS at S6 SRMS to SSRMS Handback posn with  
Brakes On, GO for S6 Grapple



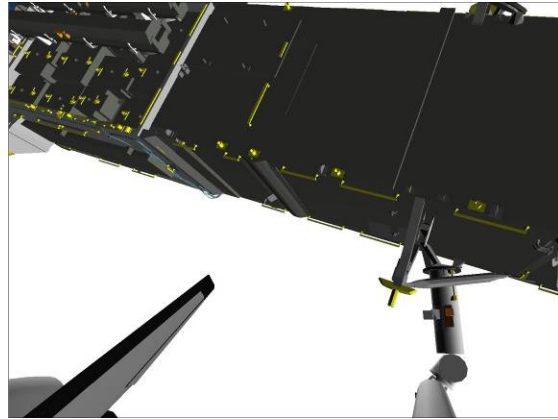
Step 1:

Drive EP+ (for 41.9°)

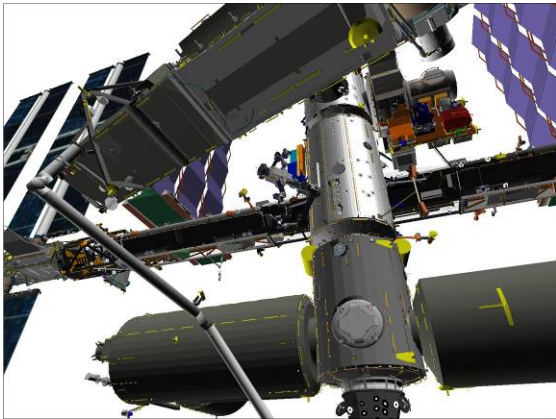
From -73.0° to -31.1°



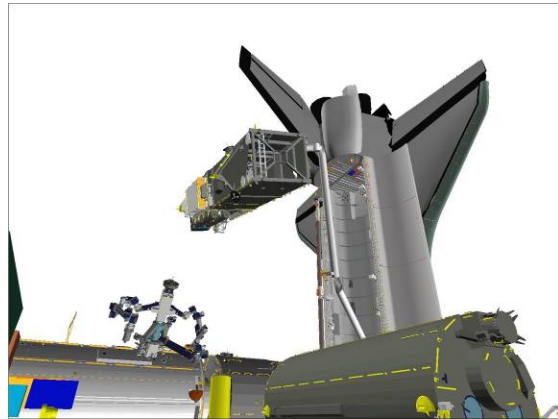
**CCTV A (-5,30)**



**ELBOW (-20,20)**



**CCTV C (-20,35)**

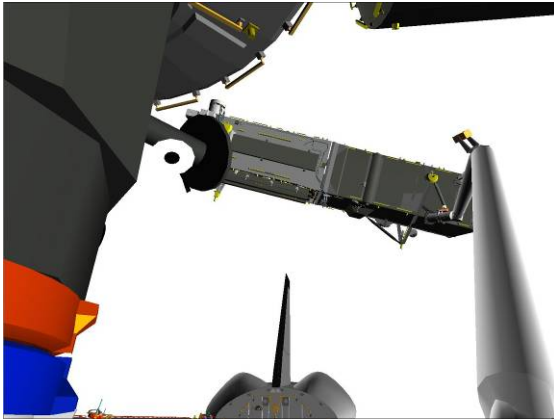


**P1 LOOB (120,30)**

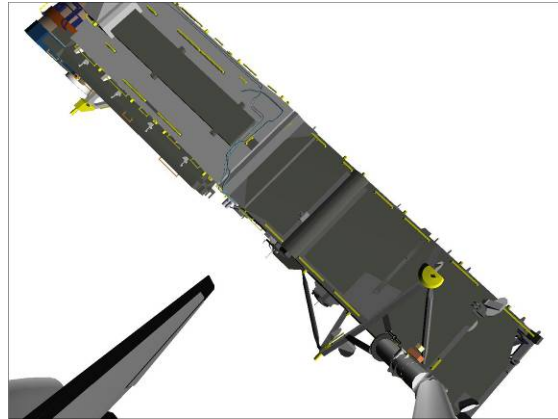
Step 2:

Drive WP- (for 92.6°)

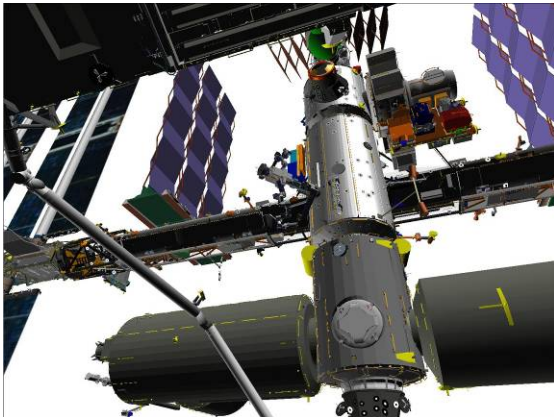
From +88.1° to -4.5°



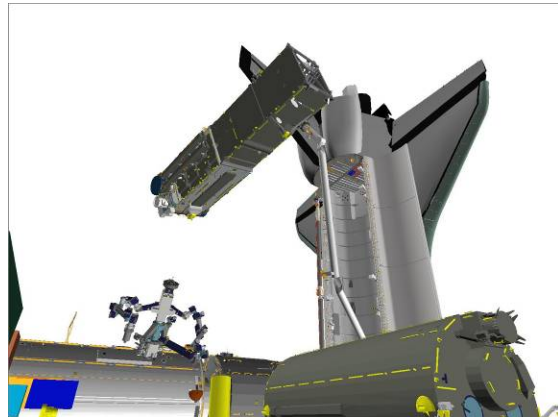
**CCTV A (-5,30)**



**ELBOW (-20,20)**



**CCTV C (-20,35)**

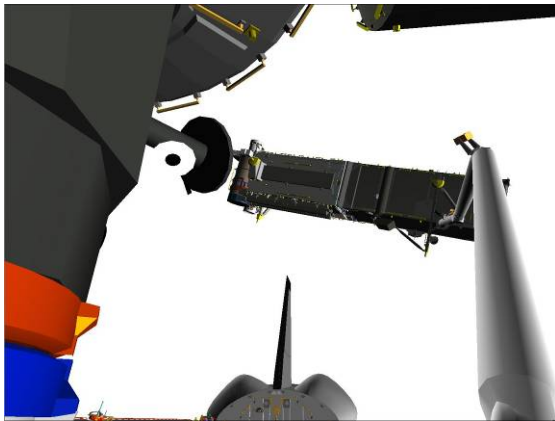


**P1 LOOB (120,30)**

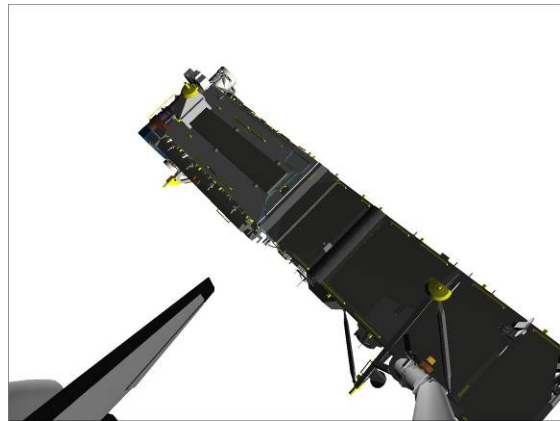
Step 3:

Drive WY+ (for 21.7°)

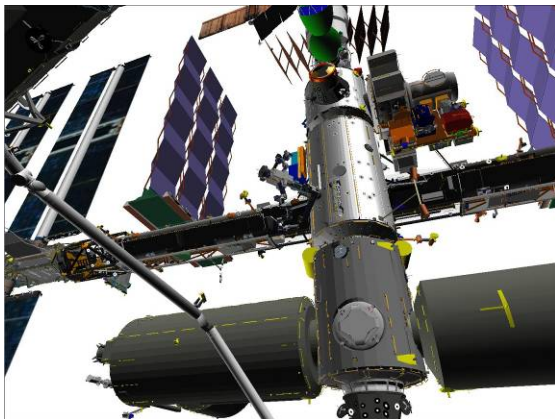
From -42.1° to -20.4°



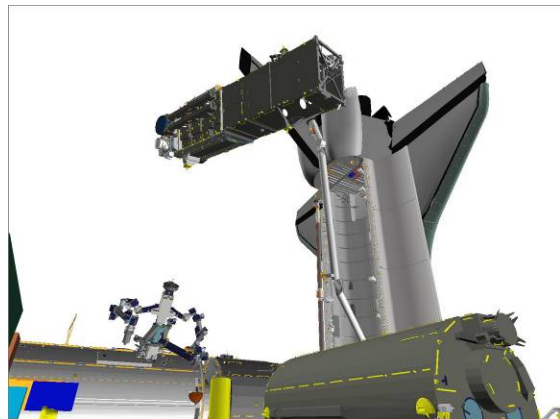
**CCTV A (-5,30)**



**ELBOW (-20,20)**



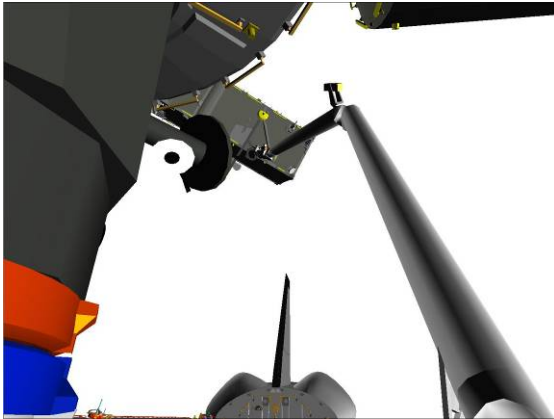
**CCTV C (-20,35)**



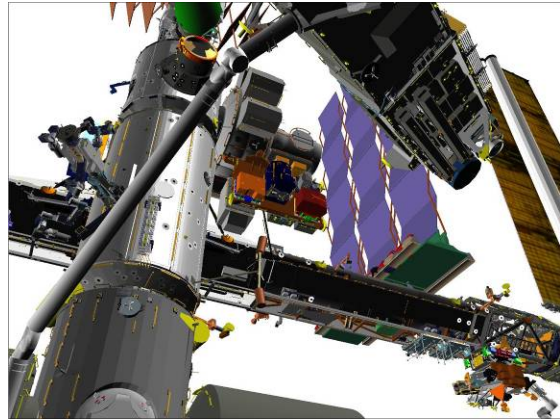
**P1 LOOB (120,30)**

Step 4:

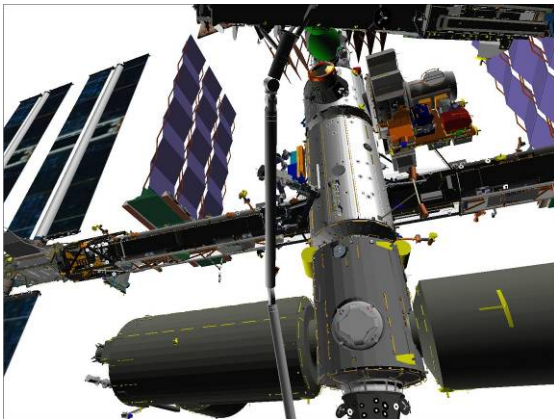
Drive SY- (for 41.4°)  
From +11.4° to -30.0°



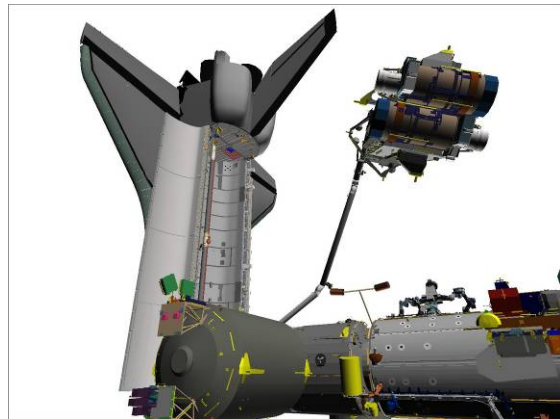
**CCTV A (-5,30)**



**CCTV B (25,40)**



**CCTV C (-20,35)**



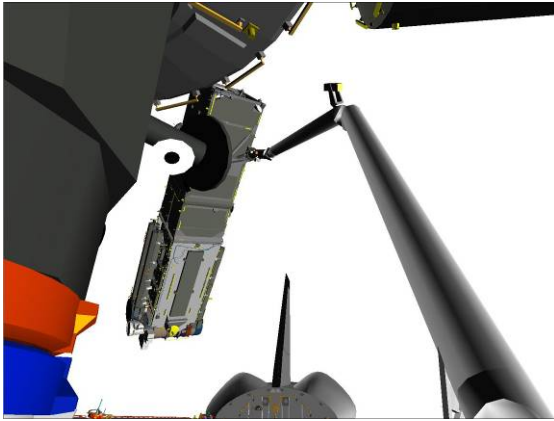
**S1 LOOB (60,25)**



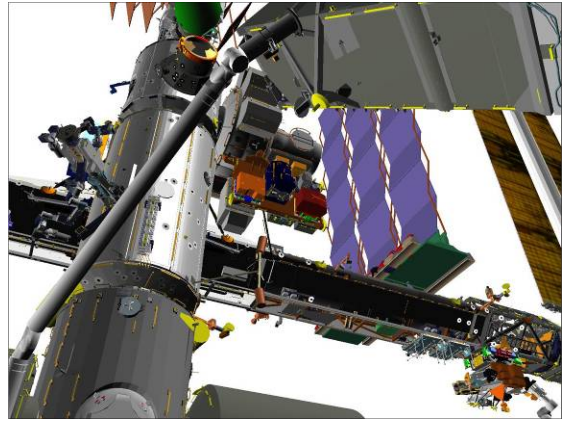
Step 5:

Drive WR- (for 112.9°)

From +21.4° to -91.5°



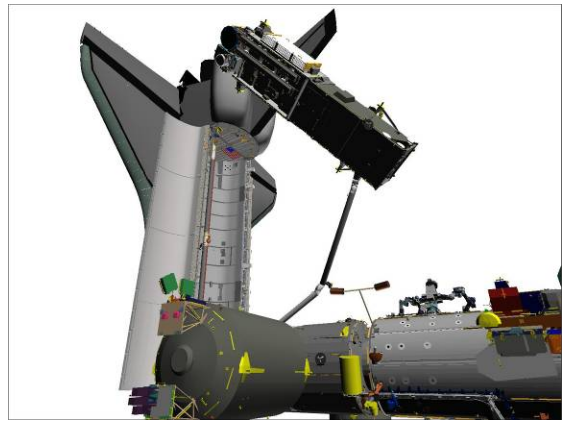
**CCTV A (-5,30)**



**CCTV B (25,40)**



**CCTV D (-10,25)**



**S1 LOOB (60,25)**

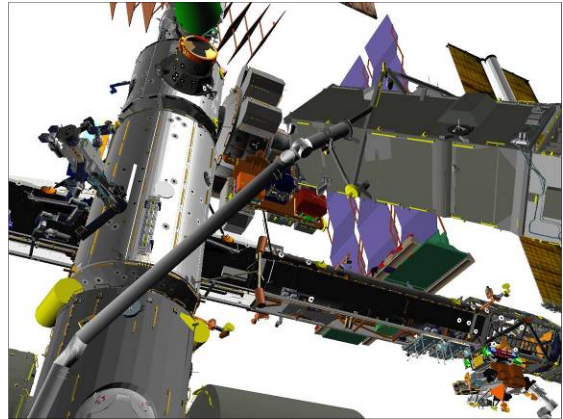
Step 6:

Drive SY- (for 20.0°)

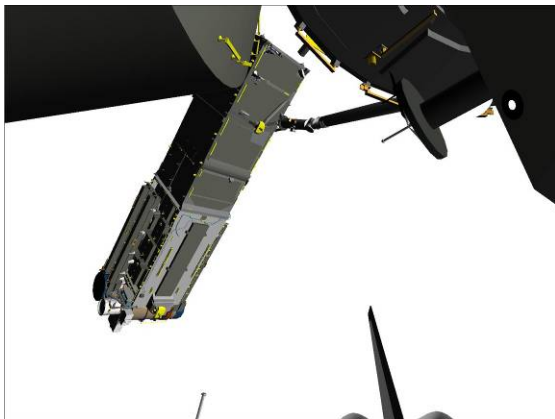
From -30.0° to -50.0°



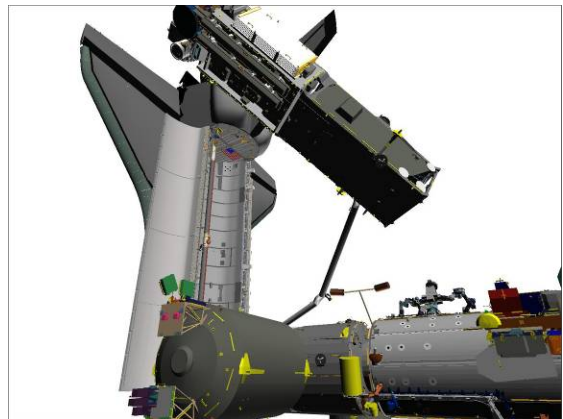
**CCTV A (-5,30)**



**CCTV B (25,40)**



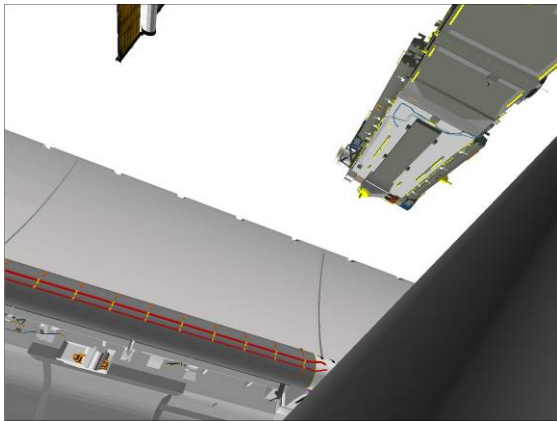
**CCTV D (-10,35)**



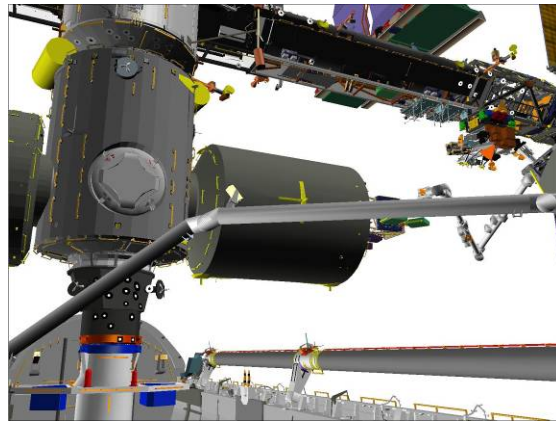
**S1 LOOB (60,25)**

Step 7:

Drive SP- (for 39.1°)  
From +53.9° to +14.8°



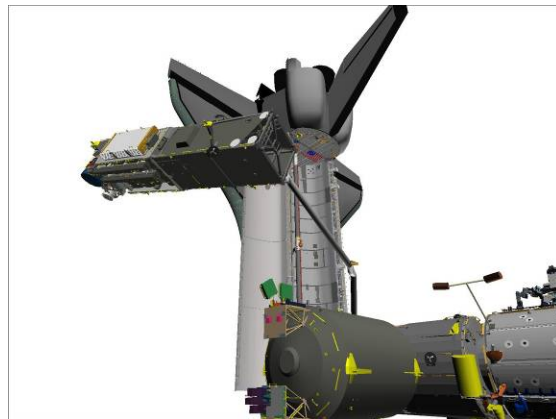
**ELBOW (-45,-35)**



**CCTV B (25,15)**



**CCTV D (-30,5)**

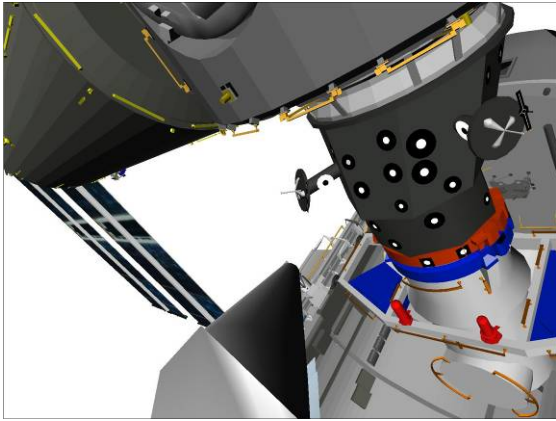


**S1 LOOB (45,25)**

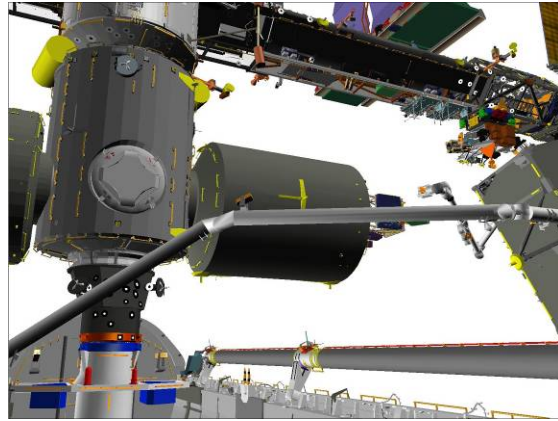
Step 8:

Drive SY- (for 12.9°)

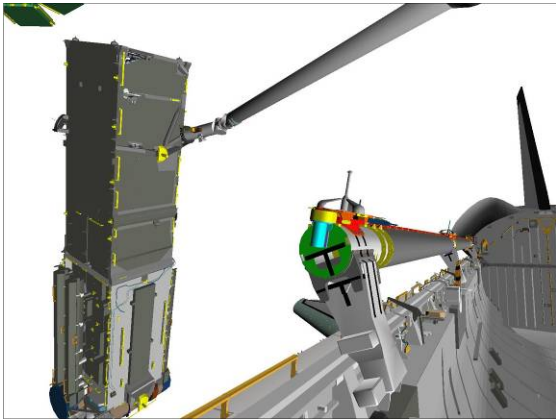
From -50.0° to -62.9°



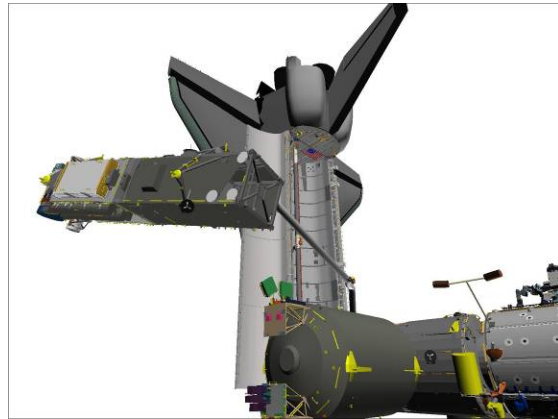
**ELBOW (-160,-15)**



**CCTV B (25,15)**



**CCTV D (-30,5)**



**S1 LOOB (45,25)**



3. S6 UNGRAPPLE

On SSRMS Operator GO for S6 Release

V10/L	B
V10/R	US LAB
MON 1	EE(Elbow)
MON 2	D

CCTV – config for ungrapple

- RMS WRIST, ZOOM: 34.0 HFOV
- FOCUS: 5 ft

If TEST MODE available:

RHC

NOTE  
CONTR ERR It and 'S96 PDRS CNTL' msg may occur due to Consistency/Envelope Check error

RATE – COARSE (RATE MIN tb-OFF)

SM 94 PDRS CONTROL

AUTO BRAKE INH – ITEM 10 EXEC (\*)

A8U

BRAKES – OFF (tb-OFF)  
MODE – TEST, ENTER  
Wait 5 sec

BRAKES – ON (tb-ON)

SM 94 PDRS CONTROL

AUTO BRAKE ENA – ITEM 9 EXEC (\*)

If SINGLE MODE available:

SM 94 PDRS CONTROL

PL ID – ITEM 3 +0 EXEC  
INIT ID – ITEM 24 +0 EXEC

RHC

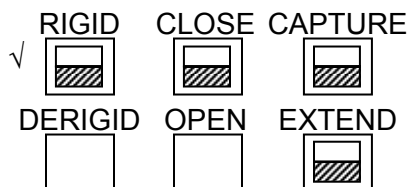
RATE – VERN (RATE MIN tb-ON)  
BRAKES – OFF (tb-OFF)

MODE – best available

CAUTION  
Monitor EE tb timing to prevent EE motor burnout

EE MODE – MAN

MAN CONTR – DERIGID (hold until DERIGID tb-gray, 5 sec max)  
RELEASE sw – depress (hold until OPEN tb-gray, 3 sec max)



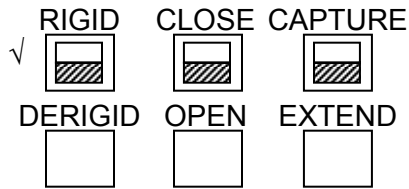
CRITICAL TIMES (8 sec total):

DERIGID tb – gray, 5 sec max, then  
OPEN tb – gray, 3 sec max

Give SSRMS Operator GO for maneuver to SRMS CLEAR posn

Once SSRMS has cleared Grapple Pin

EE MAN CONTR – DERIG (hold until EXTEND tb-gray, 20 sec max)  
 MODE – OFF



CRITICAL TIMES (20 sec total):  
 EXTEND tb – gray, 20 sec max

4. MNVR TO S6 INSTALL VIEWING POSN

On SSRMS Operator GO for maneuver to S6 INSTALL VIEWING posn

V10/L	B
V10/R	S1 LOOB
MON 1	Elbow
MON 2	D

PARAM – Joint Angle

If SINGLE MODE available:

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – best available

Mnvr to S6 INSTALL VIEWING posn:

	SY	SP	EP	WP	WY	WR	
S6 Handback	-62.9	+14.8	-31.1	-4.5	-20.4	-91.5	
1: SY +	-58.1						
2: SP +		+41.4					
3: EP –			-64.4				
4: WP +				+19.3			
5: WY –					-51.8		
6: WR +						-50.6	
S6 Install Viewing	-58.1	+41.4	-64.4	+19.3	-51.8	-50.6	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-908	+298	-647	141	296	70	0

If SINGLE MODE:

BRAKES – ON (tb-ON)

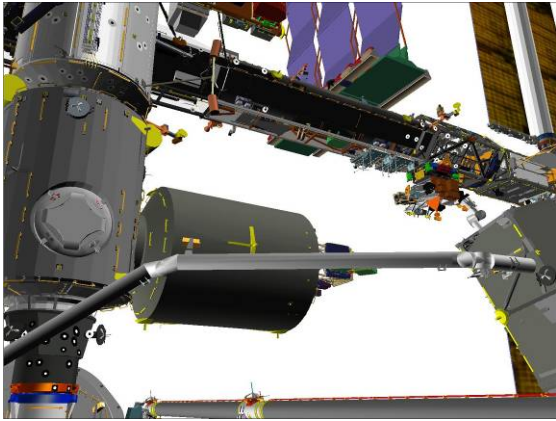
MODE – not DIRECT (It off)

PARAM – PORT TEMP

JOINT – CRIT TEMP

Step 1:

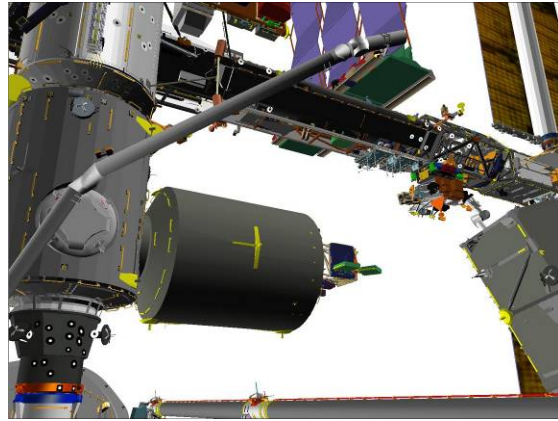
Drive SY+ (for 4.8°)  
From -62.9° to -58.1°



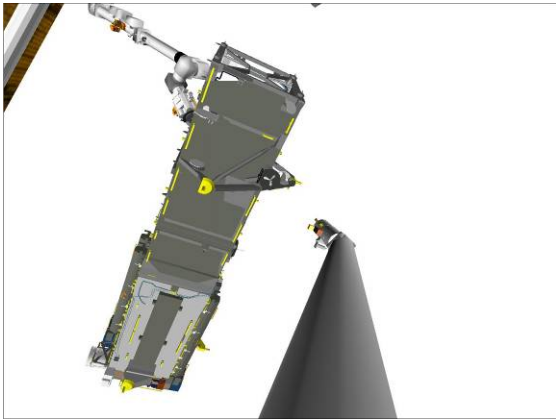
**CCTV B (30,20)**

Step 2:

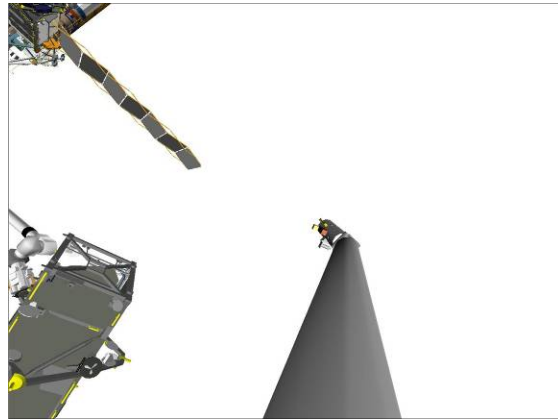
Drive SP+ (for 26.6°)  
From +14.8° to +41.4°



**CCTV B (30,20)**



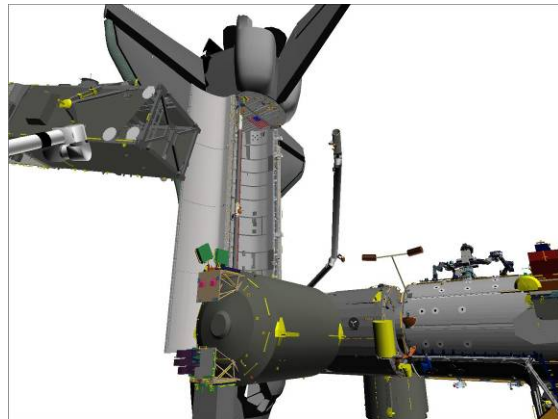
**ELBOW (-10,0)**



**ELBOW (-10,0)**



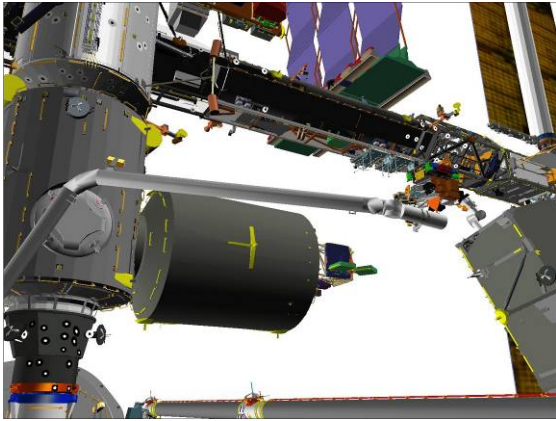
**CCTV D (-20,25)**



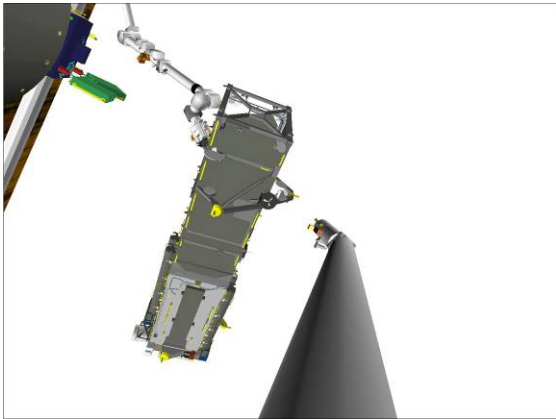
**S1 LOOB (55,20)**

Step 3:

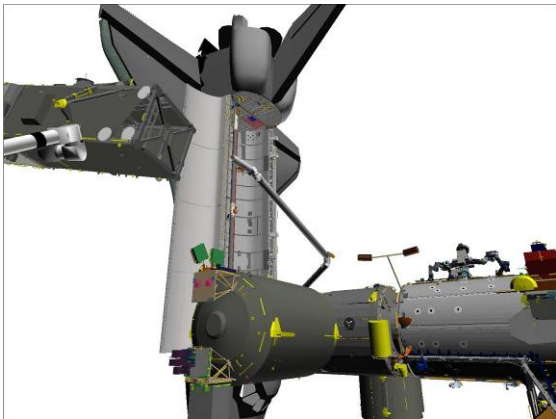
Drive EP- (for 33.3°)  
From -31.1° to -64.4°



**CCTV B (30,20)**



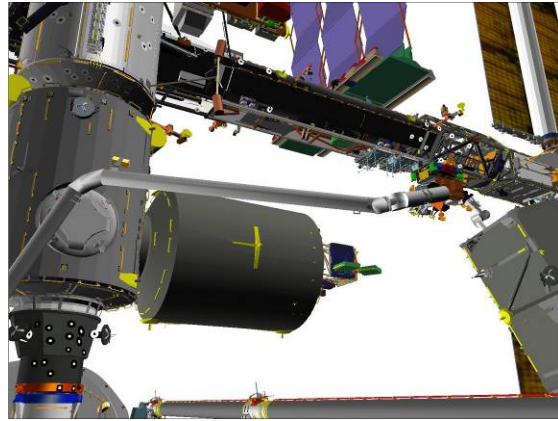
**ELBOW (-10,0)**



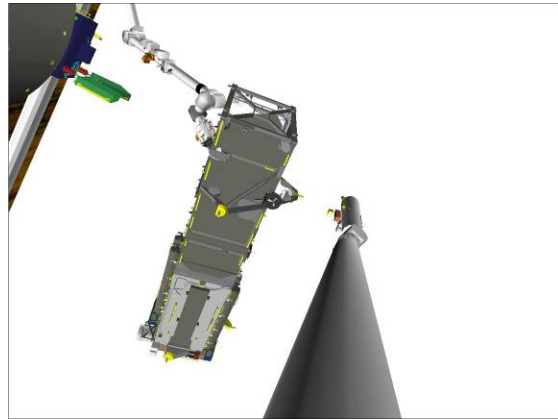
**S1 LOOB (55,20)**

Step 4:

Drive WP+ (for 23.8°)  
From -4.5° to +19.3°



**CCTV B (30,20)**



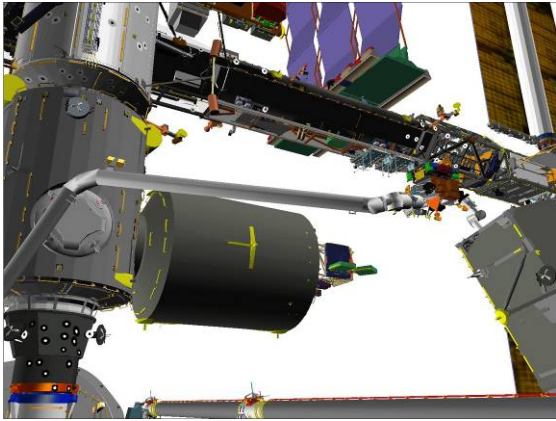
**ELBOW (-10,0)**



**CCTV D (-20,25)**

Step 5:

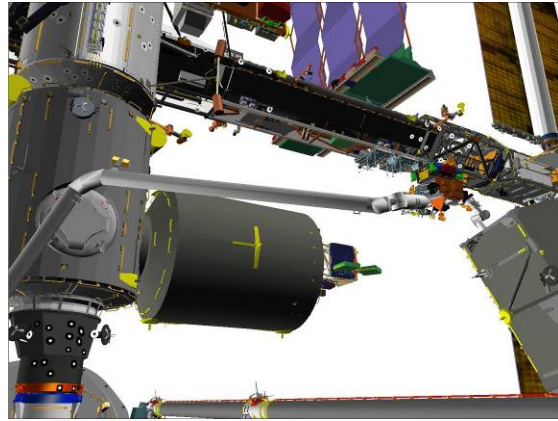
Drive WY- (for 31.4°)  
From -20.4° to -51.8°



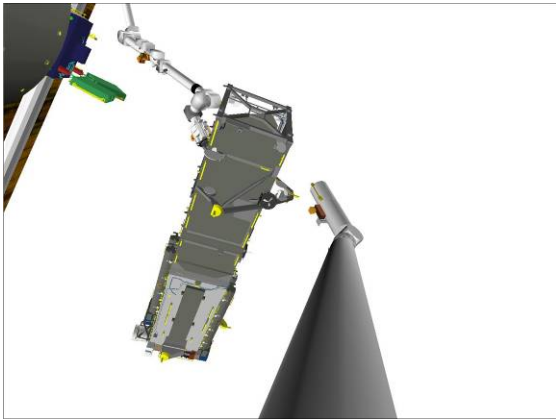
**CCTV B (30,20)**

Step 6:

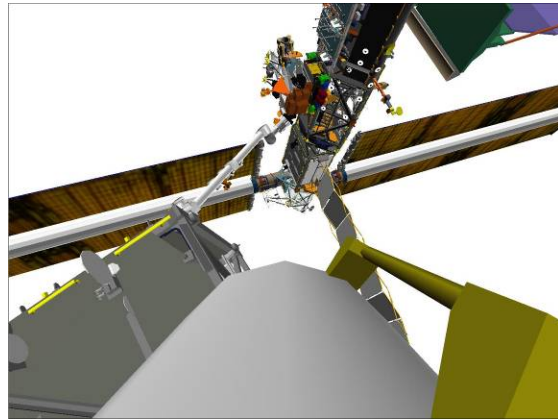
Drive WR+ (for 40.9°)  
From -91.5° to -50.6°



**CCTV B (30,20)**



**ELBOW (-10,0)**



**EE**



**CCTV D (-20,25)**



**CCTV D (-20,25)**

# MNVR FROM S6 INSTALL VIEWING TO PRE-CRADLE POSN

## 1. SETUP

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 0

√INIT ID, ITEM 24: 0

R12

√Green Jumper – ISS

V10/L	C
V10/R	A
MON 1	B → Elbow
MON 2	S1 LOOB

Verify at S6 INSTALL VIEWING posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-908	+298	-647	141	296	70	0
SY	SP	EP	WP	WY	WR	
-58.1	+41.4	-64.4	+19.3	-51.8	-50.6	

## 2. MNVR TO PRE-CRADLE POSN

If SINGLE MODE available:

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – best available

Mnvr to PRE-CRADLE posn:

	SY	SP	EP	WP	WY	WR	
S6 Install Viewing	-58.1	+41.4	-64.4	+19.3	-51.8	-50.6	
1: SP –		+25.0					
2: EP +			-25.0				
3: SY +	0.0						
4: WP –				+5.0			
5: WY +					0.0		
6: WR +						0.0	
Pre-Cradle	0.0	+25.0	-25.0	+5.0	0.0	0.0	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-1261	-146	-551	5	2	0	0

If SINGLE mode available:

BRAKES – ON (tb-ON)

MODE – not DIRECT

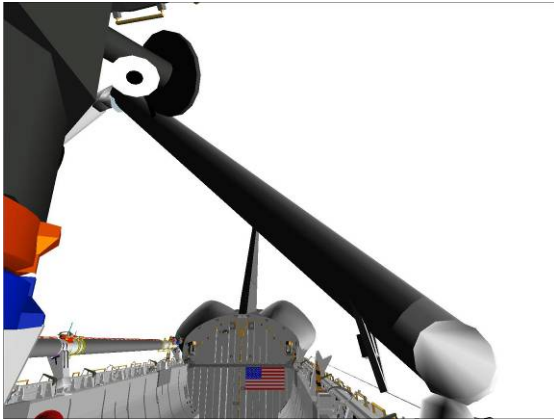
PARAM – PORT TEMP

JOINT – CRIT TEMP



Step 1:

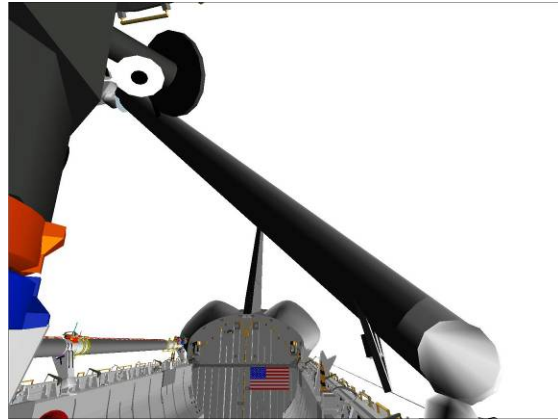
Drive SP- (for 16.4°)  
From +41.4° to +25.0°



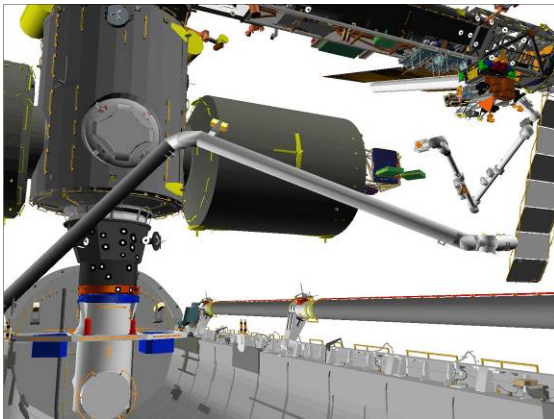
**CCTV A (0,20)**

Step 2:

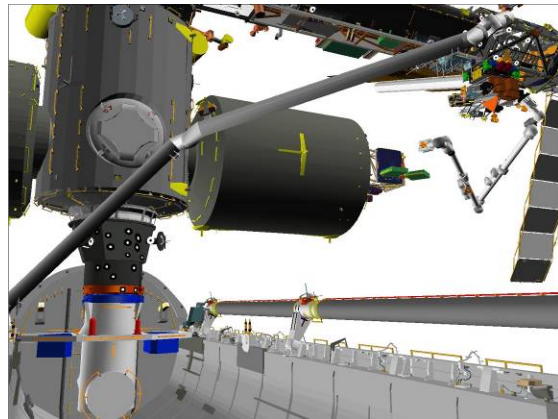
Drive EP+ (for 39.4°)  
From -64.4° to -25.0°



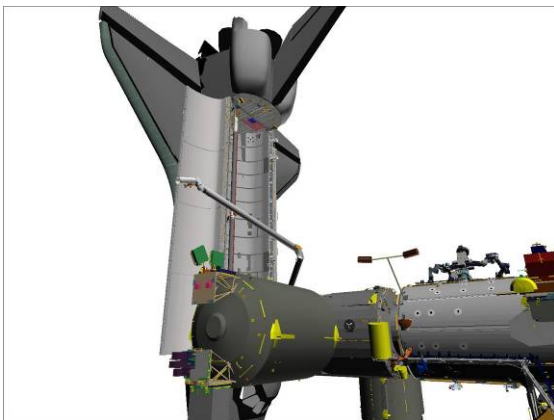
**CCTV A (0,20)**



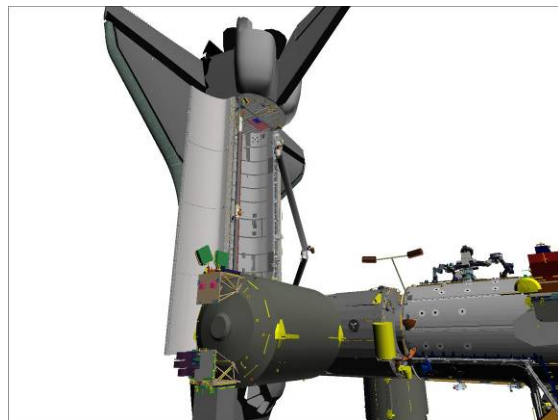
**CCTV B (25,10)**



**CCTV B (25,10)**



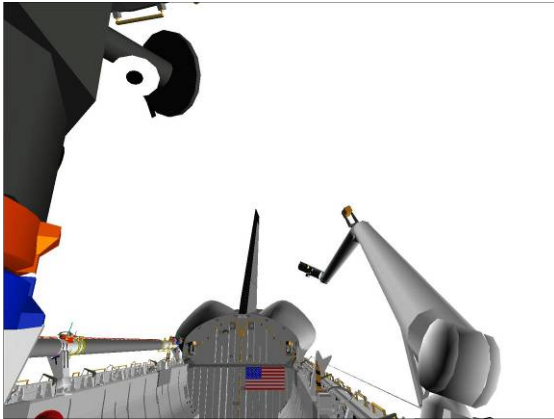
**S1 LOOB (55,20)**



**S1 LOOB (55,20)**

Step 3:

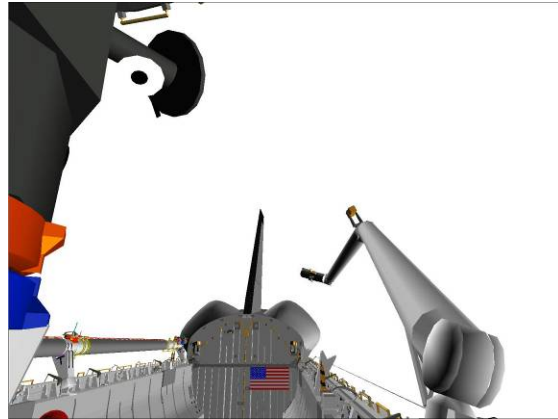
Drive SY+ (for 58.1°)  
From -58.1° to 0.0°



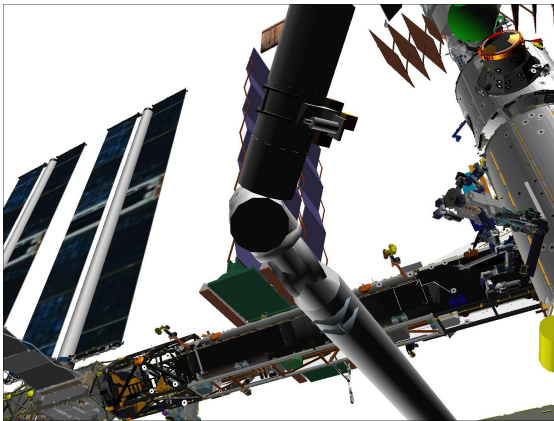
**CCTV A (0,20)**

Step 4:

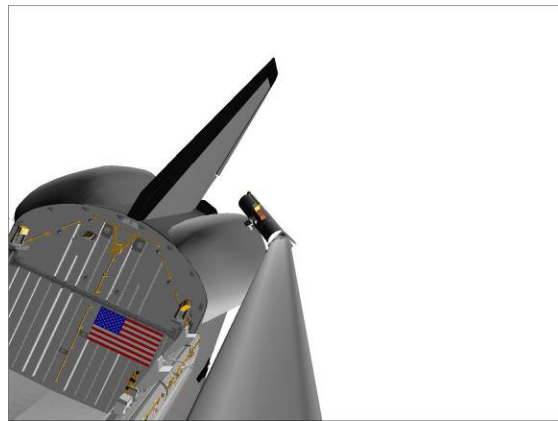
Drive WP- (for 14.3°)  
From +19.3° to +5.0°



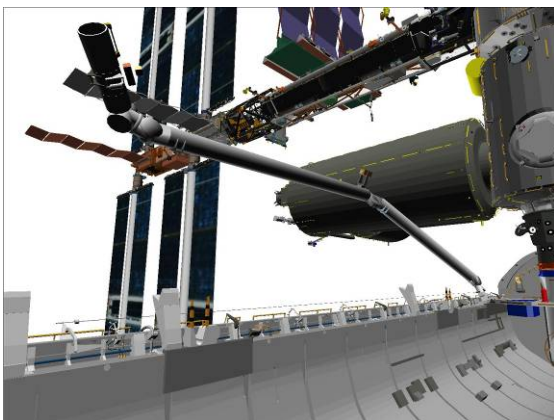
**CCTV A (0,20)**



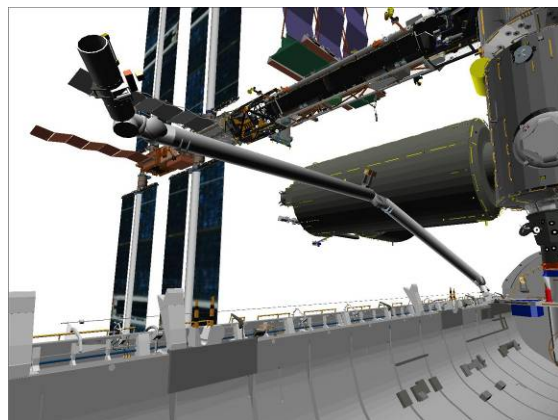
**CCTV B (-30,45)**



**ELBOW (0,0)**



**CCTV C (-45,10)**

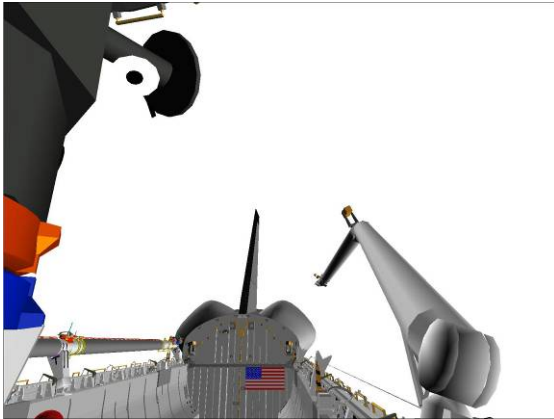


**CCTV C (-45,10)**



Step 5:

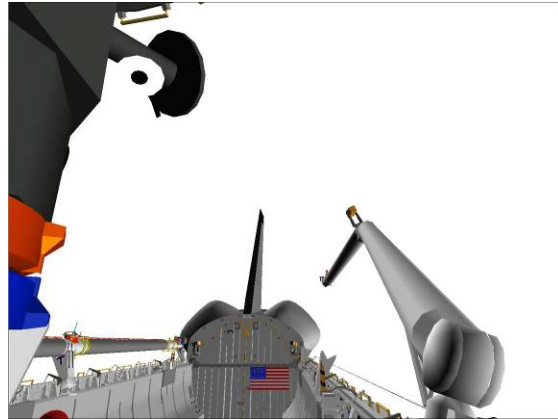
Drive WY+ (for 51.8°)  
From -51.8° to 0.0°



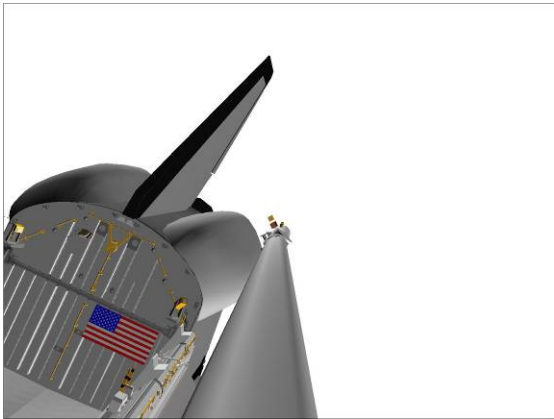
**CCTV A (0,20)**

Step 6:

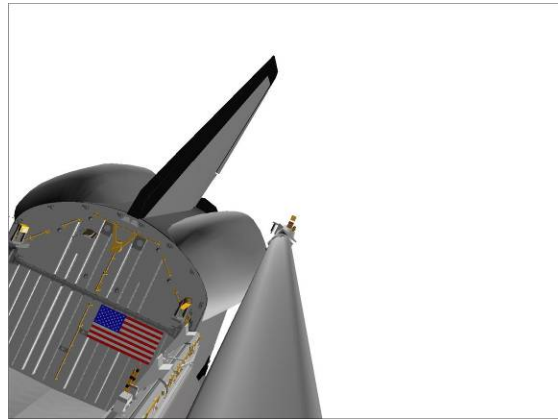
Drive WR+ (for 50.6°)  
From -50.6° to 0.0°



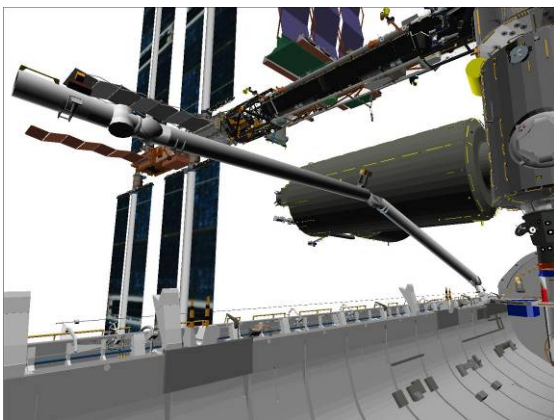
**CCTV A (0,20)**



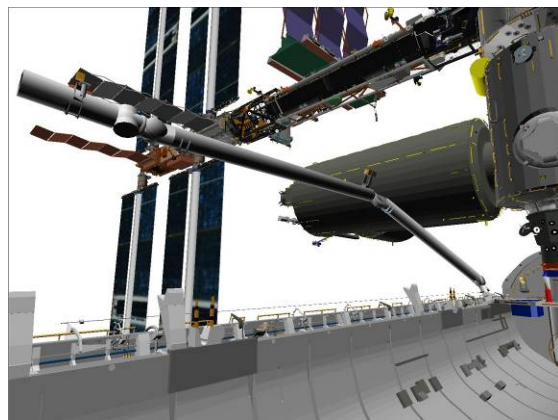
**ELBOW (0,0)**



**ELBOW (0,0)**



**CCTV C (-45,10)**



**CCTV C (-45,10)**

NOTE

Assumed starting posn is S6 HANDOFF

1. SETUP  
On SSRMS Operator GO for S6 Release

V10/L	C
V10/R	A
MON 1	EE → Elbow
MON 2	B

CCTV – config for ungrapple  
 – RMS WRIST, ZOOM: 34.0 HFOV  
 FOCUS: 5 ft

2. MNVR TO S6 PRE-GRAPPLE POSN

NOTE

CONTR ERR It and 'S96 PDRS CNTL' msg may occur due to Consistency/Envelope Check error

RHC RATE – COARSE (RATE MIN tb-OFF)

SM 94 PDRS CONTROL

AUTO BRAKE INH – ITEM 10 EXEC (\*)

A8U BRAKES – OFF (tb-OFF)  
 MODE – TEST, ENTER  
 Wait 5 sec

BRAKES – ON (tb-ON)

SM 94 PDRS CONTROL

AUTO BRAKE ENA – ITEM 9 EXEC (\*)  
 PL ID – ITEM 3 +0 EXEC  
 INIT ID – ITEM 24 +0 EXEC

RATE – VERN (RATE MIN tb-ON)  
 BRAKES – OFF (tb-OFF)  
 MODE – END EFF, ENTER

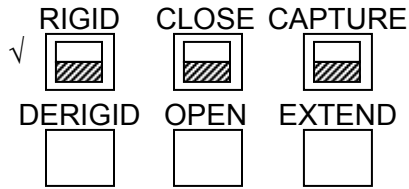
**CAUTION**  
Monitor EE tb timing to prevent EE motor burnout

**SM 169 PDRS STATUS**

EE MODE – AUTO  
RELEASE sw – depress (mom)

**NOTE**

When OPEN tb – gray, mnvr arm clear of grapple pin



**CRITICAL TIMES (28 sec total):**  
DERIGID tb – gray, 5 sec max, then  
OPEN tb – gray, 3 sec max, then  
EXTEND tb – gray, 20 sec max

EE MODE – OFF

- |  |   |
|--|---|
| * If manual release reqd:                            | * |
| * EE MODE – MAN                                      | * |
| * MAN CONTR – DERIGID (hold until DERIGID tb-gray,   | * |
| 5 sec max)   | * |
| * RELEASE sw – depress (hold until OPEN tb-gray,     | * |
| 3 sec max)   | * |
| * Mnvr arm clear, then                               | * |
| * EE MAN CONTR – DERIGID (hold until EXTEND tb-gray, | * |
| 20 sec max)  | * |
| * MODE – OFF   | * |

THC/RHC

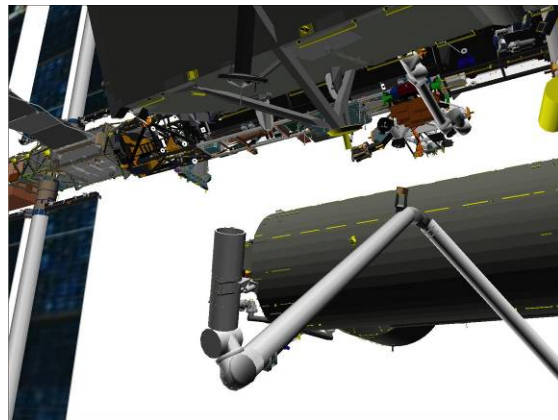
Mnvr to S6 PRE-GRAPPLE posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1089	-235	-528	65	340	358	0
SY	SP	EP	WP	WY	WR	
+18.1	+52.7	-82.0	+103.8	-44.3	+29.2	

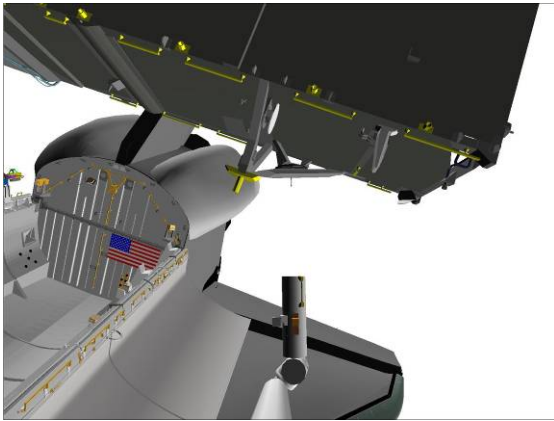
BRAKES – ON (tb-ON)



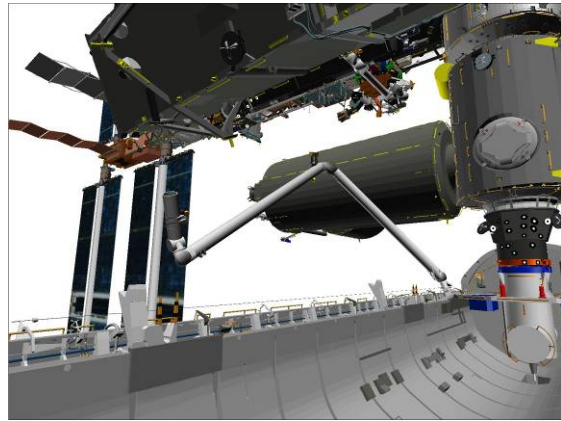
**CCTV A (20,20)**



**CCTV B (-30,20)**



**ELBOW (0,20)**



**CCTV C (-40,10)**

3. MNVR TO S6 REBERTH VIEWING POSN

R12

√Green Jumper – ISS

V10/L	P1 LOOB
V10/R	A
MON 1	Elbow
MON 2	B

SM 94 PDRS CONTROL

END POS – ITEM 18 -945 -504 -160 EXEC

ATT – ITEM 21 +300 +33 +37 EXEC

CMD CK – ITEM 25 EXEC (GOOD)

RHC

RATE – VERN (RATE MIN tb-ON)

BRAKES – OFF (tb-OFF)

MODE – OPR CMD, ENTER (READY It on)

AUTO SEQ – PROCEED (IN PROG It on)

When AUTO SEQ IN PROG It – off:

BRAKES – ON (tb-ON)

S6 REBERTH VIEWING posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
√ -945	-504	-160	300	33	37	0
√ SY	SP	EP	WP	WY	WR	
+60.4	+14.7	-50.2	+5.4	+0.4	-0.2	

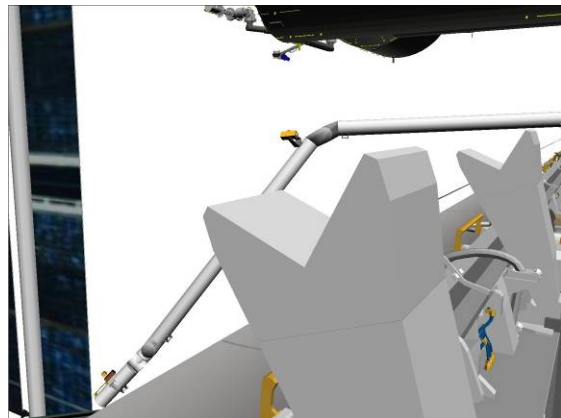
PARAM – PORT TEMP

JOINT – CRIT TEMP

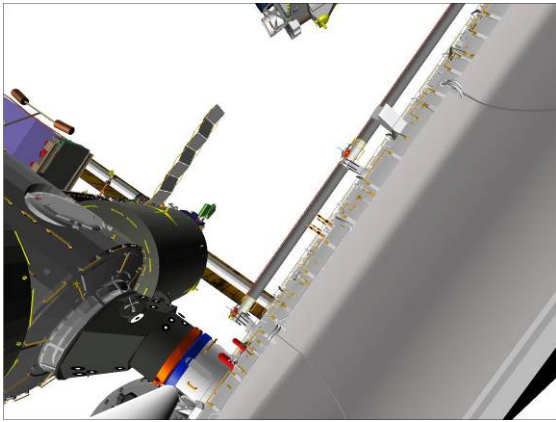
Notify SSRMS Operator that SRMS at S6 REBERTH VIEWING posn, GO for SSRMS S6 reberth



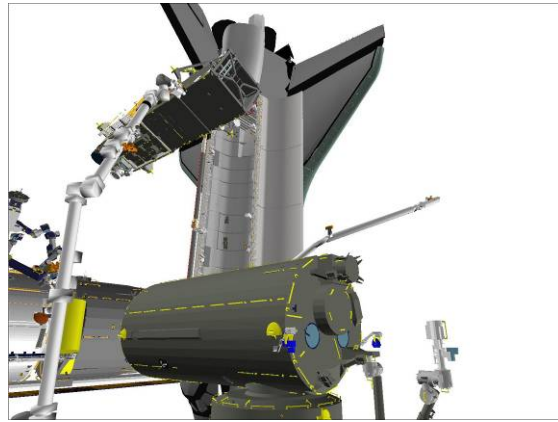
**CCTV A (40,0)**



**CCTV B (-30,-10)**



**ELBOW (-125,-10)**



**P1 LOOB (140,20)**

4. ACTIVATE LATCHES

On SSRMS Operator GO for PRLA steps

NOTE

When MCA LOGIC switches taken OFF, KU will mode to standby. MPM and MRL tbs – bp

MA73C:A MCA LOGIC MNC MID 2 – OFF  
:B MNB MID 4 – OFF

A6U √PL RETEN LAT (five) – OFF  
√PL SEL – 1

**SM 97 PL RETENTION**

√PL SEL 1 RDY-FOR-LAT 1,2,3,4 (eight) – 1  
√LAT 1,2,3,4 (eight) – 0

\* If any LAT msw shows '1', expect \*  
\* single motor time (60 sec) \*

R13L PL BAY MECH PWR SYS 1,2 (two) – ON  
A6U RETEN LOGIC PWR SYS 1,2 (two) – ON

Notify SSRMS Operator PRLAs activated, GO for SSRMS limping

5. AKA LATCH

On SSRMS Operator GO for PRLA latching, SSRMS limped

PL RETEN PL SEL – 2  
√LAT 1,2 tb – REL

Note single motor times (> 30 sec)

PL RETEN LAT 1,2 (two) – LAT (tb-LAT), 60 sec max  
– OFF  
√RDY 1,2 tb – gray

6. PRLA LATCH  
 PL RETEN PL SEL - 1  
 √LAT 1,2,3,4 (four) tb - REL  
 √RDY 1,2,3,4 (four) tb - gray

Note single motor times (> 30 sec)

PL RETEN LAT 3,4 (two) - LAT (tb-LAT), 60 sec max  
 - OFF  
 1,2 (two) - LAT (tb-LAT), 60 sec max  
 - OFF

7. DEACTIVATE LATCHES

R13L PL RETEN LOGIC PWR SYS 1,2 (two) - OFF  
 A6U BAY MECH PWR SYS 1,2 (two) - OFF  
 RETEN PL SEL - MON

MA73C:A MCA LOGIC MNC MID 2 - ON  
 :B MNB MID 4 - ON

Notify SSRMS Operator PRLAs latched, GO for S6 Ungrapple

8. MNVR TO PRE-CRADLE POSN

On SSRMS Operator GO for Pre-cradle

R12 √Green Jumper - ISS

V10/L	P1 LOOB
V10/R	A
MON 1	Elbow
MON 2	B

Verify at S6 REBERTH VIEWING posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-945	-504	-160	300	33	37	0
SY	SP	EP	WP	WY	WR	
+60.4	+14.7	-50.2	+5.4	+0.4	-0.2	

SM 94 PDRS CONTROL

END POS - ITEM 18 -1 2 6 1 -1 4 6 -5 5 1 EXEC  
 ATT - ITEM 21 +5 +2 +0 EXEC  
 CMD CK - ITEM 25 EXEC (GOOD)

RHC RATE - as reqd (VERN within 10 ft)  
 BRAKES - OFF (tb-OFF)  
 MODE - OPR CMD, ENTER (Ready It on)

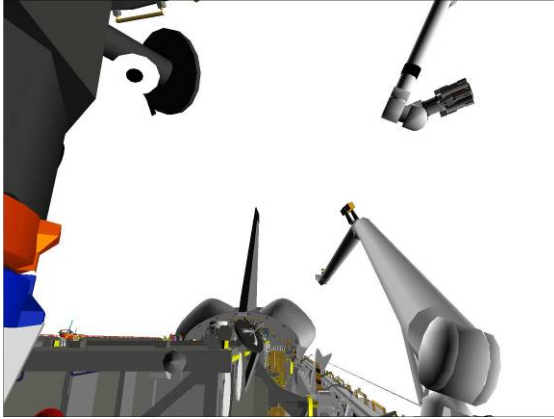
AUTO SEQ - PROCEED (IN PROG It on)

When AUTO SEQ IN PROG It - off:  
 BRAKES - ON (tb-ON)

PRE-CRADLE posn:

	X	Y	Z	PITCH	YAW	ROLL	PL ID
√	-1261	-146	-551	5	2	0	0
	SY	SP	EP	WP	WY	WR	
√	0.0	+25.0	-25.0	+5.0	0.0	0.0	

PARAM – PORT TEMP  
JOINT – CRIT TEMP



**CCTV A (0,20)**



**P1 LOOB (140,20)**

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OBSS NOMINAL

OBSS HANDOFF FROM SSRMS (NODE 2) TO SRMS .....	FS 3-2
MANEUVER TO OBSS CLEARANCE POSN .....	FS 3-6
HANDOFF FROM SRMS TO SSRMS (NODE 2) .....	FS 3-8
MNVR FROM OBSS PRE-GRAPPLE TO PRE-CRADLE POSN .....	FS 3-13

**OBSS  
NOMINAL**

# OBSS HANDOFF FROM SSRMS (NODE 2) TO SRMS

## NOTE

Assumed starting posn is PRE-CRADLE

### 1. SETUP

SM 94 PDRS CONTROL

√ PL ID, ITEM 3: 0

√ INIT ID, ITEM 24: 0

V10/L	P1 LOOB
V10/R	A
MON 1	Elbow
MON 2	C

### 2. PRE-GRAPPLE MNVR

SM 94 PDRS CONTROL

END POS – ITEM 18 -1 0 1 5 -3 6 2 -6 8 8 EXEC

ATT – ITEM 21 +2 8 4 +0 +2 7 0 EXEC

CMD CK – ITEM 25 EXEC (GOOD)

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – OPR CMD, ENTER (READY lt on)

┌ After PROCEED, if motion no longer apparent but POR is within  
├ 1 in/1 deg and IN PROG lt – on:  
└ AUTO SEQ – STOP

AUTO SEQ – PROCEED (IN PROG lt on)

When AUTO SEQ IN PROG lt – off:

BRAKES – ON (tb-ON)

OBSS PRE-GRAPPLE AT HANDOFF posn: (01:00)

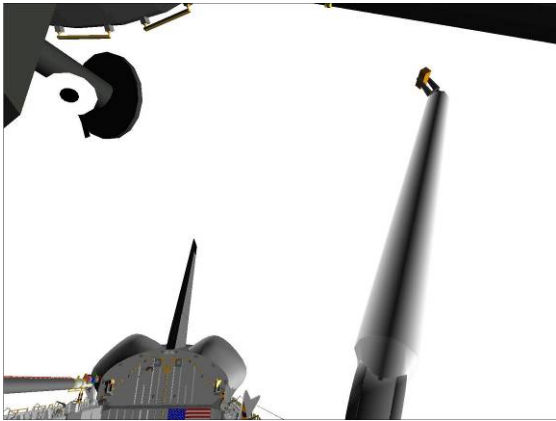
	X	Y	Z	PITCH	YAW	ROLL	PL ID
√	-1015	-362	-688	284	0	270	0
	SY	SP	EP	WP	WY	WR	
√	+23.5	+63.5	-29.6	-102.9	+11.5	-98.6	

PARAM – PORT TEMP

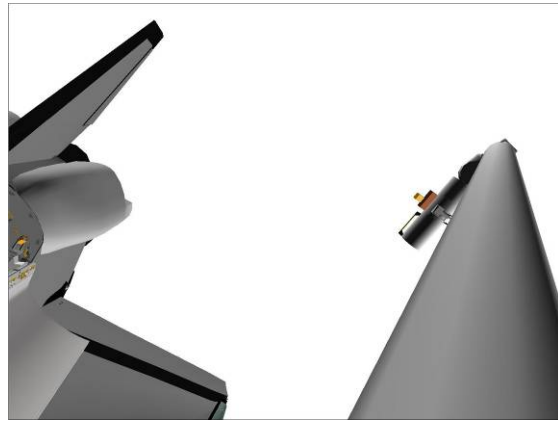
JOINT – CRIT TEMP

Notify MCC that SRMS at OBSS PRE-GRAPPLE AT HANDOFF posn

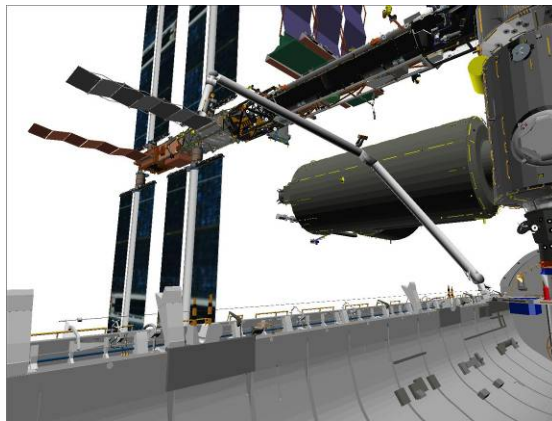
OBSS  
NOMINAL



**CCTV A (10,25)**



**ELBOW (-30,-15)**



**CCTV C (-45,10)**

3. CONFIGURE POWER

**CAUTION**  
SPEE power must be applied within 90 min  
to prevent sensor package damage

On SSRMS Operator GO to release STBD MRLs

STBD RMS HTR A,B (two) – OFF

A6U           EVENT TIMER MODE – UP  
                  CNTL – START

MA73C:C      cb MCA PWR AC3 3Φ MID 2 – op  
                  √AC2 3Φ MID 2 – op  
:D             √AC3 3Φ MID 4 – op

R13L           PL BAY MECH PWR SYS (two) – ON

4. STBD MRL RELEASE

**SM 94 PDRS CONTROL**  
RMS STBD – ITEM 2 EXEC (\*)  
√STBD AFT, MID, FWD REL (six) = 0

**NOTE**

Expect single motor drive time for MRL release

STBD RMS RETEN LAT – REL (tb-REL) (18 sec max)  
– OFF

If motor drive time > 18 sec, √MCC

**SM 94 PDRS CONTROL**

√STBD AFT, MID, FWD REL (six) = 1

R13L 5. RECONFIGURE POWER  
PL BAY MECH PWR SYS (two) – OFF

MA73C:C cb MCA PWR AC3 3Φ MID 2 – cl  
√AC2 3Φ MID 2 – op  
:D √AC3 3Φ MID 4 – op

Give SSRMS Operator GO for OBSS Unberth  
Monitor RFL Status

After OBSS Unberth,

**SM 94 PDRS CONTROL**

RMS PORT – ITEM 1 EXEC (\*)

6. SETUP FOR GRAPPLE  
On SSRMS Operator GO for OBSS grapple

V10/L	P1 LOOB
V10/R	A
MON 1	EE
MON 2	C

A7U CCTV – config for grapple  
– install PDRS TARGET OVERLAY FOR CTVM  
– RMS WRIST, ZOOM: 34.0 HFOV  
FOCUS: 5 ft  
Maintain eyepoint approx 18 in when using grapple overlay

R12(OBSS) √SPEE PWR – OFF  
A15 √APCU 1,2 CONV (two) – OFF  
√OUTPUT (two) – OFF

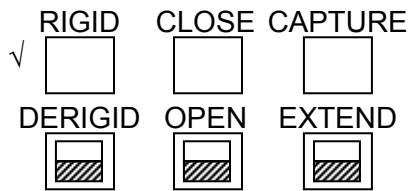
RHC 7. OBSS GRAPPLE AT HANDOFF  
RATE – VERN (RATE MIN tb-ON)  
BRAKES – OFF (tb-OFF)  
MODE – END EFF, ENTER

Mnvr to grapple envelope

**CAUTION**  
Monitor EE tb timing to prevent EE motor burnout

**SM 169 PDRS STATUS**

EE MODE – AUTO  
CAPTURE sw – depress (mom)



CRITICAL TIMES (28 sec total):  
 CAPTURE tb – gray, then  
 CLOSE tb – gray, 3 sec max, then  
 RIGID tb – gray, 25 sec max

EE MODE – OFF

MODE – TEST, ENTER  
 Wait 5 sec

BRAKES – ON (tb-ON)  
 MODE – not DIRECT

**SM 94 PDRS CONTROL**  
 PL ID – ITEM 3 +2 EXEC  
 INIT ID – ITEM 24 +2 EXEC

Expected OBSS HANDOFF posn:

	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-1029	+229	-614	14	270*	0	2
	SY	SP	EP	WP	WY	WR	
✓	+25.8	+66.3	-49.0	-85.9	+10.7	-100.7	

\* Display Singularity



**CCTV C (-45,10)**



**CCTV A (10,25)**

Review GENERIC END EFFECTOR CUE CARD – ISS/SHUTTLE DOCKED OPS

R12 (OBSS) RSC PWR – OFF,ON

Perform ACTIVATION (LDRI/ITVC Cue Card, PHOTO/TV)

Notify SSRMS Operator SRMS OBSS grapple complete and Brakes On, GO for OBSS RELEASE

Perform LCH ACTIVATION (LCS Cue Card, PHOTO/TV)

Perform LCC ACTIVATION (LCS Cue Card, PHOTO/TV), step 2

# OBSS MANEUVER TO OBSS CLEARANCE POSN

## NOTE

Assumed starting posn is OBSS Handoff

### 1. SETUP

On SSRMS Operator GO for mnvr to OBSS CLEARANCE posn

**SM 94 PDRS CONTROL**

√PL ID, ITEM 3: 2

√INIT ID, ITEM 24: 2

R12

Green Jumper – ISS

V10/L	P1 LOOB
V10/R	A
MON 1	Elbow
MON 2	C(B)

RHC

### 2. MNVR TO OBSS CLEARANCE POSN

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – SINGLE, ENTER

Mnvr to OBSS CLEARANCE posn:

OBSS  
Handoff  
1: WR +  
OBSS  
Clearance

SY	SP	EP	WP	WY	WR	
+25.8	+66.3	-49.0	-85.9	+10.7	-100.7	
					-70.0	
+25.8	+66.3	-49.0	-85.9	+10.7	-70.0	
X	Y	Z	PITCH	YAW	ROLL	PL ID
-1323	+148	-688	14	300	0	2

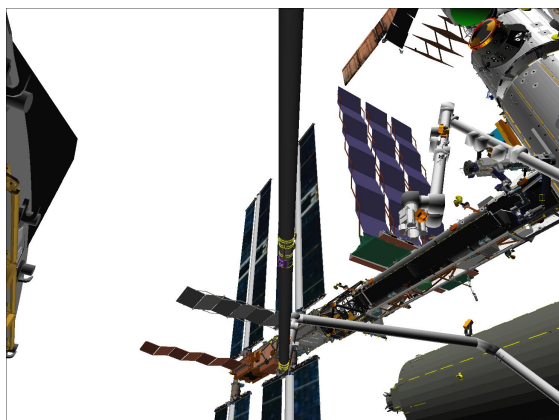
BRAKES – ON (tb-ON)

If using shuttle attitude control:

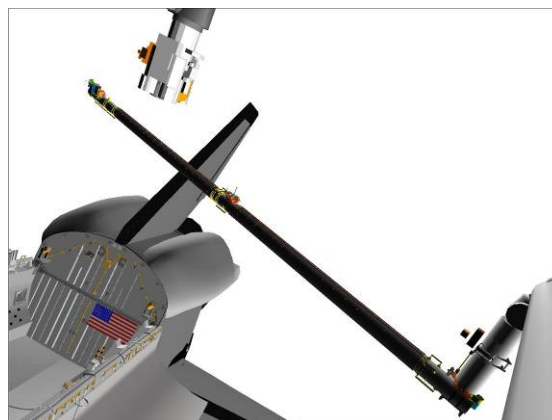
Verify Rate < 0.1 deg/s/axis, then

DAP: AUTO

Notify SSRMS Operator SRMS at OBSS CLEARANCE posn, GO for mnvr to FOCUSED INSPECTION VIEWING posn



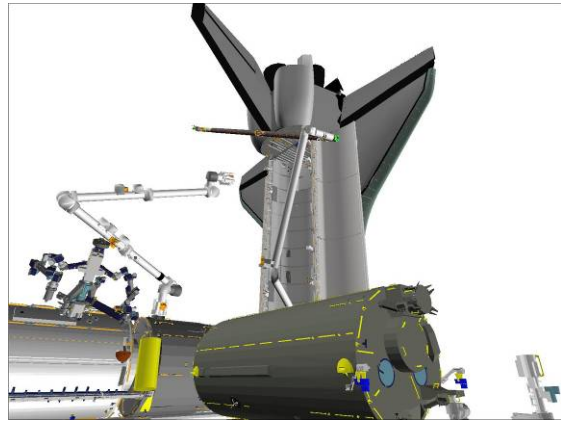
CCTV C (-60,40)



ELBOW (-35,5)



**CCTV A (10,25)**



**P1 LOOB (130,25)**

# OBSS HANDOFF FROM SRMS TO SSRMS (NODE 2)

## NOTE

Assumed starting posn is OBSS Clearance

### 1. SETUP

On SSRMS Operator GO for mnvr to OBSS HANDOFF posn

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 2

√INIT ID, ITEM 24: 2

R12

Green Jumper – ISS

V10/L	P1 LOOB
V10/R	A
MON 1	Elbow
MON 2	C

RHC

### 2. MNVR TO OBSS HANDOFF POSN

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – SINGLE, ENTER

Mnvr to OBSS HANDOFF posn:

OBSS  
Clearance  
1: WR –  
OBSS  
Handoff

SY	SP	EP	WP	WY	WR	
+25.8	+66.3	-49.0	-85.9	+10.7	-70.0	
					-100.7	
+25.8	+66.3	-49.0	-85.9	+10.7	-100.7	
X	Y	Z	PITCH	YAW	ROLL	PL ID
-1029	+229	-614	14	270*	0	2

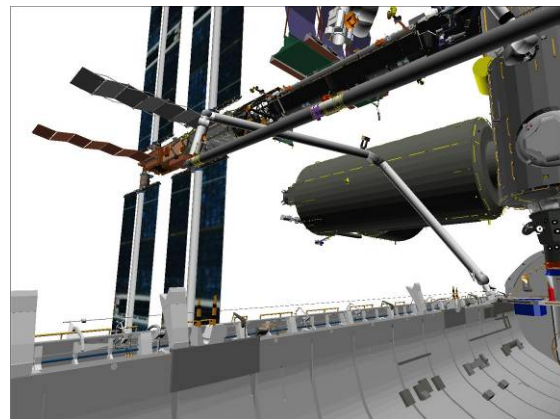
\* Display Singularity

BRAKES – ON (tb-ON)

Notify SSRMS Operator SRMS at OBSS HANDOFF posn, GO for OBSS Grapple



CCTV A (10,25)



CCTV C (-45,10)



R12 3. STOW PTU  
Green Jumper – LDRI/ITVC

A7U DTV ← PL2

CAMR CMD PAN/TILT – HI RATE  
PAN – L (to hard stop)  
TILT – UP (to hard stop)  
PAN/TILT – RESET, HI RATE (LO within 10°)  
PAN: +108 (right)  
TILT: -175 (down)

On SSRMS Operator GO for OBSS Release

Perform LCC DEACTIVATION (LCS Cue Card, PHOTO/TV)  
Perform LCH DEACTIVATION (LCS Cue Card, PHOTO/TV)

<u>CAUTION</u>
STBD RMS HTR power must be applied within 90 min to prevent sensor package damage

Perform DEACTIVATION (LDRI/ITVC Cue Card, PHOTO/TV)

R12 4. OBSS UNGRAPPLE  
Green Jumper – ISS

V10/L	P1 LOOB
V10/R	A
MON 1	EE→Elbow
MON 2	C

A7U CCTV – config for ungrapple  
– RMS WRIST, ZOOM: 34.0 HFOV  
FOCUS: 5 ft

NOTE  
CONTR ERR It and 'S96 PDRS CNTL' msg may  
occur due to Consistency/Envelope Check error

RHC RATE – COARSE (RATE MIN tb-OFF)

<u>SM 94 PDRS CONTROL</u>
---------------------------

AUTO BRAKE INH – ITEM 10 EXEC (\*)

BRAKES – OFF (tb-OFF)  
MODE – TEST, ENTER  
Wait 5 sec

BRAKES – ON (tb-ON)

**SM 94 PDRS CONTROL**

AUTO BRAKE ENA – ITEM 9 EXEC (\*)

PL ID – ITEM 3 +0 EXEC

INIT ID – ITEM 24 +0 EXEC

RHC

RATE – VERN (RATE MIN tb-ON)

BRAKES – OFF (tb-OFF)

MODE – END EFF, ENTER

**CAUTION**

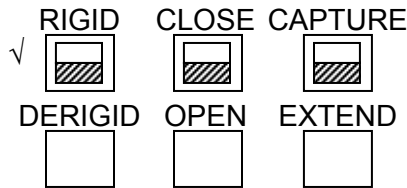
Monitor EE tb timing to prevent EE motor burnout

**SM 169 PDRS STATUS**

EE MODE – AUTO

RELEASE sw – depress (mom)

When OPEN tb – gray, mnvr arm clear of grapple pin



**CRITICAL TIMES (28 sec total):**

DERIGID tb – gray, 5 sec max, then

OPEN tb – gray, 3 sec max, then

EXTEND tb – gray, 20 sec max

EE MODE – OFF

- \* If manual release reqd: \*
- \* EE MODE – MAN \*
- \* MAN CONTR – DERIGID (hold until DERIGID tb-gray, 5 sec max) \*
- \* RELEASE sw – depress (hold until OPEN tb-gray, 3 sec max) \*
- \* Mnvr arm clear of grapple pin, then \*
- \* EE MAN CONTR – DERIGID (hold until EXTEND tb-gray, 20 sec max) \*
- \* MODE – OFF \*

**5. MNVR TO OBSS PRE-GRAPPLE AT HANDOFF**

RHC

RATE – VERN (RATE MIN tb-ON)

MODE – as desired

Mnvr to OBSS PRE-GRAPPLE AT HANDOFF posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1015	-362	-688	284	0	270	0
SY	SP	EP	WP	WY	WR	
+23.5	+63.5	-29.6	-102.9	+11.5	-98.6	

BRAKES – ON (tb-ON)

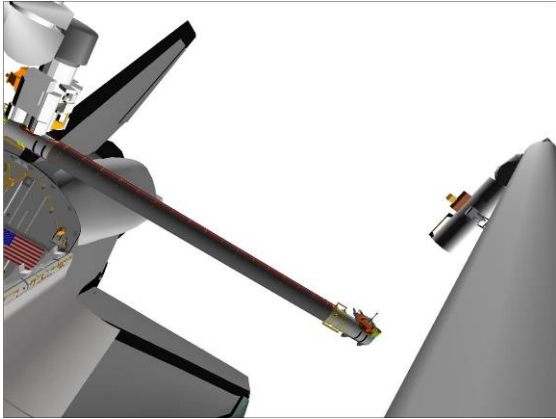
MODE – not DIRECT

If using shuttle attitude control:

Verify Rate < 0.1 deg/s/axis, then

DAP: AUTO

Give SSRMS Operator GO for OBSS Berth



**ELBOW (-35,-15)**



**CCTV C (-45,10)**

- 6. CONFIGURE CIRCUIT BREAKERS  
 MA73C:C      cb MCA PWR AC3 3Φ MID 2 – op  
                         √AC2 3Φ MID 2 – op  
                         √AC3 3Φ MID 4 – op  
 :D

- 7. CONFIGURE FOR MONITORING  
 On SSRMS notification to watch for STBD RMS RFLs,  
     SM 94 PDRS CONTROL  
     RMS STBD – ITEM 2 EXEC (\*)

Notify SSRMS operator when STBD RMS R-F-L tb (three) – gray

- 8. STBD MRL LATCH  
 On SSRMS Operator GO to latch STBD MRLs to Topological Capture,  
     √STBD RMS R-F-L tb (three) – gray  
     SM 94 PDRS CONTROL  
     √STBD AFT, MID, FWD LAT (six) = 0

R13L      PL BAY MECH PWR SYS (two) – ON

NOTE

Expect single motor drive time for MRL latching (18 sec max).  
 The following STBD RMS RETEN LAT – OFF and PL BAY  
 MECH PWR SYS (two) – OFF actions are to be performed simo

Verify AOS for latching to Topological Capture

STBD RMS RETEN LAT – LAT 6 sec only (tb-bp)  
   – OFF

R13L      PL BAY MECH PWR SYS (two) – OFF

Give SSRMS Operator GO to Limp All SSRMS Joints and Derigidize

R13L      On SSRMS Operator GO to complete STBD MRL latching,  
                         PL BAY MECH PWR SYS (two) – ON

STBD RMS RETEN LAT – LAT (tb-LAT) (12 sec max)  
   – OFF

If using shuttle attitude control:  
Verify Rate < 0.1 deg/s/axis, then  
DAP: AUTO

R13L 9. RECONFIGURE POWER  
PL BAY MECH PWR SYS (two) – OFF

STBD RMS HTR A,B (two) – AUTO

A6U EVENT TIMER CNTL – STOP

SM 94 PDRS CONTROL

√STBD AFT, MID, FWD LAT (six) = 1  
RMS PORT – ITEM 1 EXEC (\*)

MA73C:C cb MCA PWR AC3 3Φ MID 2 – cl

√AC2 3Φ MID 2 – op

:D √AC3 3Φ MID 4 – op

Give SSRMS Operator GO for OBSS Release

# MNVR FROM OBSS PRE-GRAPPLE TO PRE-CRADLE POSN

## 1. SETUP

SM 94 PDRS CONTROL

√ PL ID, ITEM 3: 0

√ INIT ID, ITEM 24: 0

V10/L	P1 LOOB
V10/R	A
MON 1	Elbow
MON 2	C

Verify at OBSS PRE-GRAPPLE AT HANDOFF posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1015	-362	-688	284	0	270	0
SY	SP	EP	WP	WY	WR	
+23.5	+63.5	-29.6	-102.9	+11.5	-98.6	

## 2. MNVR TO PRE-CRADLE POSN

On SSRMS Operator GO for maneuver to Pre-cradle posn

SM 94 PDRS CONTROL

END POS – ITEM 18 -1 2 6 1 -1 4 6 -5 5 1 EXEC

ATT – ITEM 21 +5 +2 +0 EXEC

CMD CK – ITEM 25 EXEC (GOOD)

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – OPR CMD, ENTER (READY lt on)

AUTO SEQ – PROCEED (IN PROG lt on)

When AUTO SEQ IN PROG lt – off:

BRAKES – ON (tb-ON)

PRE-CRADLE posn:

(01:00)

X	Y	Z	PITCH	YAW	ROLL	PL ID
√ -1261	-146	-551	5	2	0	0
SY	SP	EP	WP	WY	WR	
√ 0.0	+25.0	-25.0	+5.0	0.0	0.0	

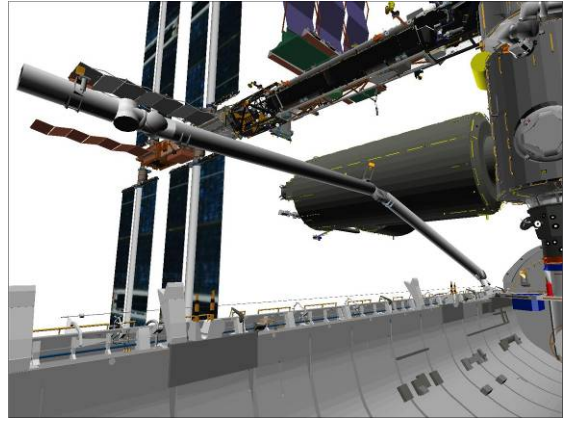
PARAM – PORT TEMP

JOINT – CRIT TEMP

Notify SSRMS Operator that SRMS at PRE-CRADLE posn



**CCTV A (10,25)**



**CCTV C (-45,10)**

OBSS OFF-NOMINAL

OBSS SJ HANDOFF FROM SSRMS (NODE 2) TO SRMS .....	FS 4-2
MANEUVER TO OBSS CLEARANCE POSN .....	FS 4-10
HANDOFF FROM SRMS TO SSRMS (NODE 2).....	FS 4-12
MNVR FROM OBSS PRE-GRAPPLE TO PRE-CRADLE POSN .....	FS 4-20

**OBSS  
OFF-NOMINAL**

# OBSS SJ HANDOFF FROM SSRMS (NODE 2) TO SRMS

## 1. SETUP

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 0

√INIT ID, ITEM 24: 0

A7U

CCTV – config as reqd  
 – perform PAN/TILT RESET for PLB cameras  
 ZOOM – full OUT

V10/L	P1 LOOB
V10/R	A
MON 1	Elbow
MON 2	C

## 2. SJ OBSS PRE-GRAPPLE MANEUVER

If SINGLE mode available:

RHC

RATE – as reqd (VERN within 10 ft)  
 BRAKES – OFF (tb-OFF)

MODE – best available

Mnvr to OBSS PRE-GRAPPLE AT HANDOFF posn:

	SY	SP	EP	WP	WY	WR	
S6 Install Viewing	-58.1	+41.4	-64.4	+19.3	-51.8	-50.6	
1: EP +			-29.6				
2: SY +	+23.5						
3: SP +		+63.5					
4: WP -				-102.9			
5: WY +					+11.5		
6: WR -						-98.6	
OBSS Pre-Grapple	+23.5	+63.5	-29.6	-102.9	+11.5	-98.6	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-1015	-362	-688	284	0	270	0

If SINGLE mode available:

BRAKES – ON (tb-ON)

MODE – not DIRECT

PARAM – PORT TEMP

JOINT – CRIT TEMP

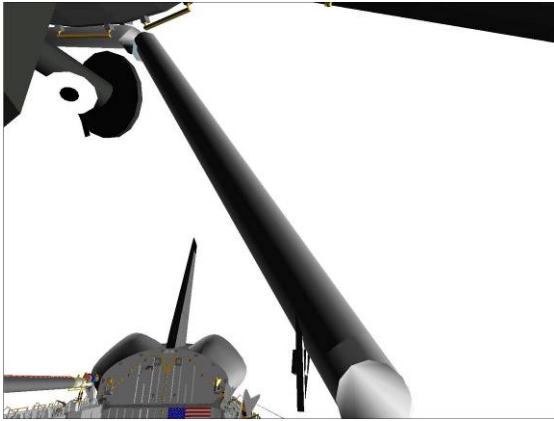
Notify MCC that SRMS at OBSS PRE-GRAPPLE AT HANDOFF posn

OBSS OFF-NOMINAL



Step 1:

Drive EP+ (for 34.8°)  
From -64.4° to -29.6°



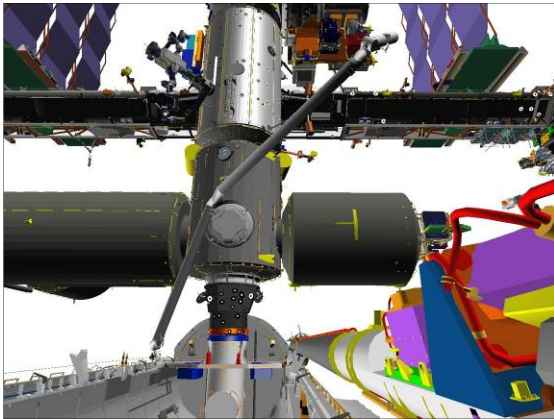
**CCTV A (10,25)**

Step 2:

Drive SY+ (for 81.6°)  
From -58.1° to +23.5°



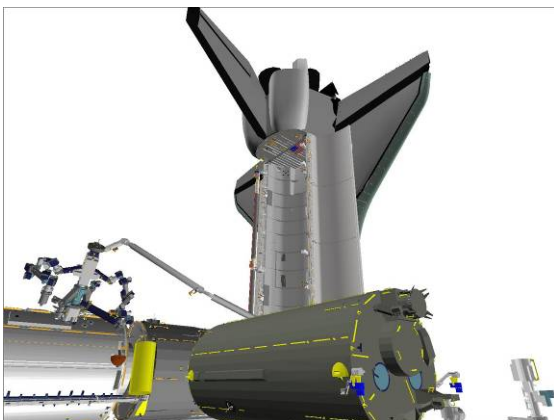
**CCTV A (10,25)**



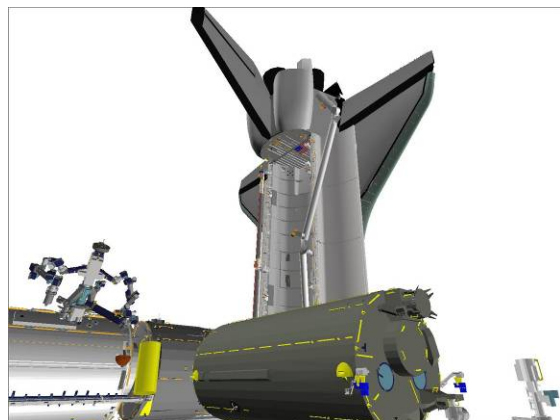
**CCTV C (0,20)**



**CCTV C (-45,10)**



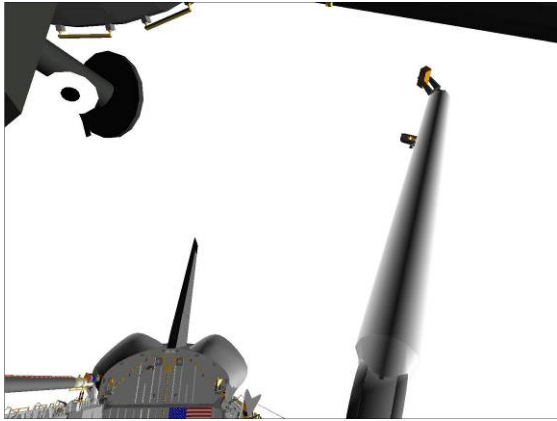
**P1 LOOB (130,25)**



**P1 LOOB (130,25)**

Step 3:

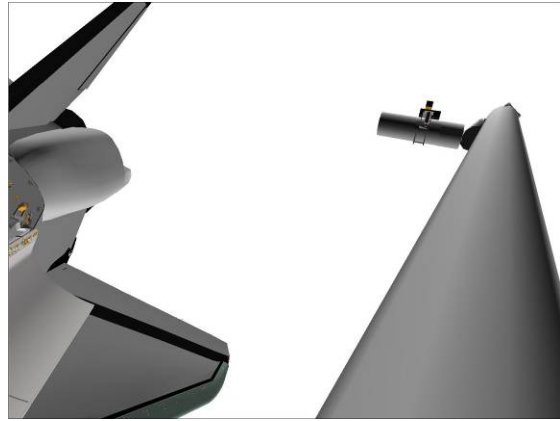
Drive SP+ (for 22.1°)  
From +41.4° to +63.5°



**CCTV A (10,25)**

Step 4:

Drive WP- (for 122.2°)  
From +19.3° to -102.9°



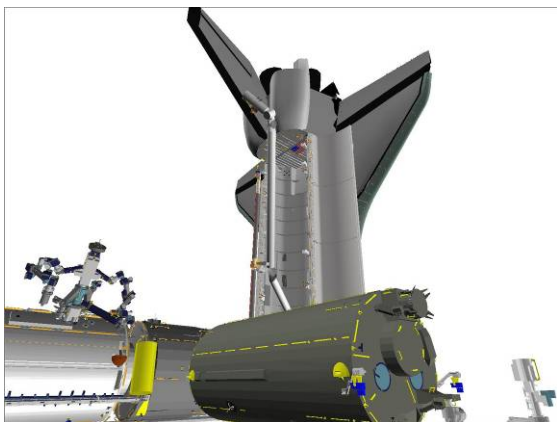
**ELBOW (-30,-20)**



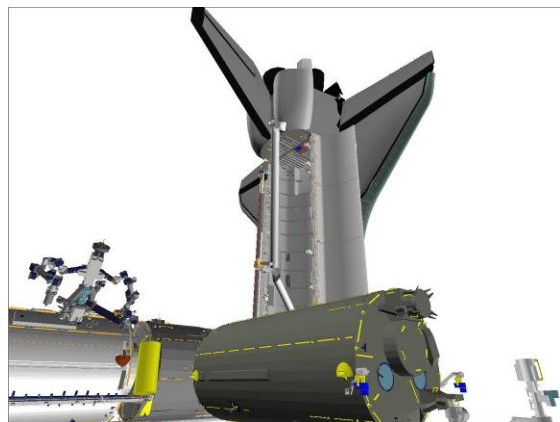
**CCTV C (-45,10)**



**CCTV C (-45,10)**



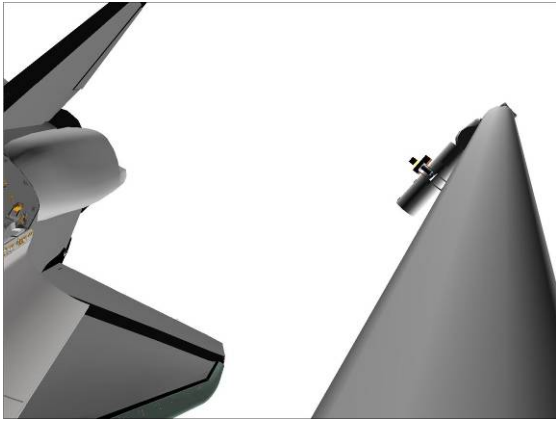
**P1 LOOB (130,25)**



**P1 LOOB (130,25)**

Step 5:

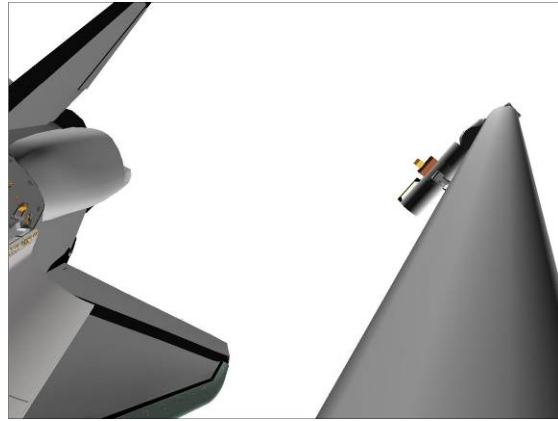
Drive WY+ (for 63.3°)  
From -51.8° to +11.5°



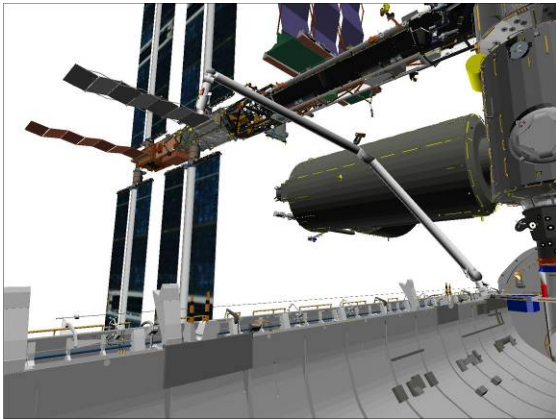
**ELBOW (-30,-20)**

Step 6:

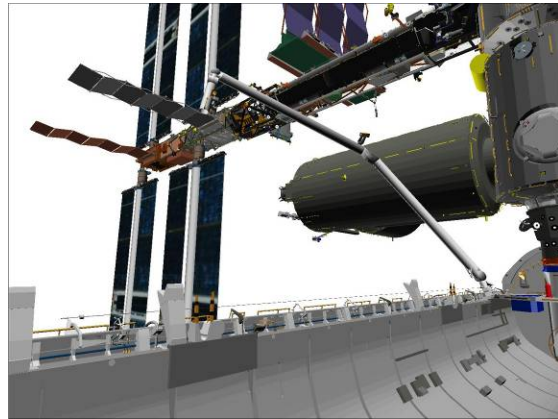
Drive WR- (for 48.0°)  
From -50.6° to -98.6°



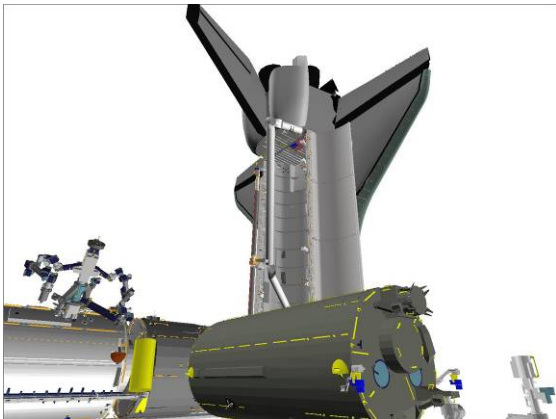
**ELBOW (-30,-20)**



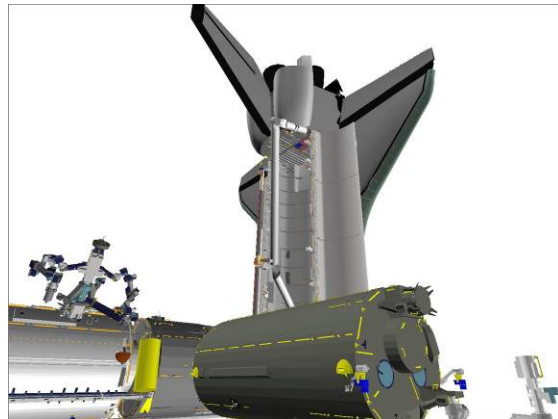
**CCTV C (-45,10)**



**CCTV C (-45,10)**



**P1 LOOB (130,25)**



**P1 LOOB (130,25)**

3. CONFIGURE POWER

CAUTION  
SPEE power must be applied within 90 min  
to prevent sensor package damage

On SSRMS Operator GO to Release STBD MRLs

STBD RMS HTR A,B (two) – OFF

A6U           EVENT TIMER MODE – UP  
                  CNTL – START

MA73C:C      cb MCA PWR AC3 3Φ MID 2 – op  
                  √AC2 3Φ MID 2 – op  
:D             √AC3 3Φ MID 4 – op

R13L           PL BAY MECH PWR SYS (two) – ON

4. STBD MRL RELEASE

SM 94 PDRS CONTROL  
RMS STBD – ITEM 2 EXEC (\*)  
√STBD AFT, MID, FWD REL (six) = 0

NOTE  
Expect single motor drive time for MRL release

STBD RMS RETEN LAT – REL (tb-REL) (18 sec max)  
– OFF

If motor drive time > 18 sec, √MCC

SM 94 PDRS CONTROL  
√STBD AFT, MID, FWD REL (six) = 1

5. RECONFIGURE POWER

R13L           PL BAY MECH PWR SYS (two) – OFF

MA73C:C      cb MCA PWR AC3 3Φ MID 2 – cl  
                  √AC2 3Φ MID 2 – op  
:D             √AC3 3Φ MID 4 – op

Give SSRMS Operator GO for OBSS Unberth  
Monitor RFL Status

After OBSS Unberth,  
style="text-align: center;">SM 94 PDRS CONTROL  
RMS PORT – ITEM 1 EXEC (\*)

6. SETUP FOR GRAPPLE

On SSRMS Operator GO for OBSS Grapple

V10/L	P1 LOOB
V10/R	A
MON 1	EE
MON 2	C

A7U

CCTV – config for grapple

– install OBSS SJ GRAPPLE AT HANDOFF OVERLAY

– RMS WRIST, ZOOM: 34.0 HFOV

FOCUS: 5 ft

Maintain eyepoint approx 18 in when using grapple overlay

R12(OBSS) √SPEE PWR – OFF

A15 √APCU 1,2 CONV (two) – OFF (tb-bp)

A15 √OUTPUT (two) – OFF (tb-bp)

7. SJ OBSS GRAPPLE AT HANDOFF

If SINGLE mode available:

RHC

RATE – VERN (RATE MIN tb-ON)

BRAKES – OFF (tb-OFF)

MODE – best available

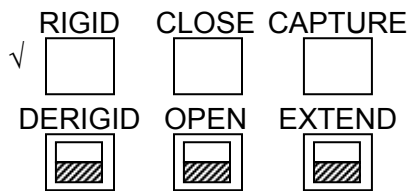
Drive joints per OBSS SJ GRAPPLE AT HANDOFF OVERLAY and diagram until EE within grapple envelope

CAUTION  
Monitor EE tb timing to prevent EE motor burnout

SM 169 PDRS STATUS

EE MODE – AUTO

CAPTURE sw – depress (mom)



CRITICAL TIMES (28 sec total):

CAPTURE tb – gray, then

CLOSE tb – gray, 3 sec max, then

RIGID tb – gray, 25 sec max

EE MODE – OFF

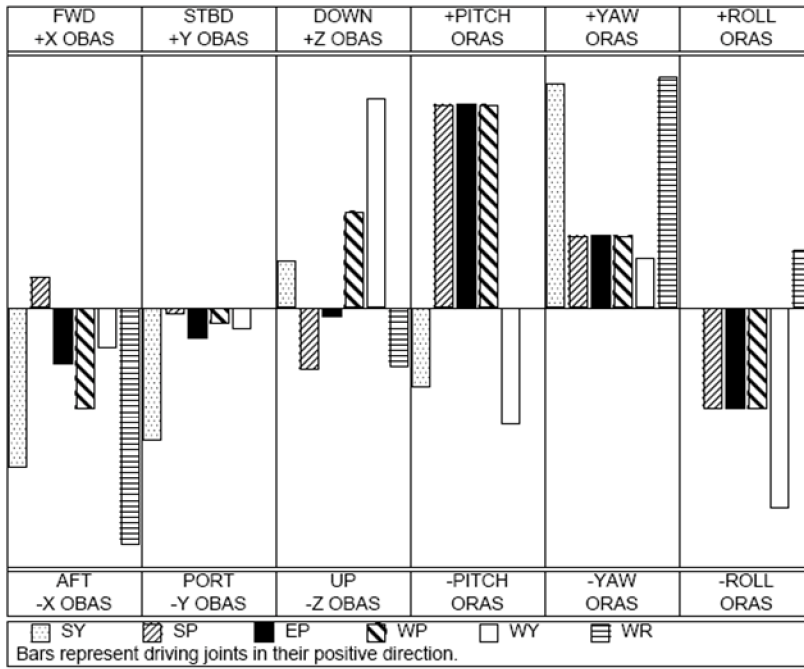
- \* If manual capture required: \*
- \* EE MODE – MAN \*
- \* CAPTURE sw – depress (hold until CLOSE tb-gray, 3 sec max) \*
- \* MAN CONTR – RIGID (hold until RIGID tb-gray, 25 sec max) \*
- \* MODE – OFF \*

If TEST mode available,  
MODE – TEST, ENTER  
Wait 5 sec

If SINGLE mode available:  
BRAKES – ON (tb-ON)

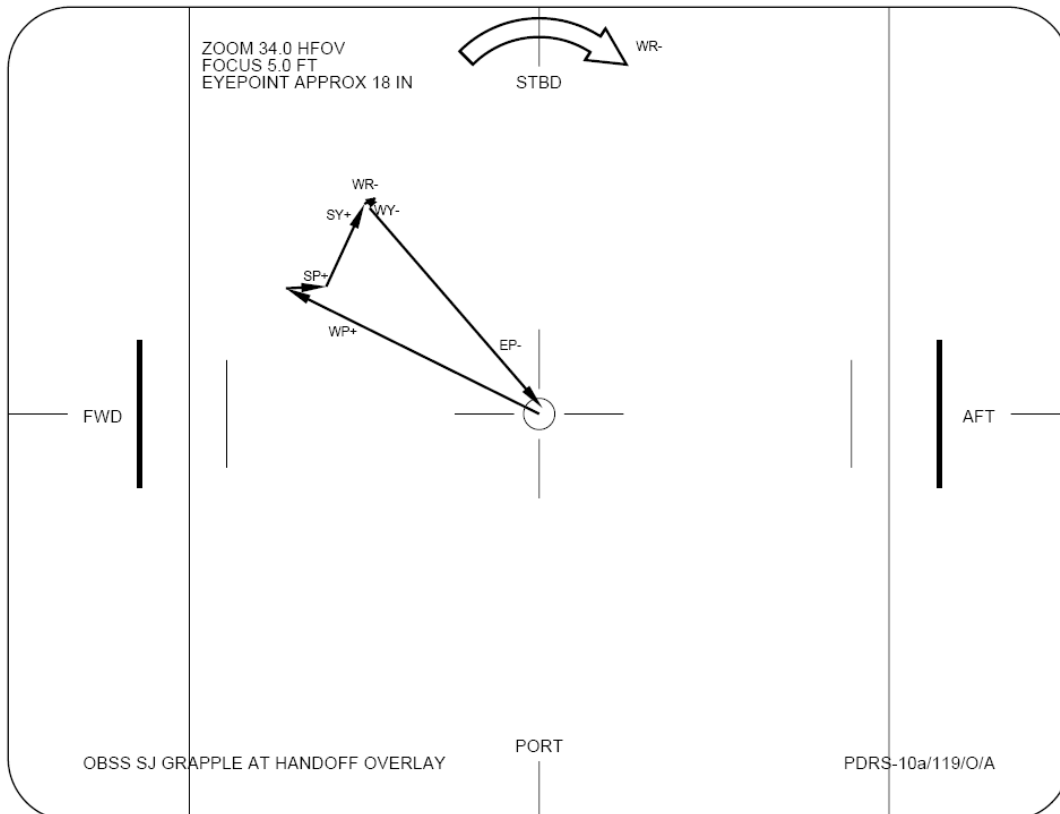
MODE – not DIRECT

# OBSS SJ HANDOFF SRMS GRAPPLE



To get:	Drive:	To get:	Drive:	Driving:	Results In:	Driving:	Results In:
+X (fwd)	-WR, -SY	+PITCH	+EP, +SP	+SY	-X (aft), +YAW	+WP	-X (aft), +PITCH
+Y (stbd)	-SY	+YAW	+WR, +SY	+SP	-Z (up), +PITCH	+WY	+Z (down), -ROLL
+Z (down)	+WY, +WP	+ROLL	-WY, -EP	+EP	-X (aft), +PITCH	+WR	-X (aft), +YAW

$\Delta SY$	$\Delta SP$	$\Delta EP$	$\Delta WP$	$\Delta WY$	$\Delta WR$
+2.2	+2.1	-18.2	+16.6	-0.8	-2.1





If SINGLE mode available:

**SM 94 PDRS CONTROL**

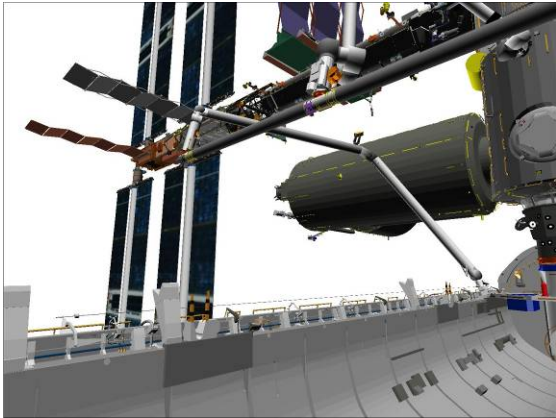
PL ID – ITEM 3 +2 EXEC

INIT ID – ITEM 24 +2 EXEC

Expected OBSS HANDOFF posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1029	+229	-614	14	270*	0	2
SY	SP	EP	WP	WY	WR	
+25.8	+66.3	-49.0	-85.9	+10.7	-100.7	

\* Display Singularity



**CCTV C (-45,10)**



**CCTV A (10,25)**

Review GENERIC END EFFECTOR CUE CARD – ISS/SHUTTLE DOCKED OPS

R12(OBSS) RSC PWR – OFF,ON

Perform ACTIVATION (LDRI/ITVC Cue Card, PHOTO/TV)

Notify SSRMS Operator SRMS OBSS grapple complete and Brakes On, GO for OBSS RELEASE

Perform LCH ACTIVATION (LCS Cue Card, PHOTO/TV)

Perform LCC ACTIVATION (LCS Cue Card, PHOTO/TV), step 2

# OBSS SJ MANEUVER TO OBSS CLEARANCE POSN

## NOTE

Assumed starting posn is OBSS Handoff

### 1. SETUP

On SSRMS Operator GO for mnvr to OBSS CLEARANCE posn

R12

Green Jumper – ISS

V10/L	P1 LOOB
V10/R	A
MON 1	Elbow
MON 2	C(B)

### 2. MNVR TO OBSS CLEARANCE POSN

If SINGLE mode available:

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – best available

Mnvr to OBSS CLEARANCE posn:

OBSS  
Handoff  
1: WR +  
OBSS  
Clearance

SY	SP	EP	WP	WY	WR	
+25.8	+66.3	-49.0	-85.9	+10.7	-100.7	
					-70.0	
+25.8	+66.3	-49.0	-85.9	+10.7	-70.0	
X	Y	Z	PITCH	YAW	ROLL	PL ID
-1323	+148	-688	14	300	0	2

If SINGLE mode available:

BRAKES – ON (tb-ON)

MODE – not DIRECT

If using shuttle attitude control:

Verify Rate < 0.1 deg/s/axis, then

DAP: AUTO

Notify SSRMS Operator SRMS at OBSS CLEARANCE posn, GO for mnvr to FOCUSED INSPECTION VIEWING posn



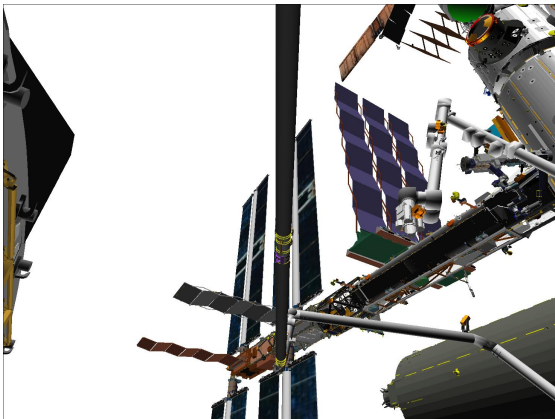
Step 1:

Drive WR+ (for 30.7°)

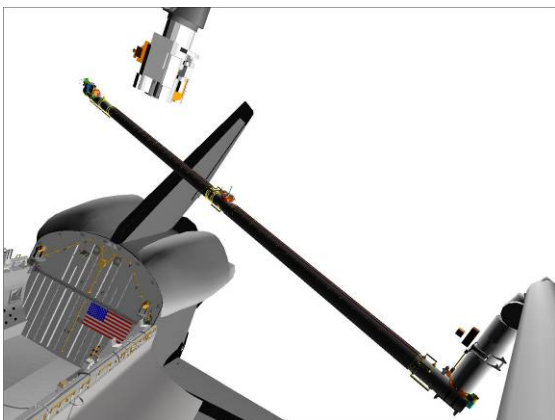
From -100.7° to -70.0°



**CCTV A (10,25)**



**CCTV C (-60,40)**



**ELBOW (-35,5)**

## OBSS SJ HANDOFF FROM SRMS TO SSRMS (NODE 2)

### NOTE

Assumed starting posn is OBSS Clearance

#### 1. SETUP

On SSRMS Operator GO for mnvr to OBSS HANDOFF posn

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 2

√INIT ID, ITEM 24: 2

R12

Green Jumper – ISS

V10/L	P1 LOOB
V10/R	A
MON 1	Elbow
MON 2	C

#### 2. SJ MNVR TO OBSS HANDOFF POSN

If SINGLE mode available:

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – best available

Mnvr to OBSS HANDOFF posn:

OBSS  
Clearance  
1: WR –  
OBSS  
Handoff

SY	SP	EP	WP	WY	WR	
+25.8	+66.3	-49.0	-85.9	+10.7	-70.0	
					-100.7	
+25.8	+66.3	-49.0	-85.9	+10.7	-100.7	
X	Y	Z	PITCH	YAW	ROLL	PL ID
-1029	+229	-614	14	270*	0	2

\* Display Singularity

If SINGLE mode available:

BRAKES – ON (tb-ON)

MODE – not DIRECT

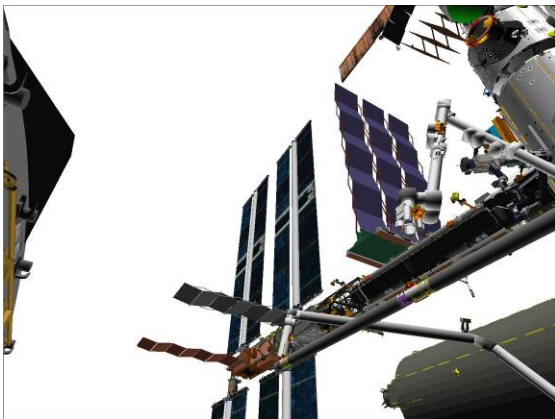
Notify SSRMS Operator SRMS at OBSS HANDOFF posn, GO for OBSS Grapple

Step 1:

Drive WR- (for 30.7°)  
From -70.0° to -100.7°



**CCTV A (10,25)**



**CCTV C (-60,40)**



**ELBOW (-30,0)**

R12 3. STOW PTU  
Green Jumper – LDRI/ITVC

A7U DTV ← PL2

CAMR CMD PAN/TILT – HI RATE  
PAN – L (to hard stop)  
TILT – UP (to hard stop)  
PAN/TILT – RESET, HI RATE (LO within 10°)  
PAN: +108 (right)  
TILT: -175 (down)

On SSRMS Operator GO for OBSS Release

Perform LCC DEACTIVATION (LCS Cue Card, PHOTO/TV)  
Perform LCH DEACTIVATION (LCS Cue Card, PHOTO/TV)

<u>CAUTION</u> STBD RMS HTR power must be applied within 90 min to prevent sensor package damage
--

Perform DEACTIVATION (LDRI/ITVC Cue Card, PHOTO/TV)

R12 4. OBSS UNGRAPPLE  
Green Jumper – ISS

V10/L	P1 LOOB
V10/R	A
MON 1	EE→Elbow
MON 2	C

A7U CCTV – config for ungrapple  
– RMS WRIST, ZOOM: 34.0 HFOV  
FOCUS: 5 ft

NOTE  
CONTR ERR It and 'S96 PDRS CNTL' msg may  
occur due to Consistency/Envelope Check error

RHC If TEST MODE available:  
RATE – COARSE (RATE MIN tb-OFF)

SM 94 PDRS CONTROL
--------------------

AUTO BRAKE INH – ITEM 10 EXEC (\*)

BRAKES – OFF (tb-OFF)  
MODE – TEST, ENTER  
Wait 5 sec

BRAKES – ON (tb-ON)

SM 94 PDRS CONTROL
--------------------

AUTO BRAKE ENA – ITEM 9 EXEC (\*)

↑  
If SINGLE MODE available:

**SM 94 PDRS CONTROL**  
 PL ID – ITEM 3 +0 EXEC  
 INIT ID – ITEM 24 +0 EXEC

RHC RATE – VERN (RATE MIN tb-ON)  
 BRAKES – OFF (tb-OFF)

MODE – best available

**CAUTION**  
 Monitor EE tb timing to prevent EE motor burnout

**SM 169 PDRS STATUS**

EE MODE – MAN  
 MAN CONTR – DERIGID (hold until DERIGID tb-gray, 5 sec max)  
 RELEASE sw – depress (hold until OPEN tb-gray, 3 sec max)

<p>✓</p> <table border="0"> <tr> <td>RIGID </td> <td>CLOSE </td> <td>CAPTURE </td> </tr> <tr> <td>DERIGID </td> <td>OPEN </td> <td>EXTEND </td> </tr> </table>	RIGID 	CLOSE 	CAPTURE 	DERIGID 	OPEN 	EXTEND 	<p><u>CRITICAL TIMES (8 sec total):</u>          DERIGID tb – gray, 5 sec max, then          OPEN tb – gray, 3 sec max</p>
RIGID 	CLOSE 	CAPTURE 					
DERIGID 	OPEN 	EXTEND 					

EE MODE – OFF

5. SJ MNVR TO OBSS PRE-GRAPPLE AT HANDOFF  
 Drive joints per OBSS SJ HANDOFF SRMS UNGRAPPLE WRIST CCTV OVERLAY and diagram until SRMS at OBSS PRE-GRAPPLE posn

EE MODE – MAN  
 MAN CONTR – DERIGID (hold until EXTEND tb-gray, 20 sec max)  
 MODE – OFF

<p>✓</p> <table border="0"> <tr> <td>RIGID </td> <td>CLOSE </td> <td>CAPTURE </td> </tr> <tr> <td>DERIGID </td> <td>OPEN </td> <td>EXTEND </td> </tr> </table>	RIGID 	CLOSE 	CAPTURE 	DERIGID 	OPEN 	EXTEND 	<p><u>CRITICAL TIMES (20 sec total):</u>          EXTEND tb – gray, 20 sec max</p>
RIGID 	CLOSE 	CAPTURE 					
DERIGID 	OPEN 	EXTEND 					

Mnvr to OBSS PRE-GRAPPLE AT HANDOFF posn:

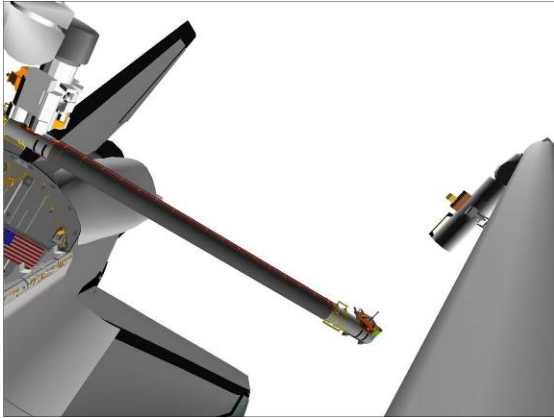
X	Y	Z	PITCH	YAW	ROLL	PL ID
-1015	-362	-688	284	0	270	0
SY	SP	EP	WP	WY	WR	
+23.5	+63.5	-29.6	-102.9	+11.5	-98.6	

If SINGLE mode available:  
 BRAKES – ON (tb-ON)

MODE – not DIRECT

If using shuttle attitude control:  
Verify Rate < 0.1 deg/s/axis,  
then  
DAP: AUTO

Give SSRMS Operator GO for OBSS Berth

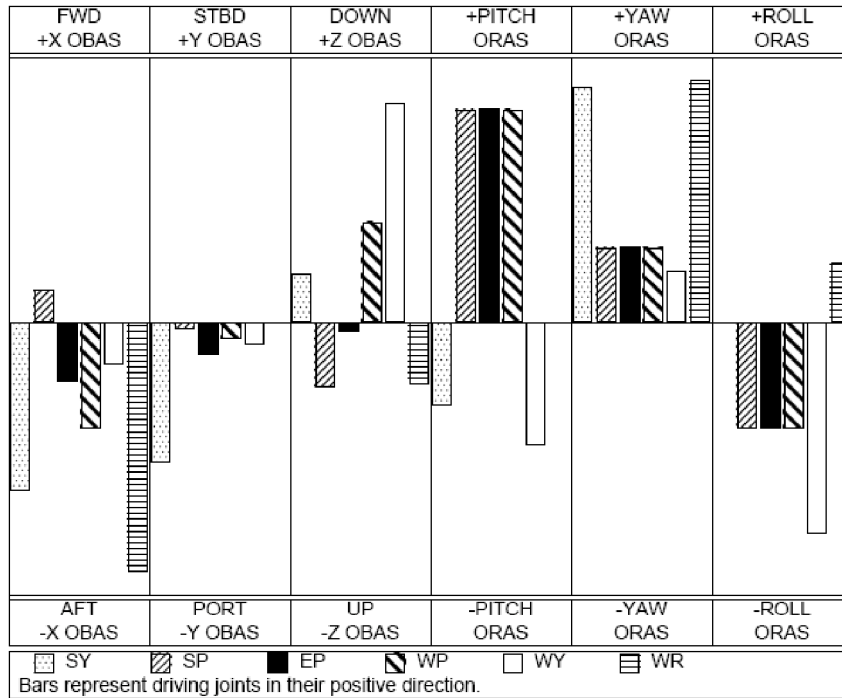


**ELBOW (-35,-15)**



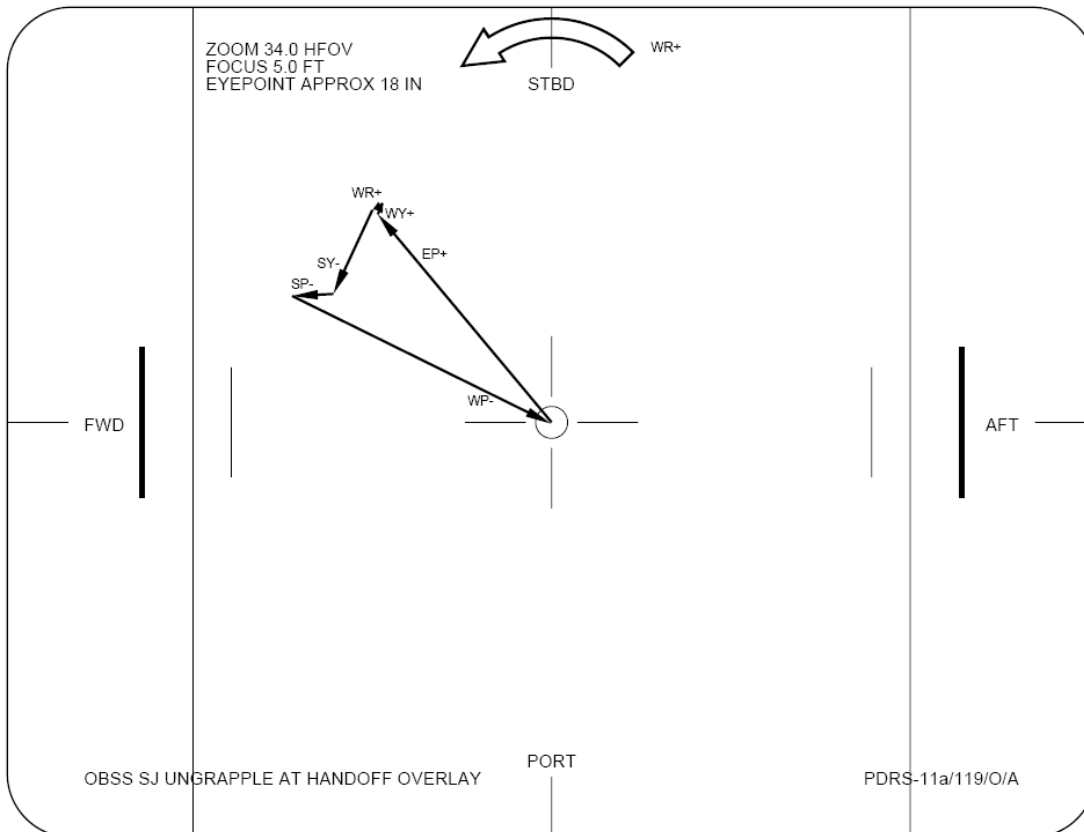
**CCTV C (-45,10)**

# OBSS SJ UNGRAPPLE AT HANDOFF OVERLAY



To get:	Drive:	To get:	Drive:	Driving:	Results In:	Driving:	Results In:
+X (fwd)	-WR, -SY	+PITCH	+EP, +SP	+SY	-X (aft), +YAW	+WP	-X (aft), +PITCH
+Y (stbd)	-SY	+YAW	+WR, +SY	+SP	-Z (up), +PITCH	+WY	+Z (down), -ROLL
+Z (down)	+WY, +WP	+ROLL	-WY, -EP	+EP	-X (aft), +PITCH	+WR	-X (aft), +YAW

$\Delta SY$	$\Delta SP$	$\Delta EP$	$\Delta WP$	$\Delta WY$	$\Delta WR$
-2.2	-2.1	+18.2	-16.6	+0.8	+2.1



6. CONFIGURE CIRCUIT BREAKERS

MA73C:C      cb MCA PWR AC3 3Φ MID 2 – op  
                  √AC2 3Φ MID 2 – op  
:D               √AC3 3Φ MID 4 – op

7. CONFIGURE FOR MONITORING

On SSRMS notification to watch for STBD RMS RFLs,  
SM 94 PDRS CONTROL  
RMS STBD – ITEM 2 EXEC (\*)

Notify SSRMS operator when STBD RMS R-F-L tb (three) – gray

8. STBD MRL LATCH

On SSRMS Operator GO to latch STBD MRLs to Topological Capture,  
√STBD RMS R-F-L tb (three) – gray

SM 94 PDRS CONTROL

√STBD AFT, MID, FWD LAT (six) = 0

R13L            PL BAY MECH PWR SYS (two) – ON

NOTE

Expect single motor drive time for MRL latching (18 sec max).  
The following STBD RMS RETEN LAT – OFF and PL BAY  
MECH PWR SYS (two) – OFF actions are to be performed simo

Verify AOS for latching to Topological Capture

STBD RMS RETEN LAT – LAT 6 sec only (tb-bp)  
– OFF

R13L            PL BAY MECH PWR SYS (two) – OFF

Give SSRMS Operator GO to Limp All SSRMS Joints and Derigidize

R13L            On SSRMS Operator GO to complete STBD MRL latching,  
PL BAY MECH PWR SYS (two) – ON

STBD RMS RETEN LAT – LAT (tb-LAT) (12 sec max)  
– OFF

If using shuttle attitude control:  
Verify Rate < 0.1 deg/s/axis, then  
DAP: AUTO

9. RECONFIGURE POWER

R13L            PL BAY MECH PWR SYS (two) – OFF

STBD RMS HTR A,B (two) – AUTO

A6U            EVENT TIMER CNTL – STOP

SM 94 PDRS CONTROL

√STBD AFT, MID, FWD LAT (six) = 1  
RMS PORT – ITEM 1 EXEC (\*)



MA73C:C      cb MCA PWR AC3 3Φ MID 2 – cl  
                       √AC2 3Φ MID 2 – op  
                       √AC3 3Φ MID 4 – op  
:D

Give SSRMS Operator GO for OBSS Release

## MNVR FROM OBSS PRE-GRAPPLE TO PRE-CRADLE POSN

### 1. SETUP

On SSRMS Operator GO for mnvr to PRE-CRADLE

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 0

√INIT ID, ITEM 24: 0

V10/L	P1 LOOB
V10/R	A
MON 1	Elbow
MON 2	C

### 2. MNVR TO PRE-CRADLE POSN

If SINGLE MODE available:

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – best available

Mnvr to PRE-CRADLE posn:

OBSS  
Pre-Grapple  
1: WR +  
2: WY –  
3: WP +  
4: EP +  
5: SP –  
6: SY –  
Pre-Cradle

SY	SP	EP	WP	WY	WR	
+23.5	+63.5	-29.6	-102.9	+11.5	-98.6	
					0.0	
				0.0		
			+5.0			
		-25.0				
	+25.0					
0.0						
0.0	+25.0	-25.0	+5.0	0.0	0.0	
X	Y	Z	PITCH	YAW	ROLL	PL ID
-1261	-146	-551	5	2	0	0

If SINGLE mode available:

BRAKES – ON (tb-ON)

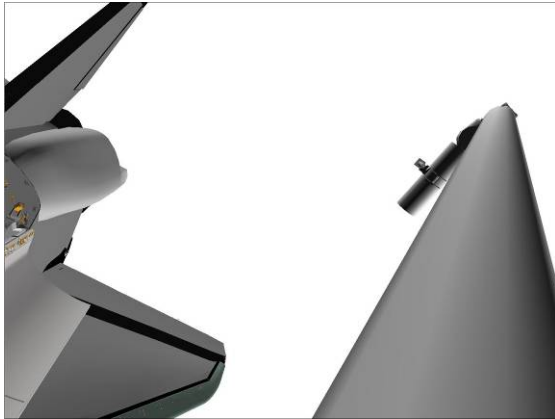
MODE – not DIRECT

PARAM – PORT TEMP

JOINT – CRIT TEMP

Step 1:

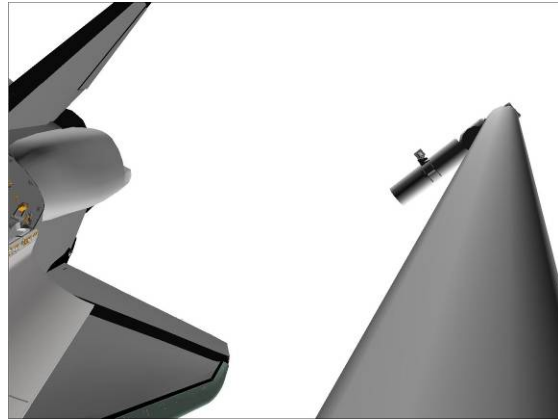
Drive WR+ (for 98.6°)  
From -98.6° to 0.0°



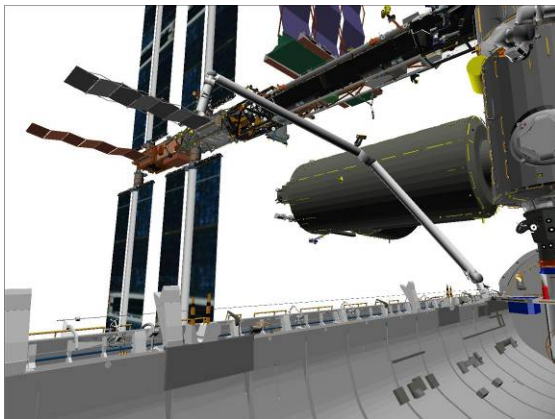
**ELBOW (-30,-20)**

Step 2:

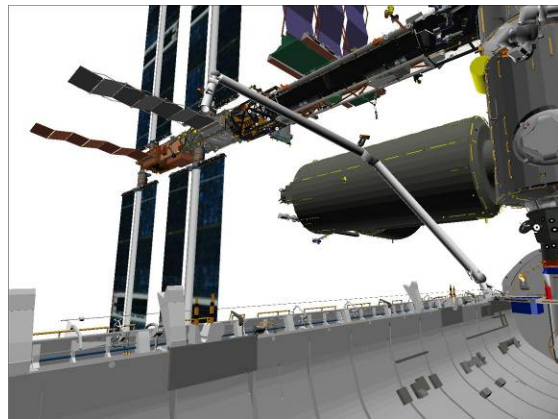
Drive WY- (for 11.5°)  
From 11.5° to 0.0°



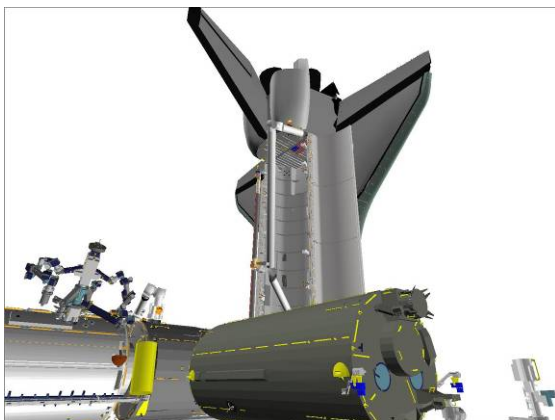
**ELBOW (-30,-20)**



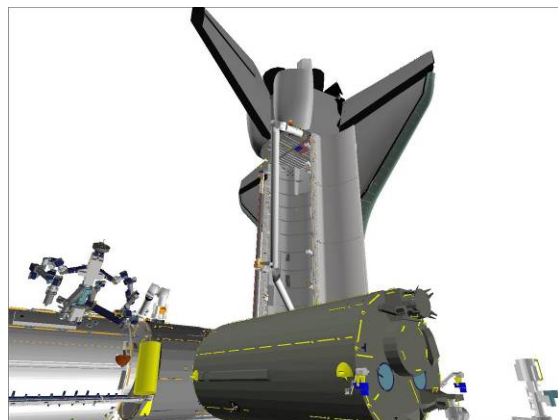
**CCTV C (-45,10)**



**CCTV C (-45,10)**



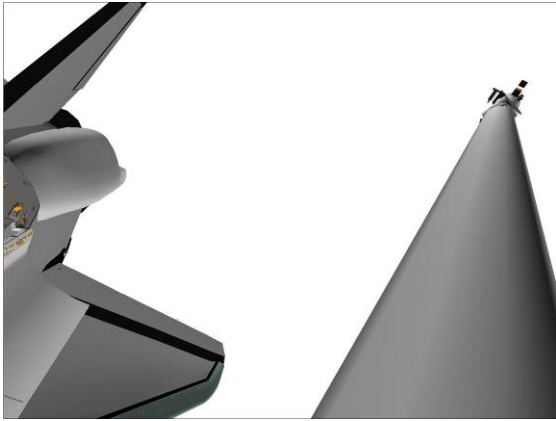
**P1 LOOB (130,25)**



**P1 LOOB (130,25)**

Step 3:

Drive WP+ (for 107.9°)  
From -102.9° to 5.0°



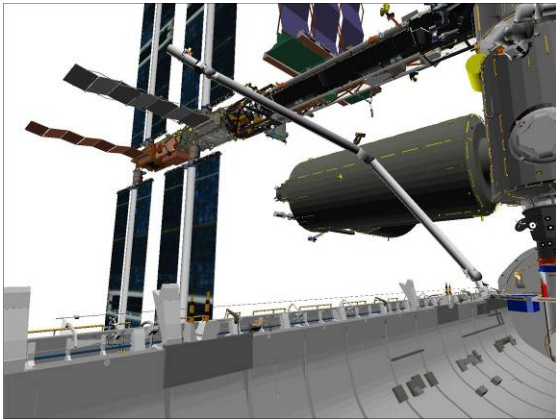
**ELBOW (-30,-20)**

Step 4:

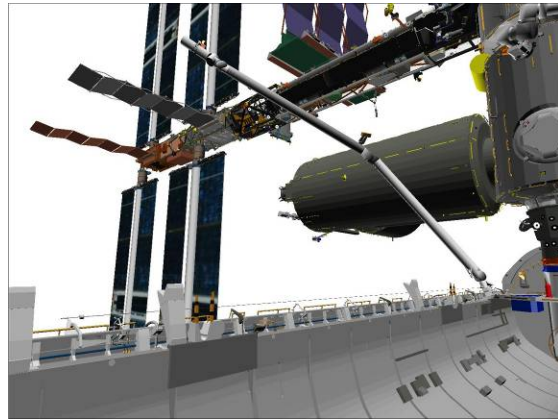
Drive EP+ (for 4.6°)  
From -29.6° to -25.0°



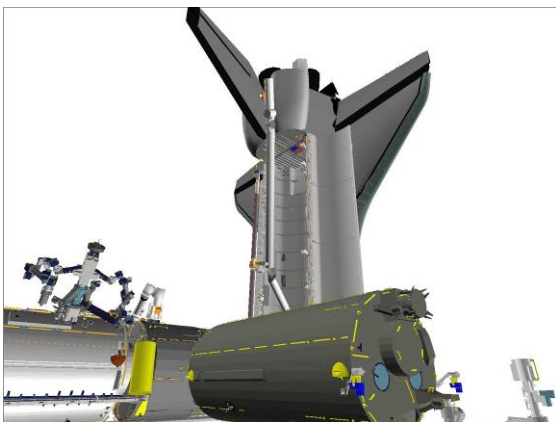
**CCTV A (10,25)**



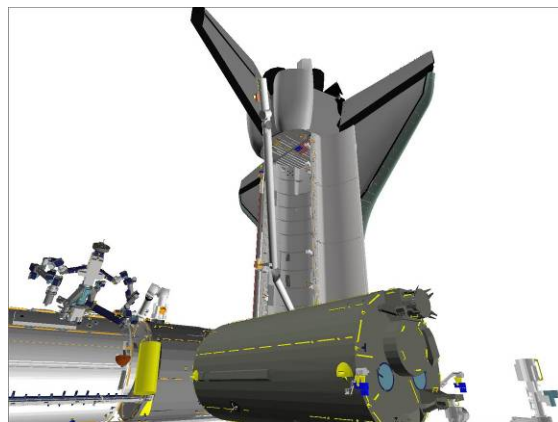
**CCTV C (-45,10)**



**CCTV C (-45,10)**



**P1 LOOB (130,25)**



**P1 LOOB (130,25)**

Step 5:

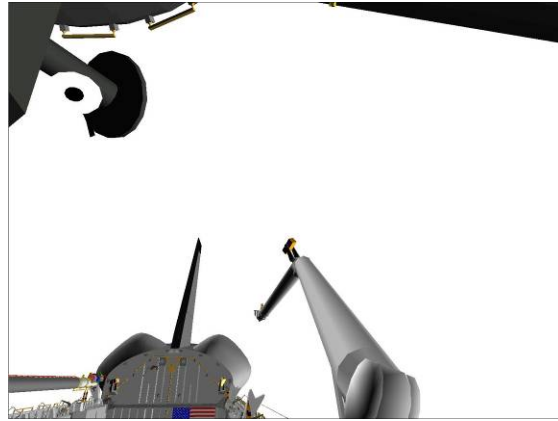
Drive SP- (for 38.5°)  
From 63.5° to 25.0°



**CCTV A (10,25)**

Step 6:

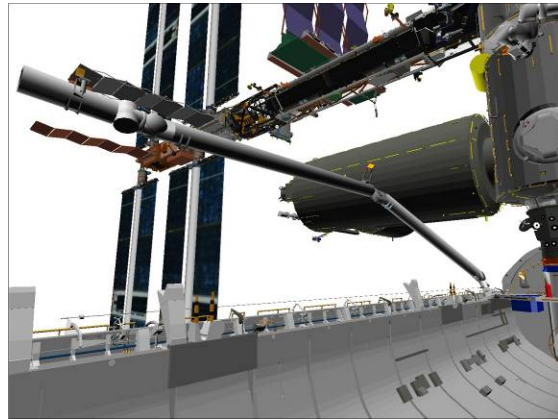
Drive SY- (for 23.5°)  
From 23.5° to 0.0°



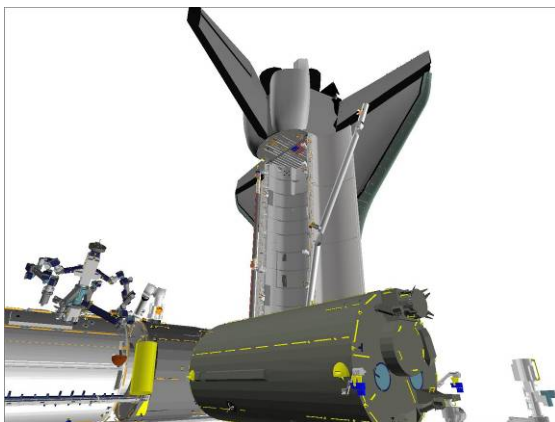
**CCTV A (10,25)**



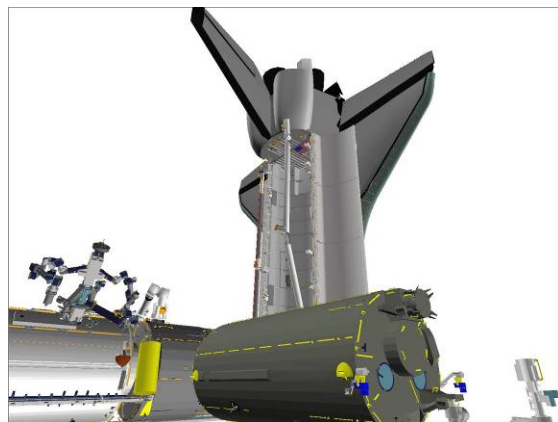
**CCTV C (-45,10)**



**CCTV C (-45,10)**



**P1 LOOB (130,25)**



**P1 LOOB (130,25)**

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VIEWING SUPPORT

SAW DEPLOY VIEWING..... FS 5-2  
CETA CART RELOCATE VIEWING..... FS 5-6  
SPDM VIEWING ..... FS 5-8

## SAW DEPLOY VIEWING

### 1. SETUP

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 0

√INIT ID, ITEM 24: 0

R12

√Green Jumper – ISS

V10/L	B
V10/R	A
MON 1	Elbow→EE
MON 2	S1 LOOB

Verify at PRE-CRADLE posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1261	-146	-551	5	2	0	0
SY	SP	EP	WP	WY	WR	
0.0	+25.0	-25.0	+5.0	0.0	0.0	

### 2. MNVR TO 1B SAW DEPLOY VIEWING POSN

SM 94 PDRS CONTROL

END POS – ITEM 18 -9 3 4 +3 7 6 -6 2 5 EXEC

ATT – ITEM 21 +1 3 0 +3 0 1 +2 0 8 EXEC

CMD CK – ITEM 25 EXEC (GOOD)

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – OPR CMD, ENTER (Ready It on)

AUTO SEQ – PROCEED (IN PROG It on)

When AUTO SEQ IN PROG It – off:

BRAKES – ON (tb-ON)

1B SAW DEPLOY VIEWING posn:

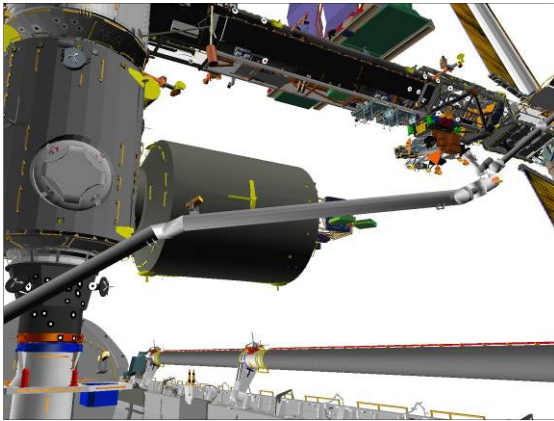
(01:30)

X	Y	Z	PITCH	YAW	ROLL	PL ID
√ -934	+376	-625	130	301	208	0
√ SY	SP	EP	WP	WY	WR	
√ -59.5	+12.7	-23.9	+18.7	-49.6	+105.7	

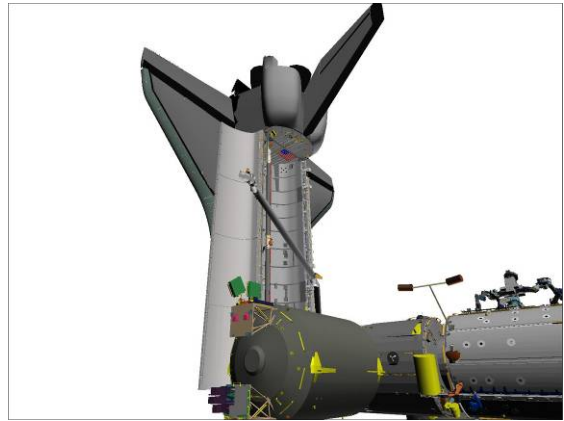
PARAM – PORT TEMP

JOINT – CRIT TEMP

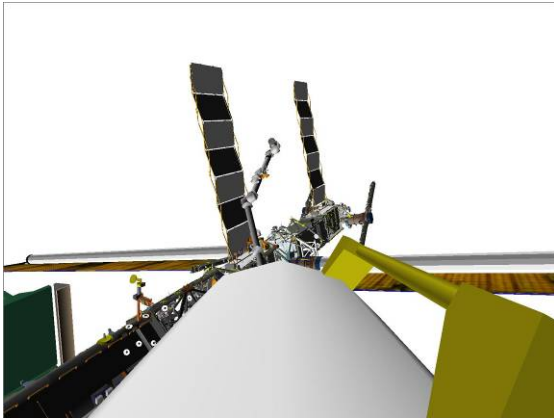




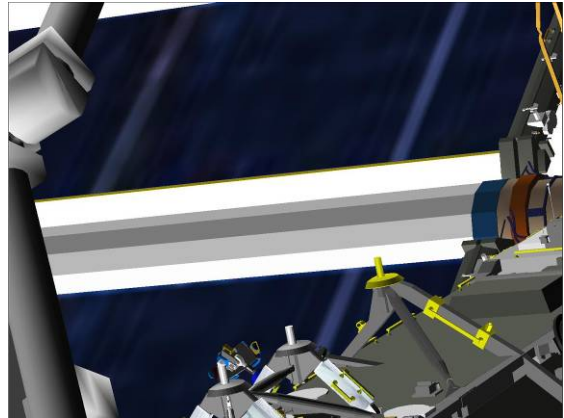
**CCTV B (30,15)**



**S1 LOOB (50,25)**



**EE**



**SAW DEPLOYED EE FOV:10**

**3. MNVR TO 3B SAW DEPLOY VIEWING POSN**

V10/L	B
V10/R	A
MON 1	EE
MON 2	S1 LOOB

**SM 94 PDRS CONTROL**

END POS – ITEM 18 -9 4 2 +3 8 3 -5 5 7 EXEC  
 ATT – ITEM 21 +2 1 4 +2 8 9 +2 8 3 EXEC  
 CMD CK – ITEM 25 EXEC (GOOD)

RHC

RATE – as reqd (VERN within 10 ft)  
 BRAKES – OFF (tb-OFF)  
 MODE – OPR CMD, ENTER (Ready It on)

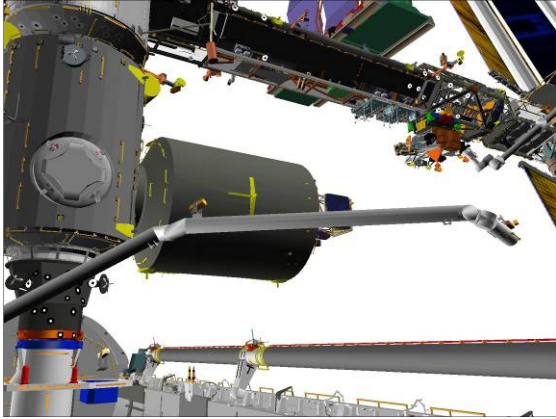
AUTO SEQ – PROCEED (IN PROG It on)

When AUTO SEQ IN PROG It – off:  
 BRAKES – ON (tb-ON)

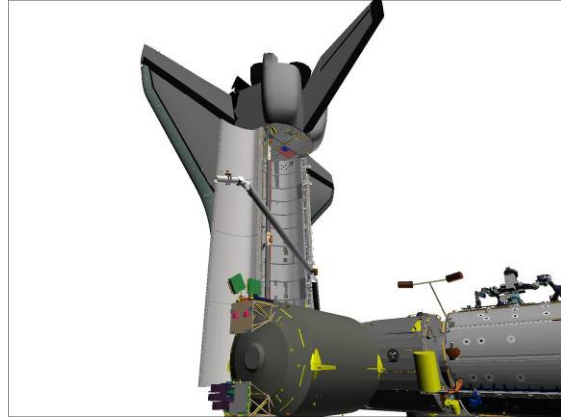
3B SAW DEPLOY VIEWING posn: (00:30)

	X	Y	Z	PITCH	YAW	ROLL	PL ID
√	-942	+383	-557	214	289	283	0
	SY	SP	EP	WP	WY	WR	
√	-58.5	+11.4	-25.5	-26.2	-41.7	+66.5	

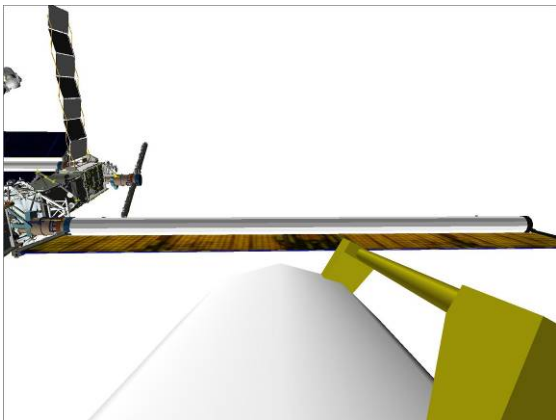
PARAM – PORT TEMP  
 JOINT – CRIT TEMP



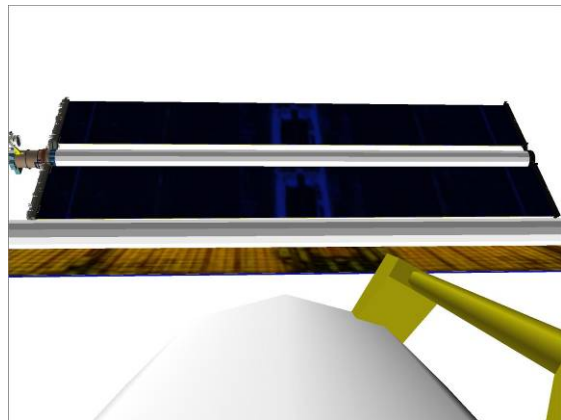
**CCTV B (30,15)**



**S1 LOOB (50,25)**



**EE**



**SAW DEPLOYED EE FOV:50**

4. MNVR TO PRE-CRADLE POSN

V10/L	B→C
V10/R	A
MON 1	Elbow
MON 2	S1 LOOB

**SM 94 PDRS CONTROL**

END POS – ITEM 18 -1 2 6 1 -1 4 6 -5 5 1 EXEC

ATT – ITEM 21 +5 +2 +0 EXEC

CMD CK – ITEM 25 EXEC (GOOD)

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – OPR CMD, ENTER (Ready It on)

AUTO SEQ – PROCEED (IN PROG It on)

When AUTO SEQ IN PROG It – off:

BRAKES – ON (tb-ON)

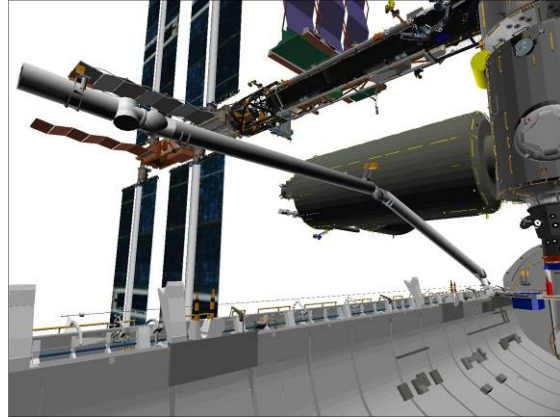
PRE-CRADLE posn: (01:30)

	X	Y	Z	PITCH	YAW	ROLL	PL ID
√	-1261	-146	-551	5	2	0	0
	SY	SP	EP	WP	WY	WR	
√	0.0	+25.0	-25.0	+5.0	0.0	0.0	

PARAM – PORT TEMP  
JOINT – CRIT TEMP



**CCTV A (20,10)**



**CCTV C (-45,10)**

# CETA CART RELOCATE VIEWING

## 1. SETUP

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 0

√INIT ID, ITEM 24: 0

R12

√Green Jumper – ISS

V10/L	S1 LOOB
V10/R	Elbow
MON 1	A
MON 2	B

RHC

## 2. MNVR TO CETA CART RELOCATE VIEWING POSN

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – SINGLE, ENTER

Mnvr to CETA CART RELOCATE VIEWING posn:

Pre-Cradle  
1: SY +  
CETA Cart  
Viewing

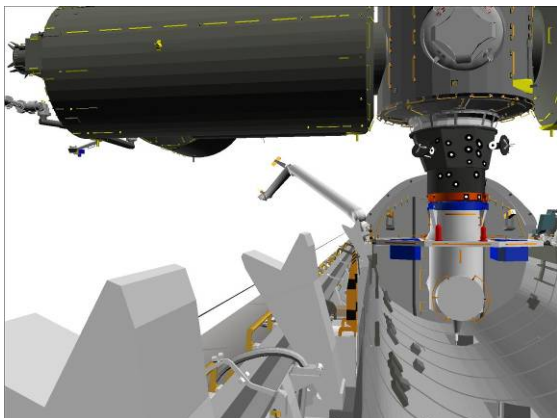
SY	SP	EP	WP	WY	WR		
0.0	+25.0	-25.0	+5.0	0.0	0.0		
+160.0							
+160.0	+25.0	-25.0	+5.0	0.0	0.0		
X	Y	Z	PITCH	YAW	ROLL	PL ID	
-133	-334	-485	182	21	142	0	

BRAKES – ON (tb-ON)

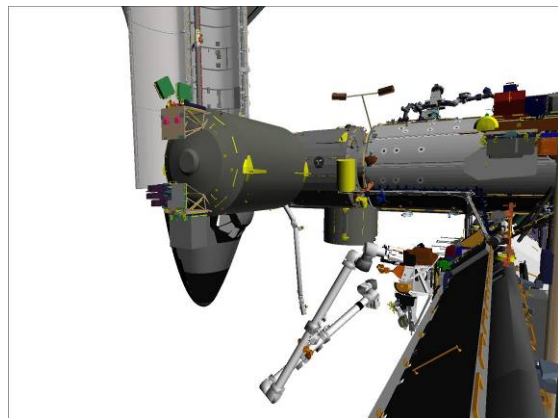
PARAM – PORT TEMP

JOINT – CRIT TEMP

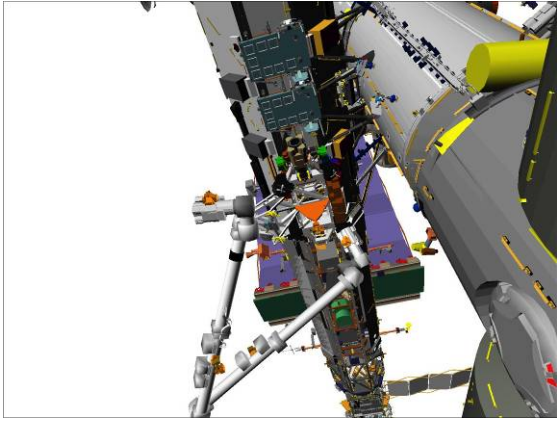
Notify SSRMS Operator that SRMS at CETA CART RELOCATE VIEWING posn



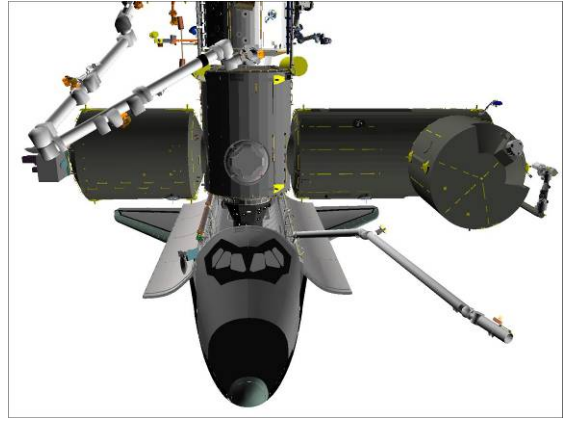
**CCTV B (-10,0)**



**S1 LOOB (60,-5)**



**ELBOW (100,-15)**



**FRONT**

# SPDM VIEWING

## 1. SETUP

SM 94 PDRS CONTROL

√PL ID, ITEM 3: 0

√INIT ID, ITEM 24: 0

R12

√Green Jumper – ISS

V10/L	S1 LOOB
V10/R	Elbow
MON 1	A
MON 2	B→C

## 2. MNVR TO SPDM VIEWING POSN

On SSRMS Operator GO for maneuver to SPDM Viewing posn

RHC

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – SINGLE, ENTER

Mnvr to SPDM VIEWING posn:

CETA Cart  
Viewing  
1: SY –  
SPDM  
Viewing

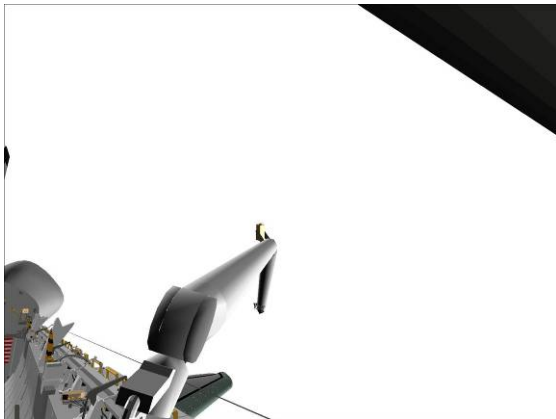
SY	SP	EP	WP	WY	WR		
+160.0	+25.0	-25.0	+5.0	0.0	0.0		
+32.0							
+32.0	+25.0	-25.0	+5.0	0.0	0.0		
X	Y	Z	PITCH	YAW	ROLL	PL ID	
-1173	-436	-449	354	32	0	0	

BRAKES – ON (tb-ON)

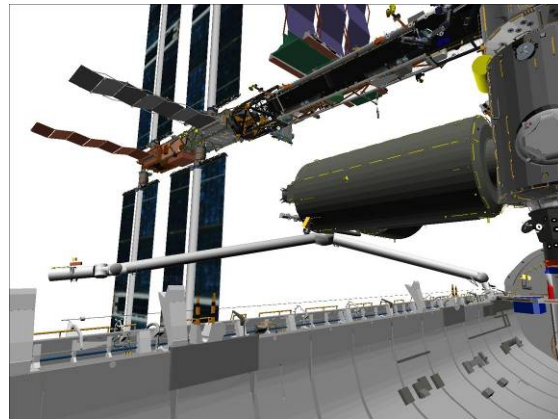
PARAM – PORT TEMP

JOINT – CRIT TEMP

Notify SSRMS Operator that SRMS at SPDM VIEWING posn

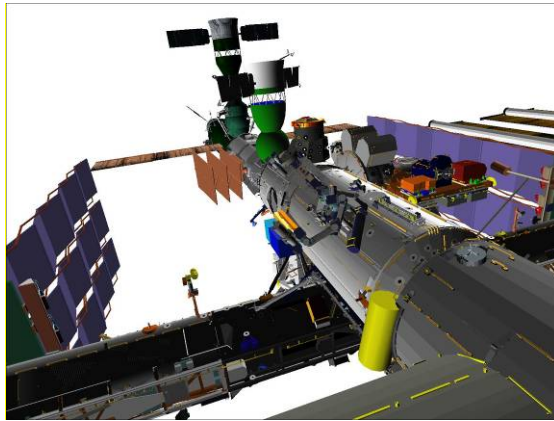


CCTV A (35,15)



CCTV C (-45,10)





**ELBOW (150,45)**

3. MNVR TO SRMS PRE-CRADLE POSN

On SSRMS Operator GO for maneuver to SRMS Pre-Cradle posn

RHC           RATE    – as reqd (VERN within 10 ft)  
                  BRAKES – OFF (tb-OFF)  
                  MODE    – SINGLE, ENTER

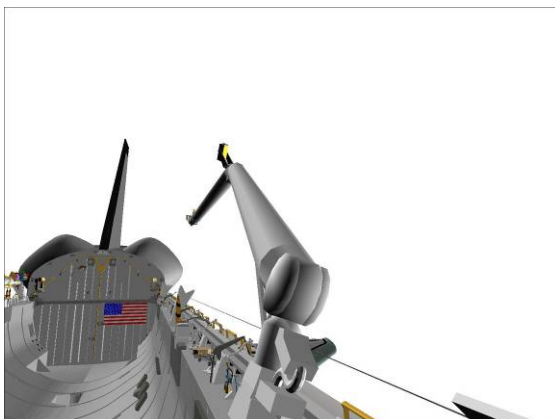
Mnvr to SRMS PRE-CRADLE posn:

SPDM  
 Viewing  
 1: SY –  
 Pre-Cradle

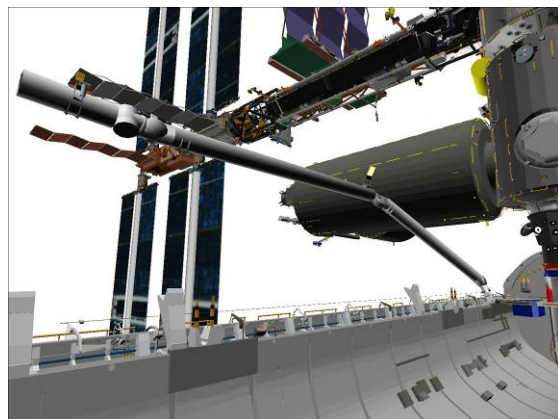
SY	SP	EP	WP	WY	WR		
+32.0	+25.0	-25.0	+5.0	0.0	0.0		
0.0							
0.0	+25.0	-25.0	+5.0	0.0	0.0		
X	Y	Z	PITCH	YAW	ROLL	PL ID	
-1261	-146	-551	5	2	0	0	

BRAKES – ON (tb-ON)

PARAM – PORT TEMP  
 JOINT    – CRIT TEMP



**CCTV A (20,10)**



**CCTV C (-45,10)**

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REFERENCE DATA

SRMS JOINT ANGLES VS POR COORDINATES.....	FS 6-2
PL ID 3 – S6 – POR @ CENTER OF TRUNNIONS .....	FS 6-4
S6 PRLA CONFIGURATION .....	FS 6-5

REFERENCE  
DATA

## SRMS JOINT ANGLES VS POR COORDINATES

REFERENCE DATA

### S6 Unberth Viewing

X	Y	Z	PITCH	YAW	ROLL	PL ID
-773	-653	-396	296	66	46	0
SY	SP	EP	WP	WY	WR	
+80.0	+43.0	-50.0	+5.0	0.0	0.0	

### S6 Handoff from SSRMS to SRMS

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1117	-212	-588	65	340	359	0
-1105	-19	-661	346	272*	280	3
SY	SP	EP	WP	WY	WR	
+11.4	+53.9	-73.0	+88.1	-42.1	+21.4	

\*Display Singularity

### S6 AUTO SEQUENCE (Auto Seq ID #7) posns:

Auto Pos #	X/ SY	Y/ SP	Z/ EP	PITCH/ WP	YAW/ WY	ROLL/ WR	PL ID
148 P	-1105	-19	-661	346	272*	280	3
	+11.4	+53.9	-73.0	+88.1	-42.1	+21.4	
149	-1134	+116	-660	269	280	229	3
	-6.5	+62.5	-82.6	+44.3	-30.9	-11.3	
150	-1129	+372	-630	290	290	246	3
	-37.4	+39.6	-63.7	+43.7	-2.2	+35.2	
151	-1057	+443	-587	281	316	210	3
	-46.5	+32.9	-43.5	+16.8	-19.5	-65.1	
152	-978	465	-447	281	343	192	3
	-56.2	+24.7	-39.5	-7.0	-19.8	-89.0	
153 P	-924	+523	-417	284	341	185	3
	-62.9	+14.8	-31.1	-4.5	-20.4	-91.5	

\*Display Singularity

### S6 Handback from SRMS to SSRMS

X	Y	Z	PITCH	YAW	ROLL	PL ID
-926	+399	-583	360	275	258	0
-924	+523	-417	284	341	185	3
SY	SP	EP	WP	WY	WR	
-62.9	+14.8	-31.1	-4.5	-20.4	-91.5	

### S6 Install Viewing

X	Y	Z	PITCH	YAW	ROLL	PL ID
-908	+298	-647	141	296	70	0
SY	SP	EP	WP	WY	WR	
-58.1	+41.4	-64.4	+19.3	-51.8	-50.6	

### OBSS Pre-Grapple at Handoff

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1015	-362	-688	284	0	270	0
SY	SP	EP	WP	WY	WR	
+23.5	+63.5	-29.6	-102.9	+11.5	-98.6	

OBSS Handoff

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1033	-362	-618	284	360	270	0
-1029	+229	-614	14	270*	0	2
SY	SP	EP	WP	WY	WR	
+25.8	+66.3	-49.0	-85.9	+10.7	-100.7	

\*Display Singularity

OBSS Clearance

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1033	-362	-618	284	360	301	0
-1323	+148	-688	14	300	0	2
SY	SP	EP	WP	WY	WR	
+25.8	+66.3	-49.0	-85.9	+10.7	-70.0	

1B SAW Deploy Viewing

X	Y	Z	PITCH	YAW	ROLL	PL ID
-934	+376	-625	130	301	208	0
SY	SP	EP	WP	WY	WR	
-59.5	+12.7	-23.9	+18.7	-49.6	+105.7	

3B SAW Deploy Viewing

X	Y	Z	PITCH	YAW	ROLL	PL ID
-942	+383	-557	214	289	283	0
SY	SP	EP	WP	WY	WR	
-58.5	+11.4	-25.5	-26.2	-41.7	+66.5	

CETA Cart Relocate Viewing

X	Y	Z	PITCH	YAW	ROLL	PL ID
-133	-334	-485	182	21	142	0
SY	SP	EP	WP	WY	WR	
+160.0	+25.0	-25.0	+5.0	0.0	0.0	

SPDM Viewing

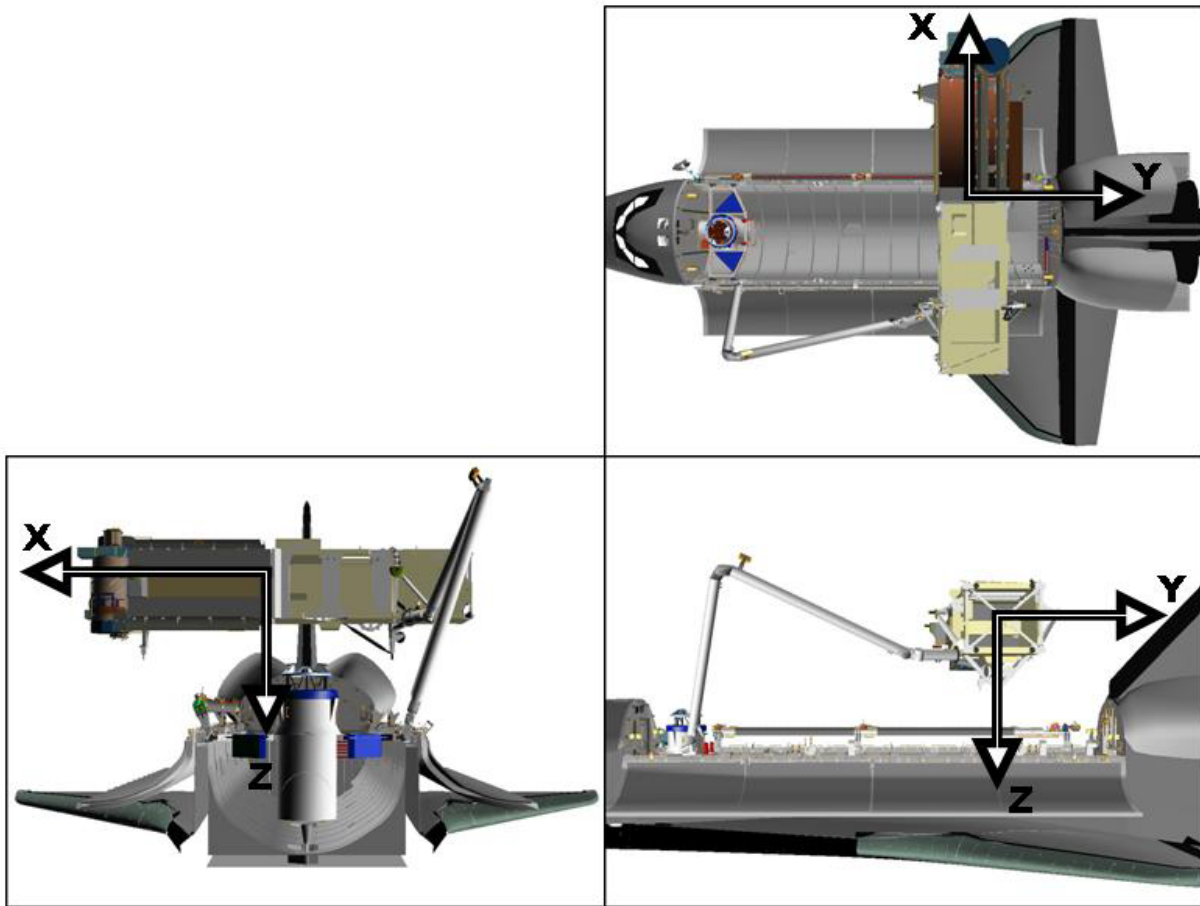
X	Y	Z	PITCH	YAW	ROLL	PL ID
-1173	-436	-449	354	32	0	0
SY	SP	EP	WP	WY	WR	
+32.0	+25.0	-25.0	+5.0	0.0	0.0	

OBSS Undock

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1033	-362	-618	284	360	270	0
-1029	+229	-614	14	270*	0	2
SY	SP	EP	WP	WY	WR	
+25.8	+66.3	-49.0	-85.9	+10.7	-100.7	

\*Display Singularity

PL ID 3 – S6 – POR @ CENTER OF TRUNNIONS



POR:

POR at Center of Trunnions

PURPOSE:

Maneuvering S6 Truss Segment

POR RATES:

TRANS LIM ft/sec

COARSE

VERN

0.10

0.05

ROT LIM deg/sec

0.154

0.077

JOINT RATES:

SHOULDER LIM deg/sec

COARSE

VERN

0.10

0.05

ELBOW LIM deg/sec

0.104

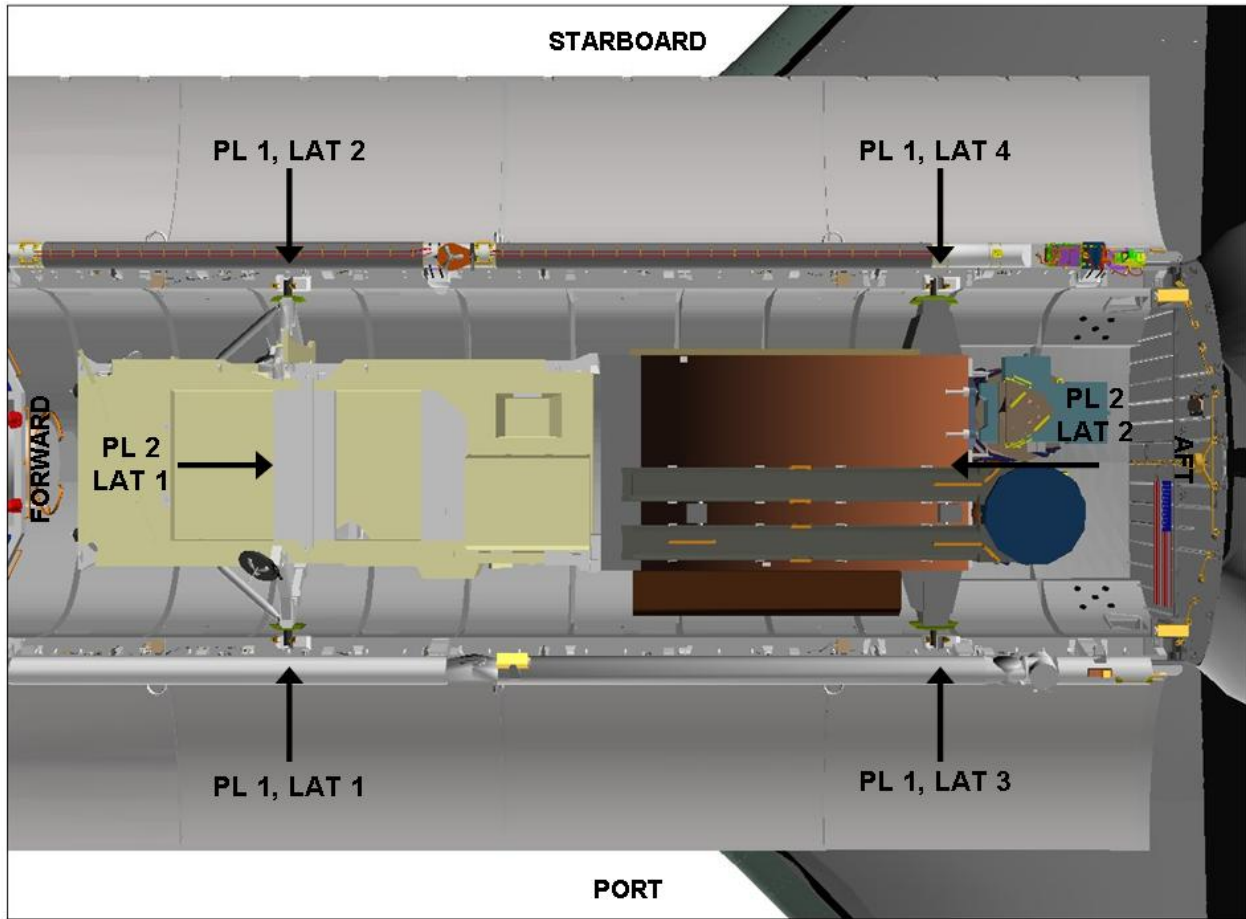
0.052

WRIST LIM deg/sec

0.154

0.077

# S6 PRLA CONFIGURATION



SEQUENCE	PL SEL	RELEASE
AKA	2	1,2
PRLA	1	1,2 (Forward)
PRLA	1	3,4 (Aft)

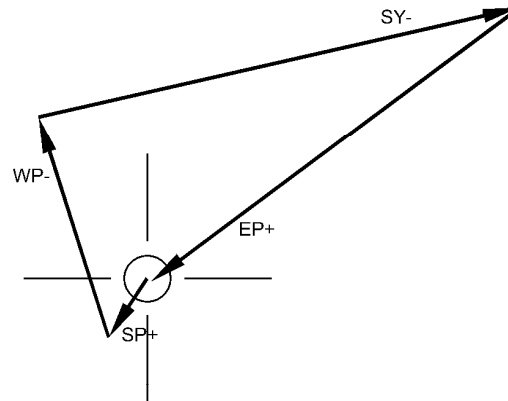
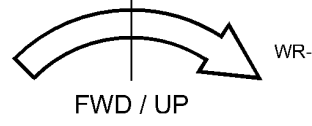
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CUE CARD CONFIGURATION

# CUE CARD CONFIG

Fabricate as transparency

ZOOM 34.0 HFOV  
FOCUS 5.0 FT  
EYEPOINT APPROX 18 IN



STBD

PORT

S6 SJ GRAPPLE AT HANDOFF - CCTV OVERLAY

AFT / DOWN

PDRS-9a/119/O/A

(reduced copy)

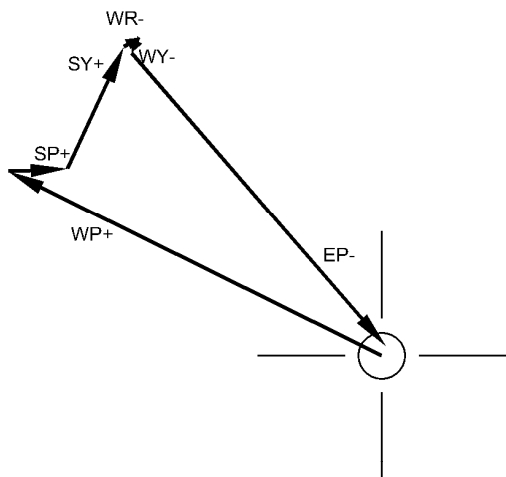
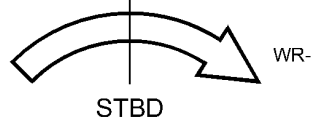
FS CC 7-2

PDRS/19/FIN



Fabricate as transparency

ZOOM 34.0 HFOV  
FOCUS 5.0 FT  
EYEPOINT APPROX 18 IN



FWD

AFT

OBSS SJ GRAPPLE AT HANDOFF OVERLAY

PORT

PDRS-10a/119/O/A

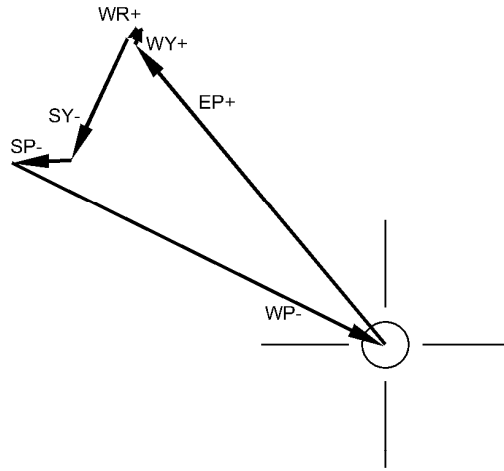
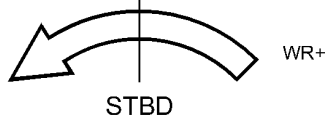
(reduced copy)

FS CC 7-3

PDRS/19/FIN

Fabricate as transparency

ZOOM 34.0 HFOV  
FOCUS 5.0 FT  
EYEPOINT APPROX 18 IN



FWD

AFT

OBSS SJ UNGRAPPLE AT HANDOFF OVERLAY

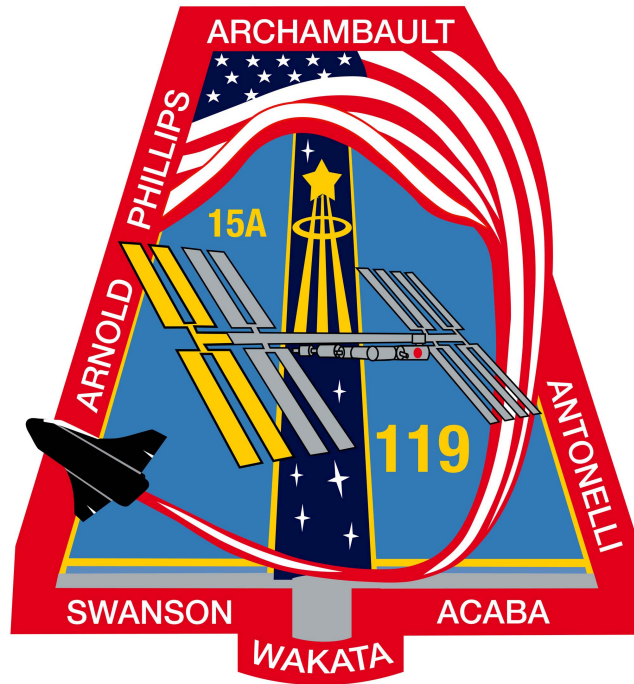
PORT

PDRS-11a/119/O/A

(reduced copy)

FS CC 7-4

PDRS/19/FIN



**PDRS OPS C/L**

**STS  
119**