

MICROFILME
AUG 02 1985



PDRS OPS CHECKLIST

**STS
41-C**

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EIS CHECKOUT

EIS CHECKOUT

1 SETUP

A7 CCTV - RMS/Wrist (zoom as reqd)
✓PL BAY FLOOD MID STBD,PORT - OFF
✓FWD STBD,PORT - OFF

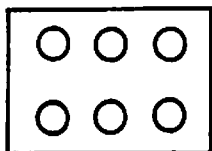
CRT |SM 94 PDRS CONTROL|
✓PL ID, ITEM 3 - 0
✓PL INIT ID, ITEM 24 - 0

2 MANEUVER TO EIS INDICATORS

BRAKES - OFF (tb-OFF)
MODE - ORB UNL, ENTER
Mnvr to GF 1 $X_0 = -919$
 $Y_0 = -69$

When EIS indicators in view,
BRAKES - ON (tb-ON)
✓EIS indicators (six) - black

Record status of EIS indicators, report
to MCC



LDEF ACTIVATION

LDEF ACTIVATION

1 SETUP

A7 CCTV - RMS/Wrist (zoom out)
✓Target overlay attached
✓PL BAY FLOOD MID STBD,PORT - OFF
FWD STBD,PORT - OFF

R11 VTR - ✓Tape

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

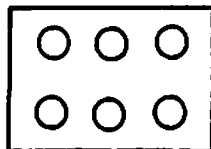
Take 70mm photo of LDEF through either
AFD window

BRAKES - OFF (tb-OFF)
MODE - ORB UNL, ENTER
Mnvr to GF 1 $X_o = -919$
 $Y_o = -69$

2 CYCLE EIS

R11 When grapple fixture in view,
VTR pb - PLAY, RCD
MODE - END EFF, ENTER

Mnvr to grapple envelope
✓BRAKES - OFF (tb-OFF)
✓EIS indicators same as EIS C/O
Record and report if different



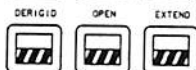
EE MODE - AUTO

EE CAPTURE sw - depress (mom)

✓

RIGID	CLOSE	CAPTURE
☐	☐	☐

 (23 sec max)



BRAKES - ON (tb-ON)

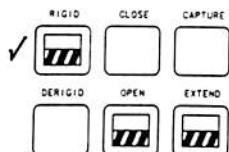
Pause 2.5 min

EE MODE - MAN

BRAKES - OFF (tb-OFF)

MODE - END EFF, ENTER

EE MAN CONTR - DERIGID (for 3 sec after
DERIGID tb-gray)



EE RELEASE sw - depress

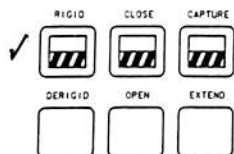
✓

RIGID	CLOSE	CAPTURE
☒	☒	☒
DERIGID	OPEN	EXTEND
☐	☐	☒

 (3 sec max)

Mnvr off grapple fixture

EE MAN CONTR - DERIGID



BRAKES - ON (tb-ON)

Pause 5 min

Record and report EIS indicator status

R11

VTR pb - STOP

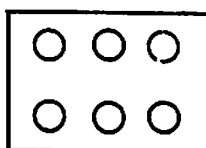
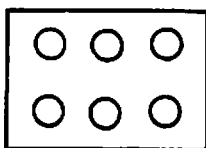
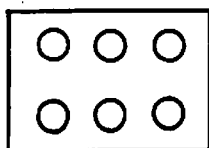
If any EIS indicators go white and none go black, go for DTO

* If any go black or none go white, *
* wait 30 min and perform next *
* cycle. After CYCLE 3, go for *
* deploy regardless of indicators *

CYCLE 1

CYCLE 2

CYCLE 3



3 CLEANUP

RATE sw - VERN (RATE MIN tb-ON)

BRAKES - OFF (tb-OFF)

MODE - END EFF, ENTER

Mnvr arm away from PL

BRAKES - ON (tb-ON)

EE MODE - OFF

LDEF DEPLOY

LDEF DEPLOY

-2:15:00 1 SETUP

A7 CCTV - RMS/Wrist (zoom out)
✓Target overlay attached

R11 VTR - ✓Tape

CRT SM 94 PDRS CONTROL
PL ID - ITEM 3 +1 EXEC
PL INIT ID - ITEM 24 +1 EXEC

NOTE

During UNBERTH and AUTO SEQUENCE,
70mm photos and VTR of as many LDEF
trays as possible are required

2 LDEF GRAPPLE

BRAKES - OFF (tb-OFF)
MODE - ORB UNL, ENTER
Mnvr to GF 2 $X_o = -919$
 $Y_o = +40$

When grapple fixture in view,
EE MODE - AUTO

W9 Take spotmeter reading
70mm Camr photo
16mm Camr - ON (for 1 min)

MODE - END EFF, ENTER
Mnvr to grapple envelope
EE CAPTURE sw - depress (mom)

✓

RIGID	CLOSE	CAPTURE
☐	☐	☐
DERIGID	OPEN	EXTEND
☐	☐	☐

 (23 sec max)

EE MODE - OFF
BRAKES - ON (tb-ON)
16mm Camr - OFF

70mm Camr photos

A7 CCTV - VTR RCD - MUX B & C, Alt with
 elbow document
 unberth/berth

```
R13      PL BAY MECH PWR SYS (two) - ON
A6        PL RETEN PL SEL - 1
          LOGIC PWR SYS (two) - ON
```

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

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

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

R13 LOGIC PWR SYS (two) - OFF
PL BAY MECH PWR SYS (two) - OFF

DAP ROT: PULSE/PULSE/PULSE
Config DAP: B11/MAN/VERN

16mm Camr - ON (for 1 min of unberth)
70mm Camr photos of unberth

RATE sw - VERN (RATE MIN tb-ON), until
clear of guides
BRAKES - OFF (tb-OFF)
MODE - ORB LD, ENTER

Mnvr LDEF to Z = -465

..IF ATTITUDE TRIM DESIRED..

.
. DAP: B11/AUTO/VERN .
. When in attitude, .
. DAP: B11/MAN/VERN .
.....

Berth LDEF

A6

✓PL RETEN RDY 1,2,3,4 tb - gray

..IF ATTITUDE TRIM DESIRED...

.
. Config DAP: B10/AUTO/VERN .
. (CNTL ACCEL = 0) .
. When in attitude, .
. DAP: B10/MAN/VERN .
.....

C360-02 OPS (1 min), (Cue Card, C360 OPS) |

Mnvr LDEF to Z = -550

Roll LDEF to 70°

Mnvr LDEF to Z = -600

R11

BRAKES - ON (tb-ON)
VTR pb - STOP

.. IF ATTITUDE TRIM DESIRED...

.
. Config DAP: B12/AUTO/VERN .
. (CNTL ACCEL = 2) .
. When in attitude, .
. DAP: B12/MAN/VERN .
.....

A6

PL RETEN PL SEL - MON

-1:15:00 4 STANDARD AUTO TRAJECTORY

Verify MCC has ACIP - ON

CRT

SM 94 PDRS CONTROL
PL ID - ITEM 3 +2 EXEC
PL INIT ID - ITEM 24 +2 EXEC
AUTO MODE - ITEM 13 +1 EXEC

OPR CMD to pt 1

-892, 0, -690, 0, 0, 0

SY	SP	EP	WP	WY	WR
-29.6	+96.2	-77.7	-95.3	-22.0	-127.8

BRAKES - ON (tb-ON)

.. IF ATTITUDE TRIM DESIRED...

.
. Config DAP: B13/AUTO/VERN .
. (CNTL ACCEL = 1) .
. When in attitude, .
. DAP: B13/MAN/VERN .
.....

A7

MADS RCDR PWR - PCM/WB ENA
WB/ACIP PCM - ON

R11. VTR pb - PLAY, RCD
BRAKES - OFF (tb-OFF)
MODE - AUTO 1, ENTER (✓READY 1t-ON)

pt 1 -892, 0, -690, 0, 0, 0 (INITIAL)

AUTO SEQ - PRO (✓IN PROG 1t-ON)
✓Moves: UP

pt 2 -892, 0, -750, 0, 0, 0 (PAUSE)

C360-02 OPS (1 min), C360 OPS CUE CARD |

AUTO SEQ - PRO (✓IN PROG 1t-ON)
✓Rotation only

pt 3 -892, 0, -750, 0, 0, 45 (PAUSE)

AUTO SEQ - PRO (✓IN PROG 1t-ON)
✓Moves: FWD, STBD, UP and PITCH

pt 4 -792, +100, -850, 270, 0, 45 (PAUSE)

W7/8 Take spotmeter reading
IMAX - ON (Approx 400 ft)
Perform Lens changeout (30mm to 250mm) |

AUTO SEQ - PRO (✓IN PROG 1t-ON)
✓Moves: AFT, PORT, UP and PITCH thru FLYBY

pt 5 -892, 0, -900, 0, 0, 45 (FLYBY)

then,
✓Moves: DOWN thru FLYBY

pt 6 -892, 0, -750, 0, 0, 45 (FLYBY)

then,
✓Rotation only

pt 7 -892, 0, -750, 0, 0, 0 (FLYBY)

then,
✓Moves: DOWN

pt 8 -892, 0, -690, 0, 0, 0 (FINAL)

R11 ✓/AUTO SEQ lts - off
 Pause 30 sec, then
 VTR pb - STOP
 BRAKES - ON (tb-ON)

A7 MADS WB/ACIP PCM - CMD

..IF ATTITUDE TRIM DESIRED...

. .
. Config DAP: B13/AUTO/VERN .
. (CNTL ACCEL = 1) .
. When in attitude, .
. DAP: B13/MAN/VERN .
.....

CRT

|SM 94 PDRS CONTROL|
PL ID - ITEM 3 +1 EXEC
PL INIT ID - ITEM 24 +1 EXEC

-00:40:00 5 MNVR LDEF TO DEPLOY POSITION/ATTITUDE

CRT SM 94 PDRS CONTROL

✓PL ID, ITEM 3 - 1
✓PL INIT ID, ITEM 24 - 1

OPR CMD to DEPLOY POS/ATT

-926, -14, -630, 16, 10, 90

SY	SP	EP	WP	WY	WR
-17.1	+100.8	-100	-56.7	-32.7	-134.8

BRAKES - ON (tb-ON)

-00:30:00 6 MNVR ORBITER TO DEPLOY ATTITUDE

Change DAP B to B12 (CNTL ACCEL = 2)

CRT GNC UNIV PTG

✓START TIME - in past
TGT ID - 2
BODY VECTOR - 5
P - 164.5
Y - 347
OM - 359
Initiate TRK - ITEM 19 EXEC (CUR - *)
DAP: B12/AUTO/VERN

During maneuver,

CRT GNC 33 REL NAV

RNDZ NAV ENA - ITEM 1 EXEC (*)
✓SV SEL - ITEM 4 (PROP)
FILTER RR - ITEM 13 EXEC (*)
SV TRANSFER ORB TO TGT - ITEM 10 EXEC
FLTR TO PROP - ITEM 8 EXEC
GNC, I/O RESET EXEC
ADI ATT - LVLH
ERR - MED
RATE - LO
SENSE - -Z

A6U

R13
A1U
A2

✓KU ANT - GND
✓PWR - ON
DIGI-DIS SEL - EL/AZ
KU MODE - RDR PASSIVE
RADAR OUTPUT - HI
- MAN SLEW
CNTL - PNL

A2

SIG STRENGTH sel - KU
SLEW RATE - as reqd
SLEW antenna to Elev 0, Az 0, then:
DIGI-DIS SEL - R/R
X-PNTR SCALE - X1

CRT

SM ANTENNA
SELF TEST - ITEM 7 EXEC (*)

NOTE

SELF TEST runs about 3 min

A1U

✓KU SCAN WARN tb - gray
✓TRACK tb - gray
✓SEARCH tb - gray

A2
CRT

✓RANGE - 888.8
SELF TEST - ITEM 7 EXEC (no *)
RDR RNG MIN - ITEM 2 EXEC (*)
DIGI-DIS SEL - EL/AZ
KU RADAR OUTPUT - LOW
KU CNTL - CMD
Install -Z COAS

A7U

CCTV - MON 1 - Camr C
MON 2 - Camr D
Aim C at D and D at C
PAN/TILT - RESET for both
Repeat for Camr A & B

Adjust Camrs A,B & C for tip-off
rate determination

R11

VTR - ✓Tapes

Change DAP A to A11

When in attitude,
DAP: A11/AUTO/VERN
Change DAP B to B7

-00:05:00 7 LDEF RELEASE/TIP-OFF RATE DETERMINATION

A7 CCTV - MON 1 - RMS/Wrist (zoom out)
- MON 2 - Camr D - ZOOM in on LDEF
trunnions, attach overlays

✓LDEF POS/ATT(-926, -14, -630, 16, 10, 90)
Pause until within DB
✓ORB RATES within .01 of +.014, -.062,
+.004

A6 FLT CNTLR PWR - ON
DAP TRANS: PULSE/PULSE/PULSE, LOW Z
DAP ROT: PULSE/PULSE/PULSE
DAP: A11/MAN/NORM
BRAKES - OFF (tb-OFF)

NOTE

Pause 60 to 120 sec in free
drift before release

EE MODE - AUTO
MODE - END EFF, ENTER

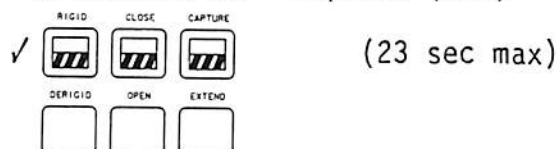
W9 Take spotmeter reading
16mm Camr - ON (for 3 min)
70mm photos

R11 VTR pb - PLAY, RCD
Alternately record 10 sec of
Camr A, B & C

0:00

When OPEN tb - gray, mnvr arm away
from PL

EE RELEASE sw - depress (mom)



BRAKES - ON (tb-ON)

Perform tip-off rate determination,
report to MCC

Regrapple and release if rates >
.025 deg/sec

EE MODE - OFF

+00:03:00 8 PERFORM SEPARATION

✓DAP TRANS: PULSE/PULSE/PULSE, LOW Z
DAP ROT: DISC/DISC/DISC
THC - +Z (out) 10 pulses (~.5 fps)
DAP: B7/MAN/VERN, NORM as reqd

Maintain LDEF in view w/RHC as reqd

Record the following photo documentation
until R = 400 ft,

W7/8

16mm Camr - ON (for 1 min)

Take 70mm photos at 5 min intervals

Take 300 ft of IMAX when convenient

R11

LDEF VTR as convenient

+00:05:00 9 RADAR ACQUISITION

A1 KU CNTL - PNL
CRT GNC 33 REL NAV
KU ANT ENA - ITEM 2 EXEC (*)

A1U ✓KU - MAN SLEW, point antenna at LDEF
- AUTO TRACK
If TRACK tb - bp,
KU SEARCH - SEARCH (tb-gray)

..IF NO LOCK-ON.....

. KU - GPC .
. Maintain LDEF within 30° of .
. -Z axis w/RHC .

.....

When KU TRACK tb - gray,

CRT GNC 33 REL NAV
AUTO RNG - ITEM 17 EXEC (*)
R - ITEM 20 EXEC (*)
ANGLES - ITEM 23 EXEC (*)

CRT SM ANTENNA
RDR RNG AUTO - ITEM 1 EXEC (*)
A1U KU RADAR OUTPUT - HI
A2 DIGI-DIS SEL - R/R

10 SELECT FLTR NAV STATE

CRT GNC 33 REL NAV
✓RESIDs ~0
✓SV UPDATE POS, VEL ~0
SV SEL - ITEM 4 EXEC (FLTR)
KU - GPC

11 CONFIG FOR TARGET TRACK (RNG > 500')

CRT

GNC UNIV PTG

TGT ID - 1

BODY VECTOR - 3

OM - 0

Initiate TRK - ITEM 19 EXEC (CUR - *)

DAP: B7/AUTO/VERN, No LOW Z

A6

FLT CNTLR PWR - OFF

Perform RMS PWRDN, 3-1 (Delete MPM stow
if two motor stow capability exists)

+00:45:00 12 CONFIG KU FOR COMM

CRT

GNC 33 REL NAV

KU ANT ENA - ITEM 2 EXEC (no *)

A1U

KU CNTL - CMD

MODE - COMM

KU - GPC

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SMM DEPLOY

SMM DEPLOY

-60:00 1 MNVR SMM TO RELEASE POSITION/ATTITUDE

A7 CCTV - Setup Camrs to monitor SMM
Record time of release (from MCC), set timer

___/___:___:___

CRT SM 94 PDRS CONTROL
✓PL ID, ITEM 3 - 3
✓PL INIT ID, ITEM 24 - 3
DAP ROT: PULSE/PULSE/PULSE
DAP: B11/MAN/VERN
OPR CMD to release POS/ATT

-913, 0, -867, 270, 344, 0

SY	SP	EP	WP	WY	WR
-31.6	+78.3	-44.9	-67.3	-53.4	+261.6

BRAKES - ON (tb-ON)

-50:00 2 MNVR ORBITER TO RELEASE ATTITUDE

Change DAP A to A12

CRT UNIV PTG
✓START TIME in past
TGT ID - 4
BODY VECTOR - 2
OM - 0
Initiate TRK - ITEM 19 EXEC (CUR - *)

DAP: A12/AUTO/VERN (✓DB IF PRI JETS (1°))

During maneuver,

CRT GNC 33 REL NAV
RNDZ NAV ENA - ITEM 1 EXEC (*)
✓SV SEL - ITEM 4 (PROP)
FILTER RR - ITEM 13 EXEC (*)
SV TRANSFER ORB TO TGT - ITEM 10 EXEC

A6U

FLTR TO PROP - ITEM 8 EXEC
GNC, I/O RESET EXEC
ADI ATT - LVLH
ERR - MED
RATE - LO
SENSE - -Z

R13

✓KU ANT - GND
✓PWR - ON
DIGI-DIS SEL - EL/AZ
KU MODE - RDR PASSIVE
RADAR OUTPUT - HI
- MAN SLEW
CNTL - PNL

A2

SIG STRENGTH sel - KU
SLEW RATE - as reqd
SLEW antenna to Elev 0, Az, 0, then:
DIGI-DIS SEL - R/R
X-PNTR SCALE - X1

CRT

SM ANTENNA
SELF TEST - ITEM 7 EXEC (*)

NOTE

SELF TEST runs about 3 min

A1U

✓KU SCAN WARN tb - gray
✓TRACK tb - gray
✓SEARCH tb - gray

A2
CRT

✓RANGE - 888.8
SELF TEST - ITEM 7 EXEC (no *)
RDR RNG MIN - ITEM 2 EXEC (*)

A2
A1U

DIGI-DIS SEL - EL/AZ
KU RADAR OUTPUT - LOW **

A1

KU MODE - COMM
- GPC
CNTL - CMD

Install -Z COAS

A7U CCTV - MON 1 - Camr C
 MON 2 - Camr D
 Aim C at D and D at C
 PAN/TILT - RESET for both
 Repeat for Camr A & B
RI1 VTR - ✓Tape
 Change DAP B to B7

-05:00 3 SMM RELEASE

A7 CCTV - RMS/Wrist (zoom out)

✓SMM POS/ATT (-913,0,-867,270,344,0)
✓ORB ATT ERR < 10, 10, 10
✓ORB ATT RATES < .01, .01, .01

A6 When AFT ADI PITCH = 350 (LVLH),
 FLT CNTLR PWR - ON
 DAP TRANS: PULSE/PULSE/PULSE, LOW Z
 DAP ROT: PULSE/PULSE/PULSE
 DAP: A12/MAN/NORM
 BRAKES - OFF (tb-OFF)

NOTE

Pause 60 to 120 sec in free
drift before release

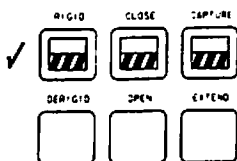
EE MODE - AUTO
MODE - END EFF, ENTER

Continue if MCC has given a GO for release
C360-05 OPS (2.5 min), (Cue Card, C360 OPS)

When OPEN tb - gray, mnvr arm away
from PL

0:00 EE RELEASE sw - depress (mom)

AD1 PITCH
= 0



(23 sec max)

BRAKES - ON (tb-ON)
EE MODE - OFF

+1:00 4 PERFORM SEP

DAP: A12/LVLH/NORM
DAP ROT: DISC/DISC/DISC (PROBABLY 10)
THC - +Z (out) 5 pulses (~.25 fps)
DAP: B7/MAN/VERN, NORM as reqd
Maintain SMM in COAS w/THC as reqd
(LVLH)

W7/8 Take spotmeter reading
16mm Camr - ON (for 15 min)
70mm photos

5 CONFIG FOR SK

CRT |GNC UNIV PTG|
TGT ID - 2
BODY VECTOR - 1 (+X)
OM - 0
Initiate TRK - ITEM 19 EXEC (CUR - *)

Change DAP A to A10

When $R = 200'$, null $\dot{R}$
DAP: B7/AUTO/NORM
THC - as reqd to maintain $\dot{R} = 0$

W7/8 Take spotmeter reading
IMAX - ON (Approx 300 ft)
Perform Lens changeout (250mm - 40mm)

AT TDRS LOS:

6 RADAR ACQUISITION

A1U KU MODE - RDR PASSIVE
KU - MAN SLEW
✓RDR OUTPUT - LOW
KU CNTL - PNL
|GNC 33 REL NAV|
KU ANT ENA - ITEM 2 EXEC (*)
SLEW RATE - as reqd
Slew antenna to target
KU - AUTO TRACK

If TRACK tb - bp,
KU SEARCH - SEARCH (tb-gray)

..IF NO LOCK-ON..

. KU - GPC .
.....

When KU TRACK tb - gray,

CRT |GNC 33 REL NAV|
 AUTO RNG - ITEM 17 EXEC (*)
 R - ITEM 20 EXEC (*)
 Angles - ITEM 23 EXEC (*)

CRT |SM ANTENNA|
A2 RDR RNG AUTO - ITEM 1 EXEC (*)
 DIGI-DIS SEL - R/R

7 SELECT FILTER NAV STATE

CRT |GNC 33 REL NAV|
 ✓RESIDs ~0
 ✓SV UPDATE POS, VEL ~0
A1U SV SEL - ITEM 4 EXEC (FLTR)
 KU - GPC

AT TDRS AOS OR SUNRISE:

8 CONFIG KU FOR COMM

CRT |GNC 33 REL NAV|
 INH RNG ITEM 18 - (*)
 R ITEM 21 - (*)
 Angles ITEM 24 - (*)
 KU ANT ENA - ITEM 2 EXEC (no *)

A1U KU CNTL - CMD
 MODE - COMM
 KU - GPC

AT TDRS LOS:

9 CONFIG KU FOR RADAR

A1U

KU MODE - RDR PASSIVE

✓RDR OUTPUT - LOW

✓KU - GPC

KU CNTL - PNL

CRT

GNC 33 REL NAV

KU ANT ENA - ITEM 2 EXEC (*)

..IF NO LOCK-ON.....

. KU - MAN SLEW .

. SLEW RATE - as reqd .

. Slew antenna to target .

. KU - AUTO TRACK .

. If TRACK tb - bp, .

. KU SEARCH - SEARCH (tb-gray) .

.....

CRT

GNC 33 REL NAV

✓Elev, Az approx 0

If RATIO < 1.0 for four NAV cycles

| AUTO RNG - ITEM 17 EXEC

| R - ITEM 20 EXEC

| Angles - ITEM 23 EXEC

If RATIO < 1.0

1) COVAR REINIT - ITEM 16 EXEC

2) FORCE 3 MARKS

3) PROP TO FLTR - ITEM 9 EXEC

+2:00:00 10
(Terminator
Set)

RADIAL SEP

(LVLH)

DAP: A10/AUTO/NORM

THC - +X (up) 20 pulses (~1.0 fps)

DAP: B7/MAN/NORM

DAP TRANS: PULSE/PULSE/PULSE, No Low Z

DAP ROT: DISC/PULSE/DISC

RHC - as reqd to keep SMM in PI FOV

W7/8

Take spotmeter reading

IMAX - ON (Approx 300 ft)

+2:20:00 11 FINAL SEP

CRT |GNC UNIV PTG|
 TGT ID - 2
 BODY VECTOR - 2 (-X)
 OM - 0
 TRACK - ITEM 19 EXEC (CUR - *)

 When in attitude,
 DAP: A10/AUTO/NORM
 THC - -Z (in) 7 pulses (~.5 fps)
 DAP: B7/AUTO/VERN

A6 FLT CNTLR PWR - OFF

12 DISABLE RNDZ NAV, CONFIG KU FOR COMM

 Perform step 8 CONFIG KU FOR COMM (*Pg 4-6*)

CRT |GNC 33 REL NAV|
 RNDZ NAV ENA - ITEM 1 EXEC (no *)

13 Perform RMS PWRDN, 3-1

RMS POWERUP WITH SMM

RMS POWERUP WITH SMM

(Assumes RMS in TEMP MONITOR)

1 PLB LTS, CCTV ACT

A7

PL BAY FLOOD - as reqd

Perform TV ACT, VTR ACT, (Cue Card, TV/VTR)

TV CAMR PWR as reqd - ON

✓Physical integrity of arm, EE, blankets

2 RMS SEL (IDLE MODE)

✓BRAKES - ON (tb-ON)

✓RMS SEL - OFF

✓PWR - PRI

CRT

SM 94 PDRS CONTROL

✓I/O ON, ITEM 5 - (*)

✓ENA, ITEM 9,11 - (*)

RMS SEL - PORT (if cradled, MA,
C/W RCH LIM 1t-on (SP,EP),
SINGULAR 1t-on (EP))

✓SAFING tb - gray

3 DEPLOY/RELEASE ARM

R13L PL BAY MECH PWR SYS (two) - ON
 ✓PORT RMS - DPY (tb-DPY) (34 sec max), then
 - OFF

PORT RMS RETEN LAT - REL (tb-REL)
 (8 sec max), then
 - OFF

R13L PL BAY MECH PWR SYS (two) - OFF

4 ARM UNCRADLE

PARAM sel - JOINT ANGLE
 BRAKES - OFF (tb-OFF)
 Until clear of MPMs:
 RATE sw - VERN (RATE MIN tb-on)
 MODE - SINGLE, ENTER

SINGLE DR to approx:

	SY	SP	EP	WP	WY	WR
1	0	0	0	+5	0	0
2			+1			
3		+2.5				
4	+10					
5		+25				
6			-25			

BRAKES - ON (tb-ON)

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RMS POWERDOWN WITH SMM

RMS POWERDOWN WITH SMM

1 ARM CRADLE

PRE-CRADLE Ref: (10, 25, -25, +5, 0, 0)

X	Y	Z	P	Y	R
-1252	-241	-517	1	11	359

NOTE

C/W SINGULAR 1t - on (MA) (EP = -7.6)
REACH LIM 1t - on (MA) (EP = -2.4)
(SP = +2.6)

When S/W STOP tb - bp (EP = -0.4)

Then MODE - SINGLE, ENTER

BRAKES - OFF (tb-OFF)

When near MPMs:

RATE sw - VERN

MODE - SINGLE, ENTER

SINGLE DR to:

	SY	SP	EP	WP	WY	WR
1	+10	+25	-25	+5	0	0
2			+1(MA)			
3		2.5(MA)				
4	0					
5		0				
6			0			
7				0		

✓PORT RMS R-F-L tb (three) - gray

BRAKES - ON (tb-ON)

2 LATCH/STOW ARM

R13L

PL BAY MECH PWR SYS (two) - ON

✓PORT RMS R-F-L tb (three) - gray

PORT RMS RETEN LAT - LAT (tb-LAT)
(8 sec max)
- OFF

R13L

PL BAY MECH PWR SYS (two) - OFF

3 CCTV, PLB LTS DEACT

PLB FLOOD (six) - OFF, as reqd
Perform TV DEACT, VTR DEACT, (Cue Card,
TV/VTR)

TV CAMR PWR (five) - OFF, as reqd

4 RMS TEMP MON

✓BRAKES - ON (tb-ON)

RMS SEL - OFF

✓RMS PWR - PRI

CRT

| SM 94 PDPS CONTROL |
✓I/O ON, ITEM 5 - (*)

PARAM sel - PORT TEMP
JOINT - CRIT TEMP

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POISE FOR CAPTURE/SMM CAPTURE

POISE FOR CAPTURE/SMM CAPTURE

1 POISE FOR CAPTURE

CRT |SM 94 PDRS CONTROL|
 PL ID, ITEM 3 +3 EXEC
 PL INIT ID, ITEM 24 +3 EXEC

OPR CMD to poise for capture

-950, -65, -850, 40, 344, 0

SY	SP	EP	WP	WY	WR
-20.7	80.0	-40.8	-84.2	-61.9	118.6

BRAKES - ON (tb-ON)

2 SMM CAPTURE

BRAKES - OFF (tb-OFF)
MODE - END EFF, ENTER
EE MODE - AUTO

When grapple fixture in view,
DAP ROT: PULSE/PULSE/PULSE
DAP: B7/LVLH/VERN

Mnvr to grapple envelope
EE CAPTURE sw - depress (mom)

✓ ☐

☐

☐

(23 sec max)

DERIGID

OPEN

EXTEND



BRAKES - ON (tb-ON)
EE MODE - OFF

SMM BERTH

SMM BERTH

1 BERTH SMM

BRAKES - OFF (tb-OFF)

MODE - ORB LD, ENTER

Mnvr SMM to Z = -575, pitch negative to 340°

BRAKES - ON (tb-ON)

OPR CMD to above berthed position

-1217, 0, -575, 0, 0, 0

MODE - ORB LD, ENTER

Berth SMM

Perform SMM BERTH (PL OPS, SMM OPERATIONS),
then:

2 UNGRAPPLE SMM

A7

CCTV - RMS/Wrist (zoom out)

EE MODE - AUTO

RATE sw - VERN (RATE MIN tb-ON)

MODE - END EFF, ENTER

When OPEN tb - gray, mnvr arm away from
grapple fixture

EE RELEASE sw - depress (mom)

✓

RIGID	CLOSE	CAPTURE
RIGID	OPEN	EXTEND

 (23 sec max)

Mnvr arm clear of Orbiter, payload

BRAKES - ON (tb-ON)

EE MODE - OFF

SMM UNBERTH

SMM UNBERTH

1 GRAPPLE SMM

A7 CCTV - RMS/Wrist (zoom out)
✓Target overlay attached

CRT SM 94 PDRS CONTROL
PL ID - ITEM 3 +3 EXEC
PL INIT ID - ITEM 24 +3 EXEC

BRAKES - OFF (tb-OFF)
MODE - ORB UNL, ENTER
Mnvr to grapple fixture

When grapple fixture in view,
EE MODE - AUTO
MODE - END EFF, ENTER
Mnvr to grapple envelope
EE CAPTURE sw - depress (mom)

✓

RIGID	CLOSE	CAPTURE
☐	☐	☐
DERIGID	OPEN	FF*END

 (23 sec max)

EE MODE - OFF
BRAKES - ON (tb-ON)

Perform SMM UNBERTH (PL OPS,
SMM OPERATIONS), then:

2 UNBERTH SMM

A7 CCTV - Adjust Camrs to monitor SMM

DAP ROT: PULSE/PULSE/PULSE
Config DAP: B11/MAN/VERN

CRT

|SM 94 PDRS CONTROL|
PL ID - ITEM 3 +3 EXEC
PL INIT ID - ITEM 24 +3 EXEC

RATE sw - VERN (RATE MIN tb-ON), until
clear of guides
BRAKES - OFF (tb-OFF)
MODE - ORB LD, ENTER
Mnvr SMM to Z = -575
BRAKES - ON (tb-ON)

3 POSITION SMM IN PARKED POSITION

CRT

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

✓DAP ROT: PULSE/PULSE/PULSE
✓DAP: B11/MAN/VERN

BRAKES - OFF (tb-OFF)
MODE - ORB LD, ENTER
YAW + to 45°

OPR CMD to parked configuration

-900, 0, -650, 270, 294, 0

SY	SP	EP	WP	WY	WR
-20.9	87.0	-121.8	93.8	-53.6	-16.9

BRAKES - ON (tb-ON)
DAP: B11/AUTO/VERN

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OFF-NOMINAL OPERATIONS

LDEF CAMERA A DEPLOY

Make the following changes to the nominal LDEF DEPLOY
(Section 3)

FS 3-7 Change DEPLOY POS/ATT to:

-926, -14, -630, 16, 349, 90

Change joint angles to:

SY	SP	EP	WP	WY	WR
-17.5	+90.4	-88.4	-79.9	-37.1	-158.2

Change the following UNIV PTG parameter:
Y - 11.0

FS 3-9 Delete 'MON 2 - Camr D'

Change 'Aim C at D and D at C' to 'Aim C at D'

Change ' - MON 2 - Camr D - ZOOM in on LDEF
trunnions, attach overlays'
to ' - MON 2 - Camr A - ZOOM in on LDEF
trunnions, attach overlays'

FS 3-10 Change '✓LDEF POS/ATT (-926,-14,-630,16,10,90)'
to '✓LDEF POS/ATT (-926,-14,-630,16,349,90)'

Change '✓ORB RATES within .01 of +.014, -.062,
+.004'
to '✓ORB RATES within .01 of -.014, -.062,
-.004'

Change 'Alternately record 10 sec of Camr A,
B & C'
to 'Alternately record 10 sec of Camr B & C'

LDEF STBD GF BACKOFF/GRAPPLE - SINGLE JOINT

(Motion of target on CCTV monitor)

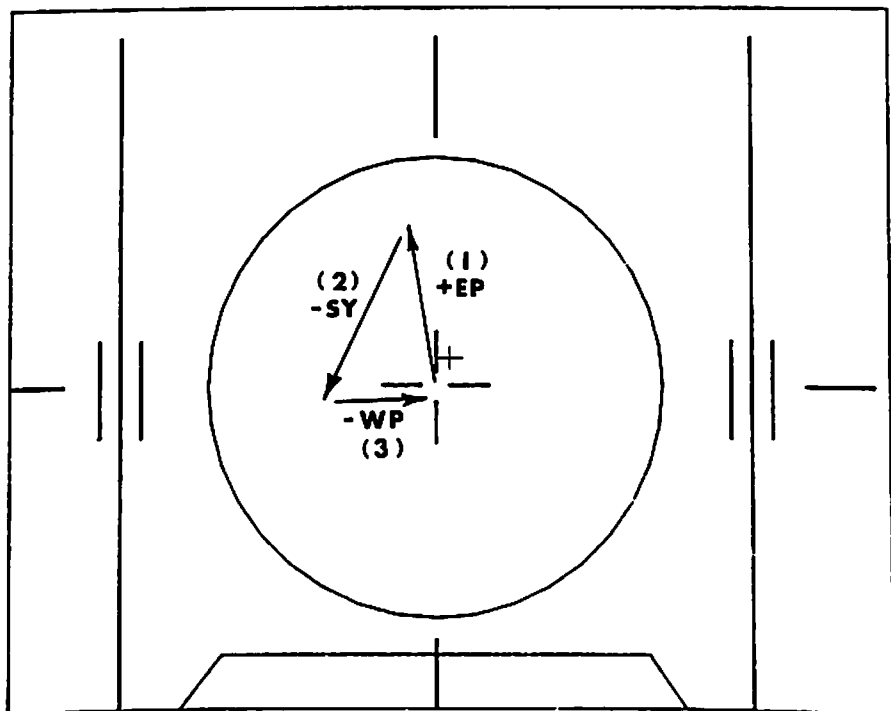
✓OPEN tb - gray

A7

CCTV - RMS/Wrist (zoom out)

Drive joints in order indicated until end effector is clear of grapple fixture

To grapple, drive joints in opposite order indicated until end effector is over grapple fixture



LDEF PORT GF BACKOFF/GRAPPLE - SINGLE JOINT

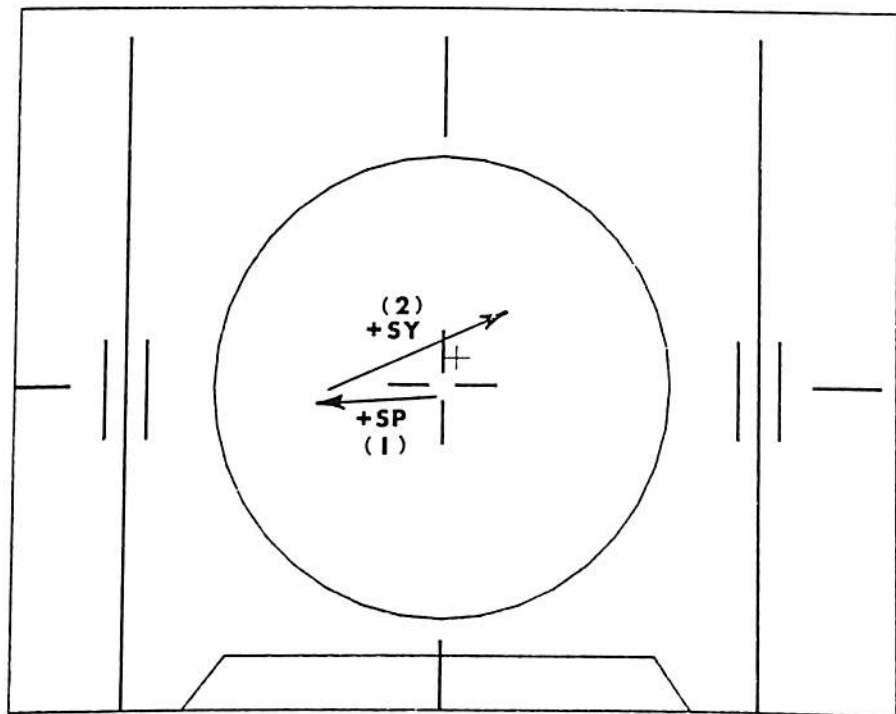
(Motion of target on CCTV monitor)

✓OPEN tb - gray

A7 CCTV - RMS/Wrist (zoom out)

Drive joints in order indicated until end effector is clear of grapple fixture

To grapple, drive joints in opposite order indicated until end effector is over grapple fixture



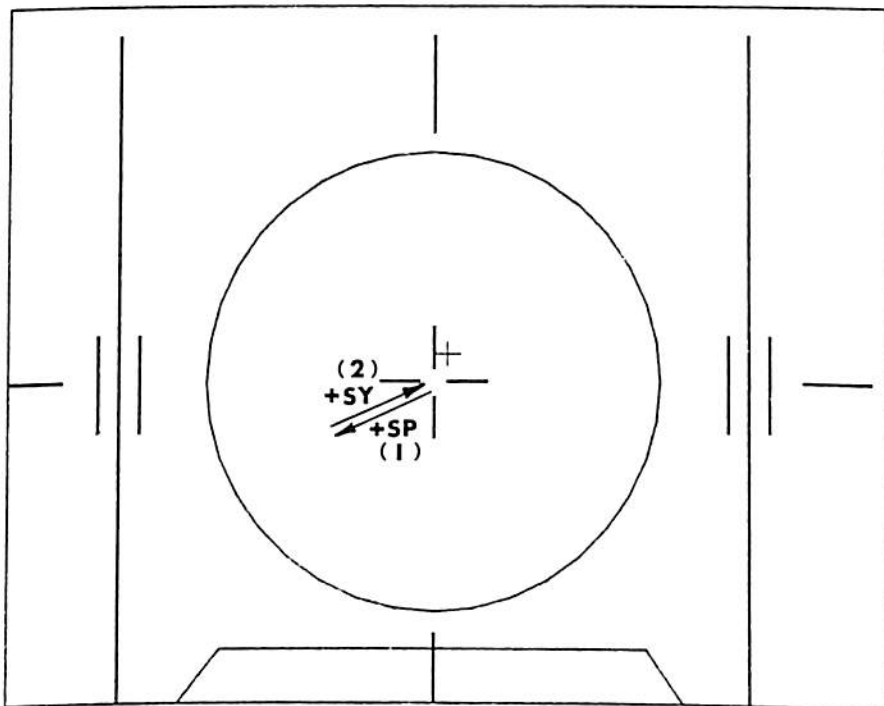
STBD
LDEF PORT GF BACKOFF, DEPLOY POSITION -
SINGLE JOINT (Motion of target on CCTV monitor)

✓OPEN tb - gray

A7

CCTV - RMS/Wrist (zoom out)

Drive joints in order indicated until end effector is clear of grapple fixture



SMM EXISTING GF BACKOFF/GRAPPLE - SINGLE JOINT

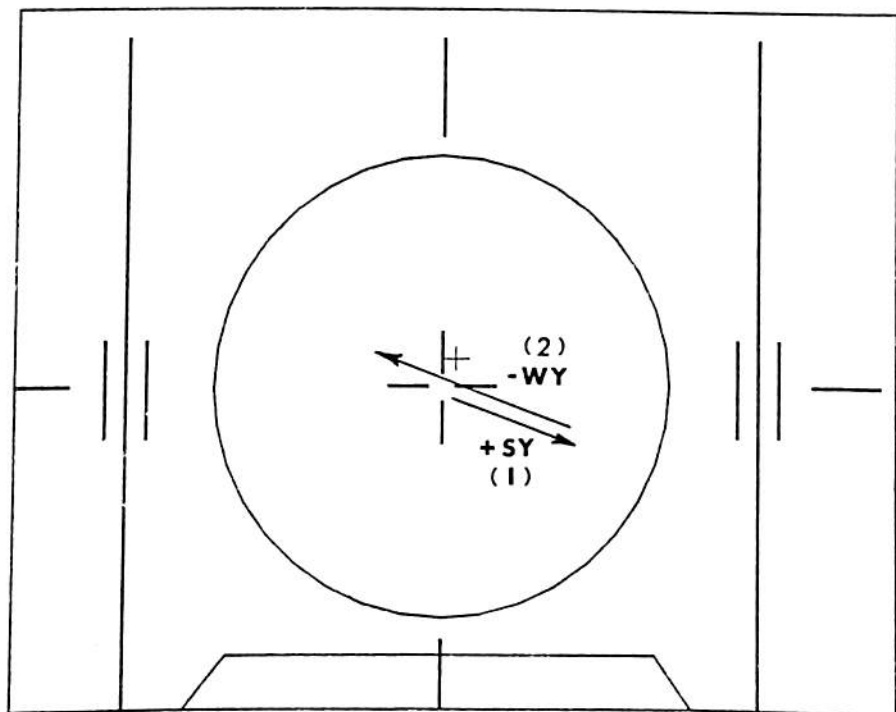
(Motion of target on CCTV monitor)

✓OPEN tb - gray

A7 CCTV - RMS/Wrist (zoom out)

Drive joints in order indicated until end effector is clear of grapple fixture

To grapple, drive joints in opposite order indicated until end effector is over grapple fixture



SMM TPAD GF BACKOFF/GRAPPLE - SINGLE JOINT

(Motion of target on CCTV monitor)

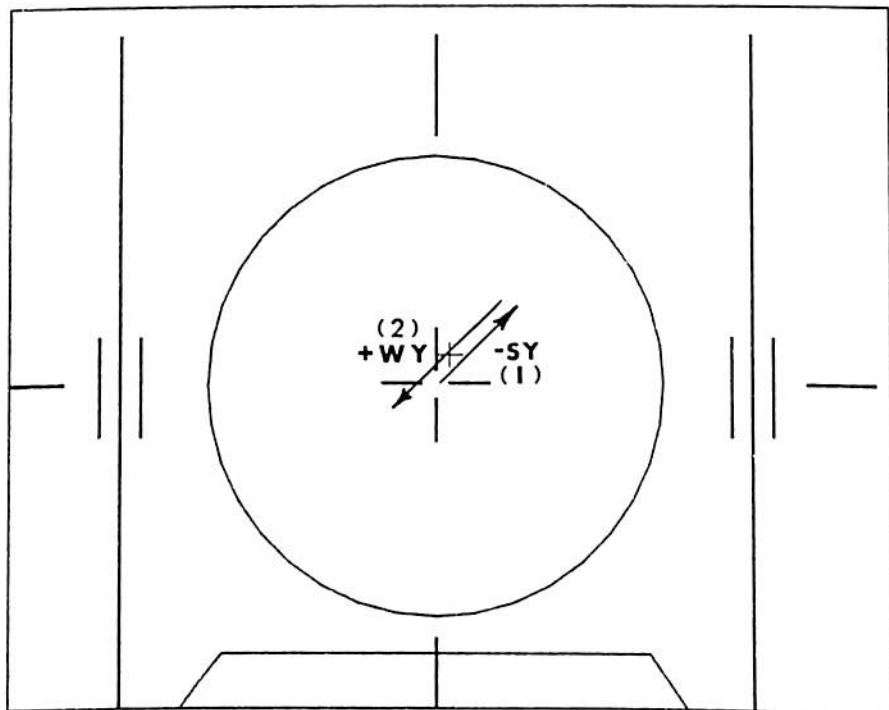
✓OPEN tb - gray

A7

CCTV - RMS/Wrist (zoom out)

Drive joints in order indicated until end effector is clear of grapple fixture

To grapple, drive joints in opposite order indicated until end effector is over grapple fixture

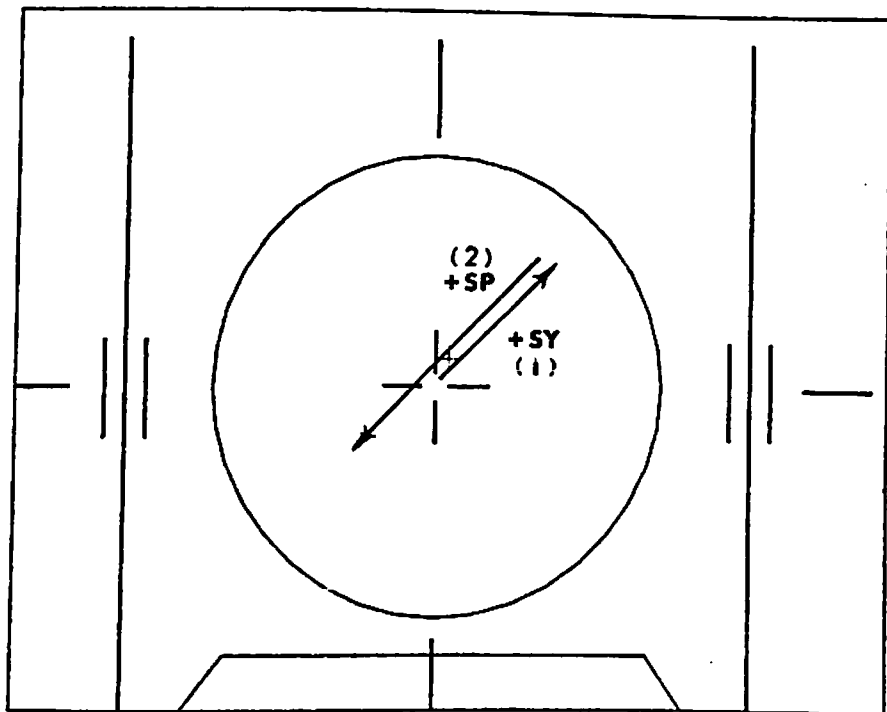


**SMM EXISTING GF BACKOFF, DEPLOY POSITION -
SINGLE JOINT** (Motion of target on CCTV monitor)

✓OPEN tb - gray

A7 CCTV - RMS/Wrist (zoom out)

Drive joints in order indicated until end
effector is clear of grapple fixture



**POSITIONS/ATTITUDES AND JOINT ANGLES FOR
BACKED OFF* END EFFECTOR**

LDEF PORT GF - PL ID 0

X = -920, Y = -82, Z = -447, P = 270, Y = 300, R = 180,
SY = 2.7, SP = 81.8, EP = -127, WP = -47, WY = -40.5,
WR = 196.0

LDEF STBD GF - PL ID 0

X = -920, Y = 47, Z = -482, P = 270, Y = 30, R = 180,
SY = -39.9, SP = 63.1, EP = -106.6, WP = -83.4,
WY = 35.6, WR = -107.8

SMM EXISTING GF - PL ID 0

X = -1203, Y = -50, Z = -482, P = 0, Y = 286, R = 181,
SY = -1.8, SP = 27.6, EP = -42.2, WP = -31.8,
WY = -63.8, WR = 151

SMM TPAD GF - PL ID 0

X = -1158, Y = 17, Z = -512, P = 0, Y = 16, R = 91,
SY = -20, SP = 40.2, EP = -72.4, WP = 38.6, WY = 35,
WR = 87.5

*End effector is backed off 18-in. from rigidized
position

LDEF PRCS DEPLOY

Make the following changes to the nominal LDEF DEPLOY
(Section 3)

- FS 3-3 Change 'Config DAP: B11/MAN/VERN'
to 'Config DAP: A11/MAN/NORM, LOW Z'
- FS 3-4 Delete 'IF ATTITUDE TRIM DESIRED' boxes
- FS 3-5 Delete 'IF ATTITUDE TRIM DESIRED' boxes
- FS 3-7 Delete 'IF ATTITUDE TRIM DESIRED' boxes
- Delete 'Change DAP B to B12 (CNTL ACCEL = 2)'
- Change 'DAP: B12/AUTO/VERN'
to 'DAP: A11/AUTO/NORM, LOW Z'
- FS 3-9 Delete 'Change DAP A to A11'
- Delete 'DAP: A11/AUTO/VERN'
- FS 3-10 Change 'DAP: B7/MAN/VERN, NORM as reqd'
to 'DAP: B7/MAN/NORM'

SMM PRCS DEPLOY

Make the following changes to the nominal SMM DEPLOY
(Section 4)

- FS 4-2 Change 'DAP: B11/MAN/VERN'
to 'DAP: B11/MAN/NORM, LOW Z'
- Change 'DAP: A12/AUTO/VERN'
to 'DAP: A12/AUTO/NORM, LOW Z'
- FS 4-5, Change all DAP callouts from VERN jets to
4-6 NORM jets

LDEF SINGLE JOINT DEPLOY

LDEF SINGLE JOINT DEPLOY

1 LDEF ACTIVATION

A7

CCTV - RMS/Wrist (zoom out)
✓Target overlay attached
✓PL BAY FLOOD MID STBD,PORT - OFF
✓FWD STBD,PORT - OFF

CRT

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

Take 70mm photo of LDEF through either
AFD window

MODE - best available
Mnvr to GF 1 $X_0 = -919$
 $Y_0 = -69$

Mnvr to grapple envelope using sequence
on FS 10-4
EE MODE - AUTO, if available
EE CAPTURE sw - depress (mom)

	RIGID	CLOSE	CAPTURE	
✓				(23 sec max)
	DERIGID	OPEN	EXTEND	
				

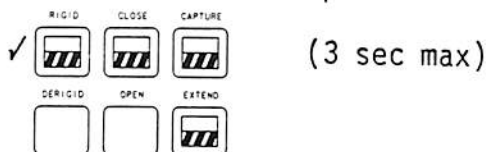
BRAKES - ON (tb-ON)

Pause 2.5 min

EE MODE - MAN
EE MAN CONTR - DERIGID (for 3 sec after
DERIGID tb-gray)

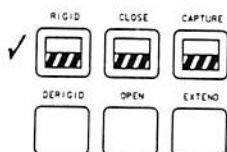
✓			
	DERIGID	OPEN	EXTEND
			

EE RELEASE sw - depress



Mnvr off grapple fixture using sequence on FS 10-4

EE MAN CONTR - DERIGID



Pause 5 min

Record and report EIS indicator status

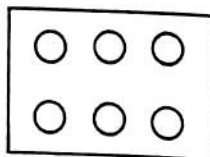
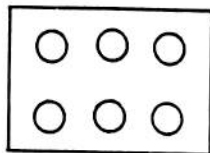
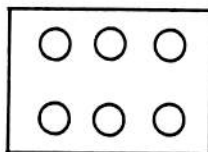
If any EIS indicators go white and none go black, go for deploy

- * If any go black or none go white, *
- * wait 30 min and perform next *
- * cycle. After CYCLE 3, go for *
- * deploy regardless of indicators *

CYCLE 1

CYCLE 2

CYCLE 3



Mnvr arm away from PL

EE MODE - OFF

2 LDEF GRAPPLE

A7 CCTV - RMS/Wrist (zoom out)
✓Target overlay attached

R11 VTR - ✓Tape

CRT SM 94 PDRS CONTROL
PL ID - ITEM 3 +1 EXEC
PL INIT ID - ITEM 24 +1 EXEC

NOTE

During UNBERTH, 70mm photos and
VTR of as many LDEF trays as
possible are required

MODE - best available
Mnvr to GF 2 $X_0 = -919$
 $Y_0 = +40$

When grapple fixture in view,
EE MODE - AUTO, if available

W9 Take spotmeter reading
70mm Camr photo
16mm Camr - ON (for 1 min)

Mnvr to grapple envelope using sequence
on FS 10-3

EE CAPTURE sw - depress (mom)

✓

RIGID	CLOSE	CAPTURE
☐	☐	☐
DERIGID	OPEN	EXTEND

 (23 sec max)

EE MODE - OFF

W9 70mm Camr photo

3 TRUNNION RELEASE/UNBERTH

A7 CCTV - VTR RCD - MUX B & C, Alt with D
document unberth

R11 VTR pb - PLAY,RCD

R13 PL BAY MECH PWR SYS (two) - ON
A6 PL RETEN PL SEL - 1
LOGIC PWR SYS (two) - ON

Note any single motor times (> 30 sec)

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

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

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

LOGIC PWR SYS (two) - OFF

R13 PL BAY MECH PWR SYS (two) - OFF

DAP ROT: PULSE/PULSE/PULSE
Config DAP: B11/MAN/VERN

W9 Take spotmeter reading
16mm Camr - ON (for 1 min of unberth)
70mm Camr photos of unberth

C360-02 OPS (1 min), (Cue Card, C360 OPS)

Mnvr LDEF to ~9 ft above guides using control scheme below

Desired PL Motion	Input
+X _{ORB}	-EP
+Y _{ORB}	-SY
-Z _{ORB}	+SP
+P _{ORB}	+WP
+Y _{ORB}	+WR/-WP, -EP
+R _{ORB}	-WY/-WR, +WP

Input +EP for -X movement after above guides

Input +EP for -Z movement after 4-5 ft above guides

A6 PL RETEN PL SEL - MON

Take spotmeter reading
C360-02 OPS (1 min), (Cue Card, C360 OPS)
IMAX - ON (Approx 400 ft)
Perform Lens changeout (30mm to 250mm)

Roll LDEF to +90° by moving each joint the following amount:

SY	SP	EP	WP	WY	WR
+32	+26	-25	+50	-74	-37

A7 CCTV - MON 2 - Camr D

Aim D at C

PAN/TILT - RESET

PAN to +10°, TILT to +16°

Mnvr LDEF to align port trunnions in Camr D view and align trunnions parallel to Z axis

-00:30:00 4 MNVR ORBITER TO DEPLOY ATTITUDE

Change DAP B to B12

CRT

GNC UNIV PTG

✓START TIME - in past

TGT ID - 2

BODY VECTOR - 5

P - 164.5

Y - 347

OM - 359

Initiate TRK - ITEM 19 EXEC (CUR - *)

DAP: B12/AUTO/VERN

CRT

During maneuver,

GNC 33 REL NAV

RNDZ NAV ENA - ITEM 1 EXEC (*)

✓SV SEL - ITEM 4 (PROP)

FILTER RR - ITEM 13 EXEC (*)

SV TRANSFER ORB TO TGT - ITEM 10 EXEC

FLTR TO PROP - ITEM 8 EXEC

GNC, I/O RESET EXEC

ADI ATT - LVLH

ERR - MED

RATE - LO

SENSE - -Z

A6U

R13

A1U

A2

✓KU ANT - GND

✓PWR - ON

DIGI-DIS SEL - EL/AZ

KU MODE - RDR PASSIVE

RADAR OUTPUT - HI

- MAN SLEW

CNTL - PNL

SIG STRENGTH sel - KU

SLEW RATE - as reqd

SLEW antenna to Elev 0, Az 0, then:

DIGI-DIS SEL - R/R

X-PNTR SCALE - X1

A2

CRT

SM ANTENNA

SELF TEST - ITEM 7 EXEC (*)

NOTE
SELF TEST runs about 3 min

A1U ✓KU SCAN WARN tb - gray
 ✓TRACK tb - gray
 ✓SEARCH tb - gray

A2 ✓RANGE - 888.8
CRT SELF TEST - ITEM 7 EXEC (no *)
 RDR RNG MIN - ITEM 2 EXEC (*)
A2 DIGI-DIS SEL - EL/AZ
A1U KU RADAR OUTPUT - LOW
 KU CNTL - CMD
 Install -Z COAS

A7U CCTV - MON 1 - Camr C
 MON 2 - Camr D
 Aim C at D and D at C
 PAN/TILT - RESET for both
 Repeat for Camr A & B

 Adjust Camrs A,B & C for tip-off
 rate determination

R11 ° VTR - ✓Tapes

 Change DAP A to A11

 When in attitude,
 DAP: A11/AUTO/VERN
 Change DAP B to B7

+00:05:00 5 LDEF RELEASE/TIP-OFF RATE DETERMINATION

A7 CCTV - MON 1 - RMS/Wrist (zoom out)
- MON 2 - Camr D - ZOOM in on LDEF
trunnions, attach overlays

Pause until within DB

A6 ✓ORB RATES within .01 of +.014,-.062,+.004|
FLT CNTLR PWR - ON
DAP TRANS: PULSE/PULSE/PULSE, LOW Z
DAP ROT: PULSE/PULSE/PULSE
DAP: A11/MAN/NORM

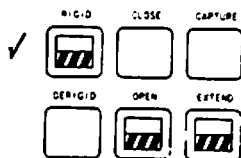
NOTE

Pause 60 to 120 sec in free
drift before release

R11 VTR - PLAY, RCD
Alternately record 10 sec of A,B & C

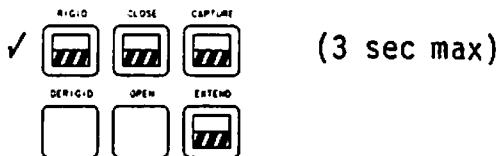
EE MODE - MAN

EE MAN CONTR - DERIGID (until DERIGID
tb-gray)



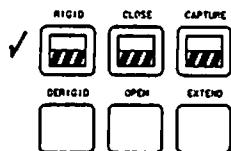
0:00

EE RELEASE sw - depress



Mnvr off grapple fixture using control
scheme on FS 10-5

EE MAN CONTR - DERIGID



Perform tip-off rate determination,
report to MCC

+00:03:00 6 PERFORM SEPARATION

✓DAP TRANS: PULSE/PULSE/PULSE, LOW Z
DAP ROT: DISC/DISC/DISC
THC - +Z (out) 10 pulses (~.5 fps)
DAP: B7/MAN/VERN, NORM as reqd

Maintain LDEF in view w/RHC as reqd

Record the following photo documentation
until R = 400 ft,

W7/8 16mm Camr - ON (for 1 min)
Take 70mm photos at 5 min intervals
Take 300 ft of IMAX when convenient
R11 LDEF VTR as convenient

+00:04:00 7 RADAR ACQUISITION

KU CNTL - PNL
|GNC 33 REL NAV|
KU ANT ENA - ITEM 2 EXEC (*)

A1U ✓KU - MAN SLEW, point antenna at LDEF
- AUTO TRACK
If TRACK tb - bp,
KU SEARCH - SEARCH (tb-gray)

..IF NO LOCK-ON.....
.
. KU - GPC .
. Maintain LDEF within 30° .
. of -Z axis w/RHC .
.....

CRT

When KU TRACK tb - gray,

|GNC 33 REL NAV|

AUTO RNG - ITEM 17 EXEC (*)

R - ITEM 20 EXEC (*)

Angles - ITEM 23 EXEC (*)

CRT

|SM ANTENNA|

RDR RNG AUTO - ITEM 1 EXEC (*)

A1U

KU RADAR OUTPUT - HI

A2

DIGI-DIS SEL - R/R

8 SELECT FLTR NAV STATE

CRT

|GNC 33 REL NAV|

✓RESIDs ~0

✓SV UPDATE POS, VEL ~0

SV SEL - ITEM 4 EXEC (FLTR)

KU - GPC

9 CONFIG FOR TARGET TRACK (RNG > 500')

CRT

|GNC UNIV PTG|

TGT ID - 1

BODY VECTOR - 3

OM - 0

Initiate TRK - ITEM 19 EXEC (CUR - *)

A6

DAP: B7/AUTO/VERN

FLT CNTLR PWR - OFF

Perform RMS PWRDN, 3-1 or BACKUP
CRADLE, 5-44 (Delete MPM stow if two
motor stow capability exists)

+00:45:00 10 CONFIG KU FOR COMM

CRT

|GNC 33 REL NAV|

KU ANT ENA - ITEM 2 EXEC (no *)

A1U

KU CNTL - CMD

MODE - COMM

KU - GPC

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SMM SINGLE JOINT CAPTURE

SMM SINGLE JOINT CAPTURE

1 POISE FOR CAPTURE

CRT

|SM 94 PDRS CONTROL|

PL ID, ITEM 3 +3 EXEC

PL INIT ID, ITEM 24 +3 EXEC

Mnvr to poise to capture configuration

SY	SP	EP	WP	WY	WR
-90	+123	-79	-64	0	+200

2 SMM CAPTURE

EE MODE - AUTO, if available

When grapple fixture in view,

DAP ROT: PULSE/PULSE/PULSE

DAP: B7/MAN/VERN

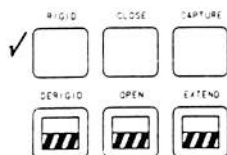
Mnvr to grapple envelope using control scheme below

NOTE

Desired End Effector motion is in End Effector Axis System

Desired EE Motion	Input
$+X_{EE}$	-SP
$+Y_{EE}$	-SY
$+Z_{EE}$	+EP
$+P_{EE}$	-WP
$+Y_{EE}$	-WY
$+R_{EE}$	+WR

EE CAPTURE sw - depress (mom)



(23 sec max)

EE MODE - OFF

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SMM SINGLE JOINT BERTH

SMM SINGLE JOINT BERTH

1 MNVR TO HIGH HOVER

CRT

SM 94 PDRS CONTROL

✓PL ID, ITEM 3 - 3

✓PL INIT ID, ITEM 24 - 3

Mnvr SMM to high hover position

2 BERTH SMM

A7

CCTV - Setup camrs to monitor SMM

Berth SMM using the control scheme below

<u>Desired PL Motion</u>	<u>Input</u>
+XORB	-EP
+YORB	-SY
+ZORB	-SP
+PORB	+WP, -WR
+YORB	+WY
+RORB	+WR, +WP

Perform SMM BERTH (PL OPS,
SMM OPERATIONS) then,

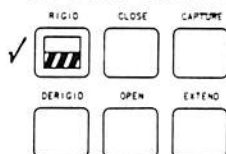
3 UNGRAPPLE SMM

A7

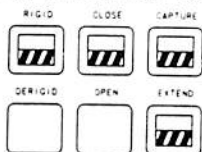
CCTV - RMS/Wrist (zoom out)

EE MODE - MAN

EE MAN CONTR - DERIGID (until DERIGID
tb-gray)

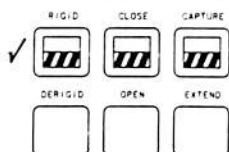


EE RELEASE sw - depress



Mnvr off grapple fixture using control
scheme on FS 10-8

EE MAN CONTR - DERIGID



Mnvr arm away from PL

EE MODE - OFF

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SMM SINGLE JOINT UNBERTH

SMM SINGLE JOINT UNBERTH

1 GRAPPLE SMM

A7 CCTV - RMS/Wrist (zoom out)
✓Target overlay attached

CRT SM 94 PDRS CONTROL
PL ID - ITEM 3 +3 EXEC
PL INIT ID - ITEM 24 +3 EXEC

MODE - best available

Mnvr to grapple fixture

EE MODE - AUTO, if available

Mnvr to grapple envelope using sequence
on FS 10-6

EE CAPTURE sw - depress (mom)

✓

RIGID	CLOSE	CAPTURE
☐	☐	☐
DERIGID	OPEN	EXTEND

 (23 sec max)

EE MODE - OFF

Perform SMM UNBERTH (PL OPS,
SMM OPERATIONS) then:

2 UNBERTH SMM

DAP ROT: PULSE/PULSE/PULSE
Config DAP: B11/MAN/VERN

Mnvr SMM clear of FSS using control
scheme below

Desired PL Motion	Input
+XORB	-EP
+YORB	-SY
-ZORB	+SP
+PORB	+WP, -WR
+YORB	+WY
+RORB	+WR, +WP

3 POSITION SMM IN PARKED POSITION

CCTV - MON 1 - Camr A

MON 2 - Camr D

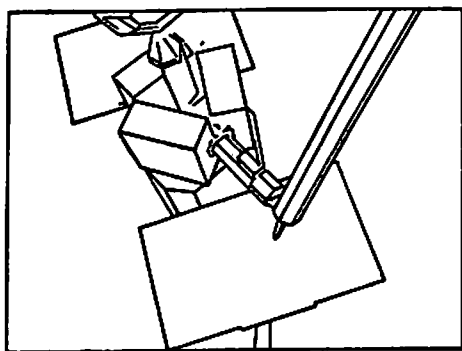
Aim C at D and D at C

PAN/TILT - RESET for both

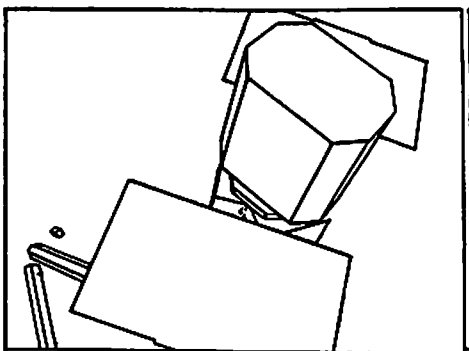
Camr A - Pan to -7° , Tilt to $+25^{\circ}$

Camr B - Pan to $+10^{\circ}$, Tilt to $+30^{\circ}$

Mnvr SMM so that view in monitor matches
the following figures:



CAMR A



CAMR B

-900, 0, -650, 270, 294, 0

SY	SP	EP	WP	WY	WR
-20.9	87.0	-121.8	93.8	-53.6	-16.9

SMM SINGLE JOINT DEPLOY

SMM SINGLE JOINT DEPLOY

1 SETUP

A7

CCTV - MON 1 - Camr A

MON 2 - Camr B

Aim C at D and D at C

PAN/TILT - RESET for both

Camr A - Pan to -3.00° , Tilt to $+50.00^\circ$

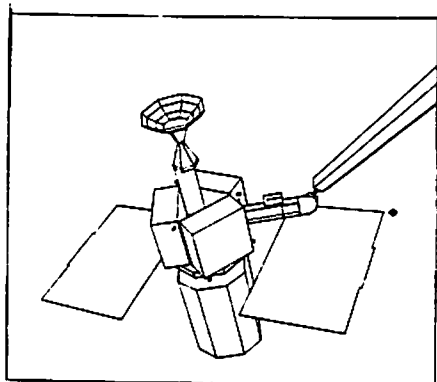
Camr B - Pan to $+10.00^\circ$, Tilt to $+50.00^\circ$

MODE - best available

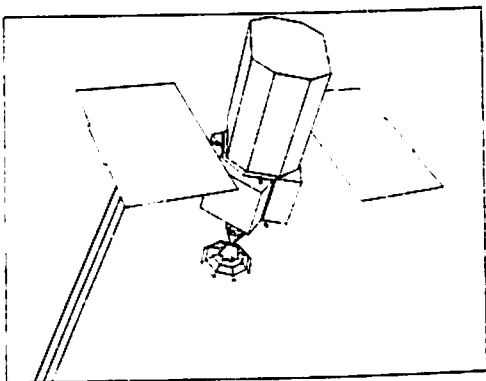
DAP ROT: PULSE/PULSE/PULSE

DAP: B11/MAN/VERN

Mnvr SMM so that view in monitor matches
the following figures:



CAMR A



CAMR B

-00:50:00 2 MNVR ORBITER TO RELEASE ATTITUDE

Change DAP A to A12

CRT

|UNIV PTG|
✓START TIME in past
TGT ID - 4
BODY VECTOR - 2
OM - 0
Initiate TRK - ITEM 19 EXEC (CUR - *)

DAP: A12/AUTO/VERN

CRT

During maneuver,
|GNC 33 REL NAV|
RNDZ NAV ENA - ITEM 1 EXEC (*)
✓SV SEL - ITEM 4 (PROP)
FILTER RR - ITEM 13 EXEC (*)
SV TRANSFER ORB TO TGT - ITEM 10 EXEC
FILTER TO PROP - ITEM 8 EXEC
GNC, I/O RESET EXEC

A6U

ADI ATT - LVLH
ERR - MED
RATE - LO
SENSE - -Z

R13

✓KU ANT - GND
✓PWR - ON
DIGI-DIS SEL - EL/AZ
KU MODE - RDR PASSIVE
RADAR OUTPUT - HI
- MAN SLEW
CNTL - PNL

A2

SIG STRENGTH sel - KU
SLEW RATE - as reqd
SLEW antenna to Elev 0, Az, 0, then:
DIGI-DIS SEL - R/R
X-PNTR SCALE - X1

CRT

SM ANTENNA

SELF TEST - ITEM 7 EXEC (*)

NOTE

SELF TEST runs about 3 min

A1U

✓KU SCAN WARN tb - gray

✓TRACK tb - gray

✓SEARCH tb - gray

A2

✓RANGE - 888.8

CRT

SELF TEST - ITEM 7 EXEC (no *)

RDR RNG MIN - ITEM 2 EXEC (*)

A2

DIGI-DIS SEL - EL/AZ

A1U

KU RADAR OUTPUT - LOW

A1

KU MODE - COMM

- GPC

CNTL - CMD

Install -Z COAS

A7U

CCTV - MON 1 - Camr C

MON 2 - Camr D

Aim C at D and D at C

PAN/TILT - RESET for both

Repeat for Camr A & B

R11

VTR - ✓Tape

Change DAP B to B7

-05:00

3 SMM RELEASE

A7

CCTV - RMS/Wrist (zoom out)

✓ORB ATT ERR < 1⁰, 1⁰, 1⁰

✓ORB ATT RATES < .01, .01, .01

A6

When AFT ADI PITCH = 345 (LVLH)
 FLT CNTLR PWR - ON
 DAP TRANS: PULSE/PULSE/PULSE, LOW Z
 DAP ROT: PULSE/PULSE/PULSE
 DAP: A12/MAN/NORM

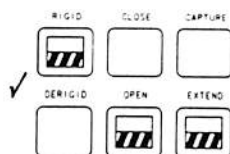
NOTE

Pause 60 to 120 sec in free
 drift before release

C360-05 OPS (2.5 min), C360 OPS
 (Cue Card)

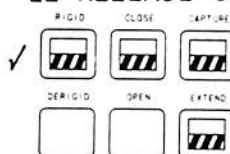
EE MODE - MAN

EE MAN CONTR - DERIGID (until DERIGID
 tb-gray)



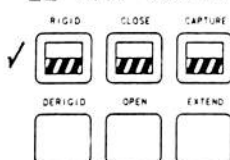
0:00
 ADI PITCH
 = 0

EE RELEASE sw - depress



Mnvr off grapple fixture using control
 scheme on FS 10-8

EE MAN CONTR - DERIGID



+01:00

4 Perform SEP

DAP: A12/LVLH/NORM
 DAP ROT: DISC/DISC/DISC
 THC +Z (out) 5 pulses (~.25 fps)
 DAP: B7/LVLH/VERN, NORM as reqd

Maintain SMM in COAS w/THC as reqd

W7/8

Take spotmeter reading
16mm Camr - ON (for 15 min)
70mm Camr photos

5 CONFIG FOR SK

CRT

|GNC UNIV PTG|
TGT ID - 2
BODY VECTOR - 1 (+X)
OM - 0
Initiate TRK - ITEM 19 EXEC (CUR - *)

Change DAP A to A10

When $R = 200'$, null $\dot{R}$
DAP: B7/AUTO/NORM
THC - as reqd to maintain $\dot{R} = 0$

W7/8

Take spotmeter reading
IMAX - ON (Approx 300 ft)
Perform Lens changeout (250mm - 40mm)

At TDRS LOS:

6 RADAR ACQUISITION

A1U

KU MODE - RDR PASSIVE

KU - MAN SLEW

✓RDR OUTPUT - LOW

KU CNTL - PNL

CRT

|GNC 33 REL NAV|

KU ANT ENA - ITEM 2 EXEC (*)

SLEW RATE - as reqd

Slew antenna to target

KU - AUTO TRACK

If TRACK tb - bp,

KU SEARCH - SEARCH (tb-gray)

..IF NO LOCK-ON..

:
: KU - GPC :
:

When KU TRACK tb - gray,

CRT

|GNC 33 REL NAV|

AUTO RNG - ITEM 17 EXEC (*)

R - ITEM 20 EXEC (*)

Angles - ITEM 23 EXEC (*)

CRT

|SM ANTENNA|

RDR RNG AUTO - ITEM 1 EXEC (*)

A2

DIGI-DIS SEL - R/R

7 SELECT FILTER NAV STATE

CRT

|GNC 33 REL NAV|

✓RESIDs ~0

✓SV UPDATE POS, VEL ~0

SV SEL - ITEM 4 EXEC (FLTR)

A1U

KU - GPC

AT TDRS AOS OR SUNRISE:

8 CONFIG KU FOR COMM

CRT

|GNC 33 REL NAV|
INH RNG ITEM 18 - (*)
R ITEM 21 - (*)
Angles ITEM 24 - (*)

KU ANT ENA - ITEM 2 EXEC (no *)

A1U

KU CNTL - CMD
MODE - COMM
KU - GPC

AT TDRS LOS:

9 CONFIG KU FOR RADAR

A1U

KU MODE - RDR PASSIVE
✓RDR OUTPUT - LOW
✓KU - GPC
KU CNTL - PNL

CRT

|GNC 33 REL NAV|
KU ANT ENA - ITEM 2 EXEC (*)

.. IF NO LOCK-ON ..
.
. KU - MAN SLEW .
. SLEW RATE - as reqd .
. Slew antenna to target .
. KU - AUTO TRACK .
. If TRACK tb - bp, .
. KU SEARCH - SEARCH (tb-gray) .
.....

CRT

|GNC 33 REL NAV|
✓Elev, Az approx 0
If $RATIO < 1.0$ for four NAV cycles
|
| AUTO RNG - ITEM 17 EXEC
| R - ITEM 20 EXEC
| Angles - ITEM 23 EXEC
|
If $RATIO > 1.0$
1) COVAR REINIT - ITEM 16 EXEC
2) FORCE 3 MARKS
3) PROP TO FLTR - ITEM 9 EXEC

+02:00:00 10
(Terminator
Rise)

RADIAL SEP

DAP: A10/AUTO/NORM
THC - +X (up) 9 pulses (~.5 fps)
DAP: B7/MAN/NORM

DAP TRANS: PULSE/PULSE/PULSE, NO LOW Z
DAP ROT: DISC/PULSE/DISC
RHC - as reqd to keep SMM in PI FOV

W7/8

Take spotmeter reading
IMAX - ON (Approx 300 ft)

+02:20:00 11

FINAL SEP

CRT

|GNC UNIV PTG|
TGT ID - 2
BODY VECTOR - 2 (-X)
OM - 0
TRACK - ITEM 19 EXEC (CUR - *)

When in attitude,
DAP: A10/AUTO/NORM
THC - -Z (in) 7 pulses (~.5 fps)
DAP: B7/AUTO/VERN
FLT CNTLR PWR - OFF

A6

12 DISABLE RNDZ NAV, CONFIG KU FOR COMM

Perform step 8 CONFIG KU FOR COMM

CRT

GNC 33 REL NAV

RNDZ NAV ENA - ITEM 1 EXEC (no *)

- 13 Perform RMS PWRDN, 3-1 or
BACKUP CRADLE, 5-44

LDEF DEPLOY
(NO RMS)

LDEF DEPLOY (NO RMS)

1 SETUP

A7U CCTV - MON 1 - Camr C
 MON 2 - Camr D
 Aim C at D and D at C
 PAN/TILT - RESET for both
 Repeat for Camr A & B
R11 VTR - ✓Tapes

2 MNVR ORBITER TO DEPLOY ATTITUDE

Change DAP A,B to A10,B7

CRT |GNC UNIV PTG|
✓START TIME - in past
 TGT ID - 2
 BODY VECTOR - 2
 OM - 90
 Initiate TRK - ITEM 19 EXEC (CUR - *)
 DAP: B7/AUTO/VERN

CRT During maneuver,
 |GNC 33 REL NAV|
 RNDZ NAV ENA - ITEM 1 EXEC (*)
✓SV SEL - ITEM 4 (PROP)
 FILTER RR - ITEM 13 EXEC (*)
 SV TRANSFER ORB TO TGT - ITEM 10 EXEC
 FLTR TO PROP - ITEM 8 EXEC
 GNC, I/O RESET EXEC
A6U ADI ATT - LVLH
 ERR - MED
 RATE - LO
 SENSE - -Z

R13 ✓KU ANT - GND
A1U ✓PWR - ON
A2 DIGI-DIS SEL - EL/AZ
 KU MODE - RDR PASSIVE
 RADAR OUTPUT - HI
 - MAN SLEW
 CNTL - PNL

SIG STRENGTH sel - KU
SLEW RATE - as reqd
SLEW antenna to Elev 0, Az 0, then:
DIGI-DIS SEL - R/R
X-PNTR SCALE - X1

A2

CRT

SM ANTENNA
SELF TEST - ITEM 7 EXEC (*)

NOTE

SELF TEST runs about 3 min

A1U

✓KU SCAN WARN tb - gray
✓TRACK tb - gray
✓SEARCH tb - gray

A2

CRT

✓RANGE - 888.8
SELF TEST - ITEM 7 EXEC (no *)
RDR RNG MIN - ITEM 2 EXEC (*)

A2

A1U

DIGI-DIS SEL - EL/AZ
KU RADAR OUTPUT - LOW

A1

KU CNTL - CMD

Install -Z COAS

SUNRISE 3 RELEASE LDEF

✓Att errs, rates

A6

FLT CNTLR PWR - ON
DAP TRANS: PULSE/PULSE/PULSE
DAP ROT: PULSE/PULSE/PULSE
DAP: B7/MAN/NORM

R11

VTR pb - PLAY,RCD

R13

A6

PL BAY MECH PWR SYS (two) - ON
PL RETEN PL SEL - 1
LOGIC PWR SYS (two) - ON

Note any single motor times (> 30 sec)

PL RETEN LAT 1,2 - REL (tb-REL),

60 sec max

- OFF

LAT 3,4 - REL (tb-REL),

60 sec max

- OFF

LAT 5 - REL (tb-REL),

60 sec max

- OFF

LOGIC PWR SYS (two) - OFF

PL BAY MECH PWR SYS (two) - OFF

R13

4 PERFORM OUT-OF-PLANE SEP

THC - +Z (out) 4 DAP B pulses (.1 fps)

When LDEF clear of V-guides,

DAP: A10/MAN/NORM

THC - +Z (out) 8 DAP A pulses (.4 fps)

DAP TRANS: PULSE/PULSE/PULSE, LOW Z

DAP: B7/AUTO/VERN

5 RADAR ACQUISITION

KU CNTL - PNL

GNC 33 REL NAV

KU ANT ENA - ITEM 2 EXEC (*)

✓KU - MAN SLEW, point antenna at LDEF

- AUTO TRACK

If TRACK tb - bp,

KU SEARCH - SEARCH (tb-gray)

..IF NO LOCK-ON.....

.

. KU - GPC .

. Maintain LDEF within 30° of .

. -Z axis w/RHC .

.....

CRT

When KU TRACK tb - gray,

GNC 33 REL NAV

AUTO RNG - ITEM 17 EXEC (*)

R - ITEM 20 EXEC (*)

Angles - ITEM 23 EXEC (*)

CRT

SM ANTENNA

RDR RNG AUTO - ITEM 1 EXEC (*)

A1U

KU RADAR OUTPUT - HI

A2

DIGI-DIS SEL - R/R

6 SELECT FLTR NAV STATE

CRT

GNC 33 REL NAV

✓RESIDs ~0

✓SV UPDATE POS, VEL ~0

SV SEL - ITEM 4 EXEC (FLTR)

A1U

KU - GPC

ON-ORBIT BURN

SEP PAD TARGET DATA

BURN DATA

OMS BOTH 1

L 2

R 3

RCS SEL 4

5 TV ROLL

TRIM LOAD

6 P

7 L Y

8 R Y

9 WT

10 TIG

TGT PEG 7

19 ΔVX

20 ΔVY

21 ΔVZ

BURN ATT

24 R

25 P

26 Y

ΔVTOT

TGO

VGO

Y

Z

HA

HP

TGT

ON-ORBIT BURN

SEP PAD TARGET DATA

BURN DATA

OMS BOTH 1

L 2

R 3

RCS SEL 4

5 TV ROLL

TRIM LOAD

6 P

7 L Y

8 R Y

9 WT

10 TIG

TGT. PEG 7

19 ΔVX

20 ΔVY

21 ΔVZ

BURN ATT

24 R

25 P

26 Y

ΔVTOT

TGO

VGO

Y

Z

HA

HP

TGT

+3:00 7 MNVR TO FINAL SEP BURN ATT

CRT GNC UNIV PTG
STOP - ITEM 21 EXEC (*)
OPS 202 PRO
1: GNC ORBIT MNVR EXEC
2: GNC SYS SUMM 2

CRT Load TGT data per burn pad
LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC

C3 ✓Burn data per burn pad
DAP: A/AUTO/VERN
DAP TRANS: as reqd

CRT ROT: DISC/DISC/DISC
MNVR - ITEM 27 EXEC (*)

8 PERFORM FINAL SEP BURN

Perform ON-ORBIT OMS BURN
or ON-ORBIT RCS BURN (ORB OPS)
as appropriate, then:

R11 VTR - OFF

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SMM DEPLOY (NO RMS)

SMM DEPLOY (NO RMS)

-50:00 1 MNVR ORBITER TO RELEASE ATTITUDE

Change DAP A,B to A9,B7

CRT

UNIV PTG

✓START TIME in past

TGT ID - 4

BODY VECTOR - 3

OM - 0

Initiate TRK - ITEM 19 EXEC (CUR - *)

DAP: A9/AUTO/VERN

During maneuver,

CRT

GNC 33 REL NAV

RNDZ NAV ENA - ITEM 1 EXEC (*)

✓SV SEL - ITEM 4 (PROP)

FILTER RR - ITEM 13 EXEC (*)

SV TRANSFER ORB TO TGT - ITEM 10 EXEC

A6U

ADI ATT - LVLH

ERR - MED

RATE - LO

SENSE - -Z

R13

✓KU ANT - GND

✓PWR - ON

DIGI-DIS SEL - EL/AZ

KU MODE - RDR PASSIVE

RADAR OUTPUT - HI

- MAN SLEW

CNTL - PNL

SIG STRENGTH sel - KU

SLEW RATE - as reqd

SLEW antenna to Elev 0, Az 0, then:

A2

DIGI-DIS SEL - R/R

X-PNTR SCALE - X1

CRT

SM ANTENNA

SELF TEST - ITEM 7 EXEC (*)

NOTE
SELF TEST runs about 3 min

A1U ✓KU SCAN WARN tb - gray
 ✓TRACK tb - gray
 ✓SEARCH tb - gray

A2 ✓RANGE - 888.8
CRT SELF TEST - ITEM 7 EXEC (no *)
 RDR RNG MIN - ITEM 2 EXEC (*)

A2 DIGI-DIS SEL - EL/AZ
A1U KU RADAR OUTPUT - LOW ..

A1 KU MODE - COMM
 - GPC
 CNTL - CMD

Install -Z COAS

A7U CCTV - MON 1 - Camr C
 MON 2 - Camr D
 Aim C at D and D at C
 PAN/TILT - RESET for both
 Repeat for Camr A & B

R11 VTR - ✓Tape

Position FSS to visual indicator T
 or as directed by MCC

-01:00 2 ORBITER TO FREE FOR RELEASE

When AFT ADI PITCH = 350 (LVLH),
FLT CNTLR PWR - ON

A6U DAP TRANS: PULSE/PULSE/PULSE
 DAP ROT: PULSE/PULSE/PULSE
 DAP: A9/MAN/NORM

CRT |SM 221 FSS CONTROL|
SCIU OFF - ITEM 17 EXEC (*)
A6 UMB HEATER - ITEM 5 EXEC (*)
PL RETEN LAT 1 - REL (tb-REL)
 - OFF

CRT UMB MAIN - ITEM 4 EXEC (*)
A6 PL RETEN LAT 1 - REL (tb-REL)
 - OFF

CRT BERTH LAT 3 - ITEM 3 EXEC (*)
A6 PL RETEN LAT 1 - REL (tb-REL)
 - OFF

CRT BERTH LAT 2 - ITEM 2 EXEC (*)
A6 PL RETEN LAT 1 - REL (tb-REL)
 - OFF

CRT BERTH LAT 1 - ITEM 1 EXEC (*)
A6 PL RETEN LAT 1 - REL (tb-REL)
 - OFF

CRT DESELECT - ITEM 13 EXEC
A6 MSB OFF - ITEM 19 EXEC (*)
PL RETEN PL SEL - MON
LOGIC PWR SYS 1 - OFF

R13L PL BAY MECH PWR SYS 1 - OFF

+01:00 3 PERFORM SEP

A6U ✓DAP: A9/MAN/NORM
 THC - +Z (out) 10 pulses (~.5 fps)
 DAP: B7/MAN/VERN, NORM as reqd
 DAP ROT: DISC/DISC/DISC
 DAP TRANS: PULSE/PULSE/PULSE, LOW Z
 ~~RHC - Pitch as reqd to maintain SMM in~~
 ~~PI FOV~~

AT TDRS LOS:

4 RADAR ACQUISITION

A1U

KU MODE - RDR PASSIVE
KU CNTL - PNL
|GNC 33 REL NAV|
KU ANT ENA - ITEM 2 EXEC (*)
GNC, I/O RESET EXEC
KU - MAN SLEW
SLEW RATE - as reqd
Slew antenna to target
KU - AUTO TRACK
KU SEARCH - SEARCH (tb-gray)

..IF NO LOCK-ON..

.
. KU - GPC .
.....

CRT

When KU TRACK tb - gray,
|GNC 33 REL NAV|
AUTO RNG - ITEM 17 EXEC (*)
R - ITEM 20 EXEC (*)
Angles - ITEM 23 EXEC (*)

CRT

A2

|SM ANTENNA|
RDR RNG AUTO - ITEM 1 EXEC (*)
DIGI-DIS SEL - R/R

5 SELECT FILTER NAV STATE

CRT

A1U

|GNC 33 REL NAV|
✓RESIDS ~0
✓SV UPDATE POS, VEL ~0
SV SEL - ITEM 4 EXEC (FLTR)
KU - GPC

+45:00 6 ORBITER TO -XLV

CRT |GNC UNIV PTG|

TGT ID - 2

BODY VECTOR - 2 (-X)

OM - ~~180~~ 0

TRACK - ITEM 19 EXEC (CUR - *)

A6 FLT CNTLR PWR - OFF

RAPID LDEF DEPLOY

RAPID LDEF DEPLOY

1 SETUP

A7U CCTV - MON 1 - Camr C
 MON 2 - Camr D
 Aim C at D and D at C
 PAN/TILT - RESET for both
 Repeat for Camr A & B

R11 VTR - ✓Tapes

2 MNVR ORBITER TO DEPLOY ATTITUDE

Change DAP A,B to A11,B7

CRT GNC UNIV PTG
 ✓START TIME - in past
 TGT ID - 2
 BODY VECTOR - 2
 OM - 90
 Initiate TRK - ITEM 19 EXEC (CUR - *)
 DAP: B7/AUTO/VERN

3 LDEF GRAPPLE

SM 94 PDRS CNTL
PL ID - ITEM 3 +1 EXEC
PL INIT ID - ITEM 24 +1 EXEC
BRAKES - OFF (tb-OFF)
MODE - ORB UNL, ENTER
Mnvr to GF 1 $X_0 = 919$
 $Y_0 = 69$

When grapple fixture in view,
EE MODE - AUTO
MODE - END EFF, ENTER
Mnvr to grapple envelope

EE CAPTURE sw - depress (mom)

✓ ☐ ☐ ☐ (23 sec max)



EE MODE - OFF

BRAKES - ON (tb-ON)

Record POS/ATT

4 LDEF UNBERTH

R13
A6

PL BAY MECH PWR SYS (two) - ON

PL RETEN PL SEL - 1

LOGIC PWR SYS (two) - ON

Note any single motor times (> 30 sec)

PL RETEN LAT 1,2 - REL (tb-REL),

60 sec max

- OFF

LAT 3,4 - REL (tb-REL),

60 sec max

- OFF

LAT 5 - REL (tb-REL),

60 sec max

- OFF

LOGIC PWR SYS (two) - OFF

R13

PL BAY MECH PWR SYS (two) - OFF

RATE sw - VERN (RATE MIN tb-ON), until
clear of guides

BRAKES - OFF (tb-OFF)

MODE - ORB LD, ENTER

Mnvr LDEF to Z = -630

✓LDEF P,Y,R = BERTHED P,Y,R

A6

BRAKES - ON (tb-ON)
PL RETEN PL SEL - MON
When orbiter in attitude,
DAP: A11/AUTO/VERN

5 LDEF RELEASE

✓Att errs, rates

A7

CCTV - RMS/Wrist (zoom out)

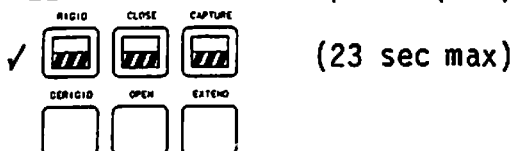
A6

FLT CNTLR PWR - ON
DAP TRANS: PULSE/PULSE/PULSE, LOW Z
DAP ROT: PULSE/PULSE/PULSE
DAP: A11/MAN/NORM

RATE sw - VERN (RATE MIN tb-ON)

EE MODE - AUTO
BRAKES - OFF (tb-OFF)
MODE - END EFF, ENTER

When OPEN tb - gray, mnvr arm away from PL
EE RELEASE sw - depress (mom)



BRAKES - ON (tb-ON)
EE MODE - OFF

6 PERFORM OUT-OF-PLANE SEP

THC - +Z (out) 10 DAP A pulses (~.5 fps)
DAP: B7/AUTO/VERN

Perform RMS PWRDN, 3-1, then:

ON-ORBIT BURN

SEP PAD TARGET DATA

BURN DATA

OMS BOTH 1

--

L 2

--

R 3

--

RCS SEL 4

--

5 TV ROLL

--	--	--

TRIM LOAD

()		.	
-----	--	---	--

6 P

()		.	
-----	--	---	--

7 L Y

()		.	
-----	--	---	--

8 R Y

()		.	
-----	--	---	--

9 WT

--	--	--	--	--

10 TIG

/		:		:		.	
---	--	---	--	---	--	---	--

TGT PEG 7

19 ΔVX

()				.	
-----	--	--	--	---	--

20 ΔVY

()			.	
-----	--	--	---	--

21 ΔVZ

()			.	
-----	--	--	---	--

BURN ATT

24 R

25 P

26 Y

ΔVTOT

			.	
--	--	--	---	--

TGO

	:		
--	---	--	--

VGO X

()			.	
()			.	
()			.	

Y

()			.	
()			.	

Z

()			.	
()			.	

TGT

--	--

 HA

--	--

 HP

()		
-----	--	--

ON-ORBIT BURN

SEP PAD TARGET DATA

BURN DATA

OMS BOTH 1

--

L 2

--

R 3

--

RCS SEL 4

--

5 TV ROLL

--	--	--

TRIM LOAD

()		.	
-----	--	---	--

6 P

()		.	
-----	--	---	--

7 L Y

()		.	
-----	--	---	--

8 R Y

()		.	
-----	--	---	--

9 WT

--	--	--	--	--

10 TIG

/		:		:		.	
---	--	---	--	---	--	---	--

TGT PEG 7

19 ΔVX

()				.	
-----	--	--	--	---	--

20 ΔVY

()			.	
-----	--	--	---	--

21 ΔVZ

()			.	
-----	--	--	---	--

BURN ATT

24 R

25 P

26 Y

ΔVTOT

			.	
--	--	--	---	--

TGO

	:		
--	---	--	--

VGO X

()			.	
()			.	
()			.	

Y

()			.	
()			.	

Z

()			.	
()			.	

TGT

--	--

 HA

--	--

 HP

()		
-----	--	--

+03:00 7 MNVR TO FINAL SEP BURN ATT

CRT GNC UNIV PTG
STOP - ITEM 21 EXEC (*)
OPS 202 PRO
1: GNC ORBIT MNVR EXEC
2: GNC SYS SUMM 2

CRT Load TGT data per burn pad
LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC
✓Burn data per burn pad
C3 DAP: A/AUTO/VERN
DAP TRANS: as reqd
ROT: DISC/DISC/DISC
CRT MNVR - ITEM 27 EXEC (*)

8 PERFORM FINAL SEP BURN

Perform ON-ORBIT OMS BURN
or ON-ORBIT RCS BURN (ORB OPS)
as appropriate

POS SMM FOR ARRAY/HGAS JETTISON

POS SMM FOR ARRAY/HGAS JETTISON

1 Perform SMM UNBERTH, FS 9-1, step 1,2 if reqd, then:

2 POSITION SMM TO ARRAY JETT POSITION

CRT

|SM 94 PDRS CONTROL|

✓PL ID, ITEM 3 - 3

✓PL INIT ID, ITEM 24 - 3

✓DAP: B11/MAN/VERN

✓DAP ROT: PULSE/PULSE/PULSE

OPR CMD to INTERMEDIATE POSITION

-1100, -100, -675, 0, 74, 0

SY	SP	EP	WP	WY	WR
-15.5	+80.6	-84.1	+3.5	+15.5	+180.5

BRAKES - ON (tb-ON)

OPR CMD to ARRAY JETTISON POSITION

-671, -500, -850, 180, 335, 180

SY	SP	EP	WP	WY	WR
+72.7	+80.6	-14.7	-38.5	+56.9	+189.6

BRAKES - ON (tb-ON)

3 MNVR ORBITER TO ARRAY 1 JETT ATTITUDE

CRT

|UNIV PTG|
✓START TIME in past
TGT ID +2
BODY VECTOR +5
P +270
Y +0
OM +333
Initiate TRK - ITEM 19 EXEC (CUR - *)
DAP: B11/AUTO/VERN

Notify MCC when in attitude

Verify array 1 jett. Report to MCC

4 MNVR ORBITER TO ARRAY 2/HGAS JETT ATTITUDE

CRT

|UNIV PTG|
✓START TIME in past
TGT ID +2
BODY VECTOR +5
P +270
Y +0
OM +153

Initiate TRK - ITEM 19 EXEC (CUR - *)
✓DAP: B11/AUTO/VERN

Notify MCC when in attitude

Verify array 2 jett. Report to MCC

5 POSITION SMM FOR HGAS JETT (IF REQD)

DAP: B11/MAN/VERN

DAP ROT: PULSE/PULSE/PULSE

OPR CMD to HGAS JETT POSITION

-652, -455, -873, 98, 14, 148

SY	SP	EP	WP	WY	WR
72.7	97.7	-39.1	-33.9	47.0	101.2

BRAKES - ON (tb-ON)

DAP: B11/AUTO/VERN

Notify MCC when in attitude

Verify HGAS jett. Report to MCC

6 BERTH SMM

DAP: B11/MAN/VERN

DAP ROT: PULSE/PULSE/PULSE

OPR CMD to INTERMEDIATE POSITION

-1100, -100, -675, 0, 74, 0

SY	SP	EP	WP	WY	WR
-15.5	80.6	-84.1	3.5	15.5	180.5

BRAKES - ON (tb-ON)

OPR CMD to above BERTHED POSITION

-1217, 0, -575, 0, 0, 0

MODE - ORB LD,ENTER

Berth SMM

Perform SMM BERTH (PL OPS, SMM OPS), then:

7 UNGRAPPLE SMM

A7

CCTV - RMS/Wrist (zoom out)
EE MODE - AUTO
RATE sw - VERN (RATE min tb-ON)
MODE - END EFF, ENTER

When OPEN tb - gray, mnvr arm away from PL
EE RELEASE sw - depress (mom)

✓

RIGID	CLOSE	CAPTURE
DERIGID	OPEN	EXTEND

 (23 sec max)

BRAKES - ON (tb-ON)
EE MODE - OFF

Go to SMM BERTH/STOW FOR RETURN, (PL OPS,
SMM RETURN)

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POS SMM FOR ARRAY JETTISON (NO RMS)

POS SMM FOR ARRAY JETTISON (NO RMS)

1 MNVR ORBITER TO PADDLE 1 JETT ATTITUDE

Change DAP A to A1

CRT

|UNIV PTG|

✓STAR TIME - in past

TGT ID - 2

BODY VECTOR - 5

P - 270

Y - 0

OM - 60

Initiate TRK - ITEM 19 EXEC (CUR - *)

DAP: A1/AUTO/VERN

2 POSITION SMM FOR ARRAY JETT

R13L
A6

PL BAY MECH PWR SYS 1 - ON

PL RETEN LOGIC PWR SYS 1 - ON

PL SEL - 2

CRT

|SM 221 FSS CONTROL|

✓ITEMS 1-14 (no *)

✓DISABLE, ITEM 15 - (*)

✓MSB ON, ITEM 18 - (*)

PIVOTER - ITEM 10 EXEC (*)

A6

PL RETEN LAT 1 - REL (to 250, ~2 min 30 sec)
- OFF

CRT

MPC ON - ITEM 20 EXEC

ROTATOR - ITEM 9 EXEC (*)

A6

PL RETEN LAT 1 - REL/LAT as reqd to 440 jett
pos (stop on visual
indicator J)

Notify MCC when FSS in position/Orbiter in
attitude

Verify Paddle 1 jettison. Report to MCC

3 MNVR ORBITER TO PADDLE 2 JETTISON ATTITUDE

CRT

UNIV PTG

✓START TIME - in past

TGT ID - 2

BODY VECTOR - 5

P - 270

Y - 0

OM - 240

Initiate TRK - ITEM 19 EXEC (CUR - *)

DAP: A1/AUTO/VERN

Notify MCC when in attitude

Verify Paddle 2 jettison. Report to MCC

Go to SMM BERTH/STOW FOR RETURN, (PL OPS,
SMM RETURN)

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H2O DUMP NOZZLE/OMS PODS SURVEY

H2O DUMP NOZZLE/OMS PODS SURVEY

1 WRIST CAMERA SURVEY OF H2O DUMP NOZZLE

A7 CCTV - MON 2 - RMS/Wrist (zoom out)
- VTR RCD - RMS/Wrist

R11 VTR - ✓Tape

A8 PARAM sel - JOINT ANGLE
BRAKES - OFF (tb-OFF)
MODE - SINGLE, ENTER

SINGLE DR to:

Tol: +1 deg

	SY	SP	EP	WP	WY	WR
1	0	+25	-25	+5	0	0
2		+44				
3	+77					
4			-112			
5				-105		
6					+14	
7						-157

BRAKES - ON (tb-ON)

SURVEY

BRAKES - OFF (tb-OFF)

MODE - SINGLE, ENTER

RMS SPOT PORT - ON

Adjust ALC, GAMMA, ZOOM as reqd

VTR pb - PLAY, RCD

Use WP, WY to inspect nozzle for ice

After survey completed,

SINGLE DR to:

Tol: ± 1 deg

	SY	SP	EP	WP	WY	WR
1	+77	+44	-112	-105	+14	-157
2		+63				

BRAKES - ON (tb-ON)

SURVEY

BRAKES - OFF (tb-OFF)

MODE - SINGLE, ENTER

A7 Adjust ALC, GAMMA, ZOOM, as reqd

Use WP, WY to perform survey

Inspect upper surface of wing for damage

After survey completed,

BRAKES - ON (tb-ON)

A8
R11

VTR pb - STOP

BRAKES - OFF (tb-OFF)

MODE - SINGLE, ENTER

SINGLE DR to:

Tol: ± 1 deg

	SY	SP	EP	WP	WY	WR
1	+77	+63	-112	-105	+14	-157
2					0	
3				+5		
4			-25			
5		+25				
6	0					

BRAKES - ON (tb-ON)

A7

RMS SPOT PORT - OFF

2 ELBOW CAMERA SURVEY OF H2O DUMP NOZZLE

A7 CCTV - MON 2 - RMS/Elbow
- VTR RCD - RMS/Elbow

R11 VTR - ✓Tape

A8 PARAM sel - JOINT ANGLE
BRAKES - OFF (tb-OFF)
MODE - SINGLE, ENTER

SINGLE DR to:

Tol: ±1 deg

	SY	SP	EP	WP	WY	WR
1	0	+25	-25	+5	0	0
2	+148					
3		+9				
4			-103			
5				+15		
6					-17	

BRAKES - ON (tb-ON)

SURVEY

Adjust PAN, TILT, as reqd

Adjust ALC, GAMMA, ZOOM, as reqd

VTR pb - PLAY, RCD

R11

Inspect nozzle for ice

When survey completed,
VTR pb - STOP

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

SINGLE DR to:

Tol: ± 1 deg

	SY	SP	EP	WP	WY	WR
1	+148	+9	-103	+15	-17	0
2					0	
3				+5		
4			-25			
5		+25				
6	0					

BRAKES - ON (tb-ON)

3 OMS PODS SURVEY

A7

CCTV - MON 2 - RMS/Wrist (zoom out)
- VTR RCD - RMS/Wrist

R11

VTR - $\sqrt$ Tape

A8

PARAM sel - JOINT ANGLE
BRAKES - OFF (tb-OFF)
MODE - SINGLE, ENTER

SINGLE DR to:

Tol: ± 1 deg

LEFT OMS POD

	SY	SP	EP	WP	WY	WR
1	-7	+21	-10	-52	-4	+22

BRAKES - ON (tb-ON)

SURVEY

BRAKES - OFF (tb-OFF)

MODE - SINGLE, ENTER

RMS SPOT PORT - ON, as reqd

Adjust ALC, GAMMA, ZOOM, as reqd

VTR pb - PLAY, RCD

Use WP, WY to perform survey

Inspect OMS Pod for tile/blanket damage

Continue with Right OMS Pod Survey

SINGLE DR to:

Tol: +1 deg

RIGHT OMS POD

	SY	SP	EP	WP	WY	WR
1	-25	+21	-10	-56	+40	+22

SURVEY

Use WP, WY to perform survey

Inspect OMS Pod for tile/blanket damage

When survey finished,

BRAKES - ON (tb-ON)

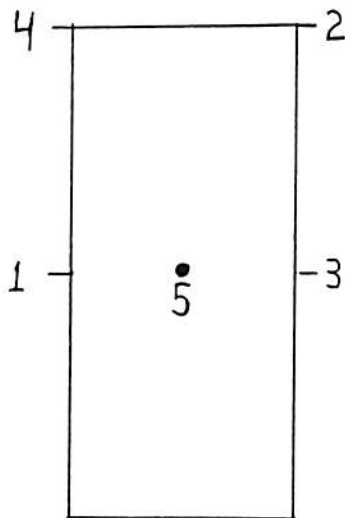
VTR pb - STOP

REFERENCE DATA

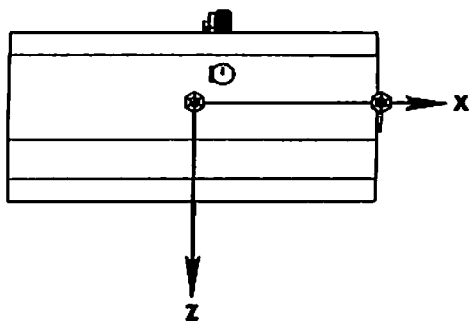
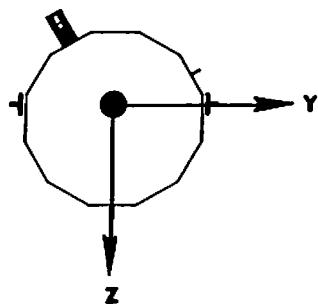
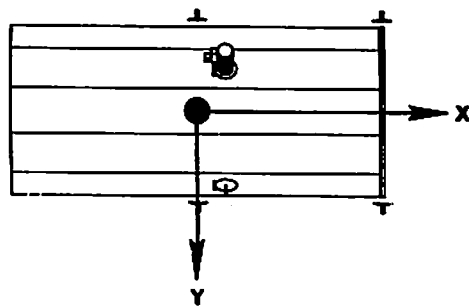
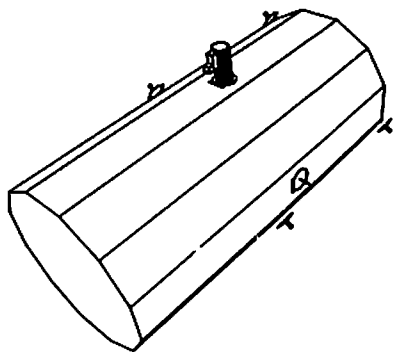
LDEF, SMM BERTHED CONFIGURATION DATA

PAYLOAD	POSITION			ATTITUDE			JOINT ANGLES					
	X	Y	Z	P	Y	R	SY	SP	EP	WP	WY	WR
LDEF STBD GF PORT GF	-893	-2	-412	0	0	0	-38	62.7	-109.3	-79.2	36.8	-109.8
	-	-	-	-	-	-	-.1	79.3	-127.9	-41.2	-40.5	-160.4
SMM EXISTING TPAD	-1217	0	-459	0	0	0	-3.6	25.2	-39.2	-30.0	-62.5	153.9
	-1217	0	-459	0	0	0	-18.8	37.2	-66.6	35.7	33.7	87.7

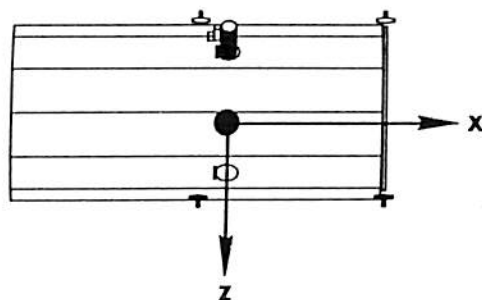
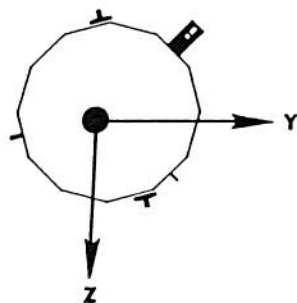
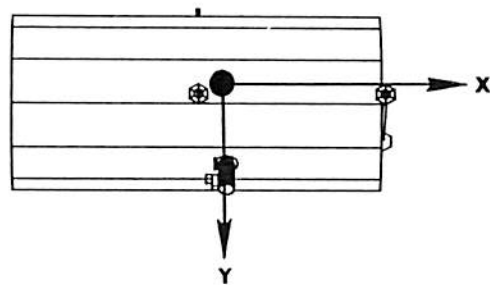
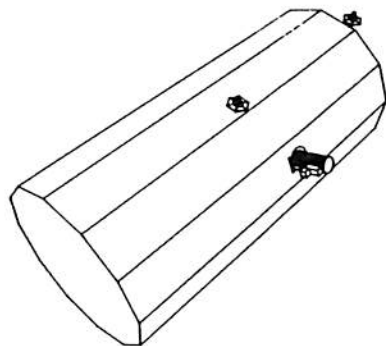
↑
AFT



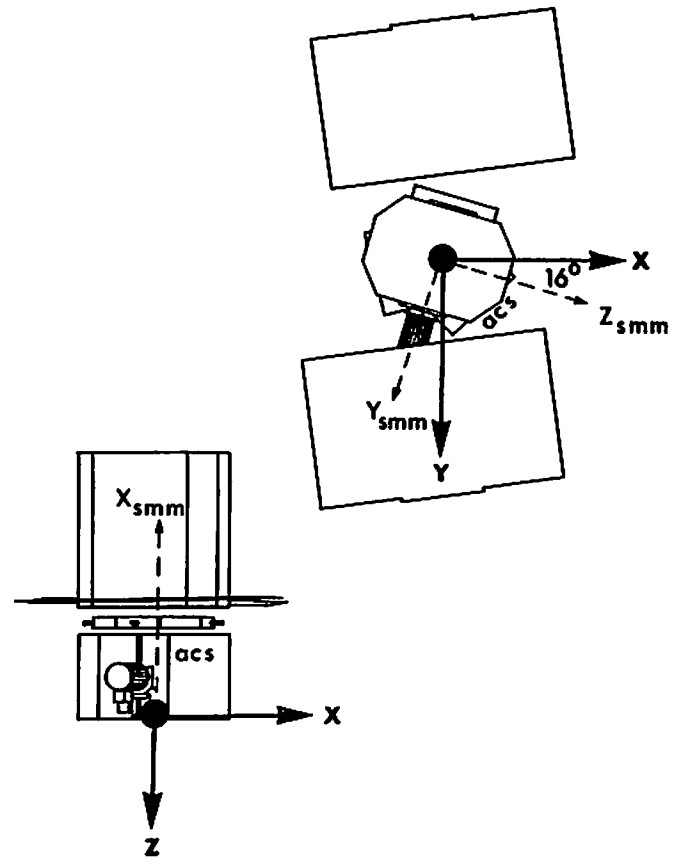
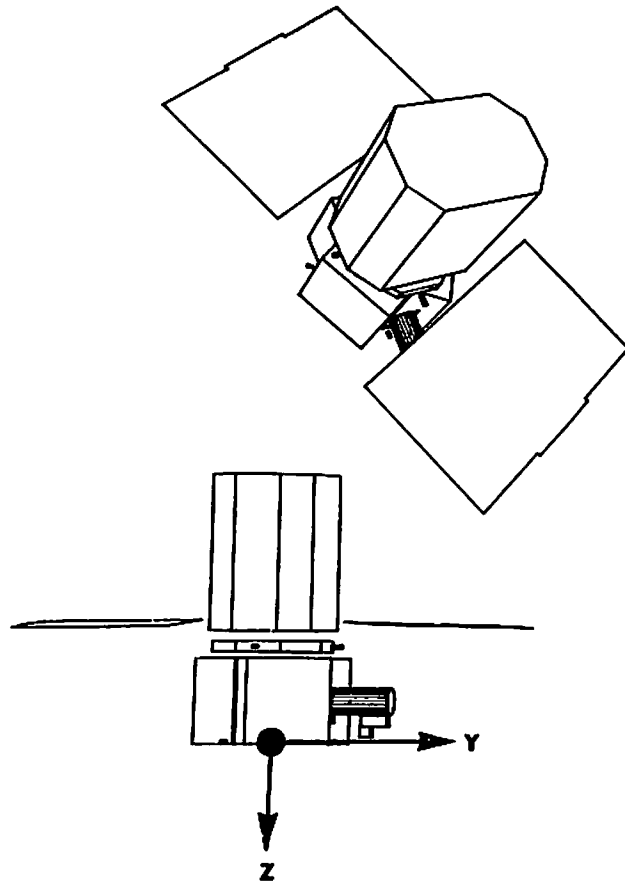
LDEF STBD GF COORDINATE SYSTEM - PL ID 1



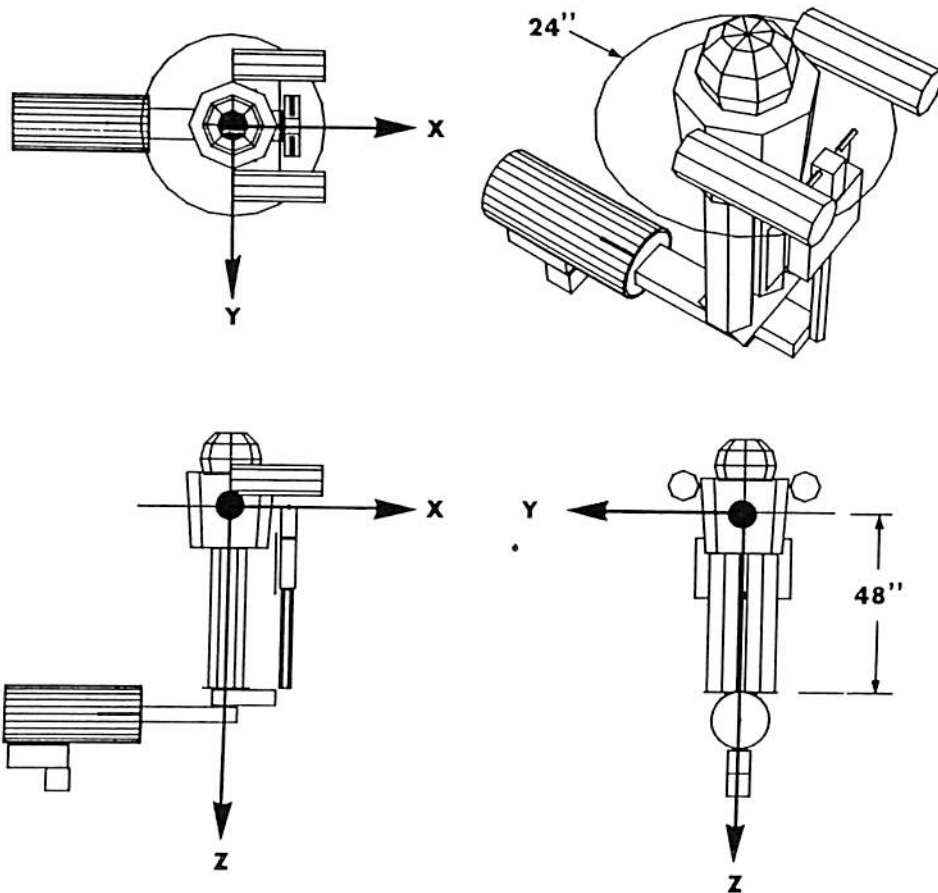
LDEF COORDINATE SYS, STBD GF, STD AUTO SEQ - PL ID 2



SMM COORDINATE SYSTEM, EXISTING GF - PL ID 3



MFR COORDINATE SYSTEM - PL ID 4



SMM COORDINATE SYSTEM, TPAD GF - PL ID 5

