

Ascent Checklist

STS-400

**Mission Operations Directorate
Flight Design and Dynamics Division**

**Final
May 16, 2008**

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



ASCENT C/L STS-400	FINAL (May 16, 2008)
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PCN-1 (Sept 17, 2008) Sheet 1 of 1

List of Implemented Change Requests (482s):

ASC-1833	ASC-1841
ASC-1835B	ASC-1844
ASC-1837	ASC-1845
ASC-1839	ASC-1847
ASC-1840	ASC-1850

Incorporate the following:

1. Replace v thru x
2. Replace FB 2-3 thru 2-6, 2-39 & 2-40
3. Replace 3-5 & 3-6
4. Replace 7-7 thru 7-10
5. Replace 9-11 thru 9-16, 9-23 & 9-24, 9-27 & 9-28
6. Replace CC 10-21 thru CC 10-24

Prepared by: Allison McCagg
 Book Manager *10/01/08*

 Jim G. Schmidt
 Lead Ascent GPO *JG*

Approved by: [Signature]
 Chief, Ascent/Descent Dynamics Branch

Encl: 32 pages


File this PCN immediately behind the front cover as a permanent record

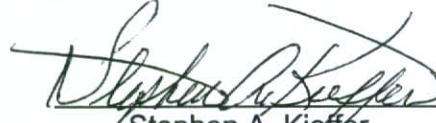
MISSION OPERATIONS DIRECTORATE

**ASCENT CHECKLIST
STS-400**


FINAL
May 16, 2008

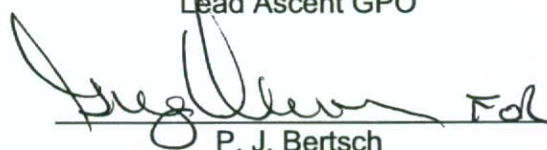
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This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes must be submitted via FDF Workflow Crew Procedure Change Request (CR) to DO3/FDF Manager.

Additional distribution of this book, for official use only, may be requested in writing to DO3/PMO Administrator. The request must include justification and requester's name, organization, position, and phone number. Contractor requests are made through the NASA or DOD organization supported. Deletions, reduction in quantity, or change of address may be submitted to DO3/FDF Management Office, 281-244-1184.

Incorporates the following:
482#: None – Establishes baseline

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DM4/A. McCagg	281-483-7752
Switch List	CA4/S. Kieffer	281-244-8333
Entry	DM4/M. Trump	281-483-8029

NOTES

1. The STS-400 trajectory data in this checklist is based on the STS-400 One Cycle to Flight load and the August environment.
2. The Handover/Ingress Switch List gives the vehicle configuration at LCC/MCC handover (SRB Ignition) and flight crew ingress (T-3:00). If there is a switch position difference between ingress and handover, the ingress position will be boxed beside the handover position.
3. The time reference used in the Prelaunch procedures is the T- (Time to Launch) that LCC uses. This time does not reflect planned holds. The second time referenced in parentheses reflects the planned holds. The mission elapsed time (MET) has MET = 0 at SRB ignition.
4. Normal Flight Procedures are for liftoff through the OMS 2 burn.
5. The Abort to Orbit (ATO) procedures and the Backup Flight System (BFS) procedures are integrated into the appropriate parts of this checklist.
6. AOA procedures terminate with ENTRY MANEUVERS Cue Cards.
7. Ascent Flip Book for the CDR and PLT will be fabricated from the FB pages in section 2.
8. Ascent related cue cards are contained in this document. The cue cards are listed in the Ascent Cue Card section. Some cards are printed in the body of the checklist for MS use and also in the Cue Card Config section for reference of crop marks and fabrication instructions.
9. Mission STS-400 is flown with vehicle OV105.



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ASCENT CHECKLIST
STS-400

LIST OF EFFECTIVE PAGES

FINAL 05/16/08
PCN-1 09/17/08

Sign Off	* 400/FIN	FB 2-7	400/FIN
ii.....	* 400/FIN	FB 2-8	400/FIN
iii.....	* 400/FIN	FB 2-9	400/FIN
iv.....	* 400/FIN	FB 2-10	400/FIN
v	* 400/FIN 1	FB 2-11	400/FIN
vi.....	* 400/FIN 1	FB 2-12	<input checked="" type="checkbox"/> 400/FIN
vii.....	* 400/FIN 1	FB 2-13	400/FIN
viii.....	* 400/FIN	FB 2-14	<input checked="" type="checkbox"/> 400/FIN
ix.....	* 400/FIN 1	FB 2-15	400/FIN
x	* 400/FIN	FB 2-16	400/FIN
xi.....	400/FIN	FB 2-17	400/FIN
xii.....	400/FIN	FB 2-18	400/FIN
1-1	400/FIN	FB 2-19	400/FIN
1-2	400/FIN	FB 2-20	400/FIN
1-3	400/FIN	FB 2-21	400/FIN
1-4	400/FIN	FB 2-22	400/FIN
1-5	400/FIN	FB 2-23	400/FIN
1-6	400/FIN	FB 2-24	400/FIN
1-7	400/FIN	2-25	400/FIN
1-8	400/FIN	2-26	400/FIN
1-9	400/FIN	2-27	400/FIN
1-10	<input checked="" type="checkbox"/> 400/FIN	2-28	400/FIN
1-11	400/FIN	2-29	400/FIN
1-12	400/FIN	2-30	400/FIN
1-13	400/FIN	2-31	400/FIN
1-14	400/FIN	2-32	400/FIN
2-1	400/FIN	2-33	* 400/FIN
FB 2-2	400/FIN	2-34	* 400/FIN
FB 2-3	400/FIN	2-35	* 400/FIN
FB 2-4	400/FIN 1	2-36	* 400/FIN
FB 2-5	400/FIN 1	2-37	* 400/FIN
FB 2-6	400/FIN	2-38	* 400/FIN

* – Omit from flight book

– Prelift-off information required

2-39.....	*	400/FIN 1	6-23.....	400/FIN
2-40.....	*	400/FIN	6-24.....	400/FIN
3-1.....		400/FIN	6-25.....	400/FIN
3-2.....		400/FIN	6-26.....	400/FIN
3-3.....		400/FIN	6-27.....	400/FIN
3-4.....		400/FIN	6-28.....	400/FIN
3-5.....		400/FIN	6-29.....	400/FIN
3-6.....		400/FIN 1	6-30.....	400/FIN
3-7.....		400/FIN	6-31.....	400/FIN
3-8.....		400/FIN	6-32.....	400/FIN
4-1.....		400/FIN	6-33.....	400/FIN
4-2.....		400/FIN	6-34.....	400/FIN
4-3.....		400/FIN	6-35.....	400/FIN
4-4.....		400/FIN	6-36.....	400/FIN
5-1.....		400/FIN	6-37.....	400/FIN
5-2.....		400/FIN	6-38.....	400/FIN
5-3.....		400/FIN	6-39.....	400/FIN
5-4.....		400/FIN	6-40.....	400/FIN
6-1.....		400/FIN	7-1.....	400/FIN
6-2.....		400/FIN	7-2.....	400/FIN
6-3.....		400/FIN	7-3.....	400/FIN
6-4.....		400/FIN	7-4.....	400/FIN
6-5.....		400/FIN	7-5.....	400/FIN
6-6.....		400/FIN	7-6.....	400/FIN
6-7.....		400/FIN	7-7.....	400/FIN
6-8.....		400/FIN	7-8.....	400/FIN 1
6-9.....		400/FIN	7-9.....	400/FIN 1
6-10.....		400/FIN	7-10.....	400/FIN
6-11.....		400/FIN	7-11.....	400/FIN
6-12.....		400/FIN	7-12.....	400/FIN
6-13.....		400/FIN	8-1.....	400/FIN
6-14.....		400/FIN	8-2.....	400/FIN
6-15.....		400/FIN	8-3.....	<input checked="" type="checkbox"/> 400/FIN
6-16.....		400/FIN	8-4.....	<input checked="" type="checkbox"/> 400/FIN
6-17.....		400/FIN	8-5.....	<input checked="" type="checkbox"/> 400/FIN
6-18.....		400/FIN	8-6.....	<input checked="" type="checkbox"/> 400/FIN
6-19.....		400/FIN	8-7.....	<input checked="" type="checkbox"/> 400/FIN
6-20.....		400/FIN	8-8.....	400/FIN
6-21.....		400/FIN	9-1.....	* 400/FIN
6-22.....		400/FIN	9-2.....	* 400/FIN

* – Omit from flight book

– Prelift-off information required

9-3.....	*	400/FIN	CC 10-11	*	400/FIN
9-4.....	*	400/FIN	CC 10-12	*	400/FIN
9-5.....	*	400/FIN	CC 10-13	*	400/FIN
9-6.....	*	400/FIN	CC 10-14	*	400/FIN
9-7.....	*	400/FIN	CC 10-15	*	400/FIN
9-8.....	*	400/FIN	CC 10-16	*	400/FIN
9-9.....	*	400/FIN	CC 10-17	*	400/FIN
9-10.....	*	400/FIN	CC 10-18	*	400/FIN
9-11.....	*	400/FIN	CC 10-19	*	400/FIN
9-12.....	*	400/FIN 1	CC 10-20	*	400/FIN
9-13.....	*	400/FIN 1	CC 10-21	*	400/FIN 1
9-14.....	*	400/FIN	CC 10-22	*	400/FIN
9-15.....	*	400/FIN 1	CC 10-23	*	400/FIN
9-16.....	*	400/FIN	CC 10-24	*	400/FIN 1
9-17.....	*	400/FIN	CC 10-25	*	400/FIN
9-18.....	*	400/FIN	CC 10-26	*	400/FIN
9-19.....	*	400/FIN	CC 10-27	*	400/FIN
9-20.....	*	400/FIN	CC 10-28	*	400/FIN
9-21.....	*	400/FIN	CC 10-29	*	400/FIN
9-22.....	*	400/FIN	CC 10-30	*	400/FIN
9-23.....	*	400/FIN	CC 10-31	*	400/FIN
9-24.....	*	400/FIN 1	CC 10-32	*	400/FIN
9-25.....	*	400/FIN	CC 10-33	*	400/FIN
9-26.....	*	400/FIN	CC 10-34	*	400/FIN
9-27.....	*	400/FIN	CC 10-35	*	400/FIN
9-28.....	*	400/FIN 1	CC 10-36	*	400/FIN
10-1.....	*	400/FIN	CC 10-37	*	400/FIN
CC 10-2.....	*	400/FIN	10-38.....	*	400/FIN
CC 10-3.....	*	400/FIN			
CC 10-4.....	*	400/FIN			
(A)CC 10-5....	*	400/FIN			
(A)CC 10-6....	*	400/FIN			
(B)CC 10-5....	*	400/FIN			
(B)CC 10-6....	*	400/FIN			
(C)CC 10-5....	*	400/FIN			
(C)CC 10-6....	*	400/FIN			
CC 10-7.....	*	400/FIN			
CC 10-8.....	*	400/FIN			
CC 10-9.....	*	400/FIN			
CC 10-10.....	*	400/FIN			

* – Omit from flight book

ASCENT CUE CARDS

<u>Title</u>	<u>Ref. Page</u>	<u>Card No.</u>
ADI ERROR/RATE SWITCH		
ASCENT (Front).....	CC 10-2	ASC-1a/A,E/H
ENTRY (Back).....	CC 10-2	ASC-1b/A,E/E
ASCENT/ENTRY SPEC		
(Front).....	CC 10-3	ASC-2a/A,E/E
(Back).....	CC 10-3	ASC-2b/A,E/D
SPEED BRAKE CMD		
(Front).....	CC 10-4	ASC-3a/A,E/E
(Back).....	CC 10-4	ASC-3b/A,E/D
CONTINGENCY ABORT		
CDR (Front).....	(A)CC 10-5	ASC-30a/400/A/A
RTLS CONTINGENCY		
CDR (Back).....	(A)CC 10-6	ASC-30b/400/A/A
CONTINGENCY ABORT		
PLT (Front).....	(B)CC 10-5	ASC-31a/400/A/A
RTLS CONTINGENCY		
PLT (Back).....	(B)CC 10-6	ASC-31b/400/A/A
CONTINGENCY ABORT		
MS (Front).....	(C)CC 10-5	ASC-32a/400/A/A
RTLS CONTINGENCY		
MS (Back).....	(C)CC 10-6	ASC-32b/400/A/A
OMS 2 BURN MONITOR (Front)..	CC 10-7	ASC-5a/400/A,O/A
OMS FAILURES (Back).....	CC 10-8	ASC-5b/A,O,E/I
OMS 2/ORBIT OMS BURNS		
(Front).....	CC 10-9	ASC-6a/400/A,O/A
OPS 1 RCS BURN (Back).....	CC 10-10	ASC-6b/400/A,O/A
ASCENT ADI – NOMINAL		
(Front).....	CC 10-11	ASC-14a/400/A/A
ENTRY ALPHA – KSC 15		
(Back).....	CC 10-11	ASC-14b/400/A,E/A
AOA DEORBIT BURN (2 ENG)		
(Top/Front).....	CC 10-12	ASC-8a/A/E
(Bottom/Front).....	CC 10-13	ASC-8aa/400/A/A
AOA DEORBIT BURN (1 ENG)		
(Top/Back).....	CC 10-14	ASC-8b/A/B
(Bottom/Back).....	CC 10-15	ASC-8bb/400/A/A
AOA DEORBIT BURN (RCS)		
(Top/Front).....	CC 10-16	ASC-7a/A/B
(Bottom/Front).....	CC 10-17	ASC-7aa/400/A/A
(Top/Back).....	CC 10-18	ASC-7b/A/B
(Bottom/Back).....	CC 10-19	ASC-7bb/A/B

MRN TAL REDESIGNATION		
(Front).....	CC 10-20	ASC-10a/400/A/A
BDA – MRN PRIME TAL		
(Back).....	CC 10-21	ASC-10b/400/A/B
ASCENT/ABORT SUMMARY		
(Front).....	CC 10-22	ASC-11a/400/A/A
(Back).....	CC 10-22	ASC-11b/A/C
EMERGENCY EGRESS		
(Front).....	CC 10-23	ASC-15a/A,E/I
ACES TROUBLESHOOTING		
(ASCENT/ENTRY) (Back)	CC 10-24	ASC-15b/A,E/F
ESCAPE PANEL EGRESS		
(Front).....	CC 10-25	ASC-16a/A,E/D
(Back).....	CC 10-25	ASC-16b/A,E/C
GPC/FCS CHANNEL CONFIG		
(Front).....	CC 10-26	ASC-17a/A,O,E/B
(Back).....	CC 10-26	ASC-17b/A,O,E/B
PANEL R14 – OV105 ONLY		
(Front).....	CC 10-27	ASC-19a/A,O,E/D
(Back).....	CC 10-28	ASC-19b/A,O,E/C
LOC/BREAK-UP.....	CC 10-29	ASC-21a/A/D
EMERGENCY EGRESS (OVERSIZED)		
(Top/Front)	CC 10-30	ASC-25a/A,E/G
(Bottom/Front)	CC 10-31	ASC-25aa/A,E/E
(Top/Back).....	CC 10-32	ASC-25b/A,E/D
(Bottom/Back).....	CC 10-33	ASC-25bb/A,E/D
EMERGENCY EGRESS (RUSSIAN)		
(Top/Front)	CC 10-34	ASC-26a/A,E/E
(Bottom/Front)	CC 10-35	ASC-26aa/A,E/D
(Top/Back).....	CC 10-36	ASC-26b/A,E/D
(Bottom/Back).....	CC 10-37	ASC-26bb/A,E/D

PLT & CDR Ascent

<u>Flip Book</u>	FB 2-2 thru FB 2-24
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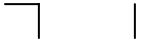
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AOA PROCEDURES	6-7
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AOA POST DEORBIT BURN.....	6-27
OMS/RCS POST BURN RECONFIG (CIL).....	6-28
OMS FAILURE	6-37
OMS/RCS ΔV	6-39
OMS TARGETS, COMM COVERAGE, LAND SITES	7-1
WEATHER PADS	8-1
SWITCH LIST	9-1
CUE CARD CONFIG	10-1



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PRELAUNCH PROCEDURES

**PRE-
LAUNCH**

1-1

ASC/400/FIN



PRELAUNCH PROCEDURES

ABORT/RECYCLE PROCEDURES

NOTE

These recycle procedures will be used inside T-5 min

OTC (or NTD) will call for BFS Safing, SRB Safing, APU Shutdn, Heater Reconfig (Aerosurface positioning complete), MPS He Reconfig, OMS/RCS Reconfig, RCS Driver and OMS Safing, and Main Bus Switch Safing as reqd

C **BFS SAFING (On NTD call)**

O6 GPC MODE 5 – HALT
Report BFS Safing complete

MS1 **SRB SAFING (On NTD call – if reqd)**

O17 MEC 1 – OFF
. . . Wait 2 sec, then . . .
MEC 2 – OFF
Report SRB Safing complete

P **APU SHUTDN (On OTC call)**

R2 APU OPER (three) – OFF
FU TK VLV (three) – CL
√Shutdn (HYD PRESS < 200)
CNTLR PWR (three) – OFF
HYD CIRC PUMP (three) – GPC

Report APU SHUTDN complete

C **HEATER RECONFIG (On OTC call)**

L2 FLASH EVAP FDLN HTR (two) – 2

Report Heater Reconfig complete

NOTE

Numerous non-time-critical steps
for recycle will be individually
called by OTC

P MPS He RECONFIG (On OTC call)

R2 MPS He ISOL A,B (six) – GPC
PNEU He ISOL – GPC

Report MPS He Reconfig complete

P OMS/RCS RECONFIG (On OTC call)

O8 L,R OMS
√TK ISOL (four) – GPC (tb-OP)
√XFEED (four) – GPC (tb-CL)
FWD RCS
He PRESS (two) – GPC (tb-OP)
√TK ISOL (two) – GPC (tb-OP)
√MANF ISOL 1,2,3,4,5 (five) – GPC
(tb-OP)

O7 AFT L,R RCS
He PRESS (four) – GPC (tb-OP)
√TK ISOL (six) – GPC (tb-OP)
√MANF ISOL 1,2,3,4,5 (ten) – GPC
(tb-OP)

Report OMS/RCS Reconfig complete

C, **RCS DRIVER AND OMS SAFING**
MS2 **(On OTC call)**

MS2 O14:F RJD DRIVER (three) – OFF
 LOGIC (three) – OFF
 L OMS ENG VLV – OFF
O15:F RJD DRIVER (two) – OFF
 LOGIC (two) – OFF
O16:F RJD DRIVER (four) – OFF
 LOGIC (three) – OFF
 R OMS ENG VLV – OFF

C C3 OMS ENG (two) – OFF

Report RCS Driver and OMS Safing
complete

MS2 **MAIN BUS SWITCH SAFING (On OTC call)**

O13:A cb ESS 1BC MNA CONTR – op
 :C 2CA MNB CONTR – op
 :E 3AB MNC CONTR – op
O14:B MNA MNC CONTR – op
O15:B MNB MNA CONTR – op
O16:B MNC MNB CONTR – op

Report Main Bus Switch Safing complete

1: GNC GPC MEMORY	2: GNC 104 GND IMU CNTL/MON
3: GNC GPC MEMORY	

-3:00:00
(Hold)

PRE-INGRESS SW RECONFIG

ASP configures OI PCMMU PWR – 1*** (C3).
 ESS BUS SOURCE FC (three) – ON, AC BUS
 SNSR (three) – OFF (1 sec) then AUTO TRIP
 (R1), cb APU FU TK VLV ENA (six) – cl (R2).
 OTC will call: (~2 min) ESS BUS SOURCE FC
 (three) – OFF, AC BUS SNSR (three) – OFF
 (1 sec) then MON (R1), cb ESS MN CONTR
 (three) – cl (O13), cb MN CONTR (three) – cl
 (O14,O15,O16), cb AC1 H2O LOOP PUMP 1 A/2
 (three) – op (L4)

PAYLOAD ACTIVATION

A6U √PL RETEN PL SEL – MON

NAVAIDS ACTIVATION

O8 MLS CH pb/tw (three) – 6
 RADAR ALTM (two) – ON

If OV105:

O7 √GPS PRE AMPL UPPER (three) – ON
 LOWER (three) – ON
 √PWR (three) – ON
 √ENCRYPT (three) – NORM

-2:25:00 A
(-3:15:00)

INGRESS ORBITER & SEATS

During seat ingress COMM
 PWR – ON (L5,R6)
 CCU PWR – ON (A11,A15,MO39M)

O5,O9, AUD VOX SENS (as needed) – adj as reqd
 R10,L9, Contact LCC (OTC & NTD) and MCC on
 MO42F A/G 1

1: GNC GPC MEMORY	2: GNC 104 GND IMU CNTL/MON
3: GNC GPC MEMORY	

Install ASC Flip Cards
 ✓ Cue Card positions

-2:10:00
 (-3:00:00)

POST INGRESS SW RECONFIG

ASP turns on RCS 1,2,3,4
 DRIVERS (eight) (O14,O15,O16),
 OMS ENG VLV (two) (O14,O16),
 GPC OUTPUT 5 – B/U (O6)

NOTE

ASP doing C/W VOL adjust,
 expect MA

-1:57:00
 (-2:47:00)

(IDP Equivalent)

NOTE

IMU preflight align begins

-1:35:00 A
 (-2:25:00)

LCC ASTRO COMM CHECK

LCC will contact all crew on A/G 1,
 A/G 2, ICOM A, ICOM B then A/A

A MCC A/G VOICE CHECK

B A/G 1 Voice Check
 O5,O9 L,R AUD A/G 2 (two) – OFF
 A/A (two) – OFF
 Voice check with MCC

A/G 2 Voice Check
 L,R AUD A/G 2 (two) – T/R
 1 (two) – OFF
 Voice check with MCC

A/A Voice Check
 L,R AUD A/A (two) – T/R
 A/G 2 (two) – OFF
 Voice check with MCC

1: GNC GPC MEMORY 2: GNC 104 GND IMU CNTL/MON

3: GNC GPC MEMORY

-32:00 C
(-1:22:00)

PASS/BFS TRANSFER PREP

O6 √GPC MODE 5 – STBY (tb-RUN)
C3 √BFC CRT SEL: 3+1
 DISP – ON

3: GNC BFS MEMORY

CRT3 PASS/BFS XFER ENA – ITEM 25 EXEC
 √ITEM 25 (*)

NOTE

 ** blanks when transfer is complete
 (~10 min)

-30:00 C
(-1:20:00)

OMS GN2 PRESS

C3 OMS ENG (two) – ARM/PRESS

P **WSB GN2 SUPPLY ACTIVATION**

R2 BLR N2 SPLY (three) – ON

-25:00 A
(-1:15:00)

A/G VOICE CHECK

SIMO VOICE CHECK (LAUNCH CONFIG)
Voice check with MCC

Update Abort Winds Pad, ASC Flip Book,
and ALTM, 1-10 (if reqd)

NOTE

Cabin Press Reporting and vent vlv
closure may occur earlier or later at
LCC direction

-22:00 C
(-1:12:00)

REPORT CABIN PRESS

3: BFS, SM SYS SUMM 1

CRT3,O1 Report cabin pressure (two) to OTC

3: BFS, GNC BFS MEMORY

C **CLOSE VENT VLVS**

L2 CAB VENT ISOL – CL (tb-CL)
 VENT – CL (tb-CL)

1: GNC GPC MEMORY	2: GNC 104 GND IMU CNTL/MON
3: BFS, GNC BFS MEMORY	

NOTE

At T-20 there will be a planned
10-min hold

TRAJECTORY UPDATE

√MCC for max rates and trajectory
config, 8-7

-20:00
(-1:00:00)

OPS 1 LOAD (IDP Equivalent)

1: GNC LAUNCH TRAJ	2: GNC LAUNCH TRAJ
1: GNC 0 GPC MEMORY	
1: GNC FAULT	

Report faults other than from unpwr
equipment

CRT1 GNC, SPEC 99 PRO

-18:30 C
(-58:30)

BFS TO OPS 1

3: BFS, GNC FAULT

CRT3 GNC, SPEC 99 PRO
O6 GPC MODE 5 – RUN (tb-RUN)

CRT3 GNC, OPS 101 PRO

3: BFS, GNC LAUNCH TRAJ
3: BFS, GNC FAULT

Report faults other than from unpwr
equipment

CRT3 GNC, SPEC 99 PRO

1: GNC FAULT	2: GNC LAUNCH TRAJ
--------------	--------------------

3: BFS, GNC FAULT

2: GNC 50 HORIZ SIT

3: BFS, GNC 50 HORIZ SIT

-17:00 P **HORIZ SIT CONFIG**
 (-57:00)

ALTM – ITEM 9 +

		.		
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	<u>PASS ITEM</u>		<u>BFS ITEM</u>	
PTI	INH	√1		
TAL SITE (MCC)	3	√40	3	√40
RTLS SITE	1	√41	1	√41
PRI (MCC)	KSC 15	√3	KSC 15	√3
SEC (MCC)	KSC 33	√4	KSC 33	√4
TAEM TGT				
G&N	OVHD	√6	OVHD	√6
HSI	blank		blank	
XEP	NEP	√7	NEP	√7
AIM	NOM	√8	NOM	√8
	(or CLSE)		(or CLSE)	
NAV				
GPS	INH	√43	INH	√43
DRAG H	AUT	√22	AUT	√22
ADTA H	INH	√26	INH	√26
MLS	AUT	√50		
G&C				
GPS	INH	√48		
ADTA	INH	√29	AUT	√28

1: GNC LAUNCH TRAJ	2: GNC SYS SUMM 1
--------------------	-------------------

3: BFS, GNC SYS SUMM 2

C CONFIG CONT ABORT YAW STEER

CRT1 √ITEM 5

E	N	A
---	---	---

1: GNC LAUNCH TRAJ	2: GNC SYS SUMM 1
3: BFS, GNC SYS SUMM 2	

-16:00
(-56:00)

P **MPS He RECONFIG**

R2 MPS He ISOL A,B (six) – OP
PNEU He ISOL – OP

NOTE

At T-9 there will be a planned
40 min hold

C **√INTERCOM VOICE**

√Intercom voice with all crewmembers
prior to entering T-9 hold

WEATHER UPDATE (if reqd)

Update Abort winds, RWY and ALTM
setting

-9:00

(~17:00)

P **CLEAR HARDWARE C/W MEMORY**

C3 C/W MEM – CLEAR

-9:00

(~15:00)

MS1

Activate V10 Recorder

-9:00

'GO FOR LAUNCH' (All)

C2 EVENT TIMER – START

F7 √TIME ind – counting down

NOTE

GLS starts

-8:00

P

CONNECT ESS BUSES TO FC (GLS √ @ T-7:24)

R1 ESS BUS SOURCE FC (three) – ON

-7:30

NOTE

Access arm retract

√ACES gloves

Cinch down shoulder harness and lap belt

1-11

ASC/400/FIN

1: GNC LAUNCH TRAJ 2: GNC SYS SUMM 1

3: BFS, GNC SYS SUMM 2

3: BFS, SM SYS SUMM 2

-6:15 P **APU PRE START (GLS √ @ T-5:25)**

- R2 √BLR N2 SPLY (three) – ON
- √PWR (three) – ON
- √CNTLR/HTR (three) – A
- √HYD CIRC PUMP (three) – GPC
- √cb APU FU TK VLV ENA (six) – cl
- √APU FU TK VLV (three) – CL
- √AUTO SHTDN (three) – ENA
- √SPEED SEL (three) – NORM
- √OPER (three) – OFF
- HYD MN PUMP PRESS (three) – LO
- APU CNTLR PWR (three) – ON
- FU TK VLV (three) – OP
- √APU/HYD RDY tb (three) – gray

* If any tb not gray, consult *
* LCC before continuing *

-5:00 P **APU START (GLS √ @ T-4:05)**

R2 APU OPER (three) – START/RUN

HYD/ APU

 √HYD PRESS ind (three) – LO green

R2 √APU/HYD RDY tb (three) – bp
 HYD MN PUMP PRESS (three) – NORM

HYD/ APU

 √PRESS ind (three) – HI green

R2 CIRC PUMP (three) – OFF

F7 √PRESS It – off

1: GNC LAUNCH TRAJ 2: GNC SYS SUMM 1
3: BFS, SM SYS SUMM 2

C HTR RECONFIG

L2 FLASH EVAP FDLN HTR (two) – OFF

NOTE

Motion/Vibration may be felt in crew module due to Main Engine gmb1 profile cks at -3:25 and move to start at -3:10

-2:30 P **CLEAR C/W MEMORY**

2: GNC FAULT
3: BFS, GNC FAULT

Verify no unexpected errors
CRT2, GNC, SPEC 99 PRO
CRT3

2: GNC SYS SUMM 1
3: BFS, GNC SYS SUMM 1

C3 C/W MEM – CLEAR

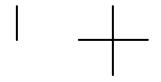
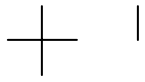
-2:00 A **SUIT PREP**

√Tabs/visor – cl/LES O2 – ON



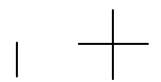
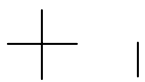
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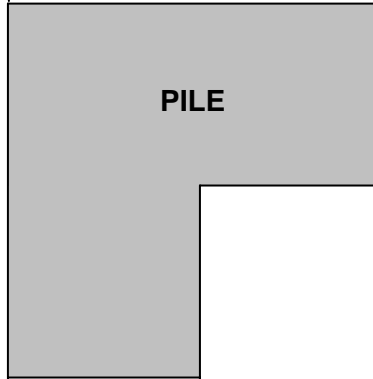


ASCENT PROCEDURES
(FLIP BOOK)

**BAILOUT
EGRESS**



TAB TITLE BLANK ON THIS PAGE ONLY
TOP
MOUNT ON LEFT SIDE OF BACKBOARD FACING
'BAILOUT MODE 8'



**ASCENT FLIP BOOK
(EMERGENCY EGRESS)**

**PRELAUNCH
MODE 1**

- TABS – RELEASE
- VISOR – CLOSE / LOCK
- SUIT O2 – ON
- GREEN APPLE – PULL
- KNEEBOARDS – REMOVE
- COOLING – DISCONNECT
- SEAT RESTRAINT – RELEASE
- PARACHUTE (four) – RELEASE
- COMM – DISCONNECT
- SUIT O2 – DISCONNECT
- EGRESS SEAT
- HATCH – OPEN MANUALLY
- SLIDEWIRE BASKETS

**POST LANDING
MODE 5**

- TABS – RELEASE
- VISOR – CLOSE / LOCK
- SUIT O2 – ON
- GREEN APPLE – PULL
- KNEEBOARDS – REMOVE
- COOLING – DISCONNECT
- SEAT RESTRAINT – RELEASE
- PARACHUTE (four) – RELEASE
- COMM – DISCONNECT
- (G-SUIT CLIP – PULL)
- SUIT O2 – DISCONNECT
- PLT – EMER PWR DOWN
- EGRESS SEAT
- SLIDE/ESCAPE PANEL

HOOK

ASC

- BAILOUT
MODE 8**
-
- REPORT POSITION**
 $\sqrt{\text{MACH}} < 1.0$
 P, R/Y – CSS
 OPS 305/603 PRO (if reqd)
 SB – AUTO; BF – AUTO
 FLY 185-195 KEAS, $\Phi = 0^\circ$
 ABORT MODE – ATO
 ABORT PBI – PUSH
 P,R/Y – AUTO
 FLT CNTLR PWR (two) – OFF
- ~50K FT**
- TABS – RELEASE
 VISOR – CLOSE / LOCK
 SUIT O2 – ON
 GREEN APPLE – PULL
- ~40K FT**
- MS3 – VENT CABIN
 CDR,PLT SEATS – LOWER
 KNEEBOARDS – REMOVE
 COOLING – DISCONNECT
 SEAT RESTRAINT – RELEASE
 D-RING – UNCOVER
- ~30K FT**
- MS3 – JETTISON HATCH
 COMM – DISCONNECT
 (G-SUIT CLIP – PULL)
 SUIT O2 – DISCONNECT
 EGRESS SEAT
 POLE – DEPLOY
 D-RING – HOOK UP
 BAILOUT

TOP
BACK OF 'EMERGENCY EGRESS'

BAILOUT
EGRESS

PILE

SYS FLIGHT RULES

	RTLs	TAL
OMS – 2 He TKs		X
– 1 OX & 1 FU TKs (diff pods)		X
– 2 OX or 2 FU TKs		X
APU/HYD – Impending loss of all capability	X	X
CABIN LEAK – (-EQ dP/dT > .15)	X	X
CRYO – All O2(H2)	X	X
2 FREON LOOPS ↓ [Accum Qty (↓ and decr) and/or Flow (↓)]	X	X
2 MAIN BUSES ↓	X	
THERMAL WINDOW PANE	X	

NO COMM MODE BOUNDARIES

PRESS TO ATO (104)	6200	2 ENG MRN (104)	5500
PRESS TO MECO (104)	7800	ABORT TAL MRN (3)	
NEG RETURN (104)	8600	EO VI	<input type="text"/>
SE OPS 3 BYD (109)	12000	SE OPS 3 MRN (109) (3)	<input type="text"/>
SE BYD (104)	14000	SE LIMITS MRN (109)(3)	<input type="text"/>
SE PRESS (109)	14500	SE MRN (104) (3)	<input type="text"/>
SE PRESS (104)	14800		
NEG MRN (2 @ 104)	16900		
LAST PRE MECO ELS	23000		
LAST TAL			
AML	23900		
GDV	24100		
LRB, AAT	24400		
KIN	24800		
BYD	24900		

ASCENT PROCEDURES

HOOK

R180

LVLH

0.72M

√P_c → 67%

1.41M

√P_c → 104%

P_c < 50+5 s

√SRB SEP (Backup AUTO SEP 2:21)

√TMECO

- * If **NOT STABLE** (10 sec):
- * NO COMM – CSS & MAN THROT *

3:00

Close suit O2, open visor

√EVAP OUT (T < 60)

- * If Systems ABORT reqd: *
- * RTLS at 3:40 or *
- * TAL Select prior to **[16900]** *
- * Otherwise AOA or *
- * Manual MECO **[23700]** BYD ELS *
- * *

V_I = **[13.6K]**

√Roll Heads Up

- * If Man Throttle (3 eng): *
- * Man Shutdn at **[25970]** *
- * If 1 eng: *
- * **[TRAJ]** √SERC ON *
- * When MPS PRPLT = 5%: *
- * MAN THROT *
- * When MPS PRPLT = 2%: *
- * MIN THROT (P_c → 67%) *
- * AUTO THROT *

MECO

√V_I = **[26088]**

MECO+20 s

√ET SEP

- * If 'SEP INH': *
- * ET SEP – MAN *
- * If Rates > .7,.7,.7: *
- * MPS PRPLT DUMP SEQ – STOP *
- * Null rates *
- * ET SEP – SEP *
- * Post ET Sep -Z xlation: *
- * MPS PRPLT DUMP SEQ – GPC *
- * If Rates < .7,.7,.7: *
- * Assume Feedline Fail *
- * If V_I < **[25553]**: *
- * OPS 104 – PRO (√BFS 104) *
- * **NOTE:** Expect – 'Illegal Entry' (PASS) *
- * 'Illegal TIG' (BFS) *

▶ **MM104+2 s**

If ET Sep complete and HA > **[100]**:
+X xlation for 11 sec

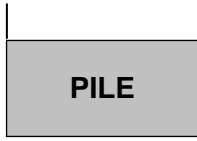
√TGTS

√ASC PKT for failures

If OMS 1 not reqd:
OMS ENG (two) – OFF
Go to POST OMS 1

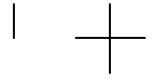
**OMS 1
TGTING**

TOP
BACK OF 'ASCENT PROCEDURES'



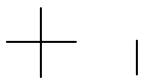
PILE

**STS-400 OCF CY
OMS 1/2 TGTING
RENDEZVOUS RECOVERY**



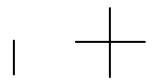
ASC

TBD



FB 2-6

ASC/400/FIN



PILE

OMS 1 BURN

OMS 1
TGTING

* **IF TIG LATER THAN MECO + 6 min:** *
* MECO + 4 min: √BDY FLP pb – lt off (MPS dump complete) *
* √MCC for APU shutdn (if time permits) *
* **FEEDLINE FAIL:** *
* Expect 'Illegal Entry' (PASS)/'Illegal TIG' (BFS) @ tgt select *
* pre ET Sep; input TIG manually & LOAD tgt *
* If TIG > MECO + 6 min: *
* TIG-1:30 or MECO + 6 min (whichever comes first): *
* ET SEP – SEP >> *
* If TIG < MECO + 6 min: *
* MPS PRPLT DUMP SEQ – STOP *
* TIG-1:30: ET SEP – SEP *
* Post ET SEP -Z xlation: *
* MPS PRPLT DUMP SEQ – GPC *
* **1 OMS ENG FAIL and ΔVTOT > 500:** *
* Burn good OMS + l'cnct both OMS to RCS, THC +X at TIG *

DAP – AUTO/DISC
√ENG/TRIM CONFIG, Select TGT (ITEM 35) then TIG
LOAD TGTS and MNVR
OMS XFEED (four) – OP
√CNTLR PWR (two) – ON
√OMS ENG (two) – ARM/PRESS
Note ΔVTOT _____ TIG :
-:15 EXEC
:00 TIG; start watch (√P_c, ΔVTOT, ENG VLVs)

* **OMS ENG FAIL:** *
* Failed ENG – OFF *
* If ΔVTOT < 500: *
* At QTY = 5%, good OMS TK ISOL (two) – CL *
* If ΔVTOT > 500: *
* RCS XFEED (four) – OP *
* RCS TK ISOL (six) – CL *
* THC +X *
* At first QTY = 5%, good OMS TK ISOL (two) – CL *
* At second QTY = 5%, THC – Release *
* **RCS COMPLETION:** *
* Interconnect to either *
* OMS that was ENG FAIL *
* THC +X (OMS% vs RCS ΔV) *
* OMS TK SW (if reqd) *

CUTOFF

+:02 OMS ENG (two) – OFF
Trim inplane X,Z residuals < 2 fps
OMS XFEED (four) – CL (√RCS straightfeed)

HOOK

OMS 1 BURN MONITOR

OMS TEMP* FU IN P ≥ <table border="1" style="display: inline-table;"><tr><td>L</td><td>R</td></tr><tr><td>219</td><td>220</td></tr></table> ≤ <table border="1" style="display: inline-table;"><tr><td>L</td><td>R</td></tr><tr><td>201</td><td>208</td></tr></table> or No FU IN P	L	R	219	220	L	R	201	208	OMS ENG FAIL OMS ENG FAIL (PRPLT FAIL if 1 Pod Feed)
L	R								
219	220								
L	R								
201	208								
OMS PC* & OMS ↓ (BFS: √accel)	OMS ENG FAIL								
OMS OX/FU TK P (√ENG IN P) OX/FU LOW	He PRESS/VAP ISOL (two) – OP If aff TK P not incr: He PRESS/VAP ISOL (two) – CL At Good OMS Qty = 5% OMS XFEED (four) – CL								
OX & FU HIGH	He PRESS/VAP ISOL (two) – CL OMS XFEED (four) – CL Cycle He A(B) to maintain TK P 234-284								
OMS He TK P LOW (√ <table border="1" style="display: inline-table;"><tr><td>OMS/MPS</td></tr></table>)	OMS/MPS	At He P < 640 √OMS XFEED (four) – OP Aff OMS TK ISOL (two) – CL At Good OMS Qty = 5% OMS TK ISOL (four) – OP XFEED (four) – CL							
OMS/MPS									
OMS N2 REG P HIGH or LOW	OMS ENG – ARM								
OMS N2 TK P LOW (√ <table border="1" style="display: inline-table;"><tr><td>OMS/MPS</td></tr></table>)	OMS/MPS	At N2 TK P < 470: OMS ENG – ARM							
OMS/MPS									
OMS GMBL	PRI fail L(R) OMS GMBL – SEC (twice) SEC fail If high RCS usage: OMS ENG FAIL								
GPC 1(4) & Burning OMS aff	aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF,ON L(R) OMS GMBL – SEC (twice)								
SEC GMBL lost 2 FAs lost	If high RCS usage: OMS ENG FAIL √MAN SHUTDN								
I/O ERROR FA 1(4)	L(R) OMS GMBL – SEC I/O RESET (if recov: BFS I/O RESET) If high RCS usage: OMS ENG FAIL								
2 FAs lost	√MAN SHUTDN								
BCE STRG D 1(4)	I/O RESET (if recov: >>) If high RCS usage: L(R) OMS GMBL – SEC (twice)								
I/O ERROR PCM	OI PCMMU PWR – 2(1)								

OMS 2
TGTING

*If XFD, BLDN, or sensor fail, monitor ENG IN P for off-nominal performance

TOP
BACK OF 'OMS 1 BURN MONITOR'

PILE

OMS 2 TARGETING
(DIR INSERTION)

OMS 1
BURN

FAILURE	OMS 2 TARGET
OMS – 1 OMS ENG 2 N2 TKs (Perform burn Single OMS Eng) – 2 OMS ENGS – 1 He TK – 1 PRPLT TK EPS – MNA & B, MNB & C MNA & C ET SEP	PEG 7; TTA = 1 CUTOFF HP = 85
OMS – 2 He TKs – 2 OX or 2 FU TKs – 1 OX & 1 FU TK diff PODs	AOA-S
2 FREON LOOPS [Accum Qty (↓ and decr) and/or Flow (↓)] 2 H2O LOOPS CABIN LEAK (-EQ dP/dT ≥ .08)	AOA
APU/HYD – impending loss of all capability	AOA
CRYO – All O2(H2)	AOA

OMS

He	%	He	%
4650	96.1	2810	50
4410	90	2410	40
4010	80	2010	30
3610	70	1610	20
3210	60	1210	10
		810	0

TOP

HOOK

ATO

NOTE

These tables apply only after ATO OMS 1 burn
(ITGT = ①, AOA to EDW). Assumes OMS and ARCS deorbit

DUAL POD - OMS REQUIRED				
Includes 9.1 % Unusable (4.6 % per pod)				
POST OMS 1 HP	ATO OMS 2 & STEEP D/O BURN (%)	MIN HP OMS 2 & SHALLOW D/O BURN (%)	AOA STEEP D/O BURN (%)	AOA SHALLOW D/O BURN (%)
95	30.5	12.6	29.3	20.4
90	32.2	11.6	27.8	18.8
85	33.7	11.3	26.1	17.0
80	34.9	12.2	24.1	14.9
75	36.0	13.4	22.3	13.0
70	37.1	14.6	20.5	11.2
65	37.8	15.6	18.7	9.5
60	38.6	16.7	17.3	9.1
55	---	17.8	16.4	9.1

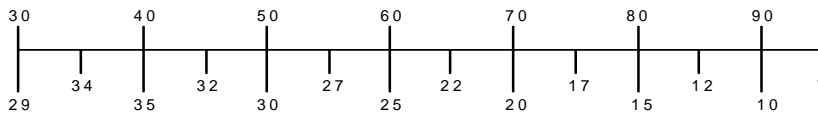
STS-400 OCF CY

SINGLE POD - OMS REQUIRED				
Includes 4.6 % Unusable				
POST OMS 1 HP	ATO OMS 2 & STEEP D/O BURN (%)	MIN HP OMS 2 & SHALLOW D/O BURN (%)	AOA STEEP D/O BURN (%)	AOA SHALLOW D/O BURN (%)
95	25.9	8.1	24.8	15.9
90	27.6	7.0	23.3	14.3
85	29.1	6.8	21.5	12.4
80	30.3	7.6	19.5	10.3
75	31.5	8.8	17.7	8.5
70	32.5	10.0	15.9	6.6
65	33.3	11.1	14.2	4.9
60	34.0	12.1	12.7	4.6
55	---	13.2	11.8	4.6

RTLS

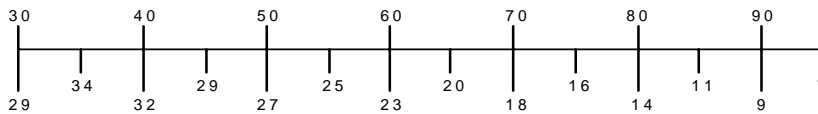
OMS BLOWDOWN

LEFT OMS GAGE QTY (%)



LEFT OMS BLDN EQUIV (%)

RIGHT OMS GAGE QTY (%)



RIGHT OMS BLDN EQUIV (%)

FB 2-11

ASC/400/FIN

PILE

RTLS CDR

Abort initiated:
After 2:30 (2 eng)
At 3:40 (3 eng)

ABORT RTLS

- * No joy: *
- * OPS 601 PRO *

√GUIDANCE STATUS on RTLS TRAJ



Expect PPA when GUID % to go = 0

- * If GUID 'INHIB': *
- * √UNCONVERGED GUID TABLE *
- * MAN PPA per PRPLT *
- * REMAINING *
- * After GUID CONVERGE: *
- * P,R/Y AUTO/AUTO THROTTLE *

WINDS

50K	/
38	/
28	/
20	/
12	/
7	/
3	/
1	/
SURF	/
SPDBK @ 3000 FT	

After PPA: √BFS ITEM 1 (*)

TRAJ √Bugs, HSI √, 

Pitchdn ($\beta = 0^\circ$, $\alpha = -2^\circ$)

----- **MECO** ----- **MECO** -----

**OMS 2
TGTING**

- √ET SEP (MECO + 16 sec)
- √MM602 ($\alpha > 10^\circ$ and SEP + 10 sec)
- √P,R/Y, SPDBK, BDY FLP – AUTO
- $\alpha = 50^\circ$ until ~1.9g, maintain 2.3g

Adjust seat

$\dot{H} > -320 \uparrow$ VERT SIT √ α vs Mach
V = 5K √RUD, AIL TRIM
& EAS < 333 ↓ AIR DATA PROBE (two) – Deploy (√Heat)

M = 3.2 √SPDBK → 65%
M = 2.7 L HUD PWR – ON

* If M < 2.5, P CSS for ADTA to G&C incorp *

M = 2.0 Ensure ADTA to G&C else THETA limits
M < 1.0 P,R/Y – CSS, √SPDBK CMD vs POS
√NWS – 1

Lock Inertia Reels

POST LANDING: ENT, POST LDG



RTLS PLT

If CSS: MAN THROT
Man MECO

√P_c = 104% (2 eng)/69% (3 eng)
√DUMP

UNCONVERGED GUIDANCE TABLE

ENG OUT	OUTBOUND INITIAL θ	PITCHAROUND at % (8°/sec)	FLYBACK INITIAL θ
Liftoff	60°	44%	64°
:30	56°	47%	63°
1:00	57°	47%	63°
:30	56°	48%	62°
2:00	49°	51%	61°
:30	42°	51%	52°
3:00	38°	52%	50°
:30	34°	53%	48°
4:00	Last RTLS	52%	46°

√P_c at PPA + 20 sec

- * If P_c = 104% (2 eng): *
- * **G51** MAX THROT – ITEM 4 (*) *

Pitchdn: √P_c → 67%

MECO ----- **MECO**

- KEAS = 77 √SPDBK → 81%
- √ET DOORS – Closed and latched (MECO +1:30)
- √ET SEP, SRB SEP – AUTO
- Adjust seat
- G50** √GPS, INCORPORATE

G50 √AIR DATA, INCORPORATE

- MM603 HYD MPS/TVC ISOL VLV (three) – CL
(hold 5 sec, tb-CL)
- H = 85K MLS (three) – ON
If Rwy 33(15): MLS CH (three) – 6(8)
I/O RESET
- M = 2.7 R HUD PWR – ON
- M < 1.0 √R FLT CNTLR PWR – ON
Lock Inertia Reels
- M = 0.7 √LG EXTD ISO VLV – OP
- H = 10K √BDY FLP – TRAIL
√A/L (KSC – Tabs, Visors, Suit O2)
- POST LANDING: ENT, POST LDG

TAL

TOP
BACK OF 'RTL PLT'

PILE

TAL CDR

If $V_1 > 23000$ manual MECO 23700 , go to post MECO
ABORT TAL

$G50$ \checkmark SITE & RWY (PASS/BFS), \checkmark HDG

TAL	HDG
MRN	332
BEN	338
BYD	002

SITE	RWY	MLS	LENGTH
2	BEN 36/18	-/-	13720/13220
3	MRN 20/02	6/-	11730/11730
5	BYD 32/14	-/-	11820/11820
7	AML 01/19	-/-	9350/9350
8	GDV 03L/21R	-/-	9670/9670
9	LAJ 15/33	-/-	10870/10870
10	BEJ 01L/19R	-/-	10820/10820
13	*MRN 20/02	6/-	11730/11730
16	LRB 04/22	-/-	9300/9300
17	KIN 24/06	-/-	14920/14920
18	AHS 18/36	-/-	13100/13100
19	AAT 02/20	-/-	11310/11310

*LO XRNG

* If second eng fails: $TRAJ$ \checkmark SERC ON *
* $G50$ \checkmark SITE (\checkmark Redes card) *

$V_1 = 15.4K$ \checkmark Roll Heads Up

----- MECO ----- $V_1 \sim 24.0K$ @ CO mark ----- MECO -----

MECO+20 s \checkmark ET SEP, \checkmark AUTO -Z TRANS
MECO+37 s \checkmark MM104

Abort TAL (if reqd):

\checkmark TAL flag set: $G50$ ITEM 41 = TAL SITE (any site)
 \checkmark MECO V_1 vs HI/LO Energy (TAL PLT)
 \checkmark Rates $< .5^\circ/\text{sec}$; $\theta > 15^\circ$, $Y = 0 \pm 30^\circ$
PASS, OPS 301 PRO (\checkmark 304)

* No joy in 68 sec: BFS - ENGAGE *
* BFS, OPS 301 PRO *

----- MM304 -----

BFS, OPS 301 PRO (\checkmark 304)
 $G50$ \checkmark SITE, RWY
S/B & ALTM (PASS/BFS)

$TRAJ$ \checkmark BUGS, HSI \checkmark H, RANGE, AMI \checkmark $\alpha = 43^\circ$

* Low energy: $TRAJ$ ITEM 3 (Lo Energy ENA) *
* If Variable/man 37: Pitch - CSS at $\alpha = 37^\circ$ *
* Pitch - AUTO when $H = 0 \uparrow$ (2nd pullout) *

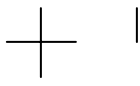
$V = 10K$
 $V = 7K$

\checkmark SPDBK $\rightarrow 81\%$

Go to ENTRY MANEUVERS
(Cue Card)

SURF WIND	/
SPDBK @ 3000 FT	
ALTM	
AIM PT	
SPDBK	

RTLS



TAL PLT



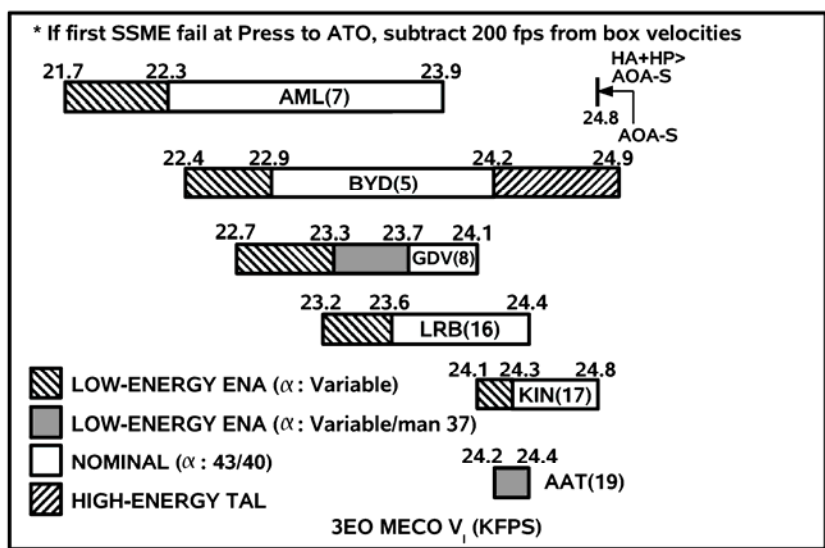
√OMS DUMP

- * If second eng fail: *
- * **G51** DUMP – ITEM 6 (*), 7 (*) *
- * Failed ME SHUTDN pb (two) – push *

√AUTO THROT

- * If STUCK TAL: *
- * When MPS PRPLT = 2%: *
- * MAN THROT, P_C → 67% *
- * AUTO THROT *

----- MECO --- V_I ~24.0K @ CO mark ----- MECO -----



----- MM304 -----

√OMS DUMP

√ET DOORS – Closed and latched (MM304 +1:30)

V = 19K HYD MPS/TVC ISOL VLV (three) – CL
(hold 5 sec, tb-CL)

G50 √GPS, INCORPORATE

V = 10K * If RCS < **57** % either side: *

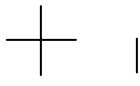
* **G51** AFT RCS INH, ITEM 13 EXEC *

V = 7K MLS (three) – ON (√channels)

I/O RESET

Go to ENTRY MANEUVERS (Cue Card)

BDA





PILE

POWERED BERMUDA


G51 √MAX THROT – ITEM 4 (*)

√ADI (two) – REF
√θ → 60°, Yaw → 45°

√Roll to Heads Up

G50 Select Site BDA – ITEM 41 +6

When EAS > 4 and incr:

- √Yaw to 
- √Pitch down at 3°/sec
- √MECO, ET SEP

**ET SEP
+ 8s:**

CSS, pull to $\alpha = 58^\circ$ at 4°/sec, AUTO
√MM602 (BFS, OPS 602 PRO)

Go to BERMUDA ENTRY

2EO BERMUDA (28.5°)

VELOCITY (Vi)	SITE	LOCATION	RWY
*SRB SEP – 7.0 (no yaw)	6	BERMUDA	BDA 30
*7.0 – 11.4 (yaw)			BDA 12
11.6 – 12.6 (yaw)			

*Probable bailout region

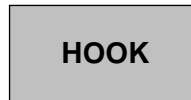
3EO BERMUDA (28.5°)

MM602 VEL (Vrel)	SITE	LOCATION	RWY
*SRB SEP – 18.5	6	BERMUDA	BDA 30 BDA 12

*Probable bailout region

TAL





HI-ENER
TAL

BERMUDA ENTRY

If 3 OUT BDA or 2 OUT SECOND GREEN:

G50 Select SITE
BFS, OPS 602 PRO

Before NZ Hold:
RHC/PNL TRIM – ENA
If M < 5, √AIL/RUD TRIM

BFS, **G50** √SITE

Nz Hold:
Expect prebank = 20° if TGT Nz < ~3.3g and ΔAZ > 20°
At H = -600 ↑ expect initial bank 2xΔAZ (70° max)
If E/W ≥ STN, expect bank = 70° until ΔAZ increased to 15-30°
past site, then 2xΔAz

G50 √GPS, INCORPORATE

M < 5 and EAS < 333 ↓:
AIR DATA PROBE (two) – Deploy (√Heat)

G50 INCORPORATE Air Data ASAP

M = 3.2: √OPS 603

Select UHF-G T/R

NO COMM BDA LNDG CRITERIA

@H = 70K, √Range:

- * If Range < 28 nm or Range > 54 nm: *
- * P, R/Y CSS *
- * Bank (≤ 30°) to avoid land mass *
- * Go to BAILOUT *

G50 √SPDBK (ITEM 39) per ELS LANDING Table

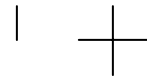
ELS LANDING:

Runway Length + Ovrn	Spdbk	MGTD	Distance
≥ 11,000'	NOM	205	2500
≥ 8500 to < 11,000'	SHORT	205	1500
< 8500'	ELS	195	1000

MAIN GEAR TD: EARLY CHUTE, DEROTATE, √SPDBK – 100%
NOSE GEAR TD: BRAKE – as reqd

- * If 5K' remaining and V > 140 KGS – MAX BRAKING *
- * (smooth application, not < 2 sec) *

Go to RTLS (enter POST-MECO M = 2.7 step) or BAILOUT



BDA



PILE

HIGH-ENERGY TAL CDR

MM104

Abort TAL:

√TAL flag set: **G50** ITEM 41 = TAL SITE (any site)
√Rates < .5°/sec; $\theta > 15^\circ$, $Y = 0 \pm 30^\circ$
PASS, OPS 301 PRO (√304)

MM304

MM304 P, R/Y – CSS
√VREL

VREL	ROLL (CSS) 4-5°/sec	ALPHA (CSS)
VREL ≥ 23,400	180°	80° ($\theta = 280^\circ$)
22,900 ≤ VREL < 23,400	180°	55°
VREL < 22,900	0°	55°

$\dot{H} = -200 \downarrow$ If Alpha = 80°, push to Alpha = 55° ($\theta = \sim 305^\circ$)

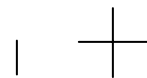
Earlier of Roll Heads Up at 4-5°/sec, maintain Alpha = 55°
 $\dot{H} = -700 \downarrow$
or Guid Init

$\dot{H} = -500 \uparrow$ R/Y – AUTO (√Rolls toward site before $\dot{H} > +200$)
Limit roll to 90° until V = 6K:
TRAJ Roll CMD > 90° R/Y CSS @ 90°
< 90° R/Y AUTO

Orbiter bug below upper line When commanded drag (\leftarrow) < 40:
Pitch down at 0.5°/sec, center pitch needle,
P – AUTO

V = 6K If energy still high:
Pitch down at 1°/sec, center pitch needle,
P, R/Y – AUTO

Go to ENTRY MANEUVERS (Cue Card)



HIGH-ENERGY TAL PLT

HOOK

-----MM304-----

BFS, OPS 301 PRO (√304)

[G50] Select [BYD] – ITEM 41 + [5]

[TRAJ] √BUGS, [HSI] √^H, RANGE√ET DOORS – closed and latched
(MM304 +1:30)

Guid Init:
(D = 3, q̄ = 8,
EAS = 48)

- * If no comm and [BYD] *
- * initial Commanded Drag (←) ≥ [40], *
- * [G50] Select Site [LRB] – ITEM 41 + [16] *

V = 19K HYD MPS/TVC ISOL VLV (three) – CL
(hold 5 sec, tb-CL)

V = 15K [G50] √RWY, S/B, ALTM
(PASS/BFS)

V = 10K * If RCS < [57] % either side: *

- * [G51] AFT RCS INH, ITEM 13 EXEC *

V = 10K √SPDBK → 81%

Go to ENTRY MANEUVERS (Cue Card)ABORT
DUMPS

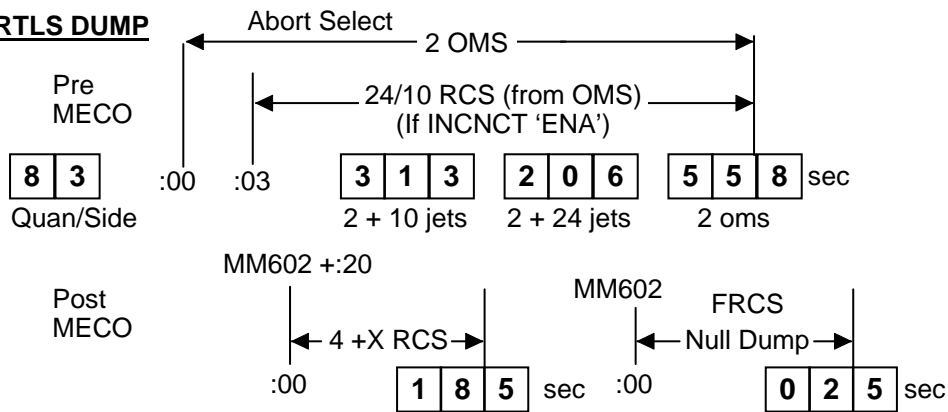
TOP
BACK OF 'ECAL ENTRY'

HI-ENER
TAL

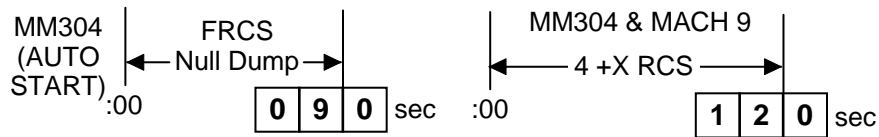
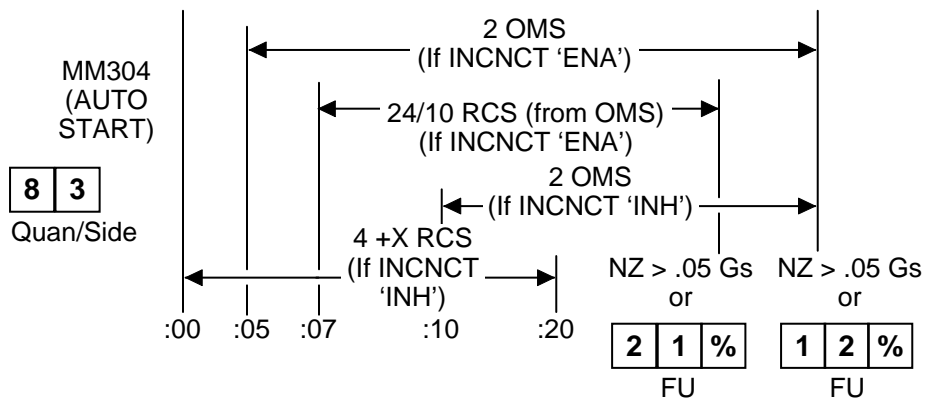
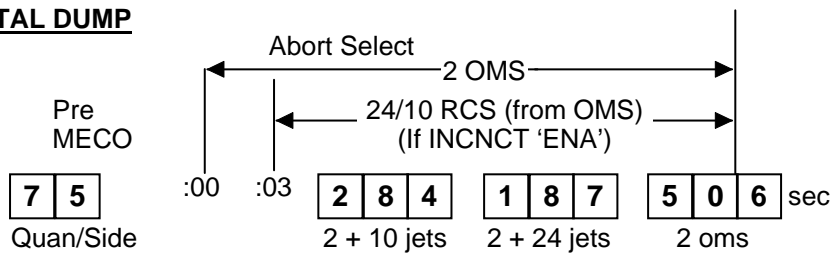
PILE

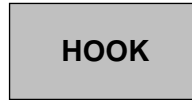
RTLS/TAL DUMPS

RTLS DUMP

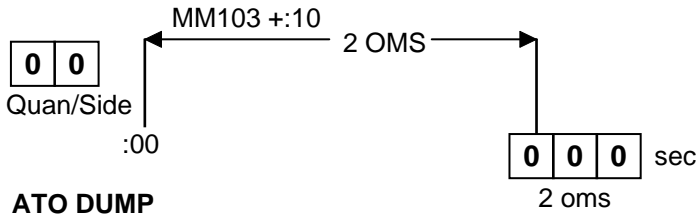


TAL DUMP

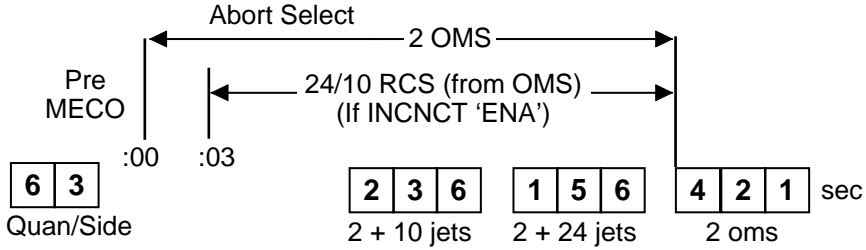




ASSIST/ATO/G51 DUMPS
ASSIST DUMP

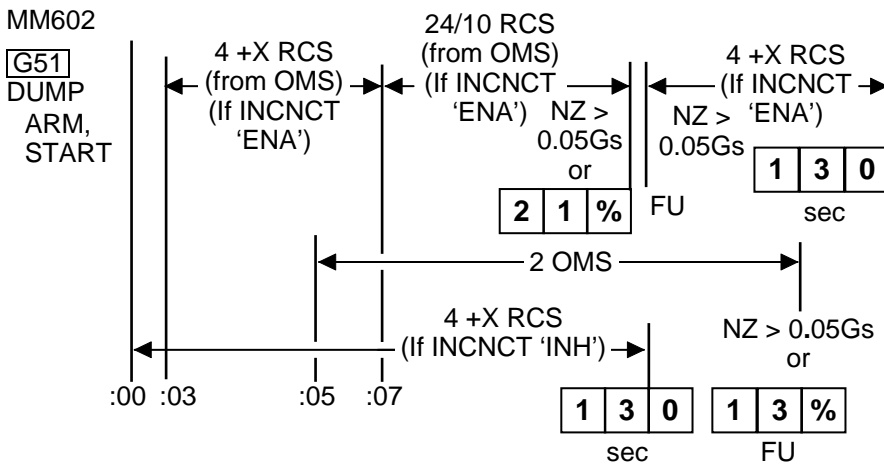
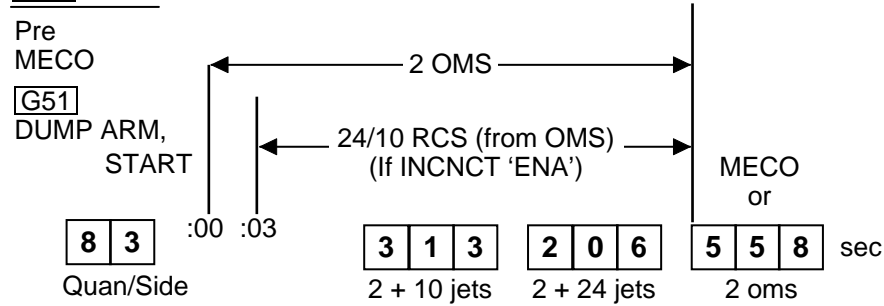


ATO DUMP



PWRD
CSS

G51 DUMP



TOP
BACK OF 'ASSIST/ATO/G51 DUMPS'



PILE

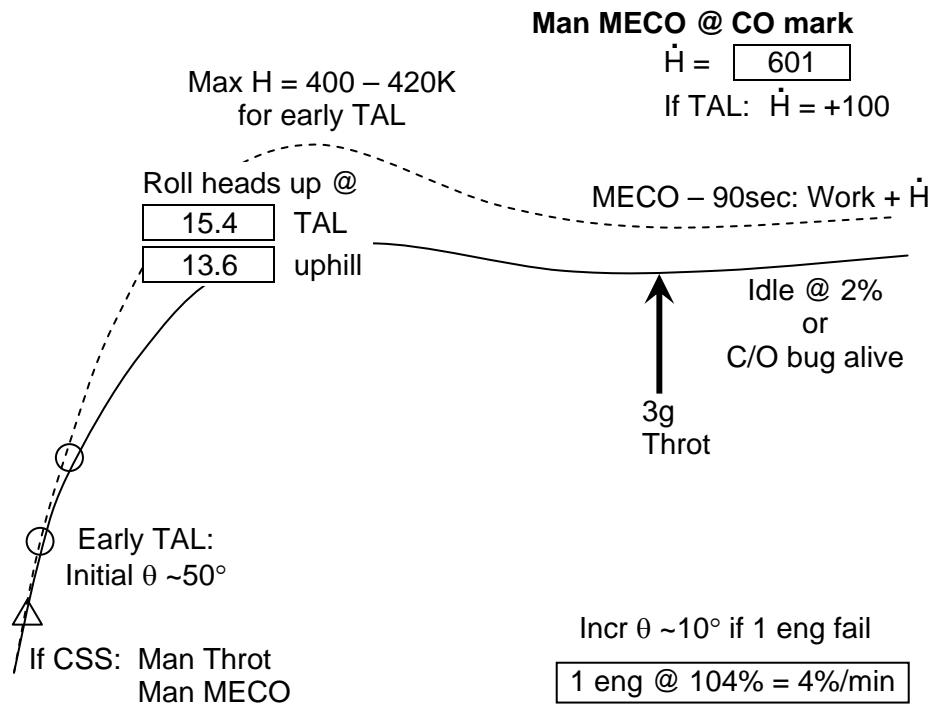
POWERED CSS – UPHILL/TAL

CSS & MAN THROT
(IF MET < 1:30, ENGAGE BFS)

Yaw to **E** until 2:30
Then **I** uphill
or **R** if TAL

If TAL \sqrt{HDG}	
MRN	332
BEN	338
BYD	002

**ABORT
DUMPS**



POWERED CSS – RTLS

HOOK

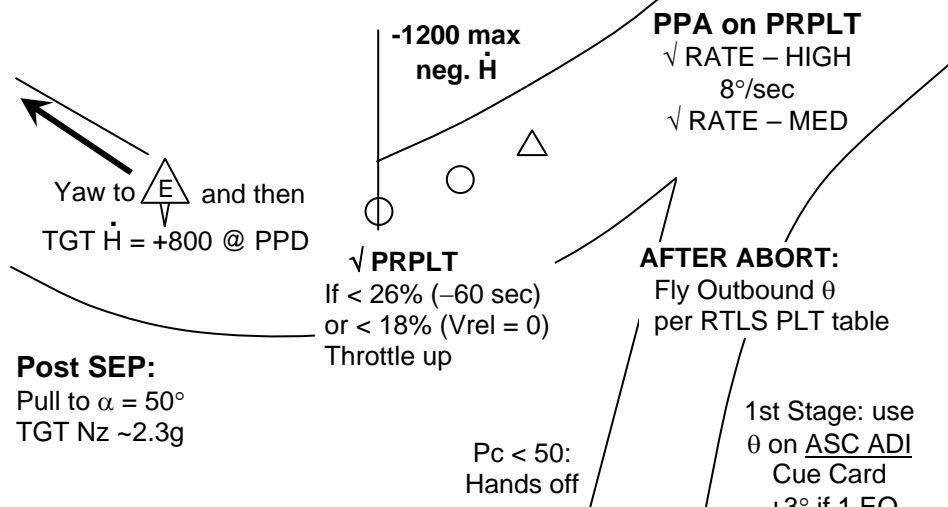
CSS & MAN THROT
(IF MET < 1:30, ENGAGE BFS)

Post PPA	Pre PPA
2 eng = 100%	2 eng = 104%
3 eng = 69%	3 eng = 69%

PPD
Idle & Pitch DN to
horiz ($\alpha -2^\circ$)
Man MECO @ CO mark
Hold FWD stick until SEP

R Yaw to **R**

\dot{H} control:
Use θ then
Throttle

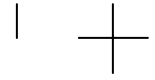
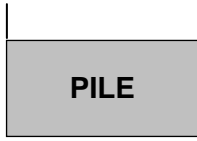


Post SEP:
Pull to $\alpha = 50^\circ$
TGT Nz $\sim 2.3g$

1 eng @ 104% = 4%/min

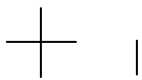
If CSS: Man Throt
Man MECO

TOP
BACK OF 'POWERED CSS – RTLS'



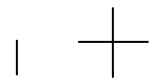
**PWRD
CSS**

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FB 2-24

ASC/400/FIN





ASCENT/ENTRY CUE CARDS

**ASC/ENT
CUE CARDS**



MS ONLY

2-25

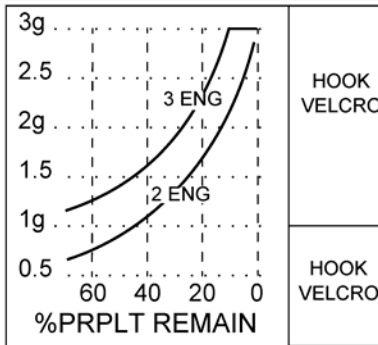
ASC/400/FIN



ASC/ENT
CUE CARDS

ASCENT ADI - NOMINAL

TIME	θ	H	\dot{H}	(400 OCF CY)
0:30	70	10K	686	
0:50	62	27K	1007	
1:10	53	50K	1405	
1:30	39	84K	1884	
1:50	31	125K	2196	



-STAGING-

V_1	θ	H	\dot{H}	ASC-14a/400/A/A
6	20	202K	1811	
7	17	265	1343	
8	14	303	988	
9	12	327	704	
10	10	342	474	
12	7	355	141	
14	5	356	-57	
16	27	353	-110	
18	24	350	-124	
20	23	348	-46	
22	21	348	101	
24	19	352	305	
26088	16	369	601	

HOOK VELCRO

ENTRY ALPHA

VR	α ref	R	H	Href	Rref
25	HI 40	LO 4275	400		
24	HI 40	LO 2733	249	-44	L84
23	43 40	37 2241	240	-60	74
22	43 40	37 1862	234	-78	67
21	43 40	37 1566	227	-99	63
20	43 40	37 1332	222	-115	R61
19	43 40	37 1146	215	-136	60
18	43 40	37 997	208	-158	62
17	43 40	37 871	201	-176	62
16	43 40	37 768	195	-188	64

KSC 15

MAX L/D	
M	α
3	17
2	15
1	12

(400 OCF CY)

HOOK
VELCRO

ASC-14b/400/A,E/A

HOOK
VELCRO

HOOK
VELCRO

15	43 40	37 685	189	-202	65
14	43 40	37 613	183	-127	63
13	43 40	37 545	180	-136	61
12	43 40	37 483	176	-152	59
11	42 39	36 428	172	-192	L56
10	41 38	35 378	167	-173	48
9	39 36	33 326	161	-206	44
8	37 34	31 277	154	-239	40
7	33 30	27 231	144	-266	39
6	30 27	24 184	133	-272	40
5	26 23	20 143	120	-274	41
4	22 19	18 107	108	-262	R38
3	19 16	15 75	92	-248	38
2.5	14	61	85	-214	
2	13	50	79	-260	
1.5	10	38	69	-314	
1	8	28	54	-261	

HOOK
VELCRO



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ENTRY MANEUVERS

FLIGHT CONDITIONS	MANEUVER
EI-5	√LVLH ATT GNC, OPS 304 PRO * If PREBANK, R/Y – CSS * * Roll at 1°/sec to <input type="text"/> <input type="text"/> <input type="text"/> * * Maintain PREBANK ±5° * If previous OMS OX TK, He TK, or RCS OX TK leak: <input type="text"/> G51 VENT DOOR CNTL OPEN – ITEM 43 EXEC (AOA) <input type="text"/> SPI When SB position – 0%: √HYD MN PUMP PRESS (three) – LO
$\bar{q} = 1$	(AOA) HYD MN PUMP PRESS (three) – NORM
‘Guidance Box’ @ $\bar{q} \sim 8$ or D ~ 3	CLOSED LOOP GUIDANCE ____:____:____ * If PREBANK: P,R/Y – AUTO * Begin ALL trim monitoring
V = 24K	If previous OMS OX TK, He TK, or RCS OX TK leak: <input type="text"/> G51 VENT DOOR CNTL CLOSE – ITEM 44 EXEC
D = 11	√DRAG H
$\Delta Az = 10.5^\circ$	FIRST ROLL REVERSAL <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> (DEL PAD)
V = 19K	√HYD MPS/TVC ISOL VLV SYS (three) – CL
V = 15K	√NAVAIDS (I/O RESET if reqd)
V = 12K	RAD BYP VLV MODE (two) – AUTO CNTLR LOOP (two) – AUTO B(A)
V = 10K	√SPDBK to 81%

**ENT
MNVR**

ENT-6a/E/P

ENT
MNVR

FLIGHT CONDITIONS	MANEUVER
V = 7K	<input type="checkbox"/> G50 √GPS, INCORPORATE * If ELS: UHF MODE – G T/R *
V = 5K	ADTA PROBES – DEPLOY (√HEAT) Begin AIL and RUD trim monitoring
M = 3.5	If previous OMS OX TK, He TK, or RCS OX TK leak: <input type="checkbox"/> G51 VENT DOOR CNTL OPEN – ITEM 43 EXEC
M = 2.7	√APUs HUD PWR (two) – ON
* If M < 2.5; P CSS for ADTA to G&C incorp *	
M = 2.0	Ensure ADTA to G&C else √Theta limits
M < 1.0	√R FLT CNTLR – ON P,R/Y – CSS as reqd √SPDBK CMD vs POS MAX N _Z <input type="text"/> . <input type="text"/> √NWS – 1 Lock Inertia Reels
M = 0.7	√LG EXTD ISO VLV – OP
h = 15K	√MLS
h = 10K	√A/L (KSC – Tabs, Visors, Suit O2)
h = 2K	LDG GEAR ARM pb – push (ARM It on)
h = 300	LDG GEAR DN pb – push (DN It on)
MAIN GEAR TD	√SPDBK – 100%
V = 195 KEAS	DRAG CHUTE ARM, DPY pb (two) – push (simo) (All Its on)
V = 185 KEAS	DEROTATE
NOSE GEAR TD	SRB SEP – MAN/AUTO and depress pb √Auto Load Relief √HYD BK ISOL VLV (three) – OP
V < 120 KGS or 5K' remaining	BRAKE as required (8-10 fps ² , -0.25 to -0.3G)
* If 5K' remaining and V > 140 KGS – MAX BRAKING *	
V = 60 KGS	DRAG CHUTE JETT pb – push (JETT1, JETT2 It on)
V = 40 KGS	BRAKE < 6 fps ² (-0.2G) (Antiskid cutout)
WHEEL STOP	Go to ENT C/L, <u>POST LANDING PROCEDURES</u>

ENT-6b/400/E/A
(Partial)

DRAG CHUTE DEPLOY

MCC Call	Flight Condition
Early	Main Gear TD
NOMINAL	195 KEAS
Late	Post-Nose Gear TD Xwind DTO
Emergency Only	No Deploy Except CDR call
NO DEPLOY prior to MGTD > 230 KEAS < 80 KGS Xwind > 15 kts	

FAILED TIRE TECHNIQUE

Post-MGTD	P – AUTO
185 KEAS	Deploy drag chute
180 KEAS	√Auto derotation
NGTD	Max RHC roll away from failed tire

50K	/
38K	/
28K	/
20K	/
12K	/
7K	/
3K	/
1K	/
SURF	/

ENT-6b/400/E/A
(Partial)



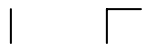
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MS ONLY

2-32

ASC/400/FIN





ABORT CUE CARDS

**CONT
ABORT**

NOT FLOWN

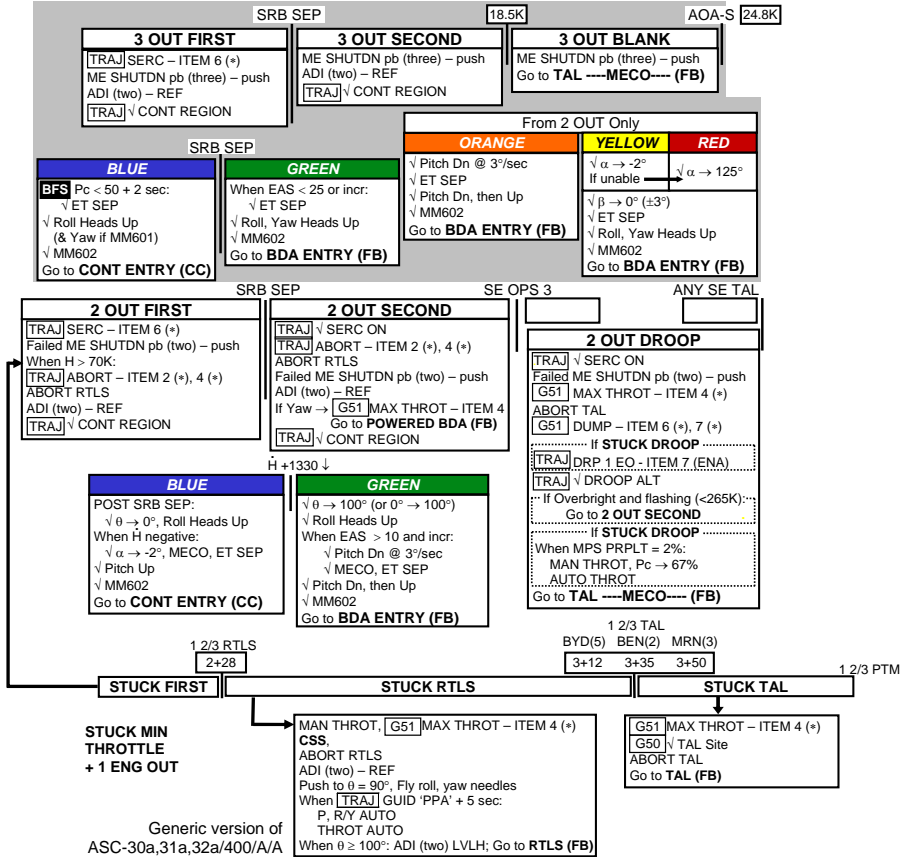
2-33

ASC/400/FIN



CONTINGENCY ABORT

Low Inclination
28.45°



CONT
ABORT

NOT FLOWN

2-34

ASC/400/FIN

CONTINGENCY ABORT

CONT ENTRY / MM602

VERT SIT | INH ECAL/BDA –
ITEM 1 (INH)

Before NZ Hold

RHC/PNL TRIM – ENA

If $M < 5$,

√ AIL/RUD TRIM

If $M < 3$, S/B = 65%

$M \leq 5$ and $EAS < 333$ ↓

ADTA PROBES – Deploy

G50 Incorp Air Data ASAP

M2 → 1: $\theta = 0^\circ$ by $M = 1.0$

Select UHF – G T/R

When $M < 1.0$

Go to **BAILOUT (FB)**

Generic version of
ASC-30a,31a,32a/400/A/A

NOT FLOWN

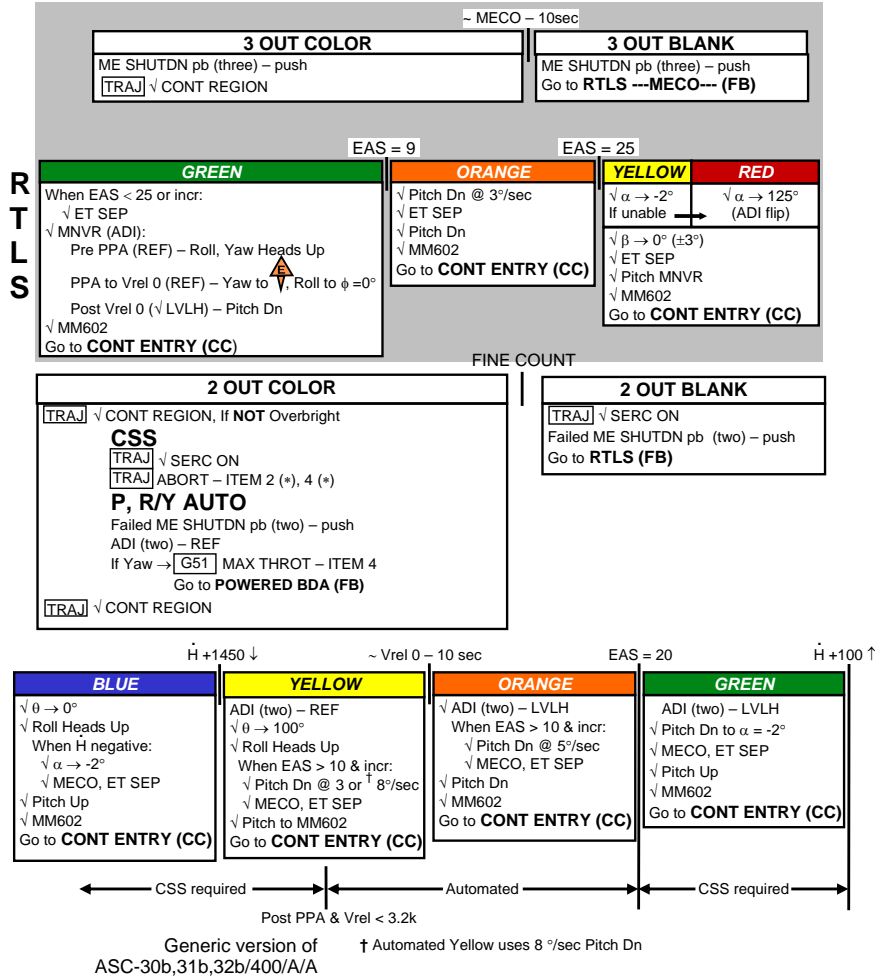
2-35

ASC/400/FIN

RTLS CONTINGENCY

Low Inclination
28.45°

TOP
BACK OF 'CONTINGENCY ABORT'



RTLS CONTINGENCY

CONT ENTRY / MM602
<div style="border: 1px solid black; display: inline-block; padding: 1px;">VERT SIT</div> -
If ECAL/BDA – INH √ Theta Limits after Nz Hold
If ECAL/BDA – ENA ITEM 1 (INH)
<u>Before NZ Hold</u> RHC/PNL TRIM – ENA
If $M < 5$, √ AIL/RUD TRIM
If $M < 3$, S/B = 65%
<u>$M \leq 5$ and $EAS < 333$</u> ↓ ADTA PROBES – Deploy <div style="border: 1px solid black; display: inline-block; padding: 1px;">G50</div> Incorp Air Data ASAP
<u>$M2 \rightarrow 1$</u> : $\theta = 0^\circ$ by $M = 1.0$
Select UHF – G T/R
When $M < 1.0$ Go to BAILOUT (FB)

Generic version of
ASC-30b,31b,32b/400/A/A

RED
√ ADI (two) – LVLH
√ $\dot{H} \rightarrow +400$ ($\theta_{max} = 75^\circ$)
<div style="border: 1px solid black; display: inline-block; padding: 1px;">TRAJ</div> AT FINE COUNT:
√ Pitch Dn to $\alpha = -2^\circ$
√ MECO, ET SEP
√ Pitch Up
√ MM602
Go to RTLS ---MECO--- (FB)
<div style="display: flex; align-items: center; justify-content: center;"> ← Automated → </div>

NOT FLOWN

2-37

ASC/400/FIN

**MRN TAL REDESIGNATION
(400 OCF CY)**

1st E.O. VI		5500	5600	5700	5800	5900	6000	6100	6200
SE OPS 3 MRN 109	(3)	10300	10400	10500	10500	10600	10600	10700	10700
SE LIMITS MRN	(3)	12400	12200	12100	11900	11900	11800	11800	11800
SE MRN 104	(3)	16100	15400	14800	14200	13900	13800	13700	13700

ASC-10a/400/A/A

NOT FLOWN

2-38

ASC/400/FIN

BDA – MRN PRIME TAL

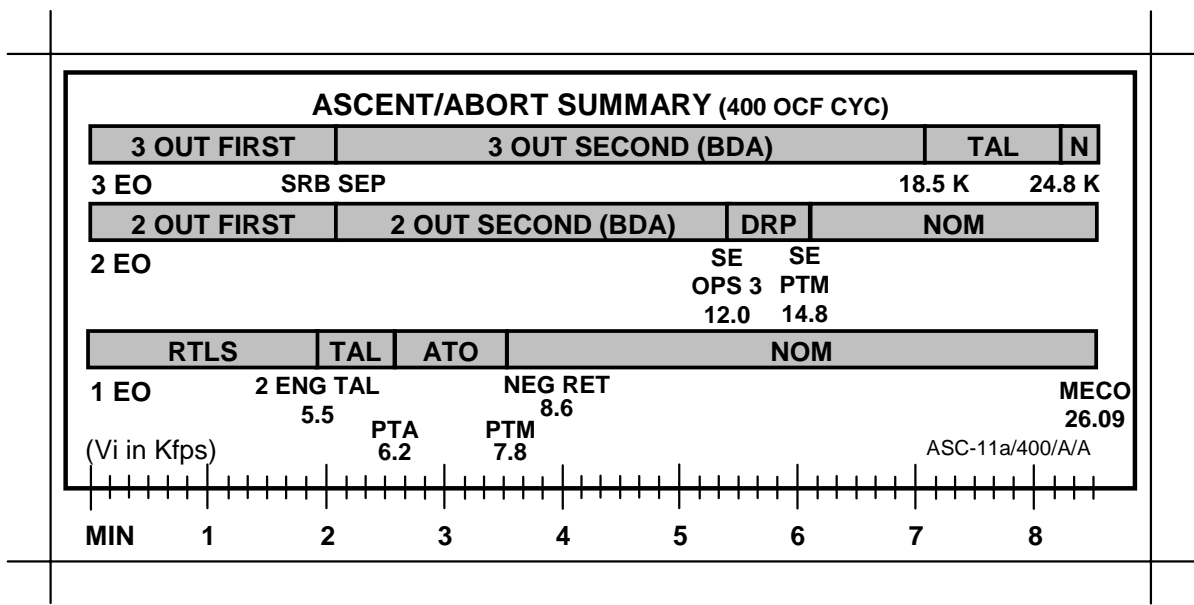
1st EO VI (KFPS)	5.5	5.7	5.9	6.1	6.3
BERMUDA (6)	9.3 – 10.7	9.4 – 10.6	9.3 – 10.6	9.3 – 10.6	9.6 – 10.7
1st EO VI (KFPS)	6.5	6.7	6.9	7.1	7.3
BERMUDA (6)	9.6 – 10.9	9.6 – 10.9	9.6 – 10.9	9.6 – 11.0	9.8 – 11.4
1st EO VI (KFPS)	7.5	7.7	7.9	8.1	8.3
BERMUDA (6)	9.9 – 11.5	9.9 – 11.4	10.0 – 11.4	10.1 – 11.6	10.1 – 11.9
1st EO VI (KFPS)	8.5	8.7	8.9	9.1	9.3
BERMUDA (6)	10.2 – 11.9	10.4 – 11.9	10.5 – 12.1	10.6 – 12.1	10.6 – 12.1
1st EO VI (KFPS)	9.5	9.7	9.9	10.1	10.3
BERMUDA (6)	10.7 – 12.2	10.8 – 12.3	10.9 – 12.4	11.1 – 12.3	11.2 – 12.4
1st EO VI (KFPS)	10.5	10.7	10.9	11.1	11.3
BERMUDA (6)	11.2 – 12.5	11.2 – 12.6	11.3 – 12.6	11.4 – 12.6	11.5 – 12.6
1st EO VI (KFPS)	11.5	11.7	11.9	12.1	12.3
BERMUDA (6)	11.6 – 12.7	11.7 – 12.7	11.9 – 12.7	12.1 – 12.7	12.3 – 12.7
1st EO VI (KFPS)	12.5	12.6			
BERMUDA (6)	12.5 – 12.6	12.6 – 12.6			

ASC-10b/400/A/B

NOT FLOWN

2-40

ASC/400/FIN





POST OMS 1 BURN PROCEDURES

**POST
OMS 1**



1: GNC OMS 1 MNVR EXEC	2: GNC OMS 1 MNVR EXEC
3: BFS, GNC SYS SUMM 2	

ET PHOTO MANEUVER/MPS DUMP

- * If OMS 1 Burn performed, go to *
- * POST BURN STATUS *

B \sqrt MCC,
ADI – REF

- * If Feedline Fail: *
- * \sqrt MCC GO for +X and Pitch Mnvr *
- * At MECO + 6 min: (14:23 Nom) *
- * ET SEP – SEP *
- * At MM104 + 2 sec *
- * +X xlation for 11 sec *
- * At OMS 1 TIG: (16:05 Nom) *
- * Pitch up at 2°/sec until ET in O/H *
- * window (P ~110°) *
- * Go to MPS DUMP complete *

If NO-GO for Photo Pitch Mnvr, go to MPS DUMP complete; do not pitch

MPS DUMP start (MECO + 2:03)

C At OMS 1 TIG + 30 sec: (MECO + 2:33)
(10:56 Nom)

C3 DAP – INRTL: R (DISC), P (PULSE), Y (DISC),
Orbiter pitches up

Control pitch rate 2°/sec to 3°/sec

- * If no pitch rate, go to MPS DUMP complete *

When ET in O/H window (MS call or P ~90°):

P – DISC

Adjust pitch photo att as reqd for MS

P **MPS DUMP complete**

F4 \sqrt BDY FLP pb – It off (MECO + 4 min) (12:24 Nom)

- * C If no pitch rate, *
- * P – DISC *
- * Pitch up at 2°/sec until ET *
- * in O/H window (P ~85°) *

POST
OMS 1

1: GNC OMS 1 MNVR EXEC	2: GNC OMS 1 MNVR EXEC
3: BFS, GNC SYS SUMM 2	

C POST BURN STATUS

NOMINAL OMS 1 TIG TO MCC :

- * C **ALPHA MANAGEMENT (if reqd)** *
- * *
- * If underspeed (ATO or AOA-S) OMS 1 *
- * and Post OMS 1 HP ≤ 75 nm: *
- * Maneuver to LVLH R000, P340, Y000 *
- * (maintain LVLH P = 0 ± 20) *
- * After 10 min: *
- * Maneuver to LVLH P = 340 *
- * After 10 min: *
- * Maneuver to Burn Attitude *

P When MPS dump complete:
R4 HYD MPS/TVC ISOL VLV (1,2,3; 5 sec interval) –
CL (hold each 5 sec, tb-CL)

B F6,F8 FLT CNTLR PWR (two) – OFF
C3 DAP – AUTO

IF AOA
If two Freon Loops ↓ or two H2O Loops ↓:
Go to SYS AOA
Otherwise, go to AOA

- * If no comm and MPS dump complete: *
- * HYD MN PUMP PRESS (three) – *
- * LO (MA) *

P APU/HYD SHUTDN

R2 √MCC
√APU AUTO SHTDN (three) – ENA
BLR PWR (three) – OFF
N2 SPLY (three) – OFF
APU OPER (1,2,3; 5 sec interval) – OFF (MA)
FU TK VLV (three) – CL
√Shutdn (HYD PRESS < 200)
CNTLR PWR (three) – OFF
√HYD MN PUMP PRESS (three) – NORM

1: GNC OMS 1 MNVR EXEC	2: GNC OMS 1 MNVR EXEC
3: BFS, GNC SYS SUMM 2	

TAIL ONLY CONTROL (√MCC)

2: GNC 23 RCS

CRT2 OVRD FWD RCS MANF STATs 1,2,3,4 – CL

FES & HEATER ACTIVATION

C L1 FLASH EVAP CNTLR PRI A – ON
L2 FDLN HTR (two) – 1

P R1 O2 TK1,2 HTRS B (two) – AUTO
H2 TK1,2 HTRS B (two) – AUTO

MS1 A12 APU HTR TK/FU LN/H2O SYS 1A,2A,3A (three) –
AUTO

AC BUS SNSR

R1 AC BUS SNSR (three) – OFF (1 sec),
then AUTO TRIP

MAJOR MODE CHANGE

CRT1 GNC, OPS 105 PRO

1: GNC OMS 2 MNVR EXEC	2: GNC OMS 2 MNVR EXEC
3: BFS, GNC OMS 2 MNVR EXEC	

1: GNC OMS 2 MNVR EXEC	2: GNC OMS 2 MNVR EXEC
3: BFS, GNC OMS 2 MNVR EXEC	

B OMS 2 BURN SETUP

√OMS 2 TARGETING, Flip Book

CRT1 TRIM LOAD – ITEM 6 +0.4 -5.7 +5.7 EXEC

- * For single eng burn (good eng): *
- * TRIM LOAD LY – ITEM 7 +5.2 EXEC *
- * RY – ITEM 8 -5.2 EXEC *
- * OMS L – ITEM 2 EXEC *
- * R – ITEM 3 EXEC *
- * For RCS burn: *
- * RCS SEL – ITEM 4 EXEC *

NOTE

Onboard computed TIG may vary slightly but is acceptable

√Targets, OMS TARGETS

LOAD – ITEM 22 EXEC
TIMER – ITEM 23 EXEC

CRT3 √BFS TGT

1: GNC OMS 2 MNVR EXEC 2: GNC OMS 2 MNVR EXEC
3: BFS, GNC OMS 2 MNVR EXEC

P MPS ISOL

NOTE

Expect multiple MAs for MPS He P
as regs bleed down

R2 MPS He ISOL (six) – GPC
 PNEU He ISOL – GPC
 √He I'CNCT (three) – GPC

MPS GH2 INERTING

R4 MPS H2 PRESS LINE VENT – OP
 (Start watch)
 After 1 min:
 MPS H2 PRESS LINE VENT – GND

25:00 ♦ **MPS PWRDN**

R2 MPS ENG PWR L (two) – OFF
 CTR (two) – OFF
 R (two) – OFF

1: GNC OMS 2 MNVR EXEC	2: GNC OMS 2 MNVR EXEC
3: BFS, GNC OMS 2 MNVR EXEC	

P ET UMBILICAL DOOR CLOSURE

* If Feedline fail, √MCC before closure *

<p>WARNING ET CTRLINE LATCHES must be stowed prior to L,R DR closure to prevent door drive damage</p>

NOTE

Double times for single motor operation

R2

ET UMB DR

MODE – GPC/MAN
CTRLINE LAT – STO
√After 6 sec, CTRLINE LAT tb – STO

* If CTRLINE LAT does not stow within 12 sec: *
* CTRLINE LAT – GND *
* √MCC *

CTRLINE LAT – GND
L,R DR (two) – CL (tb-bp)
√After 24 sec, L,R DR tb (two) – CL

* If doors do not close within 48 sec: *
* L,R DR (two) – OFF *
* √MCC *

L,R LAT (two) – LAT (tb-bp)
√After 6 sec, L,R LAT tb (two) – LAT

* If doors do not latch within 12 sec: *
* L,R DR (two) – OFF *
* LAT (two) – OFF *
* √MCC *

L,R DR (two) – OFF
LAT (two) – OFF
MODE – GPC



OMS 2 BURN CARDS

OMS 2



MS ONLY

4-1

ASC/400/FIN



OMS 2 BURN MONITOR

OMS TEMP* FU IN P ≥ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; text-align: center;">L</td><td style="width: 20px; text-align: center;">R</td></tr><tr><td style="text-align: center;">219</td><td style="text-align: center;">220</td></tr></table> ≤ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; text-align: center;">201</td><td style="width: 20px; text-align: center;">208</td></tr></table> or No FU IN P	L	R	219	220	201	208	Oms Eng Fail Oms PRPLT Fail
L	R						
219	220						
201	208						
OMS PC* & OMS ↓ (BFS: √accel) ENG VLV 1 or 2 < 70 or OX IN P > 227 OX IN P ≤ 227 or No OX IN P	Oms Eng Fail Oms PRPLT Fail						
OMS OX/FU TK P (√ENG IN P) OX/FU LOW OX & FU HIGH	He PRESS/VAP ISOL (two) – OP If aff TK P not incr: He PRESS/VAP ISOL (two) – CL At PC < 72 or OMS TEMP or HP > 85: Oms PRPLT Fail He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284						
OMS He TK P LOW (√OMS/MPS)	At He P < 640 or QTY ≤ 41: If HP < 85: Oms XFEED from good Oms At HP > 85: Oms PRPLT Fail						
OMS N2 REG P HIGH or LOW	Oms Eng – ARM						
OMS N2 TK P LOW (√OMS/MPS)	At N2 TK P < 470: Oms Eng – ARM						
OMS GMBL	PRI fail L(R) Oms GMBL – SEC (twice) SEC fail If high RCS usage: Oms Eng Fail						
GPC	1(4) & Burning Oms aff aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF,ON L(R) Oms GMBL – SEC (twice)						
SEC GMBL lost 2 FAs lost	If high RCS usage: Oms Eng Fail √MAN SHUTDN						
I/O ERROR FA	1(4) L(R) Oms GMBL – SEC I/O RESET (if recov: BFS I/O RESET) If high RCS usage: Oms Eng Fail						
2 FAs lost	√MAN SHUTDN						
BCE STRG D	1(4) I/O RESET (if recov: >>) If high RCS usage: L(R) Oms GMBL – SEC (twice)						
I/O ERROR PCM	OI PCMMU PWR – 2(1)						

*If XFD, BLDN, or sensor fail, monitor ENG IN P for off-nominal performance

ASC-5a/400/A,O/A

OMS 2

OPS 1 RCS BURN

AFT RCS

✓RCS BURN CONFIG:
 OMS TK ISOL (all) – OP OMS TK
 L(R) OMS XFEED (two) – OP switch at
 R(L) OMS XFEED (two) – CL 1/2 ΔVTOT
 AFT L,R RCS XFEED (four) – OP (If reqd)
 TK ISOL (six) – CL

TIG-2 L,R OMS He PRESS/VAP ISOL A – OP
 . . . Wait 2 sec . . .
 L,R OMS He PRESS/VAP ISOL B – OP
 ✓MM105
 CNTLR PWR (two) – ON
 ✓BURN ATT (INRTL) then REF, pb – push
 ✓RCS SEL
 DAP: INRTL/DISC
 :00 + X
 Maintain PITCH ATT ERR ± 3°
 Monitor OMS data
 Monitor ΔVTOT
 CUTOFF Release THC
 CNTLR PWR (two) – OFF

FWD RCS

FRCS BURN PREP
 Load DUMMY target for FRCS attitude
 RCS SEL – ITEM 4 EXEC
 TIG @ TTA = 2:00 or as reqd
 ΔVX = -2.1 (ITEM 19)
 ΔVY = 0 (ITEM 20)
 ΔVZ = +1.0 (ITEM 21)
 LOAD – ITEM 22 EXEC
 TIMER – ITEM 23 EXEC
 TIG-10 Auto Mnvr to ATT
 When in attitude:
 ADI ATT – REF (push)
 Load External ΔV Burn Target
 ΔVX = +80
 ΔVY = 0
 ΔVZ = 0
 LOAD – ITEM 22 EXEC
 TIMER – ITEM 23 EXEC
 ✓VGOX = negative
 ✓VGOY = 0
 ✓VGOZ = +21 ± 2
 ✓REF ball – 0,0,0

NOTE

Error needles invalid during burn
 Burn time = ~2X TGO
 TGT Hp = for ASCENT

-:30 CNTLR PWR (two) – ON
 DAP: INRTL/DISC
 :00 -X
 CUTOFF CUR HP = TGT HP , release THC
 CNTLR PWR (two) – OFF

ASC-6b/400/A,O/A

POST OMS 2 BURN PROCEDURES

**POST
OMS 2**

5-1

ASC/400/FIN

1: GNC OMS 2 MNVR EXEC	2: GNC OMS 2 MNVR EXEC
3: BFS, GNC SYS SUMM 2	

C POST BURN STATUS

NOMINAL

Δ TIG

	:		
--	---	--	--

B F6,F8 FLT CNTLR PWR (two) – OFF
 C3 \sqrt DAP: AUTO

C OMS TVC GMBL CHECK

CRT1 SECONDARY CHECK
 Perform SEC L,R then PRI L,R GMBL CK

P OMS/RCS POST BURN RECONFIG

O7 AFT L,R RCS
 He PRESS A (two) – GPC (tb-OP)
 B (two) – CL (tb-CL)
 TK ISOL (six) – OP (tb-OP)
 \sqrt MANF ISOL 1,2,3,4 (eight) – GPC (tb-OP)
 XFEED (four) – CL (tb-CL)

O8 FWD RCS
 He PRESS A – GPC (tb-OP)
 B – CL (tb-CL)
 TK ISOL (two) – OP (tb-OP)
 \sqrt MANF ISOL 1,2,3,4 (four) – GPC (tb-OP)

L,R OMS
 He PRESS/VAP ISOL (four) – CL
 TK ISOL (four) – OP (tb-OP)
 XFEED (four) – CL (tb-CL)

POST
OMS 2



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AOA PADS

**AOA
PADS**

6-1

ASC/400/FIN



DIRECT INSERTION AOA DEL PAD

DEORBIT									
PRPLT					()				
BURN CUE CARD:									
OMS ENG FAIL XFEED QTY CUE					%L		%R		
TOT AFT QTY 1 (%)							9 9		
TOT AFT QTY 2 (%)							6 1		
FLIP ΔV							7 9		
AFT ΔV							4 0		
B/U SITE							N O R		
FRCS: DUMP TO % (USE TIME AS CUE)					<input type="checkbox"/> OX		<input type="checkbox"/> FU		
ENTRY / LANDING									
EI - 5 MM303 INRTL ATT (6-30)					R		P		Y
MM304 PREBANK (ENT MNVR Cue Card)					<input type="checkbox"/> L		<input type="checkbox"/> R		
ALTM SET (6-34)							.		
CLG INIT							:		
EXPECTED AIL TRIM					<input type="checkbox"/> L		<input type="checkbox"/> R		
VREL 1ST REVERSAL							.		
XCG AT TD							.		
LAND SITE		RWY				50K /			
						38K /			
<input type="checkbox"/> L		<input type="checkbox"/> OVHD		deg		28K /			
<input type="checkbox"/> R		<input type="checkbox"/> STRT		TAC		20K /			
ΔT MACH < 1 TO HAC		MAX Nz		Nz LIMIT		12K /			
:		.		.		7K /			
ΔT HAC INIT TO H = 20K						3K /			
:						1K /			
AIMPOINT		SPEEDBRAKE				SURFACE /			
<input type="checkbox"/> NOM		<input type="checkbox"/> NOM		% @ 3K					
<input type="checkbox"/> CLOSE-IN		<input type="checkbox"/> S.F.							
REMARKS:									

AOA
PADS

W/OMS 1 AOA DEL PAD

DEORBIT													
PRPLT					() [] [] [] [] []								
BURN CUE CARD:													
OMS ENG FAIL XFEED QTY CUE					%L [] []		%R [] []						
TOT AFT QTY 1 (%)							9 9						
TOT AFT QTY 2 (%)							6 1						
FLIP HP =		() [] []	+	[] []	OR	[] [] [] []	STEEP	[] []	SHALLOW	+	[] [] [] []	=	[] []
		TGT HP				3 7 1 5	ΔHP (REDES SITE)		2 7 1 1	ΔHP (PRI SITE)	(FLIP ΔV 2)		
AFT HP =		() [] []	+	[] [] [] []						+	[] [] [] []	=	[] []
		TGT HP									(AFT ΔV 2)		
B/U SITE							N O R						
FRCS: DUMP TO % (USE TIME AS CUE)					<input type="checkbox"/> OX		<input type="checkbox"/> FU						
ENTRY / LANDING													
EI - 5 MM303 INRTL ATT (6-30)					R [] [] []		P [] [] []		Y [] [] []				
MM304 PREBANK (ENT MNVR Cue Card)					<input type="checkbox"/> L		<input type="checkbox"/> R						
ALTM SET (6-34)										. [] [] []			
CLG INIT										: [] [] [] : [] [] []			
EXPECTED AIL TRIM					<input type="checkbox"/> L		<input type="checkbox"/> R			. [] [] []			
VREL 1ST REVERSAL										[] [] [] [] []			
XCG AT TD										. [] [] []			
LAND SITE [] []		RWY [] [] [] [] [] []								50K		/	
<input type="checkbox"/> L		<input type="checkbox"/> OVHD		[] [] [] [] deg		[] []		MLS		38K		/	
<input type="checkbox"/> R		<input type="checkbox"/> STRT		[] [] [] [] TAC						28K		/	
ΔT MACH < 1 TO HAC		[] [] [] []		MAX Nz [] [] [] []		Nz LIMIT [] [] [] []		WINDS: (ENT MNVR Cue Card)		12K		/	
[] [] [] []		[] [] [] []		[] [] [] []		[] [] [] []				7K		/	
ΔT HAC INIT TO H = 20K		[] [] [] []								3K		/	
[] [] [] []										1K		/	
AIMPOINT		SPEEDBRAKE								SURFACE		/	
<input type="checkbox"/> NOM		<input type="checkbox"/> NOM		[] []		% @ 3K							
<input type="checkbox"/> CLOSE-IN		<input type="checkbox"/> S.F.											
REMARKS:													

6-4

ASC/400/FIN

DEORBIT MNVR PAD

OMS BOTH 1

L 2

R 3

RCS SEL 4

TV ROLL 5

TRIM LOAD

P 6 () .

LY 7 () .

RY 8 () .

WT 9

TIG 10 / : : .

TGT PEG 4

C1 14

C2 15 () .

HT 16 .

θT 17 .

PRPLT 18 ()

BURN ATT

R 24

P 25

Y 26

REI

TXX :

ΔVTOT

.

TGO :

VGO X () .

VGO Y () .

VGO Z () .

HA HP

TGT ()

NOTES

RCS I'CNCT:

L OMS → RCS

R OMS → RCS

NONE

BURN CARD

OMS PRPLT PAD

<p>DEORBIT BURN (1 ENG)</p>	<p>OMS XFEED RETURN at $\Delta VTOT =$ <input type="text"/> <input type="text"/> <input type="text"/> or <input type="text"/> <input type="text"/> <input type="text"/> at <input type="text"/> <input type="text"/> <input type="text"/> %</p>
<p>DEORBIT BURN (RCS)</p>	<p>RCS I'CNCT TK SW at $\Delta VTOT =$ <input type="text"/> <input type="text"/> <input type="text"/> OMS PRPLT LOW: $\Delta VTOT =$ <input type="text"/> <input type="text"/> <input type="text"/></p>
<p>UNBALANCED PRPLT DEORBIT BURN</p>	<p>INITIAL CONFIG: <input type="checkbox"/> TK ISOLs - CL While feeding 2 OMS from 1 POD: OMS PRPLT FAIL: Secure <input type="checkbox"/> OMS Secure <input type="checkbox"/> OMS Interconnect <input type="checkbox"/> OMS to RCS THC + X for <input type="text"/> : <input type="text"/> <input type="text"/> If <input type="checkbox"/> (XFEED) ENG '↓' When <input type="checkbox"/> OMS QTY: 5%: <input type="checkbox"/> OMS TK ISOL (two) - OP 4%: <input type="checkbox"/> OMS TK ISOL (two) - CL If <input type="checkbox"/> (STRAIGHT FEED) ENG '↓' OMS ENG FAIL: At $\Delta VTOT =$ <input type="text"/> <input type="text"/> <input type="text"/> or <input type="checkbox"/> <input type="text"/> <input type="text"/> at <input type="text"/> <input type="text"/> <input type="text"/> % <input type="checkbox"/> TK ISOL (two) - OP <input type="checkbox"/> TK ISOL (two) - CL Return to 2 ENG, 2 POD FLOW: At $\Delta VTOT =$ <input type="text"/> <input type="text"/> <input type="text"/> <input type="checkbox"/> TK ISOLs - OP OMS ENG FAIL: (XFEED CUE) OMS QTY <input type="text"/> <input type="text"/> %L or <input type="text"/> <input type="text"/> %R</p>
<p>DEORBIT BURN (MIXED XFEED)</p>	<p>FEED FROM GOOD POD: At $\Delta VTOT =$ <input type="text"/> <input type="text"/> <input type="text"/> or <input type="checkbox"/> <input type="text"/> <input type="text"/> at <input type="text"/> <input type="text"/> <input type="text"/> % <input type="checkbox"/> OMS He PRESS (two) - OP TK ISOL (two) - OP XFEED (two) - OP Secure <input type="checkbox"/> OMS OMS PRPLT LOW: AFT RCS RECONFIG at $\Delta VTOT =$ <input type="text"/> <input type="text"/> <input type="text"/> OMS ENG FAIL: <input type="checkbox"/> OMS He PRESS (two) - OP TK ISOL (two) - OP <input type="checkbox"/> OMS XFEED (two) - CL</p>



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AOA

AOA PROCEDURES

1: GNC OMS 2 MNVR EXEC	2: GNC OMS 2 MNVR EXEC
3: BFS, GNC OMS 2 MNVR EXEC	

NOTE

Manually entered tgt data will be carried over to OPS 3 except: PASS, BFS ITEMS 5 and 18 (ILL ENTRY).

Transition to OPS 3 NLT TIG-10 min

C4F,	Stow ASC PKT
R3A	Stow ASCENT Cue Cards
R3F	Unstow ENT PKT

F6,F8	Install <u>AOA DEORBIT BURN</u> and <u>DEORBIT BURN MONITOR</u> Cue Cards (R3A)
-------	---------------------------------------------------------------------------------

IF APUs SHUTDN:

<p>WARNING Ice in W/B Steam Vent may cause loss of APU/HYD</p>

P W/B STEAM VENT HTR ACT

3: BFS, SM SYS SUMM 2

√APU OIL IN TEMP (three) < 230 degF
√OUT TEMP (three) < 230 degF

NOTE

If any temp > 230, wait until temp < 230 in aff system

R2	√BLR CNTLR/HTR (three) – A
	PWR (three) – ON
	N2 SPLY (three) – ON

1: GNC OMS 2 MNVR EXEC	2: GNC OMS 2 MNVR EXEC
3: BFS, GNC OMS 2 MNVR EXEC	

P MPS ISOL

NOTE

Expect multiple MAs for MPS He P
as regs bleed down

R2 MPS He ISOL (six) – GPC
 PNEU He ISOL – GPC
 √He I'CNCT (three) – GPC

MPS GH2 INERTING

R4 MPS H2 PRESS LINE VENT – OP
 (Start watch)
 After 1 min:
 MPS H2 PRESS LINE VENT – GND

1: GNC OMS 2 MNVR EXEC	2: GNC OMS 2 MNVR EXEC
3: BFS, GNC OMS 2 MNVR EXEC	

P ET UMBILICAL DOOR CLOSURE

* If Feedline fail, √MCC before closure *

<p><u>WARNING</u> ET CTRLINE LATCHES must be stowed prior to L,R DR closure to prevent door drive damage</p>

* If ET Doors will not manually close and latch, prior to OPS 3 transition:
*

2: GNC 51 OVERRIDE

* ET UMB DR CLOSE – ITEM 40(30) EXEC *

NOTE

Double times for single motor operation

R2

ET UMB DR

MODE – GPC/MAN

CTRLINE LAT – STO

√After 6 sec, CTRLINE LAT tb – STO

* If CTRLINE LAT does not stow within 12 sec: *
* CTRLINE LAT – GND *
* √MCC *

CTRLINE LAT – GND

L,R DR (two) – CL (tb-bp)

√After 24 sec, L,R DR tb (two) – CL

* If doors do not close within 48 sec: *
* L,R DR (two) – OFF *
* √MCC *

L,R LAT (two) – LAT (tb-bp)

√After 6 sec, L,R LAT tb (two) – LAT

* If doors do not latch within 12 sec: *
* L,R DR (two) – OFF *
* LAT (two) – OFF *
* √MCC *

L,R DR (two) – OFF

LAT (two) – OFF

MODE – GPC

1: GNC OMS 2 MNVR EXEC	2: GNC OMS 2 MNVR EXEC
3: BFS, GNC OMS 2 MNVR EXEC	

RECONFIG DPS FOR ENTRY

CAUTION
If recovering string(s) due to failed GPC(s), all FCS CH(s) to AUTO prior to OPS 301 PRO

CRT1 GNC, OPS 301 PRO (√DAP)
 CRT3 BFS, GNC, OPS 301 PRO

CRT1 GNC, OPS 302 PRO

1: GNC 50 HORIZ SIT	2: GNC DEORB MNVR EXEC
3: BFS, GNC DEORB MNVR EXEC	

√RWY Selection
 AOA RWY OPTIONS

ALL INCLINATIONS		
SITE	RWY	MLS
1	KSC 15	8
	KSC 33	6
40	EDT 22R	8
	EDT 04L	6
41	NOR 17	6
	NOR 23	6
42	NOR 05	–
	NOR 35	–
43	EDW 15	–
	EDW 33	–
44	EDW 18L	–
	EDW 18L	–
45	EDW 22	8/†
	EDW 04	6

† MSBLS Jr. Channel 8 – Requires Uplink

1: GNC DEORB MNVR EXEC | 2: GNC DEORB MNVR EXEC
3: BFS, DEORB MNVR EXEC

OMS BURN TIG ADJUST (if reqd)

CRTX LOAD – ITEM 22 EXEC
TIMER – ITEM 23 EXEC

Determine Δ TIG (if REI – REF > 50)
from OMS TARGETS

CRTX Enter new TIG

LOAD – ITEM 22 EXEC
TIMER – ITEM 23 EXEC

Repeat until Δ RANGE < 50

CRT3 \sqrt BFS TGT

MNVR TO DEORBIT BURN ATTITUDE

B F6,F8 \sqrt ADI ATT (two) – INRTL
 \sqrt ERR (two) – 5
 \sqrt RATE (two) – 5

C MNVR – ITEM 27 EXEC (*)
(\sqrt ADI ATT with CRT BURN ATT)

3: BFS, GNC SYS SUMM 2

TIG-5 B R3A Go to AOA DEORBIT BURN (Cue Card)



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DEORBIT
CARDS

AOA DEORBIT BURN AND DEORBIT BURN MONITOR CARDS

MS ONLY

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ASC/400/FIN

DEORBIT CARDS

DEORBIT BURN MONITOR

OMS TEMP* FU IN P \geq <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 50px; text-align: center;">L</td> <td style="width: 50px; text-align: center;">R</td> </tr> <tr> <td style="text-align: center;">219</td> <td style="text-align: center;">220</td> </tr> <tr> <td style="text-align: center;">201</td> <td style="text-align: center;">208</td> </tr> </table> or No FU IN P	L	R	219	220	201	208	Oms Eng Fail Oms PRPLT Fail
L	R						
219	220						
201	208						
Oms PC* & Oms ↓ (BFS: $\sqrt{\text{accel}}$) ENG VLV 1 or 2 < 70 or OX IN P > 227 OX IN P \leq 227 or No OX IN P	Oms Eng Fail Oms PRPLT Fail						
Oms OX/FU TK P ($\sqrt{\text{ENG IN P}}$) OX/FU LOW OX & FU HIGH	He PRESS/VAP ISOL (two) – OP If aff TK P not incr: He PRESS/VAP ISOL (two) – CL At PC < 72 or OMS TEMP: Oms PRPLT Fail He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284						
Oms GMBL PRI fail SEC fail	L(R) Oms GMBL – SEC If high RCS usage: Oms Eng Fail						
GPC 1(4) & Burning Oms aff SEC GMBL lost 2 FAs lost	aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF,ON L(R) Oms GMBL – SEC If high RCS usage: Oms Eng Fail $\sqrt{\text{MAN SHUTDN}}$						
I/O ERROR FA 1(4) 2 FAs lost	L(R) Oms GMBL – SEC I/O RESET (if recov: BFS I/O RESET) If high RCS usage: Oms Eng Fail $\sqrt{\text{MAN SHUTDN}}$						
BCE STRG D 1(4)	I/O RESET (if recov: >>) If high RCS usage: L(R) Oms GMBL – SEC						
RM DLMA IMU or ABOVE SAFE HP \Rightarrow <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 15px;"></td> <td style="width: 20px; height: 15px;"></td> </tr> </table> GPC SET SPLIT or 2 MN BUSES BELOW SAFE HP \Rightarrow			STOP BURN: Oms Eng(s) – OFF >> IMU DLMA: After C/O: $\sqrt{\text{timer}}$ G21 If any IMU ACC > 0.03: aff IMU – desel I'cnct Oms to RCS ($\sqrt{\text{RCS Burn Time}}$) THC +X to TGT HP (EOM) or 3.5 x timer at C/O (AOA) SET SPLIT: Go to "GPC" above				
I/O ERROR PCM	OI PCMMU PWR – 2(1)						

*If XFD, BLDN, or sensor fail, monitor ENG IN P for off-nominal performance

ENT-2a/400/A,O,D,E/A



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MS ONLY

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ASC/400/FIN



HINGE

```

* RCS COMPLETION:
* If DIRECT INSERTION:
*   THC +X to ΔVTOT = 0 or TOT AFT QTY 1  %
*
*   At AFT QTY 1      THC +X to FLIP ΔV or
*   if CUR ΔVTOT:    TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  -----
*   ΔV                                     FRCS COMPLETION
*
*   AFT  -----
*   ΔV                                     THC +X to TGT ΔV
*
*   TGT  -----
*   ΔV
*
* If w/OMS 1:
*   THC +X to TGT HP or TOT AFT QTY 1  %
*
*   At AFT QTY 1      THC +X to FLIP HP or
*   if CUR HP:        TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  -----
*   HP                                     FRCS COMPLETION
*
*   AFT  -----
*   HP                                     THC +X to TGT HP
*
*   TGT  -----
*   HP
*
* FRCS COMPLETION:
*   MnvR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)
*   THC -X to ΔVTOT = 0 or FRCS depletion (JETS FAIL OFF)

```

CUTOFF
+ :02 OMS ENG(s) – OFF (If < 3 IMU, at :)
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)
ASC-8aa/400/A/A

AOA DEORBIT BURN (1 ENG)

- √MM302 √OMS L or R
- √OMS BURN CONFIG (L or R XFEED)
- Enter TGO + 10 sec
- √TRIM: P +0.4, LY +5.2, RY -5.2
- L,R OMS He PRESS/VAP ISOL A (two) – OP
- . . . Wait 2 sec . . . B (two) – OP
- √DAP – AUTO(PASS)/DISC
- ADI – LVLH(REF)/HI/MED
- FLT CNTLR PWR (two) – ON
- TIG-2 Good OMS ENG – ARM/PRESS
- :15 EXEC
- :15 If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
- :00 Start watch (√P_c, ΔVTOT, ENG VLVs)

OMS XFEED RETURN at ΔVTOT =
or at %
L,R OMS TK ISOL (four) – OP
XFEED (four) – CL

- * **OMS PRPLT FAIL (CONTINUE BURN):** *
- * OMS ENG – OFF *
- * ITEM 18 +0 EXEC *
- * Secure aff OMS *
- * √ADI – LVLH, center needles *
- * Interconnect good OMS to RCS *
- * THC +X (√OMS% vs RCS Burn Time) *
- * AFT RCS RECONFIG *
- * RCS COMPLETION *
- * **OMS ENG FAIL (CONTINUE BURN):** *
- * OMS ENG – OFF *
- * √ADI – LVLH, center needles *
- * Interconnect good OMS to RCS *
- * THC +X (√OMS% vs RCS Burn Time) *
- * RCS I'CNCT TK SW *
- * THC +X (√OMS% vs RCS Burn Time) *
- * AFT RCS RECONFIG *
- * RCS COMPLETION *
- * **RCS +X JET FAIL OFF:** *
- * ITEM 18 +0 EXEC *
- * Resel jet *

ASC-8b/A/B

HINGE

MS ONLY

6-22

ASC/400/FIN

HINGE

```

* RCS COMPLETION:
* If DIRECT INSERTION:
*   THC +X to  $\Delta VTOT = 0$  or TOT AFT QTY 1 %
*
*   At AFT QTY 1      THC +X to FLIP  $\Delta V$  or
*   if CUR  $\Delta VTOT$ :  TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  -----
*    $\Delta V$                                      FRCS COMPLETION
*
*   AFT  -----
*    $\Delta V$                                      THC +X to TGT  $\Delta V$ 
*
*   TGT  -----
*    $\Delta V$ 
*
* If w/OMS 1:
*   THC +X to TGT HP or TOT AFT QTY 1 %
*
*   At AFT QTY 1      THC +X to FLIP HP or
*   if CUR HP:        TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  -----
*   HP                                     FRCS COMPLETION
*
*   AFT  -----
*   HP                                     THC +X to TGT HP
*
*   TGT  -----
*   HP
*
* FRCS COMPLETION:
*   Mnvr to -X Att (pitch up at 3°/sec to VGOz = +1/4  $\Delta VTOT$ )
*   THC -X to  $\Delta VTOT = 0$  or FRCS depletion (JETS FAIL OFF)

```

CUTOFF

```

+ :02 OMS ENG – OFF (If < 3 IMU, at : )
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

```

ASC-8bb/400/A/A

AOA DEORBIT BURN (RCS)

√MM302 √RCS SEL
√RCS BURN CONFIG (L OMS I'CNCT)

L,R OMS He PRESS/VAP ISOL A (two) – OP
... Wait 2 sec ... B (two) – OP

√DAP – INRTL/DISC
ADI – LVLH(REF)/MED/MED
FLT CNTLR PWR (two) – ON

TIG THC +X
Maintain PITCH ATT ERR ± 3°
Monitor ΔVTOT

RCS I'CNCT TK SW at ΔVTOT =
R OMS XFEED (two) – OP
L OMS XFEED (two) – CL

| **OMS PRPLT LOW** |
| AFT RCS RECONFIG AT ΔVTOT = |
RCS COMPLETION

- * **OMS PRPLT FAIL (MULTIPLE JETS FAIL OFF):** *
- * Secure aff OMS *
- * ITEM 18 +0 EXEC *
- * Resel jets *
- * Interconnect good OMS to RCS *
- * THC +X (√OMS% vs RCS Burn Time) *
- * AFT RCS RECONFIG *
- * RCS COMPLETION *
- * **RCS +X JET FAIL OFF:** *
- * ITEM 18 +0 EXEC *
- * Resel jets *

ASC-7a/A/B

HINGE

MS ONLY

6-24

ASC/400/FIN

HINGE

* **RCS COMPLETION:** *
* If DIRECT INSERTION: *
* THC +X to $\Delta VTOT = 0$ or TOT AFT QTY 1 % *
* At AFT QTY 1 THC +X to FLIP ΔV or *
* if CUR $\Delta VTOT$: TOT AFT QTY 2 % then *
* FRCS COMPLETION *
* FLIP ----- *
* ΔV FRCS COMPLETION *
* AFT ----- *
* ΔV THC +X to TGT ΔV *
* TGT ----- *
* ΔV *
* If w/OMS 1: *
* THC +X to TGT HP or TOT AFT QTY 1 % *
* At AFT QTY 1 THC +X to FLIP HP or *
* if CUR HP: TOT AFT QTY 2 % then *
* FRCS COMPLETION *
* FLIP ----- *
* HP FRCS COMPLETION *
* AFT ----- *
* HP THC +X to TGT HP *
* TGT ----- *
* HP *
* **FRCS COMPLETION:** *
* Mnvr to -X Att (pitch up at 3°/sec to VGOz = +1/4 $\Delta VTOT$) *
* THC -X to $\Delta VTOT = 0$ or FRCS depletion (JETS FAIL OFF) *

CUTOFF:
VGOx = 0, release THC
AFT RCS RECONFIG
Trim Inplane X,Z residuals < 2 fps (< 0.5 fps if shallow)
ASC-7aa/400/A/A



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**POST D/O
BURN**

AOA POST DEORBIT BURN



6-27

ASC/400/FIN

1: GNC DEORB MNVR EXEC	2: GNC DEORB MNVR EXEC
3: BFS, GNC SYS SUMM 2	

B F6,F8 FLT CNTLR PWR (two) – OFF
 C3 √DAP: AUTO

P OMS/RCS POST BURN RECONFIG

**POST D/O
 BURN**

IF I'CNCT
 Perform I'CNCT RETURN
 (ENT PKT, RCS)

O7 AFT L,R RCS
 √He PRESS (four) – OP (tb-OP)
 √TK ISOL (six) – GPC (tb-OP)
 MANF ISOL 1,2,3,4 (eight) – OP (tb-OP)
 √XFEED (four) – GPC (tb-CL)

O8 FWD RCS
 TK ISOL (two) – OP (tb-OP)
 L,R OMS
 He PRESS/VAP ISOL (four) – CL
 TK ISOL (four) – OP (tb-OP)

* If OMS PRPLT FAIL: *
 * √Aff TK ISOL (two) – CL *

XFEED (four) – CL (tb-CL)

Determine Prebank
 Determine ΔHP (CUR HP -TGT HP)

Use RECOVERY PREBANK TABLES
 Record Prebank on ENTRY MANEUVERS
 Cue Card

1: GNC DEORB MNVR EXEC | 2: GNC DEORB MNVR EXEC
 3: BFS, GNC SYS SUMM 2

RECOVERY PREBANK TABLES (EDW)
 NOTE: APPLICABLE ONLY IF OMS 1 REQD

(ATO/AOA steep entries)												
EDW												
ΔHP	0	5	10	14	20	REDES.	21	24	(27)			
PREBANK	0	50	75	85	100	NOR	100	110	130			
							IF NOR NOGO					
NOR												
ΔHP			15	17	19	21	24	28	32	(37)		
PREBANK			55	65	70	75	85	100	115	150		
(ATO/AOA shallow entries)												
EDW												
ΔHP	0	2	4	6	8	REDES.	9	10	(11)			
PREBANK	90	100	105	120	135	NOR	140	150	165			
							IF NOR NOGO					
NOR												
ΔHP					7	9	10	11	13	(15)		
PREBANK					100	110	115	120	140	170		

400 ocf

C POST BURN STATUS

NOMINAL

ΔTIG

	:		
--	---	--	--

P CRT2 **GNC, OPS 303 PRO**

1: GNC DEORB MNVR COAST | 2: GNC DEORB MNVR COAST

1: GNC DEORB MNVR COAST	2: GNC DEORB MNVR COAST
3: BFS, GNC SYS SUMM 2	

C CRT1 √Uplinked INRTL EI-5 MM303 ATT with DEL PAD

- * If no Deorbit TGT uplink, enter INRTL *
- * EI-5 MM303 ATT from DEL PAD: *
- * R – ITEM 24 + _____ *
- * P – ITEM 25 + _____ *
- * Y – ITEM 26 + _____ *

Mnvr to EI-5 ATT – ITEM 27 EXEC (*)

- * If UNDERBURN or no DEL PAD, *
- * manually mnvr to LVLH R001, Y358, *
- * P per table below *

TIME to EI (min)	LVLH PITCH (deg)
20	339
	343
	347
	351
	355
15	359
	3
	7
	11
	15
10	19
	23
	27
	31
	35
5	39

1: GNC 53 CONTROLS	2: BFS, GNC SYS SUMM 2
3: GNC DEORB MNVR COAST	

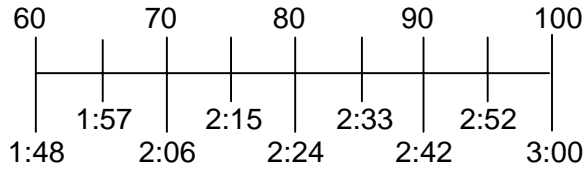
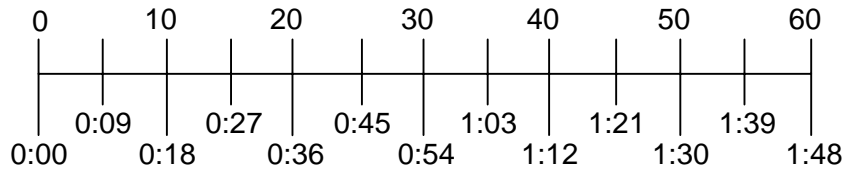
1: GNC 23 RCS	2: GNC DEORB MNVR COAST
3: BFS, GNC SYS SUMM 2	

P FRCS DUMP

Determine FWD RCS 'DUMP TO %' using lowest of OX or FU qty (calculator or DEL PAD)

FOUR JET DUMP:

FRCS PRPLT TO BE DUMPED (%)



TIME FROM DUMP INITIATION (M:S)

NOTE

During dump, disregard FRCS qty

1: GNC DEORB MNVR COAST	2: GNC DEORB MNVR COAST
-------------------------	-------------------------

3: BFS, GNC SYS SUMM 2

2: GNC 50 HORIZ SIT

3: BFS, GNC 50 HORIZ SIT

HORIZ SIT CONFIG

ALTM – ITEM 9 +

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

	<u>PASS ITEM</u>	<u>BFS ITEM</u>
PTI	INH √1	
LAND SITE (AOA DEL PAD)	√41	√41
RWY (AOA DEL PAD)	√3	√3
	√4	√4
TAEM TGT		
G&N	OVHD √6	blank
HSI	blank	blank
XEP	NEP √7	NEP √7
AIM (AOA DEL PAD)	NOM √8	NOM √8
	(or CLSE)	or (CLSE)
SPDBK	NOM √39	
NAV		
GPS	INH √43	INH √43
DRAG H	AUT √22	AUT √22
ADTA H	INH √26	INH √26
MLS	AUT √50	
G&C		
GPS	INH √48	
ADTA	INH √29	AUT √28

* If BFS engaged: *

* Set HSD BFS ITEMS to PASS Config *

1: GNC DEORB MNVR COAST	2: GNC 50 HORIZ SIT
3: BFS, GNC 50 HORIZ SIT	

ENTRY SW CHECK

B F6,F8 Stow AOA DEORBIT BURN Cue Cards (R3A)
 R3A Install ENTRY Cue Cards

NOTE

If NAVAIDS 'OFF' due to PKT C/L PWRDN,
 switch 'ON' per pwrdn procedure

- O8 √RADAR ALTM (two) – ON
 MLS (three) – ON (PASS)
 √CH (three) – 8

EDW 22	KSC 15	EDT 22R	
– 6	KSC 33	EDW 04	EDT 04L
	NOR 17	NOR 23	
- I/O RESET
- C L2 √CAB RELIEF (two) – ENA (tb-ENA)
 √ANTISKID – ON
 √NWS – 1
 √ENTRY MODE – AUTO

3: GNC 51 OVERRIDE

- B L2,C3 √ROLL MODE – AUTO
 C3 √SBTC (two) – full fwd
 √SRB SEP – AUTO
 √ET SEP – AUTO
- F6,F8 √AIR DATA (two) – NAV
 √ADI ERR (two) – 5
 √RATE (two) – 5
 √HSI SEL MODE (two) – ENTRY
- C F6 √SOURCE (two) – NAV, 1
 P F8 √SOURCE (two) – NAV, 2
- B F3 √TRIM RHC/PNL (two) – INH
 √PNL (two) – ON
- F6,F8 √RADAR ALTM (two) – 1(C), 2(P)

1: GNC DEORB MNVR COAST	2: GNC 50 HORIZ SIT
3: GNC 51 OVERRIDE	

- * **If APUs shut down:** *
- * Perform APU RESTART *
- * (ENT PKT, APU/HYD) *

PRE EI CHECKLIST

- * If less than four PASS GPCs, config FCS *
- * CHs so that each GPC cmd equals number *
- * of CHs. See table on POST OPS 3/GRTLs *
- * TRANSITION RESTRING (Cue Card) *
- * *
- *

GNC 53 CONTROLS

 *
- * *
- * Config SURF FBK (See table on POST *
- * OPS 3/GRTLs TRANSITION RESTRING *
- * (Cue Card) *
- * *

2: GNC DEORB MNVR COAST	
3: BFS, GNC DEORB MNVR COAST	

- B F6,F8 FLT CNTLR PWR (two) – ON
- P If SECONDARY ACTUATOR CHECK performed:
- R2 HYD MN PUMP PRESS (one) – NORM
- Go to ENTRY MANEUVERS (Cue Card)



OMS FAILURE

**OMS
FAILURE**



MS ONLY

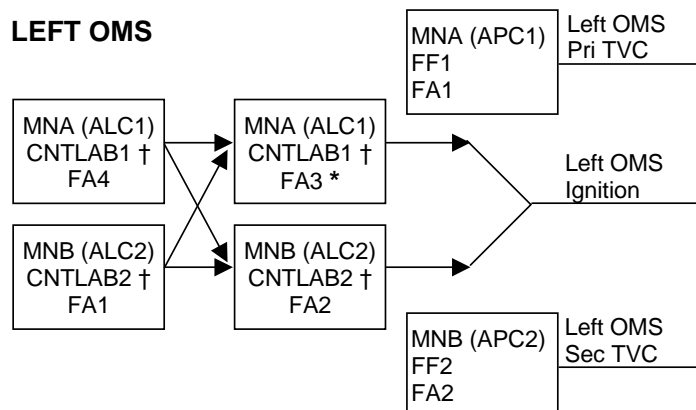
6-37

ASC/400/FIN



OMS FAILURES

LEFT OMS

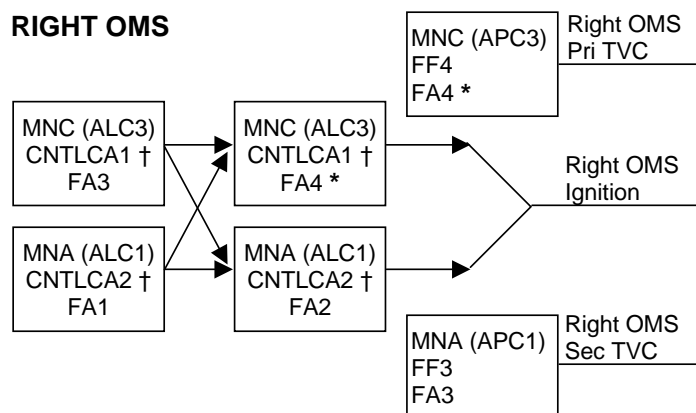


† If CNTL AB1 or AB2 (CA1 or CA2) failed and ign path still exists at OMS fail, assume L(R) OMS ↓ is PRPLT FAIL

* If L(R) P_c failed high during burn, or FA3(4) failed, at L(R) OMS fail, no guidance downmode after L(R) OMS ENG switch OFF (TGO slow, ADI needles in error, 6 ft/s underburn)

OMS FAILURE

RIGHT OMS



If two FA MDMs lost		
MDMs	Preburn: ENG – OFF	During burn: MAN SHUTDN
1,2	LEFT (TVC)	BOTH
1,3	RIGHT (IGN)	LEFT
1,4	LEFT (IGN)	RIGHT
2,3	LEFT (IGN)	RIGHT
2,4	RIGHT (IGN)	LEFT
3,4	RIGHT (TVC)	BOTH

ASC-5b/A,O,E/I



OMS/RCS ΔV

**OMS/
RCS ΔV**



OMS He PRESS/ Δ V/BURN TIME

OMS% GAGE	OMS He Press	OMS Δ V	RCS Δ V	RCS BURN MIN:SEC
96.1	4650	528	439	14:40
95	4610	522	433	14:30
90	4410	494	410	13:42
85	4210	466	387	12:54
80	4010	437	363	12:06
75	3810	409	340	11:18
70	3610	380	316	10:30
65	3410	352	293	09:42
60	3210	323	269	08:54
55	3010	294	245	08:07
50	2810	266	222	07:19
45	2610	237	198	06:31
40	2410	208	174	05:43
35	2210	179	150	04:55
30	2010	150	126	04:07
25	1810	120	101	03:19
20	1610	91	77	02:31
15	1410	62	52	01:43
10	1210	32	27	00:53
5	1010	3	2	00:04

OMS/
RCS Δ V

OMS-2/AOA Δ V
ARCS ΔV fps = $\boxed{0.8} \times [L\% + R\% - \text{AFT QTY } 1]$
FRCS ΔV fps = $\boxed{0.9}$ x FRCS %
OMS ΔV fps = $\boxed{5.6}$ x OMS %

NOTE: Uses assumed vehicle weight of $\boxed{231,562}$ lb

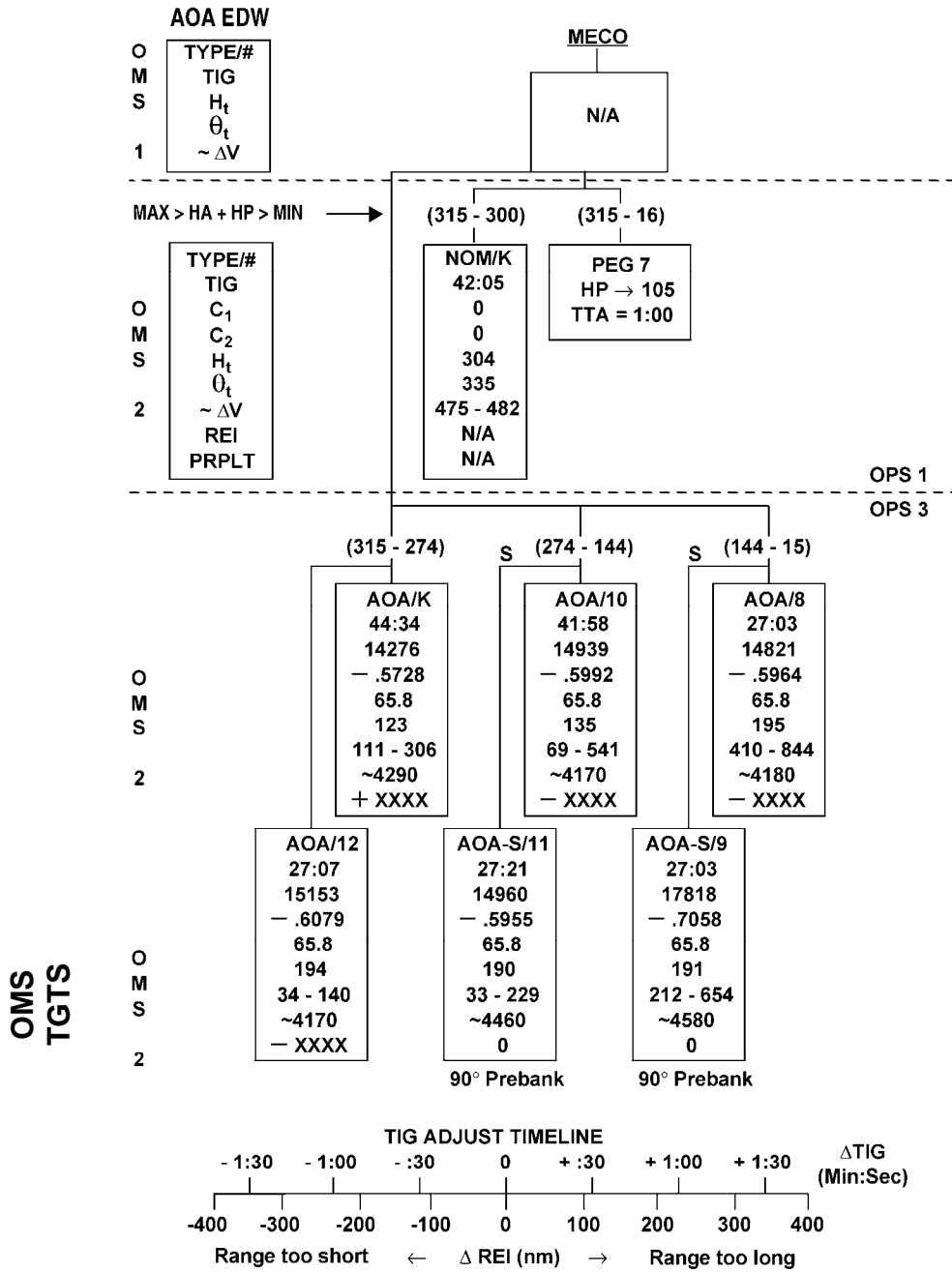


OMS TARGETS, COMM COVERAGE, LAND SITES

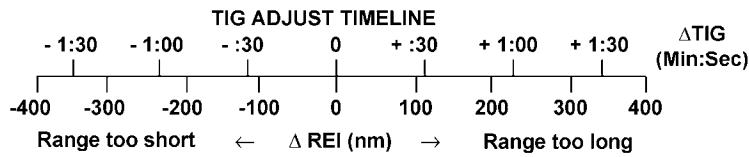
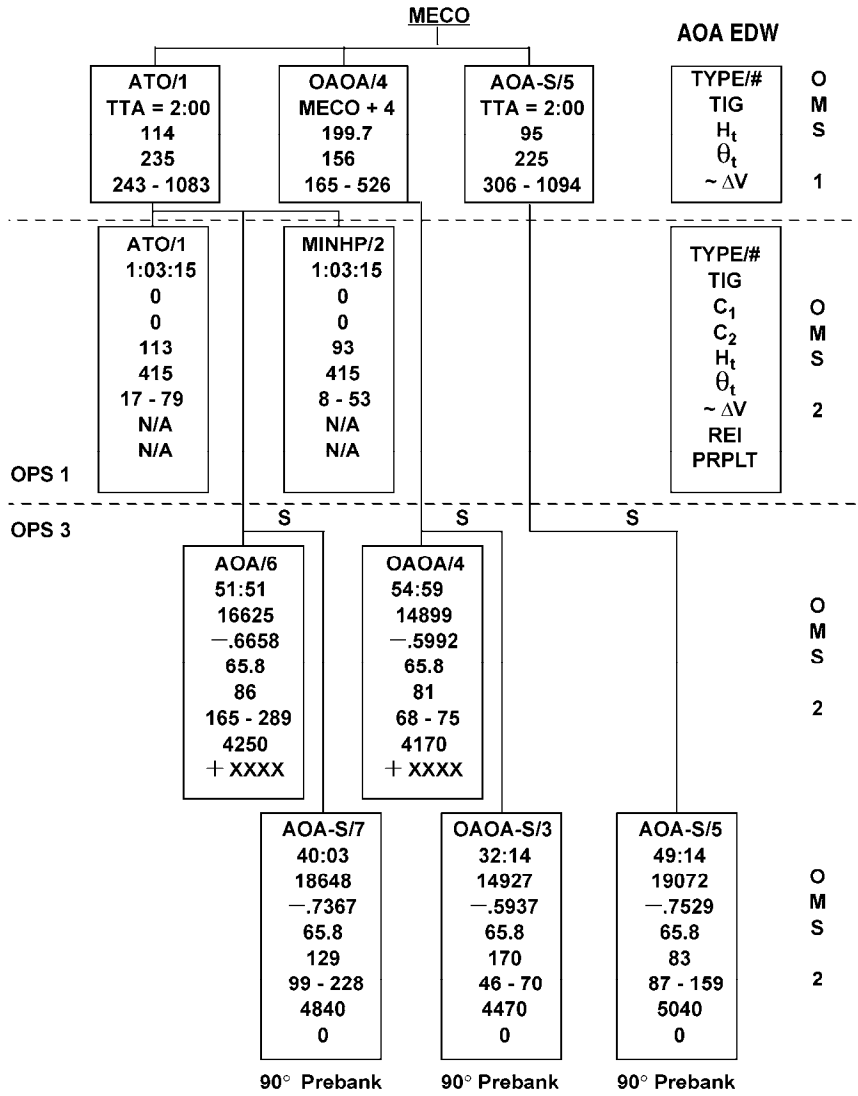
**OMS
TGTS**



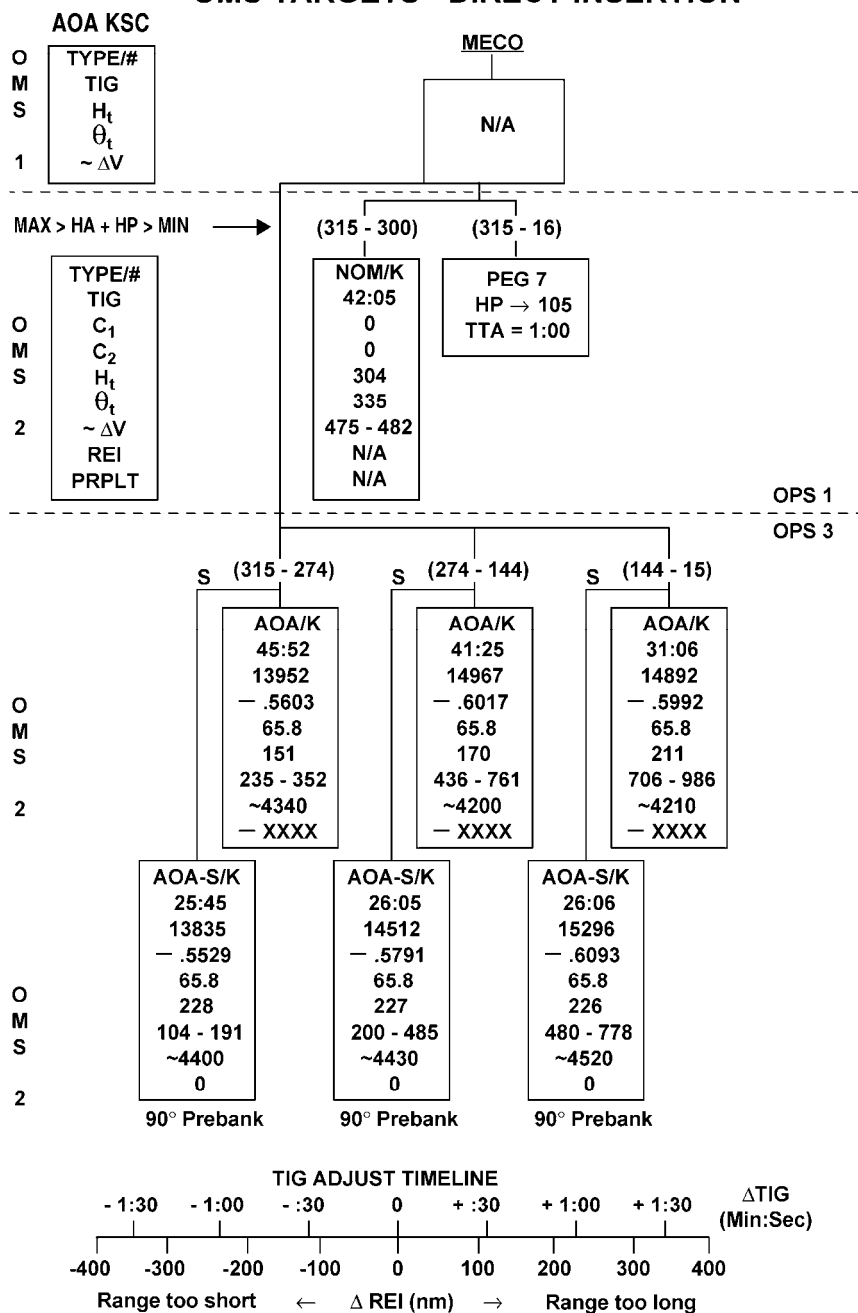
STS-400 OCF CY OMS TARGETS - DIRECT INSERTION



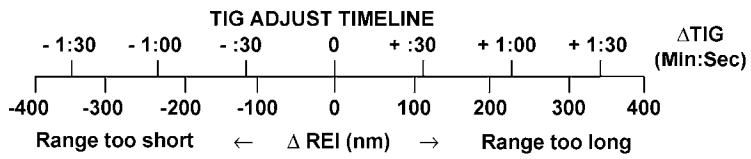
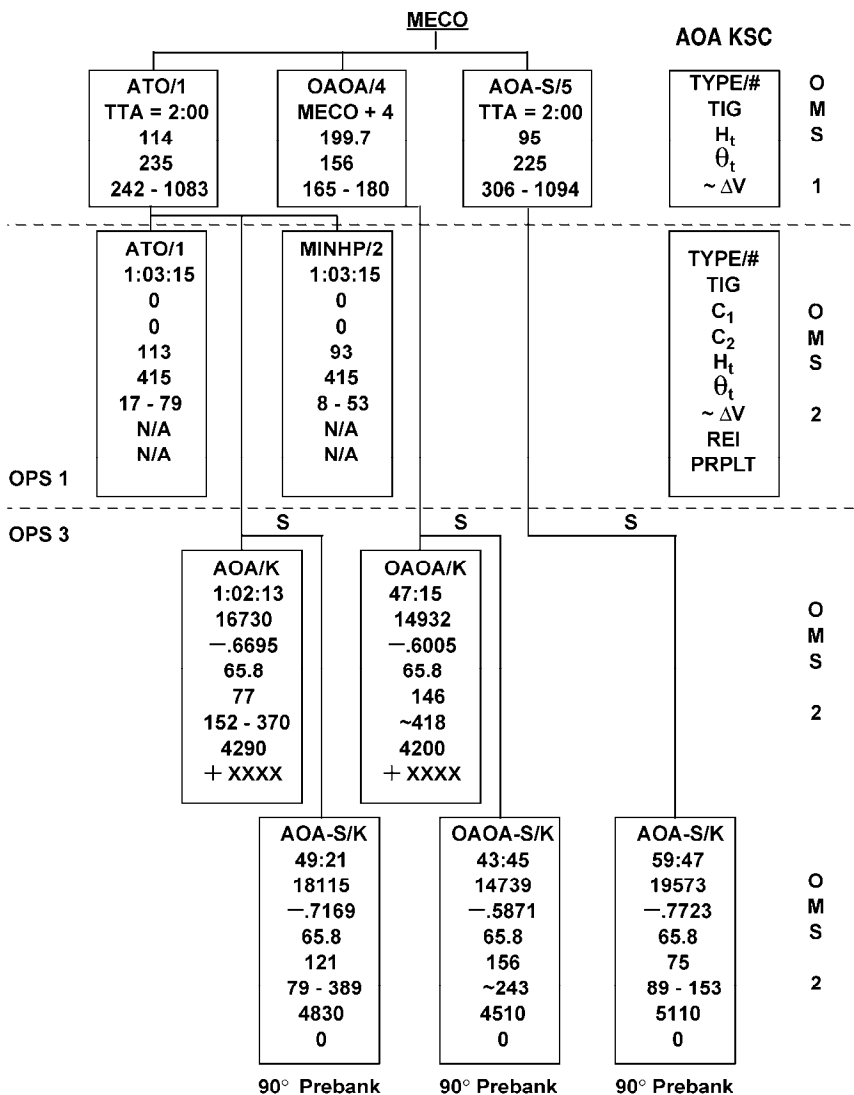
STS-400 OCF CY OMS TARGETS - W/OMS 1



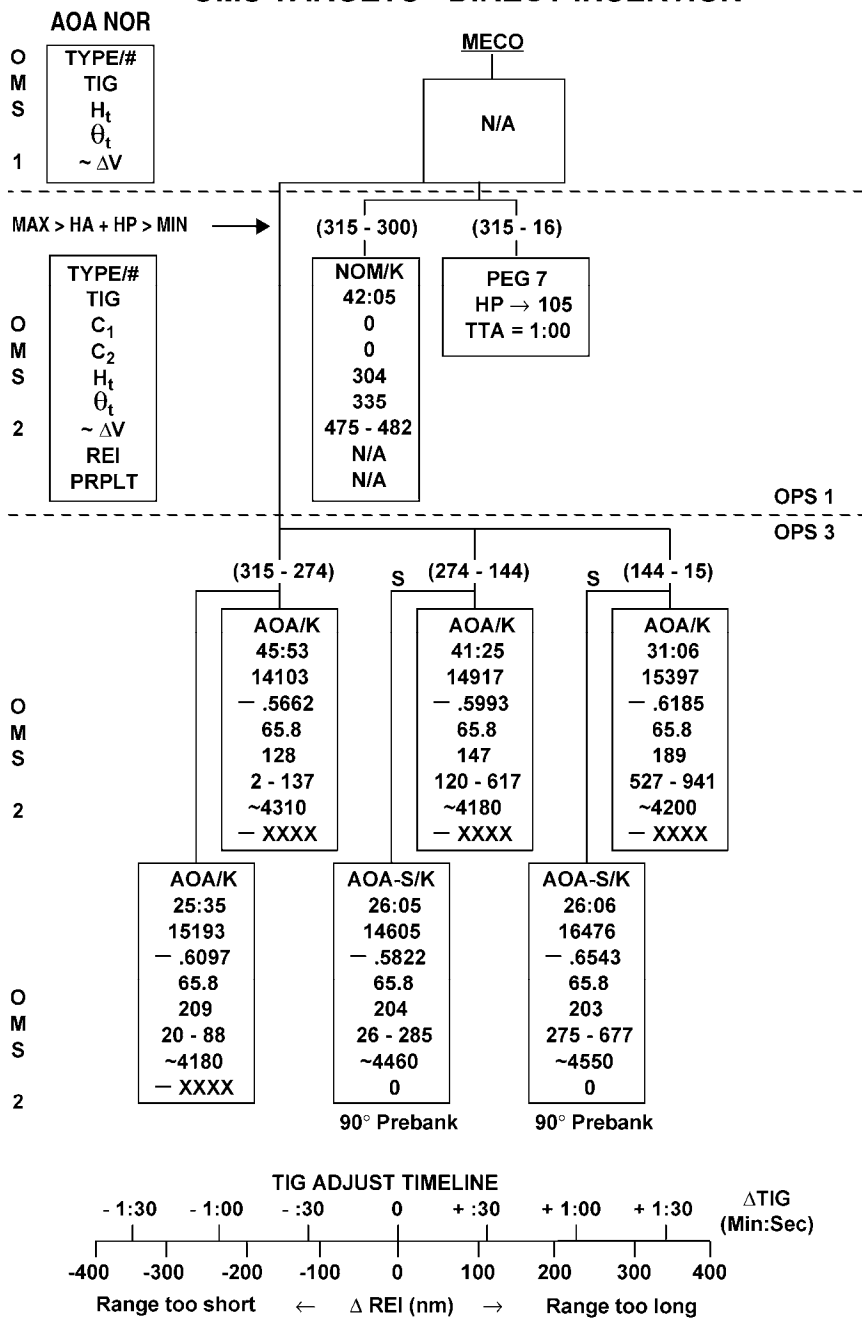
STS-400 OCF CY OMS TARGETS - DIRECT INSERTION



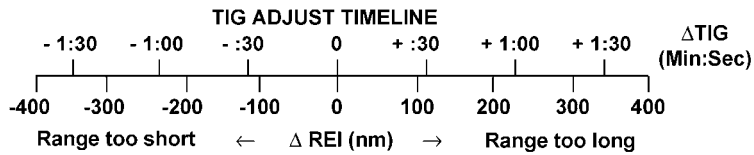
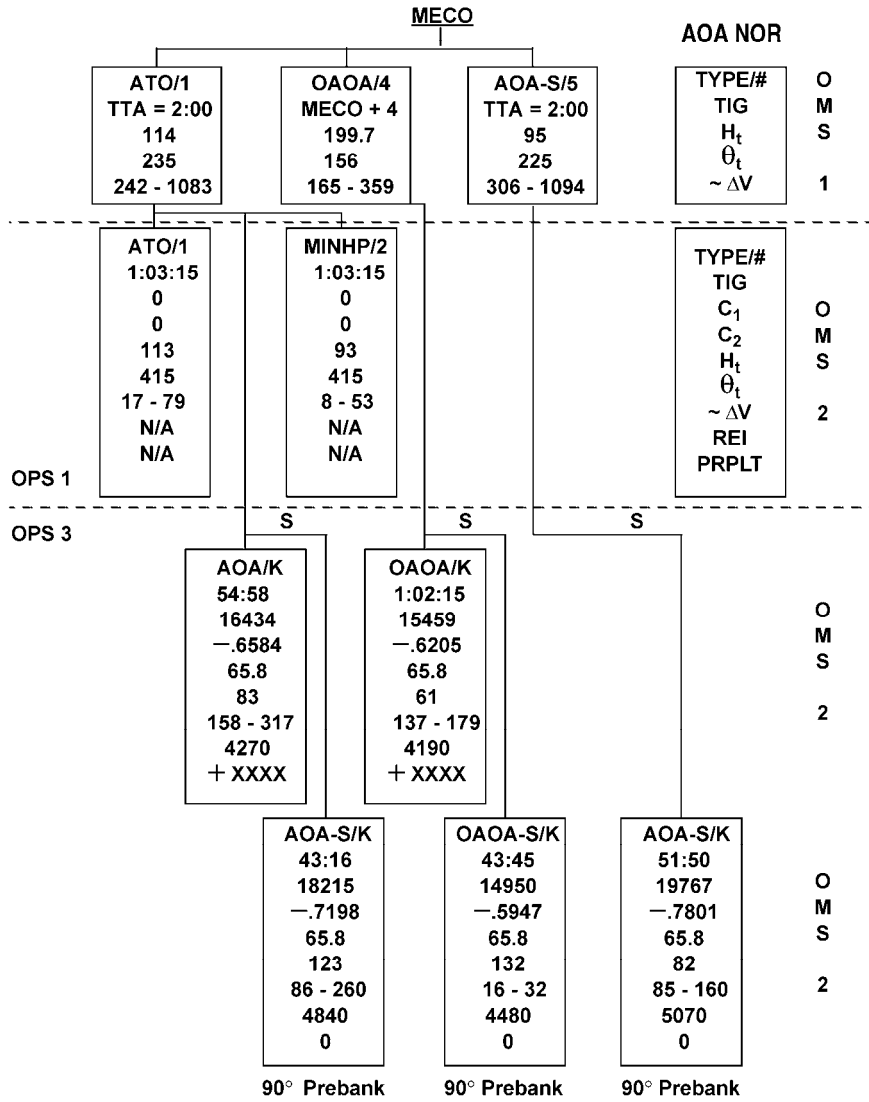
STS-400 OCF CY OMS TARGETS - W/OMS 1



STS-400 OCF CY OMS TARGETS - DIRECT INSERTION

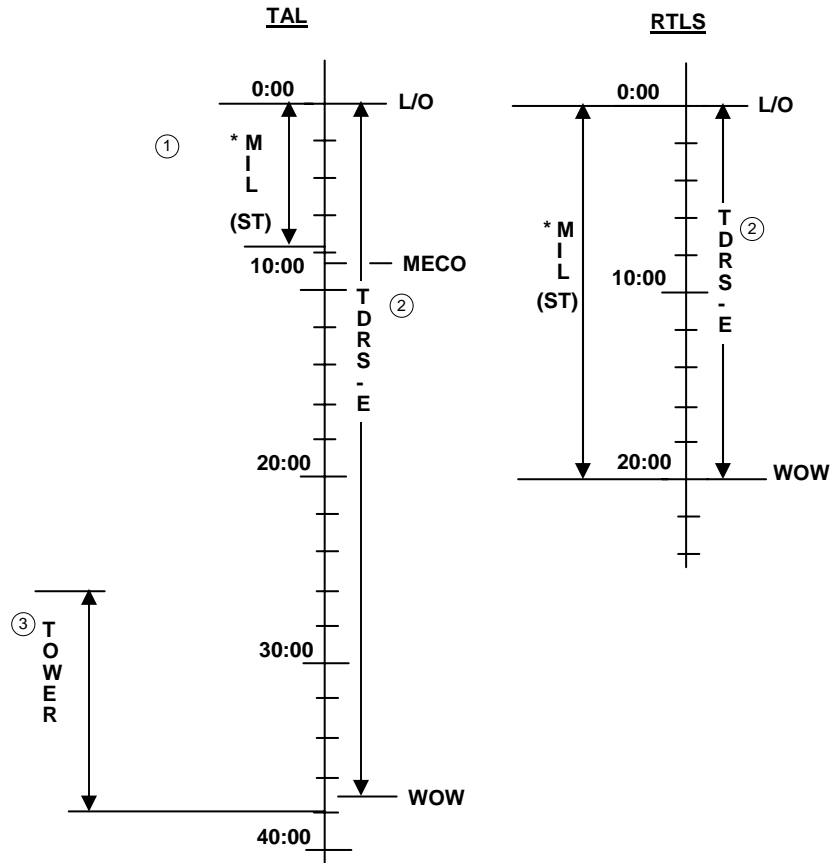


STS-400 OCF CY OMS TARGETS - W/OMS 1



**COMM
COVER**

COMMUNICATION COVERAGE – (TAL/RTLS)



MODE

ST – STDN
SG – SGLS

*UHF available

NOTE: ① WLP coverage restricted to MET 4:00 - 7:00 for 28 deg inclinations

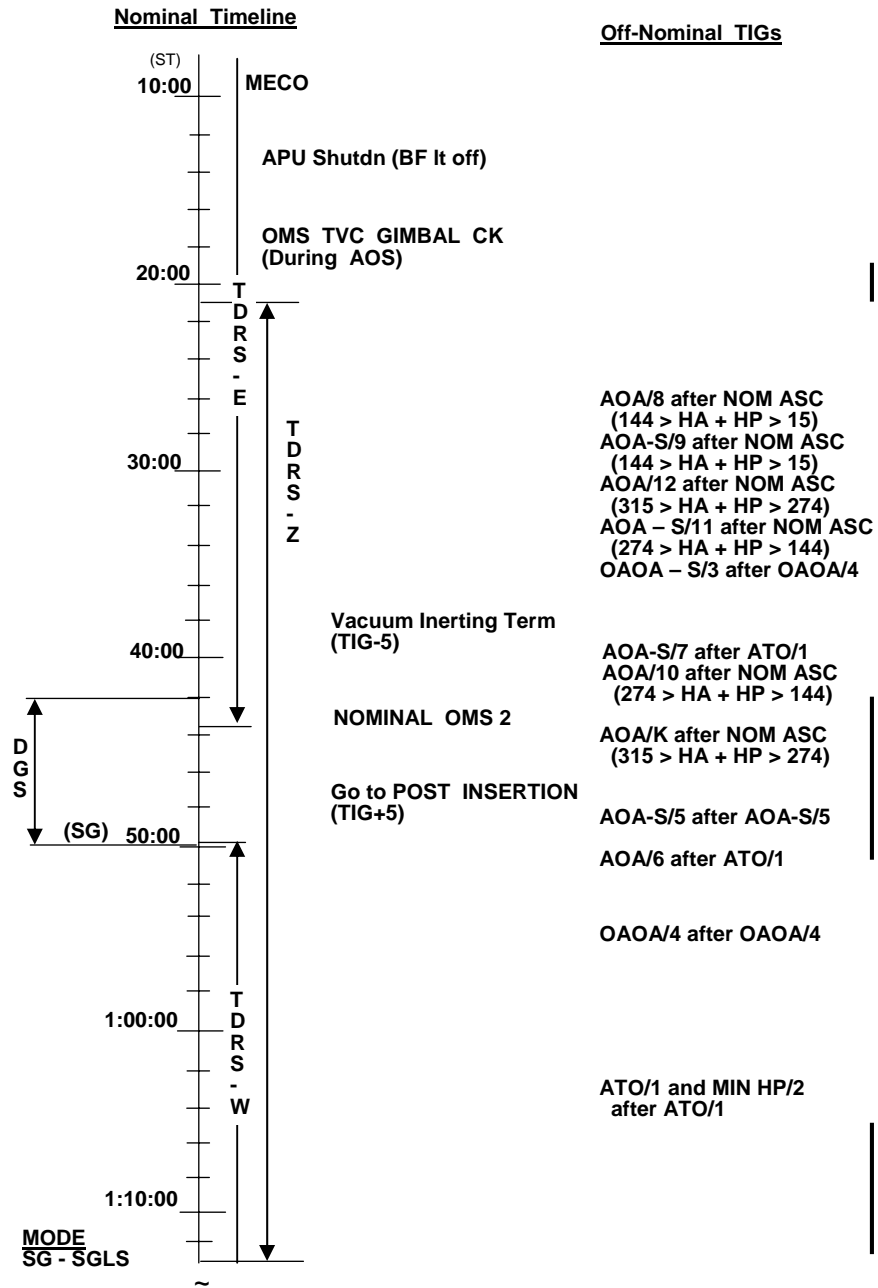
② ET blocks coverage until vehicle upright

③ Tower UHF installed at all TAL sites

**COMM
COVER**

COMMUNICATION COVERAGE – (AOA to EDW)

LAND
SITE



STS-400 LANDING SITE TABLE
(28.45° to 49.9° INCLINATION)

S I T E	LOCATION	RWY	MLS CH	LG	+ OVR RUN
1	KSC	KSC 15 KSC 33	8 6	15000 15000	1000 1000
2	BEN GUERIR	BEN 36 BEN 18	- -	13720 13220	0 1000
3	MORON AB	MRN 20 MRN 02	◆6 -	11730 11730	1000 1000
4	ZARAGOZA	ZZA 30L ZZA 12R	◆6 -	12200 12200	1000 1010
5	BANJUL INT'L	BYD 32 BYD 14	- -	11820 11820	1000 1000
6	BERMUDA	BDA 30 BDA 12	- -	9210 9210	0 0
7	AMILCAR CABRAL	AML 01 AML 19	- -	9350 9350	0 0
8	LAS PALMAS	GDV 03L GDV 21R	- -	9670 9670	0 0
9	LAJES	LAJ 15 LAJ 33	- -	10870 10870	970 990
10	BEJA	BEJ 01L BEJ 19R	- -	10820 10820	0 900
11	ISTRES AB	FMI 33 FMI 15	◆6 -	11300 12300	3960 0
12	WILMINGTON INT'L	ILM 06 ILM 24	- -	7500 7500	0 0
13	*MORON AB	MRN 20 MRN 02	◆6 -	11730 11730	1000 1000
14	CHERRY POINT	NKT 32L NKT 23R	- -	7110 7100	800 880
15	MATAVERI INT'L	EIP 10 EIP 28	- -	10390 10390	0 0

◆ Available for TAL Only

* LO XRNG TAL Site **Length** after displaced threshold

**STS-400 LANDING SITE TABLE
(28.45° to 49.9° INCLINATION)**

S I T E	LOCATION	RWY	MLS CH	LG	+ OVR RUN
16	MONROVIA	LRB 04 LRB 22	- -	9300 9300	0 0
17	NDJILI INT'L	KIN 24 KIN 06	- -	14920 14920	0 0
18	HOEDSPRUIT	AHS 18 AHS 36	- -	13100 13100	980 1740
19	TAMANRASSET	AAT 02 AAT 20	- -	11310 11310	0 0
20	SOUDA	GSA 29 GSA 11	- -	10490 10490	0 0
21	KING KHALID	KKI 15R KKI 33L	- -	13300 13300	0 0
22	DIEGO GARCIA	JDG 31 JDG 13	- -	12000 12000	950 950
23	PEARCE	PEA 18L PEA 36R	- -	7500 7500	0 0
24	TINDAL RAAF	PTN 14 PTN 32	- -	8500 8500	0 0
25	AMBERLEY	AMB 15 AMB 33	- -	9500 9500	0 0
26	YOKOTA AB	JTY 36 JTY 18	- -	11000 11000	1000 1000
27	ANDERSEN AFB	GUA 06L GUA 24R	- -	10560 10560	1050 1000
28	WAKE ISLAND	WAK 28 WAK 10	- -	9360 9360	0 0
29	HONOLULU	HNL 08R HNL 26L	- -	11500 11500	0 0
30	HAO ATOLL	HAO 12 HAO 30	- -	10390 10390	0 0

Length after displaced threshold

**STS-400 LANDING SITE TABLE
(28.45° to 49.9° INCLINATION)**

S I T E	LOCATION	RWY	MLS CH	LG	+ OVR RUN
31	ASCENSION	HAW 13	-	9520	0
		HAW 31	-	9520	0
32	ESENBOGA	ESN 03R	-	11800	0
		ESN 21L	-	11800	0
33	NASSAU	YNN 14	-	10520	0
		YNN 32	-	10520	0
34	SKID STRIP	PMR 13	-	9500	0
		PMR 31	-	9500	0
35	ORLANDO INT'L	MCO 18R	-	11500	700
		MCO 36L	-	12000	200
36	CECIL FIELD	NZC 18L	-	12000	0
		NZC 36R	-	12000	0
37	MACDILL AFB	MCF 04	-	10920	0
		MCF 22	-	10920	0
38	CHINA LAKE	NID 03	-	9490	0
		NID 21	-	9490	0
39	VANDENBERG	VBG 12	-	14500	0
		VBG 30	-	14500	0
40	EDW TEMP	EDT 22R	8	12000	1000
		EDT 04L	6	12000	1000
41	NORTHROP	NOR 17	6	15000	Lkbd
		NOR 23	6	15000	Lkbd
42	NORTHROP	NOR 05	-	15000	Lkbd
		NOR 35	-	15000	Lkbd
43	EDWARDS AFB	EDW 15	-	16300	Lkbd
		EDW 33	-	16300	Lkbd
44	EDWARDS AFB	EDW 18L	-	15000	Lkbd
		EDW 18L	-	15000	Lkbd
45	EDWARDS AFB	EDW 22	8/†	15010	0
		EDW 04	6	14010	1800

† MSBLS Jr. Ch 8 - Requires Uplink
Length after displaced threshold



WEATHER PADS

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ASC/400/FIN



**WEATHER
PADS**

**WEATHER
PADS**

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CONUS TERMINAL FORECASTS RTLS – ORB

↓ RTLS ACL pg 1-10

DEORB ORBIT	SITE	LDG GMT	SKY	VIS/WX	T/TD (°F)	WIND (MAG)	ALTM	DA	REMARKS
RTLS									
AOA (1)									
AOA (2)									

UPPER WINDS FORECAST (SFC=MAG, OTHER LEVELS=TRUE)

FIRST DAY PLS

ALT	RTLS	AOA (1)	AOA (2)	AOA (3)	ORB: _____	DEORB: _____
50K	/	/	/	/		/
38K	/	/	/	/		/
28K	/	/	/	/		/
20K	/	/	/	/		/
12K	/	/	/	/		/
7K	/	/	/	/		/
3K	/	/	/	/		/
1K	/	/	/	/		/
SFC	/	/	/	/		/

BLOCK 1 TRAJECTORY MESSAGE

DEORB ORB	APPROX TIG	SITE/RWY	OOP TIG WINDOW	
			OPEN	CLOSE
<u>MAX RATES (1st STAGE)</u>		<u>MISCELLANEOUS</u>		
<u>NOTE:</u> IGNORE ATTITUDE ERRORS DURING LOAD RELIEF		NOTAMS: _____		
ROLL _____°/sec at _____		_____		
PITCH _____°/sec at _____		_____		
YAW _____°/sec		_____		
<u>TRAJECTORY LOFTING (2nd STAGE)</u>				
LOFTED/DEPRESSED _____ K ft at VI _____ K fps				



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SWITCH LIST FOR HANDOVER INGRESS

FWD	MIDDECK	AFT
L5..... 9-3	ML86B..... 9-11	R12L..... 9-18
L side OVHD	ML85E..... 9-13	R11U..... 9-18
Flood..... 9-3	SORG..... 9-13	R11L..... 9-18
L4..... 9-3	MO13Q..... 9-13	R10..... 9-18
L1..... 9-3	ML31C..... 9-13	R13U..... 9-18
L2..... 9-3	ML26C..... 9-13	R13L..... 9-19
S1..... 9-4	ML18F..... 9-13	
	ML30N..... 9-13	A1U..... 9-19
F1..... 9-4	MA73C..... 9-13	A1L..... 9-19
F2..... 9-4	MO10W..... 9-14	A1R..... 9-20
F6U(HUD)..... 9-4	WCS..... 9-14	AFT MDU..... 9-20
F3..... 9-4	MO30F..... 9-14	A6U..... 9-20
F8U(HUD)..... 9-4	MO32M..... 9-14	A6L..... 9-20
F4..... 9-4	MO39M..... 9-14	A2..... 9-21
F6..... 9-4	MO42F..... 9-14	A7U..... 9-21
F7..... 9-5	MO51F..... 9-15	A7L..... 9-21
F8..... 9-5	MO58F..... 9-15	A4..... 9-21
F9..... 9-5	MO52J..... 9-15	A8U..... 9-22
	MO69M..... 9-15	A8L..... 9-22
R1..... 9-5	MD44F..... 9-15	A3..... 9-22
R2..... 9-5	MIDDECK FLOOR... 9-15	
R4..... 9-6	MO63P..... 9-15	L9..... 9-23
R6..... 9-6		L10L..... 9-23
R side OVHD	MIDDECK EXPERIMENTS	L10U..... 9-24
Flood..... 9-6		L11U..... 9-24
	MIDDECK (TEPC).. 9-16	L12UL..... 9-24
C2..... 9-6		L12UR..... 9-24
C3..... 9-6	AIRLOCK	L12LL..... 9-24
C5..... 9-7		L12LR..... 9-24
S2..... 9-7	AW18A..... 9-17	L12L..... 9-24
C6..... 9-7	AW18D..... 9-17	R12..... 9-24
C7..... 9-7	AW18H..... 9-17	
	AW82B..... 9-17	A15..... 9-25
O1..... 9-7	AW82D..... 9-17	A14..... 9-25
O2..... 9-7	AW82H..... 9-17	A13..... 9-25
O3..... 9-7	TW58T..... 9-17	A12..... 9-25
O5..... 9-7	A/L IN HATCH..... 9-17	A11..... 9-26
O6..... 9-7	A/L OUT HATCH.... 9-17	
O7..... 9-8	SH HATCH..... 9-17	R14..... 9-26
O8..... 9-8	EXT A/L UPPER	
O9..... 9-8	HATCH..... 9-17	HARDWARE
O13..... 9-9	TNL ADP HATCH.... 9-17	C/W..... 9-27
O14..... 9-9		MEDS CONFIG
O15..... 9-9		FOR INGRESS 9-28
O16..... 9-9		
O17..... 9-10		
O19..... 9-10		

SW LIST

NOT FLOWN

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ASC/400/FIN

NOTES

- HANDOVER from LCC occurs at SRB Ignition (LCC to MCC Handover)
- **INGRESS** denotes switch status prior to beginning of PRE-INGRESS SW RECONFIGURATION (at T-3:00 (hold)) if different than HANDOVER
- - - - - - denotes physical break in panel structure
- Radiator flow valve, indicated by *, is in full radiator flow position and unpowered to allow maximum radiator flow capability if required
- Radiator isolation valve, indicated by ****, is configured in radiator flow and unpowered
- Talkbacks on panels L2, R11, R13, A6, and ML31C indicated by ** are bp because cbs on ML86B, A6, and O16 open. Position of valves indicated below:

L2: O2 EMER - CL
R11L: SPLY H2O DUMP ISOL VLV - CL
 VLV - CL
 GALLEY SPLY VLV - CL
R13L: MMU GN2 SPLY ISOL VLV A - CL
 B - CL
A6L: VEST DEP VLV SYS 1 VENT ISOL - CL
 VENT - CL
 2 VENT ISOL - CL
 VENT - CL
ML31C: WASTE H2O DUMP ISOL VLV - CL
 VLV - CL
 VAC VENT ISOL VLV CNTL - CL

SW LIST

- Before turning OI PCMMU PWR switch on C3, indicated by ***, to OFF, notify LCC so gnd power can be connected; also notify LCC before turning it to 1 after crew ingress
- All unspecified/unlabeled switches – dn (2 position)/ctr (3 position), tb – bp, cb – op, rotaries – full counter clockwise
- PL RETEN PL SEL switch on panel A6U will nominally be 1 for deployable payload missions using only a single PL SEL position but will be **MON** until PRE-INGRESS SW CONFIG. All other missions will be in MON (Fit Rule A10-281)
- Circuit Breaker snapping color codes:
 - { R } – Red – open all times
 - { G } – Green – open on orbit only
 - { Y } – Yellow – open ascent, closed per procedure
 - { O } – Orange – open orbit thru entry
 - { } – Blank (no ring) – always closed or as required
- STS-400 options affecting switch list:
 - 1) OV105
 - 2) GMTLO
 - 3) Orbit incln = 28.45°
 - 4) Payload:
 - 5) Crew size of 4 up, 11 down
 - 6) Installed: TK CRYO sets (5), SORG, Ku Ant, GN2 (6), External Airlock (ISS), SRMS, OBSS, OIU, VPU, WVS, DTV, Recumbant Seat Kit
 - 7) Options N/R: RCRS
- Changes are with respect to STS-126 Switch List as published in FOR

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

<p>L5 L COMM PWR – ON OFF</p> <hr/> <p>L side OVHD Flood – BRT</p> <hr/> <p>L4: All cbs – cl { } except: :B All cbs – op { Y } :D All cbs – cl { O } :E All cbs – cl { O } :F cb AC1 H2O LOOP PUMP 1 A/2 (three) – op { R } cl :J AC3 SIG CONDR (two) – op { Y } :P blank cbs (three) – op { R } :Q cb AC1 ΦC LTG INST OS – op { Y } AC2 ΦC LTG NUMERIC OS – op { Y } AC3 LTG (three) – op { Y }</p> <hr/> <p>L1 HUM SEP A – OFF B – ON CAB TEMP sel – COOL CNTLR – OFF FAN A – ON B – OFF IMU FAN A,C (two) – OFF B – ON H2O PUMP LOOP 1 (two) – OFF,B 2 – ON LOOP BYP MAN (two) – ctr MODE (two) – MAN</p>	<p>L1 AV BAY 1,3 FAN A (two) – OFF B (two) – ON 2 FAN A – ON B – OFF FLOW PROP VLV LOOP (two) – ctr (tb-ICH) FREON PUMP LOOP (two) – B RAD CNTLR OUT TEMP – NORM LOOP (two) – OFF* BYP VLV MAN SEL (two) – ctr (tb-BYP) MODE (two) – MAN NH3 CNTLR A – OFF B – PRI/GPC H2O ALT PRESS – CL FLASH EVAP CNTLR PRI A – GPC B – OFF SEC (two) – A SPLY,OFF HI LOAD EVAP – ENA TOP EVAP HTR NOZ (two) – A AUTO DUCT sel – A HI LOAD DUCT HTR sel – A</p> <hr style="border-top: 1px dashed black;"/> <p>FIRE SUPPR AV BAY (three) – SAFE pb (three) – lt off SMOKE DETN lts (ten) – off SNSR – dn CKT TEST – OFF</p> <hr/> <p>L2 CAB RELIEF (two) – ctr (tb-ENA) VENT (two) – ctr (tb-CL)</p>
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

F6	ABORT MODE	- OFF
	pb	- lt off
	RCS CMD lts (three)	- off
	RANGE SAFE ARM lt	- off
	AIR DATA	- NAV
<hr/>		
F7	MDU PWR (five)	- ON
	BRT sel (five)	- as reqd
	MN ENG STAT lts (six)	- off
	SM ALERT lt	- off
	C/W matrix lts - off	all off except HYD PRESS
<hr/>		
F8	HUD DATA BUS	- 4
	MDU PWR (two)	- ON
	BRT sel (two)	- as reqd
	LDG GEAR pb (two)	- lt off
	tb (three)	- UP
	HSI SEL MODE	- ENTRY
	SOURCE (two)	- NAV,2
	FLT CNTLR PWR	- ON
	RAD ALTM	- 2
	ADI ATT	- REF
	ERR	- MED
	RATE	- MED
	AIR DATA	- NAV
<hr/>		
F9	AC Volts sel	- as reqd
	DC Volt/Amp sel	- VOLTS MNB
<hr/>		
R1	CNTL BUS PWR (three)	- dn
	ESS BUS SOURCE MN (three)	- ON
	FC (three)	- ON OFF
	FC/MN BUS (three)	- ctr (tb-ON)
	MN BUS TIE (three)	- ctr (tb-OFF)
	PL CAB	- OFF
	PRI MNC, FC 3, MNB (three)	- ctr (tb-OFF)

NOT FLOWN

R1	PL AUX	- OFF
	AFT MNB	- OFF
	MNC	- OFF
	INV PWR (three)	- ctr (tb-ON)
	INV/AC BUS (three)	- ctr (tb-ON)
	cb AC CONTR (nine)	- op { }
	AC BUS SNSR (three)	- MON
<hr style="border-top: 1px dashed black;"/>		
R1	(CRYO)	
	O2 MANF VLV (two)	- ctr (tb-OP)
	TK1,2 HTRS A (two)	- AUTO
	B (two)	- OFF
	RESET/TEST (two)	- ctr
	TK3 HTRS (two)	- OFF
	RESET/TEST	- ctr
	FC REAC (three)	- ctr
	tb (six)	- OP
	(three)	- ctr
	RDY tb (three)	- gray
	COOL PUMP ΔP tb (three)	- gray
	H2 MANF VLV (two)	- ctr (tb-OP)
	TK1,2 HTRS A (two)	- AUTO
	B (two)	- OFF
	TK3 HTRS (two)	- OFF
<hr/>		
R2	MPS PRPLT DUMP (two)	- GPC
	ENG PWR (six)	- ON
	He ISOL (six)	- OP GPC
	PNEU L ENG He XOVR	- GPC
	He ISOL	- OP GPC
	LH2 ULL PRESS	- AUTO
	He I'CNCT (three)	- GPC
R2	APU/HYD RDY tb (three)	- bp

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ASC/400/FIN

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

	APU OPER (three) – START/RUN OFF	MAJ FUNC (three) – GNC
	SPEED SEL (three) – NORM	SEL (two) – as reqd
	HYD MN PUMP PRESS (three) – NORM	EVENT TIMER MODE – DN
	cb APU FU TK VLV ENA (six) – cl { } op	CNTL – ctr
	HYD CIRC PUMP (three) – OFF GPC	TIMER SET pb (four) – 0900
	APU CNTLR PWR (three) – ON OFF	TIMER – ctr
	FUEL TK VLV (three) – OP CL	
	AUTO SHUTDN (three) – ENA	
	BLR CNTLR/HTR (three) – A	
	PWR (three) – ON	
	N2 SPLY (three) – ON OFF	
	ET UMB DR MODE – GPC	
	CTRLINE LAT – GND (tb-bp)	
	L,R DR (two) – OFF (tb-OP)	
	LAT (two) – OFF (tb-REL)	
R4	HYD BRAKE HTR (three) – OFF	C3 OMS ENG (two) – ARM/PRESS OFF
	ISOL VLV (three) – GPC (tb-CL)	BFC CRT DISP – ON OFF
	MPS/TVC ISOL VLV (three) – GPC (tb-OP)	SEL – 3+1
	LG/NWS HYD SYS – AUTO 1/2	FCS CH (four) – AUTO
	LG EXTEND ISO VLV – GPC (tb-CL)	BDY FLP – AUTO/OFF
	MPS ENG CNTLR HTR (three) – OFF	AIR DATA PROBE STO (two) – INH
	MANF PRESS (two) – GPC	MN ENG LIMIT SHUTDN – AUTO
	FILL/DRAIN (four) – GND	TRIM R,P,Y (three) – ctr
	H2 PRESS LINE VENT – GND	SBTC – full forward
	LO2 PREVLV (three) – GPC	DAP – all off
	LH2 PREVLV (three) – GPC	SRB SEP – AUTO
	FDLN RLF ISOL (two) – GPC	ET SEP – AUTO
		AUD CTR – 1
		OI PCMMU PWR – 1 OFF ***
		FORMAT – GPC
		S-BD PM CNTL – CMD
		ANT sel – GPC
		AIR DATA PROBE (two) – STOW
		FC REAC VLV (three) – dn
		cb FC REAC VLV CL ENA (three) – op { R }
		UPLK – ENA
		MSTR MADS PWR – ON
		C/W MEM – ctr
		MODE – NORM
R6	R COMM PWR – ON OFF	
	R side OVHD Flood – BRT	
C2	IDP/CRT PWR (three) – ON	

NOT FLOWN

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ASC/400/FIN

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

C3	RTG PUMP (OV103,4 – no SH) – PRI SHORT ENA (two) (OV104 – no SH) – DSBL SHORT (two) (OV104 – no SH) – OFF PL SAFING (four) (OV103 – no SH) – SAFE (five) (OV105 – no SH) – SAFE SH FIRE SUPPR ARM (two) (SH only) – SAFE DISCH (two) (SH only) – NO-OP H2O LN HTRS (SH only) – OFF EMER LTG – OFF/ON	O5	L AUD TACAN ID (two) (OV103,4) – OFF,1 VOX SENS sel – as reqd A/G (two) – T/R A/A – T/R ICOM (two) – T/R PWR – AUD/TONE CNTL sel – NORM XMIT/ICOM MODE sel – as reqd (PTT/VOX recommended) VOL pb (five) – as reqd TACAN pb – 5 PAGE – dn
<hr/>			
C5	DIRECT O2 vlv – CL		
S2	PL SEAT PWR BUS SEL – AC3 (dn) CONTR (two) – ctr		
<hr/>			
C6	LEH O2 vlv (four) – OP		
C7	LEH O2 SPLY vlv (two) – OP		
<hr/>			
O1	COAS – OFF AIR TEMP sel – CAB HX OUT H2O PUMP OUT PRESS sel – LOOP 2 FREON sel – LOOP 1 O2/N2 FLOW sel – SYS 1 O2 PPO2 sel – SNSR A	O6	LTG PNL sel (two) – OFF – (1/4 brt if night launch) INST L/CTR sel – OFF – (1/4 brt if night launch) OVHD sel – as reqd – (1/4 brt if night launch) L GLRSHLD FLOOD sel (two) – VAR, as reqd L SEAT/CTR CNSL FLOOD sel (two) – OFF,BRT S TRK DR CNTL (two) – OFF POS tb (two) – CL PWR (two) – OFF UHF SPLX/EVA XMIT FREQ – 259.7/414.2 PWR AMP – ON SPLX SQUELCH – ON EVA STRING – 1 ENCRYPT – ON MODE – SPLX
<hr/>			
O2	CRYO O2 HTR ASSY TEMP sel – TK1 1 O2/H2 sel – TK1 FC STACK TEMP sel – 1		
<hr/>			
O3	RCS/OMS PRESS sel – RCS He X 10 PRPLT QTY sel – OMS FUEL MSN TIME – MET		

NOT FLOWN

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ASC/400/FIN

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

O6	ANNUN LAMP TEST – ctr BUS SEL ACA 1 – MNA 2/3 – MNB INTEN sel (two) – BRT,MED MTU – AUTO INT DISP PROC (four) – dn MDM PL1,2 (two) – ON PL3 – OFF FA (four) – ON FF (four) – ON GPC PWR (five) – ON OUTPUT 1,2,3,4 (four) – NORM (tb-gray) 5 – B/U NORM (tb-bp) IPL SOURCE – OFF GPC MODE 1,2,3,4 (four) – RUN (tb-RUN) 5 – RUN STBY (tb-RUN)		O8 RADAR ALTM (two) – ON OFF MLS (three) – OFF MLS CH pb/tw (three) – 6 R SEAT/CTR CNSL FLOOD sel (two) – OFF,BRT LTG PNL R sel (three) – OFF – (1/4 brt if night launch) NUMERIC sel – BRT – (1/4 brt if night launch) R GLRSHLD FLOOD sel (two) – VAR, as reqd OMS KIT He PRESS/VAP ISOL (two) – CL TK ISOL (two) – CL (tb-bp) L OMS He PRESS/VAP ISOL (two) – GPC TK ISOL (two) – GPC (tb-OP) XFEED A – GPC (tb-CL) B – GPC (tb-CL) (tb-OP) R OMS He PRESS/VAP ISOL (two) – GPC TK ISOL (two) – GPC (tb-OP) XFEED (two) – GPC (tb-CL) FWD RCS He PRESS (two) – OP (tb-OP) TK ISOL (two) – GPC (tb-OP) MANF ISOL (five) – GPC (tb-OP) ANNUN LAMP TEST – ctr
O7	TACAN MODE sel (three) (OV103,4) – GPC OFF ANT SEL (three) (OV103,4) – AUTO as is CH pb/tw (three) (OV103,4) – 059Y as is GPS PRE AMPL UPPER (three) (OV105) – ON OFF LOWER (three) (OV105) – ON OFF PWR (three) (OV105) – ON OFF ENCRYPT (three) (OV105) – NORM as is AFT L RCS He PRESS (two) – OP (tb-OP) TK ISOL (three) – GPC (tb-OP) MANF ISOL (five) – GPC (tb-OP) XFEED (two) – GPC (tb-CL) MSTR RCS XFEED – OFF AFT R RCS He PRESS (two) – OP (tb-OP) TK ISOL (three) – GPC (tb-OP) MANF ISOL (five) – GPC (tb-OP) XFEED (two) – GPC (tb-CL)	O9	R AUD PWR – AUD/TONE A/G (two) – T/R A/A – T/R ICOM (two) – T/R VOX SENS sel – as reqd TACAN ID (two) (OV103,4) – OFF, as reqd

NOT FLOWN

9-8

ASC/400/FIN

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

O9 R AUD PAGE - dn
 VOL pb (five) - as reqd
 TACAN pb - 5
 XMIT/ICOM MODE sel - as reqd (PTT/VOX recommended)
 CNTL sel - NORM

O13: All cbs - cl { } except:
 :A,C,E cb ESS MN CONTR (three) - cl { } op

O14:A BRAKES MNA - ON
 RGA 1 - ON
 IMU 1 - ON
 FC1 CNTLR - ON
 :B,C,D,E All cbs - cl { } except:
 :B cb MNA MNC CONTR - cl { } op
 :D GPS PRE AMPL UC (OV103) - op {R}
 LC (OV103) - op {R}
 1 PRE AMPL (two)(OV104) - op {R}
 CAB VENT - cl {O}
 ISOL - cl {O}
 :E ADTA 1 - cl {G}
 ACCEL 1 - cl {G}
 DDU AFT - op {Y}
 :F MMU 1 - ON
 RJDA 1A L2/R2 LOGIC - ON
 DRIVER - ON OFF
 2A L4/R4 LOGIC - ON
 DRIVER - ON OFF
 RJDF 1B F1 LOGIC - ON
 DRIVER - ON OFF

O14:F L OMS ENG VLV - ON OFF
 ASA 1 - ON

O15:A BRAKES MNB - ON
 RGA (two) - ON
 IMU 2 - ON
 FC2 CNTLR - ON
 :B,C,D,E All cbs - cl { } except:
 :B cb MNB MNA CONTR - cl { } op
 :C UTIL PWR F1/MO13Q - op {Y}
 :E ADTA 2 - cl {G}
 ACCEL 2 - cl {G}
 DDU R - cl {G}
 :F MMU 2 - ON
 RJDA 1B L1/L5/R1 LOGIC - ON
 L1/R1 DRIVER - ON OFF
 RJDF 1A F2 LOGIC - ON
 DRIVER - ON OFF
 ASA 2 - ON
 ACCEL 4 - ON

O16:A BRAKES MNC - ON
 RGA 3 - ON
 IMU 3 - ON
 FC3 CNTLR - ON
 :B,C,D,E All cbs - cl { } except:
 :B cb MNC MNB CONTR - cl { } op
 :D GPS PRE AMPL UC (OV103) - cl { }
 LC (OV103) - cl { }
 3 PRE AMPL (two)(OV104) - op {R}
 O2 EMER - op {R}

NOT FLOWN

9-9

ASC/400/FIN

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

O16:E	cb MNC ADTA 3,4 (two)	- cl	{G}
	DDU R	- cl	{G}
	AFT	- op	{Y}
:F	RJDA 2B L3/R3/R5 LOGIC	- ON	
	L3/R3 DRIVER	- ON	OFF
	RJDF 2A F3 LOGIC	- ON	
	DRIVER	- ON	OFF
	2B F4/F5 LOGIC	- ON	
	F4 DRIVER	- ON	OFF
	R OMS ENG VLV	- ON	OFF
	ASA 3,4 (two)	- ON	
	ACCEL 3	- ON	
	RJD MANF L5/F5/R5/DRIVER	- OFF	
<hr/>			
O17:A	ATVC (four)	- ON	
:B	EIU (three)	- ON	
:C	SIG CONDR FREON A	- AC2	
	B	- AC3	
	OL 1/2	- ON	
	OR 1/2	- ON	
:D	SIG CONDR OA 1/2/3	- ON	
	MDM OA 1/2/3	- ON	
	MEC (two)	- ON	
<hr/>			
O19	TV PWR	- ON	OFF
	DC UTIL PWR MNA	- ON	
	COAS PWR	- OFF	

NOT FLOWN

9-10

ASC/400/FIN

MIDDECK SWITCH LIST FOR HANDOVER INGRESS

ML86B:E cb MNB MAR 1 - op {Y}
 2 - op {Y}
 SEAT L - cl { }
 R - cl { }
 CO2 COM INSTR (OV104,5) - op {R}
 FLOOD TNL ADAPT 3 - op {R}
 - (op {Y} if SH flown)
 MNC EMU 1 H2O SPLY - op {Y}
 WASTE - op {Y}
 SEAT L - cl { }
 R - cl { }
 CO2 SYS 2 CNTLR (OV104,5) - op {R}
 FLOOD TNL ADAPT 4 - op {R}
 - (op {Y} if SH flown)
 :F cb MNA FLOODS MIDDECK 1/8 - cl { }
 WMC/MO13Q - op {Y}
 AIRLK 1 - op {Y}
 MIDDECK 9 - op {Y}
 CRYO O2 HTR TK3 SNSR 1 - cl { }
 TK5 SNSR 1 - cl { }
 - (op {R} if
 TK5 not flown)
 MNB FLOODS MIDDECK 2/6 - cl { }
 BUNK 2/4 - op {Y}
 MIDDECK 10 - op {Y}
 AIRLK 3 - op {Y}
 CRYO O2 HTR TK3 SNSR 2 - cl { }
 TK4 SNSR 1 - cl { }
 - (op {R} if
 TK4 not flown)

| ML86B:F cb MNC FLOODS MIDDECK 5/7 - cl { }
 3/4/MO13Q - cl { }
 BUNK 1/3 - op {Y}
 AIRLK 4 - op {Y}
 CRYO O2 HTR TK5 SNSR 2 - cl { }
 - (op {R} if
 TK5 not flown)
 TK4 SNSR 2 - cl { }
 - (op {R} if
 TK4 not flown)
 :G cb ESS 1BC FLOOD AIRLK 2 - op {Y}
 TNL ADAPT 1 - op {R}
 - (op {Y} if
 SH flown)
 CRYO CNTLR TK4 (two) - cl { }
 - (op {R} if
 TK4 not flown)
 QTY TK4 (two) - cl { }
 - (op {R} if
 TK4 not flown)
 2CA CRYO CNTLR TK5 (two) - cl { }
 - (op {R} if
 TK5 not flown)
 QTY TK5 (two) - cl { }
 - (op {R} if
 TK5 not flown)
 3AB CRYO CNTLR TK3 (two) - cl { }
 QTY TK3 (two) - cl { }

NOT FLOWN

9-12

ASC/400/FIN 1

MIDDECK SWITCH LIST FOR HANDOVER INGRESS

ML85E (MUP – if reqd)
 AC S1 – OFF
 cb AC CB1 – op { Y }
 DC 10 AMP MNB S2 – OFF
 S3 – OFF
 S4 – OFF
 S5 – OFF
 cb DC 10 AMP MNB CB2 – op { Y }
 CB3 – op { Y }
 CB4 – op { Y }
 CB5 – op { Y }
 PUMPS S6 – OFF
 cb PUMPS (two) – op { R }

SORG (NOTE: Panel deleted if Galley not flown)
 OVEN FAN – OFF
 H2O HOT(COLD) pb (two) – lt off
 VOL sel – as reqd
 MV2 – as reqd
 REHYD STA Lever – CL, latched
 OVEN/RHS – OFF
 H2O HTR (two) – OFF
 AUX PORT – cap installed
 TEST PORT 4 – cap installed
 A5J105 ELECT TEST PORT – cap installed
 OVEN DOOR – CL

MO13Q MIDDECK FLOODS 1,2,3,5,7 (five) – OFF
 9,10 (two) – OFF
 4,6,8 (three) – ON
 MO13Q LTG – OFF

MO13Q AIRLK FAN (two) – OFF
 H2O S/O VLV – ctr (tb-OP)
 AIRLK 2 – OFF/ON
 TNL ADAPT 1 – OFF/ON
 DC UTIL PWR MNB – OFF
 AC UTIL PWR AC3 – OFF

ML31C WASTE H2O TK1 DRAIN VLV – ctr (tb-OP)
 VLV – ctr (tb-OP)
 DUMP ISOL VLV – ctr (tb-bp)**
 VLV – ctr (tb-bp)**
 VLV ENA/NOZ HTR – OFF
 SPLY H2O TKD INLET – ctr (tb-OP)
 OUTLET – ctr (tb-OP)
 VAC VENT ISOL VLV BUS SEL – MNA
 CNTL – ctr (tb-bp)**
 NOZ HTR – OFF

ML26C SPLY H2O GN2 TKA SPLY vlv – CL
 TK VENT vlv – VENT

ML18F EMER LTG – ON/OFF
 WMC FLOOD – OFF

ML30N Neg Press Relief vlv cap (two) – installed/seated

MA73C:A,B MCA LOGIC MNA (four) – ON
 MNB (six) – ON
 MNC (four) – ON
 :C,D All cbs – cl { }
 :E All cbs – op { Y }

NOT FLOWN

9-13

ASC/400/FIN 1

MIDDECK SWITCH LIST FOR HANDOVER INGRESS

MO51F (CO2 RMVL SYS (RCRS) – OV104,5)
 CNTLR lts (four) – off
 MNA – OFF
 AC1 – ctr
 CNTLR 1 MODE – ctr
 COM INSTR – OFF
 MNC – OFF
 AC3 – ctr
 CNTLR 2 MODE – ctr
 All cbs (six) (OV104,5) – op { R }

MO58F TV PWR – OFF

MO52J DC UTIL PWR MNA – OFF
 AC UTIL PWR AC1 – OFF
 MSTR ALARM pb – lt off

MO69M LEH O2 7 vlv – CL (OP if seat 7 flown)
 8 vlv – CL

MD44F CAB TEMP CNTL LINK – PRI ACT (pinned)
 vlv – FULL COOL (**ccw** by
 using AUTO TEMP
 CNTLR 1)
 SEC ACT – FULL HEAT (**cw** by
 using AUTO TEMP
 CNTLR 2)

MIDDECK FLOOR

EMU O2 ISOL VLV – CL
 CAB PURGE VLV – CL
 ISOL VLV – CL

MO63P cb CB2/J2 – op { Y }
 CB3/J3 – op { Y }
 CB4/J4 – op { Y }
 CB5/J5 – op { Y }
 CB6/J6 – op { Y }
 RLY PWR – op { Y }
 J2 – OFF
 J3 – OFF
 J4 – OFF
 J5 – OFF
 J6 – OFF
 Left select – 10A
 Right select – 10A

NOT FLOWN

9-15

ASC/400/FIN 1

MIDDECK EXPERIMENTS SWITCH LIST FOR HANDOVER **INGRESS**

(IF FLOWN)
MIDDECK (TEPC)
SW-1 – OFF

NOT FLOWN

9-16

ASC/400/FIN

AIRLOCK SWITCH LIST FOR HANDOVER INGRESS

AW18A	LTG FLOOD 1,3,4 (three) – OFF 2 – ON/OFF	
AW18D	AIRLK AUD PWR – OFF	
	A/G 1 – T/R	
	A/G 2 – RCV	
	A/A – T/R	
	ICOM (two) – T/R	
	PAGE – dn	
	VOL pb (five) – as reqd	
	CNTL – NORM	
	VOX SENS sel – as reqd	
	MSTR VOL 1 sel – MAX	
	XMIT/ICOM MODE sel – PTT/VOX	
	MSTR VOL 2 sel – MAX	
AW18H	PWR/BATT CHGR EMU BUS SEL (two) – OFF	
	MODE (two) – OFF	
	INPUT – EMU 1	
AW82B	AIRLK DEPRESS vlv – CL	
	cap – installed	
	O2 vlv (two) – CL	
AW82D	EMU H2O (four) – ctr (tb-CL)	
	CCU PWR (two) – OFF	
AW82H	EMU H2O SPLY WASTE reg (two) – REGULATING	
TW58T	(NOTE: Panel deleted if SH not flown)	
	TNL LTG FLOOD 1 – ON/OFF	
	2,3,4 (three) – OFF	
	ADP PL ISOL VLV – CL	
	cap – installed	

AIRLOCK INNER HATCH	
Actuator Handle	– LAT
Lock Lever	– LOCK
Equal vlv (two)	– NORM
cap (two)	– installed
AIRLOCK OUTER HATCH (if SH – C HATCH)	
Actuator Handle	– LAT
Lock Lever	– LOCK
Equal vlv (two)	– OFF
cap (two)	– installed
SH HATCH (D HATCH) (if SH flown)	
Actuator Handle	– LAT
Lock Lever	– LOCK
Equal vlv (two)	– OFF
cap (two)	– installed
EXT AIRLOCK UPPER HATCH (if EXT A/L flown)	
Actuator Handle	– LAT
Lock Lever	– LOCK
Equal vlv (two)	– OFF
cap (two)	– installed
TUNNEL ADAPTER HATCH (if flown)	
Actuator Handle	– LAT
Lock Lever	– LOCK
Equal vlv (two)	– OFF
cap (two)	– installed

NOT FLOWN

9-17

ASC/400/FIN

AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

R12L NOTE: Panel may be blank if no PL requirement
(See 9-23 or 9-24)

R11U	FC GPC PURGE SEQ – dn (tb-bp) PURGE HTR – GPC VLVS (three) – GPC STARTUP HTR (three) – ENA H2O LINE HTR – A AUTO RELIEF HTR – A AUTO MDU PWR – ON BRT sel – as reqd	
R11L	IDP/CRT4 PWR – ON MAJ FUNC – SM ENCRYPTOR – NORM MS AUD CNTL – NORM SPLY H2O TKA INLET – ctr (tb-OP) OUTLET – ctr (tb-CL) TKB INLET – ctr (tb-OP) OUTLET – ctr (tb-OP) TKC INLET – ctr (tb-OP) OUTLET – ctr (tb-OP) DUMP ISOL VLV – ctr (tb-bp)** VLV – ctr (tb-bp)** ENA/NOZ HTR – OFF XOVR VLV – ctr (tb-CL) GALLEY SPLY VLV – ctr (tb-bp)** B SPLY ISOL VLV – ctr (tb-OP)	

R10	MS AUD PWR A/G (two) – T/R A/A – T/R ICOM (two) – T/R VOX SENS sel – as reqd PAGE – dn VOL pb (five) – as reqd XMIT/ICOM MODE sel – as reqd (PTT/VOX recommended) LTG PNL sel – OFF FLOOD sel (two) – ON,BRT – (OFF,BRT if night launch)	
	BIOMED CH 1 sel – MIDDECK CTR 2 sel – MIDDECK R	
R13U	C/W TONE VOL (two) – as is PARAM STATUS – ctr MEM – ctr LAMP TEST – ctr PARAM SEL pb (three) – 120 LIMIT SET VALUE pb (three) – 000 LIMIT – LOWER FUNC – ctr PARAM – ctr	

NOT FLOWN

9-18

ASC/400/FIN

AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

R13L	PL BAY DR SYS (two) – DSBL MECH PWR SYS (two) – OFF DR – STOP (tb-as is) RAD LAT CNTL (two) – OFF (tb-LAT) CNTL (two) – OFF (tb-STO) KU ANT DIRECT STO – OFF ANT – GND (tb-STO) MMU GN2 SPLY ISOL VLV (two) – ctr (tb-bp)**		A1L	S-BD PL CNTL – CMD ANT POLAR – L CIRC XMTR PWR – LO CH SEL INTRG 1,2 tw (six) – 910,910 FREQ SWEEP – OFF MOD – OFF PWR SYS – OFF SEL – PSP PSP CMD OUTPUT – PL UMB PL DATA INTLVR PWR – ON S-BD PM ANT SW ELEC – 1 PRE AMP – 1 PWR AMPL STBY – 1 OPER – 1 MODE sel – STDN HI XPNDR – 1 NSP DATA RATE XMIT – HI RCV – HI UPLK DATA – S-BD CODING XMIT – OFF RCV – ON PWR – 1 ENCRYPTION PWR – ON MODE – SEL SEL – RCV
A1U	SLEW AZM – ctr ELEV – ctr RATE – SLOW SIG STRENGTH sel – S-BD PM KU tb (three) – bp sel (two) – MAN SLEW,dn PWR – OFF MODE – RDR PASSIVE RADAR OUTPUT – HI CNTL – CMD SIG PROC HDR – TV LDR – MMU 1 TAGS – CLEAR			

NOT FLOWN

9-19

ASC/400/FIN

AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

A1R	S-BD FM CNTL	- CMD
	ANT	- GPC
	PWR	- 1
	DATA SOURCE sel	- ME
	AUD CTR VOICE RCD SEL CH 1 sel	- ICOM A
	2 sel	- ICOM B
	DOCK RING (seven)	- OFF
	SL (seven)	- OFF
	UHF A/G (two)	- OFF
	A/A	- OFF
	PL BAY OUTLETS ICOM (two)	- OFF
<hr/>		
	AFT MDU MDU PWR	- OFF
	BRT sel	- as reqd
<hr/>		
A6U	DAP	- all off
	SENSE: -Z	
	FLT CNTLR PWR	- OFF
	Unused rotary sw	- full ccw
	ADI ATT	- INRTL
	ERR	- MED
	RATE	- MED
	OS LTG FLOOD sel (two)	- ON,BRT
	PNL sel	- OFF
	INST sel	- OFF
	NUMERIC sel	- OFF
	ANNUN BUS SEL	- OFF
	LAMP TEST	- ctr
	INTEN sel (two)	- VAR,MED
	EVENT TIMER SET pb (four)	- as reqd
	MODE	- UP
	CNTL	- ctr
	TIMER	- ctr

A6U	PL RETEN LOGIC PWR (two)	- OFF
	PL SEL	- MON
	LAT (five)	- OFF (tb-bp)
	RDY tb (five)	- bp
<hr/>		
A6L	(DSP)	
	cb ESS SYS PWR CNTL (two)	- op { Y }
	DEP (four)	- op { Y }
	DOCK LT (four)	- op { Y }
	MN LOG (six)	- op { Y }
	PMA 2/3 GRP 1 HOOKS SYS A (two)	- op { R }
	B (two)	- op { R }
	2 HOOKS SYS A (two)	- op { R }
	B (two)	- op { R }
	SYS PWR (two)	- ctr (tb-OFF)
	PMA 2/3 HOOKS (two)	- ctr (tb-bp)
	PYRO PWR (two)	- OFF
	PSU PWR (two)	- OFF
	VEST DEP VLV (four)	- ctr (tb-bp)**
	LTS (four)	- OFF
<hr/>		
A6L	cb MADS PWR MNB	- cl { }
	MADS RCDR PWR	- PCM/WB ENA
	PB FWD	- CMD
	STRAIN GAGE	- PCM ENA
	WB/ACIP PCM	- CMD
	PCM	- CMD
	RCD MODE	- SAMPLE
	FDM CNTL	- DATA
	MAN CALBR sel	- DC 0
	ACIP HTR	- OFF

NOT FLOWN

9-20

ASC/400/FIN

AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

<p>A8U (This panel may be replaced or deleted if RMS not flown)</p> <ul style="list-style-type: none"> RMS Mode lts (twelve) – off BRAKES – ON (tb-OFF) SAFING – AUTO (tb-bp) MODE sel – TEST AUTO SEQ – ctr <li style="padding-left: 20px;">lts (two) – off S/W STOP tb – gray C/W TONE VOL – as reqd <li style="padding-left: 20px;">lts (eleven) – off MSTR ALARM pb – lt off RATE MIN tb – OFF <li style="padding-left: 20px;">HOLD tb – OFF <li style="padding-left: 20px;">SCALE tb – gray EE MODE – OFF <li style="padding-left: 20px;">MAN CONTR – ctr <li style="padding-left: 20px;">tb (six) – bp B/U JOINT sel – SY <li style="padding-left: 20px;">PL REL – OFF <li style="padding-left: 20px;">DIRECT DR – ctr PARAM sel – PORT TEMP LTG ANNUN/NUM sel (two) – VAR,LO <li style="padding-left: 20px;">PNL/INST sel – OFF JOINT sel – CRIT TEMP SINGLE/DIRECT DR – ctr SHDLR BRACE REL – ctr (tb-bp) <hr style="border-top: 1px dashed black;"/>	<p>A8L (This panel may be deleted if RMS not flown)</p> <ul style="list-style-type: none"> STBD RMS – OFF (tb-STO) <li style="padding-left: 20px;">– (OFF (tb-bp) if no MPMs present) RETEN LAT – OFF (tb-LAT) <li style="padding-left: 20px;">– (OFF (tb-bp) if no MPMs present) HTR (two) – OFF R-F-L tb (three) – gray <li style="padding-left: 20px;">– (bp if no RMS flown) RMS SEL – OFF <li style="padding-left: 20px;">PWR – OFF PORT RMS – OFF (tb-STO) <li style="padding-left: 20px;">– (OFF (tb-bp) if no MPMs present) RETEN LAT – OFF (tb-LAT) <li style="padding-left: 20px;">– (OFF (tb-bp) if no MRLs present) HTR (two) – OFF R-F-L tb (three) – gray <li style="padding-left: 20px;">– (bp if no RMS flown) RMS RHC RATE – VERN <hr/> <p>A3</p> <ul style="list-style-type: none"> MON CONTRAST (two) – ctr BRT (two) – ctr COLOR (two) – as reqd TINT (two) – as reqd FUNCTION (two) – ctr PWR (two) – OFF <hr/>
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NOT FLOWN

9-22

ASC/400/FIN

AFT FLIGHT DECK PAYLOADS SWITCH LIST FOR HANDOVER INGRESS

L10U	(AVIU) SYNC/VIDEO – VIDEO HI-Z/75 – HI-Z PWR SEL – HI	L12LR	SSP-2 cb PDIP 2 PWR 1 – op
L11U	(PDIP 2) MPLM DATA – OIU (ctr) DC PWR 1 CABIN P/L – OFF 2 CABIN P/L – OFF	L12L	(PDIP 1) Ku BAND RATE – OFF DC PWR 1 CABIN P/L – OFF 2 CABIN P/L – OFF
L12UL	SSP-1 Verify all tbs bp cb CB2 – op PDIP 1 PWR 2/KuBAND RLY – op MPLM CHAN 1 HTR PWR – OFF 2 HTR PWR – OFF	R12	(VPU/OPP) VPU PWR – OFF
L12UR	SSP-1 Verify all tbs bp TCS PWR – OFF PSSC DEPLOY – (ctr) PRE-ARM – SAFE cb PSSC – op PDIP 1 PWR S1 – op PSSC ARM – SAFE OIU PWR – OFF (ctr)	R12	(OPP) cb OBSS SW PWR cb1 – op { Y } OBSS SW PWR – OFF
L12LL	SSP-2 MPLM KEEL CAM PWR – OFF HTR/ILLUM PWR – OFF cb PDIP 2 PWR 2 – op C/L CAM PWR – OFF (ctr)	R12	(OBSS) RSC PWR – OFF ITVC ENA – OFF SPEE PWR – OFF

NOT FLOWN

9-24

ASC/400/FIN 1

HARDWARE CAUTION & WARNING CONFIGURATION

UPPER LIMIT CHANGE

4	CABIN PRESS
7	OMS TK P OX-L
17	OMS TK P FU-L
37	OMS TK P OX-R
39	MPS He Reg 1A P
47	OMS TK P FU-R
49	MPS He Reg 2A P
55	CAB FAN ΔP
59	MPS He Reg 3A P
65	PPO2 #1
74	CABIN FAN ΔP
75	PPCO2 #1
79	MANF P LH2
85	ARS FAN ΔP
95	CAB TOTAL PRESS
105	H2O LOOP 1 PUMP OUT P
107	FREON LOOP 1 EVAP OUT T
117	FREON LOOP 2 EVAP OUT T

TO

3.85	V/15.36 psia (OV103)
3.90	V/15.53 psia (OV104)
3.85	V/15.42 psia (OV105)
3.60	V/288 psi (OV103,5)
3.70	V/296 psi (OV104)
3.60	V/288 psi
3.60	V/288 psi
4.00	V/816.3 psia (OV103)
4.10	V/815.5 psia (OV104)
4.10	V/807.0 psia (OV105)
3.60	V/288 psi
4.00	V/810.6 psia (OV103)
4.85	V/0.2" H2O (if SH flown)
3.90	V/806.5 psia (OV105)
2.30	V/2.7 psi (if SH flown)
4.25	V/6.80" H2O
3.80	V/7.6 mmHg (if SH flown)
3.25	V/65 psi
4.85	V/0.2" H2O (if SH flown)
1.55	V/13.8 psi (if SH flown)
2.85	V/85.5 psia (OV104)
4.30	V/115.2 °F
4.30	V/115.2 °F

LOWER LIMIT CHANGE

4	CABIN PRESS
39	MPS He Reg 1A P
49	MPS He Reg 2A P
59	MPS He Reg 3A P
74	CABIN FAN ΔP
105	H2O LOOP 1 PUMP OUT P
106	FREON FLOW 1
116	FREON FLOW 2

TO

3.45	V/13.76 psia (OV103)
3.45	V/13.74 psia (OV104)
3.40	V/13.62 psia (OV105)
3.30	V/676 psia (OV103)
3.45	V/677.0 psia (OV105)
3.35	V/679.9 psia (OV103)
3.30	V/682.8 psia (OV105)
2.60	V/4.16" H2O
0.85	V/25.5 psia (OV104)
0.80	V/1186 lb/hr
0.80	V/1186 lb/hr

INHIBIT

8	APU 1 EGT
14	CAB O2 FLOW 1 (OV105)
18	APU 2 EGT
28	APU 3 EGT
30	CRYO O2 P TK4 (if TK4 not flown)
40	CRYO O2 P TK5 (if TK5 not flown)
55	CAB FAN ΔP (if SH flown)
61	CRYO O2 HTR1 TK4 (if TK4 not flown)
65	PPO2 (if SH flown)
71	CRYO O2 HTR2 TK4 (if TK4 not flown)
75	PPCO2 #1 (if SH flown)
77	OMS PBK OXID TK ULL P
80	CRYO H2 P TK4 (if TK4 not flown)
81	CRYO O2 HTR1 TK5 (if TK5 not flown)
85	ARS FAN ΔP (if SH flown unpowered)
87	OMS PBK FUEL TK ULL P
90	CRYO H2 P TK5 (if TK5 not flown)
95	CAB TOTAL PRESS (if SH flown)

MEDS CONFIGURATION FOR INGRESS

MDU	View Angle	Port Config	Selected Port	Flight Critical Bus	Display	Edgekey Menu
CRT1	positive	auto	primary	3	DPS	DPS
CRT2	positive	auto	primary	4	DPS	DPS
CRT3	positive	auto	primary	4	DPS	DPS
CRT4	negative	auto	primary	1	DPS	DPS
CDR1	positive	auto	primary	1	OMS/MPS	FLT INST
CDR2	positive	auto	primary	3	A/E PFD	DATA BUS
MFD1	positive	auto	primary	3	HYD/APU	SUBSYS STATUS
MFD2	positive	auto	primary	4	OMS/MPS	SUBSYS STATUS
PLT1	positive	auto	primary	4	A/E PFD	DATA BUS
PLT2	positive	auto	primary	4	HYD/APU	FLT INST
AFD1	negative	auto	n/a	n/a	n/a	n/a

MEDS RECONFIGURATION FOR PRELAUNCH MDU FAILURES

Failed MDU	New MDU	Selected Port	Flight Critical Bus	Display	Edgekey Menu
CDR1	—	—	—	—	—
CDR2	CDR1	primary	3	A/E PFD	DATA BUS
MFD1	CDR1	secondary	1	HYD/APU	FLT INST
MFD2	PLT2	secondary	4	OMS/MPS	FLT INST
PLT1	PLT2	primary	4	A/E PFD	DATA BUS
PLT2	—	—	—	—	—



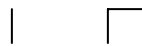
CUE CARD CONFIG

**CUE CARD
CONFIG**

FAB USE ONLY

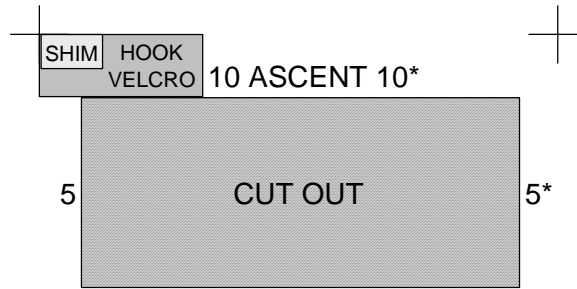
10-1

ASC/400/FIN



CUE CARD CONFIG

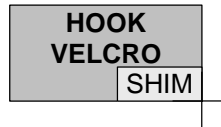
TOP



*OPS 2/8 values are 5,1,0.2

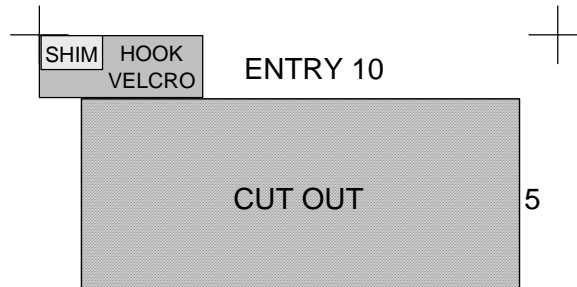
ADI ERROR/RATE SWITCH

ASC-1a/A,E/H



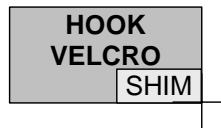
TOP

BACK OF 'ADI ERROR/RATE SWITCH'



R	α/g	Y
25	5/1.25	2.5
25	2/1.25	2.5
10	1/0.50	2.5

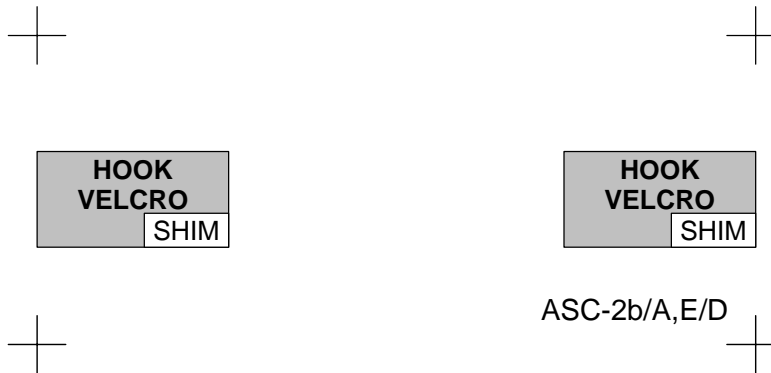
1
ASC-1b/A,E/E



TOP

ASCENT/ENTRY SPEC PASS	NO.	ASC-2a/A,E/E BFS	NO.
GPC MEMORY	0	BFS MEMORY	0
IMU ALIGN (301)	21	<u>GNC</u>	
STRK/COAS CNTL (301)	22	HORIZ SIT	50
RCS (OPS 3)	23	OVERRIDE	51
HORIZ SIT	50	GPS STATUS	55
OVERRIDE	51	<u>SM</u>	
ENT CONTROL (OPS 3)	53	PL BAY DOORS	63
GPS STATUS	55		

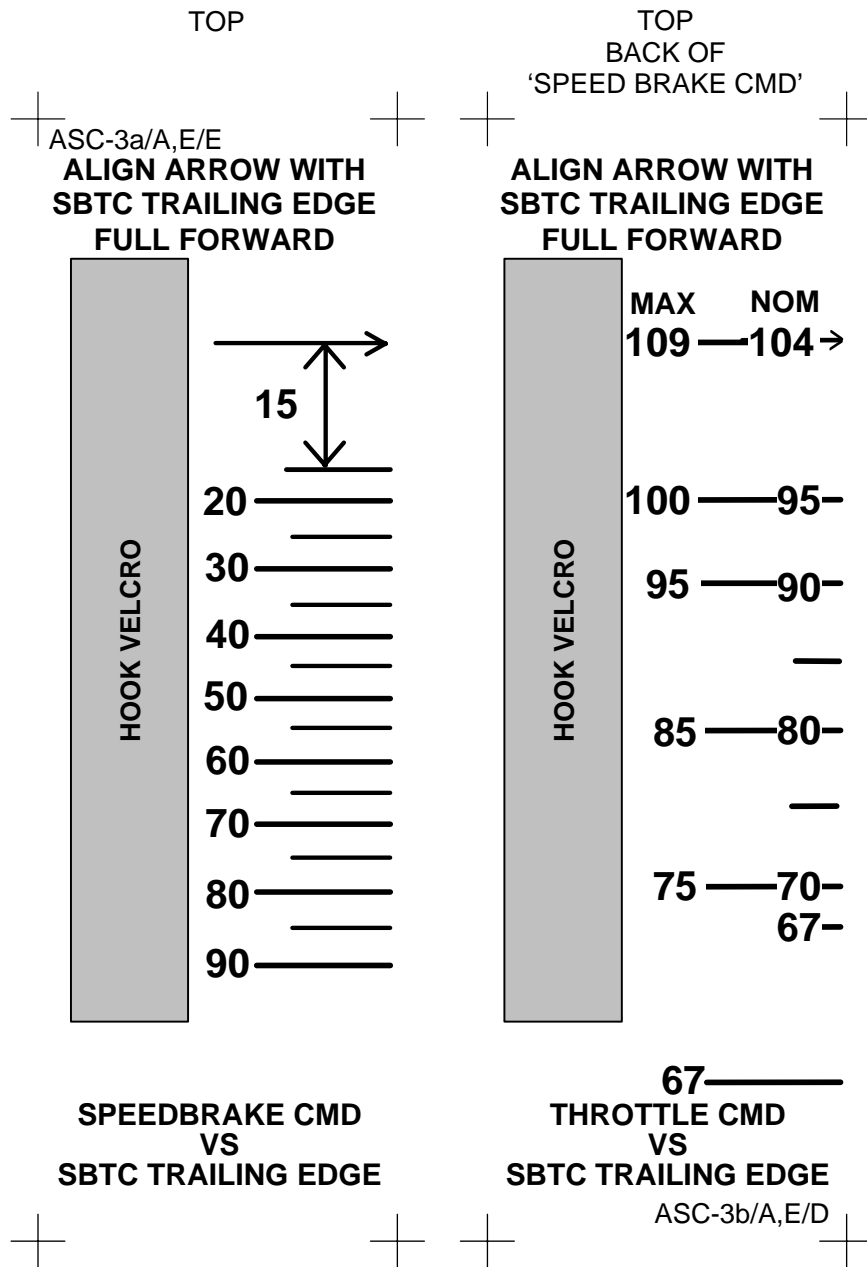
TOP
BACK OF 'ASCENT/ENTRY SPEC'

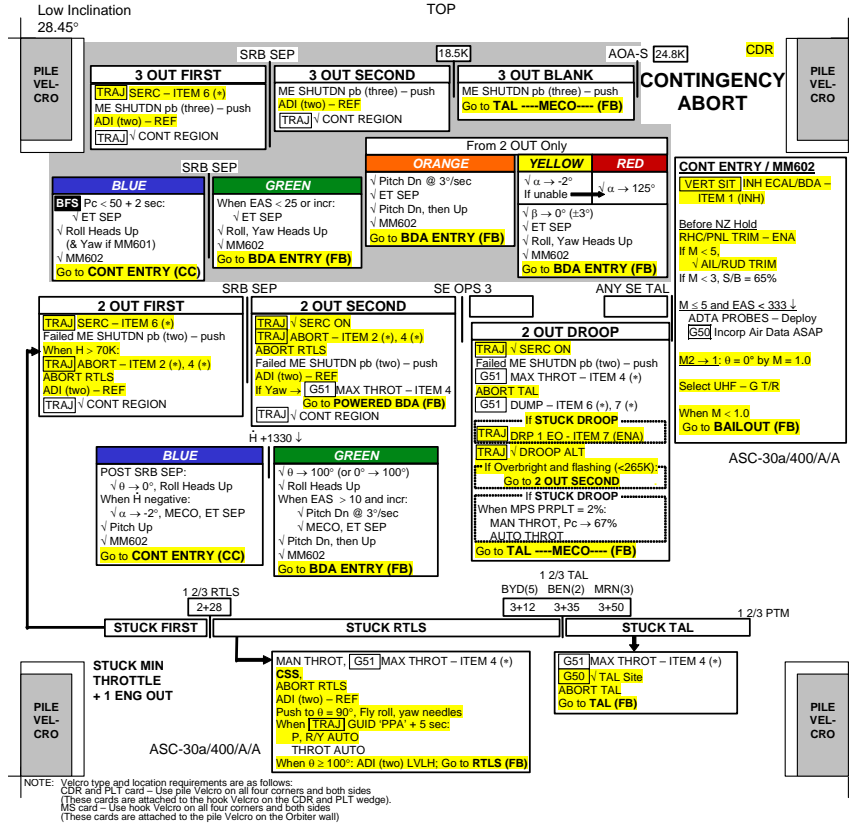


FAB USE ONLY

CC 10-3

ASC/400/FIN

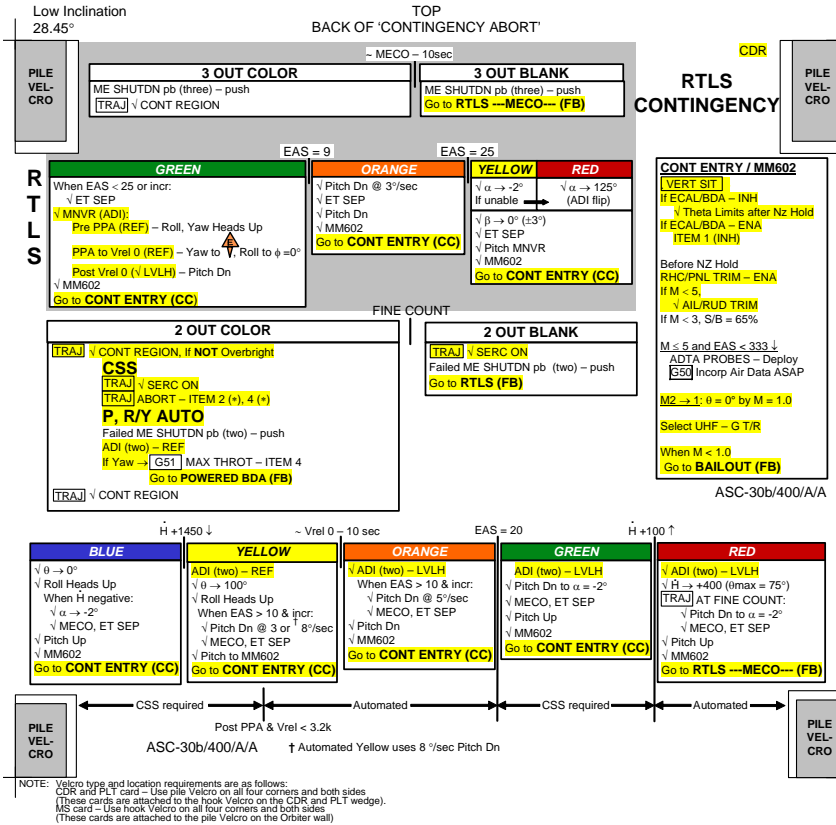




FAB USE ONLY

(reduced copy)
(A)CC 10-5

CDR
ASC/400/FIN



PILE VEL-CRO

H +1450 ↓ ~ Vrel 0 - 10 sec EAS = 20 H +100 ↑

BLUE

√ β → 0°
√ Roll Heads Up
When H negative:
√ α → -2°
√ MECO, ET SEP
√ Pitch Up
√ MM602
Go to **CONT ENTRY (CC)**

YELLOW

ADI (two) - REF
√ β → 100°
√ Roll Heads Up
When EAS > 10 & incr:
√ Pitch Dn @ 3 or 1 8°/sec
√ MECO, ET SEP
√ Pitch to MM602
Go to **CONT ENTRY (CC)**

ORANGE

ADI (two) - LVLH
When EAS > 10 & incr:
√ Pitch Dn @ 5°/sec
√ MECO, ET SEP
√ Pitch Dn
√ MM602
Go to **CONT ENTRY (CC)**

GREEN

ADI (two) - LVLH
√ Pitch Dn to α = -2°
√ MECO, ET SEP
√ Pitch Up
√ MM602
Go to **CONT ENTRY (CC)**

RED

ADI (two) - LVLH
√ H → +400 (Hmax = 75°)
[TRAJ] AT FINE COUNT:
√ Pitch Dn to α = -2°
√ MECO, ET SEP
√ Pitch Up
√ MM602
Go to **RTLS --MECO-- (FB)**

← CSS required Automated CSS required Automated →

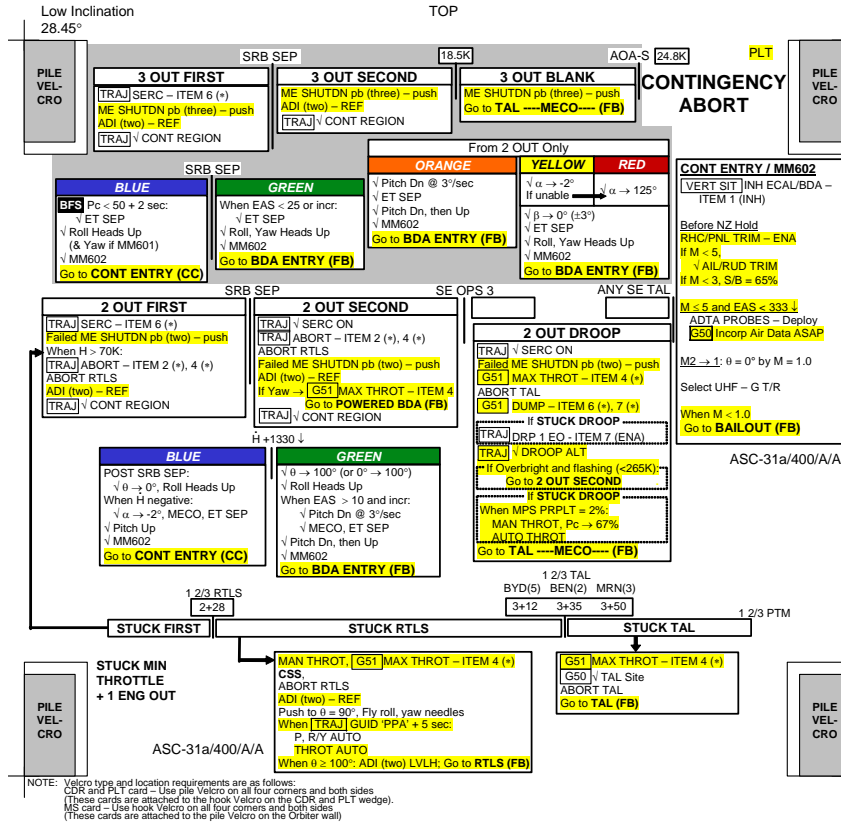
Post PPA & Vrel < 3.2k
ASC-30b/400/A/A ↑ Automated Yellow uses 8 °/sec Pitch Dn

PILE VEL-CRO

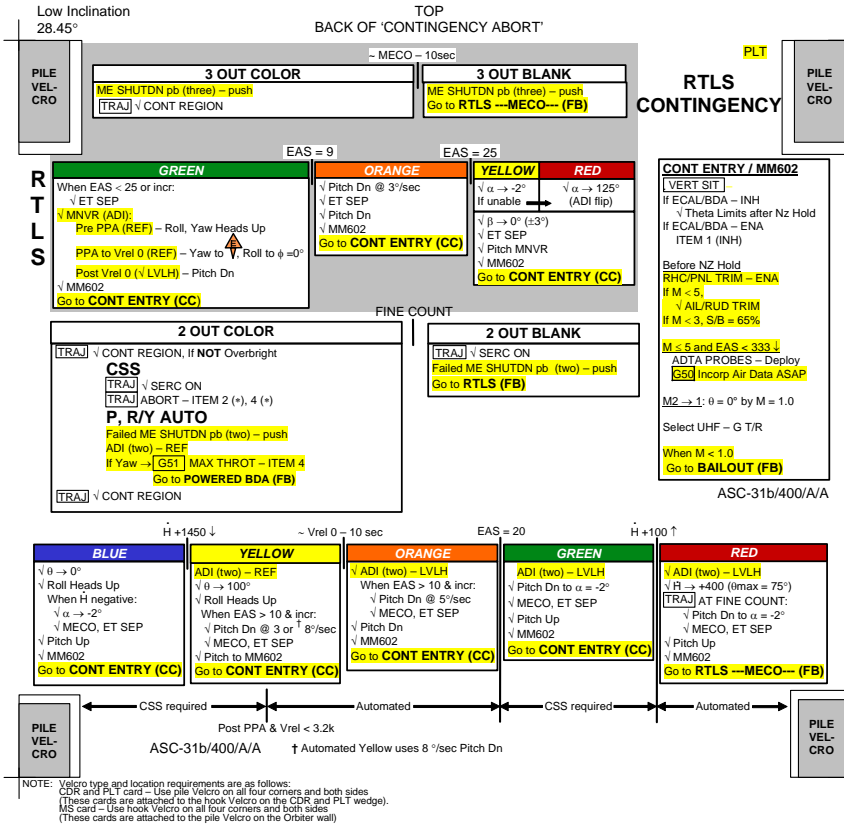
FAB USE ONLY

(reduced copy)
(A)CC 10-6

CDR
ASC/400/FIN



(reduced copy) **PLT**
 FAB USE ONLY (B)CC 10-5 ASC/400/FIN



PILE VEL-CRO

H +1450 ↓ - Vrel 0 - 10 sec EAS = 20 H +100 ↑

BLUE

√ θ → 0°

√ Roll Heads Up

When H negative:

√ α → -2°

√ MECO, ET SEP

√ Pitch Up

√ MM602

Go to **CONT ENTRY (CC)**

YELLOW

ADI (two) - REF

√ θ → 100°

√ Roll Heads Up

When EAS > 10 & incr:

√ Pitch Dn @ 3 or ↑ 8°/sec

√ MECO, ET SEP

√ Pitch to MM602

Go to **CONT ENTRY (CC)**

ORANGE

ADI (two) - LVLH

When EAS > 10 & incr:

√ Pitch Dn @ 5°/sec

√ MECO, ET SEP

√ Pitch Dn

√ MM602

Go to **CONT ENTRY (CC)**

GREEN

ADI (two) - LVLH

√ Pitch Dn to α = -2°

√ MECO, ET SEP

√ Pitch Up

√ MM602

Go to **CONT ENTRY (CC)**

RED

ADI (two) - LVLH

H → +400 (lmax = 75°)

[TRA] AT FINE COUNT:

√ Pitch Dn to α = -2°

√ MECO, ET SEP

√ Pitch Up

√ MM602

Go to **RTLS → MECO → (FB)**

← CSS required Automated CSS required Automated →

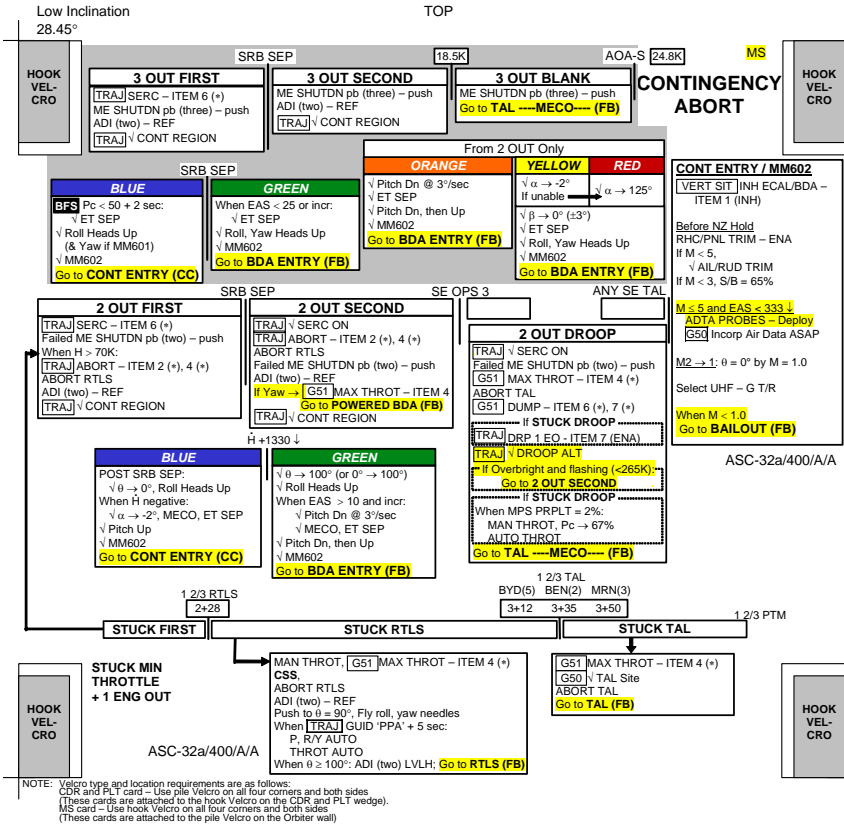
Post PPA & Vrel < 3.2k
 ASC-31b/400/A/A ↑ Automated Yellow uses 8°/sec Pitch Dn

PILE VEL-CRO

(reduced copy)

FAB USE ONLY (B)CC 10-6 **PLT**

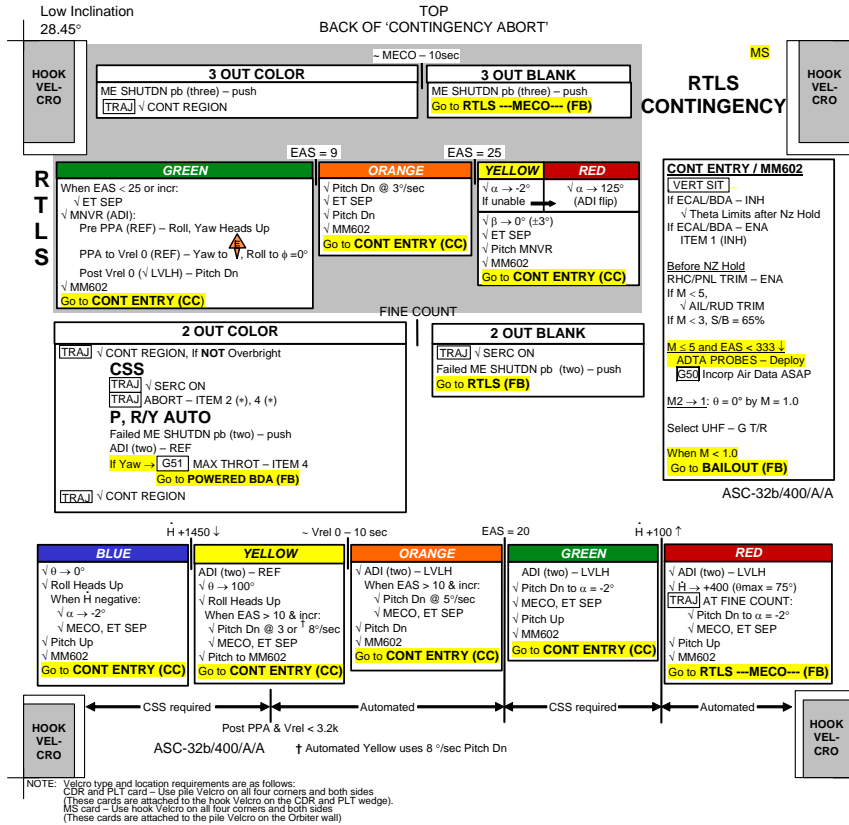
ASC/400/FIN



FAB USE ONLY

(reduced copy)
 (C)CC 10-5

MS
 ASC/400/FIN



TOP

HOOK
VELCRO
**OMS 2
BURN
MONITOR**
HOOK
VELCRO

OMS TEMP* FU IN P ≥ <table style="display: inline-table; border-collapse: collapse;"><tr><td style="border: 1px solid black; padding: 0 5px;">L</td><td style="border: 1px solid black; padding: 0 5px;">R</td></tr><tr><td style="border: 1px solid black; padding: 0 5px;">219</td><td style="border: 1px solid black; padding: 0 5px;">220</td></tr></table> or No FU IN P	L	R	219	220	Oms ENG FAIL Oms PRPLT FAIL
L	R				
219	220				
OMS PC* & OMS ↓ (BFS: √accel) ENG VLV 1 or 2 < 70 or OX IN P > 227 OX IN P ≤ 227 or No OX IN P	Oms ENG FAIL Oms PRPLT FAIL				
OMS OX/FU TK P (√ENG IN P) OX/FU LOW OX & FU HIGH	He PRESS/VAP ISOL (two) – OP If aff TK P not incr: He PRESS/VAP ISOL (two) – CL At PC < 72 or OMS TEMP or HP > 85 : Oms PRPLT FAIL He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284				
OMS He TK P LOW (√OMS/MPS)	At He P < 640 or QTY ≤ 41: If HP < 85 : Oms XFEED from good Oms At HP > 85 : Oms PRPLT FAIL				
OMS N2 REG P HIGH or LOW OMS N2 TK P LOW (√OMS/MPS)	Oms ENG – ARM At N2 TK P < 470: Oms ENG – ARM				
OMS GMBL PRI fail SEC fail	L(R) Oms GMBL – SEC (twice) If high RCS usage: Oms ENG FAIL				
GPC 1(4) & Burning Oms aff SEC GMBL lost 2 FAs lost	aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF, ON L(R) Oms GMBL – SEC (twice) If high RCS usage: Oms ENG FAIL √MAN SHUTDN				
I/O ERROR FA 1(4) 2 FAs lost	L(R) Oms GMBL – SEC I/O RESET (if recov: BFS I/O RESET) If high RCS usage: Oms ENG FAIL √MAN SHUTDN				
BCE STRG D 1(4)	I/O RESET (if recov: >>) If high RCS usage: L(R) Oms GMBL – SEC (twice)				
I/O ERROR PCM	OI PCMMU PWR – 2(1)				

*If XFD, BLDN, or sensor fail, monitor ENG IN P for off-nominal performance

ASC-5a/400/A,O/A

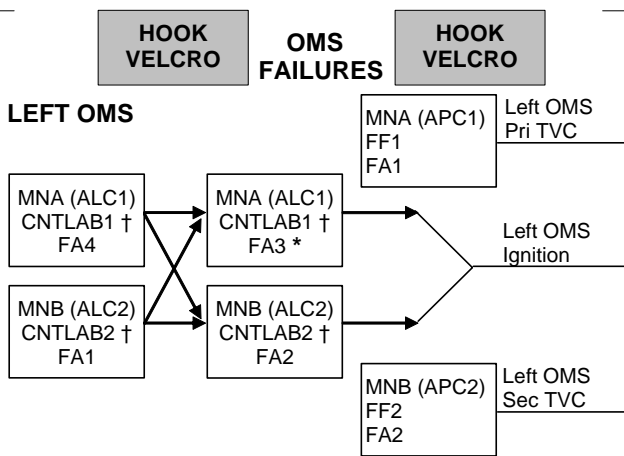
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FAB USE ONLY

CC 10-7

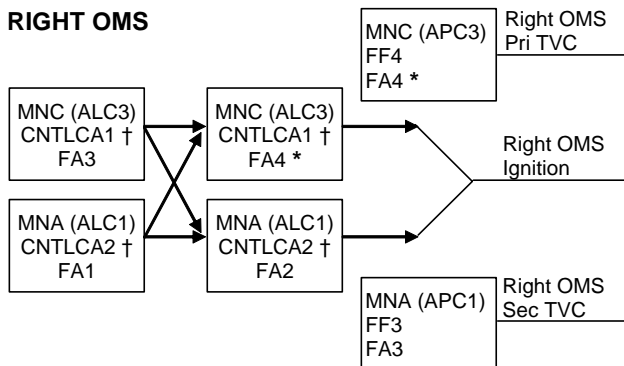
ASC/400/FIN

TOP
BACK OF 'OMS BURN MONITOR'



† If CNTL AB1 or AB2 (CA1 or CA2) failed and ign path still exists at OMS fail, assume L(R) OMS ↓ is PRPLT FAIL

* If L(R) P_c failed high during burn, or FA3(4) failed, at L(R) OMS fail, no guidance downmode after L(R) OMS ENG switch OFF (TGO slow, ADI needles in error, 6 ft/s underburn)



If two FA MDMs lost		
MDMs	Preburn: ENG – OFF	During burn: MAN SHUTDN
1,2	LEFT (TVC)	BOTH
1,3	RIGHT (IGN)	LEFT
1,4	LEFT (IGN)	RIGHT
2,3	LEFT (IGN)	RIGHT
2,4	RIGHT (IGN)	LEFT
3,4	RIGHT (TVC)	BOTH

ASC-5b/A,O,E/I

(reduced copy)

FAB USE ONLY

CC 10-8

ASC/400/FIN

TOP
BACK OF 'OMS2/ORBIT OMS BURNS'

HOOK VELCRO	OPS 1 RCS BURN	HOOK VELCRO
------------------------	---------------------------	------------------------

AFT RCS

√RCS BURN CONFIG:
 OMS TK ISOL (all) – OP OMS TK
 L(R) OMS XFEED (two) – OP switch at
 R(L) OMS XFEED (two) – CL 1/2 ΔVTOT
 AFT L,R RCS XFEED (four) – OP (If reqd)
 TK ISOL (six) – CL

TIG-2 L,R OMS He PRESS/VAP ISOL A – OP
 ... Wait 2 sec ...
 L,R OMS He PRESS/VAP ISOL B – OP
 √MM105
 CNTLR PWR (two) – ON
 √BURN ATT (INRTL) then REF, pb – push
 √RCS SEL
 DAP: INRTL/DISC

:00 + X
 Maintain PITCH ATT ERR ± 3°
 Monitor OMS data
 Monitor ΔVTOT

CUTOFF Release THC
 CNTLR PWR (two) – OFF

FWD RCS

FRCS BURN PREP
 Load DUMMY target for FRCS attitude
 RCS SEL – ITEM 4 EXEC
 TIG @ TTA = 2:00 or as reqd
 ΔVX = -2.1 (ITEM 19)
 ΔVY = 0 (ITEM 20)
 ΔVZ = +1.0 (ITEM 21)
 LOAD – ITEM 22 EXEC
 TIMER – ITEM 23 EXEC
 TIG-10 Auto Mnvr to ATT
 When in attitude:
 ADI ATT – REF (push)
 Load External ΔV Burn Target
 ΔVX = +80
 ΔVY = 0
 ΔVZ = 0
 LOAD – ITEM 22 EXEC
 TIMER – ITEM 23 EXEC
 √VGOX = negative
 √VGOY = 0
 √VGOZ = +21 ± 2
 √REF ball -0,0,0

NOTE

Error needles invalid during burn
 Burn time = ~2X TGO
 TGT Hp = **85** for ASCENT

-:30 CNTLR PWR (two) – ON
 DAP: INRTL/DISC

:00 -X
 CUTOFF CUR HP = TGT HP , release THC
 CNTLR PWR (two) – OFF

ASC-6b/400/A,O/A

(reduced copy)

FAB USE ONLY

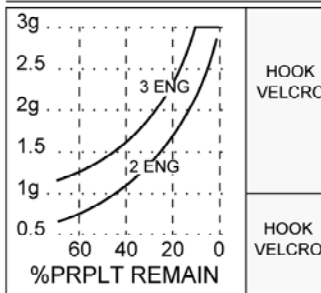
CC 10-10

ASC/400/FIN

TOP

ASCENT ADI - NOMINAL

TIME	θ	H	\dot{H}	(400 OCF CY)
0:30	70	10K	686	
0:50	62	27K	1007	
1:10	53	50K	1405	
1:30	39	84K	1884	
1:50	31	125K	2196	



-STAGING-

V_i	θ	H	\dot{H}	ASC-14a/400/A/A
6	20	202K	1811	
7	17	265	1343	
8	14	303	988	
9	12	327	704	
10	10	342	474	
12	7	355	141	
14	5	356	-57	
16	27	353	-110	
18	24	350	-124	
20	23	348	-46	
22	21	348	101	
24	19	352	305	
26088	16	369	601	

HOOK VELCRO

TOP
BACK OF 'ASCENT
ADI - NOMINAL'

ENTRY ALPHA

VR	α ref	R	H	Href	Rref
25	HI	40	LO	4275	400
24	HI	40	LO	2733	249 -44 L84
23	43	40	37	2241	240 -60 74
22	43	40	37	1862	234 -78 67
21	43	40	37	1566	227 -99 63
20	43	40	37	1332	222 -115 R61
19	43	40	37	1146	215 -136 60
18	43	40	37	997	208 -158 62
17	43	40	37	871	201 -176 62
16	43	40	37	768	195 -188 64

KSC 15

MAX L/D	
M	α
3	17
2	15
1	12

ASC-14b/400/A,E/A

HOOK VELCRO		HOOK VELCRO					
15	43	40	37	685	189	-202	65
14	43	40	37	613	183	-127	63
13	43	40	37	545	180	-136	61
12	43	40	37	483	176	-152	59
11	42	39	36	428	172	-192	L56
10	41	38	35	378	167	-173	48
9	39	36	33	326	161	-206	44
8	37	34	31	277	154	-239	40
7	33	30	27	231	144	-266	39
6	30	27	24	184	133	-272	40
5	26	23	20	143	120	-274	41
4	22	19	18	107	108	-262	R38
3	19	16	15	75	92	-248	38
2.5	14	61	85	-214			
2	13	50	79	-260			
1.5	10	38	69	-314			
1	8	28	54	-261			

HOOK VELCRO

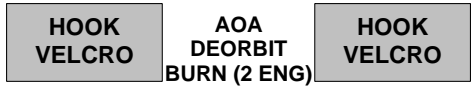
(reduced copy)

FAB USE ONLY

CC 10-11

ASC/400/FIN

TOP



√MM302 √OMS BOTH
 Enter TGO + 5 sec
 √TRIM: P +0.4, LY -5.7, RY +5.7
 L,R OMS He PRESS/VAP ISOL A (two) – GPC
 B (two) – OP
 √DAP – AUTO(PASS)/DISC
 ADI – LVLH(REF)/HI/MED
 FLT CNTLR PWR (two) – ON

TIG-2 OMS ENG (two) – ARM/PRESS
 - :15 EXEC
 - :15 If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
 :00 Start watch (√P_c, ΔVTOT, ENG VLVs)

- * **OMS PRPLT FAIL (CONTINUE BURN):** *
- * Failed OMS ENG – OFF *
- * ITEM 18 +0 EXEC *
- * When good OMS QTY: *
- * 5%: L, R OMS XFEED (four) – OP *
- * 4%: Good OMS TK ISOL (two) – CL *
- * If OMS P_c < 80 or OMS TEMP, *
- * OMS ENG – OFF *
- * √ADI – LVLH, center needles *
- * RCS COMPLETION *
- * **OMS ENG FAIL:** *
- * Failed OMS ENG – OFF *
- * OMS XFEED at 1/2 ΔVTOT at fail *
- * or OMS QTY %L or %R *
- * **2nd OMS FAIL (ENG or PRPLT):** *
- * Failed OMS ENG – OFF *
- * If PRPLT FAIL: *
- * Secure aff OMS *
- * ITEM 18 +0 EXEC *
- * √ADI – LVLH, center needles *
- * Interconnect good OMS to RCS *
- * THC +X (√OMS% vs RCS Burn Time) *
- * RCS I'CNCT TK SW (N/A for OMS PRPLT FAIL) *
- * THC +X (√OMS% vs RCS Burn Time) *
- * AFT RCS RECONFIG *
- * RCS COMPLETION *

ASC-8a/A/E

HINGE

(reduced copy)

FAB USE ONLY

CC 10-12

ASC/400/FIN

TOP
HINGED AT BOTTOM OF
'AOA DEORBIT BURN (2 ENG)'
HINGE

*** RCS COMPLETION:**

* If DIRECT INSERTION:

* THC +X to $\Delta VTOT = 0$ or TOT AFT QTY 1 %

* At AFT QTY 1 THC +X to FLIP ΔV or
* if CUR $\Delta VTOT$: TOT AFT QTY 2 % then
* FRCS COMPLETION

* FLIP -----
* ΔV FRCS COMPLETION

* AFT -----
* ΔV THC +X to TGT ΔV

* TGT -----
* ΔV

* If w/OMS 1:

* THC +X to TGT HP or TOT AFT QTY 1 %

* At AFT QTY 1 THC +X to FLIP HP or
* if CUR HP: TOT AFT QTY 2 % then
* FRCS COMPLETION

* FLIP -----
* HP FRCS COMPLETION

* AFT -----
* HP THC +X to TGT HP

* TGT -----
* HP

*** FRCS COMPLETION:**

* Mnv to -X Att (pitch up at 3°/sec to VGOz = +1/4 $\Delta VTOT$)
* THC -X to $\Delta VTOT = 0$ or FRCS depletion (JETS FAIL OFF)

CUTOFF

+ :02 OMS ENG(s) – OFF (If < 3 IMU, at :)
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ASC-8aa/400/A/A

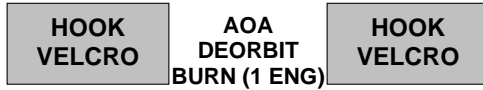
(reduced copy)

FAB USE ONLY

CC 10-13

ASC/400/FIN

TOP
 BACK OF 'AOA DEORBIT BURN (2 ENG)'



- √MM302 √OMS L or R
- √OMS BURN CONFIG (L or R XFEED)
- Enter TGO + 10 sec
- √TRIM: P +0.4, LY +5.2, RY -5.2
- L,R OMS He PRESS/VAP ISOL A (two) – OP
- . . . Wait 2 sec . . . B (two) – OP
- √DAP – AUTO(PASS)/DISC
- ADI – LVLH(REF)/HI/MED
- FLT CNTLR PWR (two) – ON
- TIG-2 Good OMS ENG – ARM/PRESS
- :15 EXEC
- :15 If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
- :00 Start watch (√P_c, ΔVTOT, ENG VLVs)

OMS XFEED RETURN at ΔVTOT =
 or at %
 L,R OMS TK ISOL (four) – OP
 XFEED (four) – CL

- * **OMS PRPLT FAIL (CONTINUE BURN):** *
- * OMS ENG – OFF *
- * ITEM 18 +0 EXEC *
- * Secure aff OMS *
- * √ADI – LVLH, center needles *
- * Interconnect good OMS to RCS *
- * THC +X (√OMS% vs RCS Burn Time) *
- * AFT RCS RECONFIG *
- * RCS COMPLETION *
- * **OMS ENG FAIL (CONTINUE BURN):** *
- * OMS ENG – OFF *
- * √ADI – LVLH, center needles *
- * Interconnect good OMS to RCS *
- * THC +X (√OMS% vs RCS Burn Time) *
- * RCS I'CNCT TK SW *
- * THC +X (√OMS% vs RCS Burn Time) *
- * AFT RCS RECONFIG *
- * RCS COMPLETION *
- * **RCS +X JET FAIL OFF:** *
- * ITEM 18 +0 EXEC *
- * **G23** Resel jet *

ASC-8b/A/B

HINGE

(reduced copy)

FAB USE ONLY

CC 10-14

ASC/400/FIN

TOP

**AOA
DEORBIT
BURN (RCS)**

√MM302 √RCS SEL
√RCS BURN CONFIG (L OMS I'CNCT)

L,R OMS He PRESS/VAP ISOL A (two) – OP
 ... Wait 2 sec ... B (two) – OP

√DAP – INRTL/DISC
ADI – LVLH(REF)/MED/MED
FLT CNTLR PWR (two) – ON

TIG THC +X
 Maintain PITCH ATT ERR ± 3°
 Monitor ΔVTOT

RCS I'CNCT TK SW at ΔVTOT =
R OMS XFEED (two) – OP
L OMS XFEED (two) – CL

OMS PRPLT LOW
AFT RCS RECONFIG AT ΔVTOT =
RCS COMPLETION

- * **OMS PRPLT FAIL (MULTIPLE JETS FAIL OFF):** *
- * Secure aff OMS *
- * ITEM 18 +0 EXEC *
- * G23 Resel jets *
- * Interconnect good OMS to RCS *
- * THC +X (√OMS% vs RCS Burn Time) *
- * AFT RCS RECONFIG *
- * RCS COMPLETION *
- * **RCS +X JET FAIL OFF:** *
- * ITEM 18 +0 EXEC *
- * G23 Resel jets *

ASC-7a/A/B

HINGE

(reduced copy)

FAB USE ONLY

CC 10-16

ASC/400/FIN

TOP
HINGED AT BOTTOM OF
'AOA DEORBIT BURN (RCS)'
HINGE

* **RCS COMPLETION:**

* If DIRECT INSERTION:

* THC +X to $\Delta VTOT = 0$ or TOT AFT QTY 1 %

* At AFT QTY 1 if CUR $\Delta VTOT$:
 * THC +X to FLIP ΔV or
 * TOT AFT QTY 2 % then
 * FRCS COMPLETION

* FLIP ΔV -----
 * FRCS COMPLETION

* AFT ΔV -----
 * THC +X to TGT ΔV

* TGT ΔV -----

* If w/OMS 1:

* THC +X to TGT HP or TOT AFT QTY 1 %

* At AFT QTY 1 if CUR HP:
 * THC +X to FLIP HP or
 * TOT AFT QTY 2 % then
 * FRCS COMPLETION

* FLIP HP -----
 * FRCS COMPLETION

* AFT HP -----
 * THC +X to TGT HP

* TGT HP -----

* **FRCS COMPLETION:**

- * Mnv to -X Att (pitch up at 3°/sec to VGOz = +1/4 $\Delta VTOT$)
- * THC -X to $\Delta VTOT = 0$ or FRCS depletion (JETS FAIL OFF)

CUTOFF:

- VGOx = 0, release THC
- AFT RCS RECONFIG
- Trim Inplane X,Z residuals < 2 fps (< 0.5 fps if shallow)

ASC-7aa/400/A/A

(reduced copy)

FAB USE ONLY

CC 10-17

ASC/400/FIN



TOP
 BACK OF 'AOA DEORBIT BURN (RCS)'



**HOOK
 VELCRO**

**HOOK
 VELCRO**



HINGE

ASC-7b/A/B



FAB USE ONLY

(reduced copy)

CC 10-18

ASC/400/FIN



TOP
HINGED AT BOTTOM OF
BACK OF 'AOA DEORBIT BURN (RCS)'
HINGE



ASC-7bb/A/B



FAB USE ONLY

(reduced copy)
CC 10-19

ASC/400/FIN

TOP



**MRN TAL REDESIGNATION
(400 OCF CY)**

1st E.O. VI		5500	5600	5700	5800	5900	6000	6100	6200
SE OPS 3 MRN 109	(3)	10300	10400	10500	10500	10600	10600	10700	10700
SE LIMITS MRN	(3)	12400	12200	12100	11900	11900	11800	11800	11800
SE MRN 104	(3)	16100	15400	14800	14200	13900	13800	13700	13700



(reduced copy)

FAB USE ONLY

CC 10-20

ASC/400/FIN

TOP
BACK OF 'MRN TAL REDESIGNATION'

**HOOK
VELCRO**

**HOOK
VELCRO**

**HOOK
VELCRO**

BDA – MRN PRIME TAL

1st EO VI (KFPS)	5.5	5.7	5.9	6.1	6.3
BERMUDA (6)	9.3 – 10.7	9.4 – 10.6	9.3 – 10.6	9.3 – 10.6	9.6 – 10.7
1st EO VI (KFPS)	6.5	6.7	6.9	7.1	7.3
BERMUDA (6)	9.6 – 10.9	9.6 – 10.9	9.6 – 10.9	9.6 – 11.0	9.8 – 11.4
1st EO VI (KFPS)	7.5	7.7	7.9	8.1	8.3
BERMUDA (6)	9.9 – 11.5	9.9 – 11.4	10.0 – 11.4	10.1 – 11.6	10.1 – 11.9
1st EO VI (KFPS)	8.5	8.7	8.9	9.1	9.3
BERMUDA (6)	10.2 – 11.9	10.4 – 11.9	10.5 – 12.1	10.6 – 12.1	10.6 – 12.1
1st EO VI (KFPS)	9.5	9.7	9.9	10.1	10.3
BERMUDA (6)	10.7 – 12.2	10.8 – 12.3	10.9 – 12.4	11.1 – 12.3	11.2 – 12.4
1st EO VI (KFPS)	10.5	10.7	10.9	11.1	11.3
BERMUDA (6)	11.2 – 12.5	11.2 – 12.6	11.3 – 12.6	11.4 – 12.6	11.5 – 12.6
1st EO VI (KFPS)	11.5	11.7	11.9	12.1	12.3
BERMUDA (6)	11.6 – 12.7	11.7 – 12.7	11.9 – 12.7	12.1 – 12.7	12.3 – 12.7
1st EO VI (KFPS)	12.5	12.6			
BERMUDA (6)	12.5 – 12.6	12.6 – 12.6			

ASC-10b/400/A/B

**HOOK
VELCRO**

**HOOK
VELCRO**

**HOOK
VELCRO**

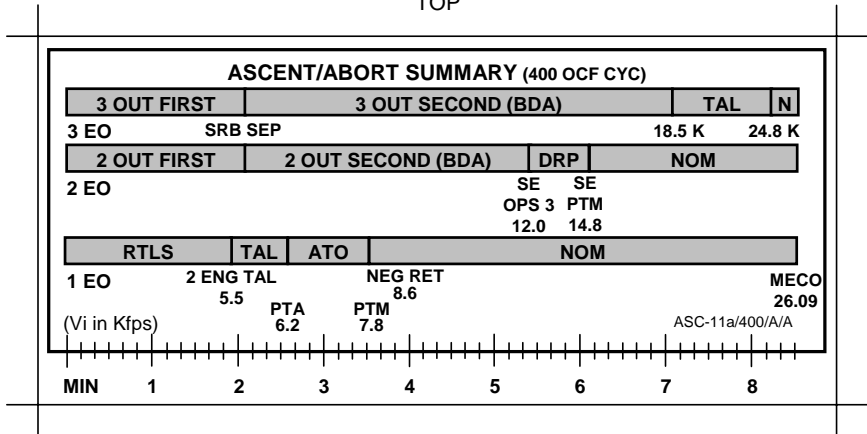
(reduced copy)

FAB USE ONLY

CC 10-21

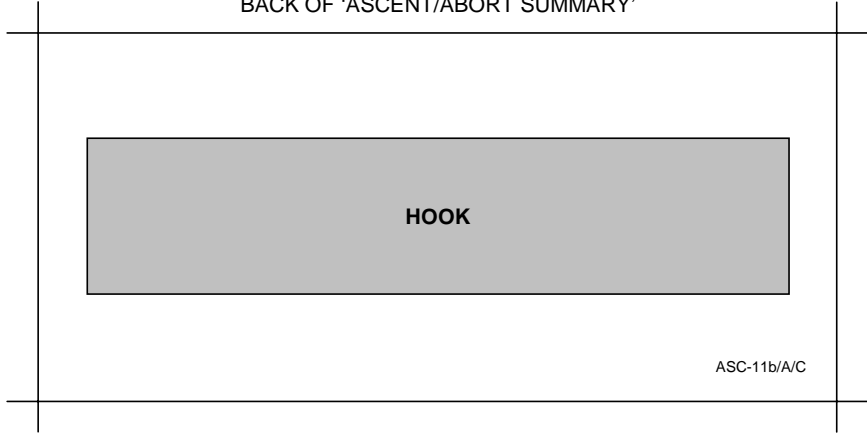
ASC/400/FIN 1

TOP



TOP

BACK OF 'ASCENT/ABORT SUMMARY'



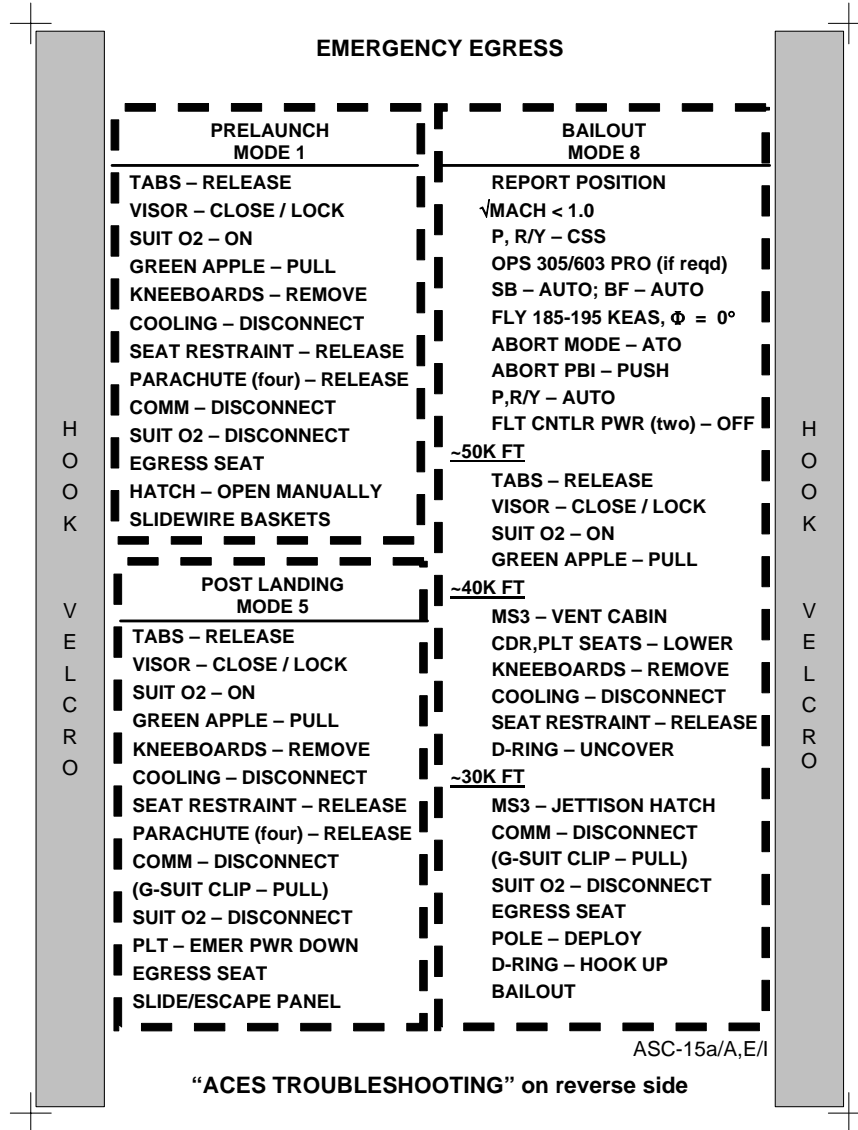
(reduced copy)

FAB USE ONLY

CC 10-22

ASC/400/FIN

TOP



(reduced copy)

FAB USE ONLY

CC 10-23

ASC/400/FIN

TOP
BACK OF "EMERGENCY EGRESS"

ACES TROUBLESHOOTING (ASCENT/ENTRY)

LOSS OF COMM

If LOSS OF XMIT:

NOTE

O2 helmet flow automutes microphones (i.e., inhalation, open or leaking visor, leaking neck dam)

1. ✓TABS – IN
2. ✓Helmet pressure visor seal not obstructed
3. ✓MIC placement
4. ✓CCU PWR – ON

POWER BUS	ATU
ESS BUS 1BC	R14 CDR
ESS BUS 2CA	R14 PLT
MNA	R14 MS STATION
MNB	R14 MIDDECK
MNC	R14 PS STATION

If LOSS OF RECEIVE:

5. HIU VOL – MAX
6. ✓All cable connections mated properly:
CCA-to-Helmet I/F cable
Comm pigtail
HIU
Comm panel
7. ✓ATU Config (Flight Deck as applicable):
A/G1, A/G2, A/A, ICOM A, ICOM B – T/R
MODE – PTT/VOX
VOX SENS – 2-4
A/G1, A/G2 tw – 9
A/A, ICOM A, ICOM B tw – 5

LOSS OF SUIT PRESSURE

1. ✓TABS – IN
2. ✓VISOR – CLOSED/LOCKED
3. ✓Helmet properly attached
4. ✓Gloves properly attached
5. ✓BIP plug secured
6. ✓Suit zipper fully zipped

LOSS OF SUIT O2

1. ✓O2 hose connected to ACES O2 manifold
2. ✓LEH O2 vlv – OP (Flight Deck)
3. ✓O2 hose connected properly at LEH O2 (Flight Deck)

INADVERTENT EOS ACTIVATION (After T-2:00)

1. Remain on shuttle LEH O2
2. Keep visor closed and locked through MECO

NOTE

Prior to opening visor, disconnect EOS O2 line (with locking collar clip) from O2 manifold to prevent EOS O2 flow

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C6

ASC-15b/A,E/F

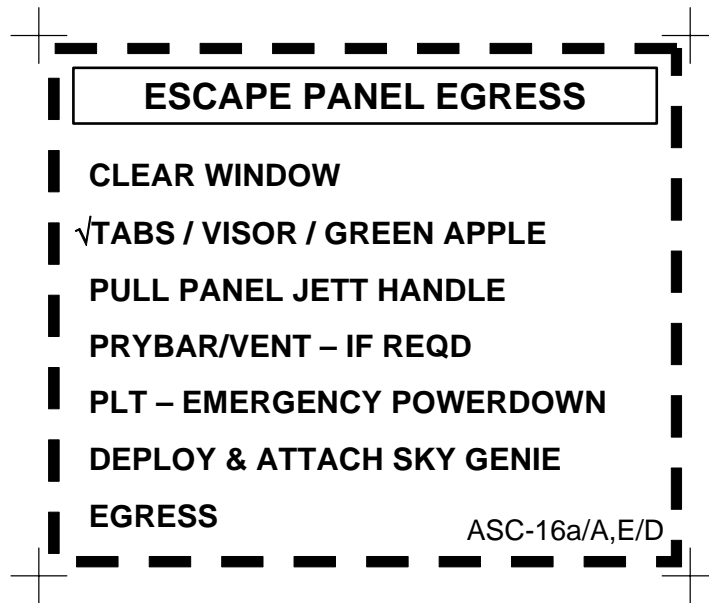
(reduced copy)

FAB USE ONLY

CC 10-24

ASC/400/FIN 1

TOP



TOP
BACK OF 'ESCAPE PANEL EGRESS'



**HOOK
VELCRO**

ASC-16b/A,E/C

(reduced copy)

FAB USE ONLY

CC 10-25

ASC/400/FIN

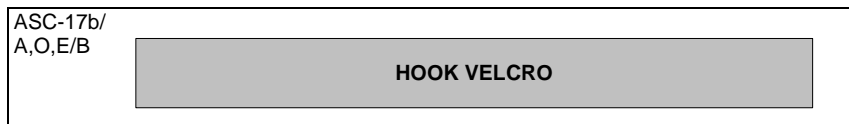
GPC/FCS CHANNEL CONFIGURATION

TOP

GPC

GPC	GPC	GPC	GPC	ASC-17a/ A,O,E/B
Delay 2 sec between each switch throw (AUTO ⇌ ORIDE)				

TOP
BACK OF 'GPC'



Fabrication Notes

1. Cut to exact outside edge
2. Cover GPC boxes with Scotch tape

(reduced copy)

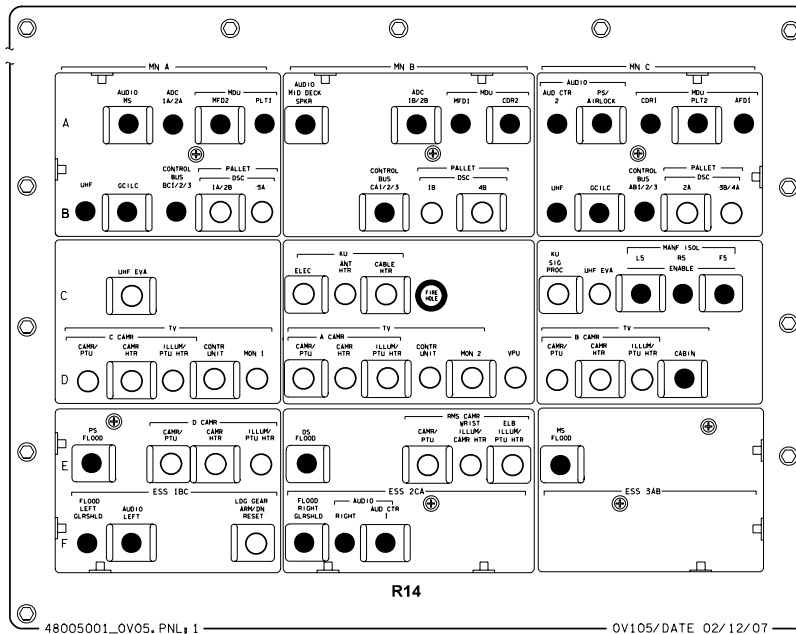
FAB USE ONLY

CC 10-26

ASC/400/FIN

TOP
 PANEL R14 – OV105 ONLY

OV105 ONLY



ASC-19a/A,O,E/D

(reduced copy)

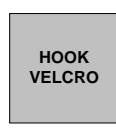
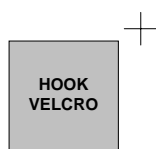
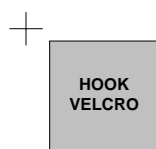
FAB USE ONLY

CC 10-27

ASC/400/FIN



TOP
BACK OF 'PANEL R14 - OV105 ONLY'



ASC-19b/A,O,E/C



(reduced copy)
CC 10-28

FAB USE ONLY

ASC/400/FIN



TOP

LOC/BREAK-UP

BEFORE 'GO AT THROTTLEUP'

- GREEN APPLE
LOCK INERTIA REEL
- JETTISON HATCH
- BAILOUT
- PULL RIP CORD

'GO AT THROTTLEUP' TO SRB SEP

- GREEN APPLE
LOCK INERTIA REEL
- VENT
- 'G' SPIKE
- JETTISON HATCH
- √ ALT/SUIT
- BAILOUT (BELOW 40 K)
- PULL RIP CORD

AFTER SRB SEP

- √ TABS/VISOR/GREEN APPLE
LOCK INERTIA REEL
- GO TO MIDDECK
- VENT
- 'G' SPIKE
- JETTISON HATCH
- √ ALT/SUIT
- BAILOUT (BELOW 40 K)
- PULL RIP CORD

ASC-21a/AD

NOTE: This crew kneeboard card is optional and has no back facing

(reduced copy)

FAB USE ONLY

CC 10-29

ASC/400/FIN

FAB USE ONLY

CC 10-30

ASC/400/FIN

(reduced copy)

HOOK
VELCRO

EMERGENCY EGRESS

TOP

NOTE
'LOSS OF COMM TROUBLESHOOTING'
ON REVERSE SIDE

HOOK
VELCRO

PRELAUNCH MODE 1

TABS – RELEASE
VISOR – CLOSE / LOCK
SUIT O2 – ON
GREEN APPLE – PULL
KNEEBOARDS – REMOVE
COOLING – DISCONNECT
SEAT RESTRAINT – RELEASE
PARACHUTE (four) – RELEASE
COMM – DISCONNECT
SUIT O2 – DISCONNECT
EGRESS SEAT
HATCH – OPEN MANUALLY
SLIDEWIRE BASKETS

BAILOUT MODE 8

REPORT POSITION
 $\sqrt{\text{MACH}} < 1.0$
P,R/Y – CSS
OPS 305/603 PRO (if reqd)
SB – AUTO; BF – AUTO
FLY 185-195 KEAS, $\Phi = 0^\circ$
ABORT MODE – ATO
ABORT PBI – PUSH
P,R/Y – AUTO
FLT CNTLR PWR (two) – OFF
~50K FT
TABS – RELEASE
VISOR – CLOSE / LOCK
SUIT O2 – ON
GREEN APPLE – PULL

ASC-25a/A,E/G

HINGE

FAB USE ONLY

CC 10-31

ASC/400/FIN

(reduced copy)

TOP, HINGED AT BOTTOM OF 'EMERGENCY EGRESS'
HINGE

**POST LANDING
MODE 5**

**TABS – RELEASE
VISOR – CLOSE / LOCK
SUIT O2 – ON
GREEN APPLE – PULL
KNEEBOARDS – REMOVE
COOLING – DISCONNECT
SEAT RESTRAINT – RELEASE
PARACHUTE (four) – RELEASE
COMM – DISCONNECT
(G-SUIT CLIP – PULL)
SUIT O2 – DISCONNECT
PLT – EMER PWR DOWN
EGRESS SEAT
SLIDE/ESCAPE PANEL**

~40K FT

**MS3 – VENT CABIN
CDR,PLT SEATS – LOWER
KNEEBOARDS – REMOVE
COOLING – DISCONNECT
SEAT RESTRAINT – RELEASE
D-RING – UNCOVER**

~30K FT

**MS3 – JETTISON HATCH
COMM – DISCONNECT
(G-SUIT CLIP – PULL)
SUIT O2 – DISCONNECT
EGRESS SEAT
POLE – DEPLOY
D-RING – HOOK UP
BAILOUT**

ASC-25aa/A,E/E

PILE
VELCRO

NOTE
'SUIT PRESS AND O2, EOS ACTIVATION TROUBLESHOOTING' ON REVERSE SIDE

PILE
VELCRO

TOP
BACK OF 'EMERGENCY EGRESS' HEAD TO TOE

ACES TROUBLESHOOTING (ASCENT/ENTRY)

LOSS OF COMM

If LOSS OF XMIT:

NOTE

O2 helmet flow automutes microphones (i.e., inhalation, open or leaking visor, leaking neck dam)

1. √TABS – IN
2. √Helmet pressure visor seal not obstructed
3. √MIC placement
4. √CCU PWR – ON

POWER BUS	ATU
ESS BUS 1BC	R14 CDR
ESS BUS 2CA	R14 PLT
MNA	R14 MS STATION
MNB	R14 MIDDECK
MNC	R14 PS STATION

If LOSS OF RECEIVE:

5. HIU VOL – MAX
6. √All cable connections mated properly:
 - CCA-to-Helmet I/F cable
 - Comm pigtail
 - HIU
 - Comm panel
7. √ATU Config (Flight Deck as applicable):
 - A/G1, A/G2, A/A, ICOM A, ICOM B – T/R
 - MODE – PTT/VOX
 - VOX SENS – 2-4
 - A/G1, A/G2 tw – 9
 - A/A, ICOM A, ICOM B tw – 5

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ASC-25b/A,E/D
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FAB USE ONLY

CC 10-32

ASC/400/FIN

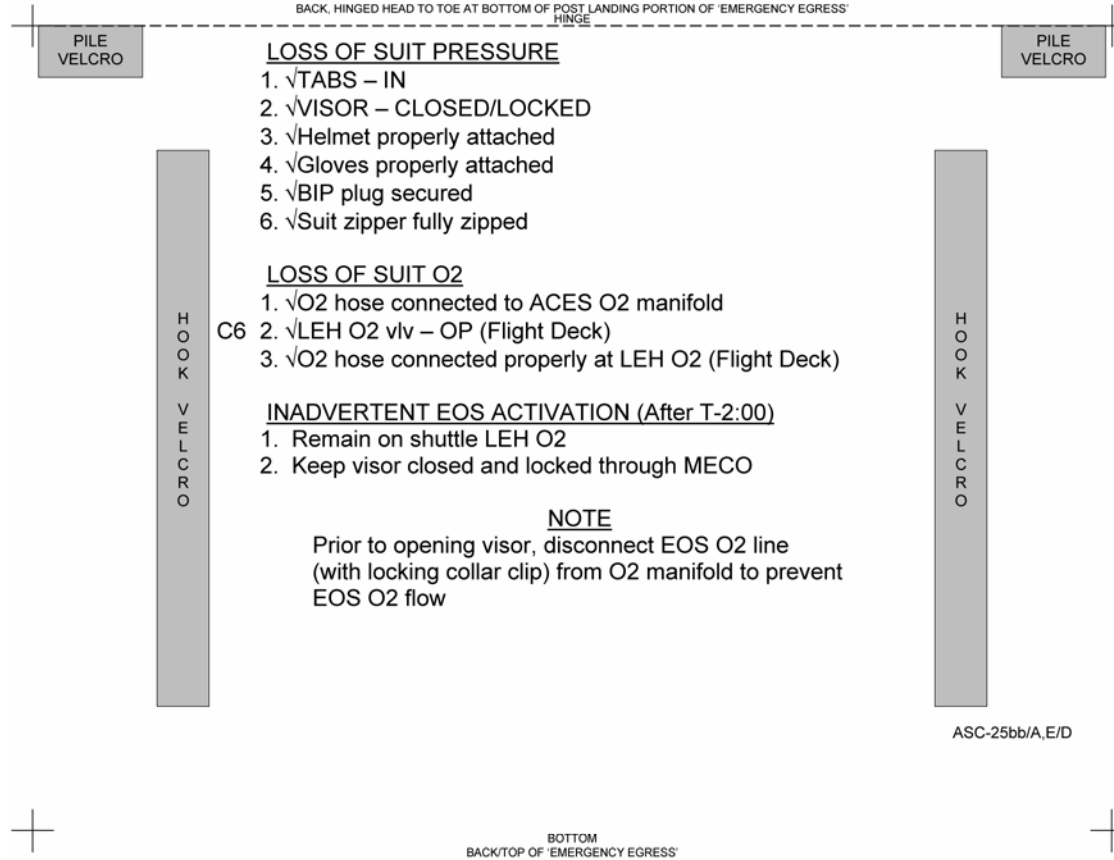
(reduced copy)

FAB USE ONLY

CC 10-33

ASC/400/FIN

(reduced copy)



FAB USE ONLY

СС 10-34

ASC/400/FIN

(reduced copy)

HOOK
VELCRO

АВАРИЙНОЕ ПОКИДАНИЕ

ВЕРХ

ПРИМЕЧАНИЕ
"УСТРАНЕНИЕ НЕИСПРАВНОСТЕЙ ПРИ ПОТЕРЕ СВЯЗИ"
НА ОБРАТНОЙ СТОРОНЕ

HOOK
VELCRO

РЕЖИМ 1 ДО СТАРТА

ЯЗЫЧКИ ШЕЙНОЙ ПРОКЛАДКИ - УБРАТЬ
ШЛЕМ - ОПУСТИТЬ/ ЗАКРЫТЬ
СК O2 - ВКЛ
ЗЕЛЕНый ШАРИК - ПОТЯНУТЬ
НАКОЛЕННЫЕ ПЛАНШЕТЫ - УБРАТЬ
СИСТЕМУ ОХЛАЖДЕНИЯ - ОТСОЕДИНИТЬ
ПРИВЯЗНЫЕ РЕМНИ КРЕСЛА - ОСВОБОДИТЬ
ПАРАШЮТ (четыре) - ОТСТЕГНУТЬ
СВЯЗЬ - ОТСОЕДИНИТЬ
СК O2 - ОТСОЕДИНИТЬ
ПОКИНУТЬ КРЕСЛО
ЛЮК – ОТКРЫТЬ ВРУЧНУЮ
ИСПОЛЬЗОВАТЬ ЛЮЛЬКУ ДЛЯ СПУСКА

РЕЖИМ 8 АВАРИЙНОЕ ДЕСАНТИРОВАНИЕ

СООБЩИТЬ ПОЛОЖЕНИЕ
 $\sqrt{\text{ЧИСЛО МАХА}} < 1,0$
ТАНГАЖ, РЫСКАНИЕ/КРЕН - CSS
OPS 305/603 PRO (если необходимо)
А/Д ТОРМОЗ - АВТО; ПОСАД. ЩИТОК - АВТО
ВЫБРАТЬ СКОРОСТЬ 185-195 KEAS, $\Phi = 0^\circ$
ABORT MODE - АТО
КН АВОРТ - НАЖАТЬ
ТАНГАЖ, РЫСКАНИЕ/КРЕН - АВТО
ТМБ FLT CNTLR PWR (два) - ВЫКЛ
~50 ТЫСЯЧ ФУТОВ
ЯЗЫЧКИ ШЕЙНОЙ ПРОКЛАДКИ - УБРАТЬ
ШЛЕМ - ОПУСТИТЬ/ ЗАКРЫТЬ
СК O2 - ВКЛ
ЗЕЛЕНый ШАРИК - ПОТЯНУТЬ

ASC-26a/A,E/E

HINGE

FAB USE ONLY

CS 10-35

ASC/400/FIN

(reduced copy)

TOP, HINGED AT BOTTOM OF 'EMERGENCY EGRESS'
HINGE

**РЕЖИМ 5
ПОСЛЕ ПОСАДКИ**

ЯЗЫЧКИ ШЕЙНОЙ ПРОКЛАДКИ - УБРАТЬ
ШЛЕМ - ОПУСТИТЬ/ ЗАКРЫТЬ
СК O2 - ВКЛ
ЗЕЛЕНый ШАРИК - ПОТЯНУТЬ
НАКОЛЕННЫЕ ПЛАНШЕТЫ - УБРАТЬ
СИСТЕМУ ОХЛАЖДЕНИЯ - ОТСОЕДИНИТЬ
ПРИВЯЗНЫЕ РЕМНИ КРЕСЛА - ОСВОБОДИТЬ
ПАРАШЮТ (четыре) - ОТСТЕГНУТЬ
СВЯЗЬ - ОТСОЕДИНИТЬ
(СНЯТЬ КОНТРОВКУ С КЛАПАНА ППК)
СК O2 - ОТСОЕДИНИТЬ
ПИЛОТ – ЭКСТРЕННО ОТКЛЮЧИТЬ
ПИТАНИЕ
ПОКИНУТЬ КРЕСЛО
ИСПОЛЬЗОВАТЬ СКЛИЗ/ВЫХОДНУЮ
ПАНЕЛЬ

~40 ТЫСЯЧ ФУТОВ

MS3 - СБРОСИТЬ ДАВЛЕНИЕ В КАБИНЕ
КРЕСЛА КЭ И ПИЛОТА - ВНИЗ
НАКОЛЕННЫЕ ПЛАНШЕТЫ - УБРАТЬ
СИСТЕМУ ОХЛАЖДЕНИЯ -
ОТСОЕДИНИТЬ
ПРИВЯЗНЫЕ РЕМНИ КРЕСЛА -
ОСВОБОДИТЬ
D-ОБРАЗНОЕ КОЛЬЦО - НАЙТИ

~30 ТЫСЯЧ ФУТОВ

MS3 - ОТСТРЕЛИТЬ ЛЮК
СВЯЗЬ - ОТСОЕДИНИТЬ
(СНЯТЬ КОНТРОВКУ С КЛАПАНА ППК)
СК O2 - ОТСОЕДИНИТЬ
ПОКИНУТЬ КРЕСЛО
РАЗЛОЖИТЬ НАПРАВЛЯЮЩУЮ ШТАНГУ
D-ОБРАЗНОЕ КОЛЬЦО - ПРИСТЕГНУТЬ
ПОКИНУТЬ КОРАБЛЬ

ASC-26aa/A, E/D

PILE
VELCRO

ПРИМЕЧАНИЕ
УСТРАНЕНИЕ НЕИСПРАВНОСТЕЙ ПРИ ПОТЕРЕ ДАВЛЕНИЯ В СК, ПОДАЧЕ O2 И ВКЛЮЧЕНИИ СИСТЕМЫ EOS
НА ОБРАТНОЙ СТОРОНЕ

PILE
VELCRO

УСТРАНЕНИЕ НЕИСПРАВНОСТЕЙ СК ACES (ВЫВЕДЕНИЕ/СПУСК)

ПОТЕРЯ СВЯЗИ

ЕСЛИ ПОТЕРЯ СВЯЗИ В РЕЖИМЕ ПЕРЕДАЧИ:

ПРИМЕЧАНИЕ

Поток O2 в шлеме загл микрофоны (т.е. дыхание, откр или негерм смотр щиток, негерм шейная прокладка)

1. ✓Язычки шейной прокладки – IN (убраны)
2. ✓Гермоуплотнение смотр щитка шлема - свободно
3. ✓Размещение микрофона
4. ✓ПИТАНИЕ CCU – ON (Вкл)

ШИНА ПИТАНИЯ	БЛОК ATU
ESS BUS 1BC	R14 CDR
ESS BUS 2CA	R14 PLT
MNA	R14 MS STATION
MNB	R14 MIDDECK
MNC	R14 PS STATION

ЕСЛИ ПОТЕРЯ СВЯЗИ В РЕЖИМЕ ПРИЕМА:

5. HIU VOL – MAX (Громкость на HIU - максимум)
6. ✓Все кабели пристыкованы правильно:
Интерфейсный кабель CCA-to-Helmet
Короткий конец кабеля связи
HIU (Устройство сопряжения с гарнитурой)
Пульт связи
7. ✓Конфигурация ATU (Полетная палуба, как предписано):
A/G1, A/G2, A/A, ICOM A, ICOM B – T/R (ПРД/ПРМ)
MODE – PTT/VOX
VOX SENS – 2-4
A/G1, A/G2 диск перекл – 9
A/A, ICOM A, ICOM B диск перекл – 5

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

ASC-26b/A,E/D

HOOK
VELCRO

HINGE

FAB USE ONLY

CC 10-36

ASC/400/FIN

(reduced copy)

FAB USE ONLY

CS 10-37

ASC/400/FIN

(reduced copy)

BACK, HINGED HEAD TO TOE AT BOTTOM OF POST LANDING PORTION OF 'EMERGENCY EGRESS'
HINGE

PILE VELCRO

PILE VELCRO

ПОТЕРЯ ДАВЛЕНИЯ В СК

1. ✓Язычки шейной прокладки – IN (убраны)
2. ✓СМОТР ЩИТОК – ОПУСТИТЬ/ЗАКРЫТЬ
3. ✓Шлем подстыкован правильно
4. ✓Перчатки подстыкованы правильно
5. ✓Вилка питания аппаратуры VIP - закреплена
6. ✓Замок-молния СК - застегнута до конца

ПОТЕРЯ ПОДАЧИ O2 В СК

C6

1. ✓Шланг O2 подстыкован к магистрали O2 СК ACES
2. ✓кл LEN O2 – OP (Откр) (Полетная палуба)
3. ✓Шланг O2 подстыкован правильно на LEN O2 (Полетная палуба)

НЕПРЕДНАМЕРЕННОЕ ВКЛЮЧЕНИЕ СИСТЕМЫ EOS
(Через T-2:00)

1. Остаться на LEN O2 Шаттла
2. Держать смотр щиток опущенным и закрытым, включая этап МЕСО

ПРИМЕЧАНИЕ

Перед открытием смотр щитка, отсоединить линию O2 системы EOS (контровка) от магистрали O2 с целью предотвращения потока O2 из EOS

HOOK VELCRO

HOOK VELCRO

ASC-26bb/A, E/D

НИЗ
ОБРАТНАЯ СТОРОНА/ВЕРХ КАРТОЧКИ "АВАРИЙНОЕ ПОКИДАНИЕ"



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FAB USE ONLY

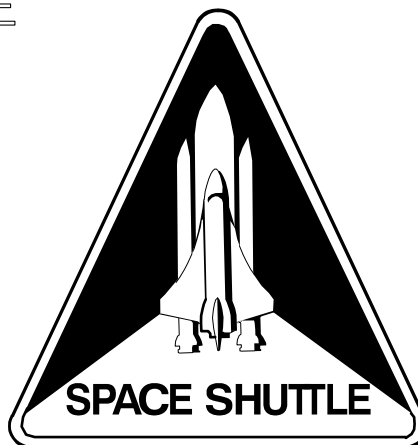
10-38

ASC/400/FIN



Space Shuttle Program
FLIGHT DATA FILE

JSC-48005-400
FINAL



ASCENT CHECKLIST

STS
400

Flight Cover (trim bottom to expose tabs)