

PDRS Operations Checklist

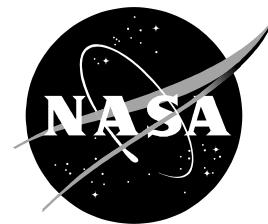
STS-121 Flight Supplement

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

**Basic
January 10, 2005**

National Aeronautics and
Space Administration

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

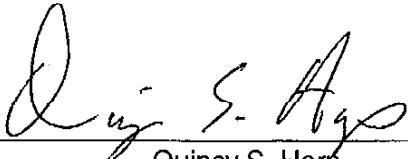


MISSION OPERATIONS DIRECTORATE

**PDRS OPERATIONS CHECKLIST
STS-121 FLIGHT SUPPLEMENT**

BASIC
January 10, 2005

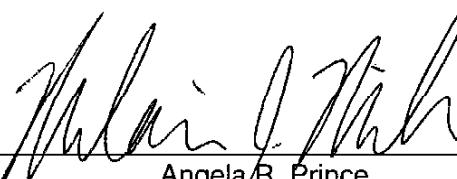
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Incorporates the following:
482#: NONE – Establishes baseline

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DX22/Q. Harp	281-483-1757
RMS Procedures	TBD	TBD
RMS Training	TBD	TBD
RMS Analysis	TBD	TBD
PRLA/ROEU Procedures	TBD	TBD

PDRS OPERATIONS CHECKLIST
STS-121 FLIGHT SUPPLEMENT

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* – Omit from flight book

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OBSS NOMINAL

OBSS UNBERTH

WARNING
For UNDOCKED ops only

NOTE

Stbd MPMs assumed deployed

1. SETUP

MON 1	Elbow
MON 2	C/D

SM 94 PDRS CONTROL

- ✓PL ID, ITEM 3: 0
✓INIT ID, ITEM 24: 0

RHC

2. MNVR TO OBSS PREGRAPPLE

RATE – as desired (VERN within 10 ft)
BRAKES – OFF (tb-OFF)
MODE – ORB UNL, ENTER

If first RMS ops for the mission:

Perform manual PLB survey, en route to OBSS PREGRAPPLE position

Mnvr to OBSS PREGRAPPLE posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-680	+96	-513	270	350	1	0
SY	SP	EP	WP	WY	WR	
-90.0	+87.6	-129.5	-57.5	0.0	+110.4	

BRAKES – ON (tb-ON)

STBD RMS HTR (two) – OFF

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

A6U

EVENT TIMER MODE – UP
CNTL – START

R12(OBSS) ✓SPEE PWR – OFF

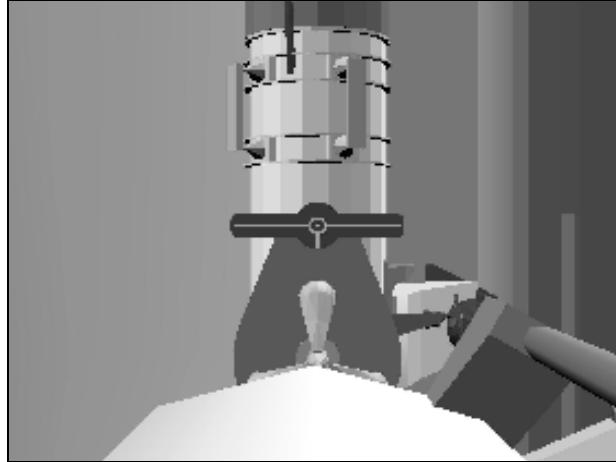
3. OBSS GRAPPLE

MON 1	Wrist
MON 2	C/D

A7U

CCTV – config for grapple
– install **PDRS TARGET OVERLAY FOR CTVM**
– RMS WRIST, zoom 34.0 HFOV
focus 5 ft

Maintain eyepoint ~18 in when using grapple overlay



WRIST

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

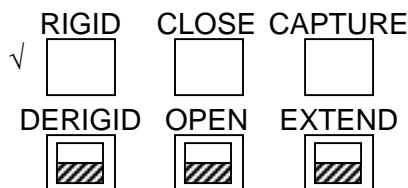
A6U DAP: VERN(FREE)

Mnvr to grapple envelope

CAUTION

Monitor EE tb timing to prevent EE motor burnout

EE MODE – AUTO
 CAPTURE – 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
 BRAKES – ON (tb-ON)

SM 94 PDRS CONTROL

PL ID – ITEM 3 +1 EXEC
 INIT ID – ITEM 24 +1 EXEC

Record POSN/ATT and Joint Angles:

	X	Y	Z	PITCH	YAW	ROLL	PL ID
Expected							1
	-680	+105	-436	0	0	341	1
	SY	SP	EP	WP	WY	WR	
Expected							
	-90.0	+76.5	-134.6	-40.9	0.0	+110.0	

Review **GENERIC END EFFECTOR CUE CARD – SHUTTLE NOT DOCKED OPS**

4. CONFIGURE POWER

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

R13L PL BAY MECH PWR SYS (two) – ON

5. STBD MRL RELEASE

SM 94 PDRS CONTROL

RMS STBD – ITEM 2 EXEC (*)

✓STBD AFT,MID,FWD REL (six) = 0

- * If any MSW shows '1', drive MRL *
- * for single motor time (18 sec) *

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

– OFF

If motor drive time > 8 sec, √MCC

SM 94 PDRS CONTROL

RMS PORT – ITEM 1 EXEC (*)

6. RECONFIGURE POWER

R13L PL BAY MECH PWR SYS (two) – OFF

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

Record joint angles:

SY	SP	EP	WP	WY	WR

7. MNVR TO OBSS HOVER

A7U CCTV – config for unberth

MON 1	Elbow
MON 2	D/C

RHC ✓RATE – VERN (RATE MIN tb-ON)

BRAKES – OFF (tb-OFF)

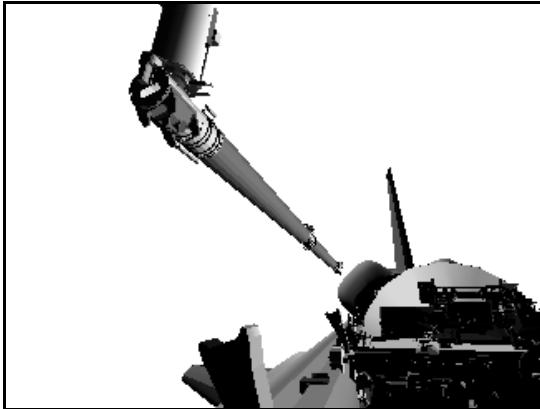
MODE – PL, ENTER

Mnvr OBSS up (-Z) to OBSS HOVER, Z: -496

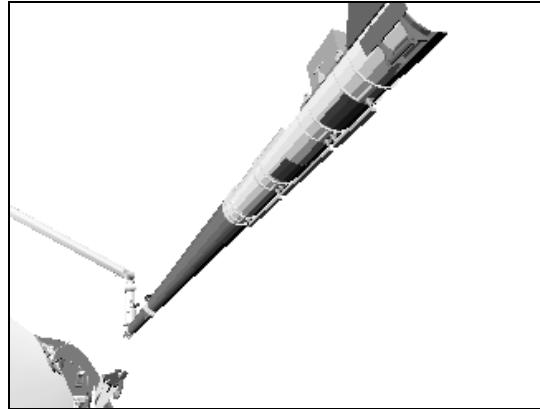
X	Y	Z	PITCH	YAW	ROLL	PL ID
-680	+126	-496	0	0	341	1
SY	SP	EP	WP	WY	WR	
-90.0	+79.8	-123.1	-55.7	0.0	+110.0	

BRAKES – ON (tb-ON)

✓MODE – not DIRECT



CCTV D (-15, 15)



CCTV C (25, 25)

A6U

DAP: as reqd

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

Perform APCU ACTIVATION (ASSY OPS, APCU), APCU 2 only

8. RESET PTU

A7U

VIDEO OUT MON2 pb – push
IN PL2(VPU) pb – push

CAMR CMD PAN/TILT – HI RATE (LO within 10°)

PAN – L (to hard stop)

TILT – UP (to hard stop)

PAN/TILT – RESET

PAN: +103 (right)

TILT: -260 (dn)

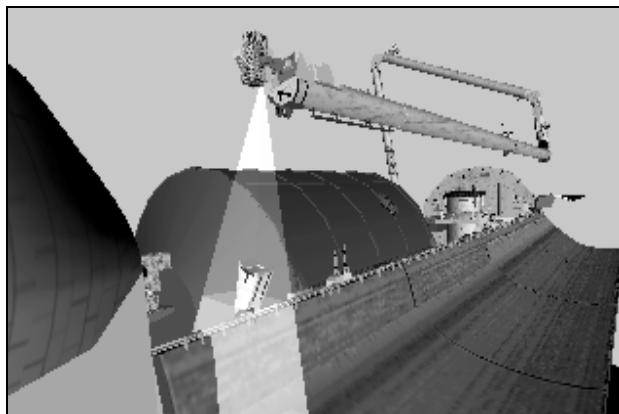
9. LDRI 3-D CALIBRATION

✓VIDEO OUT MON2 pb – push

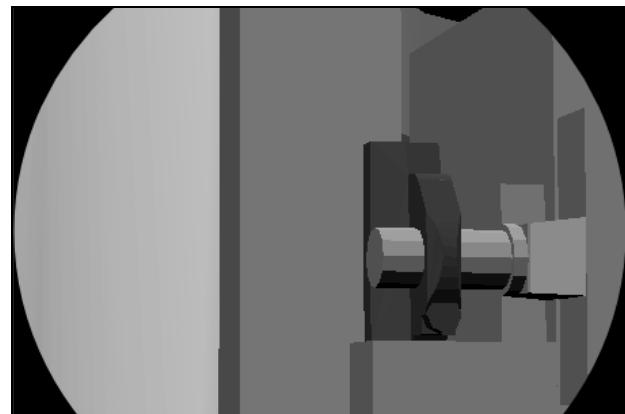
IN as desired (not PL2)

OUT MUX 1 L pb – push (MIDDECK lt on)

LDRI MODE 5 pb – push (flickering LDRI video)



BIRD'S EYE



LDRI (103, -260)

- L10(VTR) REC pb – push, hold
PLAY pb – push, simo (red •)
- Record for 2 min
- STOP pb – push (no red •)
- A7U √VIDEO OUT MUX 1 L pb – push (MIDDECK lt on)
LDRI MODE 6 pb – push (brighter flickering LDRI video)
- L10(VTR) REC pb – push, hold
PLAY pb – push, simo (red •)
- Record for 2 min
- STOP pb – push (no red •)

OBSS BERTH

WARNING
For UNDOCKED ops only

NOTE

Stbd MPMs assumed deployed

1. **SETUP**
A7U CCTV – config for berth

MON 1	Elbow
MON 2	A(D)/B(C)

SM 94 PDRS CONTROL
PL ID – ITEM 3 +2 EXEC
INIT ID – ITEM 24 +2 EXEC
2. **MNVR TO OBSS HOVER**
RHC RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – ORB LD, ENTER

Mnvr to OBSS HOVER posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-680	+126	-496	0	0	341	1
-998	+129	-507	0	0	10	2
SY	SP	EP	WP	WY	WR	
-90.0	+79.8	-123.1	-55.7	0.0	+110.0	

BRAKES – ON (tb-ON)
✓STBD RMS HTR (two) – OFF
3. **STOW PTU**
A7U VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push

CAMR CMD PAN/TILT – HI RATE (LO within 10°)
PAN – L (to hard stop)
TILT – UP (to hard stop)
PAN/TILT – RESET
PAN: +108.2 (right)
TILT: -175 (dn)

Perform DEACTIVATION (LDRI/ITVC Cue Card, PHOTO/TV)
Perform APCU DEACTIVATION (ASSY OPS, APCU), APCU 2 only
4. **OBSS BERTH**
SM 94 PDRS CONTROL
PL ID – ITEM 3 +1 EXEC
INIT ID – ITEM 24 +1 EXEC
RMS STBD – ITEM 2 EXEC (*)

A6U DAP: VERN (FREE)

BRAKES – OFF (tb-OFF)
MODE – PL, ENTER

NOTE

Refer to table in OBSS UNBERTH, step 3 for joint angles at GRAPPLE to fill in table below

Mnvr OBSS down (+Z) to OBSS BERTH:

	X	Y	Z	PITCH	YAW	ROLL	PL ID
Expected							1
	-680	+105	-436	0	0	341	1
	SY	SP	EP	WP	WY	WR	
Expected	-90.0	+76.5	-134.6	-40.9	0.0	+110.0	

A8L √STBD R-F-L tb (three) – gray

5. CONFIGURE POWER

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

R13L PL BAY MECH PWR SYS (two) – ON

6. STBD MRL LATCH

SM 94 PDRS CONTROL

✓STBD AFT,MID,FWD LAT (six) = 0

- * If any MSW shows '1', drive MRL*
- * for single motor time (18 sec) *

A8L STBD RMS RETEN LAT – LAT (tb-LAT) (18 sec max)
– OFF

If motor drive time > 8 sec, \sqrt{MCC}

BRAKES – ON (tb-ON)

A6U DAP: as reqd

SM 94 PDRS CONTROL

RMS PORT – ITEM 1 EXEC (*)

7. RECONFIGURE POWER

R13L PL BAY MECH PWR SYS (two) – OFF

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

8. OBSS UNGRAPPLE

A7U CCTV – config for ungrapple
 – RMS WRIST, zoom 34.0 HFOV
 focus 5 ft

MON 1	Wrist
MON 2	D/C

SM 94 PDRS CONTROL

SWIFT BRS CONTROL

INIT ID = ITEM 24 +0 EXEC

RHC

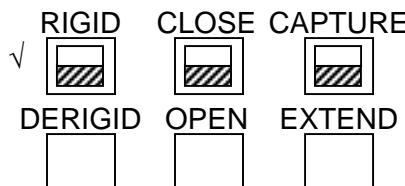
✓RATE – VERN (RATE MIN tb-ON)

BRAKES – OFF (tb-OFF)
MODE – END EFF, ENTER

CAUTION
Monitor EE tb timing to prevent EE motor burnout

EE MODE – AUTO
RELEASE sw – REL (mom)

When OPEN tb – gray, slowly 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 *

STBD RMS HTR (two) – AUTO

A6U

EVENT TIMER CNTL – STOP

DAP: as reqd

Mnvr to OBSS PREGRAPPLE posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-680	+96	-513	270	350	1	0
SY	SP	EP	WP	WY	WR	
-90.0	+87.6	-129.5	-57.5	0.0	+110.4	

BRAKES – ON (tb-ON)

9. ARM PRE-CRADLE

SM 94 PDRS CONTROL

✓PL ID, ITEM 3: 0
✓INIT ID, ITEM 24: 0

RATE – as desired (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – SINGLE, ENTER

Mnvr to PRE-CRADLE posn:

OBSS	SY	SP	EP	WP	WY	WR	
Pre-Grapple	-90.0	+87.9	-129.8	-57.0	0.0	+110.0	
1: WP +				+5.0			
2: WR -						0.0	
3: EP +			-25.0				
4: SY +	0.0						
5: SP -		+25.0					
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	

BRAKES – ON (tb-ON)

MODE – not DIRECT

PARAM – PORT TEMP

JOINT – CRIT TEMP

OBSS HANDOFF FROM SSRMS TO SRMS

1. SETUP

SM 94 PDRS CONTROL

✓PL ID, ITEM 3: 0

✓INIT ID, ITEM 24: 0

A7U

CCTV – config as reqd

MON 1	A
MON 2	B

2. PRE-GRAPPLE MNVR

RHC

On SSRMS Operator GO for mnvr to OBSS PRE-GRAPPLE,

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – ORB UNL, ENTER

Mnvr to OBSS PRE-GRAPPLE 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)

3. CONFIGURE POWER

A8L

On SSRMS Operator GO to release STBD MRLs,

STBD RMS HTR (two) – OFF

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

A6U

EVENT TIMER MODE – UP

CNTL – START

MA73C:C

:D cb MCA PWR AC2 3Φ MID 2 – cl

AC3 3Φ MID 4 – cl

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

* If any MSW shows '1', drive MRL *

* for single motor time (18 sec) *

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

If motor drive time > 8 sec, ✓MCC

SM 94 PDRS CONTROL
✓STBD AFT,MID,FWD REL (six) = 1
RMS PORT – ITEM 1 EXEC (*)

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

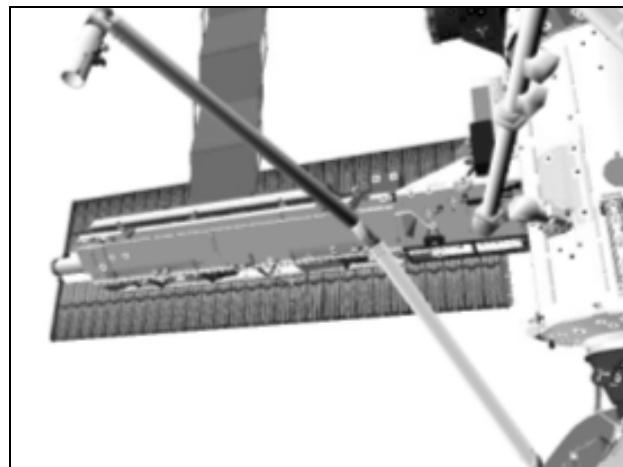
MA73C:C cb MCA PWR AC2 3Φ MID 2 – op
:D AC3 3Φ MID 4 – op

Give SSRMS Operator GO for OBSS Unberth

Perform APCU DEACTIVATION (ASSY OPS, APCU), APCU 1 only



CCTV A (0, 28)



CCTV B (-20, 20)

A7U 6. **SETUP FOR GRAPPLE**
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

MON 1	B(Elbow)
MON 2	Wrist

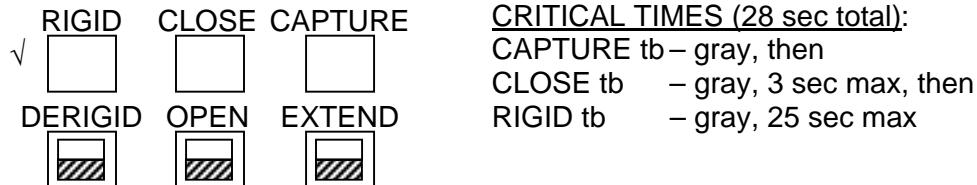
R12(OBSS) ✓SPEE PWR – OFF

RHC 7. **OBSS GRAPPLE AT HANDOFF POSITION**
On SSRMS Operator GO for SRMS OBSS Grapple,
RATE – VERN (RATE MIN tb-ON)
BRAKES – OFF (tb-OFF)
MODE – END EFF, ENTER

Mnvr to grapple envelope

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

EE MODE – AUTO
CAPTURE sw – depress (mom)



EE MODE – OFF
MODE – TEST, ENTER
Wait 5 sec

BRAKES – ON (tb-ON)

SM 94 PDRS CONTROL
PL ID – ITEM 3 + <u>2</u> EXEC
INIT ID – ITEM 24 + <u>2</u> EXEC

Expected GRAPPLE AT HANDOFF posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1032	-362	-618	284	0	270	0
-1032	-44	-610	*	270	*	2
SY	SP	EP	WP	WY	WR	
+25.8	+66.3	-49.0	-85.9	+10.7	-100.7	

*display singularity

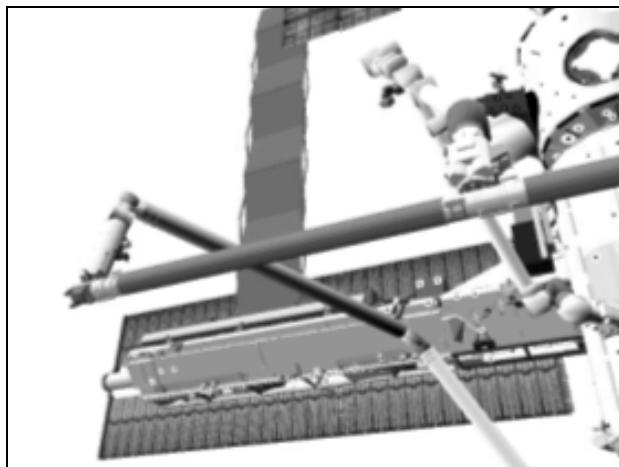
Perform ACTIVATION (LDRI/ITVC Cue Card, PHOTO/TV)

A6U EVENT TIMER CNTL – STOP

Verify APCU 1 Deact complete, then:
Perform APCU ACTIVATION (ASSY OPS, APCU), APCU 2 only

Give SSRMS Operator GO for OBSS Ungrapple

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



CCTV B (-25, 30)



ELBOW (-20, -20)

8. **MNVR TO MPLM VIEWING**

On SSRMS Operator GO for mnvr to MPLM Viewing,

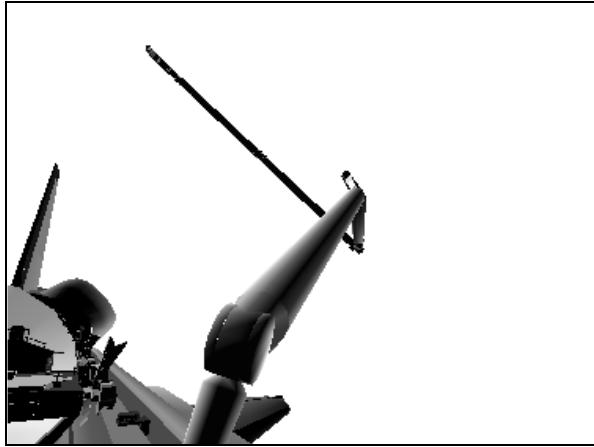
MON 1	S1LOOB(A)
MON 2	B(Elbow)

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

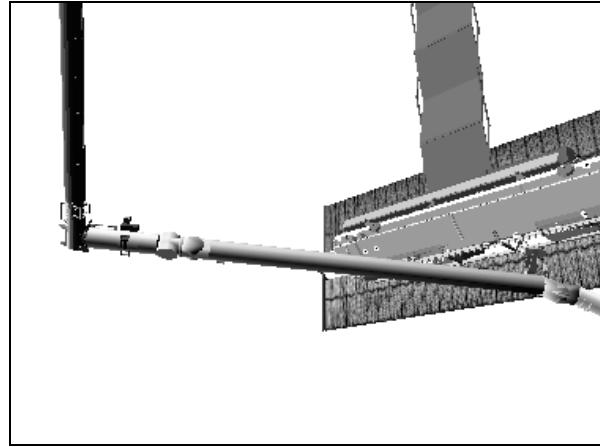
Mnvr to MPLM VIEWING posn:

	SY	SP	EP	WP	WY	WR	
Handoff posn	+25.8	+66.3	-49.0	-85.9	+10.7	-100.7	
1: SY +	+35.0						
2: EP +			-22.8				-40.0
3: WR +							
4: WY –					-0.3		
5: SP –		+38.7					
6: WP +				-0.5			
MPLM View	+35.0	+38.7	-22.8	-0.5	-0.3	-40.0	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-1248	-301	-810	62	324	312	2

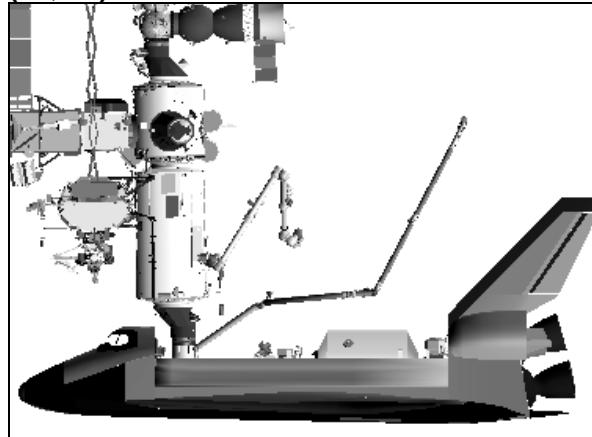
BRAKES – ON (tb-ON)
 ✓MODE – not DIRECT
 PARAM – PORT TEMP
 JOINT – CRIT TEMP



CCTV A (30, 15)



CCTV B (-45, 20)



PORT

A7U

9. RECONFIG PTU

VIDEO OUT MON2 pb – push
IN PL2(VPU) pb – push

CAMR CMD PAN/TILT – HI RATE (LO within 10°)

PAN – L (to hard stop)

TILT – UP (to hard stop)

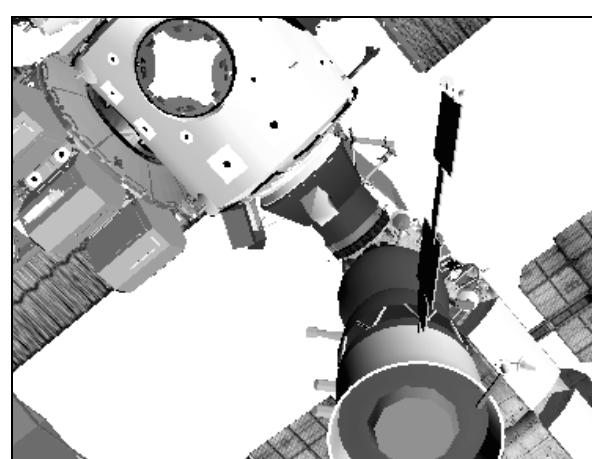
PAN/TILT – RESET

PAN: +50 (right)

TILT: -80 (dn)

VIDEO OUT MUX 1 L pb – push (MIDDECK lt on)

LDRI MODE 1 pb – push (ITVC video)



ITVC (50, -80)

OBSS HANDOFF FROM SRMS TO SSRMS

1. SETUP

- SM 94 PDRS CONTROL
- ✓PL ID, ITEM 3: 2
- ✓INIT ID, ITEM 24: 2

A7U

CCTV – config as reqd

MON 1	A
MON 2	B(Elbow)

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

2. MANEUVER TO HANDOFF

RHC

On SSRMS Operator GO for mnvr to Handoff,
RATE – as reqd (VERN within 10 ft)
BRAKES – OFF (tb-OFF)
MODE – ORB LD, ENTER

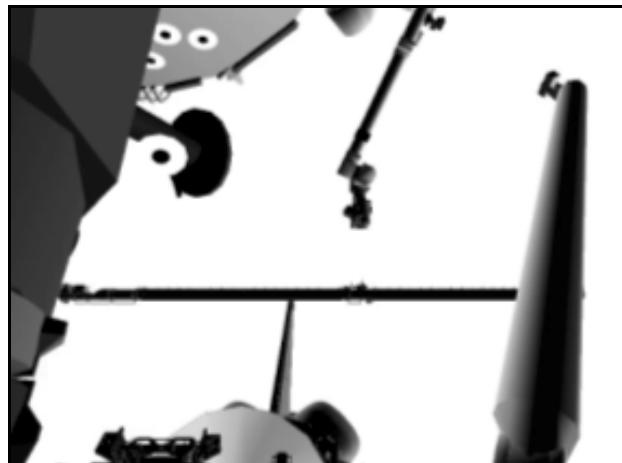
Mnvr to Handoff posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1032	-44	-610	*	270	*	2
SY	SP	EP	WP	WY	WR	
+25.8	+66.3	-49.0	-85.9	+10.7	-100.7	

*display singularity

BRAKES – ON (tb-ON)

Give SSRMS Operator GO for OBSS Grapple



CCTV A (0, 30)



CCTV B (-25, 30)



ELBOW (-30, 0)

- A7U 3. **STOW PTU**
 VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push
- CAMR CMD PAN/TILT – HI RATE (LO within 10°)
 PAN – L (to hard stop)
 TILT – UP (to hard stop)
 PAN/TILT – RESET
 PAN: +108.2 (right)
 TILT: -175 (dn)

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

<u>CAUTION</u>
STBD HTR KA power must be applied within TBD min to prevent sensor damage

- A6U EVENT TIMER MODE – UP
 CNTL – START
- Perform APCU DEACTIVATION (ASSY OPS, APCU), APCU 2 only

- A7U 4. **OBSS UNGRAPPLE**
 CCTV – config for ungrapple
 – RMS WRIST, zoom 34.0 HFOV
 focus 5 ft

MON 1	B(Elbow)
MON 2	Wrist

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

- RHC On SSRMS Operator GO for Ungrapple,
 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

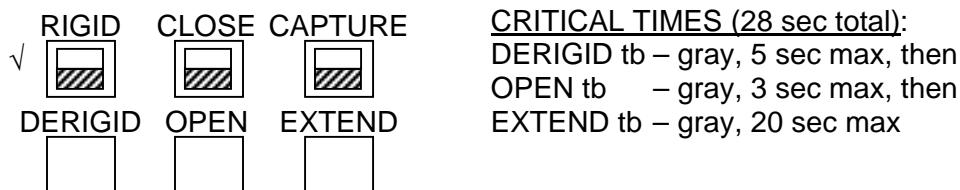
INIT ID – ITEM 24 +0 EXEC

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

EE MODE – AUTO
RELEASE sw – depress (mom)

When OPEN tb – gray, slowly mnvr arm clear



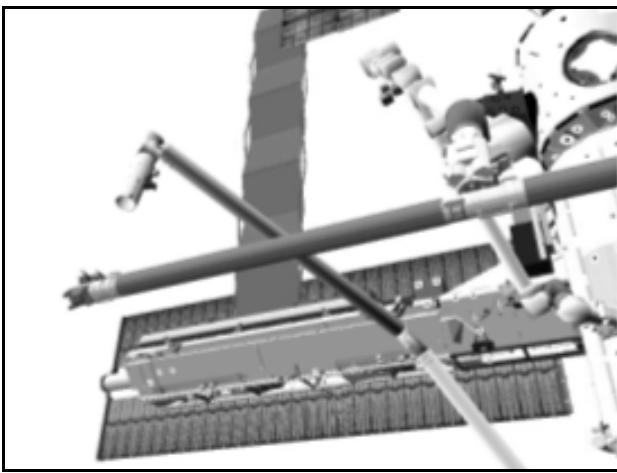
EE MODE – OFF

- * 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 *
* BRAKES – ON (tb-ON) *

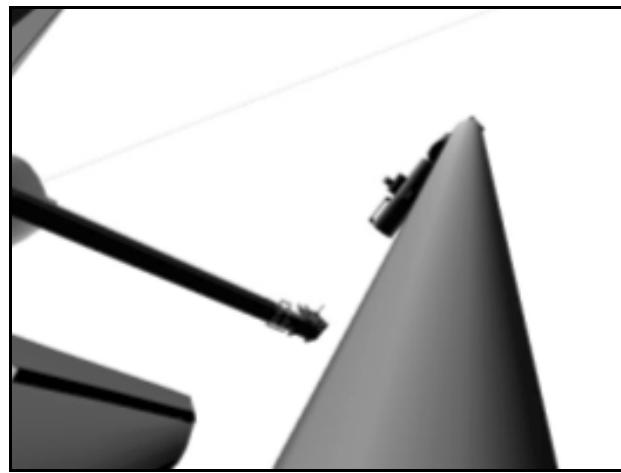
5. **MNVR TO OBSS PRE-GRAPPLE**
RATE – as desired (VERN within 10 ft)
MODE – as desired

Mnvr to OBSS PRE-GRAPPLE 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	



CCTV B (-25, 30)



ELBOW (-20, -20)

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

Give SSRMS Operator GO to Berth OBSS

6. CONFIGURE POWER

A8L On SSRMS Operator GO to latch STBD MRLs,
✓STBD R-F-L tb (three) – gray

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

R13L PL BAY MECH PWR SYS (two) – ON

7. STBD MRL LATCH

SM 94 PDRS CONTROL
✓STBD AFT,MID,FWD LAT (six) = 0

* If any MSW shows '1', drive MRL *
* for single motor time (18 sec) *

A8L STBD RMS RETEN LAT – LAT (tb-LAT) (18 sec max)
– OFF

If motor drive time > 8 sec, ✓MCC

SM 94 PDRS CONTROL
✓STBD AFT,MID,FWD LAT (six) = 1
RMS PORT – ITEM 1 EXEC (*)

8. RECONFIGURE POWER

R13L PL BAY MECH PWR SYS (two) – OFF

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

A8L STBD RMS HTR – AUTO A(B)

A6U EVENT TIMER CNTL – STOP

Give SSRMS Operator GO to ungrapple OBSS and mnvr clear

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TPS SURVEYS

OBSS LDRI RCC SURVEY – STBD.....	FS 2-2
– NOSE CAP.....	FS 2-27
– PORT	FS 2-42
SRMS EE CAM UPPER SURFACE SURVEY	FS 2-67
OBSS LCS RCC SURVEY – STBD.....	FS 2-78
– NOSE CAP	FS 2-87
– PORT	FS 2-96

OBSS LDRI RCC SURVEY – STBD

<u>WARNING</u>
For UNDOCKED ops only
Stbd PLBD radiator must be stowed
APAS Docking Ring must be retracted

NOTE

Assumed starting posn is OBSS Hover. PTU pan, tilt
should already be set from OBSS UNBERTH, step 9

1. SETUP

MON 1	Elbow
MON 2	D/C

SM 94 PDRS CONTROL

PL ID – ITEM 3 +2 EXEC
INIT ID – ITEM 24 +2 EXEC

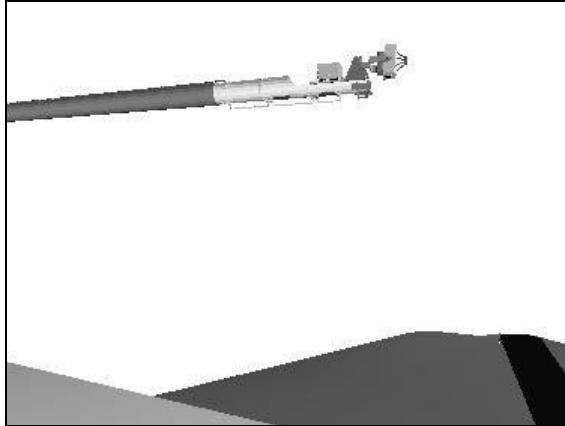
- A7U ✓CAMR CMD PAN/TILT – LO RATE
 ✓VIDEO OUT MON2 pb – push (PL2 lt on)
 IN PL2(VPU) pb – push
 ✓PAN: +95
 ✓TILT: -260

- RHC 2. MNVR TO FLAT FIELD START POSITION
 RATE – as desired (VERN within 10 ft)
 BRAKES – OFF (tb-OFF)
 MODE – ORB LD, ENTER

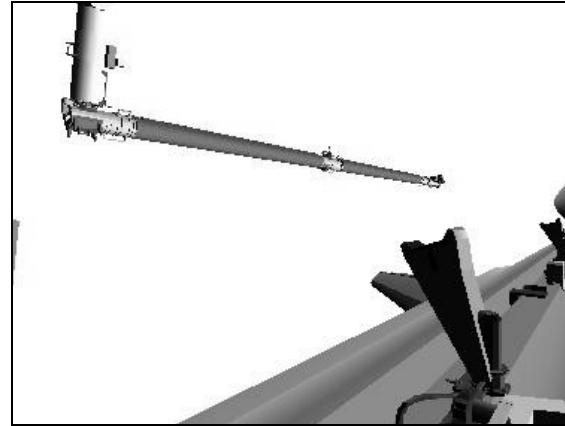
Mnvr to FLAT FIELD START posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1000	+302	-501	0	0	13	2
-1273	+300	-505	0	0	13	3
SY	SP	EP	WP	WY	WR	
-89.7	+41.8	-79.6	-58.7	0.0	+109.7	

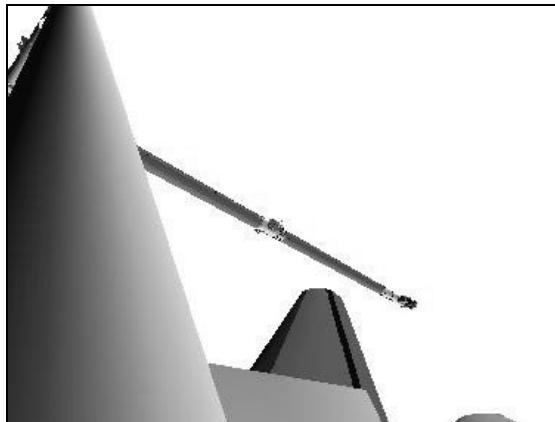
BRAKES – ON (tb-ON)



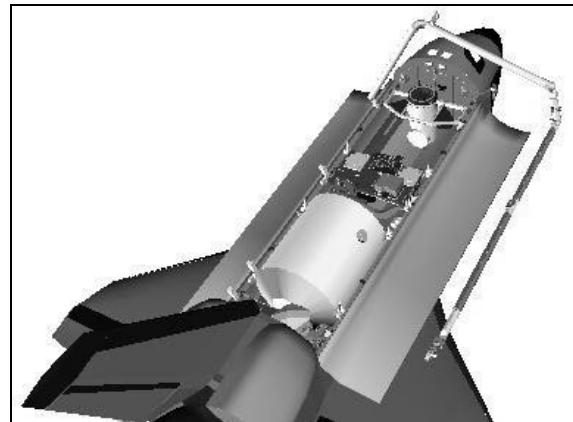
CCTV C (70,-5)



CCTV D (-40,0)



ELBOW (25,-35)



BIRD'S EYE

3. FLAT FIELDS

NOTE

Flat Field imagery is used to characterize ITVC and LDRI sensor response

A7U

a. ITVC (Black Stretch)

VIDEO OUT MUX 1 L pb – push (MIDDECK lt on)
LDRI MODE 1 pb – push

ALC pb – push
PEAK pb – push

LT LEVEL pb – push
DAY pb – push

LT LEVEL pb – push (all MENU lts off)
AP COR ON pb – push (lt on)
FOCUS – NEAR (to stop)

L10(VTR)

REC pb – push, hold
PLAY pb – push, simo (red •)

SM 94 PDRS CONTROL

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

RHC RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – ORB LD, ENTER

THC Mnvr to X ~ -1261 (pull)

b. ITVC (no Black Stretch)

A7U GAM BLK STR pb – push (lt off)

THC Mnvr to X ~ -1273 (push)

L10(VTR) STOP pb – push (no red •)

c. LDRI Mode 3 (2-D, no Black Stretch)

A7U AP COR ON pb – push (lt off)

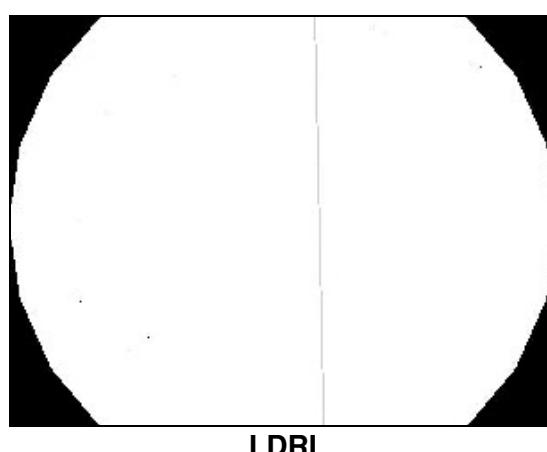
 GAM BLK STR pb – push (lt on)

ALC pb – push

AVG pb – push

VIDEO OUT MUX 1 L pb – push (MIDDECK lt on)

LDRI MODE 3 pb – push (LDRI displayed)



L10(VTR) REC pb – push, hold
 PLAY pb – push, simo (red •)

THC Mnvr to X ~ -1261 (pull)

d. LDRI Mode 4 (2-D, Black Stretch)

A7U ✓VIDEO OUT MUX 1 L pb – push (MIDDECK lt on)

 LDRI MODE 4 pb – push (brighter LDRI displayed)

THC Mnvr to X ~ -1273 (push)

BRAKES – ON (tb-ON)

L10(VTR) STOP pb – push (no red •)

4. MNVR TO ACAS START POSITION

SM 94 PDRS CONTROL

PL ID – ITEM 3 +2 EXEC

INIT ID – ITEM 24 +2 EXEC

RHC

✓RATE – VERN (RATE MIN tb-ON)
BRAKES – OFF (tb-OFF)
MODE – SINGLE, ENTER

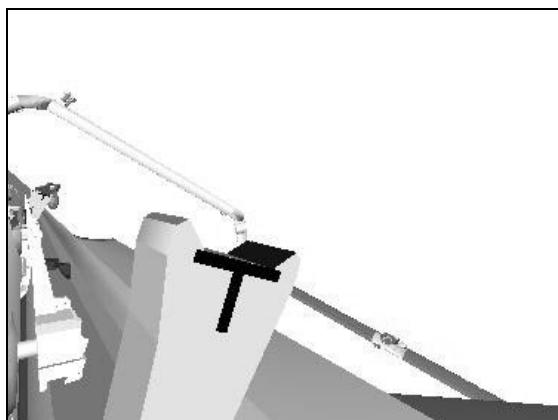
NOTE

In step 4 of SJ mnvr (SP), minimum clearance between
SRMS Upper Arm and APAS Shell ~ 17.5 in

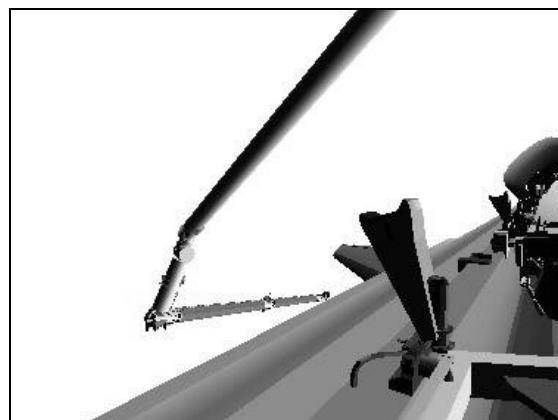
Mnvr to ACAS START posn:

	SY	SP	EP	WP	WY	WR	
Last FF Posn	-89.7	+41.8	-79.6	-58.7	0.0	-109.7	
1: WR +							+82.5
2: WP +				-48.4			
3: EP +			-56.2				
4: WY -					-15.2		
5: SP -		+6.1					
6: SY +	-71.7						
ACAS Start	-71.7	+6.1	-56.2	-48.4	-15.2	+82.5	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-1097	+435	-253	346	347	16	2

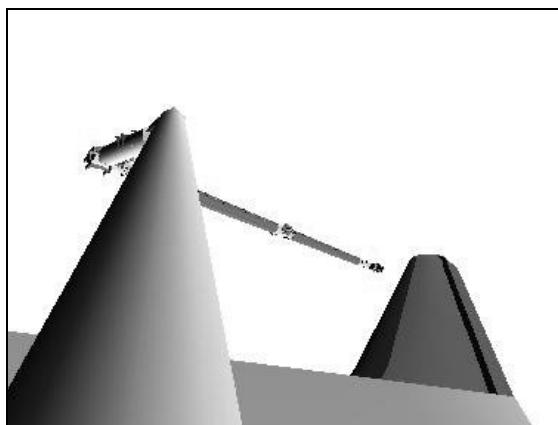
BRAKES – ON (tb-ON)



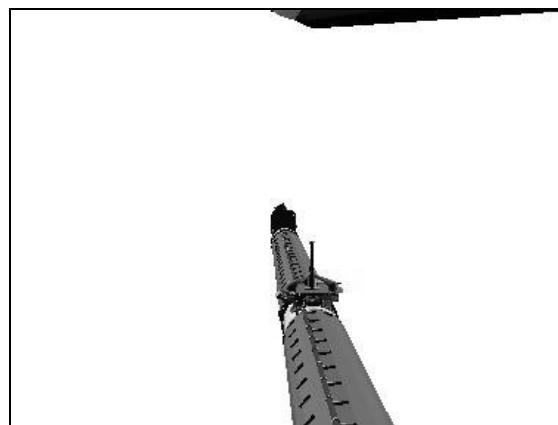
CCTV C (35,-5)



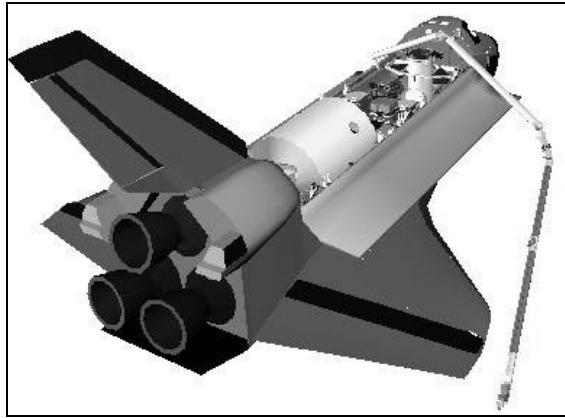
CCTV D (-35,-5)



ELBOW (15,-20)



RSC



BIRD'S EYE

5. ACAS, SECTION 1

NOTE

Section 1 scans underside of RCC from Panel 22 → 14

SM 94 PDRS CONTROL

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

	X	Y	Z	PITCH	YAW	ROLL	PL ID
√	-1356	+494	-193	346	347	16	3
	SY	SP	EP	WP	WY	WR	
√	-71.7	+6.1	-56.2	-48.4	-15.2	+82.5	

A7U VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push
 √OUT DTV pb – push (PL2 It on)

PAN: +80 (left)
TILT: -65 (up)

VIDEO OUT MUX 1 L pb – push (MIDDECK It on)
LDRI MODE 6 pb – push (flickering LDRI displayed)
CAMR CMD IRIS – OP(CL) as reqd
VIDEO OUT MON2 pb – push
 IN as desired (not PL2)

RHC RATE – COARSE (RATE MIN tb-OFF)

For survey scan pattern, refer to OBSS LDRI SCAN PATTERN CUE CARD

For camera views, refer to OBSS LDRI RCC SURVEY CAMERA VIEWS – STBD
(INSPECTION and REPAIR REFERENCE DATA), 5-TBD

L10(VTR) REC pb – push, hold
PLAY pb – push, simo (red •)

SM 94 PDRS CONTROL

AUTO MODE 1 – ITEM 13 +1 +2 +3 EXEC

NOTE

If unable to enter AUTO mode (no AUTO READY It),
OCAS to ACAS start posn

BRAKES – OFF (tb-OFF)
MODE – AUTO 1, ENTER (READY It on)

SM 94 PDRS CONTROL

√START PT, ITEM 17: 1

SM 169 PDRS STATUS

Monitor ACAS progress

NOTE

Time between Pts 1 and 4 ~ 2:45 min

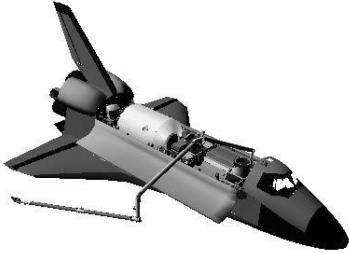
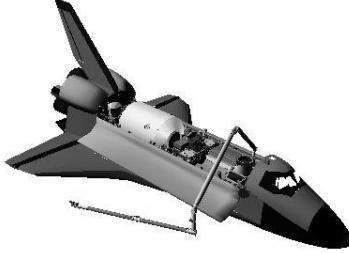
Section 1 Clearance Views	Cameras
RMS Upper Arm-to-APAS	A ^[1]
OBSS-to-PLBD	D ^[2] , ELBOW
OBSS-to-Wing	ELBOW, RSC

^[1]Good for all subsequent scan sections
^[2]Good until X ~ -1295

- * If RSC failed:
- * To regain OBSS-to-PLBD clearance view at any time during *
- * ACAS, perform CONTINGENCY LDRI CLEARANCE VIEW *

On MCC GO,
 AUTO SEQ – PROCEED (IN PROG lt on)

ACAS, pause pts **shaded in bold**, • col indicates data recording (black = VTR on) and damage criteria (inches):

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
1P	-1356	+494	-193	346	347	16	1	
2	-1315	+479	-194	346	347	16		
3	-1295	+475	-195	346	347	19	1	
4P	-1182	+354	-183	344	355	17	1	

When AUTO SEQ READY lt – on,
 L10(VTR) STOP pb – push (no red •)

6. ACAS, SECTION 2

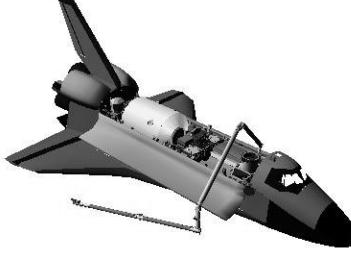
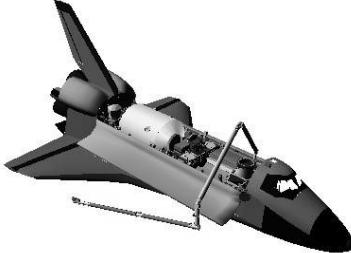
NOTE

Between Pts 4 and 5, LDRI closes in to 0.25 in criteria distance.
 Section 2 then scans underside of RCC from Panel 13 → 5.
 Time between Pts 4 and 5 ~ 1:30 min

Section 2 Clearance Views		Cameras
OBSS-to-PLBD		RSC ^[2] , ELBOW ^[1]
OBSS-to-Wing		RSC, ELBOW ^[1]
^[1] Good until X ~ -1130 when OBSS blocked by arm		
^[2] PLBD enters FOV at X ~ -1130		

RHC RATE – VERN (RATE MIN tb-ON)

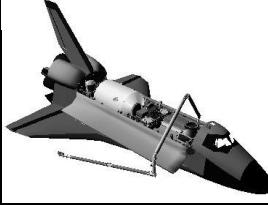
AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
4P	-1182	+354	-183	344	355	17		
5P	-1182	+343	-211	344	355	17		

L10(VTR) When AUTO SEQ READY lt – on,
 REC pb – push, hold
 PLAY pb – push, simo (red •)

NOTE
Time between Pts 5 and 7 ~ 6:30 min

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
5P	-1182	+343	-211	344	355	17		
6	-1061	+218	-201	334	12	22	1/4	
7P	-1002	+199	-204	333	17	25		

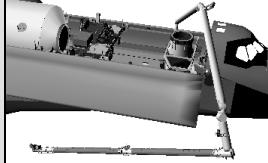
L10(VTR) When AUTO SEQ READY It – on,
STOP pb – push (no red •)

7. ACAS. SECTION 3

NOTE
Between Pts 7 and 8, LDRI moves out to 1 in criteria distance.
Section 3 then scans underside of RCC from Panel 4 → 1. At Pt 8,
Upper Arm-to-APAS Shell = 27.9 in, Upper Arm-to-Docking Ring =
30 in. Time between Pts 7 and 8 ~ 0:45 min

Section 3 Clearance Views			Cameras	
OBSS-to-PLBD			RSC	
OBSS-to-Wing			RSC	

RHC RATE – COARSE (RATE MIN tb-OFF)
AUTO SEQ – PROCEED (IN PROG It on)

7P	-1002	+199	-204	333	17	25	•	
8P	-1002	+207	-176	331	17	25		

L10(VTR) When AUTO SEQ READY It – on,
REC pb – push, hold
PLAY pb – push, simo (red •)

NOTE
Time between Pts 8 and 9 ~ 1:20 min

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
8P	-1002	+207	-176	331	17	25		
9P	-919	+221	-193	327	13	41	1	

8. ACAS, SECTION 4

NOTE

VTR is not stopped between sections 3 and 4. Section 4 scans mid-under side of RCC from Panel 1 → 4. Time between Pts 9 and 10 ~ 1:20 min

Section 4 Clearance Views				Cameras		
OBSS-to-PLBD				RSC		
OBSS-to-Wing				RSC		

AUTO SEQ – PROCEED (IN PROG It on)

9P	-919	+221	-193	327	13	41	1	
10P	-1001	+264	-204	326	4	48		

L10(VTR) When AUTO SEQ READY It – on,
STOP pb – push (no red •)

9. ACAS, SECTION 5

NOTE

Between Pts 10 and 11, LDRI moves in to 0.25 in criteria distance. Section 5 then scans mid-under side of RCC from Panel 5 → 13. Time between Pts 10 and 11 ~ 1:35 min

Section 5 Clearance Views				Cameras					
OBSS-to-PLBD				C ^[1] , ELBOW ^[1] , RSC ^[2]					
OBSS-to-Wing				ELBOW ^[1] , RSC					
^[1] Good after X ~ -1120									
^[2] Good until X ~ -1145 when PLBD outside FOV									

RHC RATE – VERN (RATE MIN tb-ON)

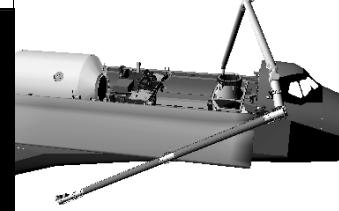
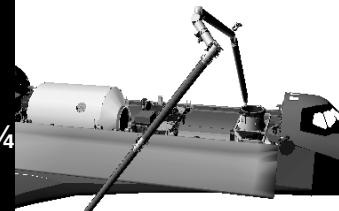
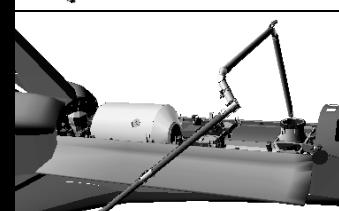
AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
10P	-1001	+264	-204	326	4	48	
11P	-1007	+246	-228	326	10	52	

L10(VTR) When AUTO SEQ READY It – on,
 REC pb – push, hold
 PLAY pb – push, simo (red •)

NOTE
Time between Pts 11 and 13 ~ 9:35 min

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	●
11P	-1007	+246	-228	326	10	52	
12	-1022	+256	-224	307	10	37	
13P	-1147	+375	-230	322	353	34	

When AUTO SEQ READY It – on,
L10(VTR) STOP pb – push (no red ●)

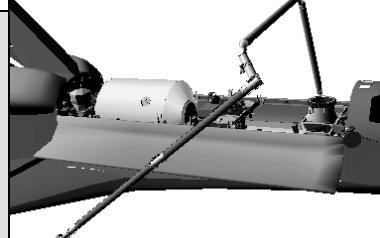
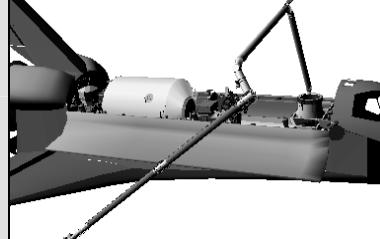
10. ACAS, SECTION 6

NOTE

Between Pts 13 and 14, LDRI moves out to 1 in criteria distance.
 Section 6 then scans mid-underside of RCC from Panel 14 → 22.
 Time between Pts 13 and 14 ~ 0:45 min

Section 6 Clearance Views	Cameras
OBSS-to-PLBD	C, D ^[1] , ELBOW
OBSS-to-Wing	D ^[1] , ELBOW, RSC
^[1] Good after X ~ -1130	

RHC RATE – COARSE (RATE MIN tb-OFF)
 AUTO SEQ – PROCEED (IN PROG lt on)

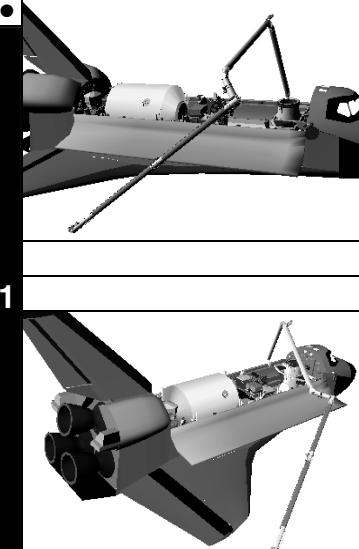
Pt	X	Y	Z	PITCH	YAW	ROLL	•	
13P	-1147	+375	-230	322	353	34	●	
14P	-1140	+392	-206	322	353	34	●	

L10(VTR) When AUTO SEQ READY lt – on,
 REC pb – push, hold
 PLAY pb – push, simo (red ●)

NOTE
Time between Pts 14 and 17 ~ 3:10 min

AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
14P	-1140	+392	-206	322	353	34	
15	-1248	+487	-207	337	343	30	
16	-1269	+509	-214	338	341	35	1
17P	-1329	+567	-273	336	335	71	



When AUTO SEQ READY lt – on,
L10(VTR) STOP pb – push (no red •)

11. ACAS, SECTION 7

NOTE

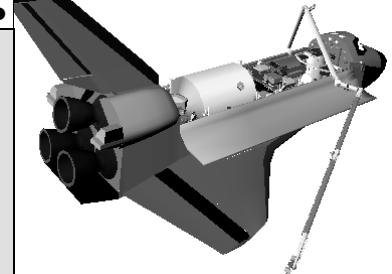
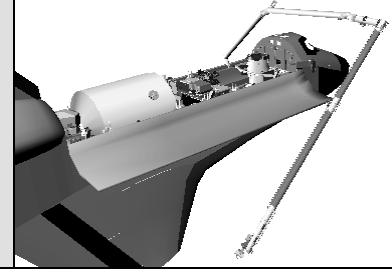
Between Pts 17 and 18, LDRI is repositioned for RCC front side scan.
 Section 7 then scans front side (apex) of RCC from Panel 19 → 14.
 Time between Pts 17 and 18 ~ 2:20 min

Section 7 Clearance Views	Cameras
OBSS-to-PLBD	C, D, ELBOW
OBSS-to-Wing	C ^[1] , D, ELBOW, RSC
^[1] Good after X ~ -1290	

A7U VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push

✓PAN: +80
 TILT: -110 (dn)

VIDEO IN as desired (not PL2)
 AUTO SEQ – PROCEED (IN PROG It on)

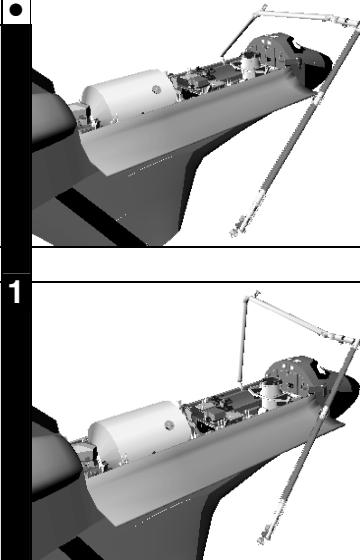
Pt	X	Y	Z	PITCH	YAW	ROLL	•	
17P	-1329	+567	-273	336	335	71	•	
18P	-1218	+532	-315	330	351	75	•	

L10(VTR) When AUTO SEQ READY It – on,
 REC pb – push, hold
 PLAY pb – push, simo (red •)

NOTE
Time between Pts 18 and 20 ~ 2:25 min

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
18P	-1218	+532	-315	330	351	75	
19	-1192	+515	-312	330	349	74	1
20P	-1088	+411	-304	329	345	69	



When AUTO SEQ READY It – on,
L10(VTR) STOP pb – push (no red •)

12. ACAS, SECTION 8

NOTE

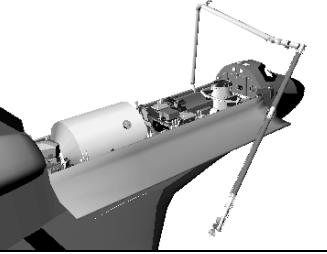
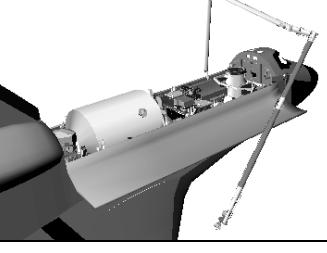
Between Pts 20 and 21, LDRI moves in to 0.25 in criteria distance.
 Section 8 then scans front side (apex) of RCC from Panel 13 → 5.
 Time between Pts 20 and 21 ~ 1:20 min

Section 8 Clearance Views	Cameras
OBSS-to-PLBD	C ^[1] , D ^[2] , ELBOW ^[3] , RSC ^[4]
OBSS-to-Wing	C ^[1] , D ^[2] , ELBOW ^[3] , RSC

^[1]Good until X ~ -1000
^[2]Good until X ~ -1025
^[3] Good until X ~ -985
^[4]PLBD enters FOV at X ~ -1075

RHC RATE – VERN (RATE MIN tb-ON)

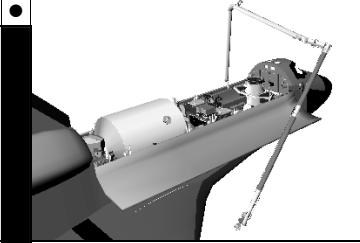
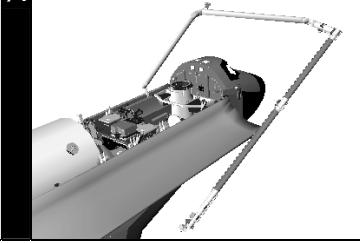
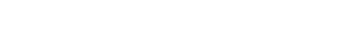
AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
20P	-1088	+411	-304	329	345	69		
21P	-1112	+392	-296	328	347	65		

L10(VTR) When AUTO SEQ READY lt – on,
 REC pb – push, hold
 PLAY pb – push, simo (red •)

NOTE
Time between Pts 21 and 23 ~ 6:30 min

AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
21P	-1112	+392	-296	328	347	65		
22	-1008	+290	-301	329	356	76	1/4	
23P	-972	+269	-295	329	8	77		

When AUTO SEQ READY lt – on,
L10(VTR) STOP pb – push (no red •)

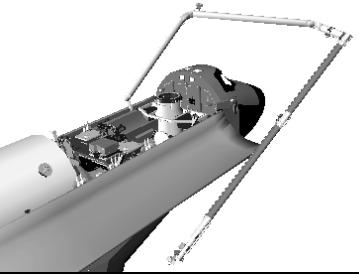
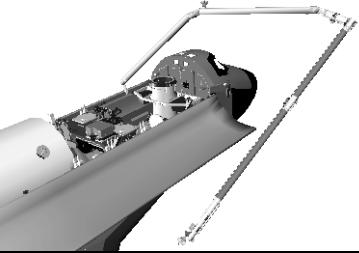
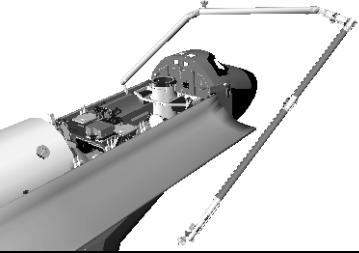
13. ACAS, SECTION 9

NOTE

Between Pts 23 and 24, LDRI moves out to 1 in criteria distance.
 Section 9 then scans front side (apex) of RCC from Panel 4 → 1.
 Time between Pts 23 and 24 ~ 0:45 min

Section 9 Clearance Views	Cameras
OBSS-to-PLBD	RSC
OBSS-to-Wing	RSC

RHC RATE – COARSE (RATE MIN tb-OFF)
 AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
23P	-972	+269	-295	329	8	77		
24P	-959	+296	-295	329	8	77		

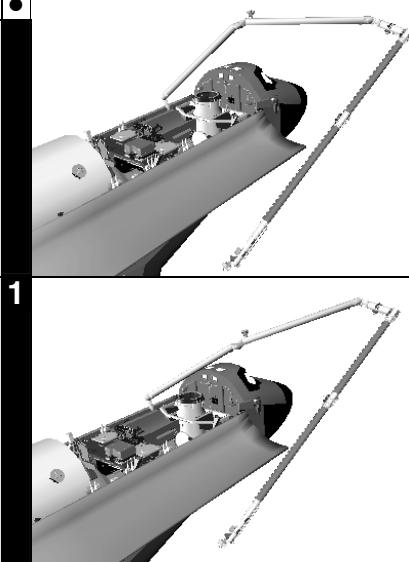
L10(VTR) When AUTO SEQ READY lt – on,
 REC pb – push, hold
 PLAY pb – push, simo (red •)

NOTE

At Pt 25, Upper Arm-to-APAS Shell = 25.5 in, Upper Arm-to-Cabin = 26.5 in, Upper Arm-to-Docking Ring = 27.2 in. Time between Pts 24 and 25 ~ 1:10 min

AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
24P	-959	+296	-295	329	8	77	●
25P	-886	+277	-300	325	9	81	1



When AUTO SEQ READY lt – on,
L10(VTR) STOP pb – push (no red •)

14. ACAS, SECTION 10

NOTE

Between Pts 25 and 26, arm adjusts to new posn for inspection of black tiles on fwd wing glove. Section 10 then scans front side (apex) of wing glove black tiles. Time between Pts 25 and 26 ~ 3:20 min

Section 10 Clearance Views	Cameras
OBSS-to-PLBD, Ku, Crew Cabin	RSC, ELBOW ^[1]
^[1] Good after Pt 26	

A7U VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push

✓PAN: +80
TILT: -85 (up)

VIDEO IN as desired (not PL2)

AUTO SEQ – PROCEED (IN PROG lt on)

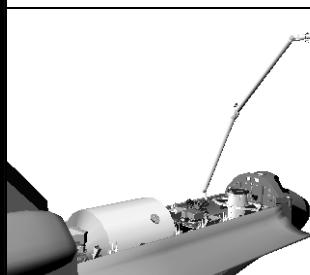
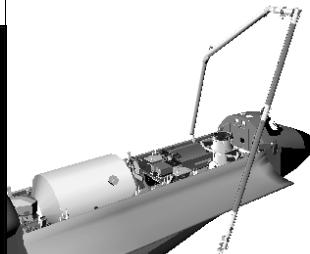
Pt	X	Y	Z	PITCH	YAW	ROLL	•	
25P	-886	+277	-300	325	9	81		
26P	-906	+282	-298	294	359	84		

L10(VTR) When AUTO SEQ READY lt – on,
 REC pb – push, hold
 PLAY pb – push, simo (red •)

NOTE
Time between Pts 26 and 31 ~ 4:55 min

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
26P	-906	+282	-298	294	359	84	
27	-733	+282	-298	289	358	84	
28	-686	+288	-320	276	354	86	
29	-562	+299	-343	266	350	87	3
30	-514	+271	-341	265	351	87	
31P	-501	+230	-328	266	355	87	



15. ACAS, SECTION 11

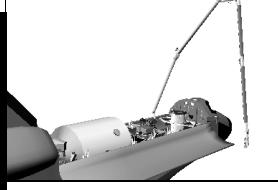
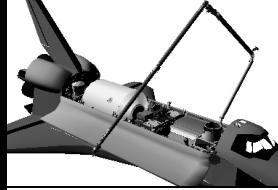
NOTE

VTR is not stopped between sections 10 and 11. Section 11 scans top side of fwd wing glove, then continues aft over mid-top portion of RCC Panels 1 → 22. Time between Pts 31 and 43 ~ 11:00 min

Section 11 Clearance Views	Cameras
OBSS-to-PLBD and Ku	C ^[1] , D ^[2] , ELBOW, RSC ^[3]
OBSS-to-Wing	C ^[1] , D ^[2] , ELBOW ^[4] , RSC ^[5]

^[1]Good after X ~ -515, blocked by MPM between X ~ -685 and -1035
^[2]Good after X ~ -680
^[3]PLBD outside FOV after X ~ -1100
^[4]Good after X ~ -940
^[5]Wing enters FOV at X ~ -890

AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
31P	-501	+230	-328	266	355	87	3	
32	-514	+271	-341	265	351	87		
33	-540	+280	-365	266	344	86		
34	-564	+292	-375	266	337	86		
35	-678	+286	-373	270	339	86		
36	-909	+286	-373	294	332	98	1	
37	-963	+288	-373	295	323	86		
38	-1027	+303	-372	302	322	94		
39	-1043	+318	-371	302	322	92		
40	-1239	+502	-386	300	316	97		
41	-1269	+520	-389	305	319	104		
42	-1286	+540	-375	305	325	99		
43P	-1333	+557	-370	312	332	103		

When AUTO SEQ READY lt – on,
L10(VTR) STOP pb – push (no red •)

16. ACAS, SECTION 12

NOTE

Between Pts 43 and 44, arm adjusts to new posn for inspection of top side of RCC. Section 12 then scans top side of RCC Panels 22 → 7.
Time between Pts 43 and 44 ~ 1:15 min

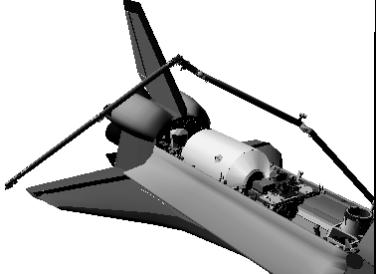
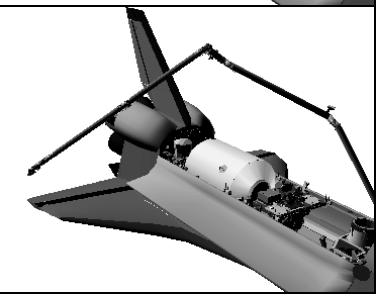
Section 12 Clearance Views	Cameras
OBSS-to-PLBD	C, D, ELBOW ^[1] , RSC ^[2]
OBSS-to-Wing	C, D, ELBOW ^[1] , RSC
^[1] Good until X ~ -1035	
^[2] PLBD enters FOV at X ~ -1130	

A7U VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push

PAN: +50 (left)
TILT: -115 (dn)

VIDEO IN as desired (not PL2)

AUTO SEQ – PROCEED (IN PROG lt on)

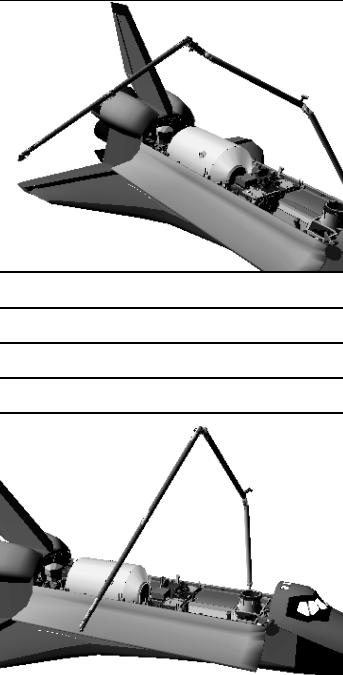
Pt	X	Y	Z	PITCH	YAW	ROLL	•	
43P	-1333	+557	-370	312	332	103		
44P	-1342	+493	-424	314	332	103		

L10(VTR) When AUTO SEQ READY lt – on,
 REC pb – push, hold
 PLAY pb – push, simo (red •)

NOTE
Time between Pts 44 and 49 ~ 4:55 min

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
44P	-1342	+493	-424	314	332	103	1
45	-1299	+489	-418	312	336	98	
46	-1274	+488	-414	312	337	94	
47	-1266	+463	-417	311	336	99	1
48	-1073	+268	-417	305	335	94	
49P	-1029	+272	-400	298	347	76	1



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

L10(VTR) STOP pb – push (no red •)

A7U VIDEO OUT MUX 1 L pb – push (MIDDECK It on)
LDRI MODE 1 pb – push (ITVC video displayed)

OBSS LDRI RCC SURVEY – NOSE CAP

WARNING
For UNDOCKED ops only
Port PLBD radiator must be stowed

NOTE

Assumed starting posn is end of OBSS LDRI RCC SURVEY – STBD

1. SETUP

MON 1	TBD
MON 2	TBD

SM 94 PDRS CONTROL

PL ID – ITEM 3 +2 EXEC
INIT ID – ITEM 24 +2 EXEC

	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-904	+215	-635	298	347	76	2
✓	SY	SP	EP	WP	WY	WR	
✓	-73.5	+70.1	-41.0	-46.1	-34.3	+166.2	

A7U VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push
 ✓OUT DTV pb – push (PL2 lt on)

PAN: 0 (left)
TILT: -40 (up)

VIDEO IN as desired (not PL2)

2. INHIBIT NOSE JETS

GNC 23 RCS

RCS FWD – ITEM 1 EXEC (*)
MANF VLVS OVRD 1 – ITEM 40 EXEC (CL)
 2 – ITEM 41 EXEC (CL)
 3 – ITEM 42 EXEC (CL)
 4 – ITEM 43 EXEC (CL)
 5 – ITEM 44 EXEC (CL)

O14:F, ✓Pri RJDA LOGIC,DRIVER (eight) – ON
O15:F,
O16:F

A6U DAP: A6/AUTO/ALT (T/O)

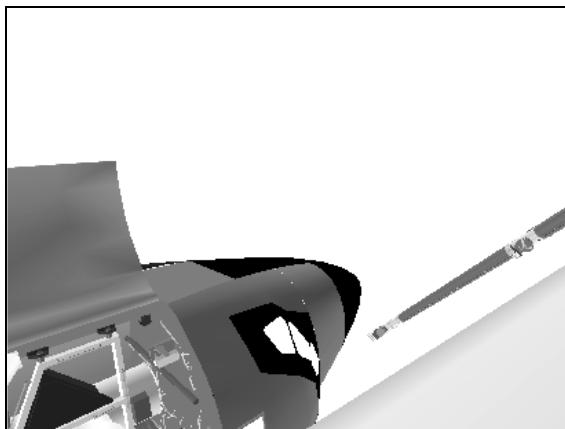
3. MNVR TO ACAS START POSITION

RHC RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – SINGLE, ENTER

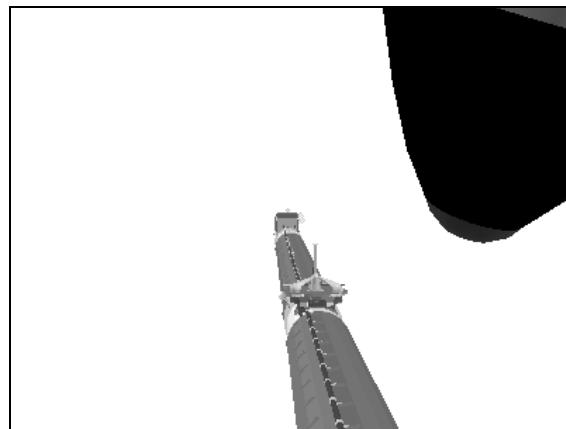
Mnvr to ACAS START posn:

	SY	SP	EP	WP	WY	WR
Stbd End	-73.5	+70.1	-41.0	-46.1	-34.3	+166.2
1: WP +				-8.2		
2: SP +		+95.6				
3: SY +	+174.9					
4: WY +					-14.7	
5: EP -			-77.8			
6: WR +						+176.7
Nose Start	+174.9	+95.6	-77.8	-8.2	-14.7	+176.7
	X	Y	Z	PITCH	YAW	ROLL
	-269	-66	-535	248	320	331
						PL ID
						2

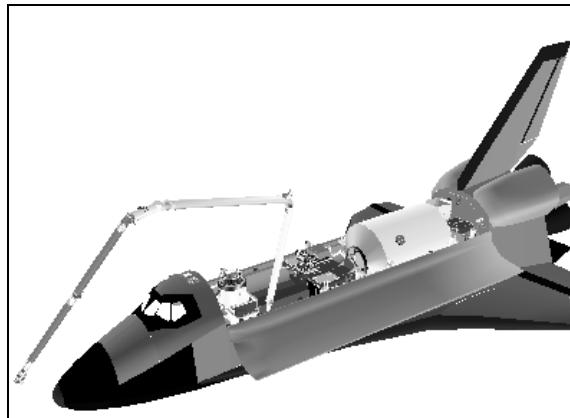
BRAKES – ON (tb-ON)



ELBOW (-60,-40)



RSC



BIRD'S EYE

4. ACAS, SECTION 1

SM 94 PDRS CONTROL

PL ID – ITEM 3 +3 EXEC

INIT ID – ITEM 24 +3 EXEC

	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-195	+107	-338	248	320	331	3
	SY	SP	EP	WP	WY	WR	
✓	+174.9	+95.6	-77.8	-8.2	-14.7	+176.7	

RHC RATE – VERN (RATE MIN tb-ON)

For survey scan pattern, refer to OBSS LDRI SCAN PATTERN CUE CARD

For camera views, refer to OBSS LDRI RCC SURVEY CAMERA VIEWS – STBD
(INSPECTION and REPAIR REFERENCE DATA), 5-TBD

L10(VTR) REC pb – push, hold
 PLAY pb – push, simo (red •)

SM 94 PDRS CONTROL

✓AUTO MODE 2, ITEM 14: 2

NOTE

If unable to enter AUTO mode (no AUTO READY lt),
 OCAS to ACAS start posn

BRAKES – OFF (tb-OFF)
 MODE – AUTO 2, ENTER (READY lt on)

SM 94 PDRS CONTROL

✓START PT, ITEM 17: 50

SM 169 PDRS STATUS

Monitor ACAS progress

NOTE

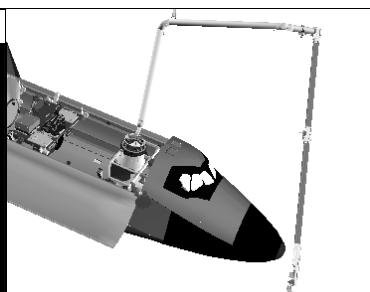
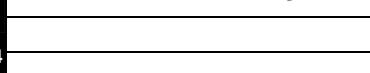
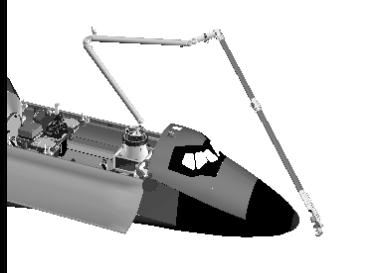
During translation from Pt 51 to 52, OBSS-to-Orbiter = 58.5 in
Time between Pts 50 and 52 ~ 5:50 min

Section 1 Clearance Views		Cameras ^[1]
OBSS-to-Orbiter Nose		RSC
SRMS-to-Orbiter		A ^[2] , B ^[2]
^[1] In addition to cameras, fwd windows may be used to monitor OBSS-to-orbiter clearances		*
^[2] Good for all subsequent scan sections		*

- * If RSC failed:
- * To regain OBSS-to-PLBD clearance view at any time during *
- * ACAS, perform CONTINGENCY LDRI CLEARANCE *

On MCC GO,
AUTO SEQ – PROCEED (IN PROG lt on)

ACAS, pause pts **shaded in bold**, • col indicates data recording (black = VTR on) and damage criteria (inches):

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
50P	-195	107	-338	248	320	331		
51	-195	103	-351	241	320	329	1/4	
52P	-185	88	-386	215	320	315		

When AUTO SEQ READY lt – on,
L10(VTR) STOP pb – push (no red •)

5. ACAS, SECTION 2

NOTE

Between Pts 52 and 55, there are two fly-by points that reconfigure the arm for the next LDRI pan and tilt. Time between Pts 52 and 55 ~ 5:00 min

Section 2 Clearance Views	Cameras
OBSS-to-Orbiter Nose	RSC, ELBOW

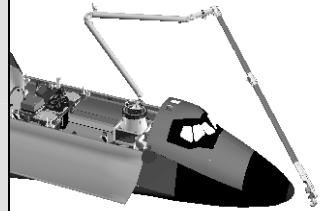
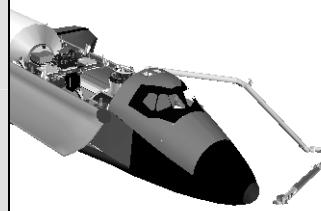
A7U VIDEO OUT MON2 pb – push
IN PL2(VPU) pb – push

PAN: +75 (right)
TILT: -43 (dn)

VIDEO IN as desired (not PL2)

RHC RATE – COARSE (RATE MIN tb-OFF)
AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
52P	-185	88	-386	215	320	315	
53	-176	77	-422	188	299	289	
54	-174	61	-437	158	293	260	
55P	-157	50	-383	139	292	240	

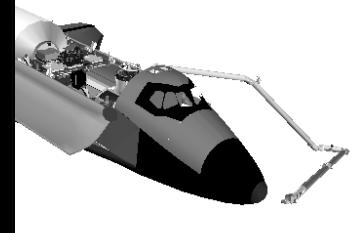
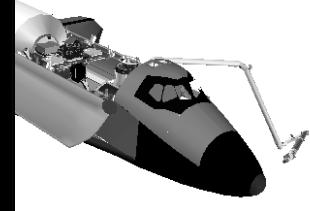
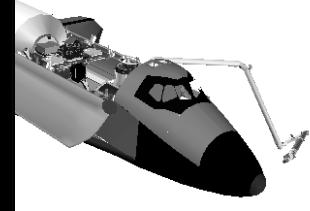



L10(VTR) When AUTO SEQ READY lt – on,
REC pb – push, hold
PLAY pb – push, simo (red •)

NOTE
Time between Pts 55 and 57 ~ 3:15 min

RHC RATE – VERN (RATE MIN tb-ON)

On MCC GO,
AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
55P	-157	50	-383	139	292	240	
56	-171	27	-411	141	298	261	$\frac{1}{4}$ 
57P	-190	7	-425	141	303	274	

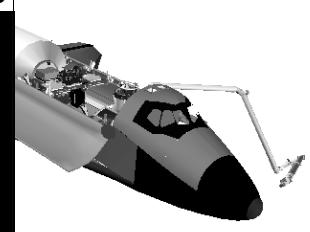
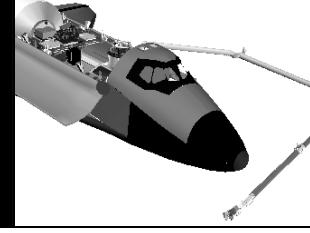
6. ACAS, SECTION 3

NOTE

VTR is not stopped between sections 2 and 3. During the translation from Pt 60 to 61, OBSS-to-Orbiter = 52.9 in. Time between Pts 57 and 61 ~ 9:00 min

Section 3 Clearance Views				Cameras		
OBSS-to-Orbiter Nose				RSC, ELBOW ^[1]		
^[1] Good until X ~ -161						

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
57P	-190	7	-425	141	303	274	
58	-155	40	-381	143	291	247	
59	-162	58	-328	195	281	275	^{1/4}
60	-155	68	-314	197	280	269	
61P	-209	83	-255	201	278	243	

7. ACAS, SECTION 4

NOTE

VTR is not stopped between sections 3 and 4. Time between
Pts 61 and 67 ~ 21:15 min

Section 4 Clearance Views				Cameras		
OBSS-to-Orbiter Nose				RSC, ELBOW ^[1]		
^[1] Good starting at X ~ -163						

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
61P	-209	83	-255	201	278	243	
62	-184	68	-273	184	282	237	
63	-173	53	-274	258	297	326	
64	-159	37	-300	233	297	309	
65	-135	4	-337	169	306	250	1/4
66	-164	-16	-395	147	318	263	
67P	-171	-19	-417	144	314	269	

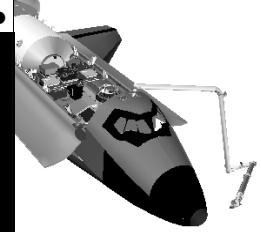
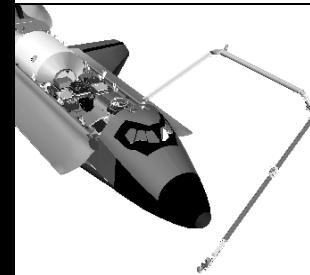
8. ACAS, SECTION 5

NOTE

VTR is not stopped between sections 4 and 5. During the translation from Pt 69 to 70, RMS Lower Arm-to-Port PLBD = 53.3 in. Time between Pts 67 and 72 ~ 19:15 min

Section 5 Clearance Views				Cameras		
OBSS-to-Orbiter Nose				RSC, ELBOW ^[1]		
^[1] Good until X ~ -183						

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
67P	-171	-19	-417	144	314	269	
68	-160	-31	-369	152	324	252	
69	-155	-46	-345	163	330	251	
70	-163	-39	-286	194	329	250	1/4
71	-165	0	-278	198	309	249	
72P	-207	29	-223	238	298	266	

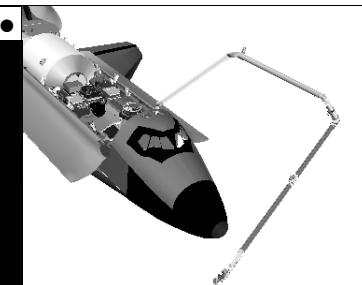
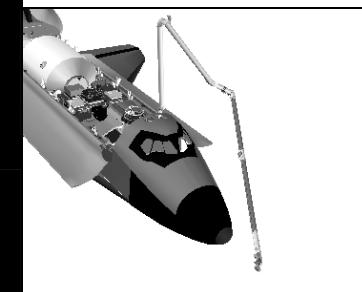
9. ACAS, SECTION 6

NOTE

VTR is not stopped between sections 5 and 6.
Time between Pts 72 and 14 ~ 10:55 min

Section 6 Clearance Views				Cameras		
OBSS-to-Orbiter Nose				RSC, ELBOW ^[1]		
^[1] Good starting at X ~ -188						

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
72P	-207	29	-223	238	298	266	
73	-218	0	-221	231	309	249	
74	-226	0	-216	231	309	249	1/4
75	-226	-23	-218	237	317	256	
76P	-176	-52	-271	200	331	250	

When AUTO SEQ READY It – on,
L10(VTR) STOP pb – push (no red •)

10. ACAS, SECTION 7

NOTE

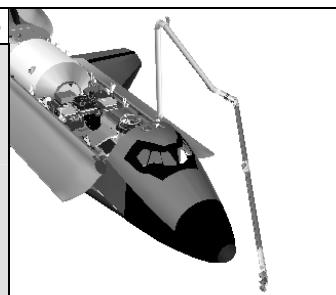
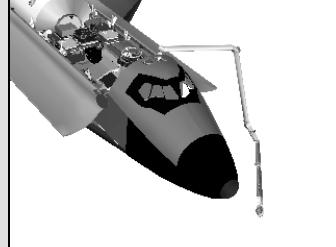
Between Pts 76 and 77, LDRI repositioned for next pan and tilt.
Time between Pts 76 and 77 ~ 4:00 min

Section 7 Clearance Views		Cameras
OBSS-to-Orbiter Nose		RSC, ELBOW

- A7U VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push

PAN: +70 (left)
TILT: -114 (up)
- RHC VIDEO IN as desired (not PL2)
RATE – COARSE (RATE MIN tb-OFF)

AUTO SEQ – PROCEED (IN PROG lt on)

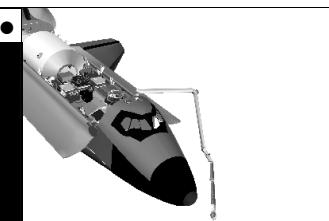
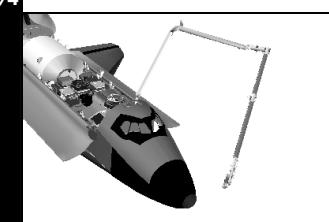
Pt	X	Y	Z	PITCH	YAW	ROLL	•	
76P	-176	-52	-271	200	331	250	•	
77P	-230	-80	-250	155	320	200	•	

- L10(VTR) When AUTO SEQ READY lt – on,
 REC pb – push, hold
 PLAY pb – push, simo (red •)

NOTE
Time between Pts 77 and 80 ~ 18:25 min

RHC RATE – VERN (RATE MIN tb-ON)

On MCC GO,
AUTO SEQ – PROCEED (IN PROG It on)

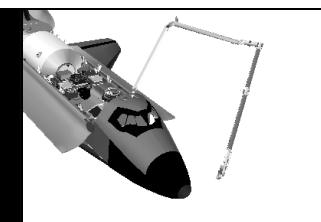
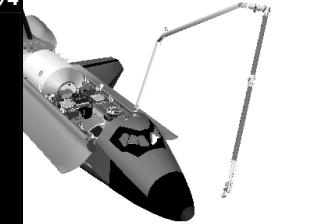
Pt	X	Y	Z	PITCH	YAW	ROLL	•
77P	-230	-80	-250	155	320	200	
78	-190	-100	-346	202	295	282	
79	-202	-84	-376	187	295	287	1/4
80P	-207	-85	-385	213	311	299	

11. ACAS, SECTION 8

NOTE
VTR is not stopped between sections 7 and 8.
Time between Pts 80 and 81 ~ 6:50 min

Section 8 Clearance Views				Cameras		
OBSS-to-Orbiter Nose				RSC		

AUTO SEQ – PROCEED (IN PROG It on)

80P	-207	-85	-385	213	311	299	
81P	-207	-87	-395	240	327	311	1/4 

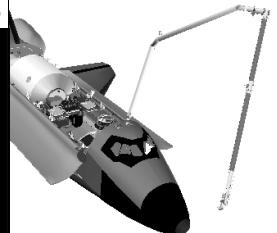
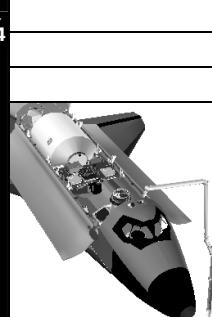
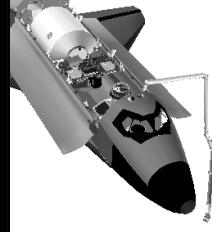
12. ACAS, SECTION 9

NOTE

VTR is not stopped between sections 8 and 9.
Time between Pts 81 and 87 ~ 22:55 min

Section 9 Clearance Views				Cameras		
OBSS-to-Orbiter Nose				RSC, ELBOW ^[1]		
^[1] Good starting at X ~ -212						

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
81P	-207	-87	-395	240	327	311	
82	-227	-114	-336	163	311	256	
83	-227	-113	-326	169	311	256	
84	-233	-103	-288	164	315	227	
85	-246	-90	-261	163	321	207	
86	-244	-80	-240	157	322	196	
87P	-253	-76	-246	156	324	195	

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

L10(VTR) STOP pb – push (no red •)

A7U VIDEO OUT MUX 1 L pb – push (MIDDECK It on)
LDRI MODE 1 pb – push (ITVC video displayed)

13. MNVR OBSS CLEAR OF NOSE JETS

SM 94 PDRS CONTROL

PL ID – ITEM 3 +2 EXEC

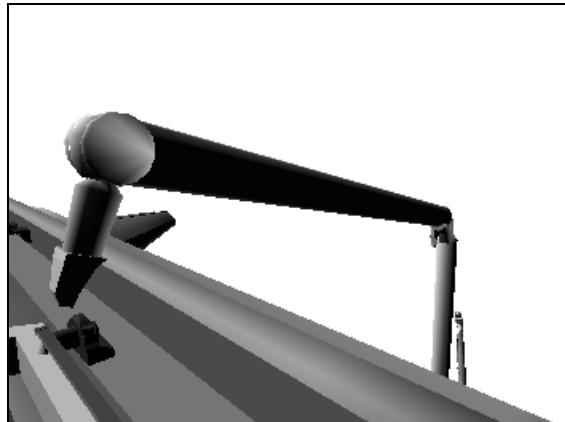
INIT ID – ITEM 24 +2 EXEC

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

Drive WR (-) to 0.0

BRAKES – ON (tb-ON)

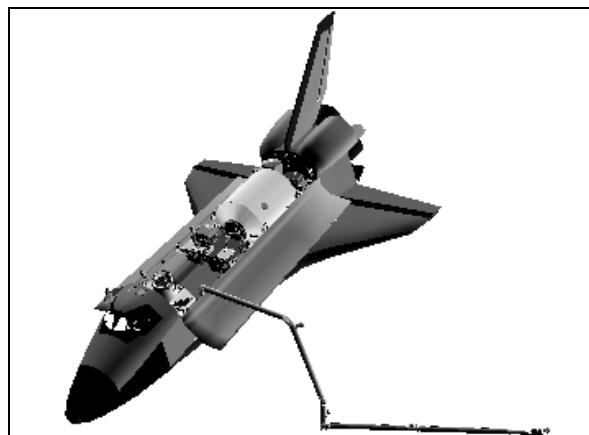
	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-804	-721	-47	0	68	326	2
✓	SY	SP	EP	WP	WY	WR	
✓	+84.2	+8.1	-67.9	+0.3	+35.2	0.0	



CCTV A (45,-10)



ELBOW (15,15)



BIRD'S EYE

14. ENABLE NOSE JETS

GNC 23 RCS

RCS FWD – ITEM 1 EXEC (*)

MANF VLVS OVRD 1 – ITEM 40 EXEC (OP)

2 – ITEM 41 EXEC (OP)

3 – ITEM 42 EXEC (OP)

4 – ITEM 43 EXEC (OP)

5 – ITEM 44 EXEC (OP)

O14:F, Pri RJDA LOGIC,DRIVER (eight) – OFF

O15:F,

O16:F

A6U DAP: as reqd

OBSS LDRI RCC SURVEY – PORT

WARNING
Port PLBD radiator must be stowed
If DOCKED, step 13 requires SSRMS based on MBS. If SSRMS based on Lab PDGF, √MCC

1. SETUP

MON 1	Elbow
MON 2	A/B

SM 94 PDRS CONTROL

✓PL ID – ITEM 3: 2
 ✓INIT ID – ITEM 24: 2

RHC 2. MNVR TO ACAS START POSITION

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

If performing on FD2:

	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-804	-721	-47	0	68	326	2
	SY	SP	EP	WP	WY	WR	
✓	+84.2	+8.1	-67.9	+0.3	+35.2	0.0	

Mnvr to ACAS START posn:

	SY	SP	EP	WP	WY	WR	
Nose Jet Clear	+84.2	+8.1	-67.9	+0.3	+35.2	0.0	
1: SP +		+45.1					
2: SY -	+79.1						
3: WP +				+53.4			
4: WR -						-88.6	
5: WY -					+0.1		
6: EP -			-73.6				
ACAS Start	+79.1	+45.1	-73.6	+53.4	+0.1	-88.6	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-1079	-556	-274	345	352	262	2

If performing on FD4:

	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-1248	-301	-810	62	324	312	2
✓	SY	SP	EP	WP	WY	WR	
✓	+35.0	+38.7	-22.8	-0.5	-0.3	-40.0	

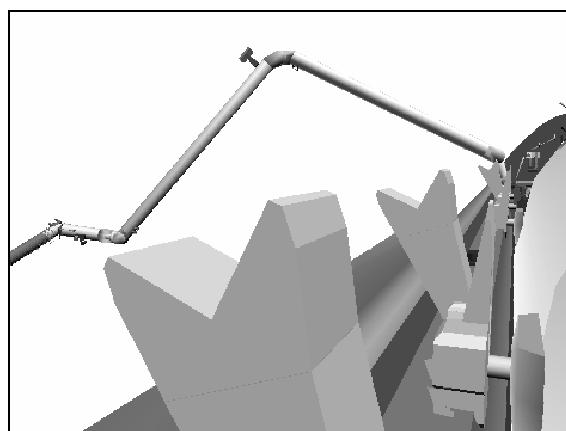
Mnvr to ACAS START posn:

MPLM View	SY	SP	EP	WP	WY	WR	
1: SY +	+35.0	+38.7	-22.8	-0.5	-0.3	-40.0	
2: SP +	+79.1						
3: WP +		+45.1		+53.4			
4: WY +					+0.1		
5: WR -						-88.6	
6: EP -			-73.6				
ACAS Start	+79.1	+45.1	-73.6	+53.4	+0.1	-88.6	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-1079	-556	-274	345	352	262	2

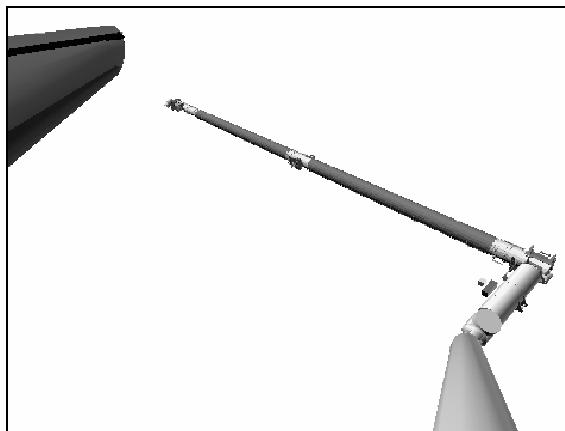
BRAKES – ON (tb-ON)



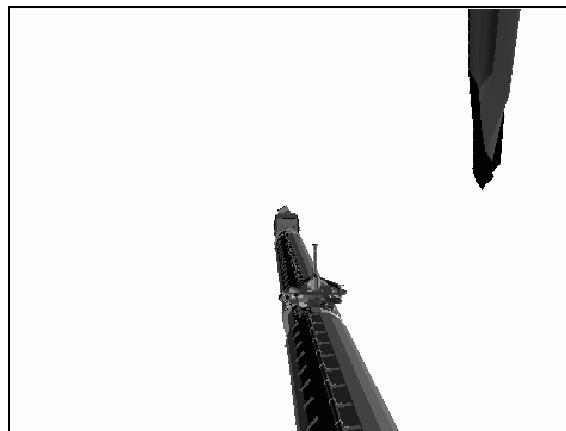
CCTV A (38,0)



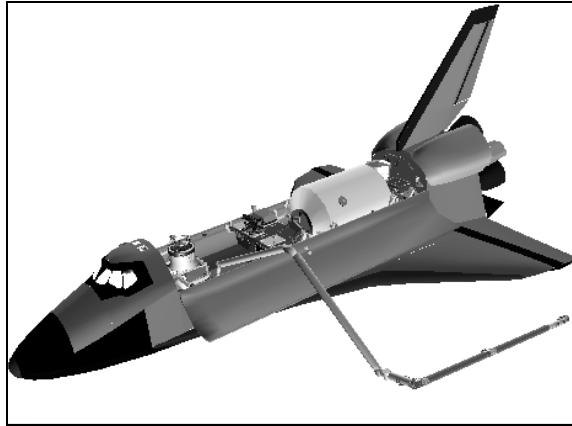
CCTV B (-22,-7)



ELBOW (-25,12)



RSC



BIRD'S EYE

3. ACAS, SECTION 1

NOTE

Section 1 scans underside of RCC from Panel 22 → 14

SM 94 PDRS CONTROL

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

	X	Y	Z	PITCH	YAW	ROLL	PL ID
√	-1339	-513	-205	345	352	262	3
	SY	SP	EP	WP	WY	WR	
√	+79.1	+45.1	-73.6	+53.4	+0.1	-88.6	

A7U VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push
 √OUT DTV pb – push (PL2 lt on)

PAN: +10
TILT: -80

VIDEO IN as desired (not PL2)

√LDRI MODE 6 pb – push (flickering LDRI displayed)
CAMR CMD IRIS – OP(CL) as reqd

RHC RATE – COARSE (RATE MIN tb-OFF)

For survey scan pattern, refer to OBSS LDRI SCAN PATTERN CUE CARD

For camera views, refer to OBSS LDRI RCC SURVEY CAMERA VIEWS –
PORT (INSPECTION AND REPAIR REFERENCE DATA), 5-TBD

L10(VTR) REC pb – push, hold
 PLAY pb – push, simo (red •)

SM 94 PDRS CONTROL

√AUTO MODE 3, ITEM 15: 3

NOTE

If unable to enter AUTO mode (no AUTO READY lt),
OCAS to ACAS start posn

BRAKES – OFF (tb-OFF)
MODE – AUTO 3, ENTER (READY lt on)

SM 94 PDRS CONTROL

✓START PT, ITEM 17: 88

SM 169 PDRS STATUS

Monitor ACAS progress

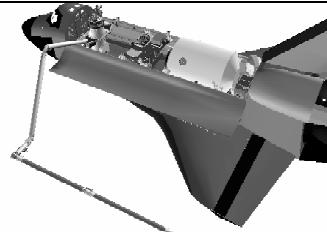
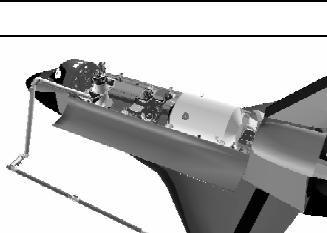
NOTE

Time between Pts 88 and 90 ~ 2:30 min

Section 1 Clearance Views		Cameras
RMS Upper Arm-to-PLBD		A ^[1] , B ^[1]
OBSS-to-PLBD		ELBOW
OBSS-to-Wing		ELBOW, RSC
^[1] Good for all subsequent scan sections		

On MCC GO,
AUTO SEQ – PROCEED (IN PROG lt on)

ACAS, pause pts **shaded in bold**, • col indicates data recording (black = VTR on) and damage criteria (inches):

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
88P	-1339	-513	-205	345	352	262	1	
89	-1265	-473	-201	345	352	262	1	
90P	-1168	-377	-194	345	352	262	1	

When AUTO SEQ READY lt – on,
L10(VTR) STOP pb – push (no red •)

4. ACAS, SECTION 2

NOTE

Between Pts 90 and 91, LDRI closes in to 0.25 in criteria distance. Section 2 then scans underside of RCC from Panel 13 → 5. Time between Pts 90 and 91 ~ 1:40 min

Section 2 Clearance Views		Cameras
OBSS-to-PLBD		RSC, ELBOW
OBSS-to-Wing		RSC, ELBOW

RHC

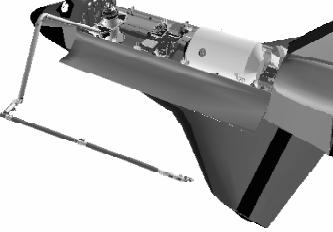
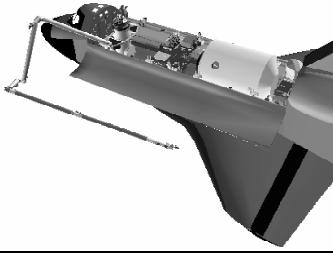
RATE – VERN (RATE MIN tb-ON)
AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
90P	-1168	-377	-194	345	352	262	
91P	-1175	-362	-214	345	345	262	

L10(VTR) When AUTO SEQ READY lt – on,
 REC pb – push, hold
 PLAY pb – push, simo (red •)

NOTE
Time between Pts 91 and 93 ~ 6:02 min

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
91P	-1175	-362	-214	345	345	262		
92	-1101	-287	-207	345	345	261	1/4	
93P	-1004	-225	-208	345	345	261		

When AUTO SEQ READY It – on,
L10(VTR) STOP pb – push (no red •)

5. ACAS, SECTION 3

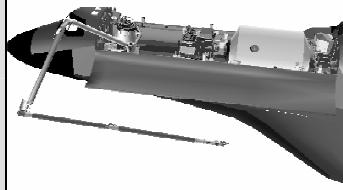
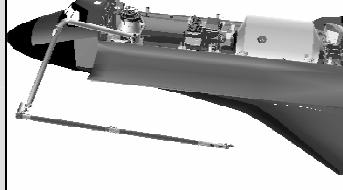
NOTE

Between Pts 93 and 94, LDRI moves out to 1 in criteria distance. Section 3 then scans underside of RCC from Panel 4 → 1. Time between Pts 93 and 94 ~ 0:35 min

Section 3 Clearance Views	Cameras
OBSS-to-PLBD	ELBOW
OBSS-to-Wing	RSC, ELBOW

RHC

RATE – COARSE (RATE MIN tb-OFF)
AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
93P	-1004	-225	-208	345	345	261	
94P	-1001	-241	-189	346	346	260	

L10(VTR)

When AUTO SEQ READY lt – on,
REC pb – push, hold
PLAY pb – push, simo (red •)

NOTE
Time between Pts 94 and 96 ~ 1:30 min

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
94P	-1001	-241	-189	346	346	260	
95	-962	-235	-193	346	344	259	1
96P	-894	-236	-205	347	348	259	

When AUTO SEQ READY It – on,
L10(VTR) STOP pb – push (no red •)

6. ACAS, SECTION 4

NOTE

At Pt 96 the LDRI is repositioned for RCC mid-underside scan.
 Section 4 then scans mid-underside of RCC from Panel 1 → 4.
 Time between Pts 96 and 97 ~ 1:45 min

Section 4 Clearance Views	Cameras
OBSS-to-PLBD	ELBOW
OBSS-to-Wing	RSC, ELBOW

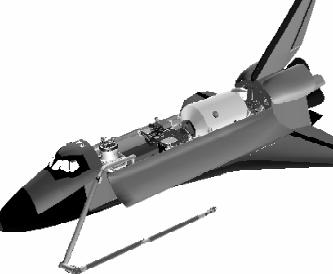
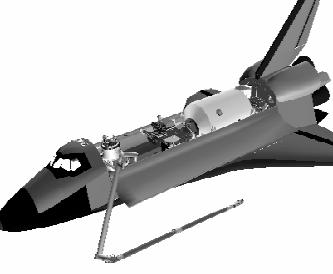
A7U VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push

✓PAN: +10
 TILT: -95 (dn)

VIDEO IN as desired (not PL2)

L10(VTR) REC pb – push, hold
 PLAY pb – push, simo (red •)

AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
96P	-894	-236	-205	347	348	259		
97P	-976	-265	-211	346	347	253	1	

L10(VTR) When AUTO SEQ READY lt – on,
 STOP pb – push (no red •)

7. ACAS, SECTION 5

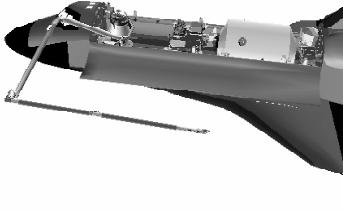
NOTE

Between Pts 97 and 98, LDRI moves in to 0.25 in criteria distance.
 Section 5 then scans mid-underside of RCC from Panel 5 → 13.
 Time between Pts 97 and 98 ~ 1:00 min

Section 5 Clearance Views	Cameras
OBSS-to-PLBD	ELBOW, RSC
OBSS-to-Wing	ELBOW, RSC

RHC

RATE – VERN (RATE MIN tb-ON)
 AUTO SEQ – PROCEED (IN PROG lt on)

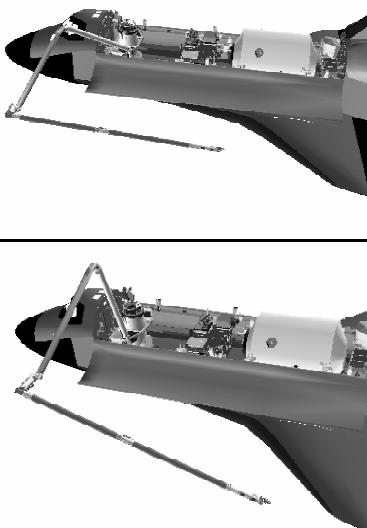
Pt	X	Y	Z	PITCH	YAW	ROLL	•
97P	-976	-265	-211	346	347	253	
98P	-983	-252	-228	346	347	252	

L10(VTR) When AUTO SEQ READY lt – on,
 REC pb – push, hold
 PLAY pb – push, simo (red •)

NOTE
Time between Pts 98 and 99 ~ 6:30 min

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
98P	-983	-252	-228	346	347	252	
99P	-1128	-387	-240	333	354	256	1/4



When AUTO SEQ READY It – on,
L10(VTR) STOP pb – push (no red •)

8. ACAS, SECTION 6

NOTE

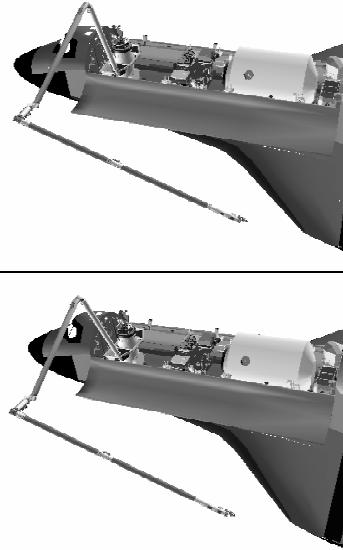
Between Pts 99 and 100, LDRI moves out to 1 in criteria distance.
 Section 6 then scans mid-underside of RCC from Panel 14 → 22.
 Time between Pts 99 and 100 ~ 0:40 min

Section 6 Clearance Views				Cameras		
OBSS-to-PLBD				A ^[1] , ELBOW		
OBSS-to-Wing				A, ELBOW, RSC		
^[1] Good after X ~ -1123						

RHC

RATE – COARSE (RATE MIN tb-OFF)
 AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
99P	-1128	-387	-240	333	354	256	
100P	-1123	-403	-227	333	354	256	



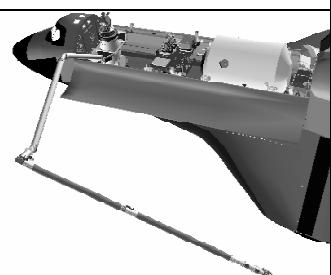
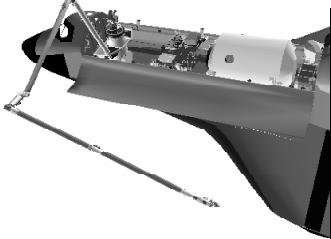
L10(VTR)

When AUTO SEQ READY lt – on,
 REC pb – push, hold
 PLAY pb – push, simo (red •)

NOTE
Time between Pts 100 and 101 ~ 3:30 min

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
100P	-1123	-403	-227	333	354	256	
101	-1231	-530	-256	330	359	243	
102	-1255	-541	-262	330	1	239	1
103P	-1318	-561	-263	330	352	234	



When AUTO SEQ READY It – on,
L10(VTR) STOP pb – push (no red •)

9. ACAS, SECTION 7

NOTE

Between Pts 101 and 102, LDRI is repositioned for RCC front side scan. Section 7 then scans front side (apex) of RCC from Panel 20 → 14. Time between Pts 101 and 102 ~ 1:50 min

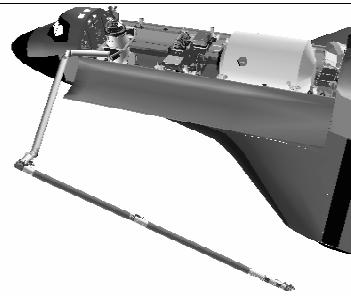
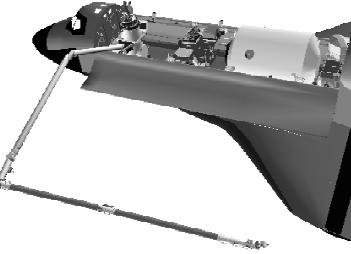
Section 7 Clearance Views	Cameras
OBSS-to-PLBD	A, ELBOW
OBSS-to-Wing	A, ELBOW, RSC

A7U VIDEO OUT MON2 pb – push
IN PL2(VPU) pb – push

PAN: +88 (right)
TILT: -120 (dn)

VIDEO IN as desired (not PL2)

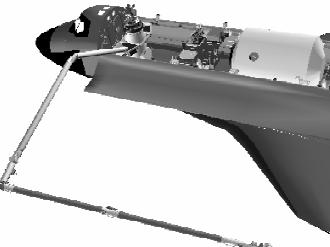
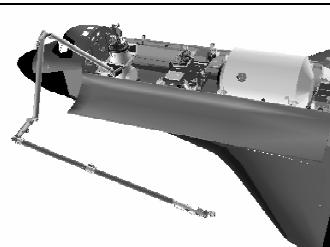
AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
103P	-1318	-561	-263	330	352	234		
104P	-1245	-548	-315	346	348	282		

L10(VTR) When AUTO SEQ READY lt – on,
REC pb – push, hold
PLAY pb – push, simo (red •)

NOTE
Time between Pts 104 and 106 ~ 3:50 min

AUTO SEQ – PROCEED (IN PROG It on)

104P	-1245	-548	-315	346	348	282		
105	-1190	-513	-305	354	5	285	1	
106P	-1093	-416	-299	354	5	285		

L10(VTR) When AUTO SEQ READY It – on,
 STOP pb – push (no red •)

10. ACAS, SECTION 8

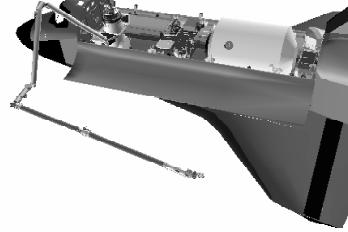
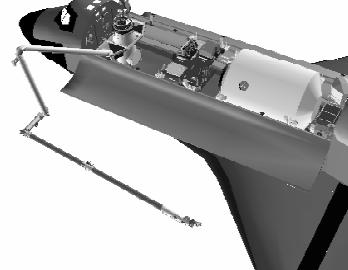
NOTE

Between Pts 106 and 107, LDRI moves in to 0.25 in criteria distance. Section 8 then scans front side (apex) of RCC from Panel 13 → 5. Time between Pts 106 and 107 ~ 2:40 min

Section 8 Clearance Views	Cameras
OBSS-to-PLBD	ELBOW
OBSS-to-Wing	A, ELBOW, RSC ^[1]
^[1] Lose perspective at X ~ -1102	

RHC

RATE – VERN (RATE MIN tb-ON)
AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
106P	-1093	-416	-299	354	5	285		
107P	-1109	-390	-297	3	6	280		

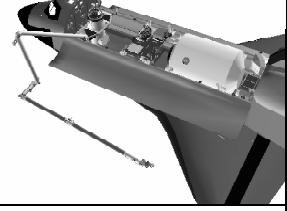
L10(VTR)

When AUTO SEQ READY lt – on,
REC pb – push, hold
PLAY pb – push, simo (red •)

NOTE
Time between Pts 107 and 109 ~ 7:00 min

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
107P	-1109	-390	-297	3	6	280	
108	-1000	-285	-291	3	1	280	1/4
109P	-971	-269	-290	0	347	283	




When AUTO SEQ READY It – on,
L10(VTR) STOP pb – push (no red •)

11. ACAS, SECTION 9

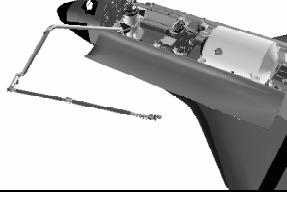
NOTE

Between Pts 109 and 110, LDRI moves out to 1 in criteria distance. Section 9 then scans front side (apex) of RCC from Panel 4 → 1. Time between Pts 109 and 110 ~ 0:45 min

Section 9 Clearance Views	Cameras
OBSS-to-PLBD	RSC, ELBOW, A ^[1]
OBSS-to-Wing	ELBOW
^[1] Partial view of OBSS	

RHC RATE – COARSE (RATE MIN tb-OFF)
AUTO SEQ – PROCEED (IN PROG It on)

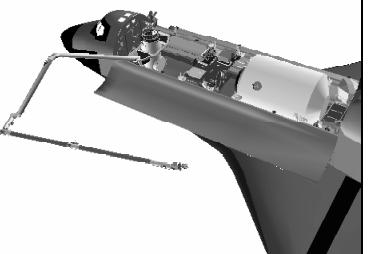
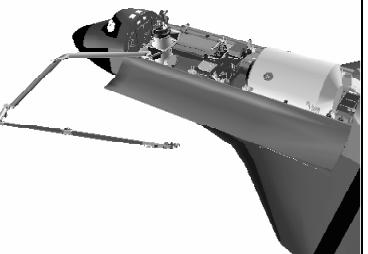
109P	-971	-269	-290	0	347	283	
110P	-960	-296	-291	0	345	283	

L10(VTR) When AUTO SEQ READY lt – on,
REC pb – push, hold
PLAY pb – push, simo (red •)

NOTE
Time between Pts 110 and 111 ~ 1:05 min

AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
110P	-960	-296	-291	0	345	283	1	
111P	-885	-277	-291	0	342	283	1	

L10(VTR) When AUTO SEQ READY lt – on,
STOP pb – push (no red •)

12. ACAS, SECTION 10

NOTE

Between Pts 111 and 112, arm adjusts to new posn for inspection of mid-top side of RCC. Section 10 then scans mid-top side of RCC Panels 1 → 22. Time between Pts 111 and 112 ~ 0:45 min

Section 10 Clearance Views	Cameras
OBSS-to-PLBD	A, ELBOW, RSC
OBSS-to-Wing	A, ELBOW, RSC ^[1]

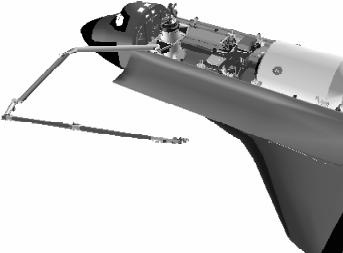
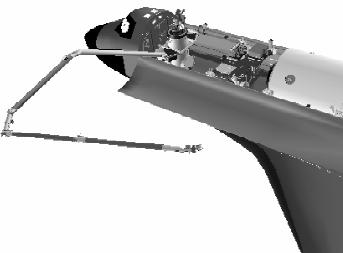
^[1]After X ~ -1025

A7U VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push

PAN: +120 (right)
TILT: -110 (up)

VIDEO IN as desired (not PL2)

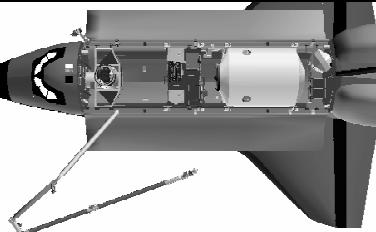
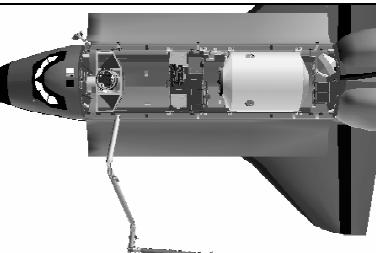
AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
111P	-885	-277	-291	0	342	283		
112P	-910	-283	-322	2	340	302		

L10(VTR) When AUTO SEQ READY lt – on,
 REC pb – push, hold
 PLAY pb – push, simo (red •)

NOTE
Time between Pts 112 and 120 ~ 6:30 min

AUTO SEQ – PROCEED (IN PROG It on)

112P	-910	-283	-322	2	340	302	
113	-926	-284	-325	1	340	298	
114	-950	-287	-335	359	340	292	
115	-978	-289	-352	357	345	287	
116	-1030	-311	-370	356	0	271	1
117	-1095	-373	-378	356	0	270	
118	-1212	-495	-375	352	12	280	
119	-1239	-522	-366	355	6	282	
120P	-1300	-548	-360	354	6	284	

When AUTO SEQ READY It – on,
L10(VTR) STOP pb – push (no red •)

13. ACAS, SECTION 11

NOTE

Between Pts 120 and 121, arm adjusts to new posn for inspection of top side of RCC. Section 11 then scans top side of RCC
 Panels 22 → 5. Time between Pts 120 and 121 ~ 1:45 min

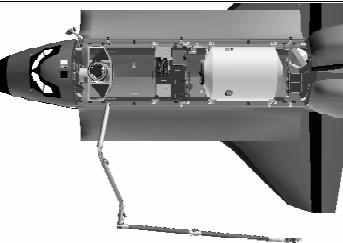
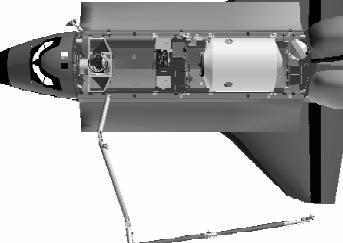
Section 11 Clearance Views	Cameras
OBSS-to-PLBD	A, ELBOW
OBSS-to-Wing	A, ELBOW ^[1] , RSC
SRMS Upper Arm-to-Lab (if docked)	B
^[1] Lose view at X ~ -1180	

A7U VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push

PAN: +135 (right)
 √TILT: -110

VIDEO IN as desired (not PL2)

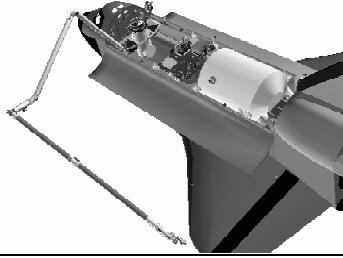
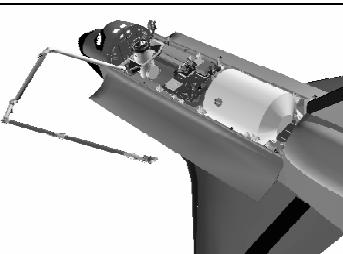
AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	Image
120P	-1300	-548	-360	354	6	284	●	
121P	-1331	-493	-418	345	355	254	●	

L10(VTR) When AUTO SEQ READY It – on,
 REC pb – push, hold
 PLAY pb – push, simo (red ●)

NOTE
Time between Pts 121 and 127 ~ 5:00 min

AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
121P	-1331	-493	-418	345	355	254		
122	-1279	-476	-417	345	355	254		
123	-1214	-417	-416	345	355	254		
124	-1176	-378	-416	345	350	253	1	
125	-1136	-341	-415	347	348	253		
126	-1023	-281	-383	355	343	285		
127P	-993	-285	-371	359	342	295		

When AUTO SEQ IN PROG lt – off,
BRAKES – ON (tb-ON)

L10(VTR) STOP pb – push (no red •)

A7U VIDEO OUT MUX 1 L pb – push (MIDDECK lt on)
LDRI MODE 1 pb – push (ITVC video displayed)

14. MNVR TO OBSS HOVER/PARK POSITION

SM 94 PDRS CONTROL

PL ID – ITEM 3 +2 EXEC
INIT ID – ITEM 24 +2 EXEC

	X	Y	Z	PITCH	YAW	ROLL	PL ID
√	-736	-373	-373	359	342	295	
√	SY	SP	EP	WP	WY	WR	
√	+131.0	+56.7	-87.4	+18.9	-56.4	-86.8	

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

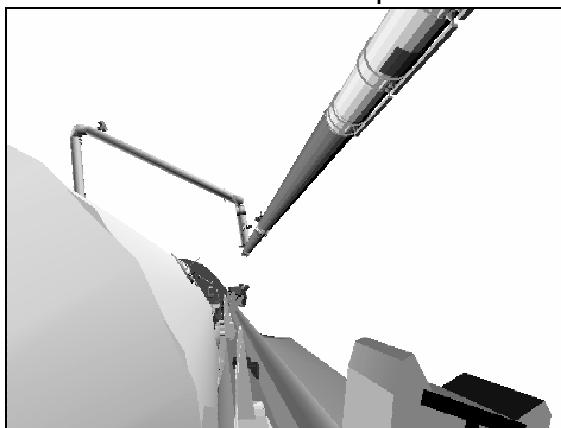
If performing on FD2:

Mnvr to OBSS HOVER posn:

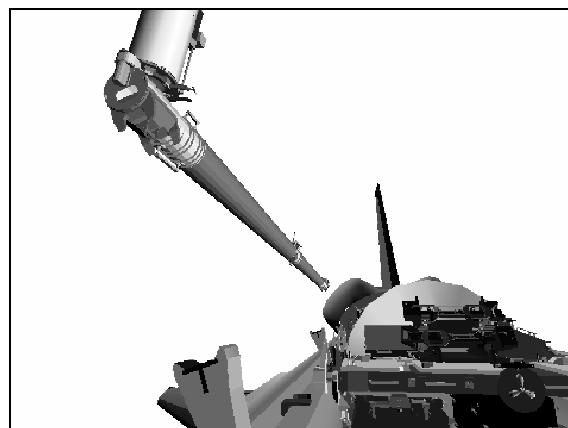
	SY	SP	EP	WP	WY	WR	
Port End	+131.0	+56.7	-87.4	+18.9	-56.4	-86.8	
1: WY +					0.0		
2: SP +		+95.0					
3: WR +						+50.0	
4: SY -	-89.9						
5: WR +						+109.9	
6: WP -				-56.2			
7: SP -		+79.7					
8: EP -			-122.9				
OBSS Hover	-89.9	+79.7	-122.9	-56.2	0.0	+109.9	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-998	129	-507	0	0	10	2

BRAKES – ON (tb-ON)

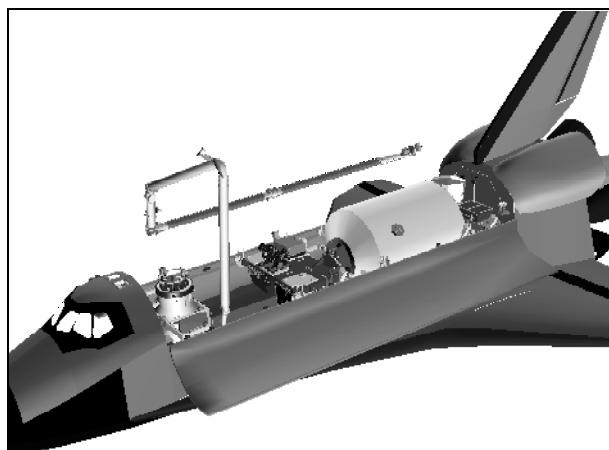
OBSS HOVER posn:



CCTV C (10,10)



CCTV D (-10,15)



BIRD'S EYE

If performing on FD4:

Mnvr to CMG R&R VIEWING posn:

	SY	SP	EP	WP	WY	WR	
Port End	+131.0	+56.7	-87.4	+18.9	-56.4	-86.8	
1: WY +					-1.0		
2: SY -	+95.0						
3: EP +			-22.4				
4: SP -		+38.6					
5: WP -				-0.7			
6: WR +						+22.3	
CMG R&R Viewing	+95.0	+38.6	-22.4	-0.7	-1.0	+22.3	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
A7U	-628	-726	-824	91	4	266	2

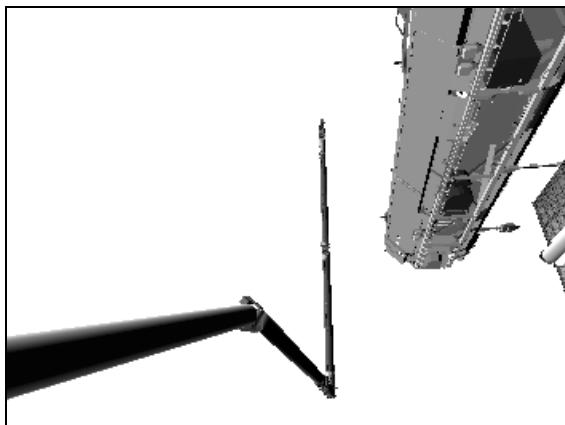
BRAKES – ON (tb-ON)

✓MODE – not DIRECT
JOINT – CRIT TEMP

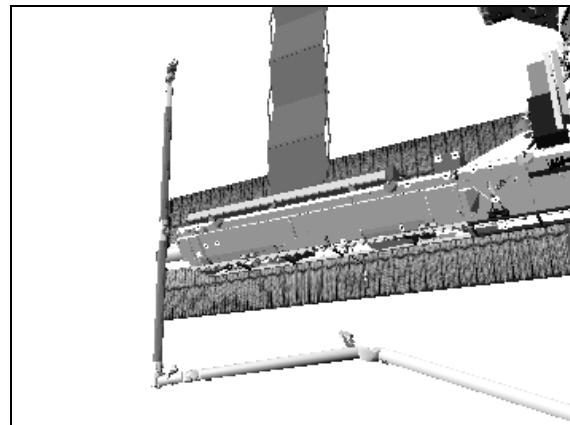
A7U VIDEO OUT MON2 pb – push
 IN PL2(VPU) pb – push

PAN: +245 (right)
TILT: -270 (dn)

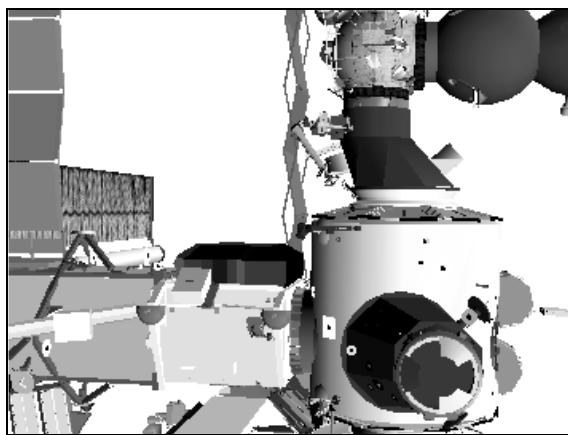
VIDEO IN as desired (not PL2)



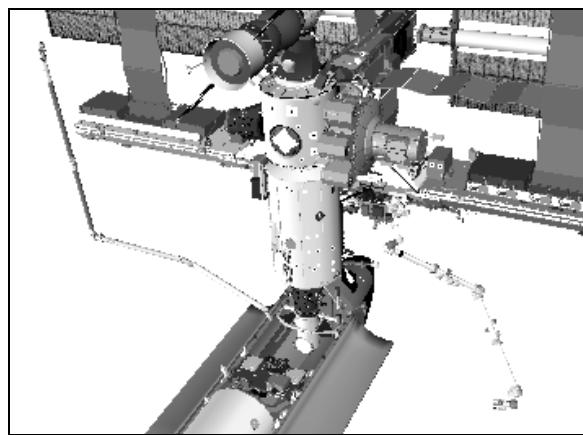
CCTV A (80,30)



CCTV B (-30,20)



ITVC (245,-270)



BIRD'S EYE

SRMS EE CAM UPPER SURFACE SURVEY

WARNING
 For UNDOCKED ops only
 Port and Stbd PLBD radiators must be stowed

1. SETUP

A7U CCTV – RMS WRIST, zoom 20.0 HFOV

SM 94 PDRS CONTROL

✓PL ID, ITEM 3: 0

✓INIT ID, ITEM 24: 0

	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	

SM 94 PDRS CONTROL

AUTO MODES – ITEM 13 +4 +5 +6 EXEC

2. MNVR TO AUTO 1 START POSITION

RHC RATE – as reqd (VERN within 10 ft)

A8U BRAKES – OFF (tb-OFF)

MODE – SINGLE, ENTER

Mnvr to AUTO 1 START posn:

	SY	SP	EP	WP	WY	WR	
Pre-craddle	0.0	+25.0	-25.0	+5.0	0.0	0.0	
1: WR –						-143.5	
2: WY –					-36.5		
3: WP –				-99.6			
4: SY +	+65.9						
5: SP +		+53.3					
6: EP –			-94.3				
AUTO 1 Start	+65.9	+53.3	-94.3	-99.6	-36.5	-143.5	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-840	-364	-333	324	291	323	0

BRAKES – ON (tb-ON)

3. INHIBIT NOSE JETS

GNC 23 RCS

RCS FWD – ITEM 1 EXEC (*)

MANF VLVS OVRD 1 – ITEM 40 EXEC (CL)
 2 – ITEM 41 EXEC (CL)
 3 – ITEM 42 EXEC (CL)
 4 – ITEM 43 EXEC (CL)
 5 – ITEM 44 EXEC (CL)

O14 **TBD RJD config**

A6U DAP: **TBD**

4. AUTO 1, SECTION 1

SM 94 PDRS CONTROL

PL ID – ITEM 3 +5 EXEC
 INIT ID – ITEM 24 +5 EXEC

	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-840	-364	-333	324	291	323	5
	SY	SP	EP	WP	WY	WR	
✓	+65.9	+53.3	-94.3	-99.6	-36.5	-143.5	

RHC RATE – VERN (RATE MIN tb-ON)

L10(VTR) REC pb – push, hold
 PLAY pb – push, simo (red ●)

NOTE

If cannot get AUTO READY lt, OCAS to ACAS start posn

A8U BRAKES – OFF (tb-OFF)
 MODE – AUTO 1, ENTER (READY lt on)

SM 94 PDRS CONTROL

✓START PT, ITEM 17: 128

SM 169 PDRS STATUS

Monitor ACAS progress

NOTE

Time between Pts 128 and 130 ~ 2:05 min

Section 1 Clearance Views	Cameras
TBD	TBD

On MCC GO,
 AUTO SEQ – PROCEED (IN PROG lt on)

ACAS, pause pts **shaded in bold**, • col indicates data recording (black = VTR on) and damage criteria (inches)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
128P	-840	-364	-333	324	291	323	■	TBD
129	-523	-296	-354	298	285	302	3	
130P	-298	-252	-375	241	283	237	■	TBD

5. AUTO 1, SECTION 2

NOTE

VTR is not paused between sections 1 and 2.

Time between Pts 130 and 131 ~ 1:05 min

Section 2 Clearance Views	Cameras
TBD	TBD

A8U AUTO SEQ – PROCEED (IN PROG It on)

130P	-298	-252	-375	241	283	237	3	TBD
131P	-518	-252	-385	300	281	271	■	TBD

A8U When AUTO SEQ READY It – on,
 BRAKES – ON (tb-ON)

L10(VTR) STOP pb – push (no •)

6. MNVR TO AUTO 2 START POSITION

SM 94 PDRS CONTROL

PL ID – ITEM 3 +0 EXEC

INIT ID – ITEM 24 +0 EXEC

RHC ✓RATE – VERN (RATE MIN tb-ON)
A8U BRAKES – OFF (tb-OFF)
 MODE – SINGLE, ENTER

Mnvr to AUTO 2 START posn:

	SY	SP	EP	WP	WY	WR
AUTO 1 End	+129.1	+70.1	-118.9	-97.9	+28.4	-209.4
1: WR +						-198.0
2: WY -					-8.4	
3: WP -				-108.0		
4: EP +			-78.9			
5: SP +		+75.1				
6: SY -	-146.3					
AUTO 2 Start	-146.3	+75.1	-78.9	-108.0	-8.4	-198.0
	X	Y	Z	PITCH	YAW	ROLL
	-408	0	-653	283	0	0
						PL ID
						0

A8U BRAKES – ON (tb-ON)

7. AUTO 2, SECTION 1

SM 94 PDRS CONTROL

PL ID – ITEM 3 +5 EXEC

INIT ID – ITEM 24 +5 EXEC

	X	Y	Z	PITCH	YAW	ROLL	PL ID
√	-408	0	-653	283	0	0	5
	SY	SP	EP	WP	WY	WR	
√	-146.3	+75.1	-78.9	-108.0	-8.4	-198.0	

RHC √RATE – VERN (RATE MIN tb-ON)

L10(VTR) REC pb – push, hold
PLAY pb – push, simo (red •)

NOTE

If cannot get AUTO READY lt, OCAS to ACAS start posn

A8U BRAKES – OFF (tb-OFF)
MODE – AUTO 2, ENTER (READY lt on)

SM 94 PDRS CONTROL

√START PT, ITEM 17: 132

SM 169 PDRS STATUS

Monitor ACAS progress

NOTE

Time between Pts 132 and 133 ~ 1:05 min

Section 1 Clearance Views	Cameras
TBD	TBD

On MCC GO,
A8U AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
132P	-408	0	-653	283	0	0	3	TBD
133P	-443	-120	-650	278	344	319		TBD

8. AUTO 2, SECTION 2

NOTE

VTR is not paused between sections 1 and 2. Time between
Pts 133 and 135 ~ 1:53 min

Section 2 Clearance Views				Cameras			
TBD				TBD			

A8U AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
133P	-443	-120	-650	278	344	319		TBD
134	-233	-50	-502	283	346	2	3	
135P	-243	69	-514	280	16	28		TBD

9. AUTO 2, SECTION 3

NOTE

VTR is not paused between sections 2 and 3.
Time between Pts 135 and 136 ~ 1:05 min

Section 3 Clearance Views				Cameras			
TBD				TBD			

AUTO SEQ – PROCEED (IN PROG It on)

135P	-243	69	-514	280	16	28	3	TBD
136P	-443	107	-620	282	13	60		TBD

10. AUTO 2, SECTION 4

NOTE

VTR is not paused between sections 3 and 4.
Time between Pts 136 and 137 ~ 1:23 min

Section 4 Clearance Views				Cameras			
TBD				TBD			

AUTO SEQ – PROCEED (IN PROG It on)

136P	-443	107	-620	282	13	60	3	TBD
137P	-511	186	-425	238	54	104		TBD

11. AUTO 2, SECTION 5

NOTE

VTR is not paused between sections 4 and 5.
Time between Pts 137 and 138 ~ 0:50 min

Section 5 Clearance Views				Cameras				
Pt	X	Y	Z	PITCH	YAW	ROLL	•	
137P	-511	186	-425	238	54	104	3	TBD
138P	-357	177	-410	236	51	127	3	TBD

A8U AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
137P	-511	186	-425	238	54	104	3	TBD
138P	-357	177	-410	236	51	127	3	TBD

12. AUTO 2, SECTION 6

NOTE

VTR is not paused between sections 5 and 6.

Time between Pts 138 and 139 ~ 1:30 min

Section 6 Clearance Views				Cameras				
Pt	X	Y	Z	PITCH	YAW	ROLL	•	
138P	-357	177	-410	236	51	127	3	TBD

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
138P	-357	177	-410	236	51	127	3	TBD
139P	-548	266	-478	270	38	45	3	TBD

When AUTO SEQ READY It – on,
BRAKES – ON (tb-ON)

L10(VTR) STOP pb – push (no •)

13. ENABLE NOSE JETS

GNC 23 RCS

RCS FWD – ITEM 1 EXEC (*)

MANF VLVS OVRD 1 – ITEM 40 EXEC (OP)

2 – ITEM 41 EXEC (OP)

3 – ITEM 42 EXEC (OP)

4 – ITEM 43 EXEC (OP)

5 – ITEM 44 EXEC (OP)

O14 TBD RJD config

A6U DAP: TBD

14. MNVR TO AUTO 3 START POSITION

SM 94 PDRS CONTROL

PL ID – ITEM 3 +0 EXEC

INIT ID – ITEM 24 +0 EXEC

RHC RATE – as reqd (VERN within 10 ft)

A8U

BRAKES – OFF (tb-OFF)
MODE – SINGLE, ENTER

Mnvr to AUTO 3 START posn:

	SY	SP	EP	WP	WY	WR
AUTO 2 End	-107.7	+28.1	-66.2	-108.4	-15.1	+163.6
1: WR -						+22.4
2: WY +					+61.4	
3: WP +				-48.5		
4: EP +			-21.0			
5: SY +	-41.9					
6: SP -		+17.7				
AUTO 3 Start	-41.9	+17.7	-21.0	-48.5	+61.4	+22.4
	X	Y	Z	PITCH	YAW	ROLL
	-1119	193	-578	328	18	345
						PL ID
						0

A8U BRAKES – ON (tb-ON)

15. AUTO 3, SECTION 1

SM 94 PDRS CONTROL

PL ID – ITEM 3 +5 EXEC

INIT ID – ITEM 24 +5 EXEC

	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-1119	193	-578	328	18	345	5
✓	SY	SP	EP	WP	WY	WR	
✓	-41.9	+17.7	-21.0	-48.5	+61.4	+22.4	

RHC RATE – VERN (RATE MIN tb-ON)

L10(VTR) REC pb – push, hold
PLAY pb – push, simo (red •)

NOTE

If cannot get AUTO READY lt, OCAS to ACAS start posn

A8U BRAKES – OFF (tb-OFF)
MODE – AUTO 3, ENTER (READY lt on)

SM 94 PDRS CONTROL

✓START PT, ITEM 17: 140

SM 169 PDRS STATUS

Monitor ACAS progress

NOTE

Time between Pts 140 and 142 ~ 1:15 min

Section 1 Clearance Views						Cameras		
Pt	X	Y	Z	PITCH	YAW	ROLL	•	Cameras
140P	-1119	193	-578	328	18	345	●	TBD

A8U On MCC GO,
AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	Cameras
140P	-1119	193	-578	328	18	345	●	TBD
141	-1191	78	-571	328	21	8	3	
142P	-1157	0	-706	337	0	0	●	TBD

16. AUTO 3, SECTION 2

NOTE

VTR is not paused between sections 1 and 2.
Time between Pts 142 and 145 ~ 2:10 min

Section 2 Clearance Views						Cameras		
Pt	X	Y	Z	PITCH	YAW	ROLL	•	Cameras
142P	-1157	0	-706	337	0	0	●	TBD

AUTO SEQ – PROCEED (IN PROG It on)

142P	-1157	0	-706	337	0	0	●	TBD
143	-1191	-78	-575	329	339	352	3	
144	-1205	-143	-550	329	339	40	3	
145P	-1213	-217	-458	350	318	51	●	TBD

When AUTO SEQ READY It – on,
BRAKES – ON (tb-ON)

L10(VTR) STOP pb – push (no ●)

17. MNVR TO PRE-CRADLE

SM 94 PDRS CONTROL

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

RHC RATE – as reqd (VERN within 10 ft)
A8U BRAKES – OFF (tb-OFF)
MODE – SINGLE, ENTER

Mnvr to PRE-CRADLE posn:

	SY	SP	EP	WP	WY	WR	
AUTO 3 End	+14.9	+30.3	-40.6	-21.4	-48.9	+36.8	
1: WR -						0.0	
2: WY +					0.0		
3: WP +				+5.0			
4: EP +			-25.0				
5: SY -	0.0						
6: SP -		+25.0					
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

A8U

BRAKES – ON (tb-ON)
 MODE – not DIRECT
 JOINT – CRIT TEMP

OBSS LCS RCC SURVEY – STBD

<u>WARNING</u>
For UNDOCKED ops only
Stbd PLBD radiator must be stowed
APAS Docking Ring must be retracted

NOTE
Assumed starting posn OBSS HOVER

1. SETUP

MON 1	Elbow
MON 2	D/C

SM 94 PDRS CONTROL
 PL ID – ITEM 3 +2 EXEC
 INIT ID – ITEM 24 +2 EXEC
 AUTO MODES – ITEM 13 +7 +8 +9 EXEC

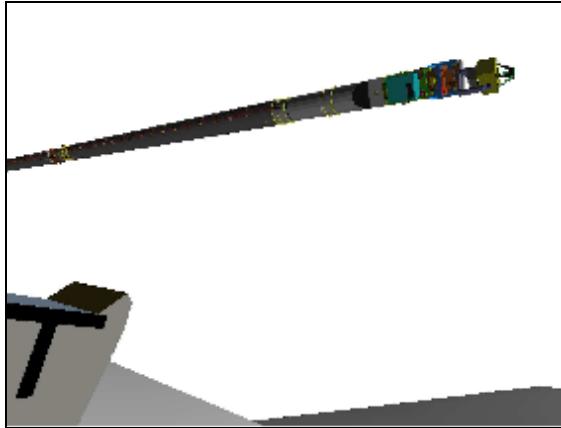
RHC
A8U2. MNVR TO TEST SCAN POSITION

RATE – VERN
 BRAKES – OFF (tb-OFF)
 MODE – ORB LD, ENTER

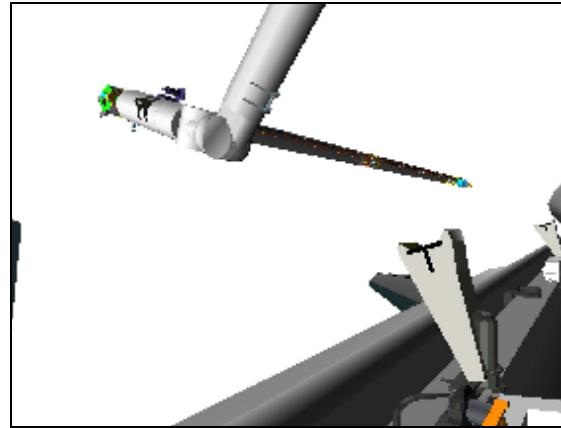
Mnvr to TEST SCAN posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1000	+255	-500	0	0	+110	2
SY	SP	EP	WP	WY	WR	
-89.6	+49.1	-117.0	+68.5	-0.4	+110.0	

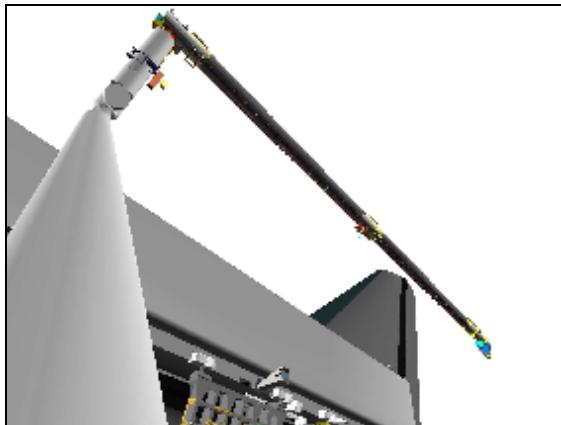
BRAKES – ON (tb-ON)



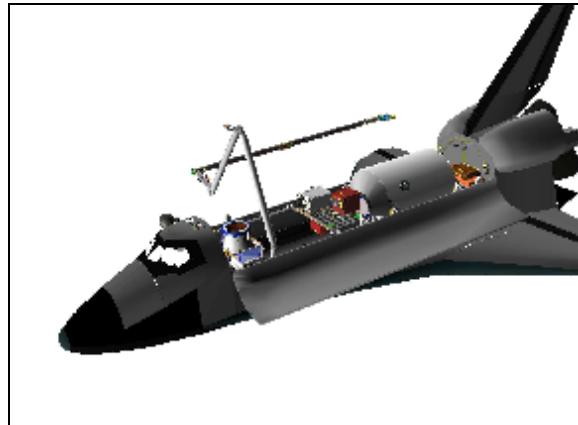
CCTV C (55,0)



CCTV D (-40,0)



ELBOW (25,-20)



BIRD'S EYE

3. TEST SCAN

NOTE

Test Scan used to verify LCS sensor response

PGSC 'Scanning' 'Detailed Area Scan'

sel – Test Scan

sel – Start Area Scan (verify image on PGSC)



LCS

- RHC 4. MNVR TO ACAS START POSITION
 A8U ✓ RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – SINGLE, ENTER

Mnvr to ACAS START posn:

	SY	SP	EP	WP	WY	WR	
Test Scan	-89.6	+49.1	-117.0	+68.5	-0.4	+110.0	
1: SP +		+125.4					
2: EP +			-110.0				
3: WP -				+34.2			
4: WR +						+231.4	
5: SY +	-38.9						
6: WY -					-67.0		
ACAS Start	-38.9	+125.4	-110.0	+34.2	-67.0	+231.4	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-806	+128	-558	+280	+319	+74	2

BRAKES – ON (tb-ON)

- SM 94 PDRS CONTROL**
 PL ID – ITEM 3 +4 EXEC
 INIT ID – ITEM 24 +4 EXEC

	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-841	+282	-371	+201	+12	+228	4
	SY	SP	EP	WP	WY	WR	
✓	-38.9	+125.4	-110.0	+34.2	-67.0	+231.4	

For survey scan pattern, refer to [OBSS LCS SCAN PATTERN CUE CARD](#)

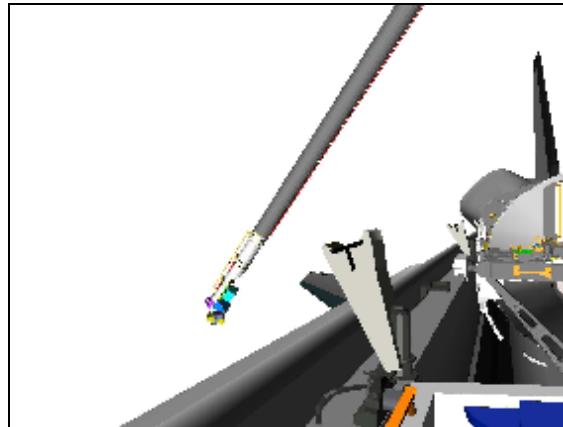
For camera views, refer to OBSS LCS RCC SURVEY CAMERA VIEWS – STBD
(INSPECTION and REPAIR REFERENCE DATA), 5-TBD

SM 94 PDRS CONTROL

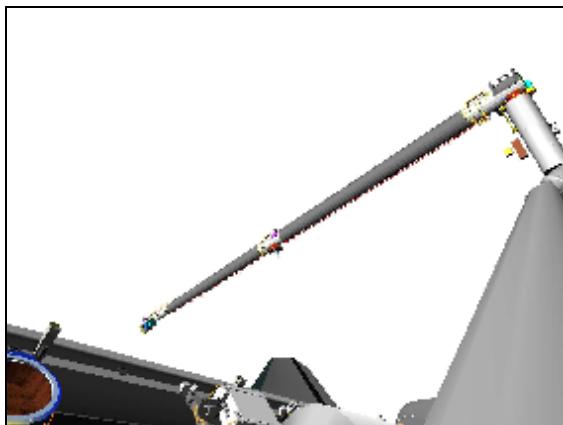
AUTO MODE 1 – ITEM 13 +1 EXEC



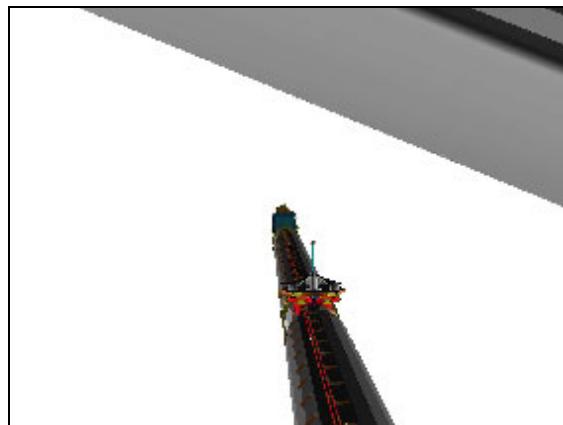
CCTV C (10,10)



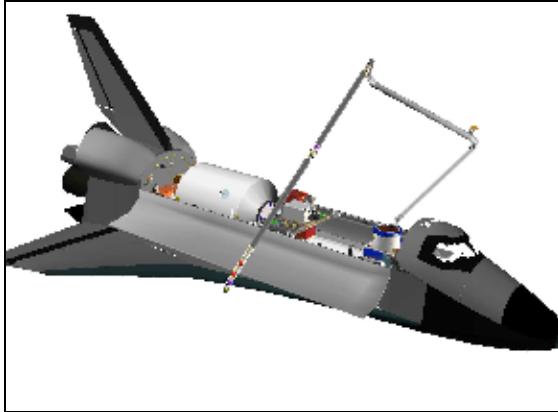
CCTV D (-30,0)



ELBOW (-35,-10)



RSC



BIRD'S EYE

5. ACAS, SECTION 1

NOTE

If cannot get AUTO READY lt, OCAS to ACAS start posn

RHC RATE – COARSE (RATE MIN tb-OFF)

A8U BRAKES – OFF (tb-OFF)
MODE – AUTO 1, ENTER (READY lt on)

SM 94 PDRS CONTROL
✓START PT, ITEM 17: 1

SM 169 PDRS STATUS
Monitor ACAS progress

NOTE

Section 1 scans Top Side of starboard wing
RCC. Time between Pts 1 and 6 ~ **2:45 min**

Section 1 Clearance Views	Cameras
OBSS to PLBD	D, ELBOW
OBSS to Wing	ELBOW, RSC

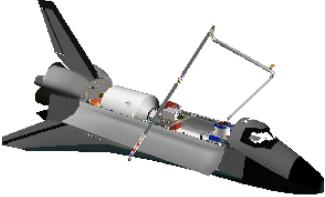
* If RSC failed:

* To regain OBSS to PLBD clearance view at any time during *

* ACAS, perform CONTINGENCY LCS CLEARANCE VIEW *

PGSC On MCC GO,
'Scanning' 'Continuous Line Scan'
sel – Starboard Upper Scan
sel – Start Line Scan (verify scan progress on PGSC)

ACAS, pause pts **shaded in bold**, • col indicates damage criteria (inches)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	
1P	-840	+282	-370	+201	+12	+228		
2	-1019	+277	-381	+194	+22	+222		
3	-1102	+323	-357	+197	+16	+221		
4	-1231	+433	-369	+200	+357	+214	¼	
5	-1279	+471	-363	+202	+352	+214		
6P	-1364	+504	-373	+204	+347	+215		

PGSC When AUTO SEQ IN PROG It – off,
 ‘Scanning’
 sel – Stop Scan

6. ACAS, SECTION 2

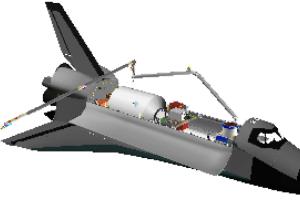
NOTE

Between Pts 6 and 7, LCS is repositioned for RCC front side scan.
 Section 2 then scans front side (apex) of starboard wing RCC.
 Time between Pts 6 and 7 ~ **2:20** min

Section 2 Clearance Views	Cameras
OBSS to PLBD	C, D
OBSS to Wing	C, D, RSC

A8U

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
6P	-1364	+504	-373	+204	+347	+215	
7P	-1355	+533	-310	+237	+3	+256	

NOTETime between Pts 7 and 13 ~ **2:25** min

PGSC

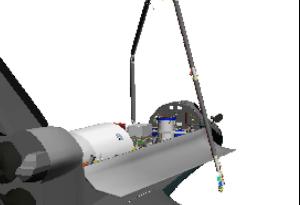
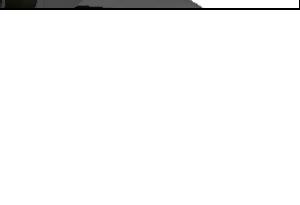
'Scanning' 'Continuous Line Scan'

sel – Starboard Upper Scan

sel – Start Line Scan (verify scan progress on PGSC)

A8U

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
7P	-1355	+533	-310	+237	+3	+256	
8	-1194	+453	-303	+228	+31	+242	
9	-1103	+362	-289	+223	+33	+249	
10	-1069	+328	-289	+225	+28	+248	
11	-1044	+304	-291	+222	+34	+249	
12	-1005	+288	-284	+217	+26	+262	
13P	-853	+285	-308	+183	+25	+261	

PGSC

When AUTO SEQ IN PROG It – off,

'Scanning'

sel – Stop Scan

7. ACAS, SECTION 3

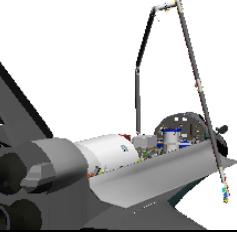
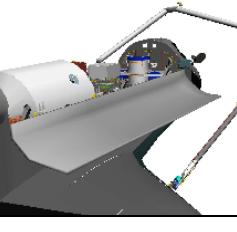
NOTE

Between Pts 13 and 14, arm adjusts to new posn for inspection of bottom surface of RCC. Section 3 then scans bottom of starboard wing RCC. Time between Pts 13 and 14 ~ 3:20 min

Section 3 Clearance Views	Cameras
OBSS to PLBD, Crew Cabin	A, RSC

A8U

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•	Image
13P	-853	+285	-308	+183	+25	+291		
14P	-902	+226	-218	+228	+57	+290		

NOTE

Time between Pts 14 and 18 ~ 4:55 min

PGSC

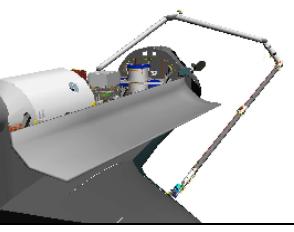
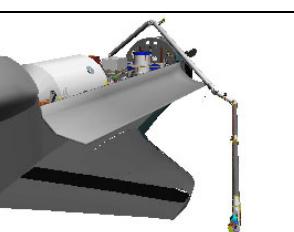
'Scanning' 'Continuous Line Scan'

sel – Starboard Upper Scan

sel – Start Line Scan (verify scan progress on PGSC)

A8U

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	
14P	-899	+213	-222	+223	+50	+296	
15	-1028	+213	-222	+222	+72	+304	
16	-1148	+322	-233	+270	+78	+256	
17	-1264	+457	-241	+281	+67	+244	1/4
18P	-1361	+487	-236	+308	+67	+221	

PGSC

When AUTO SEQ IN PROG It – off,
 ‘Scanning’
 sel – Stop Scan

A8U

BRAKES – ON (tb-ON)

OBSS LCS RCC SURVEY – NOSE CAP

WARNING
For UNDOCKED ops only
PLBD radiators must be stowed

NOTE

Assumed starting posn end of OBSS LDRI RCC SURVEY – STBD.

Procedure surveys orbiter nose cap in “stop and stare” mode.
A survey is conducted at each pause point in ACAS

1. SETUP

MON 1	C/B
MON 2	D/Elbow

X	Y	Z	PITCH	YAW	ROLL	PL ID
✓ -1361	+487	-236	+308	+67	+221	4
✓ SY	SP	EP	WP	WY	WR	
✓ -66.4	+9.7	-66.4	-42.5	-10.1	+72.1	

2. INHIBIT NOSE JETS

GNC 23 RCS

RCS FWD – ITEM 1 EXEC (*)

MANF VLVS OVRD 1 – ITEM 40 EXEC (CL)

2 – ITEM 41 EXEC (CL)

3 – ITEM 42 EXEC (CL)

4 – ITEM 43 EXEC (CL)

5 – ITEM 44 EXEC (CL)

O14 TBD RJD config

A6U DAP: TBD

3. MNVR TO ACAS START POSITION

RHC RATE – VERN (RATE MIN tb-ON)

A8U BRAKES – OFF (tb-OFF)

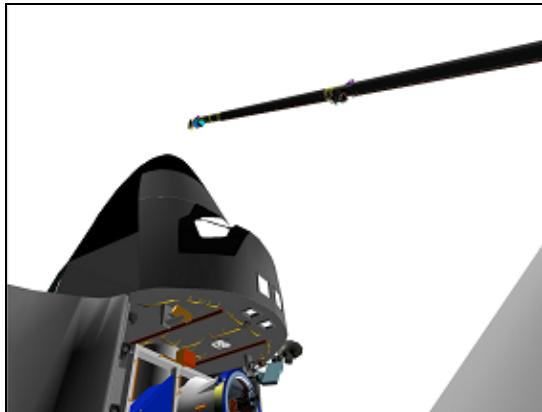
 MODE – SINGLE, ENTER

Mnvr to ACAS START posn:

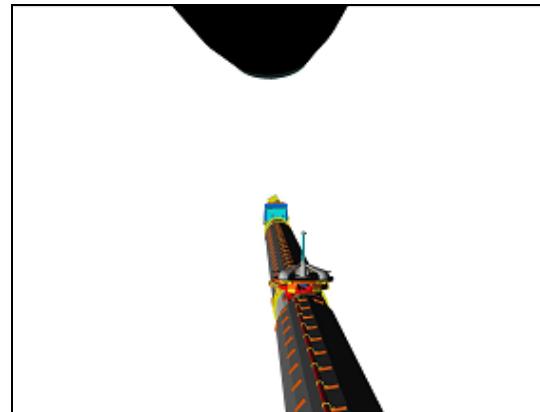
	SY	SP	EP	WP	WY	WR	
Stbd End	-66.4	+9.7	-66.4	-42.5	-10.1	+72.1	
1: SY -	-75.0						
2: SP +		+127.0					
3: SY -	-125.3						
4: EP -			-109.0				
5: WP +				+31.6			
6: WY +					+31.2		
7: WR -						-117.4	
ACAS Start	-125.3	+127.0	-109.0	+31.6	+31.2	-117.4	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-190	-12	-401	+250	+78	+158	4

A8U BRAKES – ON (tb-ON)

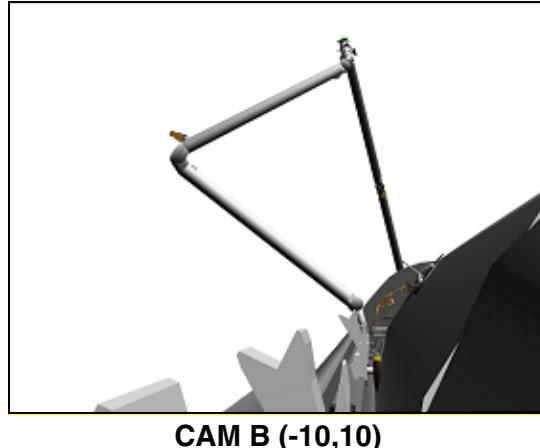
PGSC On MCC GO,
 ‘Scanning’ ‘Detailed Area Scan’
 sel – Nose Cap Scan
 sel – Start Area Scan (verify scan complete on PGSC)



ELBOW (-45,-20)



RSC



CAM B (-10,10)

- RHC 4. ACAS, SECTION 1
 RATE – VERN (RATE MIN tb-ON)

For camera views, refer to OBSS LCS NOSE CAP SURVEY CAMERA VIEWS – NOSE CAP (INSPECTION and REPAIR REFERENCE DATA), 5-TBD

NOTE

If cannot get AUTO READY lt, OCAS to ACAS start posn

- A8U BRAKES – OFF (tb-OFF)
 MODE – AUTO 2, ENTER (READY lt on)

SM 94 PDRS CONTROL

√START PT, ITEM 17: 1

SM 169 PDRS STATUS

Monitor ACAS progress

NOTE

Time between Pts 1 and 2 ~ 5:50 min

Section 1 Clearance Views	Cameras
SRMS-Orbiter	CAM B/C
OBSS-Orbiter	ELBOW/RSC

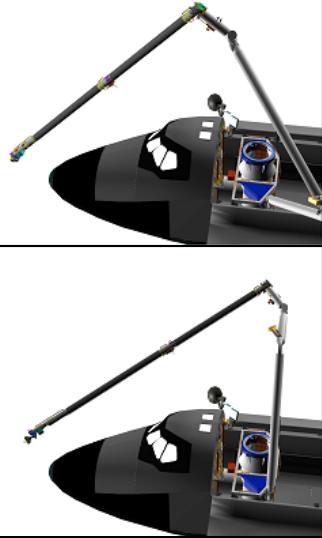
* If RSC failed:

* To regain OBSS to PLBD clearance view at any time during *

* ACAS, perform CONTINGENCY LCS CLEARANCE VIEW *

A8U On MCC GO,
AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
1P	-190	-12	-401	+250	+78	+158	
2P	-199	+65	-375	+92	+33	+308	



PGSC On MCC GO,
 ‘Scanning’ ‘Detailed Area Scan’
 sel – Nose Cap Scan
 sel – Start Area Scan (verify scan complete on PGSC)

5. ACAS, SECTION 2

NOTE

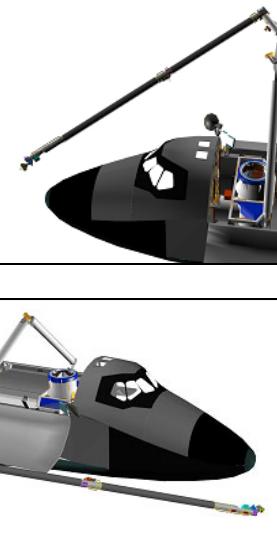
Between Pts 2 and 4, OBSS maneuvers to next survey position. **Time between Pts 2 and 4 ~13:30 min**

Section 2 Clearance Views	Cameras
SRMS-Orbiter	CAM B/C
OBSS-Orbiter	ELBOW/RSC

A8U

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
2P	-199	+65	-375	+92	+33	+308	
3	-200	+77	-343	+105	+16	+305	
4P	-229	+71	-277	+128	+342	+309	



PGSC

On MCC GO,
 ‘Scanning’ ‘Detailed Area Scan’
 sel – Nose Cap Scan
 sel – Start Area Scan (verify scan complete on PGSC)

6. ACAS, SECTION 3

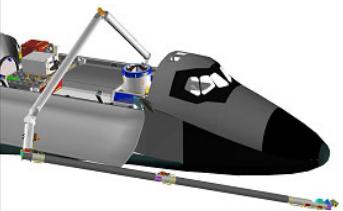
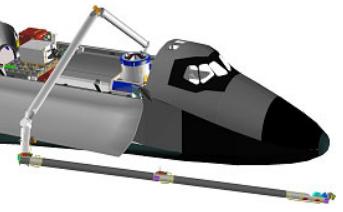
NOTE

Between Pts 4 and 5, OBSS maneuvers to next survey position. Time between Pts 4 and 5 ~13:30 min

Section 3 Clearance Views	Cameras
SRMS-Orbiter	CAM A/C
OBSS-Orbiter	ELBOW/RSC

A8U

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
4P	-229	+71	-277	+128	+342	+309	
5P	-235	+64	-265	+128	+342	+311	

A8U

BRAKES – ON (tb-ON)

PGSC

On MCC GO,
 ‘Scanning’ ‘Detailed Area Scan’
 sel – Nose Cap Scan
 sel – Start Area Scan (verify scan complete on PGSC)

7. MNVR TO ACAS START POSITION

MON 1	TBD
MON 2	TBD

RHC
A8U

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

Mnvr to ACAS START posn:

	SY	SP	EP	WP	WY	WR
Nose Pnt 5	-92.0	+15.5	-58.5	-15.4	-20.4	-107.1
1: SP +		+88.2				
2: WR +						+132.6
3: WY +					+31.6	
4: SY +	+102.6					
5: WP +				+37.8		
6: EP –			-114.4			
ACAS Start	+102.6	+88.2	-114.4	+37.8	+31.6	+132.6
	X	Y	Z	PITCH	YAW	ROLL
	-197	-68	-330	+284	+7	+134
						PL ID
						4

BRAKES – ON (tb-ON)

PGSC On MCC GO,
‘Scanning’ ‘Detailed Area Scan’
sel – Nose Cap Scan
sel – Start Area Scan (verify scan complete on PGSC)

RHC 8. ACAS, SECTION 4
RATE – VERN (RATE MIN tb-ON)

NOTE

If cannot get AUTO READY lt, OCAS to ACAS start posn

A8U BRAKES – OFF (tb-OFF)
MODE – AUTO 2, ENTER (READY lt on)

SM 94 PDRS CONTROL
✓START PT, ITEM 17: 6

SM 169 PDRS STATUS
Monitor ACAS progress

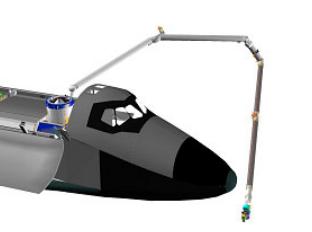
NOTE

Time between Pts 6 and 8 ~ 9:00 min

Section 4 Clearance Views	Cameras
SRMS-Orbiter	CAM A/B
OBSS-Orbiter	RSC/ELBOW

A8U

On MCC GO,
AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
6	-197	-68	-330	+284	+7	+134	
7	-201	-64	-297	+301	0	+143	
8P	-229	-38	-257	+330	+356	+159	

PGSC

On MCC GO,
'Scanning' 'Detailed Area Scan'
sel – Nose Cap Scan
sel – Start Area Scan (verify scan complete on PGSC)

9. ACAS, SECTION 5

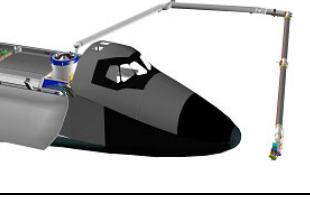
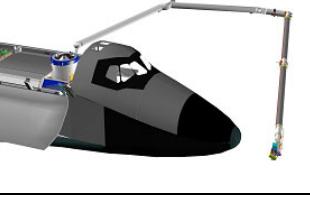
NOTE

Time between Pts 8 and 10 ~ 21:15 min

Section 5 Clearance Views	Cameras
SRMS-Orbiter	CAM A/B
OBSS-Orbiter	RSC/ELBOW

A8U

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
8P	-229	-38	-257	+330	+356	+159	
9	-191	-28	-285	+304	+3	+161	
10P	-170	-11	-323	+279	+9	+165	

A8U

BRAKES – ON (tb-ON)

PGSC

On MCC GO,
 ‘Scanning’ ‘Detailed Area Scan’
 sel – Nose Cap Scan
 sel – Start Area Scan (verify scan complete on PGSC)

OBSS LCS RCC SURVEY – PORT

WARNING
Port PLBD radiator must be stowed

1. SETUP

MON 1	Elbow
MON 2	A/B

SM 94 PDRS CONTROL

- ✓ PL ID – ITEM 3: 2
- ✓ INIT ID – ITEM 24: 2

RHC
A8U

2. MNVR TO ACAS START POSITION

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

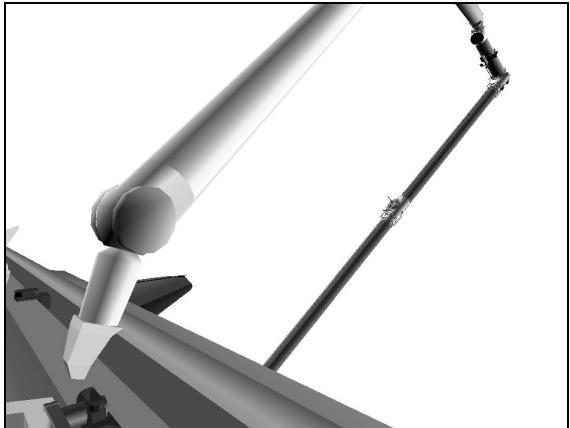
	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-804	-721	-47	0	68	326	2
	SY	SP	EP	WP	WY	WR	
✓	+84.2	+8.1	-67.9	+0.3	+35.2	0.0	

Mnvr to ACAS START posn:

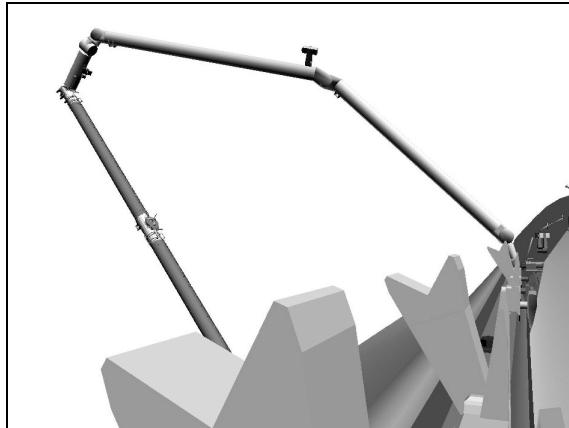
Nose Jet Clear
1: SY –
2: SP +
3: WP +
4: WY –
5: WR –
6: EP –
ACAS Start

	SY	SP	EP	WP	WY	WR	
	+84.2	+8.1	-67.9	+0.3	+35.2	0.0	
1: SY –	+79.1						
2: SP +		+45.1					
3: WP +				+53.4			
4: WY –					+0.1		
5: WR –						-88.6	
6: EP –			-73.6				
ACAS Start	+79.1	+45.1	-73.6	+53.4	+0.1	-88.6	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-1079	-556	-274	345	352	262	2

BRAKES – ON (tb-ON)



CCTV A (42,0)



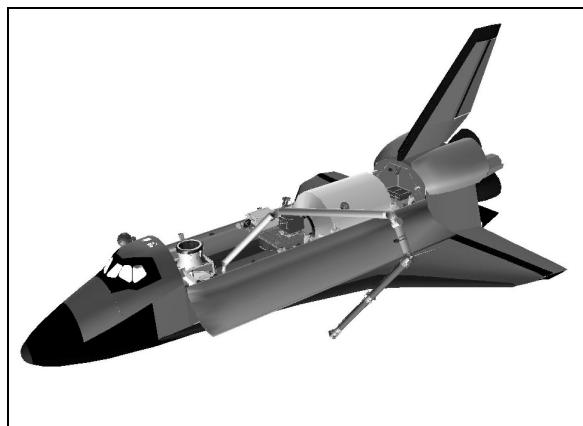
CCTV B (-23,2)



ELBOW (-96,-25)



RSC



BIRD'S EYE

3. ACAS, SECTION 1

NOTE

Section 1 scans underside of RCC from Panel 22 through 14

SM 94 PDRS CONTROL

PL ID – ITEM 3 +4 EXEC
INIT ID – ITEM 24 +4 EXEC

	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-892	-220	-234	1	17	135	4
	SY	SP	EP	WP	WY	WR	
✓	+74.5	+63.2	-31.6	-61.0	+25.1	+220.6	

RHC √RATE – VERN (RATE MIN tb-ON)

NOTE

If cannot get AUTO READY lt, OCAS to ACAS start posn

A8U BRAKES – OFF (tb-OFF)
MODE – AUTO 3, ENTER (READY lt on)

SM 94 PDRS CONTROL

√START PT, ITEM 17: **TBD**

SM 169 PDRS STATUS

Monitor ACAS progress

NOTE

Time between Pts **1** and **2** ~ 1:10 min

Port LCS Clearance Views	Cameras
RMS upper boom to PLBD	A, B
OBSS to PLBD	ELBOW
OBSS to Wing	ELBOW, RSC

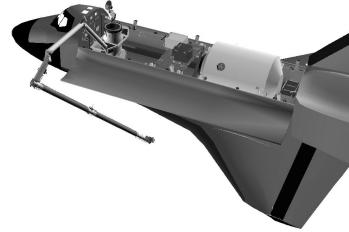
PGSC On MCC GO,
‘Scanning’ ‘Continuous Line Scan’
sel – Port Lower Scan
sel – Start Line Scan (verify scan progress on PGSC)

A8U

AUTO SEQ – PROCEED (IN PROG It on)

ACAS, pause pts **shaded in bold**, • col indicates data recording

Pt	X	Y	Z	PITCH	YAW	ROLL	•
1P	-892	-220	-234	1	17	135	
2P	-1040	-258	-220	8	41	140	



A8U
PGSCWhen AUTO SEQ READY It – on,
'Scanning'
sel – Stop Scan4. ACAS, SECTION 2NOTE

Time between Pts 2 and 3 ~ 1:45 min

A8U

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
2P	-1040	-258	-220	8	41	140	
3P	-1030	-241	-215	37	63	121	

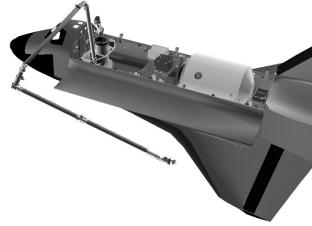



PGSC

When AUTO SEQ READY It – on,
'Scanning' 'Continuous Line Scan'
sel – Port Lower Scan
sel – Start Line Scan (verify scan progress on PGSC)

NOTE
Time between Pts 3 and 4 ~ 2:15 min

A8U AUTO SEQ – PROCEED (IN PROG It on)

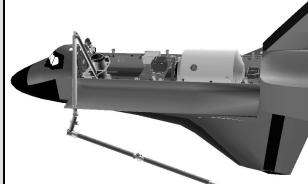
Pt	X	Y	Z	PITCH	YAW	ROLL	•
3P	-1030	-241	-215	37	63	121	
4P	-1255	-462	-228	34	64	120	

PGSC When AUTO SEQ READY It – on,
 'Scanning'
 sel – Stop Scan

5. ACAS, SECTION 3

NOTE
Time between Pts 4 and 5 ~ 0:55 min

A8U AUTO SEQ – PROCEED (IN PROG It on)

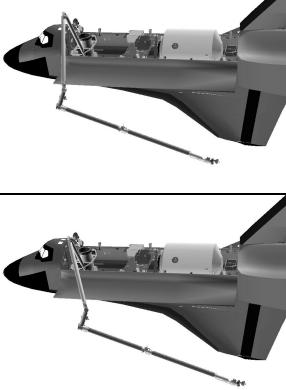
4P	-1255	-462	-228	34	64	120	
5P	-1248	-465	-231	70	65	90	

A8U PGSC When AUTO SEQ READY lt – on,
 ‘Scanning’ ‘Continuous Line Scan’
 sel – Port Mid Scan
 sel – Start Line Scan (verify scan progress on PGSC)

NOTE
 Time between Pts 5 and 6 ~ 0:55 min

A8U AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
5P	-1248	-465	-231	70	65	90	
6P	-1343	-496	-231	70	65	90	



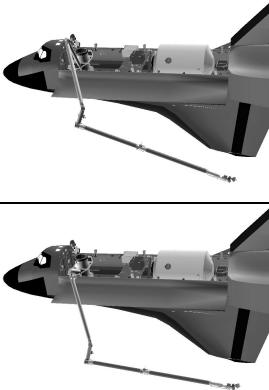
A8U PGSC When AUTO SEQ READY lt – on,
 ‘Scanning’
 sel – Stop Scan

6. ACAS, SECTION 4

NOTE
 Time between Pts 6 and 7 ~ 1:45 min

A8U AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
6P	-1343	-496	-231	70	65	90	
7P	-1359	-519	-244	98	45	79	



NOTE
Time between Pts 7 and 8 ~ 0:50 min

A8U When AUTO SEQ READY lt – on,
PGSC ‘Scanning’ ‘Continuous Line Scan’
 sel – Port Mid Scan
 sel – Start Line Scan (verify scan progress on PGSC)

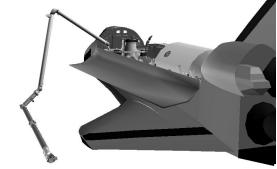
Pt	X	Y	Z	PITCH	YAW	ROLL	•
7P	-1359	-519	-244	98	45	79	
8P	-1279	-507	-244	98	45	79	

A8U When AUTO SEQ READY lt – on,
PGSC ‘Scanning’
 sel – Stop Scan

7. ACAS, SECTION 5

NOTE
Time between Pts 8 and 10 ~ 2:50 min

A8U AUTO SEQ – PROCEED (IN PROG lt on)

8P	-1279	-507	-244	98	45	79	
9	-1226	-527	-388	90	0	90	
10P	-1228	-415	-383	113	304	118	

A8U When AUTO SEQ READY lt – on,
PGSC ‘Scanning’ ‘Continuous Line Scan’
sel – Port Top Scan
sel – Start Line Scan (verify scan progress on PGSC)

NOTE
Time between Pts 10 and 11 ~ 0:55 min

A8U AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	
10P	-1228	-415	-383	113	304	118	
11P	-1292	-482	-381	113	304	118	

PGSC When AUTO SEQ READY lt – on,
‘Scanning’
sel – Stop Scan

8. ACAS, SECTION 6

NOTE
Time between Pts 11 and 12 ~ 0:45 min

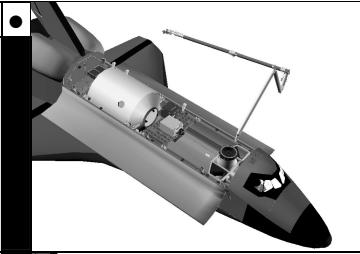
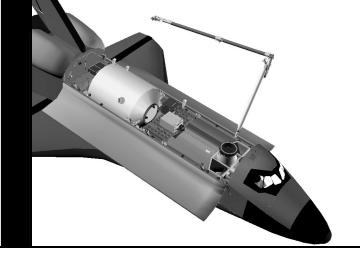
A8U AUTO SEQ – PROCEED (IN PROG lt on)

11P	-1292	-482	-381	113	304	118	
12P	-1283	-483	-382	90	300	98	

A8U When AUTO SEQ READY lt – on,
PGSC ‘Scanning’ ‘Continuous Line Scan’
 sel – Port Top Scan
 sel – Start Line Scan (verify scan progress on PGSC)

NOTE
Time between Pts 12 and 13 ~ 0:50 min

A8U AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
12P	-1283	-483	-382	90	300	98	
13P	-1368	-503	-383	90	300	98	

PGSC When AUTO SEQ READY lt – on,
 ‘Scanning’
 sel – Stop Scan

9. ACAS, SECTION 7

NOTE
Time between Pts 13 and 15 ~ 2:10 min

A8U AUTO SEQ – PROCEED (IN PROG lt on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
13P	-1368	-503	-383	90	300	98	
14	-1360	-517	-376	90	0	82	
15P	-1360	-544	-312	90	0	82	

A8U When AUTO SEQ READY lt – on,
PGSC ‘Scanning’ ‘Continuous Line Scan’
 sel – Port Top Scan
 sel – Start Line Scan (verify scan progress on PGSC)

NOTE
Time between Pts 15 and 16 ~ 1:05 min

A8U AUTO SEQ – PROCEED (IN PROG lt on)

15P	-1360	-544	-312	90	0	82	
16P	-1241	-517	-312	90	0	82	

A8U When AUTO SEQ READY lt – on,
PGSC ‘Scanning’
 sel – Stop Scan

10. ACAS, SECTION 8

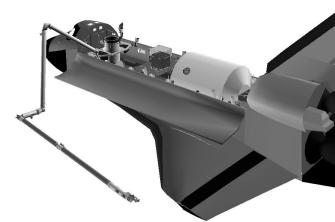
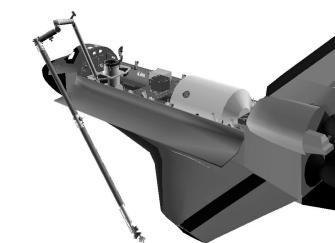
NOTE

Time between Pts 16 and 17 ~ 2:45 min

A8U

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
16P	-1241	-517	-312	90	0	82	
17P	-1243	-491	-262	44	51	86	

PGSC

When AUTO SEQ READY It – on,
 ‘Scanning’ ‘Continuous Line Scan’
 sel – Port Top Scan
 sel – Start Line Scan (verify scan progress on PGSC)

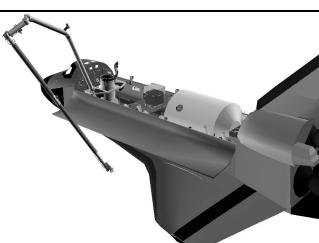
NOTE

Time between Pts 17 and 20 ~ 4:00 min

A8U

AUTO SEQ – PROCEED (IN PROG It on)

Pt	X	Y	Z	PITCH	YAW	ROLL	•
17P	-1243	-491	-262	44	51	86	
18	-1004	-265	-246	18	51	106	
19	-973	-260	-263	12	35	108	
20P	-888	-237	-256	0	16	120	

A8U When AUTO SEQ READY lt – on,
PGSC ‘Scanning’
sel - Stop Scan

11. MNVR TO OBSS HOVER/PARK POSITION

SM 94 PDRS CONTROL

PL ID – ITEM 3 +2 EXEC

INIT ID – ITEM 24 +2 EXEC

	X	Y	Z	PITCH	YAW	ROLL	PL ID
✓	-851	-361	-464	279	331	289	2
	SY	SP	EP	WP	WY	WR	
✓	+57.5	+82.6	-42.8	-55.8	+45.7	+217.1	

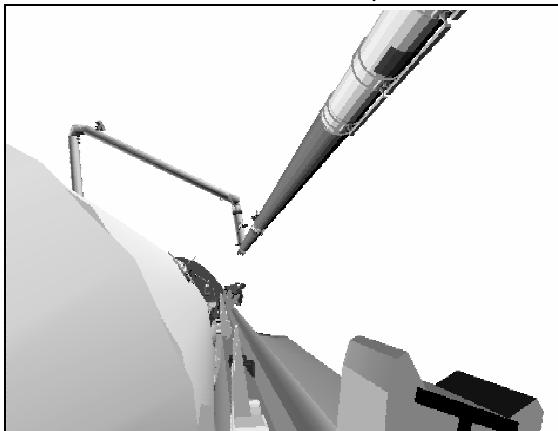
RHC ✓RATE – VERN (RATE MIN tb-ON)
A8U BRAKES – OFF (tb-OFF)
MODE – SINGLE, ENTER

Mnvr to OBSS HOVER posn:

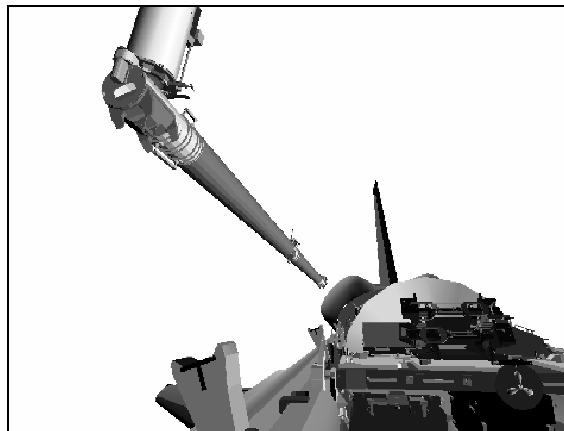
	SY	SP	EP	WP	WY	WR	
Port End	+57.5	+82.6	-42.8	-55.8	+45.7	+217.1	
1: WP +				-35.0			
2: SP +		+105.0					
3: WY -					0.0		
4: WR -						+109.9	
5: SY -	-89.9						
6: WP -				-56.2			
7: SP -		+79.7					
8: EP -			-122.9				
OBSS Hover	-89.9	+79.7	-122.9	-56.2	0.0	+109.9	
	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-998	+129	-507	0	0	10	2

A8U BRAKES – ON (tb-ON)

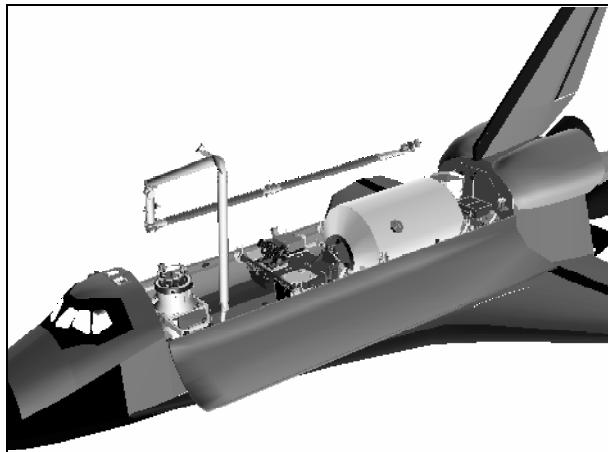
OBSS HOVER posn:



CCTV C (10,10)



CCTV D (-10,15)



BIRD'S EYE

A8U

BRAKES – ON (tb-ON)
✓MODE – not DIRECT
JOINT – CRIT TEMP

EVA 1

EVA 1 PICKUP	FS 3-2
SUPPORT	FS 3-4
DROPOFF	FS 3-5

EVA 1

EVA 1 PICKUP

1. SETUP

SM 94 PDRS CONTROL

✓PL ID, ITEM 3: 2

✓INIT ID, ITEM 24: 2

2. PAD INSTALL POSN

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – as desired

Mnvr to PAD INSTALL posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
						2
SY	SP	EP	WP	WY	WR	

TBD

TBD

EVA 1

BRAKES – ON (tb-ON)

3. PAD INGRESS

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – as desired

Mnvr to PAD INGRESS posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
						2
SY	SP	EP	WP	WY	WR	5

TBD

TBD

BRAKES – ON (tb-ON)

EVA 1 SUPPORT

1. SETUP

SM 94 PDRS CONTROL

✓PL ID, ITEM 3: 2

✓INIT ID, ITEM 24: 2

2. EVA DTO POSN

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – as desired

Mnvr to EVA DTO posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
						2
						5
SY	SP	EP	WP	WY	WR	

TBD

TBD

BRAKES – ON (tb-ON)

EVA 1 DROPOFF

1. SETUP

SM 94 PDRS CONTROL

✓PL ID, ITEM 3: 2

✓INIT ID, ITEM 24: 2

2. PAD EGRESS POSN

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – as desired

Mnvr to PAD EGRESS posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
						2
						5
SY	SP	EP	WP	WY	WR	

TBD

TBD

BRAKES – ON (tb-ON)

3. PAD UNINSTALL

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – as desired

Mnvr to PAD UNINSTALL posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
						2
						5
SY	SP	EP	WP	WY	WR	

TBD

TBD

BRAKES – ON (tb-ON)

4. STOW

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – as desired

Mnvr to STOW posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
						2
SY	SP	EP	WP	WY	WR	

TBD

TBD

BRAKES – ON (tb-ON)

OBSS CONTINGENCY

(TBS)

OBSS
CONTINGENCY

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ORBITER REPAIR

ORBITER REPAIR MANEUVER (ORM) DTO.....	FS 5-2
ORBITER REPAIR MANEUVER (CONTINGENCY)	FS 5-8
REVERSE ORBITER REPAIR MANEUVER (CONTINGENCY)	FS 5-13

ORBITER
REPAIR

ORBITER REPAIR MANEUVER (ORM) DTO

1. SETUP

MON 1	Elbow(EE)
MON 2	CAM C

SM 94 PDRS CONTROL

✓PL ID, ITEM 3: 0

✓INIT ID, ITEM 24: 0

2. MANEUVER TO PRE-GRAPPLE

A8U

RATE – as desired (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – as desired

Mnvr to PMA2 PRE-GRAPPLE posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-724	-71	-562	214	330	291	0
SY	SP	EP	WP	WY	WR	
-33.9	+131.6	-141.8	-114.0	-41.0	-4.1	

BRAKES – ON (tb-ON)

✓MODE – not DIRECT

3. ODS POWERUP

Perform DOCKING MECHANISM POWERUP (RNDZ, APDS)

Perform UNDOCKING PREP (RNDZ, APDS)

4. RECAPTURE ODS INTERFACE

SM 167 DOCKING STATUS

A7L

CLOSE LATCHES pb – push

✓LAT OP It – off

✓CL It – on

APDS CIRC PROT OFF pb – push (It on)

FIXER OFF pb – push (It on)

NOTE

APDS must be powered off within 10 sec of Capture to prevent the capture latches from automatically reopening

RING OUT pb – push

✓FNL POS It – off

When CAPTURE It – on, immediately:

PWR OFF pb – push

ON pb – push

✓CAPTURE It – off

✓LAT CL It – on

RING IN pb – push

PWR ON pb – push

00:10

5. CONFIGURE ISS ATTITUDE CONTROL
TBD
6. OPEN ODS HOOKS
A7L APDS CIRC PROT OFF pb – push (lt on)
OPEN HOOKS pb – push
00:00 CRT ✓HOOKS 1,2 DRV CMD (two) – ON
02:30 A7L ✓HOOKS 1,2 OP Its (two) – on
- 00:00 CRT 7. EXTEND RING
00:00 RING OUT pb – push
✓FNL POS lt – off
CRT ✓DRV CMD – ON
✓FIXERS – ON
✓PETAL POS BASE (three) incr
03:40 A7L ✓RING INIT POS lt – on
CRT ✓PETAL POS BASE (three): $76 \pm 3\%$
03:50 ✓CLUTCH – blank/SLIP
When no relative motion [PETAL POS BASE (three) not changing for 60 sec], proceed with step 8

8. GRAPPLE PMA2

MON 1	EE(Elbow)
MON 2	CAM C

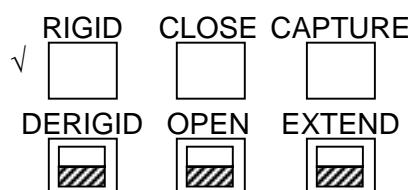
A7U CCTV – config for grapple
– install PDRS TARGET OVERLAY FOR CTVM
– RMS WRIST, zoom 34.0 HFOV
focus 5 ft
Maintain eyepoint ~18 in when using grapple overlay

A8U RATE – VERN (RATE MIN tb-ON)
BRAKES – OFF (tb-OFF)
MODE – END EFF, ENTER

Mnvr to grapple envelope

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

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
BRAKES – ON (tb-ON)

SM 94 PDRS CONTROL

PL ID – ITEM 3 +4 EXEC

INIT ID – ITEM 24 +4 EXEC

PMA2 GRAPPLE posn:

	X	Y	Z	PITCH	YAW	ROLL	PL ID
Expected	-649	0	-475	0	0	0	4
	SY	SP	EP	WP	WY	WR	
Expected	-61.0	+138.3	-151.5	-84.0	-51.0	+32.7	

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

- A7L 9. OPEN CAPTURE LATCHES

OPEN LATCHES pb – push
 ✓LAT CL It – off
 ✓OP It – on
 PWR OFF pb – push

- A8U 10. MANEUVER TO SEPARATION POSITION

RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – ORB LD, ENTER

MON 1	CAM A
MON 2	CAM C

Mnvr to SEPARATION posn:

	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-649	0	-595	0	0	0	4
	SY	SP	EP	WP	WY	WR	
	-70.1	+129.5	-124.8	-90.7	-51.3	+47.1	

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

11. OCAS TO UNDOCKED POSITION

SM 94 PDRS CONTROL

PL ID – ITEM 3 +5 EXEC

INIT ID – ITEM 24 +5 EXEC

Load OPR CMD (Items 18-23, 25)

 -681, -41, -652, 214, 330, 290

A8U RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – ORB LD, ENTER

✓AUTO SEQ READY It – ON
 AUTO SEQ – PRO

When AUTO SEQ IN PROG It – OFF:

BRAKES – ON

✓MODE – not DIRECT

✓UNDOCKED posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-679	-42	-729	215	330	290	5
SY	SP	EP	WP	WY	WR	
-76.4	+120.9	-105.1	-96.0	-49.7	+53.7	

12. CONFIGURE ISS ATTITUDE CONTROL
TBD

- A7L 13. RECONFIGURE ODS
PWR ON pb – push
CLOSE LATCHES pb – push
✓LAT OP It – off
✓CL It – on

14. ODS POWERDOWN
Perform DOCKING MECHANISM POWERDOWN (RNDZ, APDS)

15. ORM DTO OBJECTIVES
TBD

16. ODS POWERUP
Perform DOCKING MECHANISM POWERUP (RNDZ, APDS)

17. CONFIGURE ISS ATTITUDE CONTROL
TBD

18. MANEUVER TO ODS CAPTURE POSITION

SM 94 PDRS CONTROL

PL ID – ITEM 3 +4 EXEC
INIT ID – ITEM 24 +4 EXEC

- A8U RATE – VERN (RATE MIN tb-ON)
BRAKES – OFF (tb-OFF)
MODE – ORB LD, ENTER

MON 1	CAM A
MON 2	CAM C

Mnvr to CAPTURE posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-649	0	-471	0	0	0	4
SY	SP	EP	WP	WY	WR	
-60.7	+138.3	-152.3	-83.8	-51.0	+32.0	

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

19. ODS CAPTURE

Perform DOCKING PREP (RNDZ, APDS)

After the PCT or equivalent has caused capture,
perform DOCKING SEQUENCE CUE CARD (RNDZ), steps 1-3

20. RELEASE PMA2

MON 1	EE(Elbow)
MON 2	CAM C

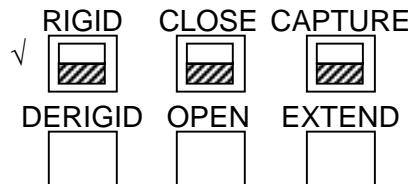
A8U

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

CAUTION
Monitor EE tb timing to prevent EE motor burnout

EE MODE – AUTO
RELEASE sw – depress (mom)

Mnvr 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 required:
- * 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 *
- * BRAKES – ON (tb-ON) *

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

21. RETRACT RING AND CLOSE ODS HOOKS

Perform DOCKING SEQUENCE CUE CARD (RNDZ), starting in step 4

22. CONFIGURE ISS ATTITUDE CONTROL
TBD

23. MANEUVER TO PRE-CRADLE POSITION

SM 94 PDRS CONTROL

PL ID – ITEM 3 +0 EXEC

INIT ID – ITEM 24 +0 EXEC

A8U RATE – as desired (VERN within 10 ft)
BRAKES – OFF (tb-OFF)
MODE – as desired

Mnvr to 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	+25	-25	+5	0	0	

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

24. ODS POWERDOWN
Go to DOCKING MECHANISM POWERDOWN (RNDZ, APDS)

ORBITER REPAIR MANEUVER (CONTINGENCY)

1. SETUP

MON 1	Elbow(EE)
MON 2	CAM C

SM 94 PDRS CONTROL

- ✓PL ID, ITEM 3: 0
- ✓INIT ID, ITEM 24: 0

2. MANEUVER TO PRE-GRAPPLE

A8U

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

Mnvr to PMA2 PRE-GRAPPLE posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-724	-71	-562	214	330	291	0
SY	SP	EP	WP	WY	WR	
-33.9	+131.6	-141.8	-114.0	-41.0	-4.1	

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

3. ODS POWERUP

Perform DOCKING MECHANISM POWERUP (RNDZ, APDS)
Perform UNDOCKING PREP (RNDZ, APDS)

4. RECAPTURE ODS INTERFACE

SM 167 DOCKING STATUS

A7L

CLOSE LATCHES pb – push
✓LAT OP It – off
✓CL It – on
APDS CIRC PROT OFF pb – push (It on)
FIXER OFF pb – push (It on)

NOTE

APDS must be powered off within 10 sec of Capture to prevent the capture latches from automatically reopening

RING OUT pb – push
✓FNL POS It – off

When CAPTURE It – on, immediately:

PWR OFF pb – push
ON pb – push
✓CAPTURE It – off
✓LAT CL It – on
RING IN pb – push
PWR ON pb – push

00:10

5. CONFIGURE ISS ATTITUDE CONTROL TBD

6. OPEN ODS HOOKS
- 00:00 A7L APDS CIRC PROT OFF pb – push (lt on)
CRT OPEN HOOKS pb – push
02:30 A7L √HOOKS 1,2 DRV CMD (two) – ON
√HOOKS 1,2 OP Its (two) – on
7. EXTEND RING
- 00:00 RING OUT pb – push
√FNL POS lt – off
CRT √DRV CMD – ON
√FIXERS – ON
√PETAL POS BASE (three) incr
03:40 A7L √RING INIT POS lt – on
CRT √PETAL POS BASE (three): $76 \pm 3\%$
√CLUTCH – blank/SLIP
When no relative motion [PETAL POS BASE (three) not changing for 60 sec], proceed with step 8

8. GRAPPLE PMA2

MON 1	EE(Elbow)
MON 2	CAM C

A7U CCTV – config for grapple
– install PDRS TARGET OVERLAY FOR CTVM
– RMS WRIST, zoom 34.0 HFOV
focus 5 ft

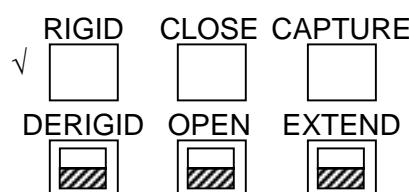
Maintain eyepoint ~18 in when using grapple overlay

A8U 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

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
BRAKES – ON (tb-ON)

SM 94 PDRS CONTROL
PL ID – ITEM 3 +4 EXEC
INIT ID – ITEM 24 +4 EXEC

PMA2 GRAPPLE posn:

	X	Y	Z	PITCH	YAW	ROLL	PL ID
Expected	-649	0	-475	0	0	0	4
	SY	SP	EP	WP	WY	WR	
Expected	-61.0	+138.3	-151.5	-84.0	-51.0	+32.7	

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

- A7L 9. OPEN CAPTURE LATCHES
 OPEN LATCHES pb – push
 √LAT CL It – off
 √OP It – on
 PWR OFF pb – push

- A8U 10. MANEUVER TO UNDOCKED POSITION
 RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – ORB LD, ENTER

MON 1	CAM A
MON 2	CAM C

Mnvr to UNDOCKED posn:

	X	Y	Z	PITCH	YAW	ROLL	PL ID
	-648	-1	-671	0	0	0	4
	SY	SP	EP	WP	WY	WR	
	-74.6	+120.9	-105.1	-96.0	-49.7	+53.7	

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

11. CONFIGURE ISS ATTITUDE CONTROL
 TBD

12. AUTO SEQUENCE TO OVERNIGHT PARK POSITION

MON 1	CAM A
MON 2	CAM C

SM 94 PDRS CONTROL
 PL ID – ITEM 3 +5 EXEC
 INIT ID – ITEM 24 +5 EXEC
 AUTO MODE 1 – ITEM 13 +1 EXEC

- A8U RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – AUTO 1, ENTER

SM 94 PDRS CONTROL

√START PT, ITEM 17: 1

√READY It – ON
 AUTO SEQ – PROCEED (IN PROG It on)

Auto Pos #	X/ SY	Y/ SP	Z/ EP	PITCH/ WP	YAW/ WY	ROLL/ WR	PL ID
1	-679	-42	-729	215	330	290	5
	-74.6	+120.9	-105.1	-96.0	-49.7	+53.7	
2	-783	15	-732	236	291	327	5
	-55.6	+110.6	-103.8	-55.3	-37.5	+83.7	
3	-1082	-104	-722	324	293	66	5
	-7.7	+65.3	-50.2	-66.0	-47.7	+69.5	
4	-1017	-394	-694	354	331	107	5
	+36.0	+70.4	-46.3	-52.7	-58.4	+87.9	
5	-1003	-394	-637	347	356	124	5
	+37.3	+80.5	-71.7	-25.7	-35.8	+115.0	
6	-605	-340	-548	318	23	193	5
	+126.4	+112.5	-117.1	-78.5	-63.1	+92.9	
7	-364	-340	-489	280	10	257	5
	+151.5	+69.4	-80.5	-73.4	-30.7	+126.6	
8	-375	-194	-589	215	338	284	5
	+170.6	+96.7	-105.9	-31.7	+17.6	146.4	

✓READY lt – ON
 BRAKES – ON (tb-ON)
 ✓MODE – not DIRECT
 PARAM – PORT TEMP
 JOINT – CRIT TEMP

- A7L 13. RECONFIGURE ODS
 PWR ON pb – push
 CLOSE LATCHES pb – push
 ✓LAT OP lt – off
 ✓CL lt – on
14. ODS POWERDOWN
 Perform DOCKING MECHANISM POWERDOWN (RNDZ, APDS)
15. CONFIGURE ISS ATTITUDE CONTROL
 TBD
16. ORBITER OVERNIGHT PARK CONFIGURATION
 TBD
17. CONFIGURE ISS ATTITUDE CONTROL
 TBD
18. AUTO SEQUENCE TO REPAIR POSITION

MON 1	CAM A
MON 2	CAM C

SM 94 PDRS CONTROL

 ✓PL ID, ITEM 3: 5
 ✓INIT ID, ITEM 24: 5
 ✓AUTO MODE 1, ITEM 13: 1

A8U RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – AUTO 1, ENTER

SM 94 PDRS CONTROL
 START PT – ITEM 17 +8 EXEC

✓READY lt – ON
 AUTO SEQ – PROCEED (IN PROG lt on)

Auto Pos #	X/ SY	Y/ SP	Z/ EP	PITCH/ WP	YAW/ WY	ROLL/ WR	PL ID
8	-375	-194	-589	215	338	284	5
	+170.6	+96.7	-105.9	-31.7	+17.6	146.4	
9	-158	-151	-381	206	345	273	5
	+171.9	+31.0	-61.0	+0.1	+13.0	+134.6	
10	-158	-151	-248	248	345	273	5
	+168.4	+3.5	-28.3	-44.2	+1.0	+130.9	
11	-340	-151	-109	279	345	273	5
	+156.9	+5.2	-68.6	-32.9	-7.3	+133.0	
12	-498	-120	-97	315	315	287	5
	+143.4	+2.7	-89.4	-47.7	+6.0	+140.8	
13	-852	-165	-158	341	330	290	5
	+53.4	+16.3	-115.4	+32.4	-61.6	+237.4	

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

19. CONFIGURE ISS ATTITUDE CONTROL
 TBD
20. ORBITER REPAIR CONFIGURATION
 TBD

REVERSE ORBITER REPAIR MANEUVER (CONTINGENCY)

1. SETUP

MON 1	Elbow
MON 2	CAM B

SM 94 PDRS CONTROL

- ✓PL ID, ITEM 3: 5
- ✓INIT ID, ITEM 24: 5

2. CONFIGURE ISS ATTITUDE CONTROL TBD

3. MANEUVER BACK TO REPAIR START POSITION

- ✓REPAIR posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-852	-165	-158	341	330	290	5
SY	SP	EP	WP	WY	WR	
+53.4	+16.3	-115.4	+32.4	-61.6	+237.4	

If not within 1"/1° of REPAIR posn:

Load OPR CMD (Items 18-23, 25)

-852, -165, -158, 341, 330, 290

A8U ✓RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – OPR CMD, ENTER

✓AUTO SEQ READY lt – ON
– PRO

When AUTO SEQ IN PROG lt – OFF:
BRAKES – ON
✓MODE – not DIRECT

4. AUTO SEQUENCE TO OVERNIGHT PARK POSITION

SM 94 PDRS CONTROL

AUTO MODE 2 – ITEM 13 +2 EXEC

A8U RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – AUTO 2, ENTER

SM 94 PDRS CONTROL

- ✓START PT, ITEM 17: 1

✓READY lt – ON
AUTO SEQ – PROCEED (IN PROG lt on)

Auto Pos #	X/ SY	Y/ SP	Z/ EP	PITCH/ WP	YAW/ WY	ROLL/ WR	PL ID
1	-852	-165	-158	341	330	290	5
	+53.4	+16.3	-115.4	+32.4	-61.6	+237.4	
2	-498	-120	-97	315	315	287	5
	+143.4	+2.7	-89.4	-47.7	+6.0	+140.8	
3	-340	-151	-109	279	345	273	5
	+156.9	+5.2	-68.6	-32.9	-7.3	+133.0	
4	-158	-151	-248	248	345	273	5
	+168.4	+3.5	-28.3	-44.2	+1.0	+130.9	
5	-158	-151	-381	206	345	273	5
	+171.9	+31.0	-61.0	+0.1	+13.0	+134.6	
6	-375	-194	-589	215	338	284	5
	+170.6	+96.7	-105.9	-31.7	+17.6	146.4	

✓READY It – ON
 BRAKES – ON (tb-ON)
 ✓MODE – not DIRECT
 PARAM – PORT TEMP
 JOINT – CRIT TEMP

5. CONFIGURE ISS ATTITUDE CONTROL
TBD
6. ORBITER OVERNIGHT PARK CONFIGURATION
TBD
7. CONFIGURE ISS ATTITUDE CONTROL
TBD
8. AUTO SEQUENCE TO UNDOCKED POSITION

MON 1	Elbow
MON 2	CAM B

SM 94 PDRS CONTROL
 ✓PL ID, ITEM 3: 5
 ✓INIT ID, ITEM 24: 5
 AUTO MODE 2, ITEM 13: 2

A8U RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – AUTO 2, ENTER

SM 94 PDRS CONTROL
 START PT – ITEM 17 +6 EXEC

✓READY It – ON
 AUTO SEQ – PROCEED (IN PROG It on)

Auto Pos #	X/ SY	Y/ SP	Z/ EP	PITCH/ WP	YAW/ WY	ROLL/ WR	PL ID
6	-375	-194	-589	215	338	284	5
	+170.6	+96.7	-105.9	-31.7	+17.6	146.4	
7	-364	-340	-489	280.0	10.1	257.4	5
	+151.5	+69.4	-80.5	-73.4	-30.7	+126.6	
8	-605	-340	-548	318.1	23.0	193.4	5
	+126.4	+112.5	-117.1	-78.5	-63.1	+92.9	
9	-1003	-394	-637	347.0	355.8	124.1	5
	+37.3	+80.5	-71.7	-25.7	-35.8	+115.0	
10	-1017	-394	-694	353.7	331.4	107.4	5
	+36.0	+70.4	-46.3	-52.7	-58.4	+87.9	
11	-1082	-104	-722	324.5	293.2	66.0	5
	-7.7	+65.3	-50.2	-66.0	-47.7	+69.5	
12	-783	15	-732	235.7	291.3	326.9	5
	-55.6	+110.6	-103.8	-55.3	-37.5	+83.7	
13	-679	-42	-729	215.2	329.7	289.9	5
	-74.6	+120.9	-105.1	-96.0	-49.7	+53.7	

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

9. ODS POWERUP

Perform DOCKING MECHANISM POWERUP (RNDZ, APDS)

10. CONFIGURE ISS ATTITUDE CONTROL

TBD

11. MANEUVER TO ODS CAPTURE POSITION

SM 94 PDRS CONTROL

PL ID – ITEM 3 +4 EXEC

INIT ID – ITEM 24 +4 EXEC

A8U RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – ORB LD, ENTER

MON 1	CAM A
MON 2	CAM C

Mnvr to CAPTURE posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-649	0	-471	0	0	0	4
SY	SP	EP	WP	WY	WR	
-60.7	+138.3	-152.3	-83.8	-51.0	+32.0	

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

12. ODS CAPTURE

Perform DOCKING PREP (RNDZ, APDS)

After the PCT or equivalent has caused capture,
 perform DOCKING SEQUENCE CUE CARD (RNDZ), steps 1-3

13. RELEASE PMA2

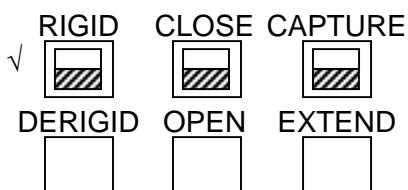
MON 1	EE(Elbow)
MON 2	CAM C

A8U RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – END EFF, ENTER

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

EE MODE – AUTO
 RELEASE sw – depress (mom)

Mnvr 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 *
- * BRAKES – ON (tb-ON) *

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

14. RETRACT RING AND CLOSE ODS HOOKS

Perform DOCKING SEQUENCE CUE CARD (RNDZ), starting in step 4

15. CONFIGURE ISS ATTITUDE CONTROL
 TBD

16. MANEUVER TO PRE-CRADLE POSITION

SM 94 PDRS CONTROL

PL ID – ITEM 3 +0 EXEC

INIT ID – ITEM 24 +0 EXEC

A8U RATE – as desired (VERN within 10 ft)
 BRAKES – OFF (tb-OFF)
 MODE – as desired

Mnvr to 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	+25	-25	+5	0	0	

BRAKES – ON (tb-ON)

✓MODE – not DIRECT

17. ODS POWERDOWN

Go to DOCKING MECHANISM POWERDOWN (RNDZ, APDS)

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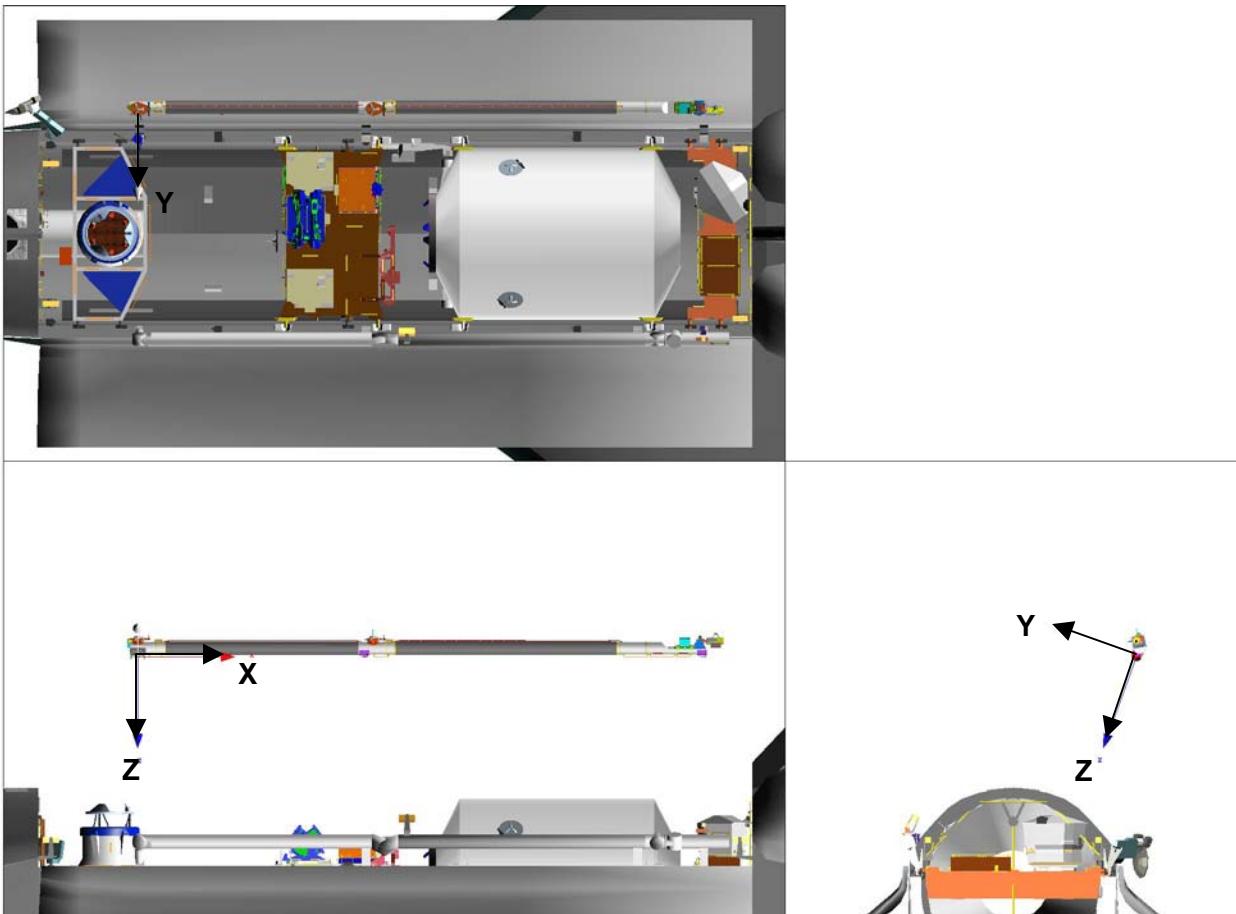
INSPECTION AND REPAIR REFERENCE DATA

OBSS JOINT ANGLES VS POR COORDINATES (TBS)	
AUTO SEQUENCES (TBS)	
COORDINATE SYSTEM – PL ID 1 OBSS UNBERTH/BERTH.....	FS 6-2
2 OBSS BOOM MNVRS	FS 6-3
3 LDRI SURVEYS.....	FS 6-4
4 LCS SURVEYS	FS 6-5
GO/NO-GO CRITERIA (TBS)	
ATTITUDE CONTROL CONSTRAINTS (TBS)	
SRMS EE CAM JOINT ANGLES VS POR COORDINATES (TBS)	
AUTO SEQUENCE (TBS)	
COORDINATE SYSTEM – PL ID 5 (TBS)	
EVA SUPPORT JOINT ANGLES VS POR COORDINATES (TBS)	
COORDINATE SYSTEM – PL ID 5A (UPLINK) (TBS)	
ORM JOINT ANGLES VS POR COORDINATES.....	FS 6-6
AUTO SEQUENCES	FS 6-7
COORDINATE SYSTEM – PL ID 4B (UPLINK) (TBS)	
5B (UPLINK) (TBS)	
GO/NO-GO CRITERIA (TBS)	
ATTITUDE CONTROL CONSTRAINTS (TBS)	

INSPECTION AND REPAIR REFERENCE DATA

OBSS JOINT ANGLES VS POR COORDINATES (TBS)	
AUTO SEQUENCES (TBS)	
COORDINATE SYSTEM – PL ID 1 OBSS UNBERTH/BERTH.....	FS 6-2
2 OBSS BOOM MNVRS	FS 6-3
3 LDRI SURVEYS.....	FS 6-4
4 LCS SURVEYS	FS 6-5
GO/NO-GO CRITERIA (TBS)	
ATTITUDE CONTROL CONSTRAINTS (TBS)	
SRMS EE CAM JOINT ANGLES VS POR COORDINATES (TBS)	
AUTO SEQUENCE (TBS)	
COORDINATE SYSTEM – PL ID 5 (TBS)	
EVA SUPPORT JOINT ANGLES VS POR COORDINATES (TBS)	
COORDINATE SYSTEM – PL ID 5A (UPLINK) (TBS)	
ORM JOINT ANGLES VS POR COORDINATES.....	FS 6-6
AUTO SEQUENCES	FS 6-7
COORDINATE SYSTEM – PL ID 4B (UPLINK) (TBS)	
5B (UPLINK) (TBS)	
GO/NO-GO CRITERIA (TBS)	
ATTITUDE CONTROL CONSTRAINTS (TBS)	

OBSS COORDINATE SYSTEM – PL ID 1 OBSS UNBERTH/BERTH



GF: FWD

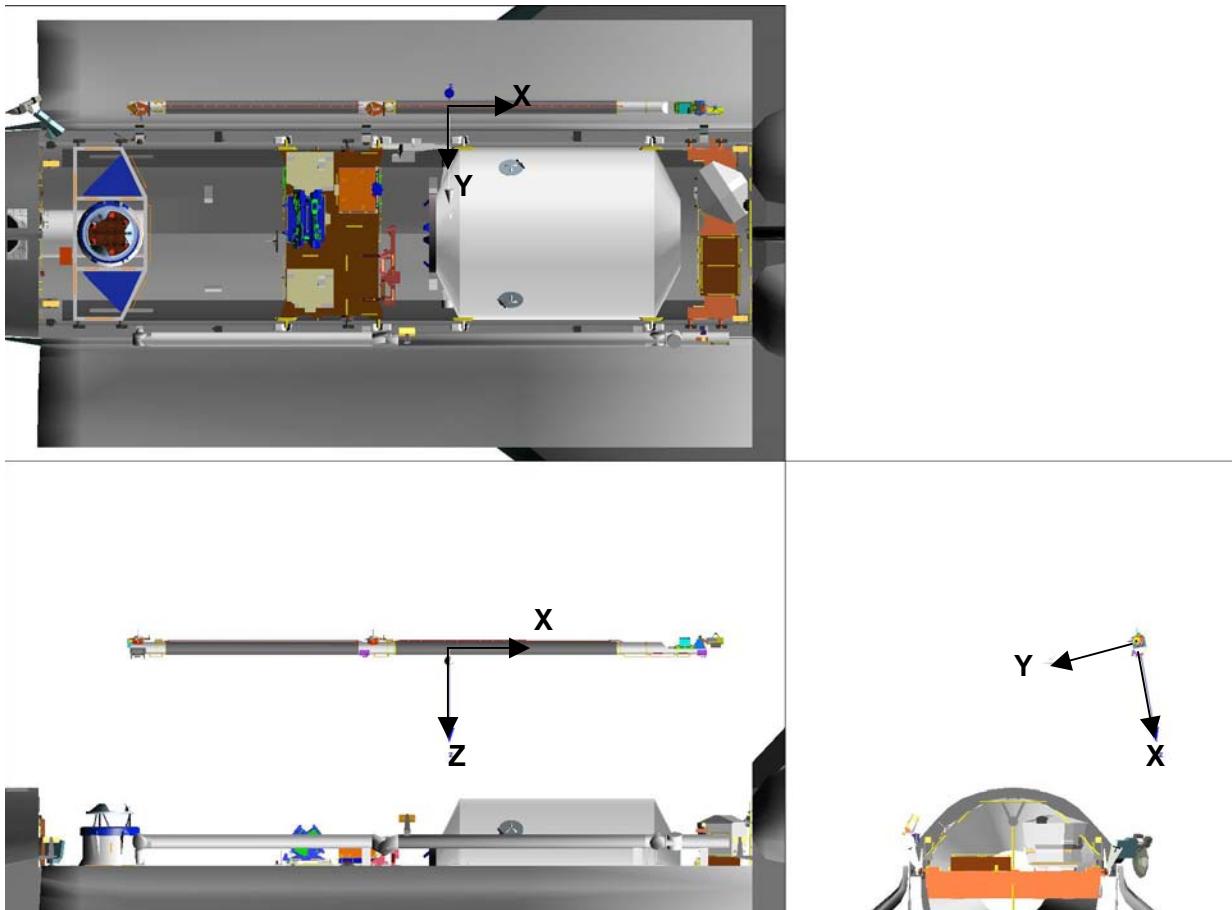
POR: Located at Fwd striker bar

PURPOSE: OBSS berthing and unberthing operations

RATES: COARSE VERN

TRAN LIM ft/sec	tbd	tbd
ROT LIM deg/sec	tbd	tbd

OBSS COORDINATE SYSTEM – PL ID 2 OBSS BOOM MNVRS



GF: FWD

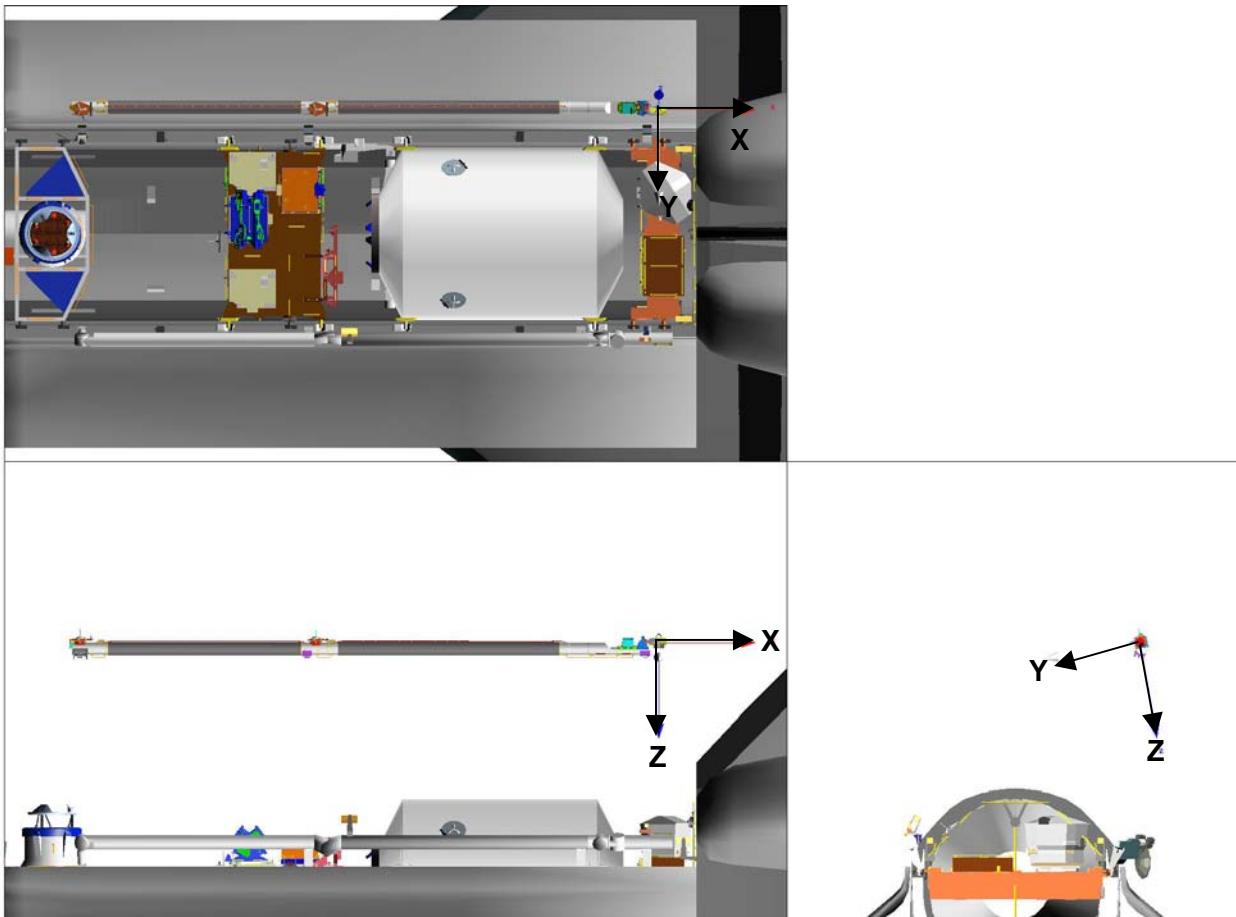
POR: Located at OBSS midpoint

PURPOSE: OBSS maneuvering

RATES: COARSE VERN

TRAN LIM ft/sec	tbd	tbd
ROT LIM deg/sec	tbd	tbd

OBSS COORDINATE SYSTEM – PL ID 3 LDRI SURVEYS



GF: FWD

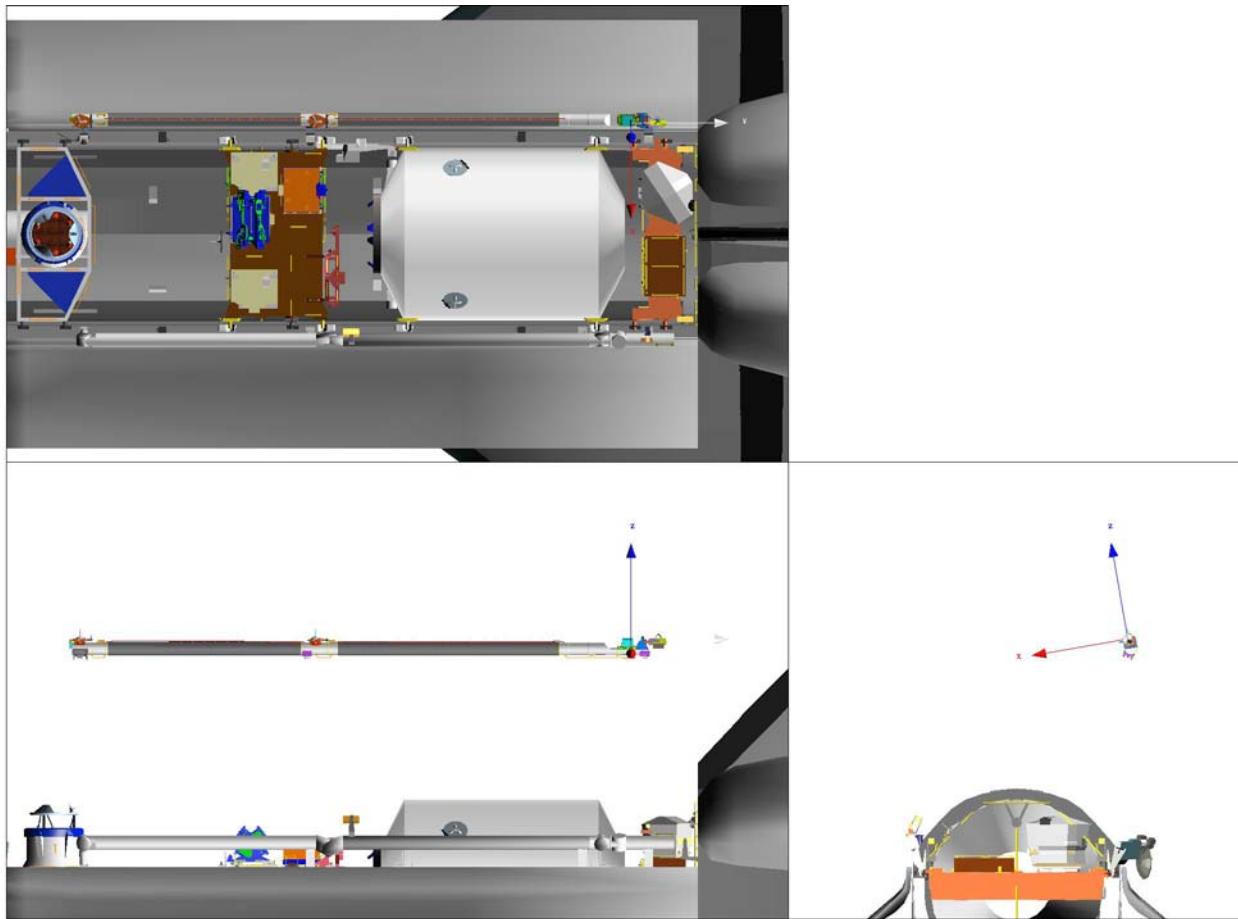
POR: Located ITVC/LDRI Pan/Tilt unit

PURPOSE: LDRI Surveys

RATES: COARSE VERN

TRAN LIM ft/sec	tbd	tbd
ROT LIM deg/sec	tbd	tbd

OBSS COORDINATE SYSTEM – PL ID 4 LCS SURVEYS



GF: FWD

POR: Located LCS Eyepoint

PURPOSE: LCS Surveys

RATES: COARSE VERN

TRAN LIM ft/sec	tbd	tbd
ROT LIM deg/sec	tbd	tbd

ORM JOINT ANGLES VS POR COORDINATES

PMA2 PRE-GRAPPLE posn

X	Y	Z	PITCH	YAW	ROLL	PL ID
-724	-71	-562	214	330	291	0
-692	-30	-504	0	0	0	4
-724	-71	-562	214	330	291	5
SY	SP	EP	WP	WY	WR	
-33.9	+131.6	-141.8	-114.0	-41.0	-4.1	

PMA2 GRAPPLED posn (Expected Values)

X	Y	Z	PITCH	YAW	ROLL	PL ID
-681	-41	-533	214	330	290	0
-649	0	-475	0	0	0	4
-681	-41	-533	214	330	290	5
SY	SP	EP	WP	WY	WR	
-61.0	+138.3	-151.5	-84.0	-51.0	+32.7	

UNDOCKED posn

X	Y	Z	PITCH	YAW	ROLL	PL ID
-679	-42	-729	215	330	290	0
-648	-1	-671	1	0	0	4
-679	-42	-729	215	330	290	5
SY	SP	EP	WP	WY	WR	
-76.4	+120.9	-105.1	-96.0	-49.7	+53.7	

REPAIR posn

X	Y	Z	PITCH	YAW	ROLL	PL ID
-852	-165	-158	341	330	290	0
-917	-124	-167	127	0	0	4
-852	-165	-158	341	330	290	5
SY	SP	EP	WP	WY	WR	
+53.4	+16.3	-115.4	+32.4	-61.6	+237.4	

CAPTURE posn

X	Y	Z	PITCH	YAW	ROLL	PL ID
-681	-41	-529	214	330	290	0
-649	0	-471	0	0	0	4
-681	-41	-529	214	330	290	5
SY	SP	EP	WP	WY	WR	
-60.7	+138.3	-152.3	-83.8	-51.0	+32.0	

ORM AUTO SEQUENCES

Maneuver to REPAIR posn (PL ID 5)

Auto Seq ID	Auto posn	X/ SY	Y/ SP	Z/ EP	PITCH/ WP	YAW/ WY	ROLL/ WR	Pause
1	1	-679	-42	-729	215	330	290	
		-74.6	+120.9	-105.1	-96.0	-49.7	+53.7	
1	2	-783	15	-732	236	291	327	
		-55.6	+110.6	-103.8	-55.3	-37.5	+83.7	
1	3	-1082	-104	-722	324	293	66	
		-7.7	+65.3	-50.2	-66.0	-47.7	+69.5	
1	4	-1017	-394	-694	354	331	107	
		+36.0	+70.4	-46.3	-52.7	-58.4	+87.9	
1	5	-1003	-394	-637	347	356	124	
		+37.3	+80.5	-71.7	-25.7	-35.8	+115.0	
1	6	-605	-340	-548	318	23	193	
		+126.4	+112.5	-117.1	-78.5	-63.1	+92.9	
1	7	-364	-340	-489	280	10	257	
		+151.5	+69.4	-80.5	-73.4	-30.7	+126.6	
1	8	-375	-194	-589	215	338	284	P
		+170.6	+96.7	-105.9	-31.7	+17.6	+146.4	
1	9	-158	-151	-381	206	345	273	
		+171.9	+31.0	-61.0	+0.1	+13.0	+134.6	
1	10	-158	-151	-248	248	345	273	
		+168.4	+3.5	-28.3	-44.2	+1.0	+130.9	
1	11	-340	-151	-109	279	345	273	
		+156.9	+5.2	-68.6	-32.9	-7.3	+133.0	
1	12	-498	-120	-97	315	315	287	
		+143.4	+2.7	-89.4	-47.7	+6.0	+140.8	
1	13	-852	-165	-158	341	330	290	P
		+53.4	+16.3	-115.4	+32.4	-61.6	+237.4	

Maneuver to UNDOCK posn (PL ID 5)

Auto Seq ID	Auto posn	X/ SY	Y/ SP	Z/ EP	PITCH/ WP	YAW/ WY	ROLL/ WR	Pause
2	1	-852	-165	-158	341	330	290	
		+53.4	+16.3	-115.4	+32.4	-61.6	+237.4	
2	2	-498	-120	-97	315	315	287	
		+143.4	+2.7	-89.4	-47.7	+6.0	+140.8	
2	3	-340	-151	-109	279	345	273	
		+156.9	+5.2	-68.6	-32.9	-7.3	+133.0	
2	4	-158	-151	-248	248	345	273	
		+168.4	+3.5	-28.3	-44.2	+1.0	+130.9	
2	5	-158	-151	-381	206	345	273	
		+171.9	+31.0	-61.0	+0.1	+13.0	+134.6	
2	6	-375	-194	-589	215	338	284	P
		+170.6	+96.7	-105.9	-31.7	+17.6	+146.4	
2	7	-364	-340	-489	280	10	257	
		+151.5	+69.4	-80.5	-73.4	-30.7	+126.6	
2	8	-605	-340	-548	318	23	193	
		+126.4	+112.5	-117.1	-78.5	-63.1	+92.9	
2	9	-1003	-394	-637	347	356	124	
		+37.3	+80.5	-71.7	-25.7	-35.8	+115.0	
2	10	-1017	-394	-694	354	331	107	
		+36.0	+70.4	-46.3	-52.7	-58.4	+87.9	
2	11	-1082	-104	-722	324	293	66	
		-7.7	+65.3	-50.2	-66.0	-47.7	+69.5	
2	12	-783	15	-732	236	291	327	
		-55.6	+110.6	-103.8	-55.3	-37.5	+83.7	
2	13	-679	-42	-729	215	330	290	P
		-74.6	+120.9	-105.1	-96.0	-49.7	+53.7	

NOMINAL MPLM INSTALL (CONTINGENCY)

NODE 1 NADIR ACBM INSPECTION (CONTINGENCY)	FS 7-2
MPLM GRAPPLE IN BAY (CONTINGENCY)	FS 7-3
ROEU DEMATE (CONTINGENCY)	FS 7-5
UNBERTH (CONTINGENCY)	FS 7-7
INSTALL (CONTINGENCY)	FS 7-11
UNGRAPPLE ON NODE NADIR (CONTINGENCY)	FS 7-16

NODE 1 NADIR ACBM INSPECTION (CONTINGENCY)

- A7U 1. SETUP
CCTV – RMS WRIST

SM 94 PDRS CONTROL
✓PL ID, ITEM 3: 0
✓INIT ID, ITEM 24: 0

2. MNVR TO ACBM INSPECTION POSN

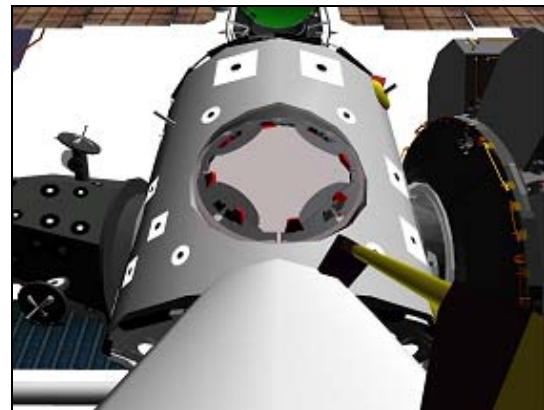
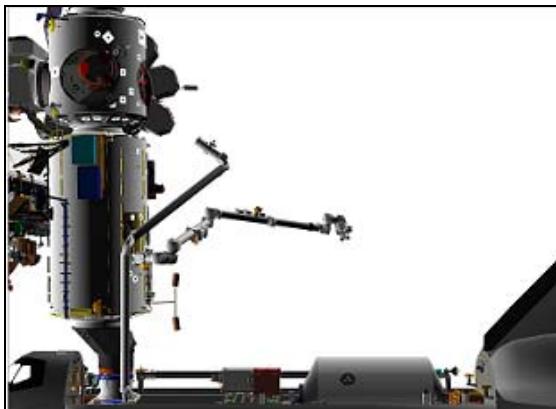
RATE – as reqd (VERN within 10 ft)
BRAKES – OFF (tb-OFF)
MODE – as desired

NODE 1 NADIR ACBM posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-791	0	-875	145	0	180	0
SY	SP	EP	WP	WY	WR	
-56.1	+86.1	-71.9	+104.7	-51.9	+168.3	

3. ACBM INSPECTION

Drive in END EFF as reqd to view entire interface



EE

BRAKES – ON (tb-ON)

MPLM GRAPPLE IN BAY (CONTINGENCY)

1. SETUP
A7U CCTV – config for grapple
 - install PDRS TARGET OVERLAY FOR CTVM
 - RMS WRIST, zoom 34.0 HFOV
focus 5 ftMaintain eyepoint approx 18 in when using grapple overlay

SM 94 PDRS CONTROL
✓PL ID, ITEM 3: 0
✓INIT ID, ITEM 24: 0

CAUTION
Mid and Aft payload bay flood lights must be OFF until MPLM clear of V-guides

2. MNVR TO PRE-GRAPPLE

MON 1	A(B)
MON 2	Elbow(EE)

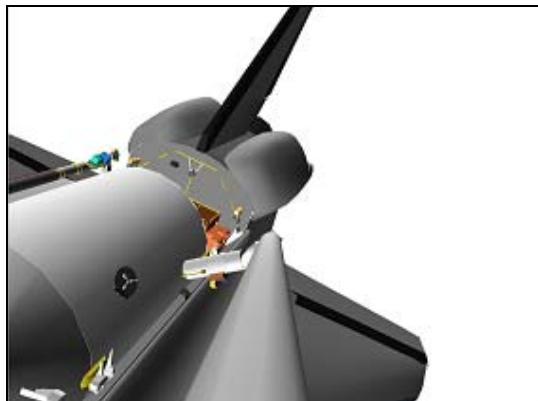
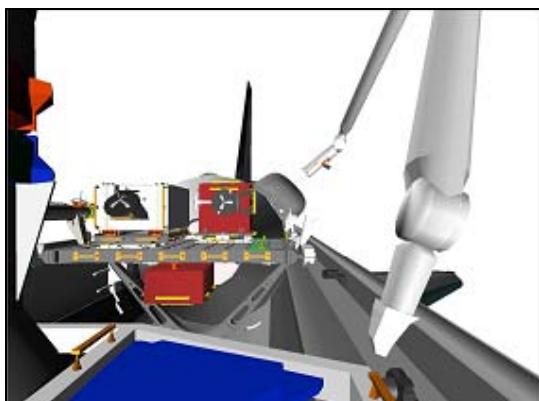
RATE – as reqd (VERN within 10 ft)
BRAKES – OFF (tb-OFF)
MODE – ORB UNL, ENTER

NOTE

WR joint may be rotated 360 degrees to maintain consistency with documented joint angles through MPLM Install

PRE-GRAPPLE posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1059	-114	-497	271	310	151	0
SY	SP	EP	WP	WY	WR	
+2.6	+62.3	-85.3	-68.4	-30.6	-193.1	



3. GRAPPLE

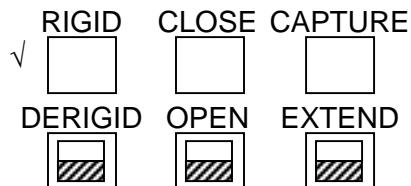
MON 1	EE(Elbow)
MON 2	A or Mux A/B(B)

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

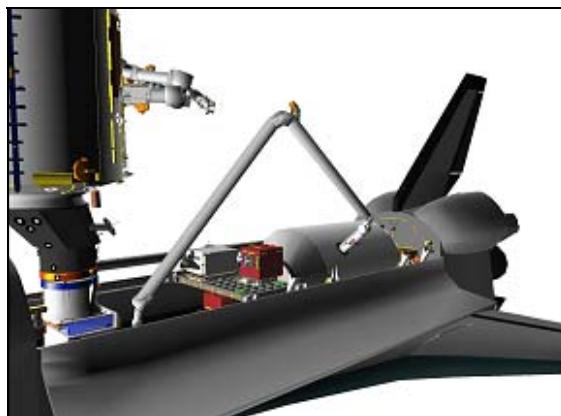
EE MODE – AUTO
 CAPTURE sw – depress (mom)



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
 BRAKES – ON (tb-ON)

SM 94 PDRS CONTROL
PL ID – ITEM 3 +1(3) EXEC
INIT ID – ITEM 24 +1(3) EXEC



Record POS/ATT and Joint Angles:

X	Y	Z	PITCH	YAW	ROLL	PL ID
						1
						3
SY	SP	EP	WP	WY	WR	
Expected	-2.0	+57.2	-89.4	-56.5	-30.6	-187.7

Review GENERIC END EFFECTOR CUE CARD

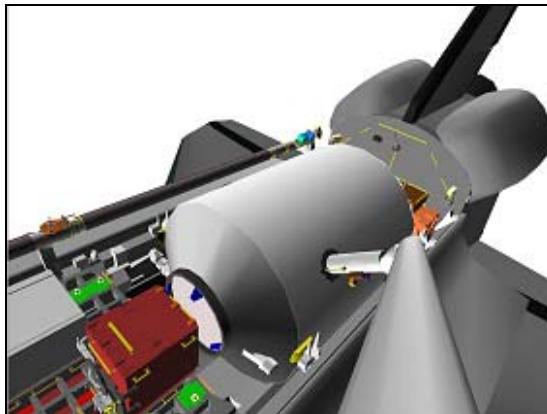
Record POS/ATT and Joint Angles in MPLM BERTH (NOM MPLM BERTH (CONT)) and MPLM SJ BERTH (OFF-NOM MPLM BERTH (CONT))

MPLM ROEU DEMATE (CONTINGENCY)

1. DEADFACE ROEU

SSP 1 √MPLM CHAN 1,2 HTR PWR – OFF (tb-bp)
 √APCU 1,2 CONV – OFF (tb-bp)
 √2 OUTPUT RLY – OP (tb-bp)

2. SETUP



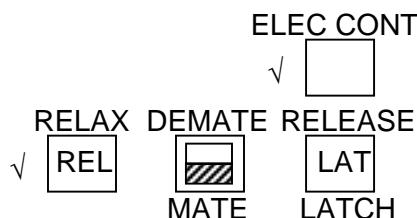
ELBOW (-20,0)

A6U Install ROEU A6U PANEL OVERLAY

PL RETEN PL SEL – 2

SM 97 PL RETEM
✓REL 2.3 (four) – 0

- * If LATCH 2,3 REL msw shows '1,' *
 - * drive latch for single motor time *



3. ACTIVATE ROEU

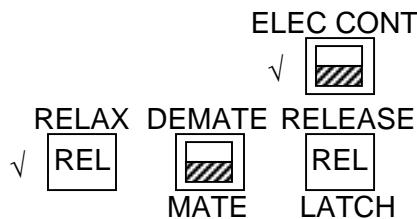
PL RETEN LOGIC PWR SYS 1.2 (two) – ON

R13L PL BAY MECH PWR SYS 1.2 (two) – ON

4. RELEASE LATCHES

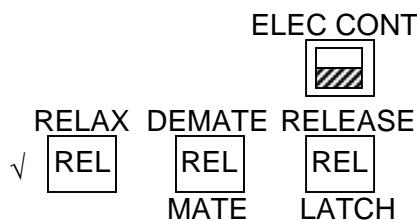
A6U

Note single motor time (> 20 sec)
RELEASE/LATCH – REL (tb-REL), 40 sec max
– OFF



5. DEMATE ROEU

Note single motor time (> 18 sec)
DEMATE/MATE – DEMATE (tb-REL), 36 sec max
– OFF



6. DEACTIVATE ROEU

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

R13L

PL BAY MECH PWR SYS 1,2 (two) – OFF

MPLM UNBERTH (CONTINGENCY)

1. SETUP

✓MPLM ROEU DEMATE complete

A7U CCTV – config for unberth

– Camr B,C,KEEL

– install MPLM BERTH OVERLAY and mark any offset between keel target and overlay

MON 1	B/C Mux(D/A Mux)
MON 2	Keel(Elbow)

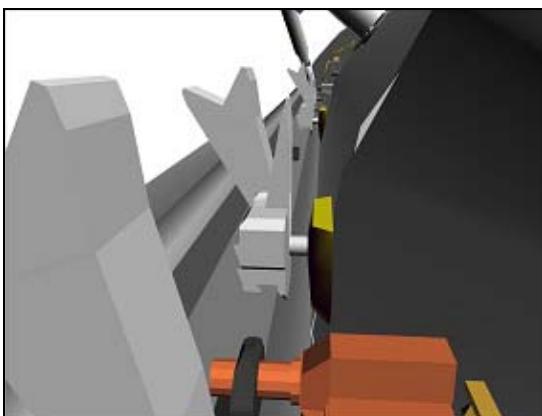
Activate KEEL CCTV:

SSP 2 ✓cb SW PWR 3 (CB2) – cl

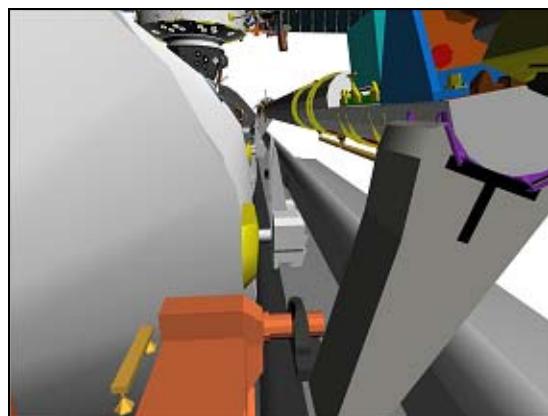
MPLM KEEL CAM PWR – ON

HTR/ILLUM PWR – OFF, then ON for HI

(repeat for MED,LO,OFF)



CCTV B (-5,-16)



CCTV C (5,-16)

PCS MCS: MCS Configuration: US GNC Inhibits
US GNC Inhibits

cmd Desat Request Inhibit (Verify – Inh)

SM 94 PDRS CONTROL

✓PL ID, ITEM 3: 1

✓INIT ID, ITEM 24: 1

2. ACTIVATE LATCHES

A6U ✓PL RETEN LAT (five) – OFF

PL SEL – 1

LOGIC PWR SYS 1,2 (two) – ON

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

SM 97 PL RETENTION

✓RDY-FOR-LAT 1,2,3,4,5 (ten): 1

✓LAT 1,2,3,4,5 (ten): 1

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

A6U

3. AKA RELEASE

✓PL RETEN LAT 5 tb – LAT
✓RDY 5 tb – gray

Note single motor time (> 30 sec)

PL RETEN LAT 5 – REL (tb-REL), 60 sec max
– OFF

4. PRLA RELEASE

✓PL RETEN LAT 1,2,3,4 tb (four) – LAT
✓RDY 1,2,3,4 tb (four) – gray

Note single motor time (> 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

5. DEACTIVATE LATCHES

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

R13L

PL BAY MECH PWR SYS 1,2 (two) – OFF

Record POS/ATT and Joint Angles:

X	Y	Z	PITCH	YAW	ROLL	PL ID
						1
						3
SY	SP	EP	WP	WY	WR	

6. MNVR TO MPLM LOW HOVER

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – ORB LD, ENTER

NOTE

Monitor clearance between MPLM STBD trunnions and the OBSS. Clearance can be monitored with Cameras C and D. Minimum clearance is 3 in

A6U

Mnvr MPLM up until unconstrained

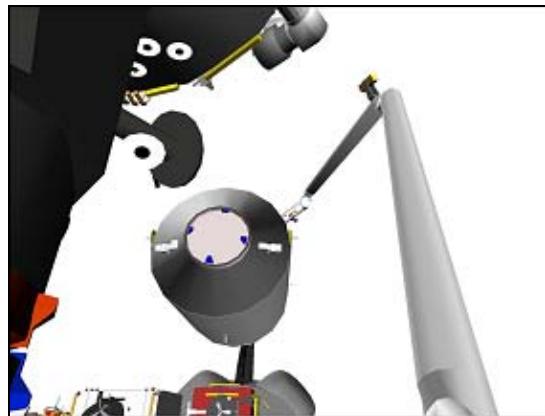
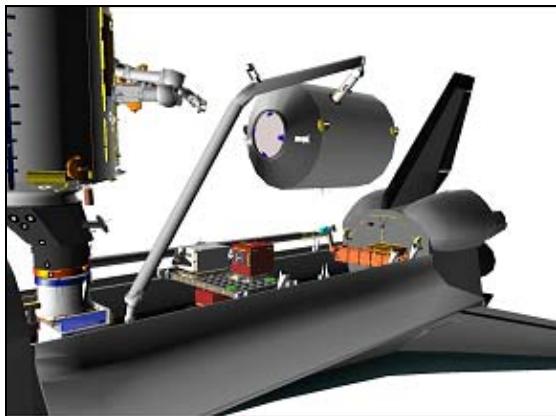
✓PL RETEN RDY 1,2,3,4 tb (four) – bp

MON 1	Keel(Elbow)
MON 2	A(D)

Mnvr MPLM to Low Hover

MPLM LOW HOVER posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1106	0	-650	0	0	0	1
-992	0	-636	0	0	270	2
SY	SP	EP	WP	WY	WR	
-13.6	+63.4	-51.0	-94.3	-29.6	-174.3	



CCTV A (0,30)

Deactivate KEEL CCTV:

SSP 2 MPLM KEEL CAM HTR/ILLUM PWR – toggle until illuminator off
 (leave sw in ON posn)
 PWR – OFF

BRAKES – ON (tb-ON)

7. MNVR TO MPLM HIGH HOVER

SM 94 PDRS CONTROL

PL ID – ITEM 3 +2 EXEC

INIT ID – ITEM 24 +2 EXEC

MON 1	Elbow(B)
MON 2	A → B(CBCS)

RATE – as reqd (VERN within 10 ft)

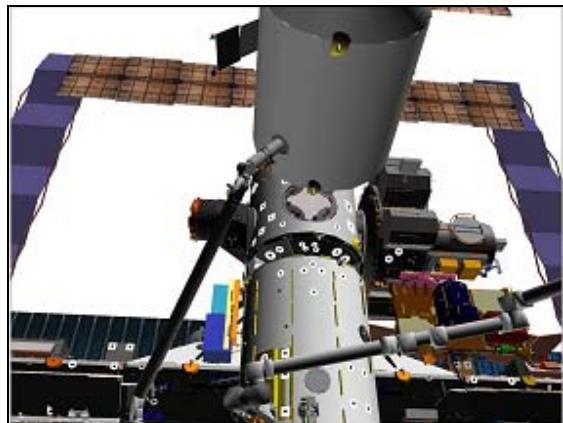
✓ BRAKES – OFF (tb-OFF)

MODE – ORB LD, ENTER

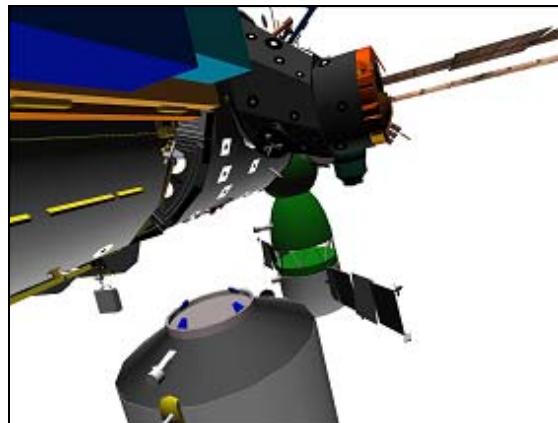
Mnvr MPLM to High Hover

MPLM to HIGH HOVER posn:

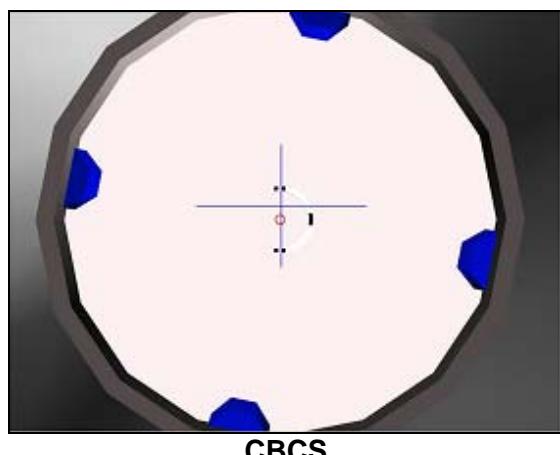
X	Y	Z	PITCH	YAW	ROLL	PL ID
-796	0	-980	1	0	0	2
SY	SP	EP	WP	WY	WR	
-40.0	+94.9	-67.7	+15.6	-41.7	-69.2	



CCTV B (5,40)



ELBOW (0,35)



CBCS

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

MPLM INSTALL (CONTINGENCY)

1. MNVR TO MPLM PRE-INSTALL POSN
Install MPLM CBCS CCTV OVERLAY
✓CBCS setup complete

SM 94 PDRS CONTROL

✓PL ID, ITEM 3: 2
✓INIT ID, ITEM 24: 2

MON 1	CBCS(B or C)
MON 2	Elbow/Dig Mux(A)

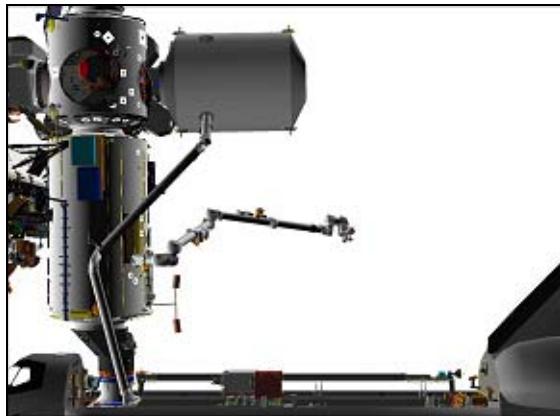
RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – ORB LD, ENTER

MPLM PRE-INSTALL posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-744	0	-980	1	0	0	2
SY	SP	EP	WP	WY	WR	
-49.5	+103.0	-74.3	+9.5	-34.6	-77.0	



BRAKES – ON (tb-ON)

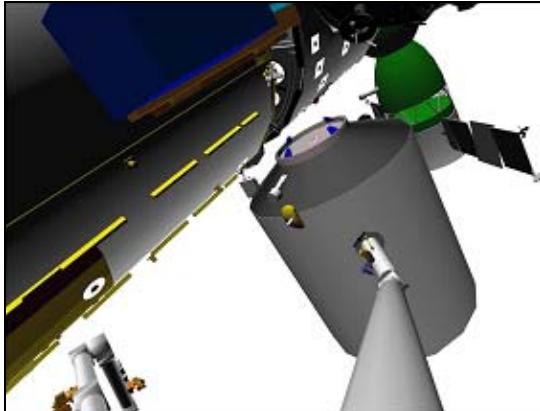
✓MODE – not DIRECT

A7U

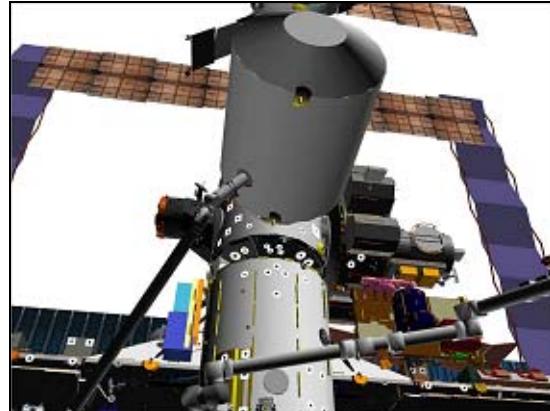
2. SETUP FOR INSTALLATION

CCTV – config for install
– RMS ELBOW, CBCS

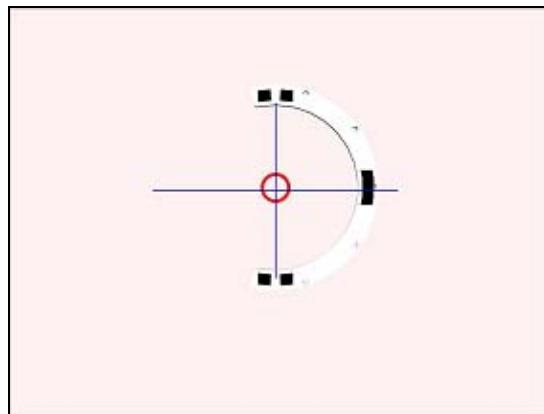
✓1.505 NODE 1 CBM VERIFY PRE-MATE STATUS (SODF: S&M:
NOMINAL: CBM) complete



ELBOW (-18,7)



CCTV B (9,41)



CBCS

3. UPDATE RMS COMMAND FRAME

SM 94 PDRS CONTROL

✓POR DISPLAY, ITEM 30: ORB

Load POR REF with calculated POR data from the table below (SM 94, Items 18-23,25,30)

SM 169 POS/ATT (PL ID 2)		SM 94 ITEM ENTRIES	
X	-		18
Y	-		19
Z	-		20
PITCH	-		21
YAW	-		22
ROLL	-		23

SM 94 PDRS CONTROL

POR DISPLAY – ITEM 30 EXEC (REL)

4. MNVR TO MPLM READY-TO-LATCH POSN

MCS: MCS Configuration: US GNC Inhibits

US GNC Inhibits

✓Desat Request – Inh

MON 1	CBCS(B or C)
MON 2	Elbow(A)

RATE – VERN (RATE MIN tb-ON)

BRAKES – OFF (tb-OFF)

MODE – ORB LD, ENTER

SM 94 PDRS CONTROL

FLY-PL – ITEM 33 EXEC (*)

Mnvr MPLM until Y, Z, PITCH, YAW, ROLL errors ≤ 0.1

Mnvr MPLM until RTLs achieved (expected X: -4.8)

NOTE

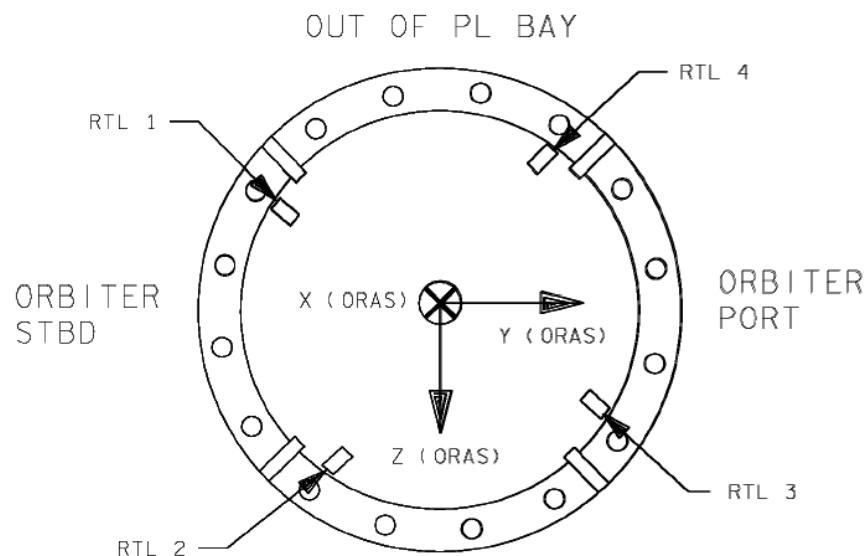
✓CBCS misalignment at X: -14 and correct if necessary

Expected MPLM READY-TO-LATCH posn:

X	Y	Z	PITCH	YAW	ROLL	
-713	1	-980	1	0	0	PL ID 2
-4.8	0	0	0	0	0	CMD FRAME
SY	SP	EP	WP	WY	WR	
-56.9	+106.8	-77.1	+5.7	-28.6	-82.2	

* Repeat step 4, correcting for misalignments until at *

* least 3 of 4 RTLs indicated *

NODE 1 NADIR CBM RTL CONFIG FOR MPLM

NOTE: VIEW SHOWN IS FROM NODE 1 NADIR WINDOW

5. FIRST STAGE CAPTURE

- ✓1.506 NODE 1 CBM CAPTURE/ABOLT, step 2 (SODF: S&M: NOMINAL: CBM)
complete

NOTE

CNTL ERR It and S96 PDRS CNTL msg may occur when Auto Brakes inhibited and during CBM Second Stage Capture

SM 94 PDRS CONTROL

AUTO BRAKE INH – ITEM 10 EXEC (*)

MODE – TEST, ENTER (CNTL ERR It and S96 PDRS CNTL msg may occur)
RATE – COARSE (RATE MIN tb-OFF)

6. SECOND STAGE CAPTURE

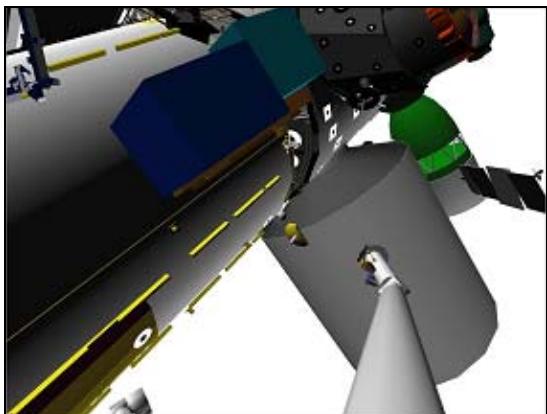
- ✓1.506 NODE 1 CBM CAPTURE/ABOLT, step 3 (SODF: S&M: NOMINAL: CBM)
complete
✓1.506 NODE 1 CBM CAPTURE/ABOLT, step 2 (SODF: S&M: NOMINAL: CBM)
complete

AUTO BRAKE ENA – ITEM 9 EXEC (*)
BRAKES – ON (tb-ON)
RATE – VERN (RATE MIN tb-ON)

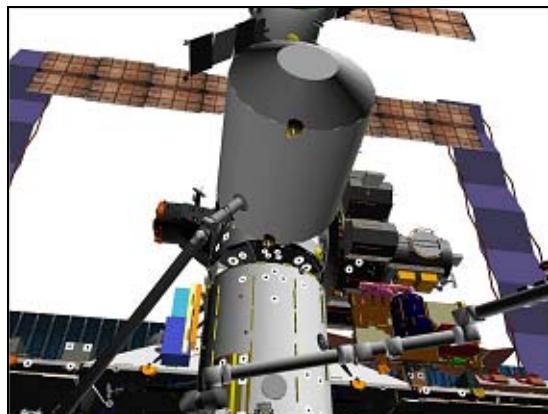
After MPLM fully installed, record POS/ATT and Joint Angles:

X	Y	Z	PITCH	YAW	ROLL	PL ID
						2
SY	SP	EP	WP	WY	WR	
-58.2	+107.3	-77.3	+5.0	-27.5	-83.0	

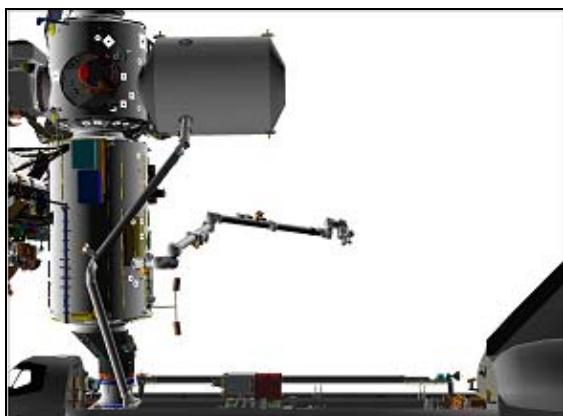
Actual
Expected



ELBOW (-18,7)



CCTV B (9,41)



MPLM UNGRAPPLE ON NODE NADIR (CONTINGENCY)

1. SETUP

✓1.506 NODE 1 CBM CAPTURE/ABOLT, step 4 (SODF: S&M: NOMINAL: CBM)
complete

PCS MCS: MCS Configuration: US GNC Inhibits

US GNC Inhibits

cmd Desat Request Enable (Verify – Ena)

A7U CCTV – config for ungrapple
 – RMS WRIST, zoom 34.0 HFOV
 focus 5 ft

SM 94 PDRS CONTROL

PL ID – ITEM 3 +0 EXEC

INIT ID – ITEM 24 +0 EXEC

2. MPLM UNGRAPPLE

MON 1	EE (Elbow)
MON 2	B(C)

RATE – VERN (RATE MIN tb-ON) within 10 ft

BRAKES – OFF (tb-OFF)

MODE – END EFF, ENTER

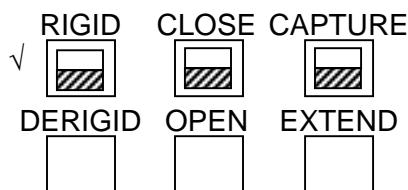
CAUTION

Monitor EE tb timing to prevent EE motor burnout

When OPEN tb – gray,
mnvr arm clear of GF and MPLM

EE MODE – AUTO

RELEASE sw – depress (mom)



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

FF MODE – OFF

BRAKES – ON (tb-ON)

✓MODE – not DIRECT
JOINT – CRIT TEMP

- * 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
 - * BRAKES - ON

NOMINAL MPLM BERTH (CONTINGENCY)

MPLM GRAPPLE ON NODE NADIR (CONTINGENCY).....	FS 8-2
UNINSTALL (CONTINGENCY).....	FS 8-4
BERTH (CONTINGENCY)	FS 8-6
ROEU MATE (CONTINGENCY)	FS 8-8
UNGRAPPLE IN BAY (CONTINGENCY).....	FS 8-10

NOM MPLM
BERTH (CONT)

MPLM GRAPPLE ON NODE NADIR (CONTINGENCY)**1. SETUP**

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

SM 94 PDRS CONTROL

✓PL ID, ITEM 3: 0

✓INIT ID, ITEM 24: 0

2. MNVR TO PRE-GRAPPLE

MON 1	Elbow(Tip Elbow)
MON 2	B(C)

RATE – as reqd (VERN within 10 ft)

BRAKES – OFF (tb-OFF)

MODE – ORB UNL, ENTER

PRE-GRAPPLER posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-777	-95	-867	91	320	331	0
SY	SP	EP	WP	WY	WR	
-47.0	+118.9	-92.0	+12.3	-36.5	-75.0	

3. GRAPPLE

MON 1	EE(Elbow)
MON 2	C(B)

RATE – VERN (RATE MIN tb-ON)

BRAKES – OFF (tb-OFF)

MODE – END EFF, ENTER

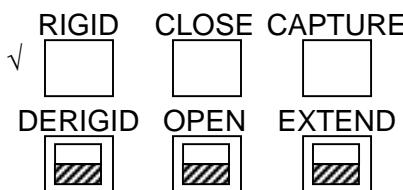
Mnvr to grapple envelope

<u>CAUTION</u>

Monitor EE tb timing to prevent EE motor burnout

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

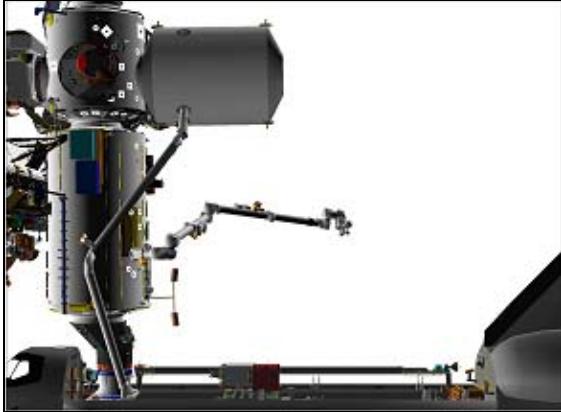
BRAKES – ON (tb-ON)

✓MODE – not DIRECT

SM 94 PDRS CONTROL

PL ID – ITEM 3 +2 EXEC

INIT ID – ITEM 24 +2 EXEC



Record POS/ATT and Joint Angles:

X	Y	Z	PITCH	YAW	ROLL	PL ID
SY	SP	EP	WP	WY	WR	
Expected	-58.2	+107.3	-77.3	+5.0	-27.5	-83.0

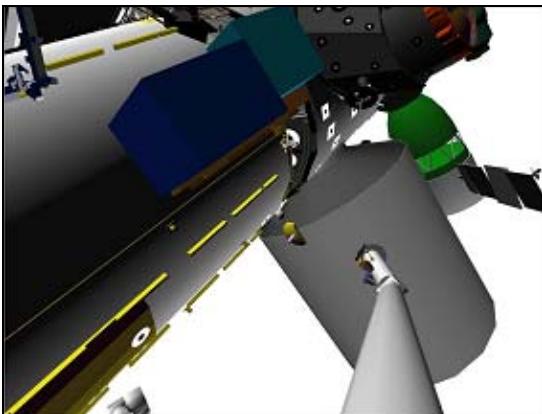
Review GENERIC END EFFECTOR CUE CARD

MPLM UNINSTALL (CONTINGENCY)

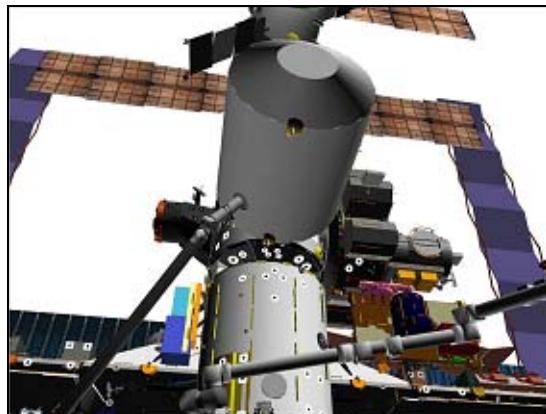
1. SETUP

✓1.509 NODE 1 CBM DEMATE, step 9 (SODF: S&M: NOMINAL: CBM) complete

CCTV – config for uninstall



ELBOW (-18,7)



CCTV B (5,40)

PCS

MCS: MCS Configuration: US GNC Inhibits
US GNC Inhibits

✓Desat Request – Inh

SM 94 PDRS CONTROL

✓PL ID, ITEM 3: 2

✓INIT ID, ITEM 24: 2

2. MNVR TO MPLM PRE-INSTALL

MON 1	CBCS(B or C)
MON 2	Elbow(A)

RATE – VERN (RATE MIN tb-ON)

BRAKES – OFF (tb-OFF)

MODE – ORB LD, ENTER

Mnvr MPLM to PRE-INSTALL posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-744	0	-980	1	0	0	2
SY	SP	EP	WP	WY	WR	
-49.5	+103.0	-74.3	+9.5	-34.6	-77.0	

3. MNVR TO MPLM LOW HOVER POSN

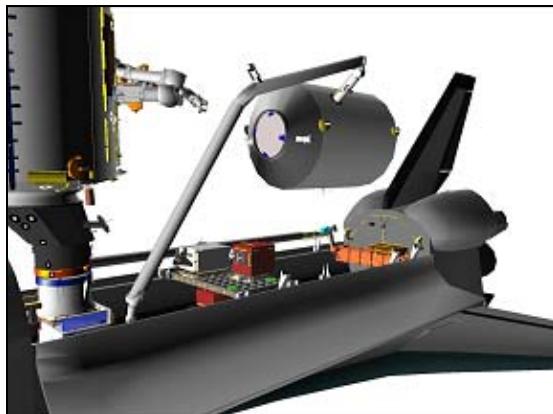
MON 1	Elbow(B)
MON 2	B → A(C)

RATE – as reqd (VERN within 10 ft)

✓ BRAKES – OFF (tb-OFF)

MODE – ORB LD, ENTER

Mnvr to LOW HOVER



MPLM LOW HOVER posn:

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1106	0	-650	0	0	0	1
-992	0	-636	0	0	270	2
-1126	-3	-549	90	0	0	3
SY	SP	EP	WP	WY	WR	
-13.6	+63.4	-51.0	-94.3	-29.6	-174.3	

MPLM BERTH (CONTINGENCY)

1. SETUP
 A7U CCTV – config for berthing
 – install MPLM BERTH OVERLAY
- SSP 2 Activate KEEL CCTV:
 √cb SW PWR 3 (CB2) – cl
 MPLM KEEL CAM PWR – ON
 HTR/ILLUM PWR – OFF, then ON for HI
 (repeat for MED,LO,OFF)
- PCS MCS: MCS Configuration: US GNC Inhibits
 US GNC Inhibits
 √Desat Request – Inh
 SM 94 PDRS CONTROL
 PL ID – ITEM 3 +1(3) EXEC
 INIT ID – ITEM 24 +1(3) EXEC
2. MNVR MPLM TO LATCHES

MON 1	Keel(Tip LEE)
MON 2	A → B/C Mux(D/A Mux)

 RATE – VERN (RATE MIN tb-ON)
 BRAKES – OFF (tb-OFF)
 MODE – ORB LD, ENTER
- NOTE
 Monitor clearance between MPLM STBD trunnions and the OBSS. Clearance can be monitored with Cameras C and D. Minimum clearance is 3 in
- A6U √PL RETEN PL SEL – 1
 √RDY 1,2,3,4,5 tb (five) – bp
 Mnvr MPLM to BERTHED posn (Insert PL ID 1 and 3 data from MPLM GRAPPLE IN BAY):

X	Y	Z	PITCH	YAW	ROLL	PL ID
						1
						3
SY	SP	EP	WP	WY	WR	

 When vertical translation complete,
 √PL RETEN PL SEL – 1
 √RDY 1,2,3,4 tb (four) – gray
 √LAT 1,2,3,4 tb (four) – REL

SM 97 PL RETENTION

✓RDY-FOR-LAT 1,2,3,4 (eight): 1

✓LAT 1,2,3,4,5 (ten): 0

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

3. ACTIVATE LATCHES

PL RETEN LOGIC PWR SYS 1,2 (two) – ON

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

4. AKA LATCH

A6U ✓PL RETEN LAT 5 tb – REL

Note single motor time (> 30 sec)

PL RETEN LAT 5 – LAT (tb-LAT), 60 sec max
– OFF

✓RDY 5 tb – gray

5. PRLA LATCH

✓PL RETEN LAT 1,2,3,4 tb (four) – REL

✓RDY 1,2,3,4 tb (four) – gray

Note single motor time (> 30 sec)

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

3,4 (two) – LAT (tb-LAT), 60 sec max
– OFF

6. DEACTIVATE LATCHES

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

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

BRAKES – ON (tb-ON)

✓MODE – not DIRECT

PCS MCS: MCS Configuration: US GNC Inhibits

US GNC Inhibits

cmd Desat Request Enable (Verify – Ena)

Deactivate KEEL CCTV:

SSP 2 MPLM KEEL CAM HTR/ILLUM PWR – Toggle until illuminator OFF

(leave sw in ON posn)

PWR – OFF

MPLM ROEU MATE (CONTINGENCY)

- A7U 1. SETUP
 CCTV – config for ROEU mate
 – install ROEU A6U PANEL OVERLAY

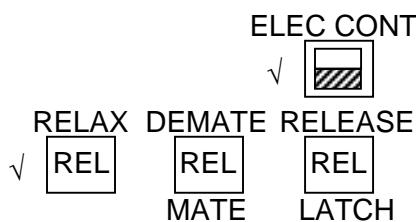
MON 1	Elbow
MON 2	D

PL RETEN PL SEL – 2

SM 97 PL RETENTION

✓LAT 1,2,3 (six): 0

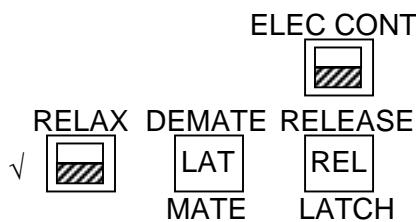
- * If LATCH 2,3 LAT msw shows '1,' drive *
- * latch for single motor time *



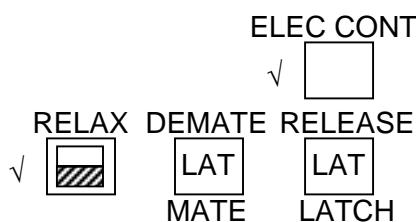
- A6U 2. ACTIVATE ROEU
 PL RETEN LOGIC PWR SYS 1,2 (two) – ON

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

- A6U 3. MATE ROEU
 Note single motor time (> 30 sec)
 DEMATE/MATE – MATE (tb-LAT), 60 sec max
 – OFF



4. LATCH LATCHES
 Note single motor time (> 20 sec)
 RELEASE/LATCH – LATCH (tb-LAT), 40 sec max
 – OFF



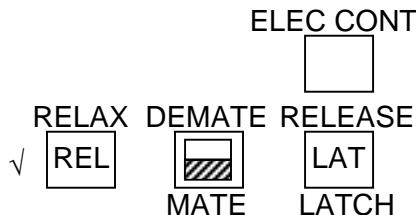
5. RELAX ROEU

NOTE

Monitor PL SEL 2 LATCH 1 REL SYS ms ws on SPEC 97

Note single motor time (> 12 sec)
RELAX – RELAX (tb-REL), 24 sec max

When LATCH 1 REL A(B) msw changes to 1:
RELAX – OFF



6. DEACTIVATE ROEU

A6U PL RETEN LOGIC PWR SYS 1,2 (two) – OFF

PL SEL – MON

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

MPLM UNGRAPPLE IN BAY (CONTINGENCY)

1. SETUP

A7U CCTV – config for ungrapple
 – RMS WRIST, zoom 34.0 HFOV
 focus 5 ft

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

2. MPLM UNGRAPPLE

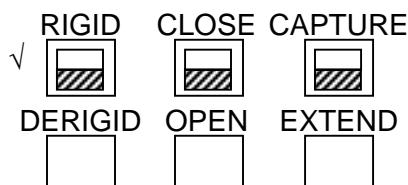
MON 1	EE(Elbow)
MON 2	A, Mux A/B(B)

RATE – VERN (RATE MIN tb-ON) within 10 ft
BRAKES – OFF (tb-OFF)
MODE – END EFF, ENTER

CAUTION
Monitor EE tb timing to prevent EE motor burnout

When OPEN tb – gray,
mnvr arm clear of GF and MPLM

EE MODE – AUTO
RELEASE sw – depress (mom)



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

BRAKES – ON (tb-ON)
✓MODE – not DIRECT
JOINT – CRIT TEMP

- * 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 *
- * BRAKES – ON *

MPLM REFERENCE DATA (CONTINGENCY)

JOINT ANGLES VS POR COORDINATES (CONTINGENCY)	FS 9-2
MPLM GRAPPLE IN BAY (CONTINGENCY)	FS 9-2
CLEAR V-GUIDES (CONTINGENCY)	FS 9-2
LOW HOVER (CONTINGENCY)	FS 9-2
HIGH HOVER (CONTINGENCY)	FS 9-2
PRE-INSTALL (CONTINGENCY)	FS 9-3
READY-TO-LATCH (CONTINGENCY)	FS 9-3
INSTALLED (CONTINGENCY)	FS 9-3
CLEAR CBM GUIDES (CONTINGENCY)	FS 9-3
MPLM COORDINATE SYSTEM – PL ID 1 (CONTINGENCY)	FS 9-4
2 (CONTINGENCY)	FS 9-5
3 (CONTINGENCY)	FS 9-6
PRLA CONFIGURATION (CONTINGENCY)	FS 9-7
NODE 1 NADIR CBM RTL CONFIG FOR MPLM (CONTINGENCY)	FS 9-8
RMS/MPLM GO/NO-GO CRITERIA (CONTINGENCY)	FS 9-9
SRMS/MPLM ATTITUDE CONTROL CONSTRAINTS (CONTINGENCY)	FS 9-10

JOINT ANGLES VS POR COORDINATES (CONTINGENCY)

MPLM GRAPPLE IN BAY (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-2.0	+57.2	-89.4	-56.5	-30.6	-187.7

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1059	-69	-457	270	310	151	0
-1106	0	-414	0	0	0	1
-992	0	-400	0	0	270	2
-1126	-3	-313	90	0	0	3

MPLM CLEAR V-GUIDES (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-3.2	+59.8	-87.9	-59.9	-30.5	-186.2

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1059	-69	-482	270	310	151	0
-1106	0	-439	0	0	0	1
-992	0	-425	0	0	270	2
-1126	-3	-338	90	0	0	3

MPLM LOW HOVER (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-13.6	+63.4	-51.0	-94.3	-29.6	-174.3

X	Y	Z	PITCH	YAW	ROLL	PL ID
-1059	-69	-693	270	310	151	0
-1106	0	-650	0	0	0	1
-992	0	-636	0	0	270	2
-1126	-3	-549	90	0	0	3

MPLM HIGH HOVER (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-40.0	+94.9	-67.7	+15.6	-41.7	-69.2

X	Y	Z	PITCH	YAW	ROLL	PL ID
-864	-57	-913	91	320	331	0
-910	-14	-982	1	0	90	1
-796	0	-980	1	0	0	2
-929	87	-979	91	90	0	3

MPLM PRE-INSTALL (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-49.5	+103.0	-74.3	+9.5	-34.6	-77.0

X	Y	Z	PITCH	YAW	ROLL	PL ID
-812	-57	-913	91	320	331	0
-858	-14	-982	1	0	90	1
-744	0	-980	1	0	0	2
-877	87	-980	91	90	0	3

MPLM READY-TO-LATCH (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-56.9	+106.8	-77.1	+5.7	-28.6	-82.2

X	Y	Z	PITCH	YAW	ROLL	PL ID
-781	-57	-913	91	320	331	0
-827	-13	-982	1	0	90	1
-713	1	-980	1	0	0	2
-846	88	-979	91	90	0	3

MPLM INSTALLED (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-58.2	+107.3	-77.3	+5.0	-27.5	-83.0

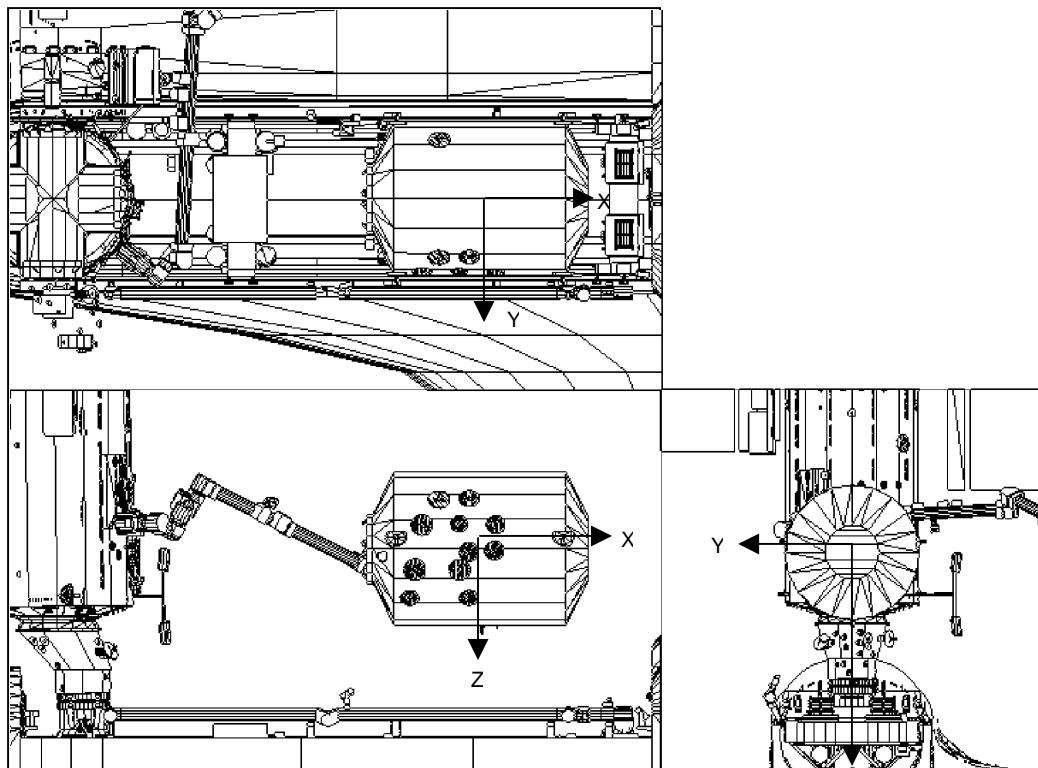
X	Y	Z	PITCH	YAW	ROLL	PL ID
-776	-57	-913	91	320	331	0
-822	-14	-982	1	0	90	1
-708	0	-980	1	0	0	2
-841	87	-980	91	90	0	3

MPLM CLEAR CBM GUIDES (CONTINGENCY)

SY	SP	EP	WP	WY	WR
-54.5	+105.7	-76.3	+6.8	-30.6	-80.5

X	Y	Z	PITCH	YAW	ROLL	PL ID
-790	-57	-913	91	320	331	0
-836	-14	-982	1	0	90	1
-722	0	-980	1	0	0	2
-855	88	-980	91	90	0	3

MPLM COORDINATE SYSTEM – PL ID 1 (CONTINGENCY)



POR: POR at centerline of fwd and aft trunnions during MPLM unberth

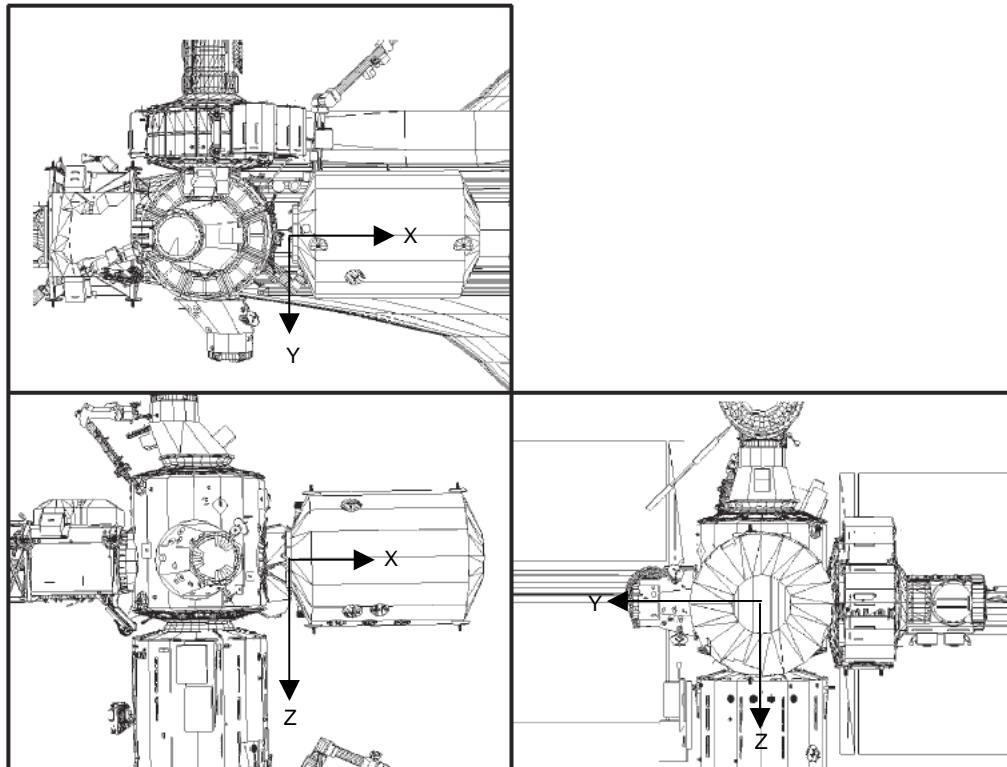
PURPOSE: MPLM unberth from payload bay

RATES: COARSE VERN
TRAN LIM ft/sec 0.10 0.05
ROT LIM deg/sec 0.22 0.11

NOTE

COARSE translational and rotational rates
are equal to VERN rates and VERN rates
equal one half original VERN rates

MPLM COORDINATE SYSTEM – PL ID 2 (CONTINGENCY)



POR: POR at CBCS target and aligned with CBCS camera view out Node nadir window

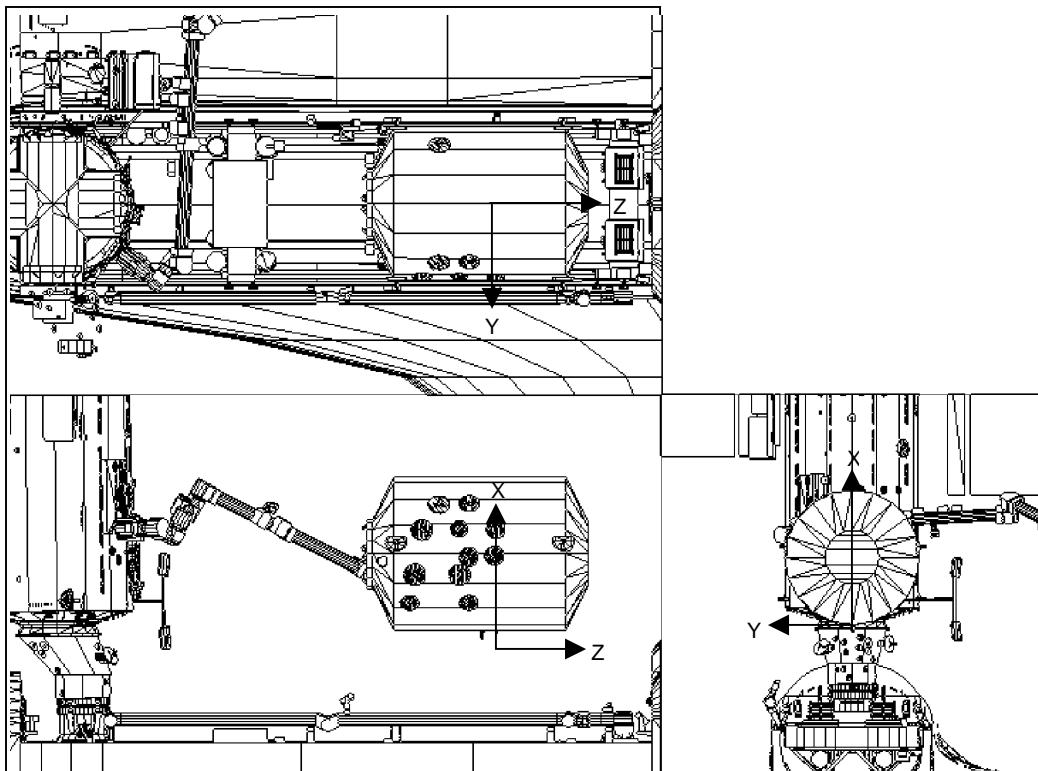
PURPOSE: MPLM mate to ISS NODE 1 nadir port

RATES: COARSE VERN
TRAN LIM ft/sec 0.10 0.05
ROT LIM deg/sec 0.22 0.11

NOTE

COARSE translational and rotational rates
are equal to VERN rates and VERN rates
equal one half original VERN rates

MPLM COORDINATE SYSTEM – PL ID 3 (CONTINGENCY)



POR: POR at MPLM keel target, aligned with view from aft keel camera

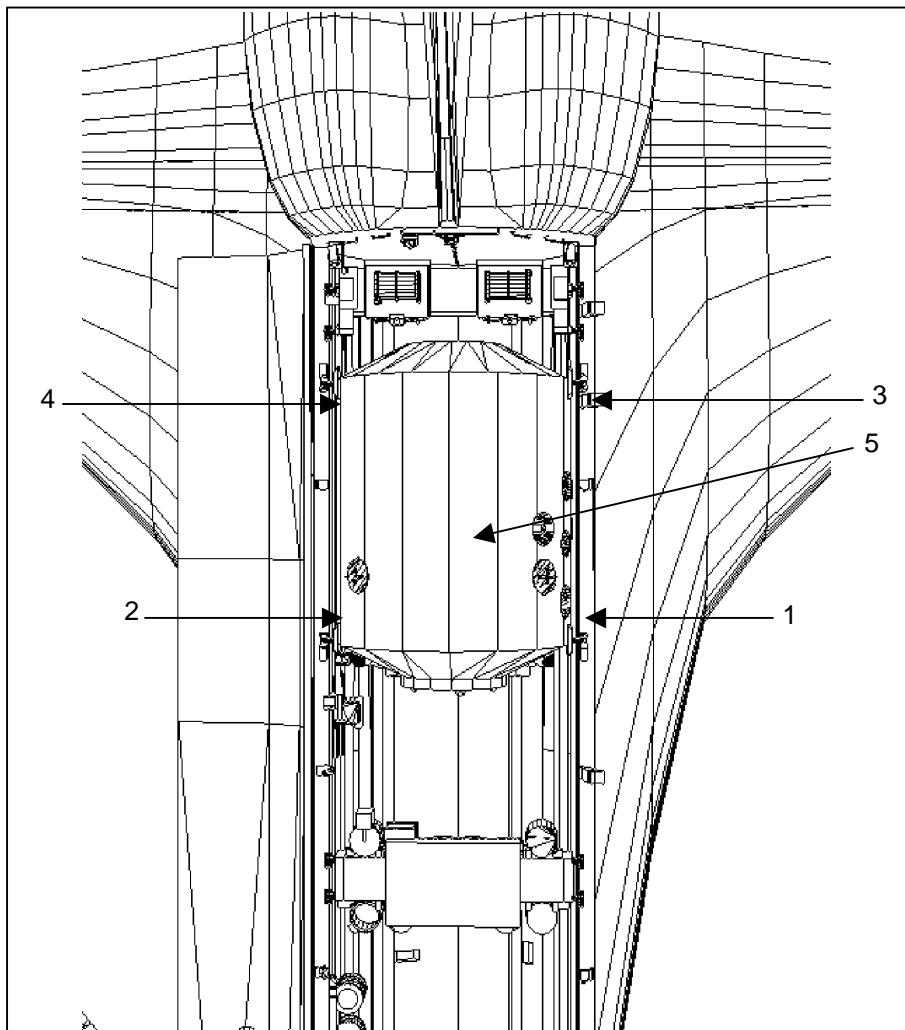
PURPOSE: MPLM berth in payload bay

RATES: COARSE VERN
TRAN LIM ft/sec 0.10 0.05
ROT LIM deg/sec 0.22 0.11

NOTE

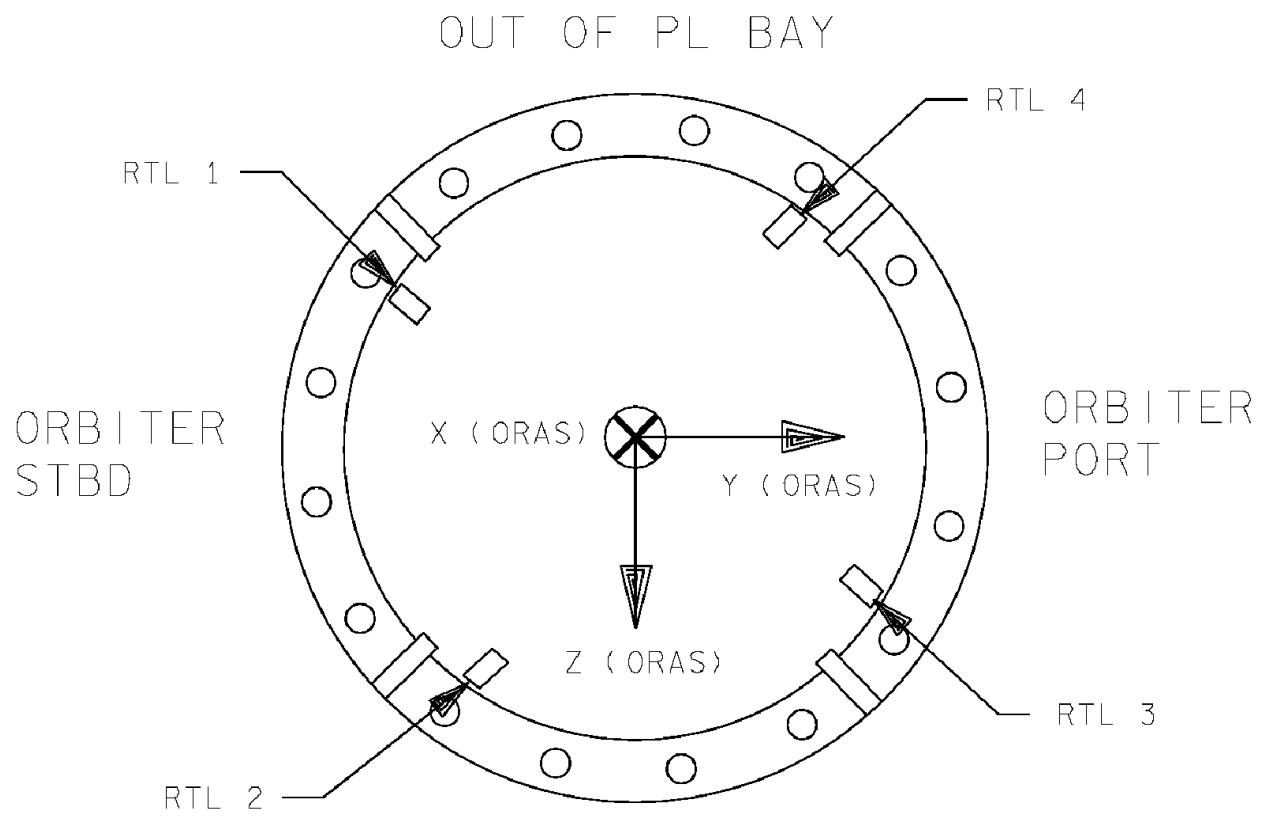
COARSE translational and rotational rates
are equal to VERN rates and VERN rates
equal one half original VERN rates

MPLM PRLA CONFIGURATION (CONTINGENCY)



OPENING SEQUENCE	PL SEL	REL
AKA	1	5
FWD PRLA	1	1,2
AFT PRLA	1	3,4

NODE 1 NADIR CBM RTL CONFIG FOR MPLM (CONTINGENCY)



NOTE: VIEW SHOWN IS FROM NODE 1 NADIR WINDOW

RMS/MPLM GO/NO-GO CRITERIA (CONTINGENCY)

CONTINUE OPS IF:	MPLM OPERATIONS (HIGH PRIORITY)	FLT RULE REF
SHOULDER BRACE REL (1)	0 ↓ [1]	
JETTISON SYSTEM (2)	1 ↓ [2]	A12-81
MPM STOW MOTORS (2)	2 ↓ [1]	A12-72
MRL LATCH CAPABILITY (3)	3 ↓ [3]	A12-73
MPM (4) STOWED IND (8)		
MPM (4) DEPLOY IND (8)	SH 1 ↓	A12-72
MRLs LATCHED (3)		
MAN AUG MODE (1)	3 ↓ [4]	A12-111
SINGLE MODE (1)		
DIRECT MODE (1)		
BACKUP MODE (1)		
BRAKES (6)	0 ↓	A12-115
AUTO BRAKES (1)	0 ↓ [5]	A12-116
CAPTURE & RIGIDIZE (2)	1 ↓	A12-161
DERIGIDIZE (2)	2 ↓	A12-161
RELEASE (2)	2 ↓	A12-161
BACKUP RELEASE (1)		
THERMAL (DEG F) -20(0), 176(172), LED -20(0), 147(144), ABE (EE) -20(0), 110(106), ABE (SPA)	REQD	A12-3

NOTES

- [1] EVA CAPABILITY EXISTS FOR THE FOLLOWING CONTINGENCIES:
 - SHOULDER BRACE RELEASE
 - MPM DEPLOY/STOW
 - RMS STRAPDOWN
 - GRAPPLE FIXTURE (GF) RELEASE
- [2] IFM IS AVAILABLE TO RECOVER JETTISON SYSTEM; HIGH PRIORITY RMS ACTIVITIES MAY CONTINUE
- [3] CONTINUE OPERATIONS EVEN IF ONE FAILURE WILL RESULT IN INABILITY TO LATCH AT LEAST TWO MRLs (ASSUMES CURRENTLY HAVE TWO-LATCH CAPABILITY). EVA CAPABILITY REQD
- [4] ONE OF SINGLE, DIRECT, OR BACKUP REQD FOR UNCRADLING
- [5] OPERATIONS CAN CONTINUE IN DIRECT OR BACKUP WITH LOSS OF AUTO BRAKES. CAPTURE CAPABILITY DOES NOT EXIST IN BACKUP

SEE FLIGHT RULE {UF-1_12C-23}, MSS REDUNDANCY REQUIREMENTS [C] FOR CONTINGENCY CASES WHERE SRMS MAY PERFORM THESE OPERATIONS IF THE SSRMS IS NO-GO

SRMS/MPLM ATTITUDE CONTROL CONSTRAINTS (CONTINGENCY)

PAYLOAD POSITIONS	STS ATTITUDE CONTROL		ISS ATTITUDE CONTROL		
	VERN	ALT	CMG-TA		THRUSTERS ONLY
			MOM MGMT OR ATT HOLD	DESAT REQ	
MANEUVERING FROM MPLM BERTHED TO LOW HOVER					
- CLEARANCE < 2 FT			ALLOWED		
- CLEARANCE > 2 FT	[6]	[6]	ALLOWED	ENA	ALLOWED
AT MPLM LOW HOVER	A12	B12, LO Z	ALLOWED	ENA	ALLOWED
MANEUVERING FROM LOW HOVER TO PRE-INSTALL	[6]	[6]	ALLOWED	ENA	ALLOWED
AT MPLM PRE-INSTALL	A12	B12, LO Z	ALLOWED	ENA	ALLOWED
MANEUVERING FROM MPLM PRE-INSTALL TO MPLM INSTALL					
- CLEARANCE > 2 FT	[6]	[6]	ALLOWED	ENA	ALLOWED
- CLEARANCE < 2 FT			ALLOWED		
AT MPLM INSTALL AFTER CBM A-BOLTS COMPLETE	A12	B12, LO Z	ALLOWED	ENA	ALLOWED
MANEUVERING FROM MPLM PRE-INSTALL TO MPLM LOW HOVER	[6]	[6]	ALLOWED	ENA	ALLOWED
AT MPLM JETTISON	A12 [7]	B12, LO Z [7]	ALLOWED	ENA	ALLOWED

NOTES:

- [1] KEY: THRUSTER FIRING NOT ALLOWED
- [2] SRMS/PAYLOAD POSITIONS DEFINED IN REF DATA
- [3] CONSTRAINTS APPLY TO BOTH BRAKES ON AND POSITION HOLD UNLESS OTHERWISE NOTED
- [4] CONSTRAINTS NOT SHOWN IN THE TABLE ARE NOT ALLOWED
- [5] REFERENCE RULE {A12.1.1-6}, OMS/RCS CONSTRAINTS, FOR USE OF AUTOMATIC ATTITUDE CONTROL IN UNPLANNED CONTINGENCY
- [6] IF SRMS IS ALONG PLANNED TRAJECTORY WITH BRAKES ON OR POSITION HOLD, CLOSED-LOOP SHUTTLE ATTITUDE CONTROL IS PERMITTED. IN ADDITION, SRMS/MPLM MUST BE GREATER THAN 2 FT FROM STRUCTURE (5 FT FOR ALT)
- [7] REAL-TIME UPLINK REQUIRED, IF USED

CUE CARD CONFIGURATION

MPLM BERTH OVERLAY	FS CC 10-2
CBCS CCTV OVERLAY	FS CC 10-3
OVERLAY FOR ROEU PL SEL POSITION.....	FS CC 10-4

**CUE CARD
CONFIG**

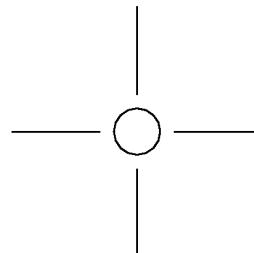
FAB USE ONLY

(reduced copy)

FS CC 10-2

PDRS/121/BAS

Fabricate as transparency



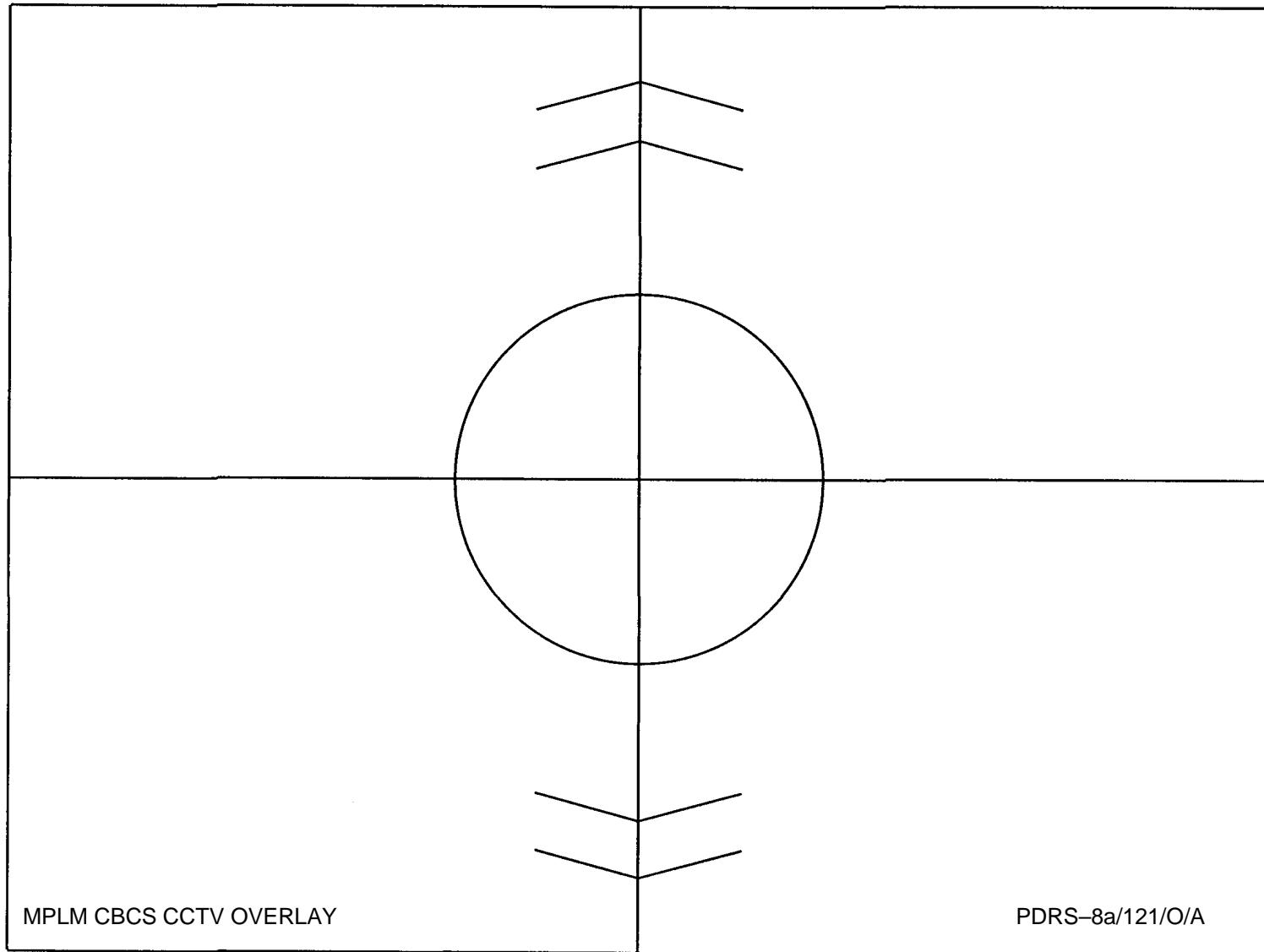
MPLM BERTH OVERLAY

PDRS-7a/121/O/A

FAB USE ONLY

FS CC 10-3

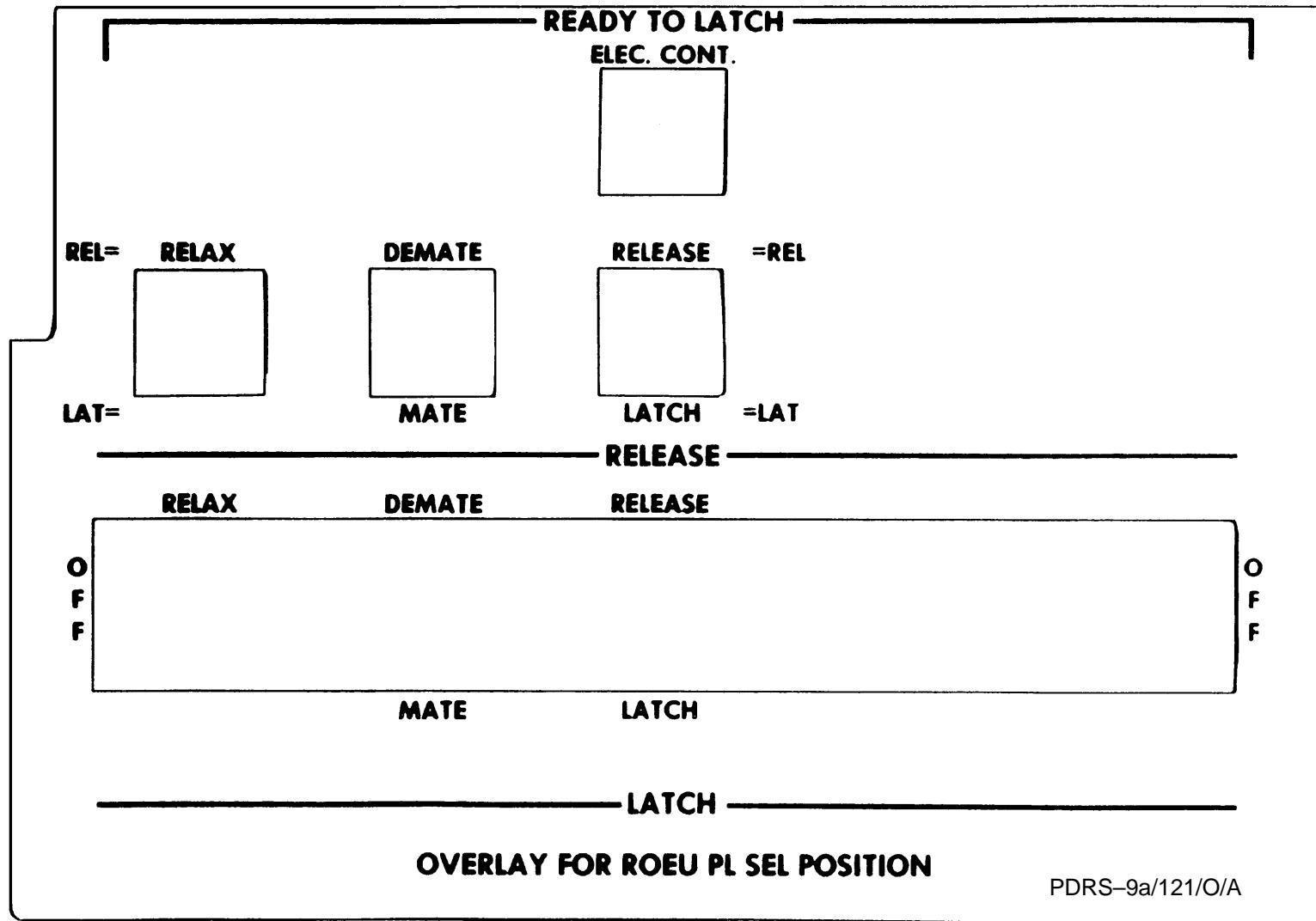
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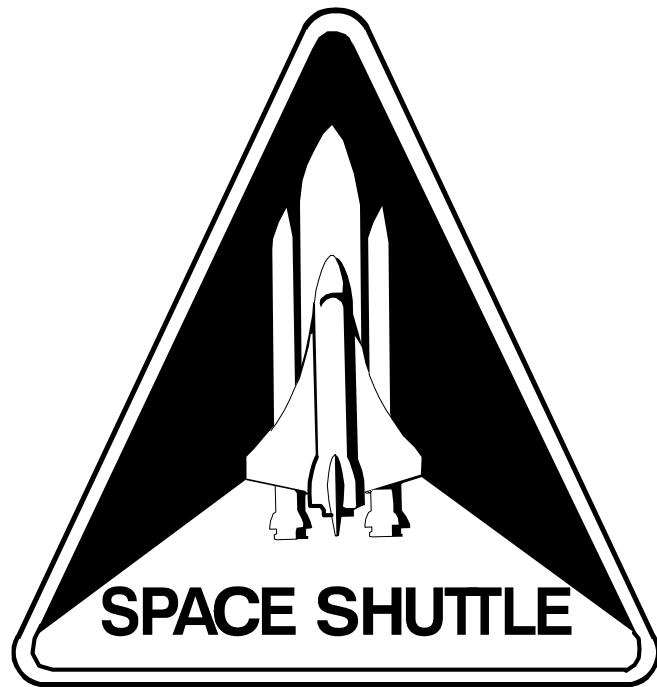
FS CC 10-4

PDRS/121/BAS



Space Shuttle Program
FLIGHT DATA FILE

JSC-48040-121
BASIC



PDRS OPS C/L

**STS
121**