

# Orbit Operations Checklist

**Mission Operations Directorate  
Flight Design and Dynamics Division  
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National Aeronautics and  
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Lyndon B. Johnson Space Center  
Houston, Texas



## NOTES

1. This Checklists is made by Johan Meza Bracamontes (Johan2011 on Orbiter Forum).
2. The Design of the Checklists Will be the same of the Original NASA Checklists as possible.
3. This Checklists is made for the Space Shuttle Vessel (SSV) Addon by GLS.
4. Full RMS OPS found in **PDRS Operations Checklist**.

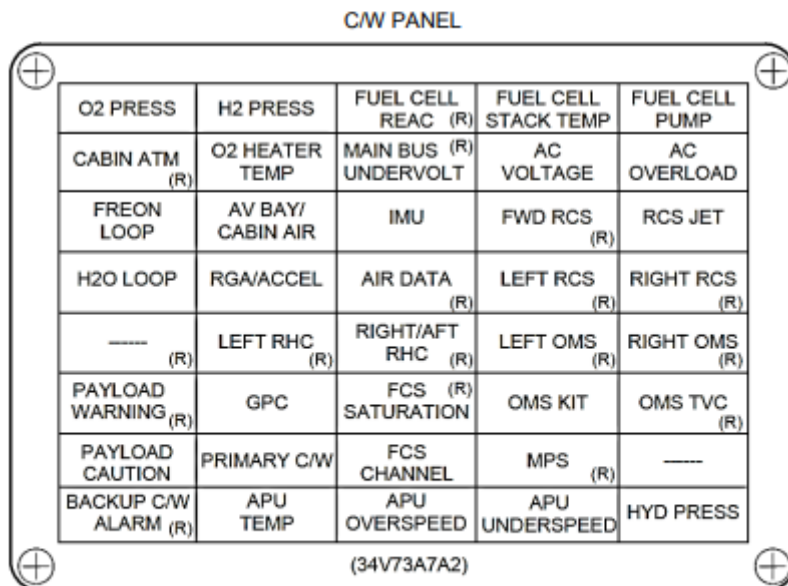
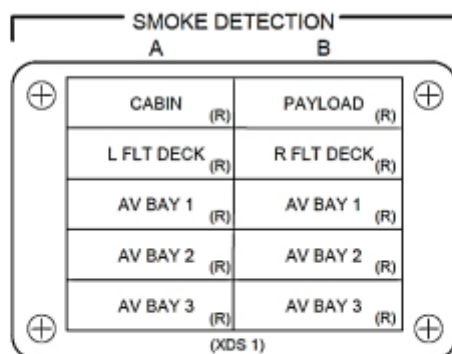
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EPS

## LAMP TEST



## FORWARD STATION

- O6/O8 ANNUN LAMP TEST – L, hold  
 ✓78 lights – illuminated:
- O1 CAM lts (25)  
 F2 MSTR ALARM (1)  
 Aerodynamic controls (7)  
 DRAG CHUTE (2)
- F3 NWS FAIL (1)  
 DRAG CHUTE (1)
- L1 FIRE SUPPR AV BAY (3)  
 SMOKE DETN (10)
- F6 LDG GEAR (2)  
 ABORT (1)

	RCS CMD (3)	
	RANGE SAFE ARM (1)	
F7	SM ALERT (1)	
	C/W panel – partial (20)	
O6/O8	ANNUN LAMP TEST	– R, hold
	√61 lights – illuminated:	
F4	MSTR ALARM (1)	
	Aerodynamic controls (7)	
	DRAG CHUTE (1)	
F3	ANTISKID FAIL (1)	
	DRAG CHUTE (2)	
F8	LDG GEAR (2)	
F7	MN ENG STAT (3)	
	C/W panel – partial (20)	
C3	DAP PANEL (24)	

**MIDDECK** (Verified by second crewmember)

O6/O8	ANNUN LAMP TEST	– L, hold
MO29J	√MIC KEY light – illuminated	
O6/O8	ANNUN LAMP TEST	– R, hold
	√5 lights – illuminated:	
MO52J	MSTR ALARM light (1)	
MO51F	RCRS CNTLR 1 (2)	
	RCRS CNTLR 2 (2)	

**AFT STATION**

A6U	ANNUN LAMP TEST	– L, hold
	√25 lights – illuminated:	
	DAP PANEL (24)	
A2	MIC KEY (1)	
A6U	ANNUN LAMP TEST	– R, hold
	√28 lights – illuminated:	
A7U	MSTR ALARM (1)	
	VID IN (13)	
	VID OUT (8)	
	CAMR CMD ALC (3)	
	CAMR CMD GAMMA (3)	

GNC

# ON ORBIT FCS CHECKOUT

## 1.FCS C/O PREP

C2            Set EVENT TIMER to 00:00, count UP

## 2.APU PRESTART

R2	BLR N2 SPLY X	– ON
	√BLR PWR (three)	– ON
	√BLR CNTLR/HTR (three)	– B
	√APU FU TK VLV (three)	– CL
	√APU SPEED SEL (three)	– NORM
	√APU OPER (three)	– OFF
	HYD MN PUMP PRESS X	– LO
	APU CNTLR PWR X	– ON

## 3.APU START

R2	APU FU TK VLV X	– OP
	√APU/HYD RDY X tb	– gray

00:00 Start EVENT TIMER

R2	APU OPER X	– START/RUN
HYD/APU	√HYD PRESS ind X	– LOW green
R2	√APU/HYD RDY X tb	– bp
	HYD MN PUMP PRESS X	– NORM
HYD/APU	√HYD PRESS ind X	– HI green



#### 4.FCS CHECKOUT

C3	√FCS CH 1,2,3,4	– AUTO
MDU1	SPI DSPLY	
CRT1	GNC OPS 801 PRO (FCS/DED DIS C/O)	

FCS C/OUT STRT, ITEM10 EXEC (\*)  
√FLT CTRLS MOVEMENT (EL,RDR,SPDBK)  
on CRT1 and MDU1 DSPLY's  
FCS C/OUT STOP, ITEM11 EXEC (\*)

#### 5.APU SHUTDOWN

	When GO for APU SHUTDN:	
R2	BLR N2 SPLY X	– OFF
	BLR PWR (three)	– OFF
	APU OPER X	– OFF
	APU FU TK VLV X	– CL
	√Shutdn (hyd press < 200)	
	APU CNTLR PWR X	– OFF

MPS

# ON-ORBIT OMS BURN

## 1. OMS BURN PREP

If OPS 2:

CRT1 GNC SPEC 20 PRO (DAP CONFIG)  
√DAP Config A1,B1  
GNC OPS 201 PRO (UNIV PTG)  
CNCL – ITEM 21 EXEC  
GNC OPS 202 PRO (ORBIT MNVR EXEC)

CRT2 GNC SYS SUMM 2

If OPS 3:

CRT1 GNC OPS 302 PRO (DEORB MNVR EXEC )  
CRT3 BFS, GNC SYS SUMM 2  
OMS/MPS √OMS PRESS He TK L,R > 1500 psia

## 2. LOAD TGT DATA

√Targets, OMS TARGETS  
LOAD – ITEM 22 EXEC  
TIMER – ITEM 23 EXEC

C3 DAP: If OPS 2, B/AUTO/VERN  
If OPS 3, AUTO

CRT1 MNVR – ITEM 27 EXEC (\*)

### 3. PERFORM OMS BURN

	CRT1	√ENG SEL	
	C3	√DAP AUTO (PASS)/DISC	
TIG-4	F6/F8	ADI RATE (two)	– MED (1 deg/sec)
		FLT CNTLR PWR (two)	– ON

Perform **ON ORBIT OMS BURN** Cue Card

## ON ORBIT OMS BURN

### 1.LOAD TGT DATA

CRT1 GNC OPS 202 PRO (ORBIT MNVR EXEC)

TV ROLL

If Posi Heads Up – ITEM 5 + 0 EXEC

If Posi Heads Dwn – ITEM 5 + 180 EXEC

Trim Load (\*1 eng)

P – ITEM 6 = + 0.4 \*(+ 0.4)

LY – ITEM 7 = - 5.7 \*(+ 5.2)

RY – ITEM 8 = + 5.7 \*(- 5.2)

### 2.PERFORM OMS BURN

CRT1 √ENG SEL

C3 √DAP AUTO (PASS)/DISC

TIG-4 F6/F8 ADI RATE (two) – MED (1 deg/sec)  
 FLT CNTLR PWR (two) – ON  
 √DAP – AUTO(PASS)/DISC  
 √GMBL TRIM

TIG-2 C3 SEL OMS ENG(s) – ARM PRESS (√P VLVs OP)  
 If P VLV CL: Aff OMS ENG – OFF

TIG-00:15 CRT1 EXEC

00:00 TIG: start watch (√Pc, ΔVTOT, ENG VLVs)

CUTOFF

+00:02 C3 OMS ENG(s) – OFF

F6/F8	FLT CNTLR PWR (two)	– OFF
CRT	IF OPS 2	
	DAP: B/INRTL/VERN	
CRT	GNC OPS 201 PRO (√DAP)	

## **CCTV PWRUP**

R14	CAMR/PTU (five)	– IN
	CAMR/HTR (five)	– IN
	ILLUM/PTU HTR (five)	– IN
	CONTR UNIT (three)	– IN
	MON 1	– IN
	MON 2	– IN
A7U	TV PWR CONTR UNIT	– MN A/B
	TV CAMR PWR (five)	– ON
A3	PWR (two)	– ON/OFF

RCS

# RCS HOT FIRE TEST

## 1.CONFIGURE FOR JET TEST

C3        DAP: A1/INRTL/VERN

## 2. PERFORM RCS JET TEST

Wait 3 sec between pulses

Monitor ADI rates to verify jet on or jet fail

C3        DAP TRANS: PULSE/PULSE/PULSE  
          DAP: A/FREE/PRI

F6/F8     ADI RATE                                – MED  
          FLT CNTLR PWR                        – ON

Perform following pulse sequence twice:

F5        THC: +X, 1 PULSE (fires jets R1A,L1A)  
          -X, 1 PULSE (fires jets F1F,F2F)  
          +Z, 1 PULSE (fires jets F1U,R1U,L1U)  
          +Y, 1 PULSE (fires jets F1L,L1L)  
          -Y, 1 PULSE (fires jets F2R,R1R)

Perform following pulse sequence twice:

          THC: +Z, 1 PULSE (fires jets F2U,L2U,R2U)  
          -Z, 1 PULSE (fires jets F1D,F2D,L2D,R2D)  
          +Y, 1 PULSE (fires jets F1L,L2L)  
          -Y, 1 PULSE (fires jets F2R,R2R)

Perform following pulse sequence twice:

          THC: +X, 1 PULSE (fires jets L3A,R3A)  
          -X, 1 PULSE (fires jet F3F)  
          -Z, 1 PULSE (fires jets F3D,F4D,L3D,R3D)  
          +Y, 1 PULSE (fires jets F3L,L3L)  
          -Y, 1 PULSE (fires jets F4R,R3R)

Perform following pulse sequence twice:

          THC: +Z, 1 PULSE (fires jets F3U,L4U,R4U)  
          -Z, 1 PULSE (fires jets F3D,F4D,L4D,R4D)  
          +Y, 1 PULSE (fires jets F3L,L4L)  
          -Y, 1 PULSE (fires jets F4R,R4R)



– OFF

## FREE DRIFT

## AUTO MNVR TO ATTITUDE

C3 Change DAP A,B to A3,B3  
DAP: B3/AUTO/VERN(ALT)

CRT1 GNC OPS 201 PRO (UNIV PTG)  
TGT ID – ITEM 8 + 2 EXEC  
BODY VECT – ITEM 14 + 5 EXEC  
Load Body Vector P,Y,OM (per table below)

## GRAVITY GRADIENT BODY VECTORS

		ATT ID	EXEC DATA			BODY RATES (±0.002)		
		ATT ID	P	Y	OM	R	P	Y
+	PLBD							
X	NORTH	A	357.51	0.97	249.18	0.002	0.024	-0.062
L	SOUTH	B	357.51	359.23	110.91	-0.002	0.024	0.062
V								
-	PLBD							
X	NORTH	C	177.51	0.77	69.09	0.002	-0.024	-0.062
L	SOUTH	D	177.51	359.03	290.82	-0.002	-0.024	0.062
V								

CRT1 TRK – ITEM 19 EXEC (CUR-\*)  
√ERR TOT, ITEM 23 – (\*)

## ESTABLISH FREE DRIFT

F6,F8    ✓Att mnvr complete  
            ADI ATT                                  – LVLH

If VERN jets available:  
C3 DAP: A3/AUTO/VERN  
DAP: FREE

If VERN jets not available:  
C3 DAP: A3/AUTO/ALT

Wait 30 sec

When  $-0.01 < \text{Roll Rate} < 0.01$ , then:

C3 DAP: FREE  
Rcd MET \_\_\_\_/\_\_\_\_ \_\_\_\_:\_\_\_\_ \_\_\_\_:\_\_\_\_

F6,F8 ADI ATT – as reqd

Reconfig to FLIGHT PLAN DAP  
DAP: INRTL

## **PRCS PTC**

### **MNVR TO PTC ATTITUDE**

C3        DAP: A1/AUTO/ALT  
CRT1     GNC OPS 201 PRO (UNIV PTG)  
          TGT ID – ITEM 8 + 4 EXEC  
          BODY VECT – ITEM 14 + 5 EXEC  
          P – ITEM 15 + 2 7 0 EXEC  
          Y – ITEM 16 + 0 EXEC  
          OM – ITEM 17 + 2 7 0 EXEC  
          TRK – ITEM 19 EXEC (CUR-\*)

### **INITIATE PTC ROTATION**

CRT1     GNC SPEC 20 PRO ( DAP CONFIG)  
          Change DAP A to A2  
          GNC OPS 201 PRO (UNIV PTG)  
          BODY VECT – ITEM 14 +1 EXEC  
          ROT – ITEM 20 EXEC (CUR-\*)

### **TERMINATE PTC ROTATION**

          GNC OPS 201 PRO (UNIV PTG)  
          CNCL – ITEM 21 EXEC  
          Reconfig to FLIGHT PLAN DAP

## **VRCS PTC**

### **MNVR TO PTC ATTITUDE**

C3        DAP: A1/AUTO/VERN  
CRT     GNC OPS 201 PRO (UNIV PTG)  
          TGT ID – ITEM 8 + 4 EXEC  
          BODY VECT – ITEM 14 + 5 EXEC  
          P – ITEM 15 + 2 7 0 EXEC  
          Y – ITEM 16 + 0 EXEC  
          OM – ITEM 17 + 2 7 0 EXEC  
          TRK – ITEM 19 EXEC (CUR-\*)

## **INITIATE PTC ROTATION**

When in attitude:

CRT1    GNC OPS 201 PRO (UNIV PTG)  
          BODY VECT – ITEM 14 +1 EXEC  
          ROT – ITEM 20 EXEC (CUR-\*)  
          When rates have stabilized (~60 sec):  
          GNC SPEC 20 PRO ( DAP CONFIG)  
          Change DAP A to A2

## **TERMINATE PTC ROTATION**

GNC SPEC 20 PRO ( DAP CONFIG)  
Change DAP A to A1

When rates have stabilized (~60 sec):

CRT1    GNC OPS 201 PRO (UNIV PTG)  
          CNCL – ITEM 21 EXEC  
          When rates have damped:  
          Reconfig to FLIGHT PLAN DAP

## ON ORBIT +X RCS BURN

### 1. LOAD TGT DATA AND MNVR TO BURN ATT

- C3        DAP: A/AUTO/ALT (B/ALT as reqd)
- CRT1      GNC OPS 201 PRO (UNIV PTG)  
            CNCL – ITEM 21 EXEC  
            GNC OPS 202 PRO (ORBIT MNVR EXEC)  
            √RCS SEL, ITEM 4 – (\*)
- CRT2      GNC SYS SUMM  
            If onboard computed burn:
- CRT1      Enter or verify TGT DATA  
            LOAD – ITEM 22 EXEC  
            TIMER – ITEM 23 EXEC  
            √BURN DATA  
            MNVR – ITEM 27 EXEC (\*)

### 2. BURN EXEC

- TIG-3:00   F6(F8)    ADI ERR – MED  
                 ADI RATE – HI  
                 ADI ATT – INRTL  
                 √ADI ATT, then:  
                 ATT – REF  
                 REF pb – push  
                 F6(F8)    FLT CNTLR PWR – ON
- TIG-0:30   C3        DAP TRANS: NORM/PULSE/PULSE  
TIG        DAP: A1/INRTL/PRI  
            If VGO Z is neg Z,X,Y seq;  
            Otherwise X,Y,Z seq  
            THC Trim VGOs < 0.2 fps

### 3. POST BURN RECONFIG

F6(F8) FLT CNTLR PWR – OFF

C3 DAP: A/AUTO/ALT (B/AUTO/ALT as reqd)  
DAP TRANS: PULSE/PULSE/PULSE

CRT1 GNC OPS 201 PRO (UNIV PTG)  
When in attitude:  
C3 DAP: A/AUTO/VERN(ALT)

### ON ORBIT MULTI-AXIS RCS BURN

#### 1. EXECUTE MULTI-AXIS BURN

C3 DAP: B1/AUTO/VERN(PRI)  
CRT1 GNC OPS 202 PRO (ORBIT MNVR EXEC)  
CRT2 GNC SYS SUMM

CRT1 Enter or verify TGT DATA  
LOAD – ITEM 22 EXEC  
TIMER – ITEM 23 EXEC  
√BURN DATA

TIG-3:00 F6(F8) FLT CTRL PWR – ON

TIG-0:30 C3 DAP TRANS: as reqd  
TIG DAP: A1/AUTO/PRI (B1/AUTO/PRI)  
If VGO Z neg:  
Z,X,Y THC sequence  
If VGO Z not neg:  
X,Y,Z THC sequence  
THC: Trim VGOs < 0.2 fps

#### 2. POST BURN RECONFIG

F6(F8) FLT CTRL PWR – OFF  
GNC OPS 201 PRO (UNIV PTG)  
C3 DAP: A/AUTO/ VERN

## SEP MANUEVER

## 1. SET UP AFT STATION

A6U      √SENSE -Z  
DAP: A1/INRTL/PRI  
DAP TRANS: as reqd  
FLT CNTLR PWR                          – ON

## 2. OBTAIN VISUAL CONTACT THRU OVHD WINDOW

A6U      DAP ROT: as reqd  
           RHC: as reqd  
           When adequate visual contact obtained,  
           DAP ROT: DISC/DISC/DISC

### 3. NULL CLOSING RATE

THC: +Z (out)  
As reqd to null closing rate

#### 4. PERFORM RR ACQ (if desired)

	A1U	KU MODE – RDR PASSIVE	
		KU RADAR OUTPUT	– LO
		KU sel	– AUTO
TRK			
		KU CNTL	– PNL
		Slew antenna to target	
		KU SEARCH	– SEARCH
(tb-gray)			
		If no lock-on within 1 min, repeat SEARCH as convenient	

## 5. OBTAIN ~1 FPS OPENING RATE

A6U      DAP TRANS:NORM/NORM/NORM  
If Norm Z sep desired:  
DAP: no LO Z

THC: +Z (out) for 3 sec  
If LO Z sep desired (MCC call):  
DAP: LO Z  
THC: +Z (out) for 25 sec

## 6. PERFORM OUT-OF-PLANE MNVR

CRT      GNC OPS 201 PRO (UNIV PTG)  
          CNCL – ITEM 21 EXEC

GNC OPS 202 PRO (ORBIT MNVR EXEC)  
GNC ORBIT MNVR EXEC  
RCS SEL – ITEM 4 EXEC (\*)  
If time critical,  
Set TIG to current time +2.00  
If not time critical,  
Set TIG to current time +22.00

TGT PEG 7  $\Delta V_x$  – ITEM 19 +0 EXEC  
 $\Delta V_y$  – ITEM 20 +2 EXEC  
 $\Delta V_z$  – ITEM 21 +0 EXEC  
LOAD – ITEM 22 EXEC  
TIMER – ITEM 23 EXEC  
 $\sqrt{VGO Z} \geq 0$ ; if  $VGO Z < 0$   
TGT PEG 7  $\Delta V_y$  – ITEM 20 -2 EXEC  
LOAD – ITEM 22 EXEC  
TIMER – ITEM 23 EXEC  
 $\sqrt{VGO Z} \geq 0$   
Do NOT MNVR to BURN ATT

A6U       $\sqrt{DAP}$ : no LO Z  
          At TIG, deflect THC to null VGOs



## 7. PERFORM FINAL SEP

CRT      GNC OPS 202 PRO (ORBIT MNVR EXEC)  
 ✓RCS SEL – ITEM 4 (\*)  
 If  $\Delta VY$  (block 6) +2:  
 TV ROLL – ITEM 5 +2 7 0 EXEC

If  $\Delta VY$  (block 6) -2:  
TV ROLL – ITEM 5 +0 9 0 EXEC  
Set TIG to TIG from step 6 +15:00  
TGT PEG 7  
 $\Delta Vx$  – ITEM 19 +3 EXEC  
 $\Delta Vy$  – ITEM 20 +0 EXEC  
 $\Delta Vz$  – ITEM 21 +0 EXEC  
LOAD – ITEM 22 EXEC  
TIMER – ITEM 23 EXEC

A6U      DAP: B1/AUTO/PRI  
At TIG-8:00, MNVR – ITEM 27 EXEC (\*)  
At TIG, deflect THC to null VGOs

FLT CNTLR PWR – OFF

## 8. MNVR TO MINIMUM DRAG ATTITUDE (-ZLV/-XVV)

A6U DAP: A/AUTO/VERN  
CRT GNC OPS 201 PRO (UNIV PTG)  
√TGT ID: 2  
BODY VECT: 3  
OM: 0  
START TRK – ITEM 19 EXEC (CUR-\*)

RMS

## **RMS ON-ORBIT INITIALIZATION**

### **1.RMS SHOULDER BRACE RELEASE**

A8L	RMS SEL	– PORT
	√SAFING tb	– gray
	SHLDR BRACE REL	– PORT
	(hold2 sec following tb-gray)	
	RMS SEL	– OFF

### **2. CONFIGURE POWER**

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

### **3. PORT MPM DEPLOY**

A8L	PORT RMS	– DPY (tb-DPY)
(68 sec max)		
	PORT RMS	– OFF

### **4. STBD MPM DEPLOY**

A8L	If Starboard MPM installed:	
	STBD RMS	– DPY (tb-DPY)
(68 sec max)		
	STBD RMS	– OFF

### **5. RECONFIGURE POWER**

R13L	PL BAY MECH PWR SYS (two)	– OFF
------	---------------------------	-------

# RMS PWRUP

## 1. PLB LTS, CCTV ACT

A7U PL BAY FLOOD (six) – as reqd  
Perform ACTIVATION, OPERATIONS (TV Cue Card) for desired camrs  
Perform ILLUMINATOR OPS (TV Cue Card) as reqd

√Physical integrity of arm, EE, blankets  
√PORT RMS HTR (two) – AUTO

## 2. RMS SEL (IDLE MODE)

A8U √MODE – not DIRECT

A8L RMS SEL – PORT (MA, SM ALERT)  
√SAFING tb – gray

	X	Y	Z	PITCH	YAW	ROLL	PL ID
√	-1282	-108	-445	0	0	0	0
	SY	SP	EP	WP	WY	WR	
√	0.0	0.0	0.0	0.0	0.0	0.0	

R13L PL BAY MECH PWR SYS (two) – ON

## 3. PORT MPM DEPLOY

If MPM stowed:  
(68 sec max) PORT RMS – DPY (tb-DPY)  
PORT RMS – OFF

A6U DAP: VERN(FREE)

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

## 4.. RECONFIGURE POWER

R13L      PL BAY MECH PWR SYS (two)      – OFF

## 5. ARM UNCRADLE

A8U      RATE      – as reqd (VERN  
within 10 ft)

PARAM      – JOINT ANGLE  
**BRAKES**      – **√OFF (tb-OFF)**  
MODE      – SINGLE,

**ENTER**

SINGLE DR to PRE-CRADLE position (within 1°):

	SY	SP	EP	WP	WY	WR	
Cradle	0.0	0.0	0.0	0.0	0.0	0.0	
1: WP +				+5.0			
2: EP +			+1.0				
3: SP +		+25.0					
4: EP –			-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)  
DAP: as reqd

## RMS PWRDWN

A8L      RMS PWR      – OFF  
F6      FLT CTRL PWR      – ON



**ORBIT OPS  
CHECKLIST**

**STS  
ALL**

Flight Cover (trim bottom to expose tabs)