

Ascent Checklist

STS-116

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

**Final, Rev B
October 19, 2006**

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



ASCENT C/L STS-116

FINAL, REV B (Oct 19, 2006)

PCN-1 (Nov 13, 2006) Sheet 1 of 1

List of Implemented Change Requests (482s):

ASC-1752B
ASC-1761
~~ASC-1765~~

Incorporate the following:

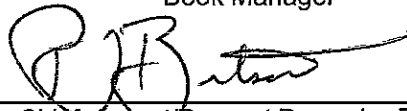
1. Replace iii thru viii
2. Replace 1-5 & 1-6
3. Replace FB 2-19 & FB 2-20

Prepared by:


Book Manager 11/09/06


Lead Ascent GPO 11-9-06

Approved by:


Chief, Ascent/Descent Dynamics Branch

Encl: 10 pages


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


MISSION OPERATIONS DIRECTORATE

**ASCENT CHECKLIST
STS-116**

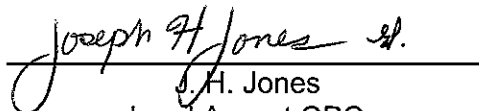
FINAL, REVISION B
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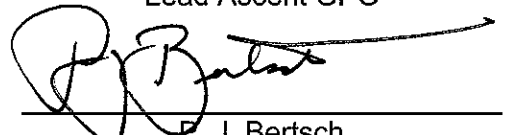
PREPARED BY:


Allison R. McCagg
Book Manager


Michael J. Menard
VITT Lead

APPROVED BY:


J. H. Jones
Lead Ascent GPO


F. J. Bertsch
Chief, Ascent/Descent Dynamics Branch

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

Additional distribution of this book for official use must be requested in writing to DO3/FDF Manager. 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#:	ASC-1752A*	ASC-1756*
	ASC-1753*	ASC-1757*
	ASC-1754*	ASC-1758*
	ASC-1755*	ASC-1759*

* Re-establishes baseline

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DM4/A. McCagg	281-483-7752
Switch List	CA4/M. Menard	281-244-8778
Entry	DM4/M. Trump	281-483-8029
	G. Jordan-Moore	281-483-1261

NOTES

1. The STS-116 trajectory data in this checklist is based on the STS-116 One Cycle to Flight R4 load and the December 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-116 is flown with vehicle OV103.



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ASCENT CHECKLIST
STS-116

LIST OF EFFECTIVE PAGES

FINAL	01/16/04
REV B	10/19/06
PCN-1	11/13/06

Sign Off	*	116/FIN B	FB 2-6	116/FIN B
ii.....	*	116/FIN B	FB 2-7	116/FIN B
iii.....	*	116/FIN B,1	FB 2-8	116/FIN B
iv.....	*	116/FIN B	FB 2-9	116/FIN B
v	*	116/FIN B,1	FB 2-10	116/FIN B
vi.....	*	116/FIN B,1	FB 2-11	116/FIN B
vii.....	*	116/FIN B,1	FB 2-12	<input checked="" type="checkbox"/> 116/FIN B
viii.....	*	116/FIN B	FB 2-13	116/FIN B
ix.....	*	116/FIN B	FB 2-14	<input checked="" type="checkbox"/> 116/FIN B
x	*	116/FIN B	FB 2-15	116/FIN B
xi.....		116/FIN B	FB 2-16	116/FIN B
xii.....		116/FIN B	FB 2-17	116/FIN B
1-1		116/FIN B	FB 2-18	116/FIN B
1-2		116/FIN B	FB 2-19	116/FIN B
1-3		116/FIN B	FB 2-20	116/FIN B,1
1-4		116/FIN B	FB 2-21	116/FIN B
1-5		116/FIN B,1	FB 2-22	116/FIN B
1-6		116/FIN B	FB 2-23	116/FIN B
1-7		116/FIN B	FB 2-24	116/FIN B
1-8		116/FIN B	FB 2-25	116/FIN B
1-9		116/FIN B	FB 2-26	116/FIN B
1-10.....	<input checked="" type="checkbox"/>	116/FIN B	2-27.....	116/FIN B
1-11.....		116/FIN B	2-28.....	116/FIN B
1-12.....		116/FIN B	2-29.....	116/FIN B
1-13.....		116/FIN B	2-30.....	116/FIN B
1-14.....		116/FIN B	2-31.....	116/FIN B
2-1		116/FIN B	2-32.....	116/FIN B
FB 2-2		116/FIN B	2-33.....	116/FIN B
FB 2-3		116/FIN B	2-34.....	116/FIN B
FB 2-4		116/FIN B	2-35.....	* 116/FIN B
FB 2-5		116/FIN B	2-36.....	* 116/FIN B

* – Omit from flight book

– Prelift-off information required

2-37.....	*	116/FIN B	6-15.....	116/FIN B
2-38.....	*	116/FIN B	6-16.....	116/FIN B
2-39.....	*	116/FIN B	6-17.....	116/FIN B
2-40.....	*	116/FIN B	6-18.....	116/FIN B
2-41.....	*	116/FIN B	6-19.....	116/FIN B
2-42.....	*	116/FIN B	6-20.....	116/FIN B
2-43.....	*	116/FIN B	6-21.....	116/FIN B
2-44.....	*	116/FIN B	6-22.....	116/FIN B
2-45.....	*	116/FIN B	6-23.....	116/FIN B
2-46.....	*	116/FIN B	6-24.....	116/FIN B
3-1.....		116/FIN B	6-25.....	116/FIN B
3-2.....		116/FIN B	6-26.....	116/FIN B
3-3.....		116/FIN B	6-27.....	116/FIN B
3-4.....		116/FIN B	6-28.....	116/FIN B
3-5.....		116/FIN B	6-29.....	116/FIN B
3-6.....		116/FIN B	6-30.....	116/FIN B
3-7.....		116/FIN B	6-31.....	116/FIN B
3-8.....		116/FIN B	6-32.....	116/FIN B
4-1.....		116/FIN B	6-33.....	116/FIN B
4-2.....		116/FIN B	6-34.....	116/FIN B
4-3.....		116/FIN B	6-35.....	116/FIN B
4-4.....		116/FIN B	6-36.....	116/FIN B
5-1.....		116/FIN B	6-37.....	116/FIN B
5-2.....		116/FIN B	6-38.....	116/FIN B
5-3.....		116/FIN B	6-39.....	116/FIN B
5-4.....		116/FIN B	6-40.....	116/FIN B
6-1.....		116/FIN B	7-1.....	116/FIN B
6-2.....		116/FIN B	7-2.....	116/FIN B
6-3.....		116/FIN B	7-3.....	116/FIN B
6-4.....		116/FIN B	7-4.....	116/FIN B
6-5.....		116/FIN B	7-5.....	116/FIN B
6-6.....		116/FIN B	7-6.....	116/FIN B
6-7.....		116/FIN B	7-7.....	116/FIN B
6-8.....		116/FIN B	7-8.....	116/FIN B
6-9.....		116/FIN B	7-9.....	116/FIN B
6-10.....		116/FIN B	7-10.....	116/FIN B
6-11.....		116/FIN B	8-1.....	116/FIN B
6-12.....		116/FIN B	8-2.....	116/FIN B
6-13.....		116/FIN B	8-3.....	☒ 116/FIN B
6-14.....		116/FIN B	8-4.....	☒ 116/FIN B

* – Omit from flight book

☒ – Prelift-off information required

8-5.....	<input checked="" type="checkbox"/>	116/FIN B	(C)CC 10-5	*	116/FIN B
8-6.....	<input checked="" type="checkbox"/>	116/FIN B	(C)CC 10-6	*	116/FIN B
8-7.....	<input checked="" type="checkbox"/>	116/FIN B	CC 10-7	*	116/FIN B
8-8.....		116/FIN B	CC 10-8	*	116/FIN B
9-1.....	*	116/FIN B	CC 10-9	*	116/FIN B
9-2.....	*	116/FIN B	CC 10-10	*	116/FIN B
9-3.....	*	116/FIN B	CC 10-11	*	116/FIN B
9-4.....	*	116/FIN B	CC 10-12	*	116/FIN B
9-5.....	*	116/FIN B	CC 10-13	*	116/FIN B
9-6.....	*	116/FIN B	CC 10-14	*	116/FIN B
9-7.....	*	116/FIN B	CC 10-15	*	116/FIN B
9-8.....	*	116/FIN B	CC 10-16	*	116/FIN B
9-9.....	*	116/FIN B	CC 10-17	*	116/FIN B
9-10.....	*	116/FIN B	CC 10-18	*	116/FIN B
9-11.....	*	116/FIN B	CC 10-19	*	116/FIN B
9-12.....	*	116/FIN B	CC 10-20	*	116/FIN B
9-13.....	*	116/FIN B	CC 10-21	*	116/FIN B
9-14.....	*	116/FIN B	CC 10-22	*	116/FIN B
9-15.....	*	116/FIN B	CC 10-23	*	116/FIN B
9-16.....	*	116/FIN B	CC 10-24	*	116/FIN B
9-17.....	*	116/FIN B	CC 10-25	*	116/FIN B
9-18.....	*	116/FIN B	CC 10-26	*	116/FIN B
9-19.....	*	116/FIN B	CC 10-27	*	116/FIN B
9-20.....	*	116/FIN B	CC 10-28	*	116/FIN B
9-21.....	*	116/FIN B	CC 10-29	*	116/FIN B
9-22.....	*	116/FIN B	CC 10-30	*	116/FIN B
9-23.....	*	116/FIN B	CC 10-31	*	116/FIN B
9-24.....	*	116/FIN B	CC 10-32	*	116/FIN B
9-25.....	*	116/FIN B	CC 10-33	*	116/FIN B
9-26.....	*	116/FIN B	CC 10-34	*	116/FIN B
9-27.....	*	116/FIN B	CC 10-35	*	116/FIN B
9-28.....	*	116/FIN B	CC 10-36	*	116/FIN B
10-1.....	*	116/FIN B	CC 10-37	*	116/FIN B
CC 10-2.....	*	116/FIN B	CC 10-38	*	116/FIN B
CC 10-3.....	*	116/FIN B	CC 10-39	*	116/FIN B
CC 10-4.....	*	116/FIN B	CC 10-40	*	116/FIN B
(A)CC 10-5....	*	116/FIN B	CC 10-41	*	116/FIN B
(A)CC 10-6....	*	116/FIN B	10-42.....	*	116/FIN B
(B)CC 10-5....	*	116/FIN B			
(B)CC 10-6....	*	116/FIN B			

– Prelift-off information required

* – 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/E
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/C
SPEED BRAKE CMD		
(Front).....	CC 10-4	ASC-3a/A,E/D
(Back).....	CC 10-4	ASC-3b/A,E/C
CONTINGENCY ABORT		
CDR (Front).....	(A)CC 10-5	ASC-30a/116/A/D
RTLS CONTINGENCY		
CDR (Back).....	(A)CC 10-6	ASC-30b/116/A/C
CONTINGENCY ABORT		
PLT (Front).....	(B)CC 10-5	ASC-31a/116/A/D
RTLS CONTINGENCY		
PLT (Back).....	(B)CC 10-6	ASC-31b/116/A/C
CONTINGENCY ABORT		
MS (Front).....	(C)CC 10-5	ASC-32a/116/A/D
RTLS CONTINGENCY		
MS (Back).....	(C)CC 10-6	ASC-32b/116/A/C
OMS 2 BURN MONITOR (Front)	CC 10-7	ASC-5a/116/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/116/A,O/B
OPS 1 RCS BURN (Back).....	CC 10-10	ASC-6b/116/A,O/B
ASCENT ADI – NOMINAL		
(Front).....	CC 10-11	ASC-14a/116/A/B
ENTRY ALPHA – KSC 15		
(Back).....	CC 10-11	ASC-14b/116/A,E/B
AOA DEORBIT BURN (2 ENG)		
(Top/Front).....	CC 10-12	ASC-8a/A/E
(Bottom/Front).....	CC 10-13	ASC-8aa/116/A/B
AOA DEORBIT BURN (1 ENG)		
(Top/Back).....	CC 10-14	ASC-8b/A/B
(Bottom/Back).....	CC 10-15	ASC-8bb/116/A/B
AOA DEORBIT BURN (RCS)		
(Top/Front).....	CC 10-16	ASC-7a/A/B
(Bottom/Front).....	CC 10-17	ASC-7aa/116/A/B
(Top/Back).....	CC 10-18	ASC-7b/A/B
(Bottom/Back).....	CC 10-19	ASC-7bb/A/B

ZZA TAL REDESIGNATION		
(Front).....	CC 10-20	ASC-9a/116/A/B
ECAL – ZZA or MRN or FMI PRIME TAL		
(Back).....	CC 10-21	ASC-9b/116/A/C
MRN TAL REDESIGNATION		
(Front).....	CC 10-22	ASC-10a/116/A/B
ECAL – ZZA or MRN or FMI PRIME TAL		
(Back).....	CC 10-23	ASC-10b/116/A/C
FMI TAL REDESIGNATION		
(Front).....	CC 10-24	ASC-12a/116/A/B
ECAL – ZZA or MRN or FMI PRIME TAL		
(Back).....	CC 10-25	ASC-12b/116/A/B
ASCENT/ABORT SUMMARY		
(Front).....	CC 10-26	ASC-11a/116/A/B
(Back).....	CC 10-26	ASC-11b/A/C
EMERGENCY EGRESS		
(Front).....	CC 10-27	ASC-15a/A,E/I
ACES TROUBLESHOOTING		
(ASCENT/ENTRY) (Back)	CC 10-28	ASC-15b/A,E/E
ESCAPE PANEL EGRESS		
(Front).....	CC 10-29	ASC-16a/A,E/D
(Back).....	CC 10-29	ASC-16b/A,E/C
GPC/FCS CHANNEL CONFIG		
(Front).....	CC 10-30	ASC-17a/A,O,E/B
(Back).....	CC 10-30	ASC-17b/A,O,E/B
PANEL R14 – OV103 ONLY		
(Front).....	CC 10-31	ASC-18a/A,O,E/H
(Back).....	CC 10-32	ASC-18b/A,O,E/C
LOC/BREAK-UP.....	CC 10-33	ASC-21a/A/D
EMERGENCY EGRESS (OVERSIZED)		
(Top/Front)	CC 10-34	ASC-25a/A,E/F
(Bottom/Front)	CC 10-35	ASC-25aa/A,E/D
(Top/Back).....	CC 10-36	ASC-25b/A,E/B
(Bottom/Back).....	CC 10-37	ASC-25bb/A,E/B
EMERGENCY EGRESS (RUSSIAN)		
(Top/Front)	CC 10-38	ASC-26a/A,E/D
(Bottom/Front)	CC 10-39	ASC-26aa/A,E/C
(Top/Back).....	CC 10-40	ASC-26b/A,E/B
(Bottom/Back).....	CC 10-41	ASC-26bb/A,E/B

PLT & CDR Ascent

<u>Flip Book</u>	FB 2-2 thru FB 2-26
------------------------	---------------------



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<u>CONTENTS</u>	<u>PAGE</u>
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ASCENT PROCEDURES (FLIP BOOK).....	2-1
RTL CDR (CIL)	FB 2-12
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ABORT CUE CARDS.....	2-35
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OMS 2 BURN CARDS	4-1
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AOA PADS.....	6-1
AOA PROCEDURES	6-7
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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**



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 – 1

NAVAIDS ACTIVATION

O8 MLS CH pb/tw (three) – 6
RADAR ALTM (two) – ON
O7 TACAN CH pb/tw (three) – 059Y
ANT SEL (three) – AUTO
MODE (three) – GPC

If OV103:

A13 √GPS PRE AMPL UC – MNC
√LC – MNC
PWR – ON
√GPS/SIGI PWR – OFF
√GPS ENCRYPT – NORM
√GPS/SIGI ENCRYPT – 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	

- A SIMO VOICE CHECK (LAUNCH CONFIG)
O5,O9, L,R AUD A/G 1 (two) – T/R
R10,L9, 2 (two) – T/R
MO42F Voice check with MCC

NOTE
Side hatch closure

-1:10:00 C **CABIN LEAK CHECK**
(-2:00:00)

- L2 CAB VENT ISOL – OP (tb-OP)
 √tb – CL
- O1 √CAB PRESS – incr to 16.7 (MA)

NOTE
Flt crew functions from this point on will be initiated by a call from OTC to proceed. Flt crew will report back to OTC after completion

-45:00 C **CABIN VENT REDUNDANCY CONFIG**
(-1:35:00)

NOTE
Vent vlv operation may occur earlier or later at LCC direction

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

-40:00 C **CABIN VENT**
(-1:30:00)

- L2 CAB VENT ISOL – OP (tb-OP)
 (klaxon)
 √tb – OP
- O1 √PRESS – decr

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 +

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

	<u>PASS ITEM</u>		<u>BFS ITEM</u>	
PTI	INH	√1		
TAL SITE (MCC)	3(4,29)	√40	3(4,29)	√40
RTLS SITE	1	√41	1	√41
PRI (MCC)	KSC 15	√3	KSC 15	√3
SEC (MCC)	KSC 33	√4	KSC 33	√4
TAC	-59	√5	-59	√5
RA	blank	√46		
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)	
TAC	INH	√20	INH	√20
GPS	INH	√43	INH	√43
DRAG H	AUT	√22	AUT	√22
ADTA H	INH	√26	INH	√26
ADTA TO G&C	INH	√29	AUT	√28
TAC	DELTA	√35		
AIF_G	INH	√48		

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 P **MPS He RECONFIG**
 (-56:00)
 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 P **CLEAR HARDWARE C/W MEMORY**
 (~-17:00)
 C3 C/W MEM – CLEAR

-9:00 MS1
 (~-15:00) 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: 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**

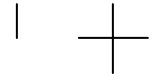
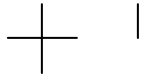
√Tabs/visor – cl/LES O2 – ON

MS1 ICOM RCDR – ON (if reqd)



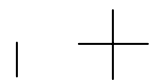
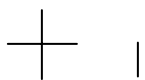
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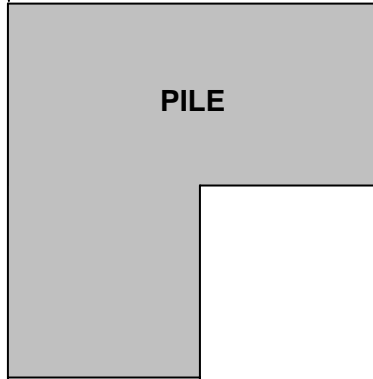


ASCENT PROCEDURES
(FLIP BOOK)

**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

	RTL5	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

NEG RETURN (104)	8100	2 ENG ZZA (104)	5900
PRESS TO ATO (104)	10600	ABORT TAL ZZA (4)	
SE OPS 3 (109)	12100	EO VI	<input type="text"/>
SE ZZA (104)	14300	SE OPS 3 ZZA (109) (4)	<input type="text"/>
PRESS TO MECO (104)	16600	SE ZZA (104) (4)	<input type="text"/>
SE PRESS (104)	19100	2 ENG MRN (104) 5700	
NEG MRN (2 @ 67)	19900	ABORT TAL MRN (3)	
LAST PRE MECO TAL	23000	EO VI	<input type="text"/>
LAST TAL		SE OPS 3 MRN (109) (3)	<input type="text"/>
YJT	19900	SE MRN (104) (3)	<input type="text"/>
YYT	20200	2 ENG FMI (104) 6100	
YQX	21900	ABORT TAL FMI (29)	
IKF	23600	EO VI	<input type="text"/>
INN	23900	SE OPS 3 FMI (109) (29)	<input type="text"/>
FFA,BEJ	24300	SE FMI (104) (29)	<input type="text"/>
MRN, KBO	24400		
ESN	24900		
ZZA, FMI, KKI	25100		
JDG	25200		

ASCENT PROCEDURES

HOOK

R180

LVLH

.89M	√P _c → 72%
1.18M	√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 *

MM103+10 s

√OMS assist

Close suit O2, open visor

3:00

√EVAP OUT (T < 60)

- * If Systems ABORT reqd: *
- * RTLS at 3:40 or *
- * TAL Select prior to 23000 *
- * Otherwise Manual MECO 23700 *

V_I = 13.2K

√Roll Heads Up

- * If Man Throttle (3 eng): *
- * Man Shutdn at 25700 *
- * If 1 eng: *
- * TRAJ √SERC ON *
- * When MPS PRPLT = 2%: *
- * MAN THROT, P_c → 67% *
- * Man MECO @ CO mark BFS *

MECO

√V_I = 25819

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 < 25760 or BFS Engaged: *
- * OPS 104 – PRO (√BFS 104) *
- * NOTE: Expect – 'Illegal Entry' (PASS) *
- * 'Illegal TIG' (BFS) *

► MM104+2 s

If ET Sep complete and HA > 72 :
+X xlation for 11 sec

√TGTS

√ASC PKT for failures

If OMS 1 not reqd:

OMS ENG (two) – OFF

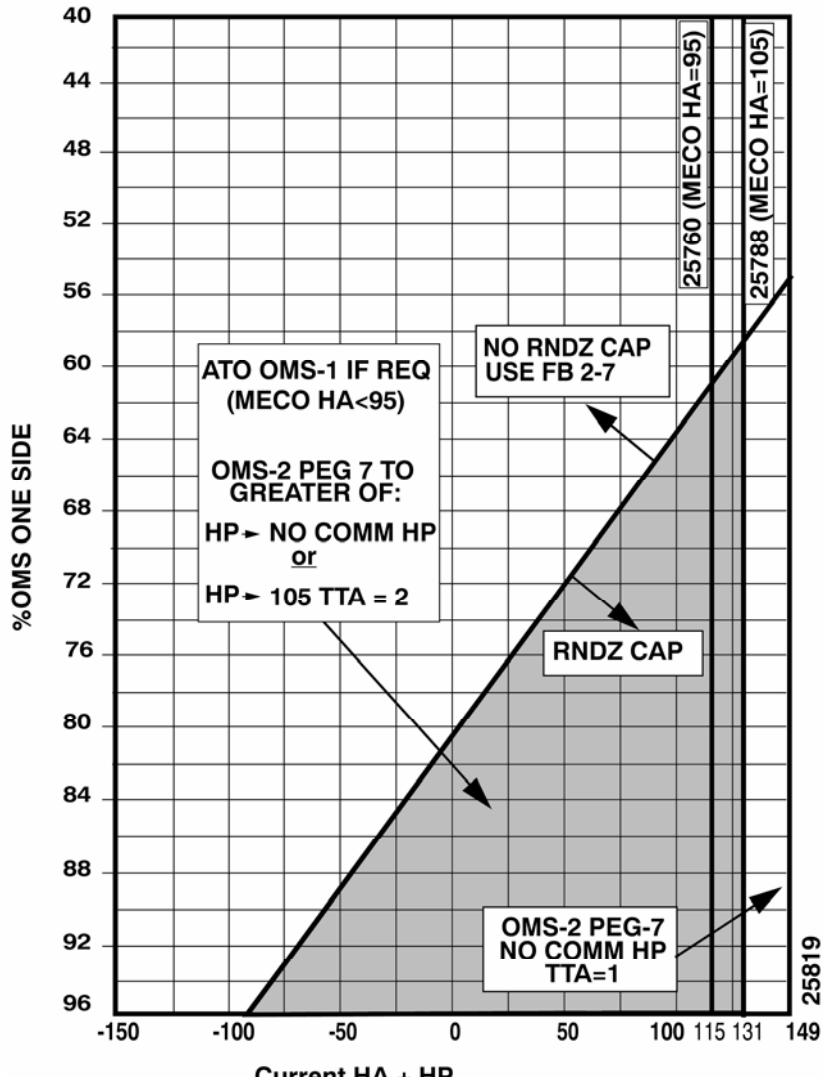
Go to POST OMS 1

**OMS 1
TGTING**

PILE

**STS-116 OCFR4 CY
OMS 1/2 TGTING
RENDEZVOUS RECOVERY**

ASC



	PLANAR WINDOW	
	1	2
NOMINAL OMS-2 HT		
NO COMM OMS-2 HP		

TOP

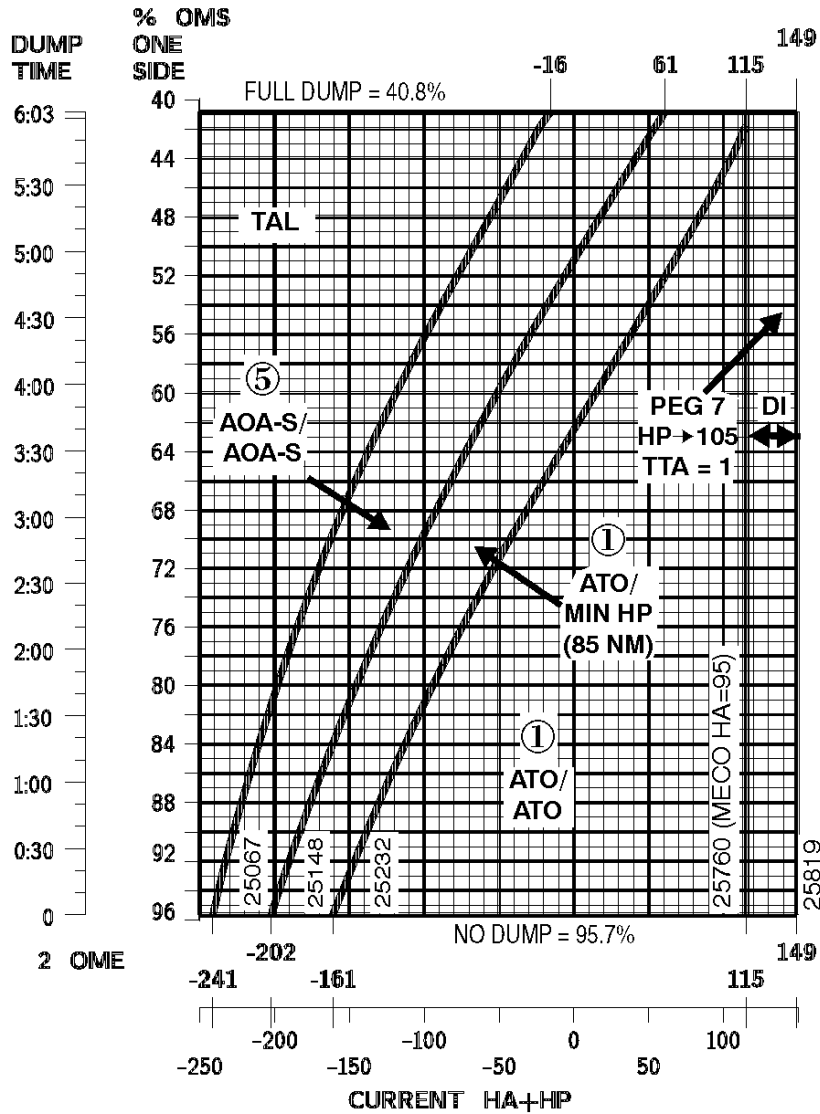
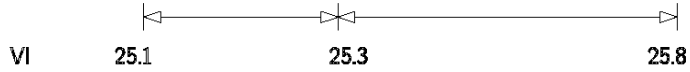
STS-116 OCFR4 CY OMS 1/2 TGTING

HOOK

OMS 1 TIG:

MECO+2

TTA=2



OMS 1
BURN

POST NOMINAL
OMS ASSIST

% OMS/SIDE

DUMP TIME

78

1 : 5 : 2

FB 2-7

ASC/116/FIN B

PILE

OMS 1 BURN

OMS 1
TGTING

* **IF TIG LATER THAN MECO + 6 min:**
* MECO + 4 min: $\sqrt{\text{BDY FLP pb - lt off (MPS dump complete)}}$ *
* $\sqrt{\text{MCC for APU shutdn (if time permits)}}$ *
* **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 $\Delta\text{VTOT} > 500$:** *
* Burn good OMS + l'cnct both OMS to RCS, THC +X at TIG *

DAP - AUTO/DISC
 $\sqrt{\text{ENG/TRIM CONFIG, LOAD TGTS, MNVR - ($\sqrt{\text{INRTL}}$)}}$
OMS XFEED (four) - OP
 $\sqrt{\text{CNTLR PWR (two) - ON}}$
 $\sqrt{\text{OMS ENG (two) - ARM/PRESS}}$
Note ΔVTOT ____ : ____

-:15 EXEC
:00 TIG; start watch ($\sqrt{P_c}$, ΔVTOT , ENG VLVs)

* **OMS ENG FAIL:** *
* Failed ENG - OFF *
* If $\Delta\text{VTOT} < 500$: *
* At QTY = 5%, good OMS TK ISOL (two) - CL *
* If $\Delta\text{VTOT} > 500$: *
* 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 ($\sqrt{\text{RCS straightfeed}}$)

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>225</td><td>220</td></tr></table> ≤ <table border="1" style="display: inline-table;"><tr><td>L</td><td>R</td></tr><tr><td>205</td><td>204</td></tr></table> or No FU IN P	L	R	225	220	L	R	205	204	OMS ENG FAIL OMS ENG FAIL (PRPLT FAIL if 1 Pod Feed)
L	R								
225	220								
L	R								
205	204								
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 – 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 OX or 2 FU TKs – 1 OX & 1 FU TK diff PODs – 2 He TKs	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	95.6	2830	50
4430	90	2430	40
4030	80	2030	30
3630	70	1630	20
3230	60	1230	10
		830	0

TOP

HOOK

ATO

NOTE

These tables apply only after ATO OMS 1 burn (ITGT = 1, AOA to KSC). 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	55.9	41.8	60.4	43.9
90	57.2	39.5	58.1	40.8
85	58.9	38.0	55.8	37.9
80	60.8	37.6	53.2	35.2
75	62.8	39.3	50.1	32.2
70	64.6	41.3	47.2	29.9
65	65.7	42.7	44.8	28.0
60	66.6	44.0	44.1	25.9
55	67.0	45.0	45.1	23.9
50	67.7	46.2	44.9	22.2
45	---	47.6	47.4	20.3

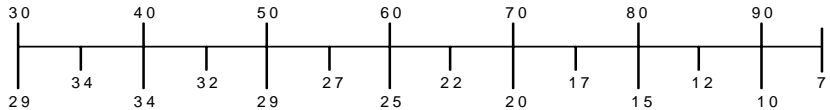
STS-116 OCFR4 CY

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	51.3	37.2	55.9	39.4
90	52.7	34.9	53.6	36.2
85	54.3	33.4	51.2	33.4
80	56.2	33.1	48.7	30.6
75	58.2	34.7	45.6	27.7
70	60.0	36.7	42.6	25.3
65	61.2	38.1	40.3	23.5
60	62.1	39.4	39.6	21.4
55	62.4	40.5	40.6	19.4
50	63.1	41.7	40.4	17.6
45	---	43.1	42.9	15.7

RTL

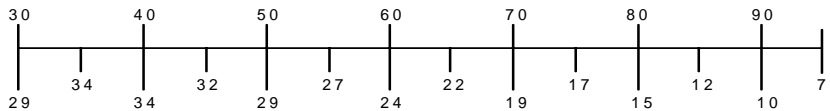
OMS BLOWDOWN

LEFT OMS GAGE QTY (%)



LEFT OMS BLDN EQUIV (%)

RIGHT OMS GAGE QTY (%)



RIGHT OMS BLDN EQUIV (%)

FB 2-11

ASC/116/FIN B

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 ~1.8g, maintain 2.2g

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

HOOK

If CSS: MAN THROT
Man MECO

$\sqrt{P_c} = 104\%$ (2 eng)/69% (3 eng)
 \sqrt{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°

$\sqrt{P_c}$ at PPA + 20 sec

* If $P_c = 104\%$ (2 eng): *

* **G51** MAX THROT – ITEM 4 (*) *

Pitchdn: $\sqrt{P_c} \rightarrow 67\%$

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

KEAS = 77 $\sqrt{SPDBK} \rightarrow 81\%$
 \sqrt{ET} DOORS – Closed and latched (MECO +1:30)
 \sqrt{ET} SEP, SRB SEP – AUTO
 Adjust seat
 \sqrt{TACANS} , INCORPORATE

* If KSC TACAN Fail: *

* TACAN Ch 073X (OMN), ITEM 5 EXEC *

G51 \sqrt{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 \sqrt{R} FLT CNTLR PWR – ON

Lock Inertia Reels

M = 0.7 \sqrt{LG} EXTD ISO VLV – OP

H = 10K \sqrt{BDY} FLP – TRAIL

$\sqrt{A/L}$ (KSC – Tabs, Visors, Suit O2)

POST LANDING: ENT, POST LDG

TAL

TOP
BACK OF 'RTL5 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
ZZA 010	
MRN 016	
FMI 006	

*LO XRNG

SITE	RWY	TACANS	ITEM 5	MLS	LENGTH
2	BEN 36/18	MAK 80 (DME)	CBA 116 (DME)	-/-	13720/13220
3	MRN 20/02	MRN 100	AOG 23	6/-	11730/11730
4	ZZA 30L/12R	ZZA 64	ZAR 77 (DME)	6/-	12200/12200
12	BEN 36/18	MAK 80 (DME)	CBA 116 (DME)	-/-	13720/13220
13	*MRN 20/02	MRN 100	AOG 23	6/-	11730/11730
14	*ZZA 30L/12R	ZZA 64	ZAR 77 (DME)	6/-	12200/12200
19	YJT 09/27	YJT 78	YDF 80 (DME)	-/-	9500/9500
20	YYT 29/11	UYT 23	YYT 82 (DME)	-/-	8500/8500
21	YQX 21/31	YQX 74	IQX 32 (DME)	-/-	9700/8900
23	LAJ 15/33	TRM 109	LAJ 45	-/-	10870/10870
24	BEJ 01L/19R	MOJ 37	BEJ 105	-/-	10820/10820
25	IKF 20/29	KEF 57	HL 44 (DME)	-/-	9520/9560
26	INN 06/24	SHA 80 (DME)	CRN 37 (DME)	-/-	9540/9540
27	FFA 27/09	FFA 81	BZN 56	-/-	9490/9490
28	KBO 14L/32R	GIX 18	DOR 23Y (DME)	-/-	12020/12020
29	FMI 33/15	FMI 16	NIM 53	6/-	11300/12300
30	ESN 03R/21L	BAG 78 (DME)	BUK 90 (DME)	-/-	11800/11800
31	KKI 15R/33L	RIY 92	KIA 80	-/-	13300/13300
32	JDG 31/13	NKW 57	NKW 57	-/-	12000/12000

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

$V_1 = 15.0K$ \checkmark Roll Heads Up

----- **MECO** $V_1 \sim 24.0K$ @ CO mark **BFS** ----- **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, TACAN
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 $\dot{H} = 0 \uparrow$ (2nd pullout) *

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

\checkmark SPDBK $\rightarrow 81\%$

Go to ENTRY MANEUVERS SURF WIND
(Cue Card)

SPDBK @ 3000 FT

ALTM			
AIM PT			
SPDBK			

RTL5

TAL PLT

HOOK

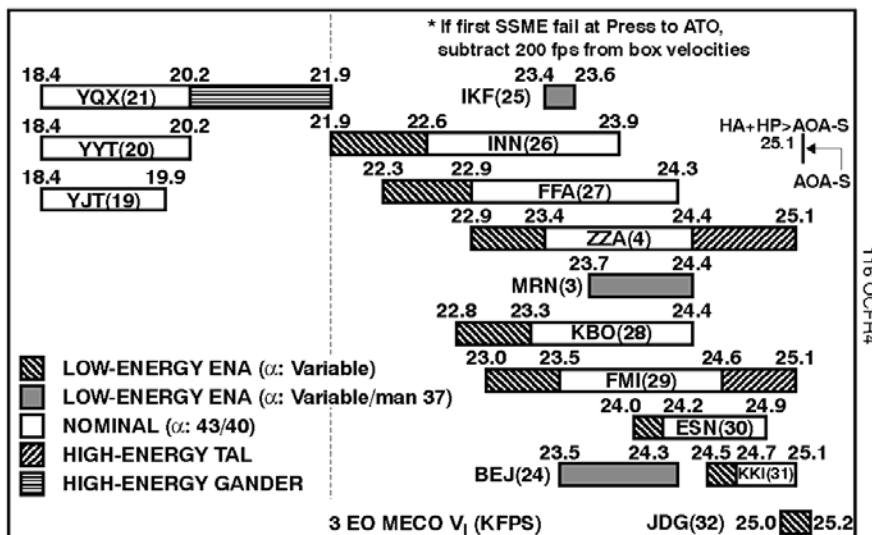
√OMS DUMP

- * If second eng fail: *
- * **G51** DUMP – ITEM 6 (*), 7 (*) *
- * If OMS He PRESS < 2K: DUMP STOP *
- * Failed ME SHUTDN pb (two) – push *

√AUTO THROT

- * If second eng fail or STUCK TAL: *
- * When MPS PRPLT = 2%: *
- * MAN THROT, P_C → 67% *
- * Man MECO @ CO mark **BFS** *

----- MECO -- V₁ ~24.0K @ CO mark **BFS** ----- 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)
- V = 10K
 - * If RCS < **N/A** % either side: *
 - * **G51** AFT RCS INH, ITEM 13 EXEC *
- V = 7K
 - MLS (three) – ON (√channels)
 - I/O RESET
 - Go to ENTRY MANEUVERS (Cue Card)

ECAL

TOP
BACK OF 'TAL PLT'

PILE

POWERED ECAL

G51 √MAX THROT – ITEM 4 (*)


√ADI (two) – REF

√θ → 60°, Yaw → 45°

√Roll to Heads Up

G50 Select SITE and TACAN

When EAS > 4 and incr:

√Yaw to 

√Pitch down at 3°/sec

√MECO, ET SEP

ET SEP + 8s: CSS, pull to α = 58° at 4°/sec, AUTO

√MM602 (BFS, OPS 602 PRO)

Go to ECAL ENTRY

2 E/O ECAL (51.6°)

Velocity (VI)			Location	Site	RWY	TACANs
IP - 2:30	In Plane	IP + 2:30				
*5.3-6.8	*5.3-6.7	*5.3-6.7 6.8-7.3	Wilmington	6	ILM 06	ILM 117
*6.8-8.6	*6.7-6.9 6.9-8.1 *8.1-8.4	6.7-7.9 *7.9-8.0	Cherry Point	7	NKT 32L	EWN 83 (D)
RTLS *8.6-9.7	RTLS *8.4-8.6 8.6-9.3	RTLS *8.0-8.1 8.1-9.8	Oceana NAS	8	NTU 32R	NFE 19Y
*9.7-10.5	9.2-9.9 *9.9-10.2	8.6-10.5	Wallops	9	WAL 28	SBY 49
	*10.2-10.5	9.5-11.2	Atlantic City	11	ACY 31	CYN 81
	10.5-12.3	10.1-12.7	Gabreski	15	FOK 06	HTO 83
*10.5-10.9 10.9-13.3	10.7-13.4	10.5-13.7	Otis ANGB	16	FMH 32	BOS 74
	11.5-13.2	11.1-13.9	Pease Int'l	17	PSM 34	ENE 118

*Probable bailout region

(D) - DME only

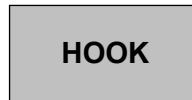
3 E/O ECAL (51.6°)

MM 602 Velocity (Vrel)			Location	Site	RWY	TACANs
IP - 2:30	In Plane	IP + 2:30				
*5.3-6.6	*5.3-6.6	*5.3-6.7	Wilmington	6	ILM 06	ILM 117
*6.6-8.9	*6.6-8.7	*6.7-7.3 7.3-8.0 *8.0-8.6	Cherry Point	7	NKT 32L	EWN 83 (D)
*8.9-10.2	*8.7-10.0	*8.6-9.7	Oceana NAS	8	NTU 32R	NFE 19Y
*10.2-10.9	*10.0-10.7	*9.7-10.6	Wallops	9	WAL 28	SBY 49
	*10.7-11.0	*10.6-11.0	Atlantic City	11	ACY 31	CYN 81
*10.9-11.9 11.9-13.9	*11.0-11.6 11.6-14.4	*11.0-11.2 11.2-14.7	Otis ANGB	16	FMH 32	BOS 74
	11.8-12.4	11.2-13.0	Gabreski	15	FOK 06	HTO 83
	12.8-13.8	12.9-14.2	Pease Int'l	17	PSM 34	ENE 118
13.5-17.2	13.3-17.4	13.1-17.2	Halifax Int'l	18	YHZ 23	UAW 38
15.2-18.0	15.0-18.0	14.9-18.0	Stephenville	19	YJT 09	YJT 78
15.4-18.0	15.3-18.0	15.3-18.0	St. Johns Int'l	20	YYT 29	UYT 23
15.5-18.0	15.4-18.0	15.2-18.0	Gander Int'l	21	YQX 21	YQX 74
		17.3-17.6	Goose Bay	22	YYR 26	UYR 40

*Probable bailout region

(D) - DME only

TAL



HI-ENER
GANDER

ECAL ENTRY

If 3 OUT ECAL or 2 OUT SECOND GREEN:

**G50 Select SITE and TACAN
BFS, OPS 602 PRO**

Before NZ Hold:

**RHC/PNL TRIM – ENA
If M < 5, √AIL/RUD TRIM**

BFS, **G50** √SITE and TACAN

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 √TACANS, 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 ECAL LNDG CRITERIA

@H = 70K, √Range:

- * If Range < 28 nm or Range > 54 nm: *
- * P, R/Y CSS *
- * Bank (≤ 30°) to HDG 120° *
- * Go to BAILOUT *

G50 √SPDBK (ITEM 39) per ECAL LANDING Table

ECAL 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

ECAL



MM104

HIGH-ENERGY GANDER CDR

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)	ALPHA (CSS)
VREL ≥ 19,900	0°	55°
VREL < 19,900	0°	50°

$\dot{H} = -800 \uparrow$ Roll towards site ($\phi \sim 80^\circ$), initial target $\dot{H} = -350$,
hold initial Alpha per table
G50 Hold 3.0g Nz using roll

- * If Nz ≥ 3.5: *
- * Reduce Alpha ($40^\circ < \alpha < 55^\circ$) and *
- * \dot{H} until Nz < 3.5 *

Orbiter bug below upper line or V = 6K Pitch down at 1°/sec, center needles,
P, R/Y – AUTO

Go to ENTRY MANEUVERS (Cue Card)

HIGH-ENERGY GANDER PLT

HOOK

-----MM304-----

BFS, OPS 301 PRO (√304)

G50 Select Site YQX – ITEM 41 +2 1**TRAJ** √BUGS, **HSI** √ \hat{H} , RANGE√ET DOORS – closed and latched
(MM304 +1:30)**Ḣ = -800**↑ Monitor \dot{H} , Nz**When \dot{H}
stabilizes** Ensure Nz stays < 3.5**Monitor
Traj** Report when orbiter bug reaches upper line**Orbiter bug
below
upper line
or V = 6K** Monitor pitchdown at 1°/sec to center needles,
√P,R/Y – AUTO**V = 19K** HYD MPS/TVC ISOL VLV (three) – CL
(hold 5 sec, tb-CL)**V = 15K** **G50** √RWY, TACAN, S/B, ALTM
(PASS/BFS)**V = 10K** * If RCS < **N/A** % either side: *
* **G51** AFT RCS INH, ITEM 13 EXEC ***V = 10K** √SPDBK → 81%
Go to ENTRY MANEUVERS (Cue Card)HI-ENER
TAL



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)

**HI-ENER
GANDER**



MM304

P, R/Y – CSS
 √VREL

VREL	ROLL (CSS) 4-5°/sec	ALPHA (CSS)
VREL ≥ 23,800	180°	80° ($\theta = 280^\circ$)
23,300 ≤ VREL < 23,800	180°	55°
VREL < 23,300	0°	55°

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

Earlier of
 $\dot{H} = -600 \downarrow$
or Guid Init Roll Heads Up at 4-5°/sec, maintain Alpha = 55°

$\dot{H} = -500 \uparrow$ R/Y – AUTO (√Rolls toward site)
 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 (\hookleftarrow) < 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] If [FMI] GO TAL Site – Select [FMI] –
ITEM 41 + [29]

Otherwise, select best Wx site [ZZA] (Site 4)
or [FMI]

[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 [ZZA/FMI] *
- * initial Commanded Drag (←) ≥ [35] , *
- * [G50] Select Site [ESN] – ITEM 41 + [30] *
- * *

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

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

V = 10K * If RCS < [N/A] % either side: *

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

V = 10K √SPDBK → 81%

V = 7K MLS (three) – ON (√channels)
I/O RESET

Go to ENTRY MANEUVERS (Cue Card)

ABORT
DUMPS

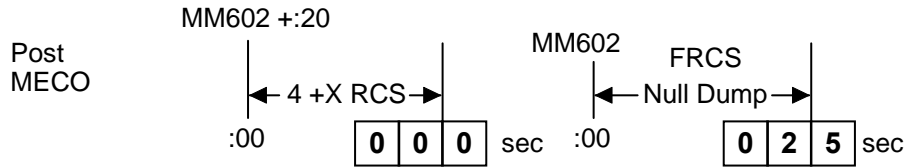
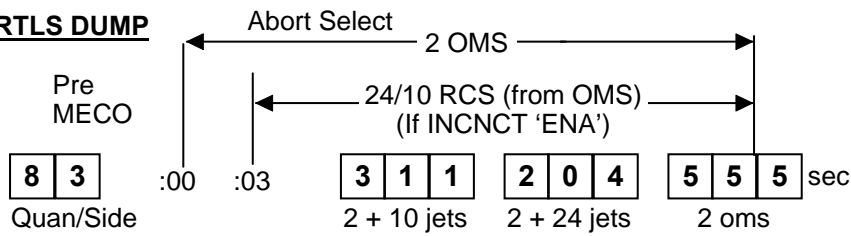
TOP
BACK OF 'ECAL ENTRY'

PILE

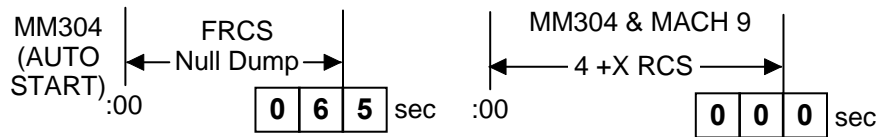
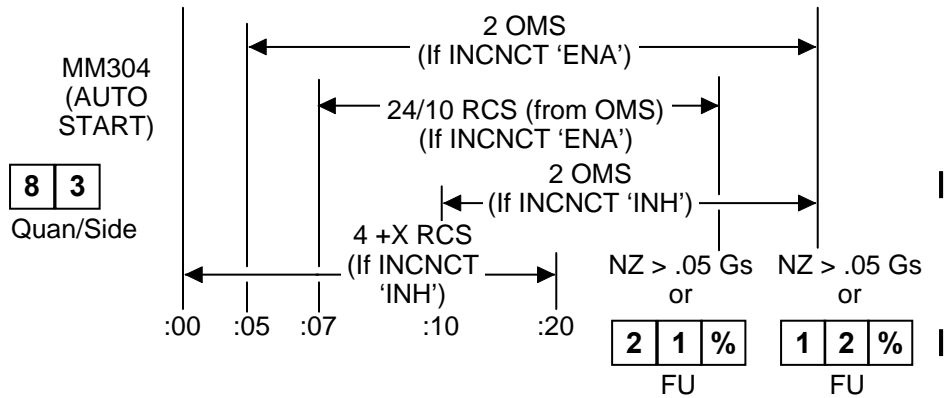
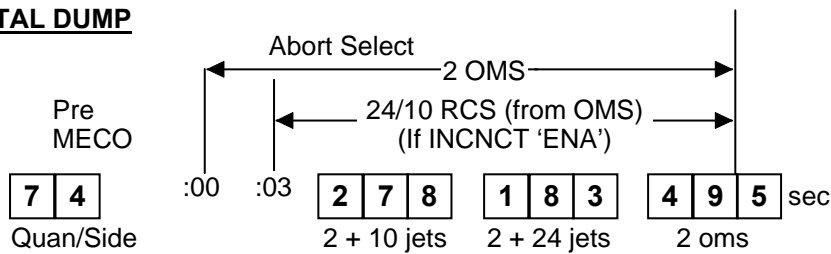
RTLS/TAL DUMPS

HI-ENER
TAL

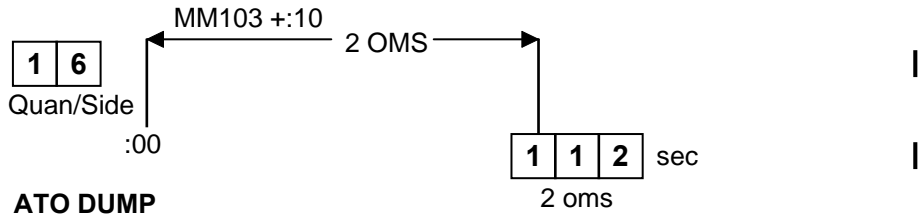
RTLS DUMP



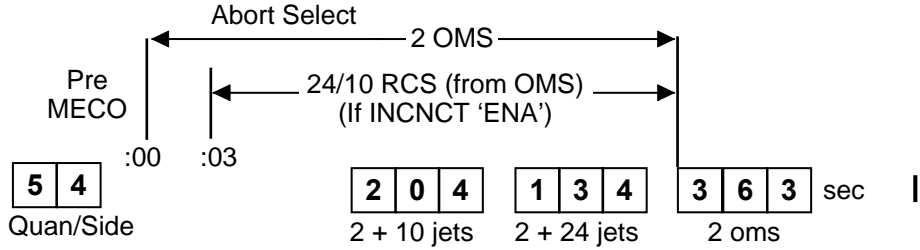
TAL DUMP



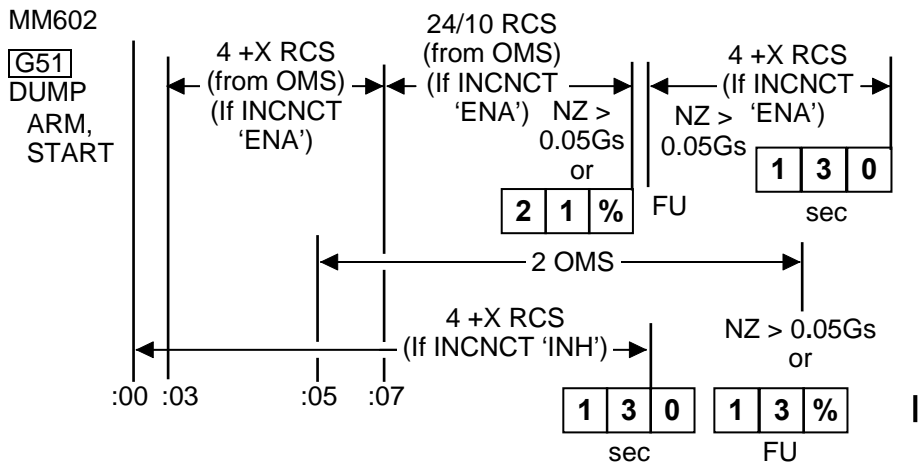
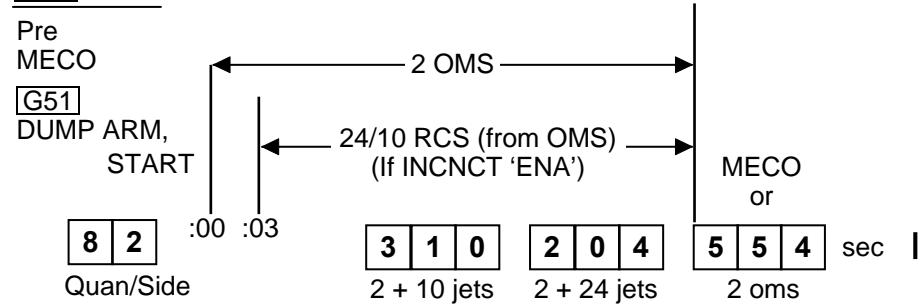
ASSIST/ATO/G51 DUMPS
ASSIST DUMP



ATO DUMP



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}	
ZZA	010
MRN	016
FMI	006

Man MECO @ CO mark BFS

$\dot{H} =$

If TAL: $\dot{H} = +100$

Max H = 400 – 420K
 for early TAL

**ABORT
 DUMPS**

Roll heads up @
 TAL
 uphill

MECO – 90sec: Work + \dot{H}

Idle @ 2%
 or
 C/O bug alive

3g
 Throt

Early TAL:
 Initial $\theta \sim 50^\circ$

If CSS: Man Throt
 Man MECO

Incr $\theta \sim 10^\circ$ if 1 eng fail

POWERED CSS – RTLS

HOOK

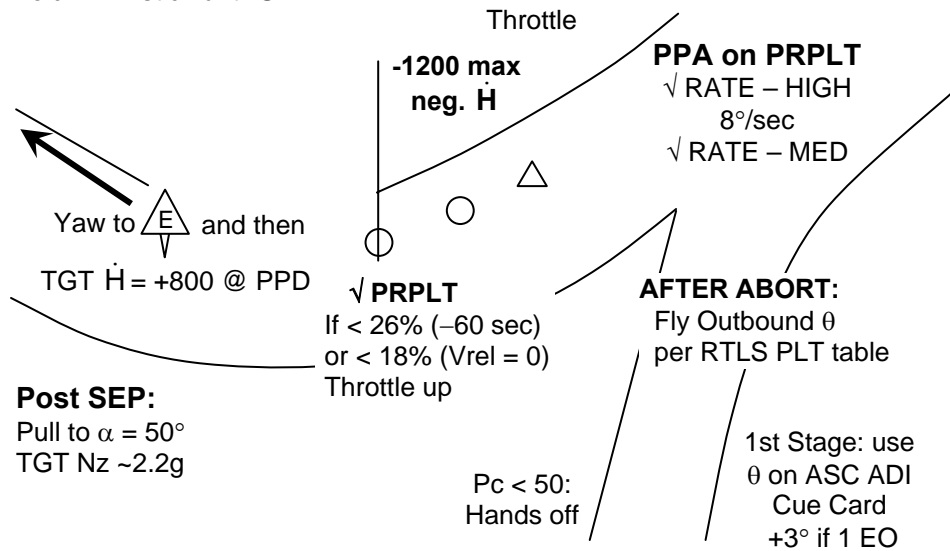
CSS & MAN THROT
(IF MET < 1:30, ENGAGE BFS)

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

R Yaw to **R**

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

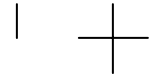
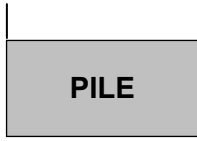
\dot{H} control:
Use θ then
Throttle



1 eng @ 104% = 4%/min

If CSS: Man Throt
Man MECO

TOP
BACK OF 'POWERED CSS – RTLS'



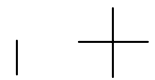
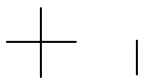
PILE

This Page Intentionally Blank

**PWRD
CSS**

FB 2-26

ASC/116/FIN B





ASCENT/ENTRY CUE CARDS

**ASC/ENT
CUE CARDS**



MS ONLY

2-27

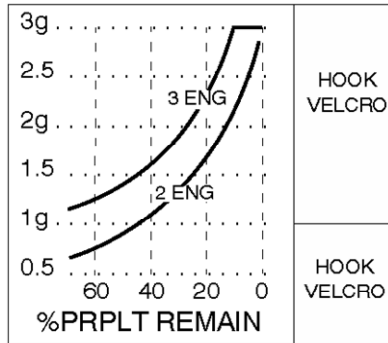
ASC/116/FIN B



ASC/ENT
CUE CARDS

ASCENT ADI - NOMINAL

TIME	θ	H	\dot{H}	(116 OCFR4 CY)
0:30	68	9K	641	
0:50	62	26K	974	
1:10	54	49K	1405	
1:30	39	82K	1873	
1:50	31	123K	2187	



-STAGING-

V_i	θ	H	\dot{H}	ASC-14a/116/A/B
6	19	216K	1729	
7	16	274	1275	
8	13	310	925	
9	11	332	640	
10	9	345	409	
12	6	356	66	
14	9	355	-145	
16	25	350	-229	
18	23	344	-266	
20	21	339	-217	
22	19	337	-104	
24	17	337	66	
25819	13	345	273	

HOOK VELCRO

ENTRY ALPHA

VR	α_{ref}	R	H	Href	Rref
25	40	4464	400		
24	HI	40 LO	2647	246	-46 L79
23	43	40 37	2164	238	-63 68
22	43	40 37	1806	231	-82 62
21	43	40 37	1523	224	-104 60
20	43	40 37	1299	218	-121 58
19	43	40 37	1122	211	-144 59
18	43	40 37	978	204	-167 60
17	43	40 37	864	198	-185 R61
16	43	40 37	768	193	-195 61

KSC 15

MAX L/D	
M	α
3	17
2	15
1	12

ASC-14b/116/A,E/B (116 OCFR4 CY)

HOOK
VELCRO

HOOK
VELCRO

15	43	40 37	686	185	-207	64
14	43	40 37	613	180	-126	62
13	43	40 37	546	176	-136	59
12	43	40 37	483	171	-152	58
11	42	39 36	425	166	-194	56
10	41	38 35	373	160	-173	51
9	39	36 33	325	155	-206	L44
8	37	34 31	277	149	-238	37
7	33	30 27	229	139	-266	36
6	30	27 24	184	128	-270	37
5	26	23 20	142	115	-272	39
4	22	19 18	104	101	-264	39
3	19	16 15	74	89	-247	R37
2.5	15		60	80	-271	
2	12		49	74	-283	
1.5	9		37	64	-333	
1	7		27	48	-267	

HOOK VELCRO



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MS ONLY

2-30

ASC/116/FIN B



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 $D \sim 3$	CLOSED LOOP GUIDANCE ____:____:____ * If PREBANK: P,R/Y – AUTO * Begin AIL 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 (FORCE if editing)
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%
$\Delta Az = 10.5^\circ$	FIRST ROLL REVERSAL <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

ENT-6a/E/O

**ENT
MNVR**

ENT
MNVR

FLIGHT CONDITIONS	MANEUVER
V = 7K	√TACAN status * 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: 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 EXT D 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
MIDFIELD and V < 140 KGS	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/E/W
(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/E/W
(Partial)



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MS ONLY

2-34

ASC/116/FIN B





CONT
ABORT

ABORT CUE CARDS



NOT FLOWN

2-35

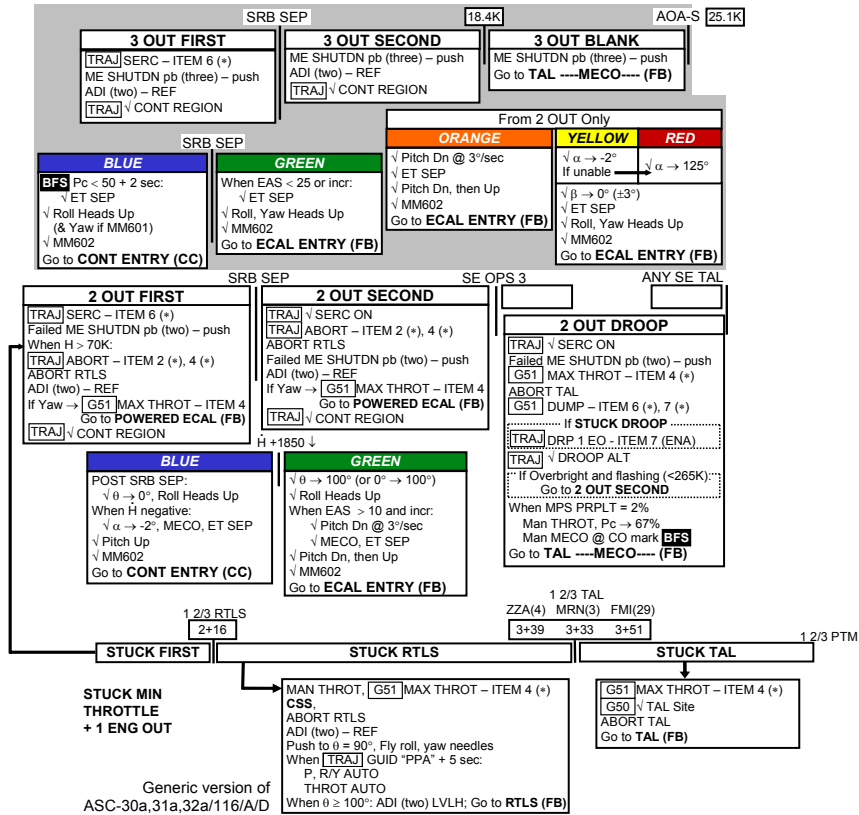
ASC/116/FIN B



**CONT
ABORT**

CONTINGENCY ABORT

High Inclination
51.6°



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

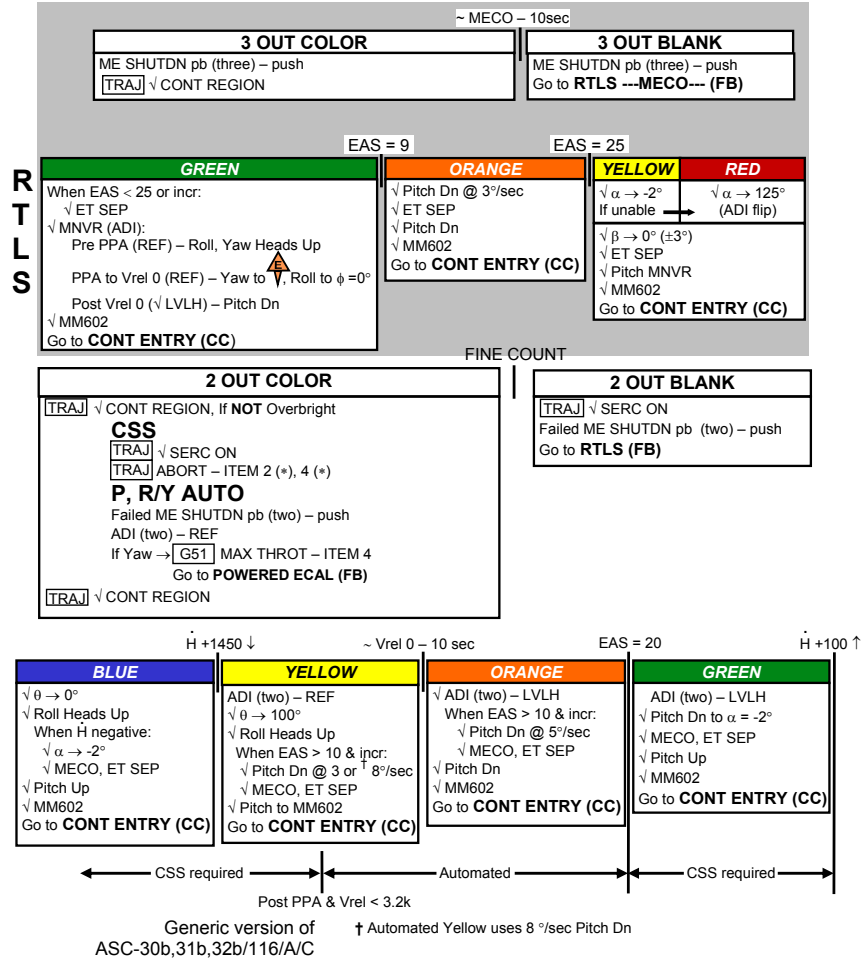
When $M < 1.0$

Go to **BAILOUT (FB)**

Generic version of
ASC-30a,31a,32a/116/A/D

RTLS CONTINGENCY

High Inclination
51.6°



RTLS CONTINGENCY

CONT ENTRY / MM602

VERT SIT -
If ECAL/BDA – INH
√ Theta Limits after Nz Hold
If ECAL/BDA – ENA
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

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

Select UHF – G T/R

When $M < 1.0$
Go to **BAILOUT (FB)**

Generic version of
ASC-30b,31b,32b/116/A/C

RED

√ ADI (two) – LVLH
√ $H \rightarrow +400$ ($\theta_{max} = 75^\circ$)
TRAJ AT FINE COUNT:
√ Pitch Dn to $\alpha = -2^\circ$
√ MECO, ET SEP
√ Pitch Up
√ MM602
Go to **RTLS ---MECO--- (FB)**

← Automated →

**ZZA TAL REDESIGNATION
(116 OCFR4 CYC)**

1st E.O. VI		5900	6000	6100	6200	6300	6400	6500	6600
SE OPS 3 ZZA 109	(4)	10900	11000	11000	11000	11100	11100	11100	11100
SE ZZA 104	(4)	17500	17300	17100	16900	16700	16500	16200	16000

1st E.O. VI		6700	6800	6900	7000	7100	7200	7300	7400
SE OPS 3 ZZA 109	(4)	11200	11200	11200	11200	11300	11300	11300	11300
SE ZZA 104	(4)	15800	15600	15400	15300	15100	14900	14700	14600

1st E.O. VI		7500	7600	7700	7800	7900	8000	8100	8200
SE OPS 3 ZZA 109	(4)	11400	11400	11400	11400	11500	11500	11500	11500
SE ZZA 104	(4)	14400	14300	14200	14000	13900	13800	13700	13700

1st E.O. VI		8300	8400	8500	8600	8700	8800	8900	9000
SE OPS 3 ZZA 109	(4)	11500	11600	11600	11600	11600	11600	11600	11700
SE ZZA 104	(4)	13600	13500	13500	13400	13400	13400	13300	13300

1st E.O. VI		9100	9200	9300	9400	9500	9600	9700	9800
SE OPS 3 ZZA 109	(4)	11700	11700	11700	11700	11700	11700	11700	11800
SE ZZA 104	(4)	13300	13300	13300	13300	13300	13300	13400	13400

1st E.O. VI		9900	10000	10100	10200	10300	10400	10500	10600
SE OPS 3 ZZA 109	(4)	11800	11800	11800	11800	11800	11800	11800	11800
SE ZZA 104	(4)	13400	13400	13500	13500	13500	13600	13600	13600

ASC-9a/116/A/B

NOT FLOWN

2-40

ASC/116/FIN B

ECAL – ZZA or MRN or FMI PRIME TAL

1st EO VI (KFPS)	5.6	5.8	6.0	6.2	6.4	6.6	6.8
CHERRY POINT (7)		6.7 - 7.0	6.7 - 7.2	6.8 - 7.3	6.8 - 7.4	6.9 - 7.5	6.9 - 7.6
OTIS ANGB (16)		10.3 - 11.1	10.3 - 11.2	10.2 - 11.3	10.2 - 11.5	10.2 - 11.6	10.2 - 11.6

1st EO VI (KFPS)	7.0	7.2	7.4	7.6	7.8	8.0	8.2
CHERRY POINT (7)	7.0 - 7.7	7.2 - 7.8	7.4 - 7.9	7.6 - 7.9	7.8 - 8.0	8.0 - 8.0	
GABRESKI (15)					10.5 - 10.7	10.4 - 10.8	10.3 - 11.0
OTIS ANGB (16)	10.2 - 11.7	10.2 - 11.8	10.2 - 11.9	10.2 - 12.0	10.2 - 12.1	10.2 - 12.1	10.3 - 12.2

1st EO VI (KFPS)	8.4	8.6	8.8	9.0	9.2	9.4	9.6
OCEANA NAS (8)		8.6 - 9.0	8.8 - 9.1	9.0 - 9.2	9.2 - 9.3		
WALLOPS (9)				9.4 - 9.6	9.2 - 9.7	9.4 - 9.8	9.6 - 9.8
GABRESKI (15)	10.3 - 11.1	10.3 - 11.2	10.3 - 11.3	10.4 - 11.3	10.4 - 11.4	10.4 - 11.5	10.4 - 11.5
OTIS ANGB (16)	10.3 - 12.3	10.3 - 12.3	10.3 - 12.4	10.4 - 12.4	10.4 - 12.5	10.5 - 12.6	10.5 - 12.6
PEASE INT'L (17)	11.3 - 11.7	11.3 - 11.9	11.3 - 12.0	11.3 - 12.1	11.3 - 12.2	11.3 - 12.2	11.3 - 12.3

1st EO VI (KFPS)	9.8	10.0	10.2	10.4	10.6	10.8	11.0
WALLOPS (9)	9.8 - 9.9						
GABRESKI (15)	10.4 - 11.6	10.5 - 11.7	10.5 - 11.7	10.5 - 11.8	10.6 - 11.8	10.8 - 11.9	11.0 - 11.9
OTIS ANGB (16)	10.5 - 12.7	10.5 - 12.7	10.6 - 12.8	10.6 - 12.8	10.7 - 12.9	10.8 - 12.9	11.0 - 12.9
PEASE INT'L (17)	11.3 - 12.4	11.4 - 12.5	11.4 - 12.5	11.5 - 12.6	11.5 - 12.6	11.5 - 12.7	11.5 - 12.7

1st EO VI (KFPS)	11.2	11.4	11.6	11.8	12.0	12.2	12.4
GABRESKI (15)	11.2 - 12.0	11.4 - 12.0	11.6 - 12.1	11.8 - 12.2	12.0 - 12.2	12.2 - 12.3	
OTIS ANGB (16)	11.2 - 13.0	11.4 - 13.0	11.6 - 13.1	11.8 - 13.1	12.0 - 13.2	12.2 - 13.2	12.4 - 13.2
PEASE INT'L (17)	11.5 - 12.8	11.5 - 12.8	11.6 - 12.9	11.8 - 12.9	12.0 - 13.0	12.2 - 13.0	12.4 - 13.0

1st EO VI (KFPS)	12.6	12.8	13.0	13.2	13.4	13.6	13.8
OTIS ANGB (16)	12.6 - 13.3	12.8 - 13.3	13.0 - 13.4	13.2 - 13.4	13.4 - 13.4		
PEASE INT'L (17)	12.6 - 13.1	12.8 - 13.1	13.0 - 13.1				

ASC-9b/116/A/C

NOT FLOWN

2-41

ASC/116/FIN B

**MRN TAL REDESIGNATION
(116 OCFR4 CYC)**

1st E.O. VI		5700	5800	5900	6000	6100	6200	6300	6400
SE OPS 3 MRN 109	(3)	10700	10800	10900	10900	11000	11000	11000	11100
SE MRN 104	(3)	17200	17000	16800	16600	16400	16200	16000	15800

1st E.O. VI		6500	6600	6700	6800	6900	7000	7100	7200
SE OPS 3 MRN 109	(3)	11100	11100	11200	11200	11200	11300	11300	11300
SE MRN 104	(3)	15700	15500	15300	15100	14900	14800	14600	14500

1st E.O. VI		7300	7400	7500	7600	7700	7800	7900	8000
SE OPS 3 MRN 109	(3)	11300	11400	11400	11400	11400	11500	11500	11500
SE MRN 104	(3)	14300	14200	14100	13900	13800	13700	13600	13600

1st E.O. VI		8100	8200	8300	8400	8500	8600	8700	8800
SE OPS 3 MRN 109	(3)	11500	11500	11600	11600	11600	11600	11600	11600
SE MRN 104	(3)	13500	13400	13400	13300	13300	13300	13200	13200

1st E.O. VI		8900	9000	9100	9200	9300	9400	9500	9600
SE OPS 3 MRN 109	(3)	11700	11700	11700	11700	11700	11700	11700	11700
SE MRN 104	(3)	13200	13200	13200	13200	13200	13200	13200	13200

1st E.O. VI		9700	9800	9900	10000	10100	10200	10300	10400
SE OPS 3 MRN 109	(3)	11800	11800	11800	11800	11800	11800	11800	11800
SE MRN 104	(3)	13200	13300	13300	13300	13400	13400	13400	13500

1st E.O. VI		10500	10600						
SE OPS 3 MRN 109	(3)	11800	11800						
SE MRN 104	(3)	13500	13500						

ASC-10a/116/A/B

NOT FLOWN

2-42

ASC/116/FIN B

ECAL – ZZA or MRN or FMI PRIME TAL

1st EO VI (KFPS)	5.6	5.8	6.0	6.2	6.4	6.6	6.8
CHERRY POINT (7)		6.7 - 7.0	6.7 - 7.2	6.8 - 7.3	6.8 - 7.4	6.9 - 7.5	6.9 - 7.6
OTIS ANGB (16)		10.3 - 11.1	10.3 - 11.2	10.2 - 11.3	10.2 - 11.5	10.2 - 11.6	10.2 - 11.6

1st EO VI (KFPS)	7.0	7.2	7.4	7.6	7.8	8.0	8.2
CHERRY POINT (7)	7.0 - 7.7	7.2 - 7.8	7.4 - 7.9	7.6 - 7.9	7.8 - 8.0	8.0 - 8.0	
GABRESKI (15)					10.5 - 10.7	10.4 - 10.8	10.3 - 11.0
OTIS ANGB (16)	10.2 - 11.7	10.2 - 11.8	10.2 - 11.9	10.2 - 12.0	10.2 - 12.1	10.2 - 12.1	10.3 - 12.2

1st EO VI (KFPS)	8.4	8.6	8.8	9.0	9.2	9.4	9.6
OCEANA NAS (8)		8.6 - 9.0	8.8 - 9.1	9.0 - 9.2	9.2 - 9.3		
WALLOPS (9)				9.4 - 9.6	9.2 - 9.7	9.4 - 9.8	9.6 - 9.8
GABRESKI (15)	10.3 - 11.1	10.3 - 11.2	10.3 - 11.3	10.4 - 11.3	10.4 - 11.4	10.4 - 11.5	10.4 - 11.5
OTIS ANGB (16)	10.3 - 12.3	10.3 - 12.3	10.3 - 12.4	10.4 - 12.4	10.4 - 12.5	10.5 - 12.6	10.5 - 12.6
PEASE INT'L (17)	11.3 - 11.7	11.3 - 11.9	11.3 - 12.0	11.3 - 12.1	11.3 - 12.2	11.3 - 12.2	11.3 - 12.3

1st EO VI (KFPS)	9.8	10.0	10.2	10.4	10.6	10.8	11.0
WALLOPS (9)	9.8 - 9.9						
GABRESKI (15)	10.4 - 11.6	10.5 - 11.7	10.5 - 11.7	10.5 - 11.8	10.6 - 11.8	10.8 - 11.9	11.0 - 11.9
OTIS ANGB (16)	10.5 - 12.7	10.5 - 12.7	10.6 - 12.8	10.6 - 12.8	10.7 - 12.9	10.8 - 12.9	11.0 - 12.9
PEASE INT'L (17)	11.3 - 12.4	11.4 - 12.5	11.4 - 12.5	11.5 - 12.6	11.5 - 12.6	11.5 - 12.7	11.5 - 12.7

1st EO VI (KFPS)	11.2	11.4	11.6	11.8	12.0	12.2	12.4
GABRESKI (15)	11.2 - 12.0	11.4 - 12.0	11.6 - 12.1	11.8 - 12.2	12.0 - 12.2	12.2 - 12.3	
OTIS ANGB (16)	11.2 - 13.0	11.4 - 13.0	11.6 - 13.1	11.8 - 13.1	12.0 - 13.2	12.2 - 13.2	12.4 - 13.2
PEASE INT'L (17)	11.5 - 12.8	11.5 - 12.8	11.6 - 12.9	11.8 - 12.9	12.0 - 13.0	12.2 - 13.0	12.4 - 13.0

1st EO VI (KFPS)	12.6	12.8	13.0	13.2	13.4	13.6	13.8
OTIS ANGB (16)	12.6 - 13.3	12.8 - 13.3	13.0 - 13.4	13.2 - 13.4	13.4 - 13.4		
PEASE INT'L (17)	12.6 - 13.1	12.8 - 13.1	13.0 - 13.1				

ASC-10b/116/A/C

NOT FLOWN

2-43

ASC/116/FIN B

**FMI TAL REDESIGNATION
(116 OCFR4 CYC)**

1st E.O. VI		6100	6200	6300	6400	6500	6600	6700	6800
SE OPS 3 FMI 109	(29)	11000	11100	11100	11100	11100	11200	11200	11200
SE FMI 104	(29)	17800	17600	17400	17200	17000	16800	16500	16300

1st E.O. VI		6900	7000	7100	7200	7300	7400	7500	7600
SE OPS 3 FMI 109	(29)	11200	11200	11300	11300	11300	11300	11300	11400
SE FMI 104	(29)	16100	15900	15700	15600	15400	15200	15000	14900

1st E.O. VI		7700	7800	7900	8000	8100	8200	8300	8400
SE OPS 3 FMI 109	(29)	11400	11400	11400	11400	11500	11500	11500	11500
SE FMI 104	(29)	14700	14600	14500	14300	14200	14100	14000	14000

1st E.O. VI		8500	8600	8700	8800	8900	9000	9100	9200
SE OPS 3 FMI 109	(29)	11500	11500	11600	11600	11600	11600	11600	11600
SE FMI 104	(29)	13900	13800	13800	13700	13700	13700	13700	13600

1st E.O. VI		9300	9400	9500	9600	9700	9800	9900	10000
SE OPS 3 FMI 109	(29)	11700	11700	11700	11700	11700	11700	11700	11800
SE FMI 104	(29)	13600	13600	13600	13600	13600	13600	13700	13700

1st E.O. VI		10100	10200	10300	10400	10500	10600		
SE OPS 3 FMI 109	(29)	11800	11800	11800	11800	11800	11800		
SE FMI 104	(29)	13700	13700	13800	13800	13800	13800		

ASC-12a/116/A/B

NOT FLOWN

2-44

ASC/116/FIN B

ECAL – ZZA or MRN or FMI PRIME TAL

1st EO VI (KFPS)	5.6	5.8	6.0	6.2	6.4	6.6	6.8
CHERRY POINT (7)		6.7 - 7.0	6.7 - 7.2	6.8 - 7.3	6.8 - 7.4	6.9 - 7.5	6.9 - 7.6
OTIS ANGB (16)		10.3 - 11.1	10.3 - 11.2	10.2 - 11.3	10.2 - 11.5	10.2 - 11.6	10.2 - 11.6

1st EO VI (KFPS)	7.0	7.2	7.4	7.6	7.8	8.0	8.2
CHERRY POINT (7)	7.0 - 7.7	7.2 - 7.8	7.4 - 7.9	7.6 - 7.9	7.8 - 8.0	8.0 - 8.0	
GABRESKI (15)					10.5 - 10.7	10.4 - 10.8	10.3 - 11.0
OTIS ANGB (16)	10.2 - 11.7	10.2 - 11.8	10.2 - 11.9	10.2 - 12.0	10.2 - 12.1	10.2 - 12.1	10.3 - 12.2

1st EO VI (KFPS)	8.4	8.6	8.8	9.0	9.2	9.4	9.6
OCEANA NAS (8)		8.6 - 9.0	8.8 - 9.1	9.0 - 9.2	9.2 - 9.3		
WALLOPS (9)				9.4 - 9.6	9.2 - 9.7	9.4 - 9.8	9.6 - 9.8
GABRESKI (15)	10.3 - 11.1	10.3 - 11.2	10.3 - 11.3	10.4 - 11.3	10.4 - 11.4	10.4 - 11.5	10.4 - 11.5
OTIS ANGB (16)	10.3 - 12.3	10.3 - 12.3	10.3 - 12.4	10.4 - 12.4	10.4 - 12.5	10.5 - 12.6	10.5 - 12.6
PEASE INT'L (17)	11.3 - 11.7	11.3 - 11.9	11.3 - 12.0	11.3 - 12.1	11.3 - 12.2	11.3 - 12.2	11.3 - 12.3

1st EO VI (KFPS)	9.8	10.0	10.2	10.4	10.6	10.8	11.0
WALLOPS (9)	9.8 - 9.9						
GABRESKI (15)	10.4 - 11.6	10.5 - 11.7	10.5 - 11.7	10.5 - 11.8	10.6 - 11.8	10.8 - 11.9	11.0 - 11.9
OTIS ANGB (16)	10.5 - 12.7	10.5 - 12.7	10.6 - 12.8	10.6 - 12.8	10.7 - 12.9	10.8 - 12.9	11.0 - 12.9
PEASE INT'L (17)	11.3 - 12.4	11.4 - 12.5	11.4 - 12.5	11.5 - 12.6	11.5 - 12.6	11.5 - 12.7	11.5 - 12.7

1st EO VI (KFPS)	11.2	11.4	11.6	11.8	12.0	12.2	12.4
GABRESKI (15)	11.2 - 12.0	11.4 - 12.0	11.6 - 12.1	11.8 - 12.2	12.0 - 12.2	12.2 - 12.3	
OTIS ANGB (16)	11.2 - 13.0	11.4 - 13.0	11.6 - 13.1	11.8 - 13.1	12.0 - 13.2	12.2 - 13.2	12.4 - 13.2
PEASE INT'L (17)	11.5 - 12.8	11.5 - 12.8	11.6 - 12.9	11.8 - 12.9	12.0 - 13.0	12.2 - 13.0	12.4 - 13.0

1st EO VI (KFPS)	12.6	12.8	13.0	13.2	13.4	13.6	13.8
OTIS ANGB (16)	12.6 - 13.3	12.8 - 13.3	13.0 - 13.4	13.2 - 13.4	13.4 - 13.4		
PEASE INT'L (17)	12.6 - 13.1	12.8 - 13.1	13.0 - 13.1				

ASC-12b/116/A/B

NOT FLOWN

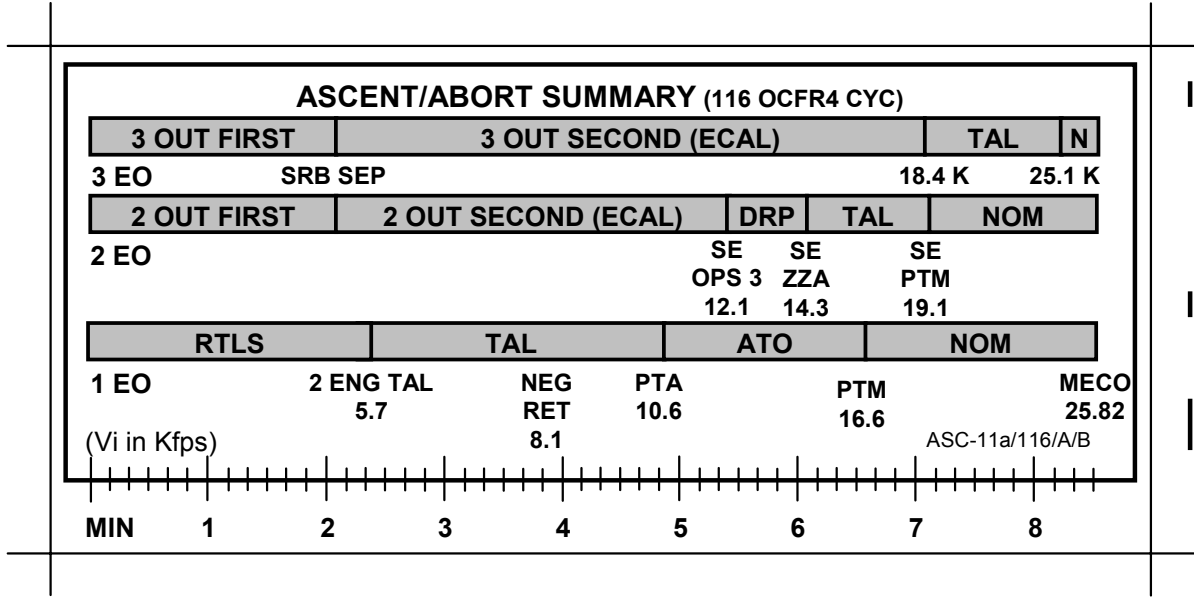
2-45

ASC/116/FIN B

NOT FLOWN

2-46

ASC/116/FIN B





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 $\sqrt{\text{MCC}}$,
ADI – REF

- * If Feedline Fail: *
- * $\sqrt{\text{MCC}}$ 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 $\sqrt{\text{BDY FLP pb}}$ – 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 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 PWRDN/ISOL

NOTE

Expect multiple MAs for MPS He P
as regs bleed down

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

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 DR (two) – OFF
LAT (two) – LAT (tb-bp)

√After 6 sec, L,R LAT tb (two) – LAT

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

L,R LAT (two) – OFF
MODE – GPC

1: GNC OMS 2 MNVR EXEC

2: GNC OMS 2 MNVR EXEC

3: BFS, GNC OMS 2 MNVR EXEC

OMS BURN PREP

- * For single eng burn/No PROP *
- * failures: *
- * XFEED failed eng PROP to *
- * good eng *

- P O8 L,R OMS
√He PRESS/VAP ISOL A (two) – GPC
B (two) – CL
√TK ISOL (four) – GPC (tb-OP)
√XFEED (four) – GPC (tb-CL)
- B Wedge Install OMS 2/ORBIT OMS BURN and
OMS 2 BURN MONITOR Cue Cards
(F6,F8)
- If FRCS reqd,
Go to OPS 1 RCS BURN (Cue Card)

OMS 2 BURN ATTITUDE MNVR

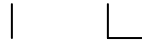
- B F6,F8 √ADI ATT (two) – INRTL
RATE (two) – 1
- C MNVR – ITEM 27 EXEC (*)

3: BFS, GNC SYS SUMM 2

B SEAT SAFING AND ADJUSTMENT

Adjust Back Angle

- TIG-5 B Go to OMS 2/ORBIT OMS BURN
(Cue Card)



OMS 2 BURN CARDS

OMS 2

MS ONLY

4-1

ASC/116/FIN B



OMS 2 BURN MONITOR

OMS TEMP* FU IN P ≥ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="padding: 2px;">L</td><td style="padding: 2px;">R</td></tr><tr><td style="padding: 2px;">225</td><td style="padding: 2px;">220</td></tr></table> ≤ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="padding: 2px;">205</td><td style="padding: 2px;">204</td></tr></table> or No FU IN P	L	R	225	220	205	204	OMS ENG FAIL <hr/> OMS PRPLT FAIL
L	R						
225	220						
205	204						
OMS PC* & OMS ↓ (BFS: √accel) ENG VLV 1 or 2 < 70 or OX IN P > 227 <hr/> OX IN P ≤ 227 or No OX IN P	OMS ENG FAIL <hr/> OMS PRPLT FAIL						
OMS OX/FU TK P (√ENG IN P) OX/FU LOW <hr/> 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 > <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="padding: 2px;">85</td></tr></table> : OMS PRPLT FAIL <hr/> He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284	85					
85							
OMS He TK P LOW (√ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="padding: 2px;">OMS/MPS</td></tr></table>)	OMS/MPS	At He P < 640 or QTY ≤ 41: If HP < <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="padding: 2px;">85</td></tr></table> : OMS XFEED from good OMS At HP > <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="padding: 2px;">85</td></tr></table> : OMS PRPLT FAIL	85	85			
OMS/MPS							
85							
85							
OMS N2 REG P HIGH or LOW	OMS ENG – ARM						
OMS N2 TK P LOW (√ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="padding: 2px;">OMS/MPS</td></tr></table>)	OMS/MPS	At N2 TK P < 470: OMS ENG – ARM					
OMS/MPS							
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	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/116/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
 -X
 :00 CUR HP = TGT HP , release THC
 CUTOFF CNTLR PWR (two) – OFF

ASC-6b/116/A,O/B

POST OMS 2 BURN PROCEDURES

**POST
OMS 2**

5-1

ASC/116/FIN B

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

POST
OMS 2

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)

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

MAJOR MODE CHANGE

CRT1 GNC, OPS 106 PRO

1: GNC OMS 2 MNVR COAST	2: GNC OMS 2 MNVR COAST
-------------------------	-------------------------

B C4A, Stow ASC PKT (Helmet Bag)
R3A Unstow ORBIT Cue Cards & ORB PKT

- * If ATO, √MCC for procedure changes *
- * If Rev 3 deorbit reqd, go to CONT *
- * DEORB, LAUNCH DAY ORBIT 3 *

Go to POST INSERT, POST INSERTION



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AOA PADS

**AOA
PADS**

6-1

ASC/116/FIN B



DIRECT INSERTION AOA DEL PAD

DEORBIT									
PRPLT					()				
BURN CUE CARD:									
OMS ENG FAIL XFEED QTY CUE					%L		%R		
TOT AFT QTY 1 (%)							2 2 3		
TOT AFT QTY 2 (%)							5 3		
FLIP ΔV							4 8		
AFT ΔV							0		
B/U SITE							N / A		
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		<input type="checkbox"/> <input type="checkbox"/>		RWY		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		50K /	
<input type="checkbox"/> L		<input type="checkbox"/> OVHD		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> deg		<input type="checkbox"/> <input type="checkbox"/> MLS		38K /	
<input type="checkbox"/> R		<input type="checkbox"/> STRT		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> TAC				28K /	
ΔT MACH < 1 TO HAC		MAX Nz		Nz LIMIT		WINDS:		12K /	
<input type="checkbox"/> : <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> . <input type="checkbox"/>		<input type="checkbox"/> . <input type="checkbox"/>		(ENT MNVR Cue Card)		7K /	
ΔT HAC INIT TO H = 20K								3K /	
<input type="checkbox"/> : <input type="checkbox"/> <input type="checkbox"/>								1K /	
AIMPOINT		SPEEDBRAKE						SURFACE /	
<input type="checkbox"/> NOM		<input type="checkbox"/> NOM		<input type="checkbox"/> <input type="checkbox"/> % @ 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 (%)							2 2 3					
TOT AFT QTY 2 (%)							5 3					
FLIP HP = () [] [] TGT HP + [] [] ΔHP (REDES SITE) OR [1 9 / 0 7] ΔHP (PRI SITE) STEEP SHALLOW + [2 4] = [] [] <small>((FLIP ΔV / 2))</small>												
AFT HP = () [] [] TGT HP + [] [] 0 = [] [] <small>((AFT ΔV / 2))</small>												
B/U SITE					N / A							
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)		20K /		
[] [] :		[] [] .		[] [] .						12K /		
ΔT HAC INIT TO H = 20K										7K /		
[] [] :										3K /		
AIMPOINT		SPEEDBRAKE									1K /	
<input type="checkbox"/> NOM		<input type="checkbox"/> NOM		[] [] % @ 3K						SURFACE /		
<input type="checkbox"/> CLOSE-IN		<input type="checkbox"/> S.F.										
REMARKS:												

6-4

ASC/116/FIN B

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

DEORBIT BURN (1 ENG)	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"/> %
DEORBIT BURN (RCS)	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"/>
UNBALANCED PRPLT DEORBIT BURN	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="text"/> <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
DEORBIT BURN (MIXED XFEED)	FEED FROM GOOD POD: 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"/> % <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



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AOA

AOA PROCEDURES

AOA

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

P HYD DEPRESS

- R4 √HYD MPS/TVC ISOL VLV (three) – CL
- R2 √APU SPEED SEL (three) – NORM
- √AUTO SHTDN (three) – ENA
- HYD MN PUMP PRESS (three) – LO (MA)

FES & HEATER ACTIVATION

- C L2 FLASH EVAP 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
- Select any AOA I_TGT (3-12) to set AOA flag,
 but do not load until OPS 3

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><u>WARNING</u> 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>WARNING 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 DR (two) – OFF
LAT (two) – LAT (tb-bp)

√After 6 sec, L,R LAT tb (two) – LAT

* If doors do not latch within 12 sec: *

* L,R LAT (two) – OFF *

* √MCC *

L,R 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	TACANS	ITEM 5	MLS
1	KSC 15 KSC 33	TTS 59Y	OMN 73	8 6
42	NOR 17 NOR 23	SNG 121Y	HMN 92	6 6
43	NOR 05 NOR 35	SNG 121Y	HMN 92	- -
44	EDW 15 EDW 18L	EDW 111	LHS 21	- -
45	EDW 22 EDW 04	EDW 111	LHS 21	8/† 6

† MSBLS Jr. Channel 8 – Requires Uplink

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

1: GNC DEORB MNVR EXEC

B OMS 2 BURN SETUP

CRT1 √Or enter Target (steep or shallow based on ΔV capability) from OMS TARGETS or MCC

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

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

NOTE

Onboard computed TIG and θ_t may vary slightly and are acceptable if REI is correct

LOAD – ITEM 22 EXEC
TIMER – ITEM 23 EXEC

CRT3 √BFS TGT

Fill in AOA DEORBIT BURN CARDS from AOA DEL PAD, 6-2 or 6-3

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

6-17

ASC/116/FIN B

DEORBIT CARDS

DEORBIT BURN MONITOR

OMS TEMP* FU IN P \geq <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;">225</td><td style="text-align: center;">220</td></tr><tr><td style="text-align: center;">205</td><td style="text-align: center;">204</td></tr></table> or No FU IN P	L	R	225	220	205	204	OMS ENG FAIL OMS PRPLT FAIL
L	R						
225	220						
205	204						
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 (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 $\sqrt{\text{MAN SHUTDN}}$						
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 (twice)						
RM DLMA IMU or GPC SET SPLIT or 2 MN BUSES	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/116/A,O,D,E/A



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MS ONLY

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ASC/116/FIN B



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

```

ASC-8aa/116/A/B

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

```

ASC-8bb/116/A/B

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

MS ONLY

6-24

ASC/116/FIN B

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      4 8      FRCS COMPLETION
*
*   AFT   -----
*   ΔV      0 0      THC +X to TGT ΔV
*
*   TGT   -----
*   ΔV      0 0
*
* 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'r 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:

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

ASC-7aa/116/A/B



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**POST D/O
BURN**

AOA POST DEORBIT BURN

6-27

ASC/116/FIN B



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 (KSC)** *

* NOTE: APPLICABLE ONLY IF OMS 1 REQD *

* (ATO/AOA steep entries) **KSC** *

Δ HP	0	4	7	10	13	16	19	23	26
PREBANK	0	60	80	95	100	105	115	140	175

* (ATO/AOA shallow entries) **KSC** *

Δ HP	0	2	3	4	5	6	7	8	9
PREBANK	90	115	120	125	135	145	155	165	175

* 1160CFR4 *

C POST BURN STATUS

NOMINAL

Δ TIG
 :

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

C OMS GMBL PWRDN (PASS ONLY)

CRT1 Verify GMBL positions:

	L	R
P	+5.9	+5.9
Y	+6.4	-6.4

GMBL OFF – ITEM 32 EXEC
– ITEM 33 EXEC

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

C SECONDARY ACTUATOR CHECK (ON MCC GO)

NOTE

If port does not bypass during check, bypass affected port after check:

SEC ACT BYPASS – ITEM 8 +X X EXEC

If affected port still does not bypass:

SEC ACT RESET – ITEM 9 +X X EXEC

- R2 1. HYD MN PUMP PRESS (one) – NORM
- CRT3 2. SURF DRIVE ON, ITEM 39 EXEC (*), wait at least 5 sec
- SPI $\sqrt{\text{SPI}}$: Stop drive test when elevon posns within +12° to -27°:
SURF DRIVE OFF, ITEM 40 EXEC (*)
- CRT1 3. $\sqrt{\text{POS}}$ STIM ENA, ITEM 7 – (no *)
- C3 4. $\sqrt{\text{FCS}}$ CH 1,2,3,4 – AUTO
- CRT1 5. SEC ACT CK, CH 1 – ITEM 1 EXEC (*)
CK START – ITEM 5 EXEC (*)
- 6. $\sqrt{\text{All}}$ CH 1 ports bypass ‘↓’
STOP – ITEM 6 EXEC (*)
- C3 7. FCS CH 1 – ORIDE
- CRT1 $\sqrt{\text{All}}$ CH 1 ports reset no ‘↓’
- C3 FCS CH 1 – AUTO
- 8. Repeat steps 5 thru 7 for CH 2,3,4
- R2 9. HYD MN PUMP PRESS (three) – LO

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
TAC (per AOA RWY)	√5	√5
RA	blank √46	
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	
TAC	INH √20	INH √20
GPS	INH √43	INH √43
DRAG H	AUT √22	AUT √22
ADTA H	INH √26	INH √26
ADTA TO G&C	INH √29	AUT √28
TAC	DELTA √35	
DES any failed TACANS	√	√
AIF_G	INH √48	

* If BFS engaged: *

* Set HSD BFS ITEMS to PASS Config *

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

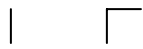
**OMS
FAILURE**



MS ONLY

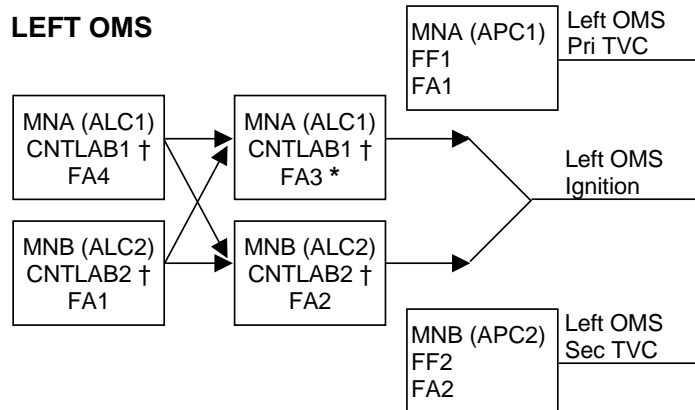
6-37

ASC/116/FIN B



OMS FAILURES

LEFT OMS

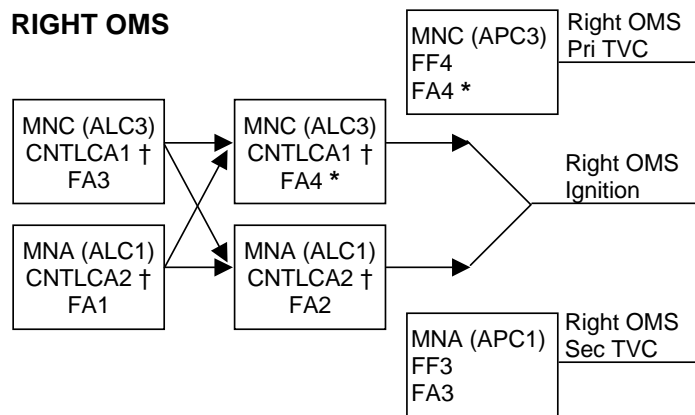


† If CNTL AB1 or AB2 (CA1 or CA2) failed and ign path still exists at OMS fail, assume L(R) OMS ↓ is PRPLT FAIL

* 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
95.6	4650	480	395	14:39
95	4630	477	393	14:33
90	4430	451	371	13:45
85	4230	425	350	12:57
80	4030	399	329	12:09
75	3830	373	308	11:21
70	3630	347	286	10:33
65	3430	321	265	09:45
60	3230	295	244	08:57
55	3030	269	222	08:09
50	2830	242	200	07:20
45	2630	216	179	06:32
40	2430	190	157	05:44
35	2230	163	135	04:56
30	2030	136	114	04:08
25	1830	110	92	03:20
20	1630	83	70	02:32
15	1430	56	47	01:43
10	1230	29	25	00:54
5	1030	2	2	00:04

OMS/
RCS Δ V

OMS-2/AOA ΔV	
ARCS ΔV fps =	$[0.7] \times [L\% + R\% - \text{AFT QTY } 1]$
FRCS ΔV fps =	$[0.8] \times \text{FRCS } \%$
OMS ΔV fps =	$[5.2] \times \text{OMS } \%$

NOTE: Uses assumed vehicle weight of $[254,998]$ lb

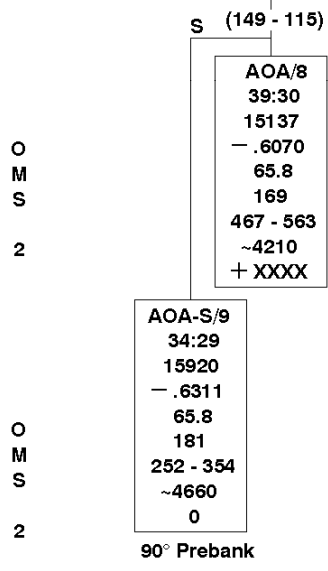
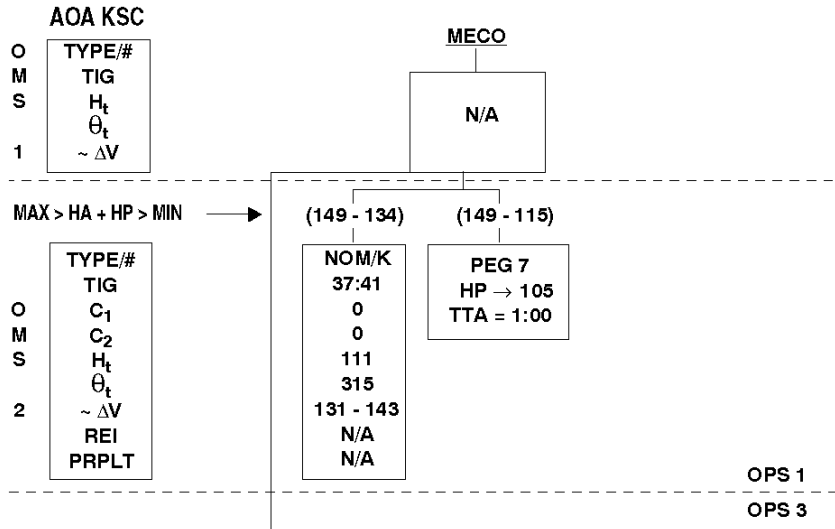


OMS TARGETS, COMM COVERAGE, LAND SITES

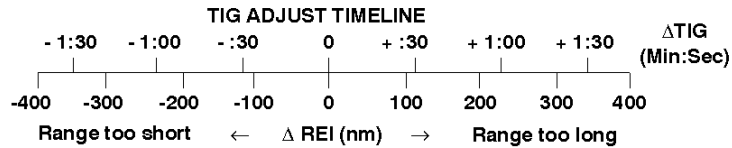
**OMS
TGTS**



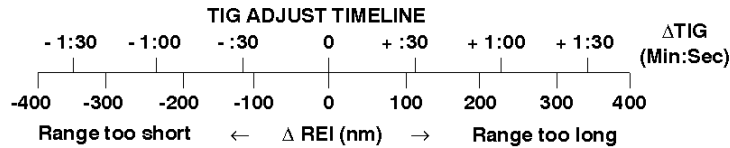
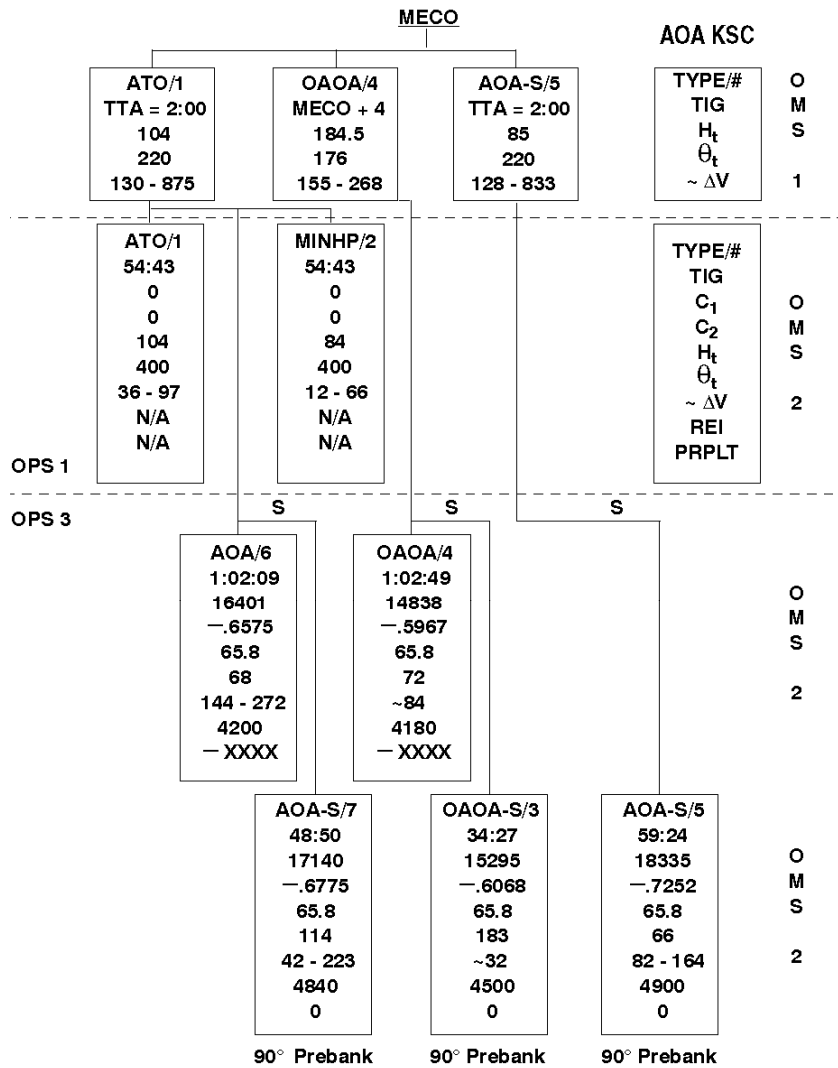
STS-116 OCFR4 CY OMS TARGETS - DIRECT INSERTION



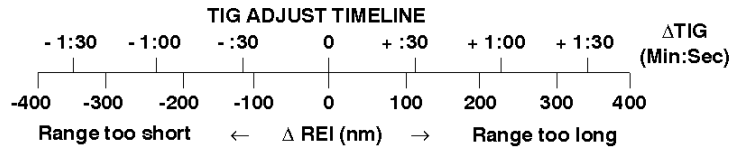
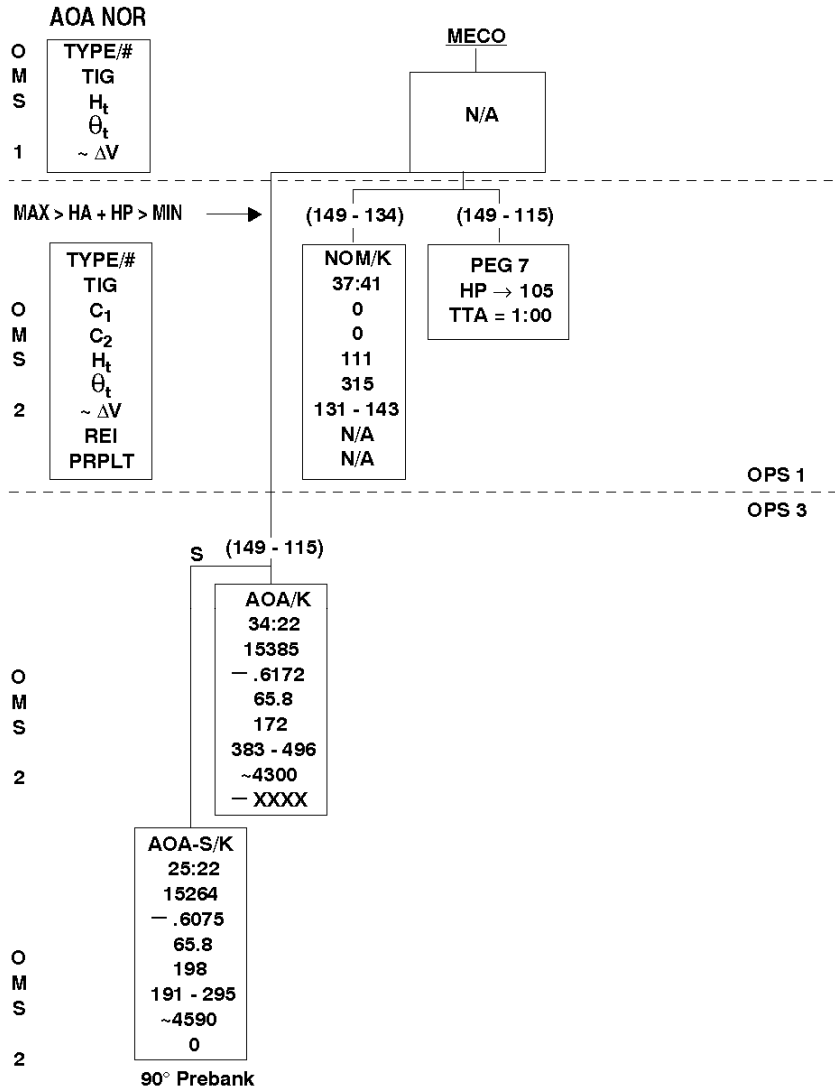
OMS
TGTS



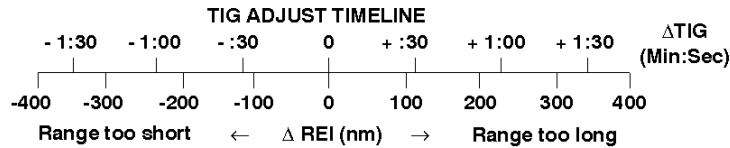
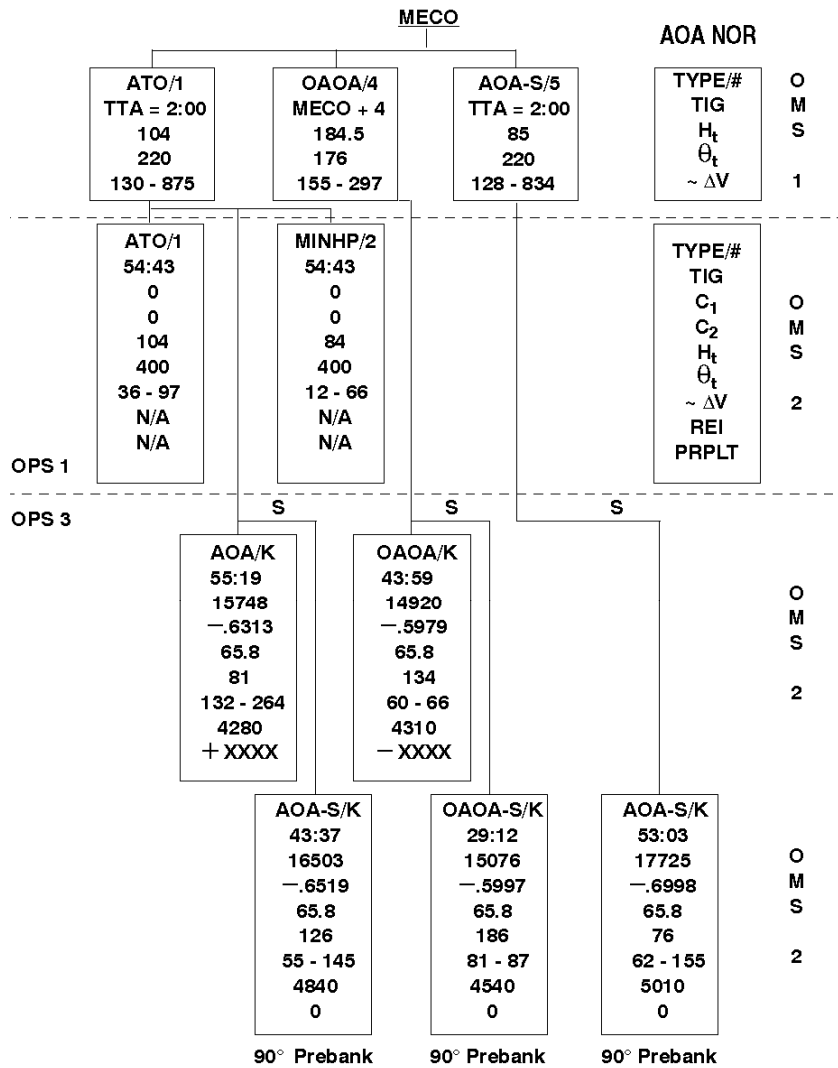
STS-116 OCFR4 CY OMS TARGETS - W/OMS 1



STS-116 OCFR4 CY OMS TARGETS - DIRECT INSERTION

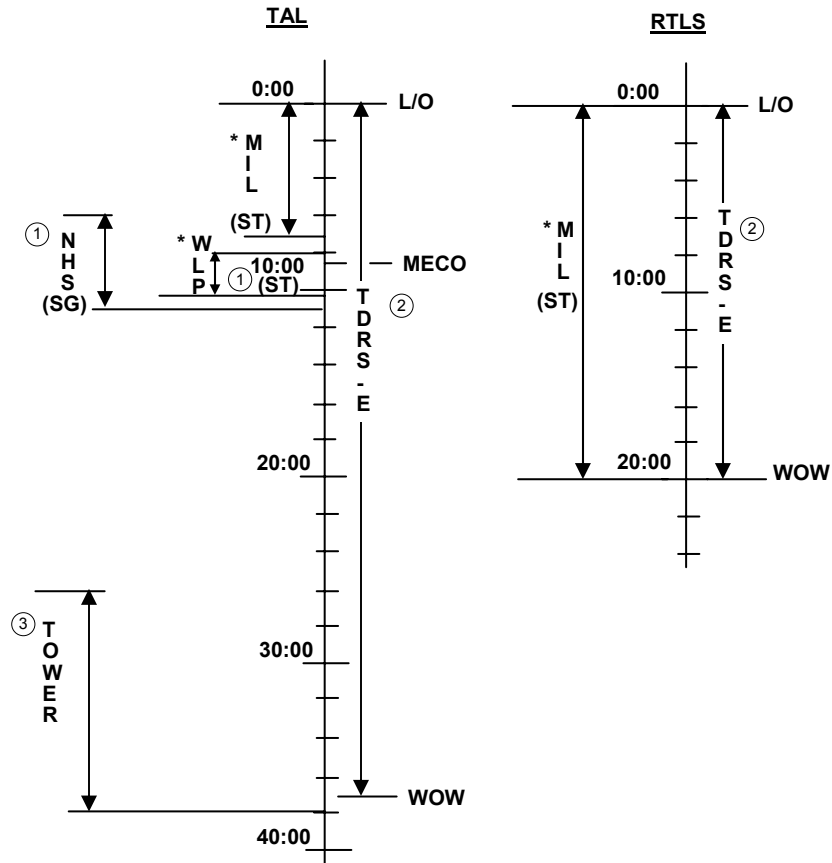


STS-116 OCFR4 CY OMS TARGETS - W/OMS 1



**COMM
COVER**

COMMUNICATION COVERAGE – (TAL/RTLS)



MODE

ST – STDN
SG – SGLS

*UHF available

NOTE: ① NHS/WLP coverage only on high inclinations

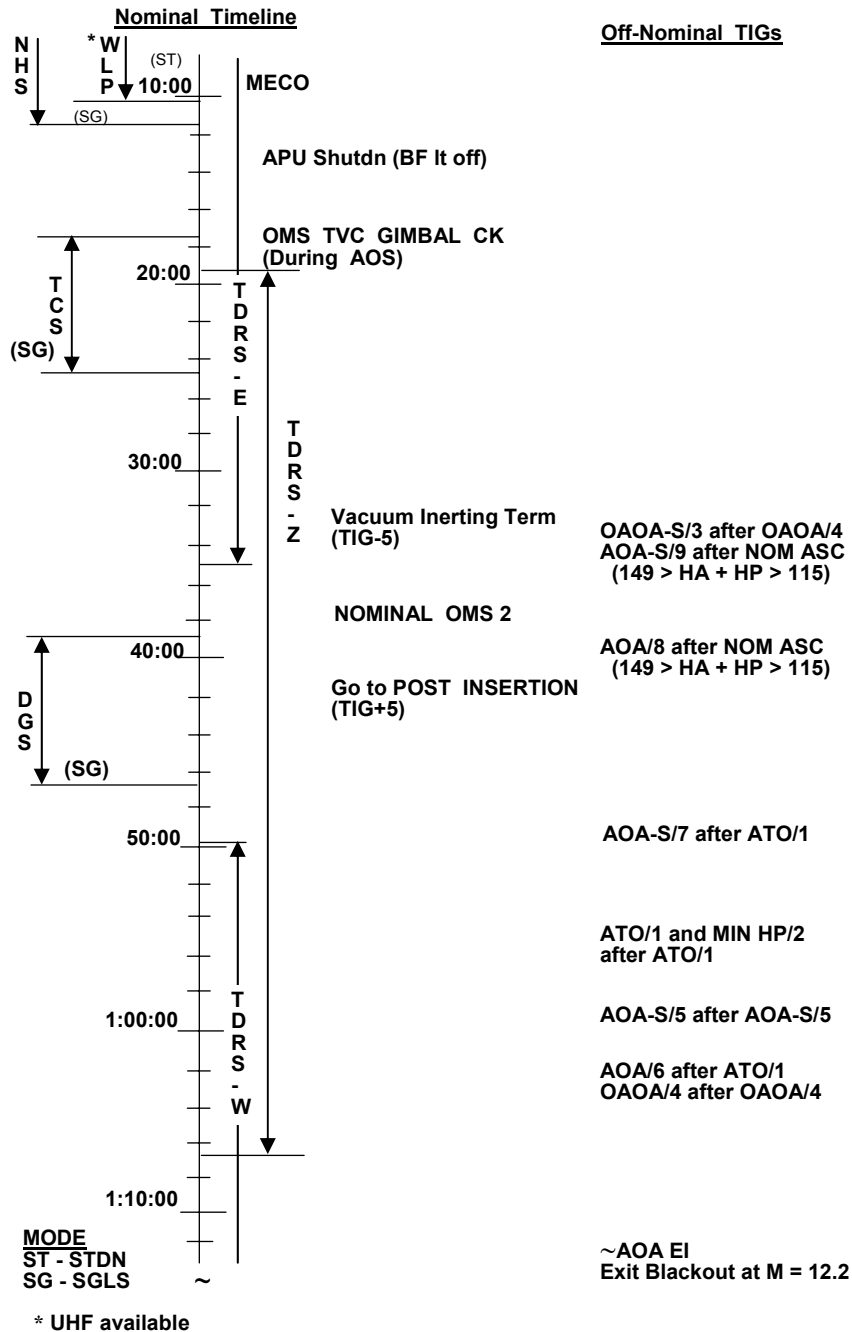
② ET blocks coverage until vehicle upright

③ Tower UHF installed at all TAL sites

**COMM
COVER**

COMMUNICATION COVERAGE – (AOA to KSC)

LAND SITE



STS-116 LANDING SITE TABLE
(50° to 63.5° INCLINATION)

SITE	LOCATION	RWY	TACANS		MLS CH	LG	+ OVR RUN
				ITEM 5			
1	KSC	KSC 15 KSC 33	TTS 59Y	OMN 73	8 6	15000 15000	1000 1000
2	BEN GUERIR	BEN 36 BEN 18	MAK 80 ■	CBA 116 ■	- -	13720 13220	0 1000
3	MORON AB	MRN 20 MRN 02	MRN 100	AOG 23	◆6 -	11730 11730	1000 1000
4	ZARAGOZA	ZZA 30L ZZA 12R	ZZA 64	ZAR 77 ■	◆6 -	12200 12200	1000 1010
5	MYRTLE BEACH	MYR 36 MYR 18	ILM 117	FLO 99	- -	9500 9500	1000 1000
6	WILMINGTON	ILM 06 ILM 24	ILM 117	DIW 107 ■	- -	7500 7500	0 0
7	CHERRY POINT	NKT 32L NKT 23R	EWN 83 ■	NCA 101	- -	7110 7100	800 880
8	OCEANA NAS	NTU 32R NTU 23L	NFE 19Y	NGU 48	- -	7500 11500	0 0
9	WALLOPS	WAL 28 WAL 04	SBY 49	SWL 71	- -	7510 8750	0 0
10	DOVER AFB	DOV 32 DOV 19	SIE 95	CYN 81	- -	12400 9100	0 0
11	ATLANTIC CITY	ACY 31 ACY 13	CYN 81	SIE 95	- -	9500 9500	0 0
12	BEN GUERIR	BEN 36 BEN 18	MAK 80 ■	CBA 116 ■	- -	13720 13220	0 1000
13	*MORON AB	MRN 20 MRN 02	MRN 100	AOG 23	◆6 -	11730 11730	1000 1000
14	*ZARAGOZA	ZZA 30L ZZA 12R	ZZA 64	ZAR 77 ■	◆6 -	12200 12200	1000 1010
15	GABRESKI	FOK 06 FOK 24	HTO 83	GON45Y ■	- -	8500 8500	1000 1000

◆ Available for TAL Only

■ DME

* LO XRNG TAL Site

Length after displaced threshold

**STS-116 LANDING SITE TABLE
(50° to 63.5° INCLINATION)**

S I T E	LOCATION	RWY	TACANS		MLS CH	LG	+ OVR RUN
				ITEM 5			
16	OTIS ANGB	FMH 32	BOS 74	PVD 103	-	9000	0
		FMH 23			-	7500	0
17	PEASE INT'L	PSM 34	ENE 118	BOS 74	-	10020	0
		PSM 16			-	10020	0
18	HALIFAX INT'L	YHZ 23	UAW 38	YHZ 98 ■	-	8800	0
		YHZ 32			-	7700	0
19	STEPHENVILLE	YJT 09	YJT 78	YDF 80 ■	-	9500	0
		YJT 27			-	9500	0
20	ST JOHNS INT'L	YYT 29	UYT 23	YYT 82 ■	-	8500	0
		YYT 11			-	8500	0
21	GANDER INT'L	YQX 21	YQX 74	IQX 32 ■	-	9700	0
		YQX 31			-	8900	0
22	GOOSE BAY	YYR 26	UYR 40	YYR 120 ■	-	10550	0
		YYR 34			-	9080	0
23	LAJES	LAJ 15	TRM 109	LAJ 45	-	10870	970
		LAJ 33			-	10870	990
24	BEJA	BEJ 01L	MOJ 37	BEJ 105	-	10820	0
		BEJ 19R			-	10820	900
25	KEFLAVIK	IKF 20	KEF 57	HL 44 ■	-	9520	0
		IKF 29			-	9560	0
26	SHANNON	INN 06	SHA 80 ■	CRN 37 ■	-	9540	0
		INN 24			-	9540	0
27	FAIRFORD	FFA 27	FFA 81	BZN 56	-	9490	990
		FFA 09			-	9490	970
28	KOLN-BONN	KBO 14L	GIX 18	DOR 23Y ■	-	12020	0
		KBO 32R			-	12020	0
29	ISTRES AB	FMI 33	◆FMI 16	NIM 53	◆6	11300	3960
		FMI 15			-	12300	0
30	ESENBOGA	ESN 03R	BAG 78 ■	BUK 90 ■	-	11800	0
		ESN 21L			-	11800	0

◆ Available for TAL Only

■ DME

Length after displaced threshold

**STS-116 LANDING SITE TABLE
(50° to 63.5° INCLINATION)**

S I T E	LOCATION	RWY	TACANS		MLS CH	LG	+ OVR RUN
				ITEM 5			
31	KING KHALID	KKI 15R KKI 33L	RIY 92	KIA 80	-	13300	0
					-	13300	0
32	DIEGO GARCIA	JDG 31 JDG 13	NKW 57	NKW 57	-	12000	950
					-	12000	950
33	AMBERLEY TINDAL RAAF	AMB 15 PTN 14	AMB 94	-	-	9500	0
			-	TDL 70	-	8500	0
34	YOKOTA AB	JTY 36 JTY 18	SHT 19	NJA 98	-	11000	1000
					-	11000	1000
35	ANDERSEN AFB	GUA 06L GUA 24R	UAM 54	UNZ 100	-	10560	1050
					-	10560	1000
36	WAKE ISLAND	WAK 28 WAK 10	AWK 82	AWK 82	-	9360	0
					-	9360	0
37	HONOLULU	HNL 08R HNL 26L	HNL 95	NGF 93	-	11500	0
					-	11500	0
38	ELMENDORF	EDF 24 EDF 06	EDF 81	BGQ 72	-	9500	0
					-	9500	0
39	HAO ATOLL	HAO 12 HAO 30	HAO 85 ■	HAO 85 ■	-	10390	0
					-	10390	0
40	RIO GALLEGOS	AWG 25 AWG 07	GAL 114 ■	GAL 114 ■	-	10900	0
					-	10900	0
41	ASCENSION	HAW 13 HAW 31	ASI 59	ASI 59	-	9520	0
					-	9520	0
42	NORTHROP	NOR 17 NOR 23	SNG 121Y	HMN 92	6	15000	Lkbd
					6	15000	Lkbd
43	NORTHROP	NOR 05 NOR 35	SNG 121Y	HMN 92	-	15000	Lkbd
					-	15000	Lkbd
44	EDWARDS AFB	EDW 15 EDW 18L	EDW 111	LHS 21	-	16300	Lkbd
					-	15000	Lkbd
45	EDWARDS AFB	EDW 22 EDW 04	EDW 111	LHS 21	8/†	15010	0
					6	14010	1800

† MSBLS Jr. Ch 8 - Requires Uplink

■ DME

Length after displaced threshold



WEATHER PADS

8-1

ASC/116/FIN B



**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	/	/	/	/	/

TAL () data to ACL FB 2-14

TAL/CONUS TERMINAL FORECASTS

DEORB ORBIT	SITE	LDG GMT	SKY	VIS/WX	T/TD (°F)	WIND (MAG)	ALTM	DA	REMARKS
TAL (1)									
TAL (2)									
TAL (3)									

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

ALT	TAL (1)	TAL (2)	TAL (3)			
50K	/	/	/			
38K	/	/	/			
28K	/	/	/			
20K	/	/	/			
12K	/	/	/			
7K	/	/	/			
3K	/	/	/			
1K	/	/	/			
SFC	/	/	/			

ELS TERMINAL FORECASTS (Site Generated)

	SITE	ID	LDG GMT	SKY	VIS/WX	WIND (TRUE)	ALTM	REMARKS

ELS TERMINAL FORECASTS (Site Generated) (Cont)

	SITE	ID	LDG GMT	SKY	VIS/WX	WIND (TRUE)	ALTM	REMARKS

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	
R4..... 9-6	FLOOR..... 9-15	L9..... 9-23
R6..... 9-6	MO63P..... 9-15	L10L..... 9-23
R side OVHD		L10U..... 9-24
Flood..... 9-6	MIDDECK EXPERIMENTS	L11U..... 9-24
		L12UL..... 9-24
C2..... 9-6	MIDDECK (TEPC).. 9-16	L12UR..... 9-24
C3..... 9-6		L12LL..... 9-24
C5..... 9-7	AIRLOCK	L12LR..... 9-24
S2..... 9-7		L12L..... 9-24
C6..... 9-7	AW18A..... 9-17	R12..... 9-24
C7..... 9-7	AW18D..... 9-17	
	AW18H..... 9-17	A15..... 9-25
O1..... 9-7	AW82B..... 9-17	A14..... 9-25
O2..... 9-7	AW82D..... 9-17	A13..... 9-25
O3..... 9-7	AW82H..... 9-17	A12..... 9-25
O5..... 9-7	TW58T..... 9-17	A11..... 9-26
O6..... 9-7	A/L IN HATCH..... 9-17	
O7..... 9-8	A/L OUT HATCH... 9-17	R14..... 9-26
O8..... 9-8	SH HATCH..... 9-17	
O9..... 9-8	EXT A/L UPPER	HARDWARE
O13..... 9-9	HATCH..... 9-17	C/W..... 9-27
O14..... 9-9	TNL ADP	MEDS CONFIG
O15..... 9-9	HATCH..... 9-17	FOR INGRESS 9-28
O16..... 9-9		
O17..... 9-10		
O19..... 9-10		

SW LIST

NOT FLOWN

9-1

ASC/116/FIN B

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
    
```

- 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-116 options affecting switch list:
 - 1) OV103
 - 2) GMTLO
 - 3) Orbit incln = 51.6°
 - 4) Payload: ITS-P5, SSTS, S Hab-SM, ICC
 - 5) Crew size of 7 up, 7 down
 - 6) Installed: TK CRYO sets (5), SORG, Ku Ant, GN2 (6), External Airlock (ISS), RMS, OBSS, OIU, VPU, WVS, DTV
 - 7) Options N/R: RCRS
- Changes are with respect to STS-121 Switch List as published in FIN 3

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 AC3 SIG CONDR (two) – op {Y} :J AC1 ΦC TACAN 1 (OV105) – op {R} :P AC2 ΦC TACAN 2 (OV105) – op {R} AC3 ΦC TACAN 3 (OV105) – op {R} blank cbs (three) (OV103,4) – 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) – It off SMOKE DETN Its (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

L2 FLASH EVAP FDLN HTR SPLY (two) – OFF 2
 ANTISKID – ON
 NWS – 1
 BDY FLP – AUTO/OFF
 ENTRY MODE – AUTO
 TRIM R,P,Y (three) – ctr
 FREON ISOL MODE – OFF
 LOOP 1,2 (two) – ctr ****
 SBTC – full forward
 ATM PRESS CONTROL
 O2 SYS SPLY (two) – ctr (tb-OP)
 EMER – ctr (tb-bp)**
 XOVR SYS (two) – OP
 N2 SYS (four) – ctr (tb-OP)
 O2/N2 CNTLR VLV SYS 1 – OP
 2 – CL
 PPO2 SNSR/VLV – NORM

S1 CDR SEAT PWR BUS SEL – AC2 (up)
 CONTR (two) – ctr

F1 DC UTIL PWR MNB – OFF
 AC UTIL PWR AC1 – OFF

F2 All pb lts off except:
 BDY FLP pb – AUTO lt off
 SPDBK/THROT pb – AUTO lt off
 PITCH pb – AUTO lt off
 ROLL/YAW pb – AUTO lt off

F6U L HUD MODE – NORM
 DIM BRT sel – mid range
 HUD BRT – as reqd

F3 L HUD PWR – OFF
 TRIM RHC/PNL – INH
 PNL – ON
 NWS FAIL lt – off
 ANTISKID FAIL lt – off
 R TRIM RHC/PNL – INH
 PNL – ON
 HUD PWR – OFF
 DRAG CHUTE pb (six) – lt off

F8U R HUD MODE – NORM
 DIM BRT sel – mid range
 HUD BRT – as reqd

F4 All pb lts off except:
 BDY FLP pb – AUTO lt off
 SPDBK/THROT pb – AUTO lt off
 PITCH pb – AUTO lt off
 ROLL/YAW pb – AUTO lt off

F6 BFC – right
 HUD DATA BUS – 1
 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, 1
 RDR ALTM – 1
 FLT CNTLR PWR – ON
 ADI ATT – REF
 ERR – MED
 RATE – MED

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	R1	PL PRI MNB,FC3 (two) – ctr (tb-OFF) 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
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	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
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	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 l'CNCT (three) – GPC
F9	AC Volts sel – as reqd DC Volt/Amp sel – VOLTS MNB		
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 – ctr (tb-OFF)		

NOT FLOWN

9-5

ASC/116/FIN B

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

R2	APU/HYD RDY tb (three) – bp APU OPER (three) – START/RUN OFF SPEED SEL (three) – NORM HYD MN PUMP PRESS (three) – NORM cb APU FU TK VLV ENA (six) – cl { } op HYD CIRC PUMP (three) – OFF GPC APU CNTLR PWR (three) – ON OFF 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)	C2	IDP/CRT PWR (three) – ON MAJ FUNC (three) – GNC SEL (two) – as reqd EVENT TIMER MODE – DN CNTL – ctr TIMER SET pb (four) – 0900 TIMER – ctr
<hr/>			
R4	HYD BRAKE HTR (three) – OFF ISOL VLV (three) – GPC (tb-CL) MPS/TVC ISOL VLV (three) – GPC (tb-OP) LG/NWS HYD SYS – AUTO 1/2 LG EXTEND ISOL VLV – GPC (tb-CL) MPS ENG CNTLR HTR (three) – OFF MANF PRESS (two) – GPC FILL/DRAIN (four) – GND H2 PRESS LINE VENT – GND LO2 PREVLV (three) – GPC LH2 PREVLV (three) – GPC FDLN RLF ISOL (two) – GPC	C3	OMS ENG (two) – ARM/PRESS OFF BFC CRT DISP – ON OFF SEL – 3+1 FCS CH (four) – AUTO BDY FLP – AUTO/OFF AIR DATA PROBE STO (two) – INH MN ENG LIMIT SHUTDN – AUTO TRIM R,P,Y (three) – ctr SBTC – full forward DAP – all off SRB SEP – AUTO 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
<hr/>			
R6	R COMM PWR – ON OFF R side OVHD Flood – BRT		

NOT FLOWN

9-6

ASC/116/FIN B

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) – 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
C5	DIRECT O2 vlv – CL		
S2	PL SEAT PWR BUS SEL – AC3 (dn) CONTR (two) – ctr		
C6	LEH O2 vlv (four) – OP		
C7	LEH O2 SPLY vlv (two) – OP		
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
O2	CRYO O2 HTR ASSY TEMP sel – TK1 1 O2/H2 sel – TK1 FC STACK TEMP sel – 1		
O3	RCS/OMS PRESS sel – RCS He X 10 PRPLT QTY sel – OMS FUEL MSN TIME – MET		

NOT FLOWN

9-7

ASC/116/FIN B

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) – GPC OFF ANT SEL (three) – AUTO as is CH pb/tw (three) – 059Y 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) – OFF, as reqd

NOT FLOWN

9-8

ASC/116/FIN B

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

O09 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) - cl { }
 LC (OV103) - cl { }
 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}

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
	RJDF 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	
<hr/>			

NOT FLOWN

9-10

ASC/116/FIN B

MIDDECK SWITCH LIST FOR HANDOVER **INGRESS**

ML86B:A	cb MNA SPLY H2O TKA INLET	- cl { }	ML86B:C	cb MNA EXT ARLK HTR VEST	- op {Y}
	TKB OUTLET	- cl { }		MNB EXT ARLK HTR LINE ZN1	- op {Y}
	WASTE H2O DUMP VLV/NOZ HTR	- op {Y}		ZN2	- op {Y}
	H2O LINE HTR A	- op {Y}		H2O S/O VLV	- cl { }
	MNB SPLY H2O TKB INLET	- cl { }		STRUC	- op {Y}
	TKC OUTLET	- cl { }		VEST	- op {Y}
	DUMP ISOL	- op {Y}		MNC EXT ARLK HTR LINE ZN1	- op {Y}
	B SPLY ISOL VLV	- cl { }		ZN2	- op {Y}
	H2O LINE HTR B	- op {Y}	:D	cb MNA PYRO JETT SYS A KU ANT	- op {R}
	MNC SPLY H2O TKA OUTLET	- cl { }		STBD RMS	- op {R}
	TKC INLET	- cl { }		MMU GN2 SPLY ISOL VLV A	- op {Y}
	DUMP VLV/NOZ HTR	- op {Y}		PORT HTR A	- op {R}
	XOVR VLV	- cl { }		STBD HTR A	- op {R}
	GALLEY SPLY	- op {Y}		MNB PYRO JETT SYS A PORT RMS	- op {R}
:B	cb MNA WASTE H2O TK1 VLV	- cl { }		MMU GN2 SPLY ISOL VLV B	- op {R}
	SPLY H2O TKD OUTLET	- cl { }		PORT HTR B	- op {R}
	WASTE H2O DUMP ISOL	- op {Y}		STBD HTR B	- op {R}
	VAC VENT ISOL VLV	- op {Y}		MNC PYRO JETT SYS B KU ANT	- op {R}
	WCS CNTLR	- op {Y}		PORT RMS	- op {R}
	GALLEY OVEN	- op {Y}		STBD RMS	- op {R}
	MNB WASTE H2O TK1 DRAIN	- cl { }	:E	cb MNA EMU 2 H2O SPLY	- op {Y}
	SPLY H2O TKD INLET	- cl { }		WASTE	- op {Y}
	VAC VENT NOZ HTR	- op {Y}		FC PCM	- cl { }
	ISOL VLV	- op {Y}		CO2 SYS 1 CNTLR (OV104,5)	- op {R}
	WCS CNTLR	- op {Y}		FLOOD TNL ADAPT 2	- op {R}
	GALLEY H2O HTR	- op {Y}			- (op {Y} if SH flown)
:C	cb MNA EXT ARLK HTR LINE ZN1	- op {Y}			
	ZN2	- op {Y}			
	STRUC	- op {Y}			

NOT FLOWN

9-11

ASC/116/FIN B

MIDDECK SWITCH LIST FOR HANDOVER INGRESS

ML86B:E cb MNB MAR 1 - op {Y}
 2 - cl { }
 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 CNTRL (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 CNTRL TK4 (two) - cl { }
 - (op {R} if
 TK4 not flown)
 QTY TK4 (two) - cl { }
 - (op {R} if
 TK4 not flown)
 2CA CRYO CNTRL TK5 (two) - cl { }
 - (op {R} if
 TK5 not flown)
 QTY TK5 (two) - cl { }
 - (op {R} if
 TK5 not flown)
 3AB CRYO CNTRL TK3 (two) - cl { }
 QTY TK3 (two) - cl { }

NOT FLOWN

9-12

ASC/116/FIN B

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 – ON
 cb DC 10 AMP MNB CB2 – op { Y }
 CB3 – op { Y }
 CB4 – op { Y }
 CB5 – cl { }
 PUMPS S6 – OFF
 cb PUMPS (two) – op { Y }

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/116/FIN B

MIDDECK SWITCH LIST FOR HANDOVER INGRESS

MA73C:F cb AC1 RMS PRI ΦA – op {Y}
 – (op {R} if no RMS flown)
 MAR 3Φ – op {Y}
 OPS INST HYD ACTR ΦC – cl { }
 AC2 RMS B/U ΦA – op {Y}
 – (op {R} if no RMS flown)
 L SEAT 3Φ – cl { }
 OPS INST HYD ACTR ΦC – cl { }
 AC3 L SEAT 3Φ – cl { }
 :G cb ARLK TNL FAN (six) – op {R}
 – (op {Y} if SH flown or
 ISS docking mission)
 AC2 R SEAT 3Φ – cl { }
 AC3 GALLEY FAN (three) – op {Y}
 R SEAT 3Φ – cl { }
 blank switch – dn
 :H,I All cbs – cl { }
 :I AFT POD VLV LOGIC (three) – ON

MO10W	14.7 CAB REG INLET vlv (two)	– CL
	PPO2 CNTLR (two)	– NORM
	O2 REG INLET vlv (two)	– CL
	H2O TK N2 REG INLET vlv (two)	– OP
	PL N2 vlv (two)	– CL
	O2 EMER vlv	– CL
	N2 XOV R vlv	– CL
	H2O TK N2 ISOL vlv (two)	– OP
	PL O2 vlv (two)	– CL

WCS	AUTO INHIBIT/AUTO	– AUTO
	COMMODE CNTL	– DN/OFF
	MODE	– AUTO
	VAC VLV	– CL
	FAN BYP (two)	– OFF
	SEP	– OFF
	HOSE BLOCK	– SEP 1
	COMPACTOR ANGLE	– ~0 or < 10%

MO30F	DC UTIL PWR MNC	– OFF
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MO32M	LEH O2 5 vlv	– CL (OP if seat 5 flown)
	6 vlv	– CL (OP if seat 6 flown)

MO39M	MIDDECK COMM CCU PWR	– ON OFF
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MO42F	MIDDECK SPKR AUD PWR	– AUD/TONE
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	A/G (two)	– T/R
	A/A	– T/R
	ICOM (two)	– T/R
	VOX SENS sel	– as reqd
	MSTR SPKR VOL sel	– as reqd
	PAGE	– dn
	VOL pb (five)	– as reqd
	XMIT/ICOM MODE sel	– as reqd
		(PTT/PTT recommended)
	TONES	– ACCU/BYP
	SPKR PWR	– OFF

	GPC MEM DUMP sel	– OFF
	BYP TONE VOL	– as reqd

NOT FLOWN

9-14

ASC/116/FIN B

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 (OV103,4 only)

cb CB2/J2 – op { Y }
 CB3/J3 – cl { }
 CB4/J4 – op { Y }
 CB5/J5 – op { Y }
 CB6/J6 – cl { }
 RLY PWR – op { Y }

J2 – OFF
 J3 – ON
 J4 – OFF
 J5 – OFF
 J6 – ON
 Left select – 10A
 Right select – 10A

NOT FLOWN

9-15

ASC/116/FIN B

MIDDECK EXPERIMENTS SWITCH LIST FOR HANDOVER **INGRESS**

MIDDECK (TEPC)
SW-1 – OFF

NOT FLOWN

9-16

ASC/116/FIN B

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/116/FIN B

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	

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 AMPL – 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/116/FIN B

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	- 1 MON
	LAT (five)	- OFF (tb-LAT) (tb-bp)
	RDY tb (five)	- gray bp
<hr style="border-top: 1px dashed black;"/>		
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 style="border-top: 1px dashed black;"/>		
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/116/FIN B

AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

A2	DIGI-DIS SEL – EL/AZ	
	X-PNTR SCALE – X10	
A7U	MSTR ALARM pb	– lt off
	PL BAY FLOOD (eight)	– OFF
	PORT RMS LIGHT	– OFF
	CAMR	– ELBOW
	WIRELESS VIDEO (two)	– OFF
	TV CAMR PWR (five)	– ctr (tb-OFF)
	PWR CNTL	– CMD
	CONTR UNIT	– OFF
	DNLK	– ENA
	SYNC	– NORM
	VID IN pb (thirteen)	– lt off
	OUT pb (eight)	– lt off
	CAMR CMD PAN/TILT	– LO RATE
	FOCUS	– ctr
	ZOOM	– ctr
	IRIS	– ctr
	TILT	– ctr
	PAN	– ctr
	MENU pb (three)	– lt off
	MODE pb (three)	– lt off
A7L	(APDS CNTL PNL)	
	CNTL PNL PWR (three)	– OFF
	HTRS/DCU PWR (three)	– OFF
	APDS PWR (three)	– OFF (lt off)
	STATUS lts (thirty-six)	– off
	PYROS (three)	– OFF (lt off)
	PYRO CIRC PROT OFF lts (two)	– off
A4	MSN TIMER sel – MET	

NOT FLOWN

9-21

ASC/116/FIN B

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 lts (two) – off S/W STOP tb – gray C/W TONE VOL – as reqd lts (eleven) – off MSTR ALARM pb – lt off RATE MIN tb – OFF HOLD tb – OFF SCALE tb – gray EE MODE – OFF MAN CONTR – ctr tb (six) – bp B/U JOINT sel – SY PL REL – OFF DIRECT DR – ctr PARAM sel – PORT TEMP LTG ANNUN/NUM sel (two) – VAR,LO 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) – (OFF (tb-bp) if NO MPMs present) RETEN LAT – OFF (tb-LAT) – (OFF (tb-bp) if no MPMs present) HTR (two) – OFF R-F-L tb (three) – gray – (bp if no RMS flown) RMS SEL – OFF PWR – OFF PORT RMS – OFF (tb-STO) – (OFF (tb-bp) if no MPMs present) RETEN LAT – OFF (tb-LAT) – (OFF (tb-bp) if no MRLs present) HTR (two) – OFF R-F-L tb (three) – gray – (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/>
--	---

NOT FLOWN

9-22

ASC/116/FIN B

AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

L9 PS FLOOD sel (two) – ON,BRT
 – (OFF,BRT if night launch)
 AUD PWR – AUD/TONE
 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 PTT/PTT
 recommended)

CHARACTER DISPLAY – OFF
 INPUT SEL – VIDEO
 COUNTER SEL – TC
 AUDIO INPUT – FIX
 AUDIO REC LEVEL CH-1 – as is
 CH-2 – as is

L10L (MUX)
 Verify all Its off
 VTR/CC PWR – 0 (dn)
 RATE SEL (three) – 1
 MUX BYPASS – ACT
 MUX/VTR/CC PWR – 0 (dn)

L10L (VIP)
 Verify all Its off
 PWR – 0 (dn)
 ATU – REC
 CCTV VIDEO IN – J3

L10L (VTR)
 Verify all Its off
 ON/STANDBY It – off
 TIMER – OFF
 AUDIO OUTPUT SEL – CH-1/2
 PHONE LEVEL – midrange
 KEY INH – OFF
 CHARACTER DISPLAY (LCD) – ON (no BLACK BACK)
 DISPLAY SEL – DATA

NOT FLOWN

9-23

ASC/116/FIN B

AFT FLIGHT DECK PAYLOADS SWITCH LIST FOR HANDOVER **INGRESS**

<table border="0" style="width: 100%;"> <tr> <td style="width: 10%;">L10U</td> <td>(AVIU) SYNC/VIDEO – VIDEO HI-Z/75 – HI-Z PWR SEL – HI</td> </tr> <tr> <td>L11U</td> <td>(PDIP 2) T-0/OIU/OIU – OIU (ctr) DC PWR 1 CABIN P/L – OFF 2 CABIN P/L – OFF</td> </tr> <tr> <td>L12UL</td> <td>SSP-1 (APCU/MEPSI) Verify all tbs bp APCU 1 CONV – OFF OUTPUT RLY – OP 2 CONV – OFF OUTPUT RLY – OP cb SW PWR 1 – op PDIP 1 PWR 2/KuBAND RLY – op MEPSI PWR – OFF PRE-ARM/SAFE – SAFE ARM/SAFE – SAFE DEPLOY/SAFE – SAFE (ctr)</td> </tr> <tr> <td>L12UR</td> <td>SSP-1 (TCS/ODS/ANDE) Verify all tbs bp TCS PWR – OFF ANDE ARM/SAFE – SAFE DEPLOY/SAFE – ctr ORB H2O LINE HTR PWR A – OFF (B ENA) B – OFF (A ENA) cb SW PWR 2 – op X1/X2 sw PDIP 1 PWR 1 – op ODS CONN MATE X1 TLM PWR – OFF X2 TLM PWR – OFF ANDE PRE-ARM/SAFE – SAFE OIU PWR – OFF</td> </tr> </table>	L10U	(AVIU) SYNC/VIDEO – VIDEO HI-Z/75 – HI-Z PWR SEL – HI	L11U	(PDIP 2) T-0/OIU/OIU – OIU (ctr) DC PWR 1 CABIN P/L – OFF 2 CABIN P/L – OFF	L12UL	SSP-1 (APCU/MEPSI) Verify all tbs bp APCU 1 CONV – OFF OUTPUT RLY – OP 2 CONV – OFF OUTPUT RLY – OP cb SW PWR 1 – op PDIP 1 PWR 2/KuBAND RLY – op MEPSI PWR – OFF PRE-ARM/SAFE – SAFE ARM/SAFE – SAFE DEPLOY/SAFE – SAFE (ctr)	L12UR	SSP-1 (TCS/ODS/ANDE) Verify all tbs bp TCS PWR – OFF ANDE ARM/SAFE – SAFE DEPLOY/SAFE – ctr ORB H2O LINE HTR PWR A – OFF (B ENA) B – OFF (A ENA) cb SW PWR 2 – op X1/X2 sw PDIP 1 PWR 1 – op ODS CONN MATE X1 TLM PWR – OFF X2 TLM PWR – OFF ANDE PRE-ARM/SAFE – SAFE OIU PWR – OFF	<table border="0" style="width: 100%;"> <tr> <td style="width: 10%;">L12LL</td> <td>SSP-2 (RAFT) Verify all tbs bp cb RAFT – op PDIP 2 PWR 2 – op RAFT ARM/SAFE – SAFE DEPLOY/SAFE – SAFE C/L CAM PWR – OFF</td> </tr> <tr> <td>L12LR</td> <td>SSP-2 (SPACEHAB) Verify all tbs bp FIRE SUPPR FSCU ARM/SAFE – ctr DISCH – ctr CAB DEPRESS VLV ARM/SAFE – SAFE OP/CL – CL SMOKE SENSOR RESET/TEST – ctr A – INHB B – INHB cb SW PWR 4 – op PDIP 2 PWR 1 – op MAIN PWR – NO-OP SS DC BUS – ctr ORB SEC DC BUS – OFF INVERTER – NO-OP EXP DC BUS – ctr</td> </tr> <tr> <td>L12L</td> <td>(PDIP 1) Ku BAND RATE – OFF DC PWR 1 CABIN P/L – OFF 2 CABIN P/L – OFF</td> </tr> <tr> <td>R12</td> <td>(VPU/OPP) VPU PWR – OFF</td> </tr> <tr> <td>R12</td> <td>(OPP) cb OBSS SW PWR cb1 – op {Y} OBSS SW PWR – OFF</td> </tr> <tr> <td>R12</td> <td>(OBSS) RSC PWR – OFF ITVC ENA – OFF SPEE PWR – OFF</td> </tr> </table>	L12LL	SSP-2 (RAFT) Verify all tbs bp cb RAFT – op PDIP 2 PWR 2 – op RAFT ARM/SAFE – SAFE DEPLOY/SAFE – SAFE C/L CAM PWR – OFF	L12LR	SSP-2 (SPACEHAB) Verify all tbs bp FIRE SUPPR FSCU ARM/SAFE – ctr DISCH – ctr CAB DEPRESS VLV ARM/SAFE – SAFE OP/CL – CL SMOKE SENSOR RESET/TEST – ctr A – INHB B – INHB cb SW PWR 4 – op PDIP 2 PWR 1 – op MAIN PWR – NO-OP SS DC BUS – ctr ORB SEC DC BUS – OFF INVERTER – NO-OP EXP DC BUS – ctr	L12L	(PDIP 1) Ku BAND RATE – OFF DC PWR 1 CABIN P/L – OFF 2 CABIN P/L – OFF	R12	(VPU/OPP) VPU PWR – OFF	R12	(OPP) cb OBSS SW PWR cb1 – op {Y} OBSS SW PWR – OFF	R12	(OBSS) RSC PWR – OFF ITVC ENA – OFF SPEE PWR – OFF
L10U	(AVIU) SYNC/VIDEO – VIDEO HI-Z/75 – HI-Z PWR SEL – HI																				
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L12UR	SSP-1 (TCS/ODS/ANDE) Verify all tbs bp TCS PWR – OFF ANDE ARM/SAFE – SAFE DEPLOY/SAFE – ctr ORB H2O LINE HTR PWR A – OFF (B ENA) B – OFF (A ENA) cb SW PWR 2 – op X1/X2 sw PDIP 1 PWR 1 – op ODS CONN MATE X1 TLM PWR – OFF X2 TLM PWR – OFF ANDE PRE-ARM/SAFE – SAFE OIU PWR – OFF																				
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L12LR	SSP-2 (SPACEHAB) Verify all tbs bp FIRE SUPPR FSCU ARM/SAFE – ctr DISCH – ctr CAB DEPRESS VLV ARM/SAFE – SAFE OP/CL – CL SMOKE SENSOR RESET/TEST – ctr A – INHB B – INHB cb SW PWR 4 – op PDIP 2 PWR 1 – op MAIN PWR – NO-OP SS DC BUS – ctr ORB SEC DC BUS – OFF INVERTER – NO-OP EXP DC BUS – ctr																				
L12L	(PDIP 1) Ku BAND RATE – OFF DC PWR 1 CABIN P/L – OFF 2 CABIN P/L – OFF																				
R12	(VPU/OPP) VPU PWR – OFF																				
R12	(OPP) cb OBSS SW PWR cb1 – op {Y} OBSS SW PWR – OFF																				
R12	(OBSS) RSC PWR – OFF ITVC ENA – OFF SPEE PWR – OFF																				

NOT FLOWN

9-24

ASC/116/FIN B

AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

A15:	(All Veh)		
	PS COMM CCU PWR	- OFF	ON
	DC UTIL PWR MNC	- OFF	
	AC UTIL PWR AC3	- OFF	
:A	CRYO TK5 HTRS (four)	- OFF	
	O2 RESET/TEST - ctr		
	(OV104,5)		
:B	cb PPCA CONT PWR (two)	- op	{ R }
:C	PALLET PWR (two)	- ctr	(tb-OFF)
	HTRS (two)	- OFF	
:D,E,	HTRS (sixteen)	- OFF	
F,G	O2 RESET/TEST (four)	- ctr	
:H,I,	cb PALLET ESS (sixteen)	- op	{ R }
J,K	HTR SNSR (eight)	- op	{ R }

A14	RCS/OMS HTR FWD RCS	- OFF	
	L POD (two)	- A OFF, B OFF	
	R POD (two)	- A OFF, B OFF	
	OMS KIT	- OFF	
	CRSFD LINES (two)	- A AUTO,	B AUTO
	FWD RCS JET (five)	- AUTO	
	AFT RCS JET (five)	- AUTO	
	CARGO COOL LP HTRS ORB (three) (OV103,5)	- OFF	
	CARGO LN (two) (OV103,5)	- OFF	
	PYRO (twelve)	- SAFE	
	RMS LAT	- SAFE	

A13	OS AUD MSTR SPKR VOL sel	- as reqd	
	SPKR PWR	- OFF	
	GPS PRE AMPL UC (OV103)	- MNC	
	LC (OV103)	- MNC	
	(two) (OV104)	- ON	
	PWR	- ON	OFF
	GPS/SIGI PWR (OV103)	- OFF	
	blank sw (OV104)	- dn	
	GPS ENCRYPT	- NORM	
	GPS/SIGI ENCRYPT (OV103)	- NORM	
	blank sw (OV104)	- dn	

A12	APU HTR GAS GEN/FUEL PUMP (three)	- OFF	
	LUBE OIL LINE (three)	- OFF	
	TK/FU LINE/H2O SYS (six)	- OFF	
	LG ARM/DN RESET	- dn	
	FC3 STRUCT RTN	- ctr (tb-ON)	
	HYD HTR RUD SPD BK A	- OFF	
	B	- AUTO	
	BDY FLP A	- AUTO	
	B	- OFF	
	ELEV A	- AUTO	
	B	- OFF	
	AFT FUS A	- AUTO	
	B	- OFF	
	CIRC PUMP PWR 1	- MNA	
	2	- MNB	
	3	- MNC	

NOT FLOWN

9-25

ASC/116/FIN B

AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

A11	CRYO TK4 HTR (four) – OFF O2 RESET/TEST – ctr MS COMM CCU PWR – ON OFF DC UTIL PWR MNC – ON (OV105) PALLET HTRS C,D (two) – OFF TK10 HTRS (four) – OFF O2 RESET/TEST – ctr TK11 HTRS (four) – OFF O2 RESET/TEST – ctr TK12 HTRS (four) – OFF O2 RESET/TEST – ctr TK13 HTRS (four) – OFF O2 RESET/TEST – ctr (OV104) CRYO TK SEL (eight) – ctr All cbs (104,5) – op {R}	R14:C cb MNA UHF EVA – op {Y} MNB KU ELEC – op {Y} ANT HTR – op {Y} CABLE HTR – op {R} MNC KU SIG PROC – op {Y} UHF EVA – op {Y}
		:D All cbs – op {Y} except: cb MNC TV CAB – cl { }
		:E MNA D CAMR (three) – op {Y} MNB RMS CAMR (three) – op {Y} – (op {R} if no PORT RMS flown)
		:F ESS 1BC LDG GEAR ARM/DN RESET – op {R}

R14:	All cbs – cl { } except: (OV104,5)	
:B	cb MNA PALLET DSC 1A/2B – op {R} 3A – op {R} MNB PALLET DSC 1B – op {R} 4B – op {R} MNC PALLET DSC 2A – op {R} 3B/4A – op {R}	

NOT FLOWN

9-26

ASC/116/FIN B

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 #2
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/15.35 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/808.4 psia (OV105)
3.60 V/288 psi
4.00 V/810.6 psia (OV103)
4.10 V/814.6 psia (OV105)
4.85 V/0.2" H2O (if SH flown)
4.00 V/811.5 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

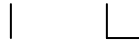
3.45 V/13.76 psia (OV103)
3.45 V/13.74 psia (OV104)
3.45 V/13.76 psia (OV105)
3.30 V/676 psia (OV103)
3.45 V/678.7 psia (OV105)
3.35 V/679.9 psia (OV103)
3.45 V/684.6 psia (OV105)
3.35 V/680.0 psia (OV105)
2.60 V/4.16" H2O
0.85 V/25.5 psia (OV104)
0.80 V/1186 lb/hr
0.80 V/1186 lb/hr

INHIBIT

8 APU 1 EGT
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 (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	4	HYD/APU	FLT INST
CDR2	positive	auto	primary	3	A/E PFD	DATA BUS
MFD1	positive	auto	primary	3	OMS/MPS	SUBSYS STATUS
MFD2	positive	auto	primary	4	HYD/APU	SUBSYS STATUS
PLT1	positive	auto	primary	4	A/E PFD	DATA BUS
PLT2	positive	auto	primary	4	OMS/MPS	FLT INST
AFD1	negative	auto	n/a	n/a	n/a	n/a



CUE CARD CONFIG

**CUE CARD
CONFIG**

FAB USE ONLY

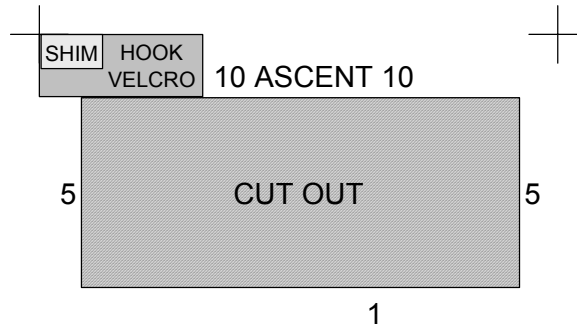
10-1

ASC/116/FIN B



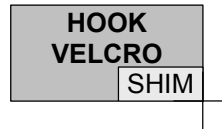
CUE CARD
CONFIG

TOP



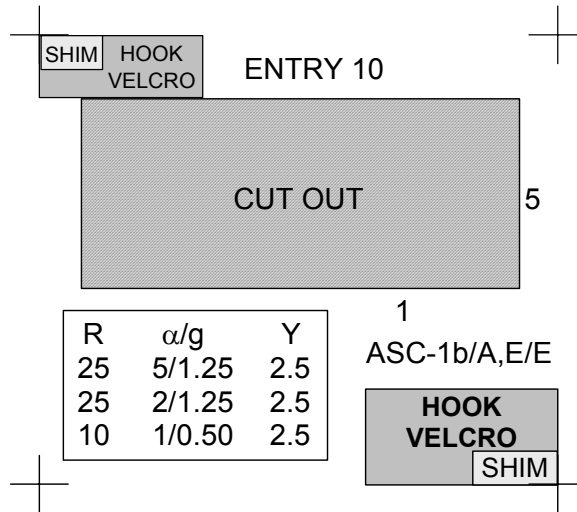
**ADI ERROR/RATE
SWITCH**

ASC-1a/A,E/E

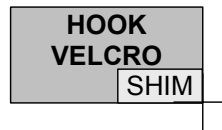


TOP

BACK OF 'ADI ERROR/RATE SWITCH'



1
ASC-1b/A,E/E



FAB USE ONLY

CC 10-2

ASC/116/FIN B

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'

HOOK
VELCRO
SHIM

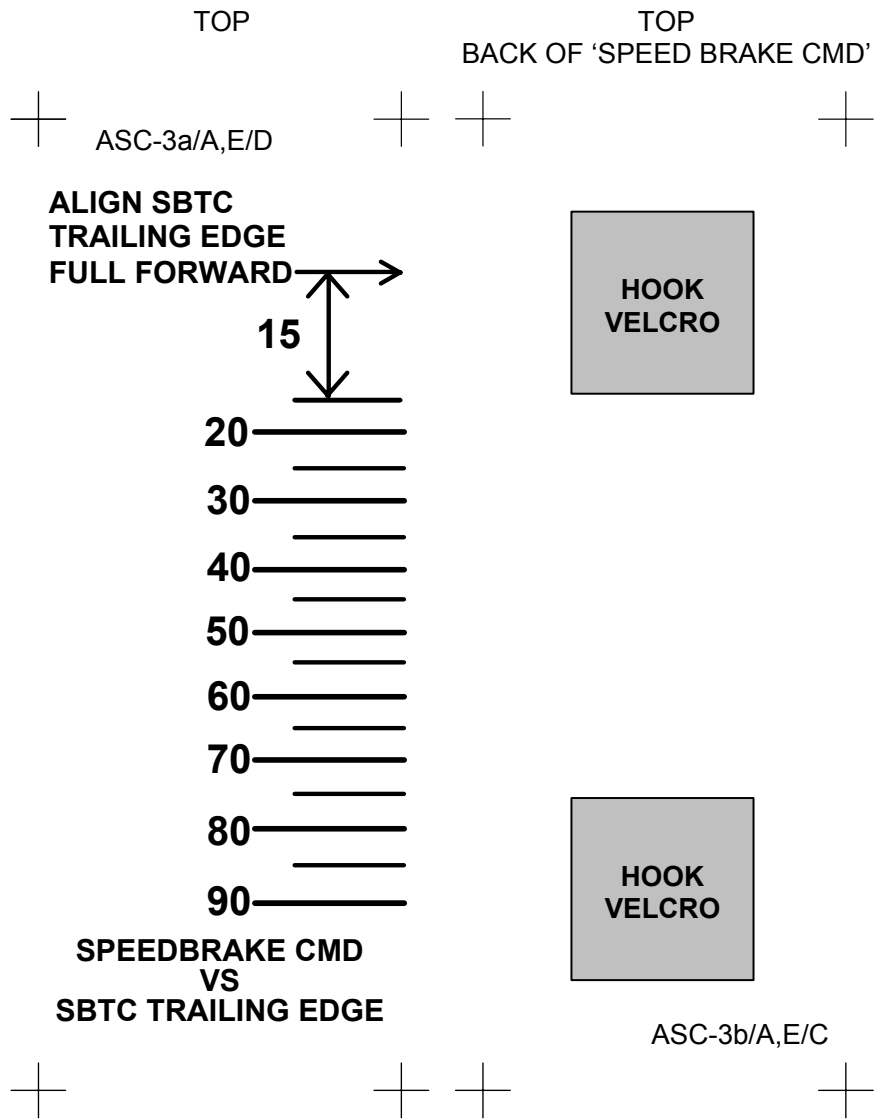
HOOK
VELCRO
SHIM

ASC-2b/A,E/C

FAB USE ONLY

CC 10-3

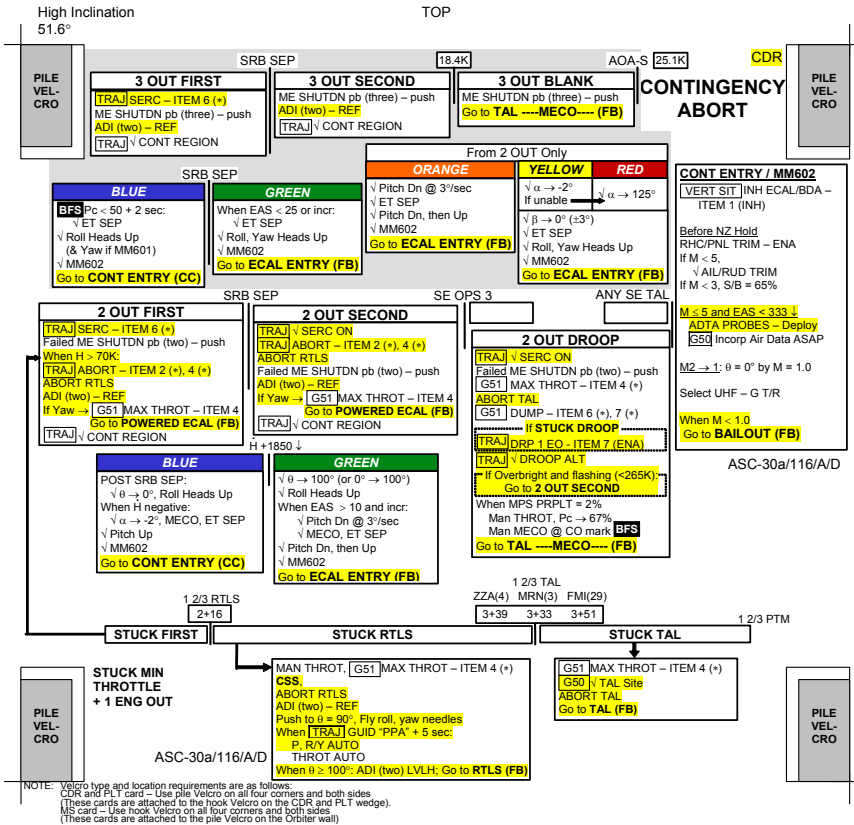
ASC/116/FIN B



FAB USE ONLY

CC 10-4

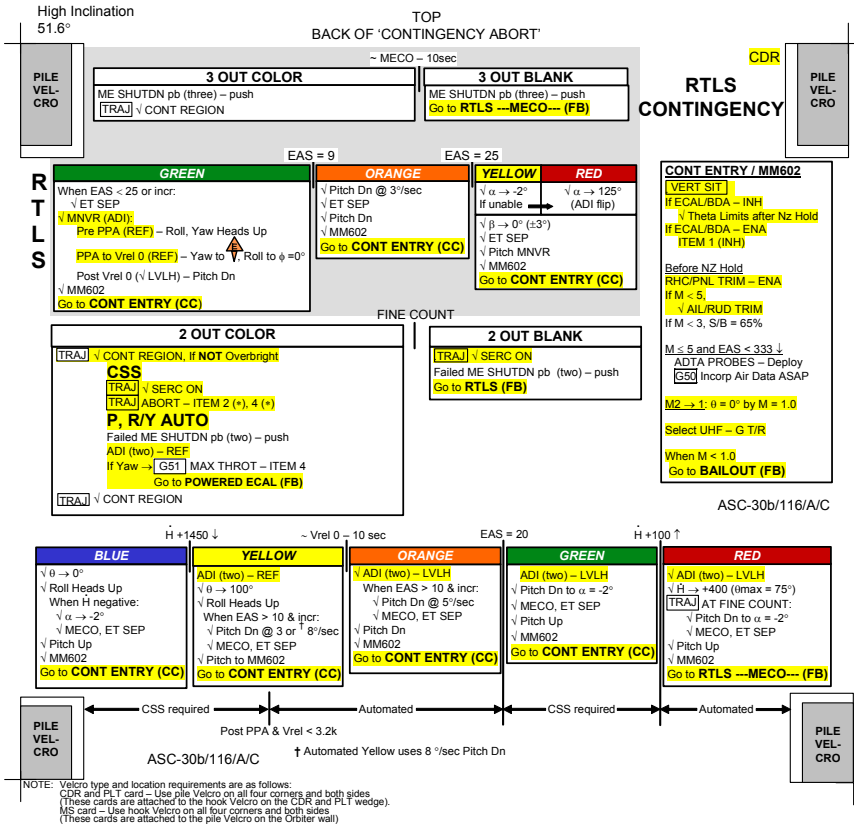
ASC/116/FIN B



FAB USE ONLY

(reduced copy)
 (A)CC 10-5

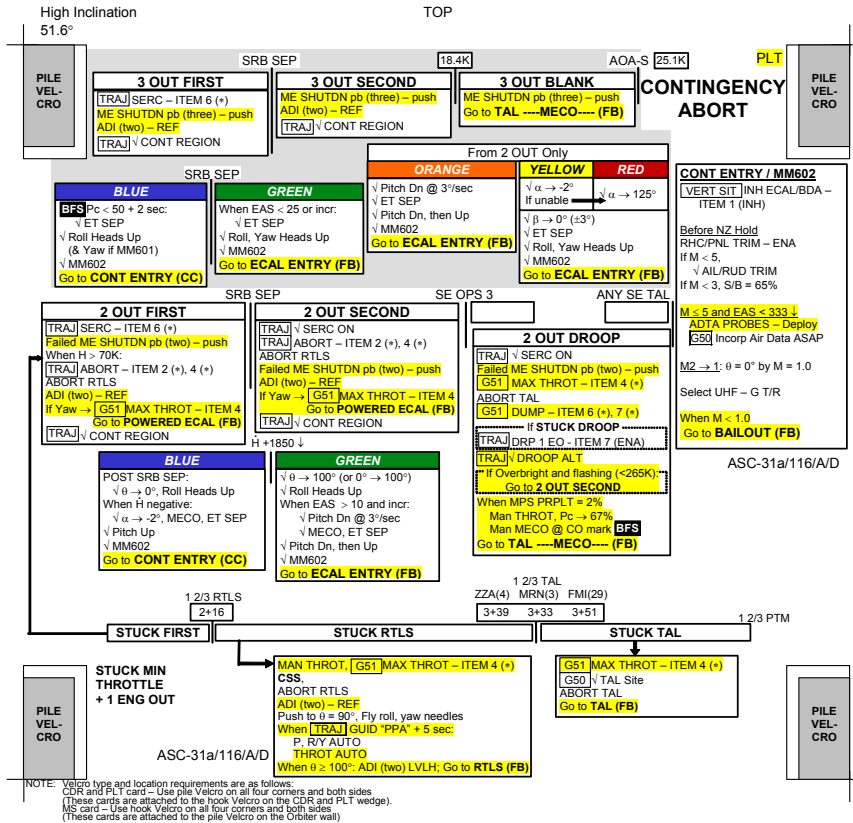
CDR
 ASC/116/FIN B



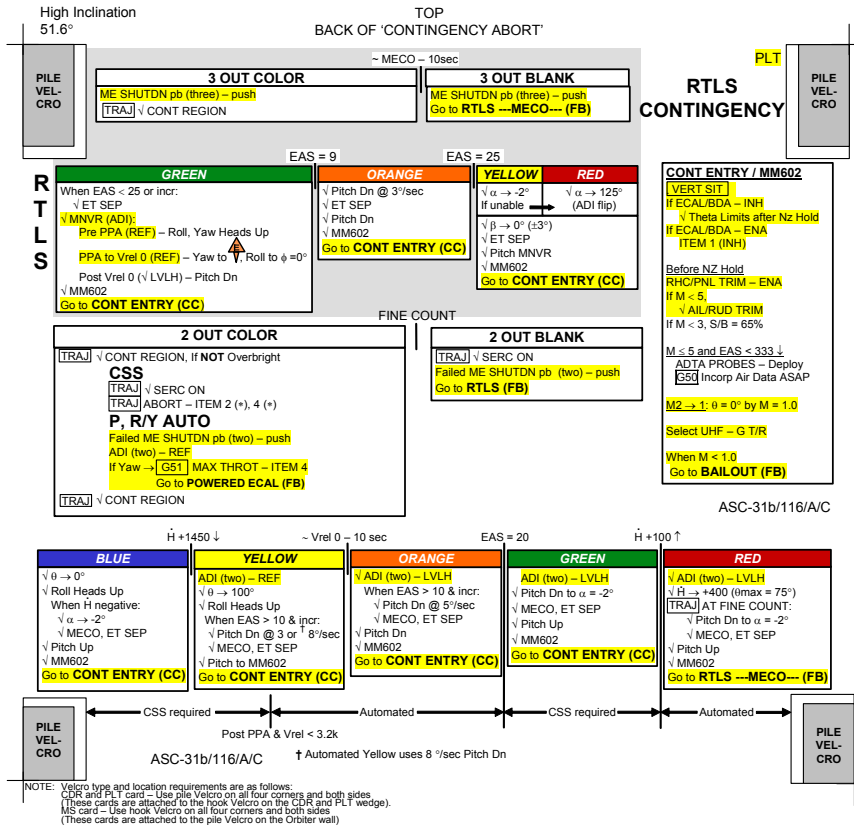
FAB USE ONLY

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(A)CC 10-6

CDR
ASC/116/FIN B



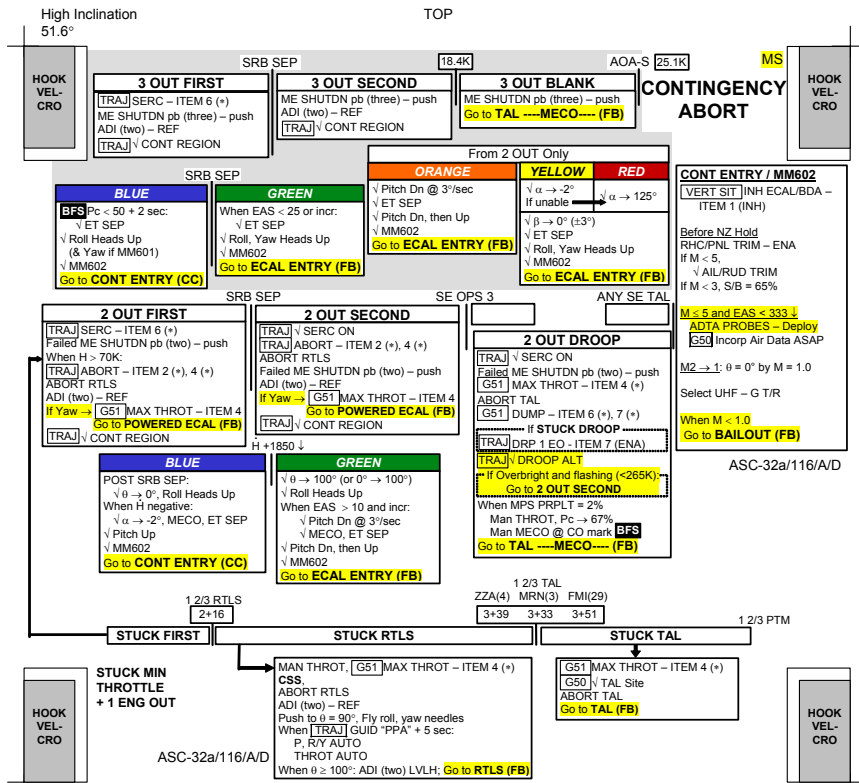
(reduced copy) **PLT**
 FAB USE ONLY (B)CC 10-5 ASC/116/FIN B



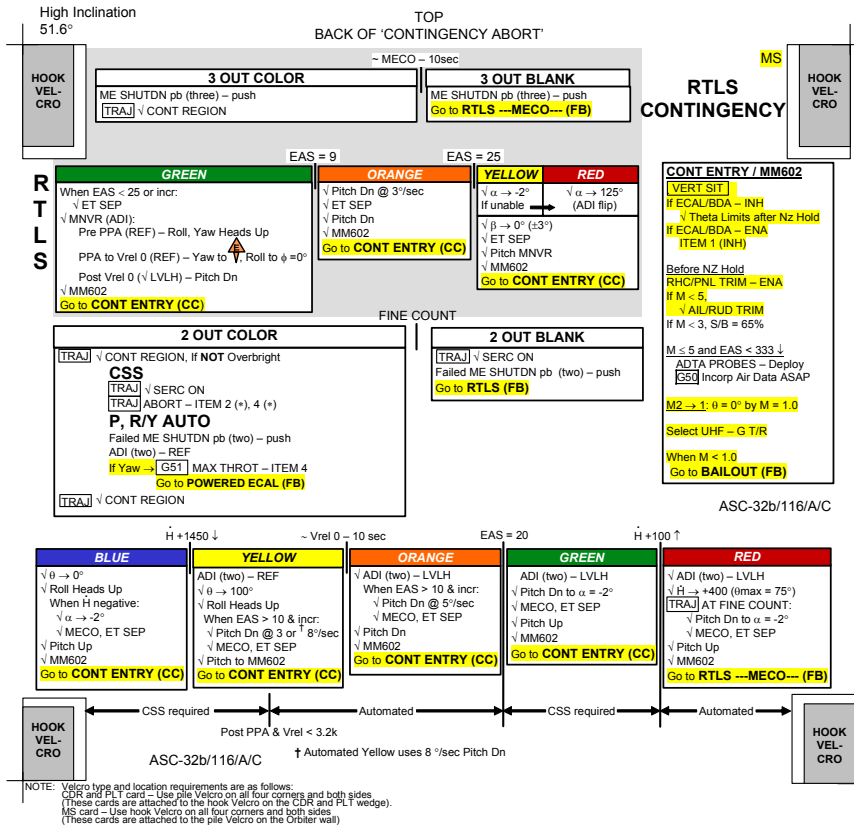
FAB USE ONLY

(reduced copy)
(B)CC 10-6

PLT
ASC/116/FIN B



NOTE: Velcro type and location requirements are as follows:
 CDR and FLT card - Use pile Velcro on all four corners and both sides
 (These cards are attached to the hook Velcro on the CDR and FLT wedge)
 MS card - Use hook Velcro on all four corners and both sides
 (These cards are attached to the pile Velcro on the Orbiter wall)



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(C)CC 10-6

MS
ASC/116/FIN B

TOP

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

OMS TEMP* <div style="display: flex; justify-content: space-around; font-size: small;"> L R </div> FU IN P ≥ 225 220 ≤ 205 204 or No FU IN P	OMS ENG FAIL OMS PRPLT FAIL
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 <div style="display: flex; justify-content: space-between; font-size: x-small;"> PRI fail SEC fail </div>	L(R) OMS GMBL – SEC (twice) If high RCS usage: OMS ENG FAIL
GPC <div style="display: flex; justify-content: space-between; font-size: x-small;"> 1(4) & Burning OMS aff SEC GMBL lost 2 FAs lost </div>	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 <div style="display: flex; justify-content: space-between; font-size: x-small;"> 1(4) 2 FAs lost </div>	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 <div style="text-align: right; font-size: x-small;">1(4)</div>	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/116/A,O/A

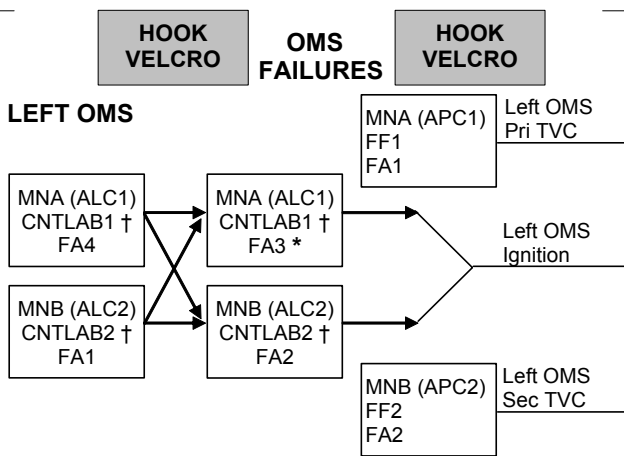
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FAB USE ONLY

CC 10-7

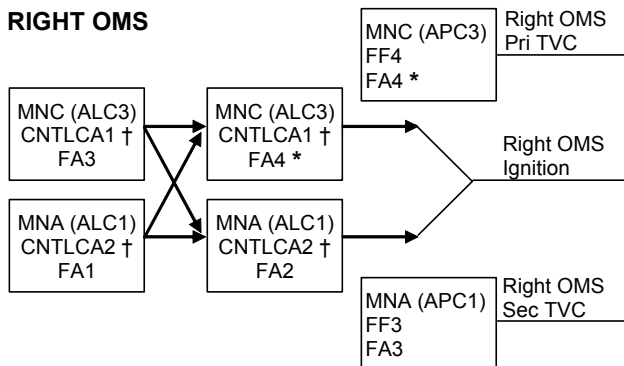
ASC/116/FIN B

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/116/FIN B

TOP

HOOK
VELCRO
**OMS 2/
ORBIT OMS
BURNS**
HOOK
VELCRO

√MM105/202(302)
 Enter TGO +5 sec (2 eng) or TGO +10 sec (1 eng)
 √BURN ATT (INRTL) then REF, pb – push
 √ENG SEL √DAP TRANS – NORM (MM202)
 CNTL PWR (two) – ON √DAP – AUTO(PASS)/DISC
 √GMBL TRIM
 2 engine: P = +0.4 LY = -5.7 RY = +5.7
 1 engine: P = +0.4 LY = +5.2 RY = -5.2
 L,R OMS He PRESS/VAP ISOL A (two) – OP
 ... Wait 2 sec ...
 L,R OMS He PRESS/VAP ISOL B (two) – GPC (OP for SE
 GPC OP CL burn)

ORB BURN A

--	--	--

 B

--	--	--

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

WARNING

Do not burn aff engine if:

OMS N2 TK P < 470(564) (NONCRIT BURN)

He TK P < 640

FU ENG IN P < 216(244)

OX ENG IN P < 151(244)

--	--	--

 ΔVTOT: OMS XFEED RETURN (Planned Single Engine)

-:15 EXEC
 If OMS ENG P_c MSG and non critical burn: Aff ENG – OFF
 If Leaking OMS PROP, burn RCS +X TIG - 15 sec to
 OMS IGN + 1 sec
 :00 TIG; start watch (√P_c, ΔVTOT, ENG VLVs)

* **OMS PRFLT FAIL:** *
 * **HP < [85] (CONTINUE BURN):** *
 * Failed OMS ENG – OFF *
 * √XFEED (two) – CL *
 * TK ISOL (two) – CL *
 * He PRESS (two) – CL *
 * **HP > [85] (STOP BURN):** *
 * OMS ENG (two) – OFF *
 * √Failed OMS XFEED (two) – CL *
 * TK ISOL (two) – CL *
 * He PRESS (two) – CL *
 * **OMS ENG FAIL:** *
 * ASCENT or CRIT O/O (Continue Burn) *
 * Failed ENG – OFF *
 * OMS XFEED at → 1/2 ΔVTOT

--	--	--

 *
 * at FAIL

--	--	--

 *
 * **RCS COMPLETION:** (Hp < [85] or CRIT O/O) *
 * Interconnect to either OMS that was ENG FAIL *
 * THC +X (Hp = [85]) *
 * Post burn, AFT RCS RECONFIG *

CUTOFF
 +:02 OMS ENG(s) – OFF (if < 3 IMU, at

--	--	--

)
 Trim
 Residuals:

OMS 2	TAIL ONLY CNTL	Orbit
VGO X < 0.2 fps	VGO X < +0.2 fps	All axes < 0.2 fps
VGO Y,Z < 2 fps		

ASC-6a/116/A,O/B

(reduced copy)

FAB USE ONLY

CC 10-9

ASC/116/FIN B

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/116/A,O/B

(reduced copy)

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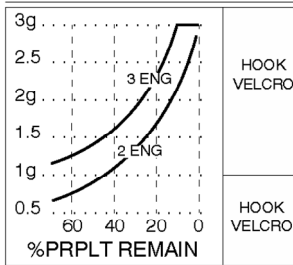
CC 10-10

ASC/116/FIN B

TOP

ASCENT ADI - NOMINAL

TIME	θ	H	\dot{H}
0:30	68	9K	641
0:50	62	26K	974
1:10	54	49K	1405
1:30	39	82K	1873
1:50	31	123K	2187



-STAGING-

V_1	θ	H	\dot{H}
6	19	216K	1729
7	16	274	1275
8	13	310	925
9	11	332	640
10	9	345	409
12	6	356	66
14	9	355	-145
16	25	350	-229
18	23	344	-266
20	21	339	-217
22	19	337	-104
24	17	337	66
25819	13	345	273

HOOK VELCRO

TOP
BACK OF 'ASCENT
ADI - NOMINAL'

ENTRY ALPHA

VR	α_{ref}	R	H	H_{ref}	Rref
25	40	4464	400		
24	HI	40	2647	246	-46 L79
23	43	40	37	2164	238 -63 68
22	43	40	37	1806	231 -82 62
21	43	40	37	1523	224 -104 60
20	43	40	37	1299	218 -121 58
19	43	40	37	1122	211 -144 59
18	43	40	37	978	204 -167 60
17	43	40	37	864	198 -185 R61
16	43	40	37	768	193 -195 61

KSC 15

MAX L/D	
M	α
3	17
2	15
1	12

ASC-14b/116/A,E/B

VR	α_{ref}	R	H	H_{ref}	Rref
15	43	40	37	686	185 -207 64
14	43	40	37	613	180 -126 62
13	43	40	37	546	176 -136 59
12	43	40	37	483	171 -152 58
11	42	39	36	425	166 -194 56
10	41	38	35	373	160 -173 51
9	39	36	33	325	155 -206 L44
8	37	34	31	277	149 -238 37
7	33	30	27	229	139 -266 36
6	30	27	24	184	128 -270 37
5	26	23	20	142	115 -272 39
4	22	19	18	104	101 -264 39
3	19	16	15	74	89 -247 R37
2.5	15			60	80 -271
2	12			49	74 -283
1.5	9			37	64 -333
1	7			27	48 -267

HOOK VELCRO

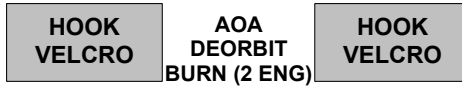
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CC 10-11

ASC/116/FIN B

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/116/FIN B

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:**

* Mvnr 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/116/A/B

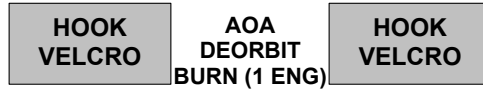
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CC 10-13

ASC/116/FIN B

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 *
- * Resel jet *

ASC-8b/A/B

HINGE

(reduced copy)

FAB USE ONLY

CC 10-14

ASC/116/FIN B

TOP
HINGED AT BOTTOM OF
'AOA DEORBIT BURN (1 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 – OFF (If < 3 IMU, at :)
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ASC-8bb/116/A/B

(reduced copy)

FAB USE ONLY

CC 10-15

ASC/116/FIN B

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 *

HINGE

ASC-7a/AB

(reduced copy)

FAB USE ONLY

CC 10-16

ASC/116/FIN B

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 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:

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

ASC-7aa/116/A/B

(reduced copy)

FAB USE ONLY

CC 10-17

ASC/116/FIN B



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/116/FIN B



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/116/FIN B

TOP

PILE
VELCRO

HOOK
VELCRO

PILE
VELCRO

**ZZA TAL REDESIGNATION
(116 OCFR4 CYC)**

1st E.O. VI		5900	6000	6100	6200	6300	6400	6500	6600
SE OPS 3 ZZA 109	(4)	10900	11000	11000	11000	11100	11100	11100	11100
SE ZZA 104	(4)	17500	17300	17100	16900	16700	16500	16200	16000

1st E.O. VI		6700	6800	6900	7000	7100	7200	7300	7400
SE OPS 3 ZZA 109	(4)	11200	11200	11200	11200	11300	11300	11300	11300
SE ZZA 104	(4)	15800	15600	15400	15300	15100	14900	14700	14600

1st E.O. VI		7500	7600	7700	7800	7900	8000	8100	8200
SE OPS 3 ZZA 109	(4)	11400	11400	11400	11400	11500	11500	11500	11500
SE ZZA 104	(4)	14400	14300	14200	14000	13900	13800	13700	13700

1st E.O. VI		8300	8400	8500	8600	8700	8800	8900	9000
SE OPS 3 ZZA 109	(4)	11500	11600	11600	11600	11600	11600	11600	11700
SE ZZA 104	(4)	13600	13500	13500	13400	13400	13400	13300	13300

1st E.O. VI		9100	9200	9300	9400	9500	9600	9700	9800
SE OPS 3 ZZA 109	(4)	11700	11700	11700	11700	11700	11700	11700	11800
SE ZZA 104	(4)	13300	13300	13300	13300	13300	13300	13400	13400

1st E.O. VI		9900	10000	10100	10200	10300	10400	10500	10600
SE OPS 3 ZZA 109	(4)	11800	11800	11800	11800	11800	11800	11800	11800
SE ZZA 104	(4)	13400	13400	13500	13500	13500	13600	13600	13600

ASC-9a/116/A/B

PILE
VELCRO

HOOK
VELCRO

PILE
VELCRO

(reduced copy)

FAB USE ONLY

CC 10-20

ASC/116/FIN B

TOP
BACK OF 'ZZA TAL REDESIGNATION'

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

ECAL – ZZA or MRN or FMI PRIME TAL

1st EO VI (KFPS)	5.6	5.8	6.0	6.2	6.4	6.6	6.8
CHERRY POINT (7)		6.7 - 7.0	6.7 - 7.2	6.8 - 7.3	6.8 - 7.4	6.9 - 7.5	6.9 - 7.6
OTIS ANGB (16)		10.3 - 11.1	10.3 - 11.2	10.2 - 11.3	10.2 - 11.5	10.2 - 11.6	10.2 - 11.6

1st EO VI (KFPS)	7.0	7.2	7.4	7.6	7.8	8.0	8.2
CHERRY POINT (7)	7.0 - 7.7	7.2 - 7.8	7.4 - 7.9	7.6 - 7.9	7.8 - 8.0	8.0 - 8.0	
GABRESKI (15)					10.5 - 10.7	10.4 - 10.8	10.3 - 11.0
OTIS ANGB (16)	10.2 - 11.7	10.2 - 11.8	10.2 - 11.9	10.2 - 12.0	10.2 - 12.1	10.2 - 12.1	10.3 - 12.2

1st EO VI (KFPS)	8.4	8.6	8.8	9.0	9.2	9.4	9.6
OCEANA NAS (8)		8.6 - 9.0	8.8 - 9.1	9.0 - 9.2	9.2 - 9.3		
WALLOPS (9)				9.4 - 9.6	9.2 - 9.7	9.4 - 9.8	9.6 - 9.8
GABRESKI (15)	10.3 - 11.1	10.3 - 11.2	10.3 - 11.3	10.4 - 11.3	10.4 - 11.4	10.4 - 11.5	10.4 - 11.5
OTIS ANGB (16)	10.3 - 12.3	10.3 - 12.3	10.3 - 12.4	10.4 - 12.4	10.4 - 12.5	10.5 - 12.6	10.5 - 12.6
PEASE INT'L (17)	11.3 - 11.7	11.3 - 11.9	11.3 - 12.0	11.3 - 12.1	11.3 - 12.2	11.3 - 12.2	11.3 - 12.3

1st EO VI (KFPS)	9.8	10.0	10.2	10.4	10.6	10.8	11.0
WALLOPS (9)	9.8 - 9.9						
GABRESKI (15)	10.4 - 11.6	10.5 - 11.7	10.5 - 11.7	10.5 - 11.8	10.6 - 11.8	10.8 - 11.9	11.0 - 11.9
OTIS ANGB (16)	10.5 - 12.7	10.5 - 12.7	10.6 - 12.8	10.6 - 12.8	10.7 - 12.9	10.8 - 12.9	11.0 - 12.9
PEASE INT'L (17)	11.3 - 12.4	11.4 - 12.5	11.4 - 12.5	11.5 - 12.6	11.5 - 12.6	11.5 - 12.7	11.5 - 12.7

1st EO VI (KFPS)	11.2	11.4	11.6	11.8	12.0	12.2	12.4
GABRESKI (15)	11.2 - 12.0	11.4 - 12.0	11.6 - 12.1	11.8 - 12.2	12.0 - 12.2	12.2 - 12.3	
OTIS ANGB (16)	11.2 - 13.0	11.4 - 13.0	11.6 - 13.1	11.8 - 13.1	12.0 - 13.2	12.2 - 13.2	12.4 - 13.2
PEASE INT'L (17)	11.5 - 12.8	11.5 - 12.8	11.6 - 12.9	11.8 - 12.9	12.0 - 13.0	12.2 - 13.0	12.4 - 13.0

1st EO VI (KFPS)	12.6	12.8	13.0	13.2	13.4	13.6	13.8
OTIS ANGB (16)	12.6 - 13.3	12.8 - 13.3	13.0 - 13.4	13.2 - 13.4	13.4 - 13.4		
PEASE INT'L (17)	12.6 - 13.1	12.8 - 13.1	13.0 - 13.1				

ASC-9b/116/A/C

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**MRN TAL REDESIGNATION
(116 OCFR4 CYC)**

1st E.O. VI		5700	5800	5900	6000	6100	6200	6300	6400
SE OPS 3 MRN 109	(3)	10700	10800	10900	10900	11000	11000	11000	11100
SE MRN 104	(3)	17200	17000	16800	16600	16400	16200	16000	15800

1st E.O. VI		6500	6600	6700	6800	6900	7000	7100	7200
SE OPS 3 MRN 109	(3)	11100	11100	11200	11200	11200	11300	11300	11300
SE MRN 104	(3)	15700	15500	15300	15100	14900	14800	14600	14500

1st E.O. VI		7300	7400	7500	7600	7700	7800	7900	8000
SE OPS 3 MRN 109	(3)	11300	11400	11400	11400	11400	11500	11500	11500
SE MRN 104	(3)	14300	14200	14100	13900	13800	13700	13600	13600

1st E.O. VI		8100	8200	8300	8400	8500	8600	8700	8800
SE OPS 3 MRN 109	(3)	11500	11500	11600	11600	11600	11600	11600	11600
SE MRN 104	(3)	13500	13400	13400	13300	13300	13300	13200	13200

1st E.O. VI		8900	9000	9100	9200	9300	9400	9500	9600
SE OPS 3 MRN 109	(3)	11700	11700	11700	11700	11700	11700	11700	11700
SE MRN 104	(3)	13200	13200	13200	13200	13200	13200	13200	13200

1st E.O. VI		9700	9800	9900	10000	10100	10200	10300	10400
SE OPS 3 MRN 109	(3)	11800	11800	11800	11800	11800	11800	11800	11800
SE MRN 104	(3)	13200	13300	13300	13300	13400	13400	13400	13500

1st E.O. VI		10500	10600						
SE OPS 3 MRN 109	(3)	11800	11800						
SE MRN 104	(3)	13500	13500						

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TOP
BACK OF 'MRN TAL REDESIGNATION'

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ECAL – ZZA or MRN or FMI PRIME TAL

1st EO VI (KFPS)	5.6	5.8	6.0	6.2	6.4	6.6	6.8
CHERRY POINT (7)		6.7 - 7.0	6.7 - 7.2	6.8 - 7.3	6.8 - 7.4	6.9 - 7.5	6.9 - 7.6
OTIS ANGB (16)		10.3 - 11.1	10.3 - 11.2	10.2 - 11.3	10.2 - 11.5	10.2 - 11.6	10.2 - 11.6

1st EO VI (KFPS)	7.0	7.2	7.4	7.6	7.8	8.0	8.2
CHERRY POINT (7)	7.0 - 7.7	7.2 - 7.8	7.4 - 7.9	7.6 - 7.9	7.8 - 8.0	8.0 - 8.0	
GABRESKI (15)					10.5 - 10.7	10.4 - 10.8	10.3 - 11.0
OTIS ANGB (16)	10.2 - 11.7	10.2 - 11.8	10.2 - 11.9	10.2 - 12.0	10.2 - 12.1	10.2 - 12.1	10.3 - 12.2

1st EO VI (KFPS)	8.4	8.6	8.8	9.0	9.2	9.4	9.6
OCEANA NAS (8)		8.6 - 9.0	8.8 - 9.1	9.0 - 9.2	9.2 - 9.3		
WALLOPS (9)				9.4 - 9.6	9.2 - 9.7	9.4 - 9.8	9.6 - 9.8
GABRESKI (15)	10.3 - 11.1	10.3 - 11.2	10.3 - 11.3	10.4 - 11.3	10.4 - 11.4	10.4 - 11.5	10.4 - 11.5
OTIS ANGB (16)	10.3 - 12.3	10.3 - 12.3	10.3 - 12.4	10.4 - 12.4	10.4 - 12.5	10.5 - 12.6	10.5 - 12.6
PEASE INT'L (17)	11.3 - 11.7	11.3 - 11.9	11.3 - 12.0	11.3 - 12.1	11.3 - 12.2	11.3 - 12.2	11.3 - 12.3

1st EO VI (KFPS)	9.8	10.0	10.2	10.4	10.6	10.8	11.0
WALLOPS (9)	9.8 - 9.9						
GABRESKI (15)	10.4 - 11.6	10.5 - 11.7	10.5 - 11.7	10.5 - 11.8	10.6 - 11.8	10.8 - 11.9	11.0 - 11.9
OTIS ANGB (16)	10.5 - 12.7	10.5 - 12.7	10.6 - 12.8	10.6 - 12.8	10.7 - 12.9	10.8 - 12.9	11.0 - 12.9
PEASE INT'L (17)	11.3 - 12.4	11.4 - 12.5	11.4 - 12.5	11.5 - 12.6	11.5 - 12.6	11.5 - 12.7	11.5 - 12.7

1st EO VI (KFPS)	11.2	11.4	11.6	11.8	12.0	12.2	12.4
GABRESKI (15)	11.2 - 12.0	11.4 - 12.0	11.6 - 12.1	11.8 - 12.2	12.0 - 12.2	12.2 - 12.3	
OTIS ANGB (16)	11.2 - 13.0	11.4 - 13.0	11.6 - 13.1	11.8 - 13.1	12.0 - 13.2	12.2 - 13.2	12.4 - 13.2
PEASE INT'L (17)	11.5 - 12.8	11.5 - 12.8	11.6 - 12.9	11.8 - 12.9	12.0 - 13.0	12.2 - 13.0	12.4 - 13.0

1st EO VI (KFPS)	12.6	12.8	13.0	13.2	13.4	13.6	13.8
OTIS ANGB (16)	12.6 - 13.3	12.8 - 13.3	13.0 - 13.4	13.2 - 13.4	13.4 - 13.4		
PEASE INT'L (17)	12.6 - 13.1	12.8 - 13.1	13.0 - 13.1				

ASC-10b/116/A/C

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**FMI TAL REDESIGNATION
(116 OCFR4 CYC)**

1st E.O. VI		6100	6200	6300	6400	6500	6600	6700	6800
SE OPS 3 FMI 109	(29)	11000	11100	11100	11100	11100	11200	11200	11200
SE FMI 104	(29)	17800	17600	17400	17200	17000	16800	16500	16300

1st E.O. VI		6900	7000	7100	7200	7300	7400	7500	7600
SE OPS 3 FMI 109	(29)	11200	11200	11300	11300	11300	11300	11300	11400
SE FMI 104	(29)	16100	15900	15700	15600	15400	15200	15000	14900

1st E.O. VI		7700	7800	7900	8000	8100	8200	8300	8400
SE OPS 3 FMI 109	(29)	11400	11400	11400	11400	11500	11500	11500	11500
SE FMI 104	(29)	14700	14600	14500	14300	14200	14100	14000	14000

1st E.O. VI		8500	8600	8700	8800	8900	9000	9100	9200
SE OPS 3 FMI 109	(29)	11500	11500	11600	11600	11600	11600	11600	11600
SE FMI 104	(29)	13900	13800	13800	13700	13700	13700	13700	13600

1st E.O. VI		9300	9400	9500	9600	9700	9800	9900	10000
SE OPS 3 FMI 109	(29)	11700	11700	11700	11700	11700	11700	11700	11800
SE FMI 104	(29)	13600	13600	13600	13600	13600	13600	13700	13700

1st E.O. VI		10100	10200	10300	10400	10500	10600		
SE OPS 3 FMI 109	(29)	11800	11800	11800	11800	11800	11800		
SE FMI 104	(29)	13700	13700	13800	13800	13800	13800		

ASC-12a/116/A/B

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TOP
BACK OF 'FMI TAL REDESIGNATION'

HOOK
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ECAL – ZZA or MRN or FMI PRIME TAL

1st EO VI (KFPS)	5.6	5.8	6.0	6.2	6.4	6.6	6.8
CHERRY POINT (7)		6.7 - 7.0	6.7 - 7.2	6.8 - 7.3	6.8 - 7.4	6.9 - 7.5	6.9 - 7.6
OTIS ANGB (16)		10.3 - 11.1	10.3 - 11.2	10.2 - 11.3	10.2 - 11.5	10.2 - 11.6	10.2 - 11.6

1st EO VI (KFPS)	7.0	7.2	7.4	7.6	7.8	8.0	8.2
CHERRY POINT (7)	7.0 - 7.7	7.2 - 7.8	7.4 - 7.9	7.6 - 7.9	7.8 - 8.0	8.0 - 8.0	
GABRESKI (15)					10.5 - 10.7	10.4 - 10.8	10.3 - 11.0
OTIS ANGB (16)	10.2 - 11.7	10.2 - 11.8	10.2 - 11.9	10.2 - 12.0	10.2 - 12.1	10.2 - 12.1	10.3 - 12.2

1st EO VI (KFPS)	8.4	8.6	8.8	9.0	9.2	9.4	9.6
OCEANA NAS (8)		8.6 - 9.0	8.8 - 9.1	9.0 - 9.2	9.2 - 9.3		
WALLOPS (9)				9.4 - 9.6	9.2 - 9.7	9.4 - 9.8	9.6 - 9.8
GABRESKI (15)	10.3 - 11.1	10.3 - 11.2	10.3 - 11.3	10.4 - 11.3	10.4 - 11.4	10.4 - 11.5	10.4 - 11.5
OTIS ANGB (16)	10.3 - 12.3	10.3 - 12.3	10.3 - 12.4	10.4 - 12.4	10.4 - 12.5	10.5 - 12.6	10.5 - 12.6
PEASE INT'L (17)	11.3 - 11.7	11.3 - 11.9	11.3 - 12.0	11.3 - 12.1	11.3 - 12.2	11.3 - 12.2	11.3 - 12.3

1st EO VI (KFPS)	9.8	10.0	10.2	10.4	10.6	10.8	11.0
WALLOPS (9)	9.8 - 9.9						
GABRESKI (15)	10.4 - 11.6	10.5 - 11.7	10.5 - 11.7	10.5 - 11.8	10.6 - 11.8	10.8 - 11.9	11.0 - 11.9
OTIS ANGB (16)	10.5 - 12.7	10.5 - 12.7	10.6 - 12.8	10.6 - 12.8	10.7 - 12.9	10.8 - 12.9	11.0 - 12.9
PEASE INT'L (17)	11.3 - 12.4	11.4 - 12.5	11.4 - 12.5	11.5 - 12.6	11.5 - 12.6	11.5 - 12.7	11.5 - 12.7

1st EO VI (KFPS)	11.2	11.4	11.6	11.8	12.0	12.2	12.4
GABRESKI (15)	11.2 - 12.0	11.4 - 12.0	11.6 - 12.1	11.8 - 12.2	12.0 - 12.2	12.2 - 12.3	
OTIS ANGB (16)	11.2 - 13.0	11.4 - 13.0	11.6 - 13.1	11.8 - 13.1	12.0 - 13.2	12.2 - 13.2	12.4 - 13.2
PEASE INT'L (17)	11.5 - 12.8	11.5 - 12.8	11.6 - 12.9	11.8 - 12.9	12.0 - 13.0	12.2 - 13.0	12.4 - 13.0

1st EO VI (KFPS)	12.6	12.8	13.0	13.2	13.4	13.6	13.8
OTIS ANGB (16)	12.6 - 13.3	12.8 - 13.3	13.0 - 13.4	13.2 - 13.4	13.4 - 13.4		
PEASE INT'L (17)	12.6 - 13.1	12.8 - 13.1	13.0 - 13.1				

ASC-12b/116/A/B

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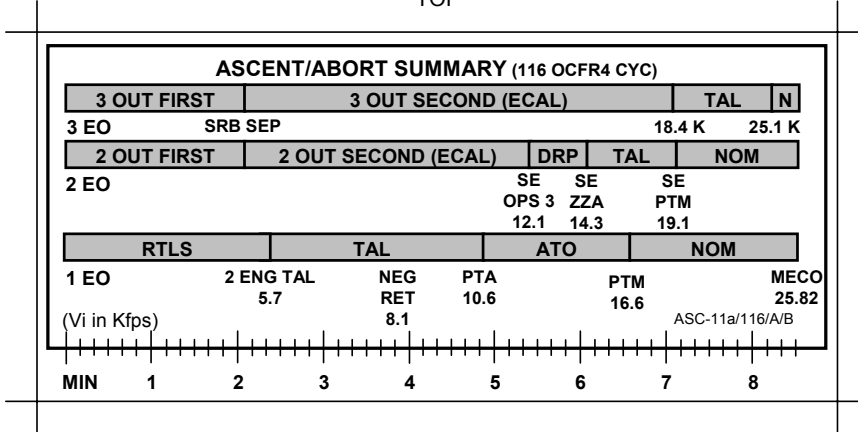
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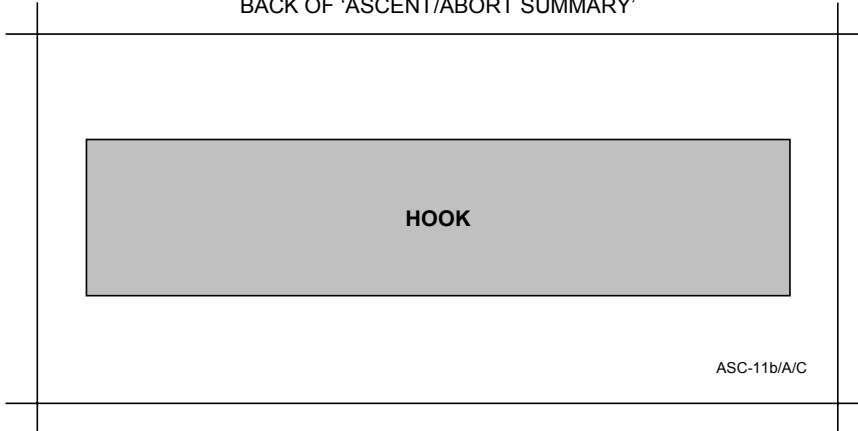
CC 10-25

ASC/116/FIN B

TOP



TOP
BACK OF 'ASCENT/ABORT SUMMARY'



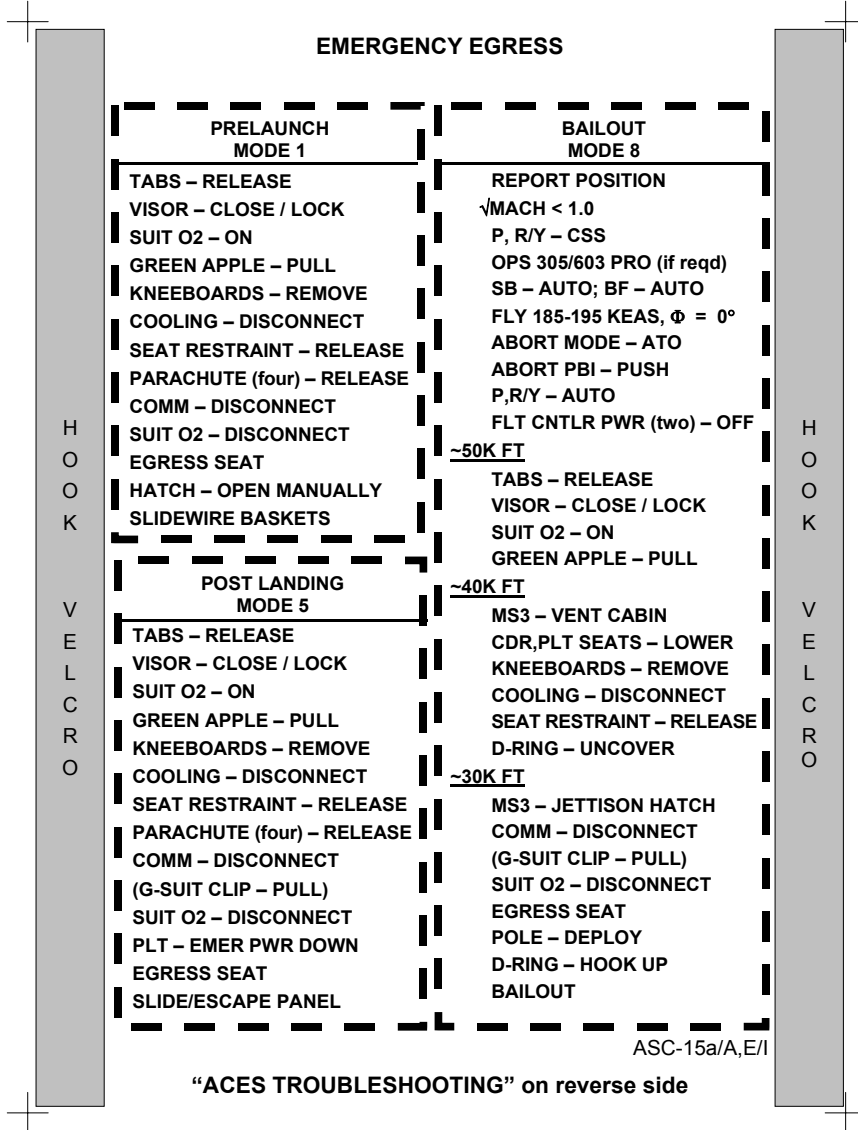
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ASC/116/FIN B

TOP



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ASC/116/FIN B

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	CDR
ESS BUS 2CA	PLT
MNA	MS STATION
MNB	MIDDECK
MNC	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 viv – 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

H
O
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ASC-15b/A,E/E

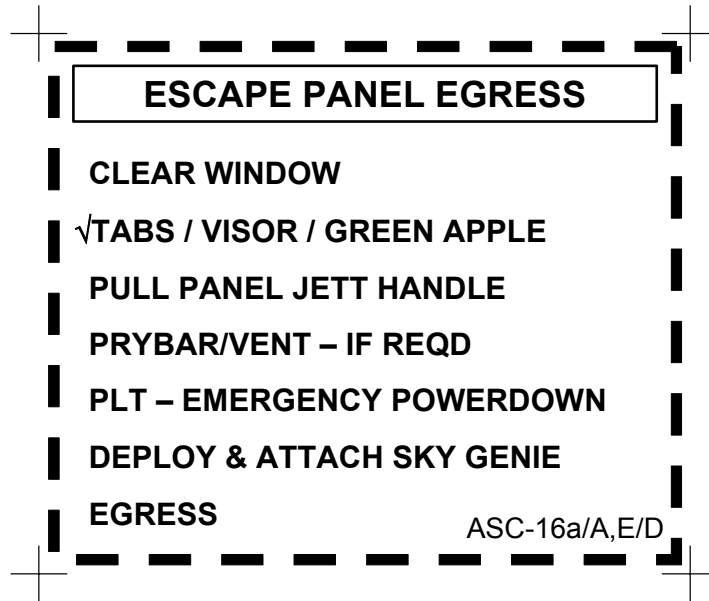
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ASC/116/FIN B

TOP



TOP
BACK OF 'ESCAPE PANEL EGRESS'



**HOOK
VELCRO**

ASC-16b/A,E/C

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CC 10-29

ASC/116/FIN B

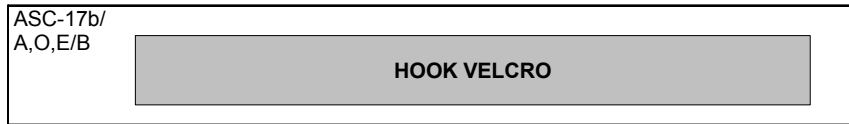
GPC/FCS CHANNEL CONFIGURATION

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

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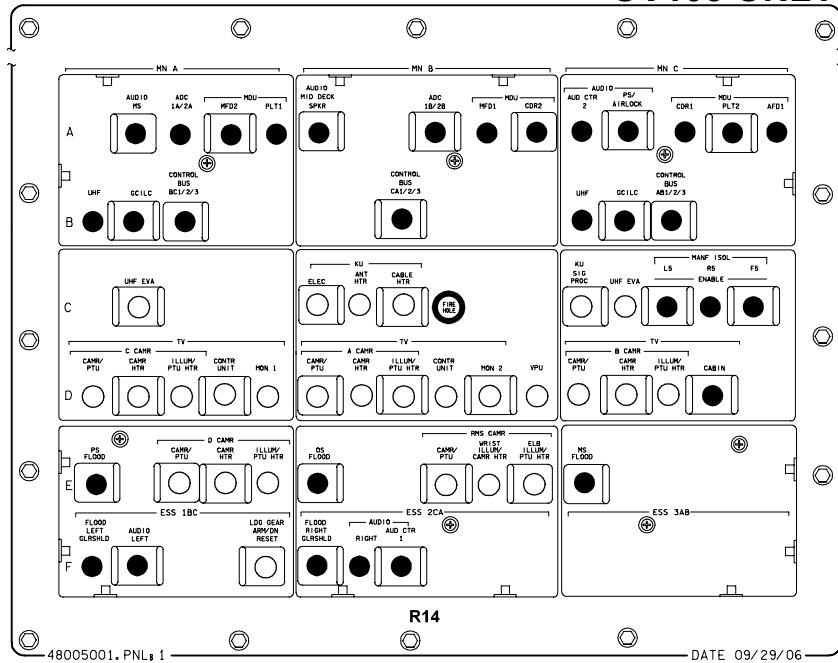
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ASC/116/FIN B

TOP
PANEL R14 - OV103 ONLY

OV103 ONLY



ASC-18a/A,O,E/H

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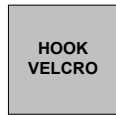
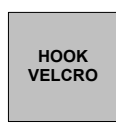
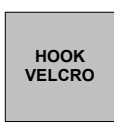
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ASC/116/FIN B



TOP
BACK OF 'PANEL R14 - OV103 ONLY'



ASC-18b/A,O,E/C

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CC 10-32

ASC/116/FIN B



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)

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CC 10-33

ASC/116/FIN B

FAB USE ONLY

CC 10-34

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HOOK
VELCRO

TOP

EMERGENCY EGRESS

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/F

HINGE

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(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**

PILE
VELCRO

~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/D

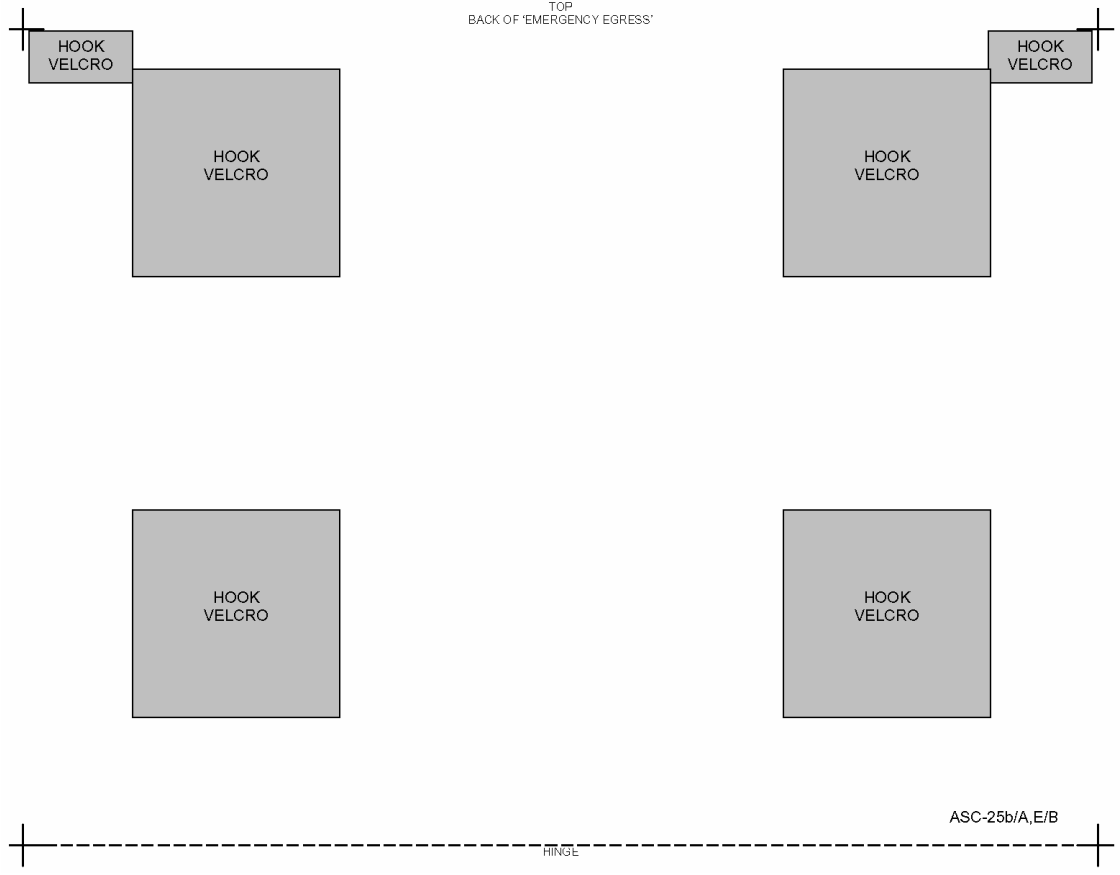
PILE
VELCRO

FAB USE ONLY

CC-10-36

ASC/116/FIN B

(reduced copy)



HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

TOP
BACK OF 'EMERGENCY EGRESS'

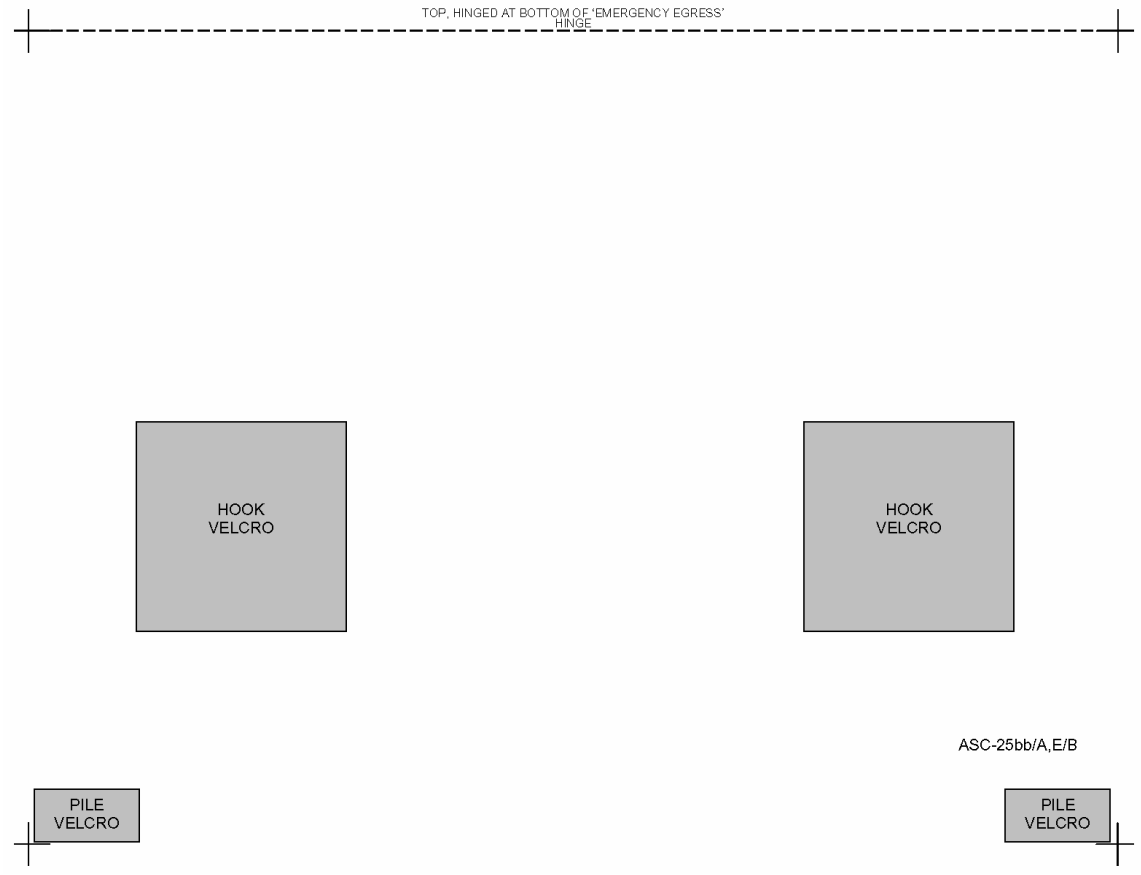
HINGE

ASC-25b/A,E/B

FAB USE ONLY

(reduced copy)
CC 10-37

ASC/116/FIN B



FAB USE ONLY

CC 10-38

ASC/116/FIN B

(reduced copy)

HOOK
VELCRO

ВЕРХ

АВАРИЙНОЕ ПОКИДАНИЕ

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
√ 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/D

HINGE

FAB USE ONLY

CC 10-39

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(reduced copy)

TOP, HINGED AT BOTTOM OF 'EMERGENCY EGRESS'
HINGE

**РЕЖИМ 5
ПОСЛЕ ПОСАДКИ**

ЯЗЫЧКИ ШЕЙНОЙ ПРОКЛАДКИ - УБРАТЬ
ШЛЕМ - ОПУСТИТЬ/ ЗАКРЫТЬ
СК O2 - ВКЛ
ЗЕЛЕНЬ 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

PILE
VELCRO

~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/C

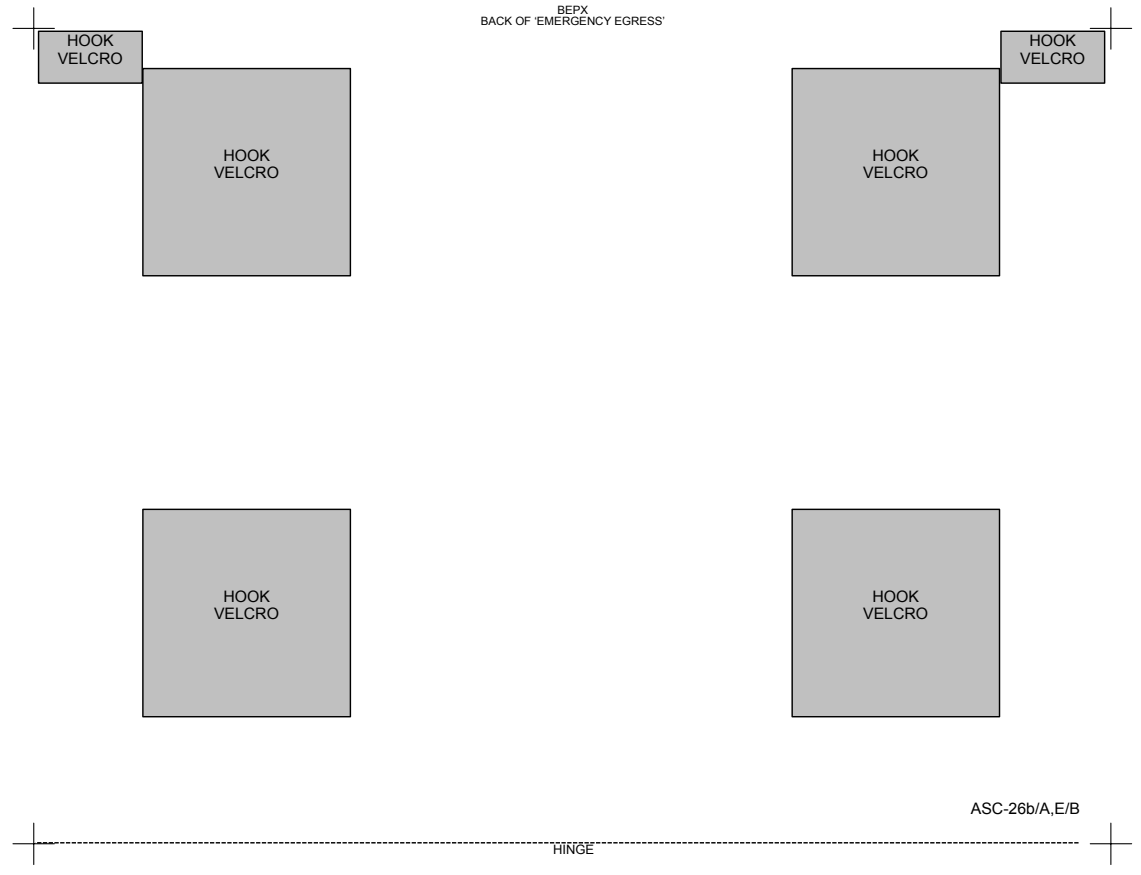
PILE
VELCRO

FAB USE ONLY

CC 10-40

ASC/116/FIN B

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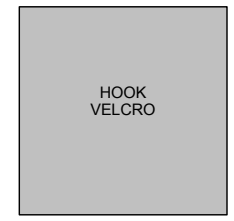
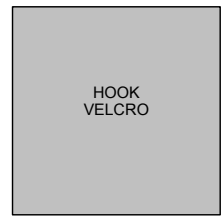
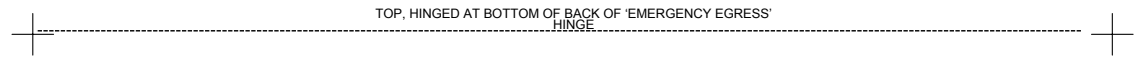


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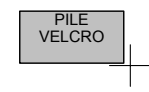
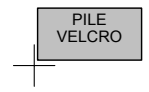
CC 10-41

ASC/116/FIN B

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ASC-26bb/A,E/B





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10-42

ASC/116/FIN B



Space Shuttle Program
FLIGHT DATA FILE

JSC-48005-116
FINAL, REV B



ASCENT CHECKLIST

STS
116

Flight Cover (trim bottom to expose tabs)