

Ascent Checklist

STS-116

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

**Final, Rev A
July 18, 2005**

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



ASCENT C/L STS-116

FINAL, Rev A (July 18, 2005)

PCN-2 (Sept 25, 2006) Sheet 1 of 1

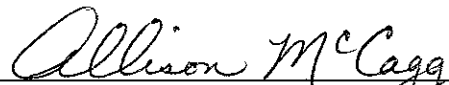
List of Implemented Change Requests (482s):

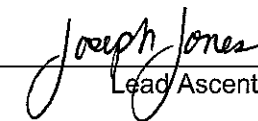
ASC-1737 MULTI-1761D
ASC-1738B
ASC-1751

Incorporate the following:

1. Replace v thru viii
2. Replace FB 2-15 & FB 2-16, FB 2-19 thru FB 2-22, 2-31 thru 2-34
3. Replace 3-1 & 3-2

Prepared by:


Book Manager 09/18/06

 ^{SP}
Lead Ascent GPO 09/18/06

Approved by:


Chief, Ascent/Descent Dynamics Branch 9/18/06

Encl: 16 pages

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

ASCENT C/L STS-116

FINAL, Rev A (July 18, 2005)

PCN-1 (May 18, 2006) Sheet 1 of 1

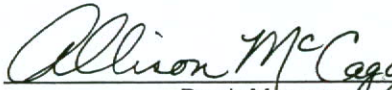
List of Implemented Change Requests (482s):

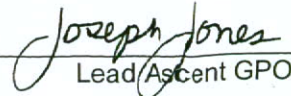
ASC-1719 MULTI-1711B
ASC-1720 MULTI-1741C
ASC-1721
ASC-1723A
ASC-1726
ASC-1728
ASC-1730

Incorporate the following:

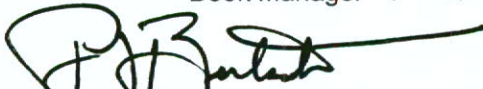
1. Replace v thru viii
2. Replace 1-5 & 1-6, 1-11 & 1-12
3. Replace FB 2-7 & FB 2-8, FB 2-11 thru FB 2-14, FB 2-17 & FB 2-18, 2-31 thru 2-40
4. Replace 3-3 & 3-4, 3-7 & 3-8
5. Replace 6-15 & 6-16, 6-29 & 6-30
6. Replace 7-7 thru 7-10
7. Replace (A)CC 10-5 thru (C)CC 10-6 (6 pgs)

Prepared by:


Book Manager 05/16/06

 sp.
Lead Ascent GPO 05/16/06

Approved by:


Chief, Ascent/Descent Dynamics Branch

Encl: 44 pages

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

MISSION OPERATIONS DIRECTORATE

**ASCENT CHECKLIST
STS-116**

FINAL, REVISION A
July 18, 2005

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Book Manager

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ASC/116/FIN A

Incorporates the following:
482#: None - Establishes baseline

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DM4/A. McCagg	281-483-7752
Switch List	CA4/J. Branson	281-244-8596
Entry	DM4/M. Trump	281-483-8029
Cue Cards	DO3/C. Pierce	281-483-6087

NOTES

1. The STS-116 trajectory data in this checklist is based on the STS-116 One Cycle to Flight load and the May 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. The size, shape, and Velcro location of the cue cards are controlled by the Cue Card Book Manager.
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 A	07/18/05
PCN-1	05/18/06
PCN-2	09/25/06

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

* – Omit from flight book

☒ – Prelift-off information required

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

* – Omit from flight book

8-3 ☒ 116/FIN A
 8-4 ☒ 116/FIN A
 8-5 ☒ 116/FIN A
 8-6 ☒ 116/FIN A
 8-7 ☒ 116/FIN A
 8-8 116/FIN A
 9-1 * 116/FIN A
 9-2 * 116/FIN A
 10-1 * 116/FIN A
 CC 10-2 * 116/FIN A
 CC 10-3 * 116/FIN A
 CC 10-4 * 116/FIN A
 (A)CC 10-5 * 116/FIN A,1
 (A)CC 10-6 * 116/FIN A,1
 (B)CC 10-5 * 116/FIN A,1
 (B)CC 10-6 * 116/FIN A,1
 (C)CC 10-5 * 116/FIN A,1
 (C)CC 10-6 * 116/FIN A,1
 CC 10-7 * 116/FIN A
 CC 10-8 * 116/FIN A
 CC 10-9 * 116/FIN A
 CC 10-10 * 116/FIN A
 CC 10-11 * 116/FIN A
 CC 10-12 * 116/FIN A
 CC 10-13 * 116/FIN A
 CC 10-14 * 116/FIN A
 CC 10-15 * 116/FIN A
 CC 10-16 * 116/FIN A
 CC 10-17 * 116/FIN A
 CC 10-18 * 116/FIN A
 CC 10-19 * 116/FIN A
 CC 10-20 * 116/FIN A
 CC 10-21 * 116/FIN A
 CC 10-22 * 116/FIN A
 CC 10-23 * 116/FIN A
 CC 10-24 * 116/FIN A
 CC 10-25 * 116/FIN A
 CC 10-26 * 116/FIN A
 CC 10-27 * 116/FIN A
 CC 10-28 * 116/FIN A

CC 10-29 * 116/FIN A
 CC 10-30 * 116/FIN A
 CC 10-31 * 116/FIN A
 CC 10-32 * 116/FIN A
 CC 10-33 * 116/FIN A
 CC 10-34 * 116/FIN A
 CC 10-35 * 116/FIN A
 CC 10-36 * 116/FIN A
 CC 10-37 * 116/FIN A
 CC 10-38 * 116/FIN A
 CC 10-39 * 116/FIN A
 CC 10-40 * 116/FIN A
 CC 10-41 * 116/FIN A
 10-42 * 116/FIN A

☒ – 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/D
ENTRY (Back).....	CC 10-2	ASC-1b/A,E/D
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/C
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/C
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/C
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/A
ENTRY ALPHA – KSC 15		
(Back).....	CC 10-11	ASC-14b/116/A,E/A
AOA DEORBIT BURN (2 ENG)		
(Top/Front).....	CC 10-12	ASC-8a/A/E
(Bottom/Front).....	CC 10-13	ASC-8aa/116/A/A
AOA DEORBIT BURN (1 ENG)		
(Top/Back).....	CC 10-14	ASC-8b/A/B
(Bottom/Back).....	CC 10-15	ASC-8bb/116/A/A
AOA DEORBIT BURN (RCS)		
(Top/Front).....	CC 10-16	ASC-7a/A/B
(Bottom/Front).....	CC 10-17	ASC-7aa/116/A/A
(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/A
ECAL – ZZA or MRN PRIME TAL		
(Back)	CC 10-21	ASC-9b/116/A/B
MRN TAL REDESIGNATION		
(Front)	CC 10-22	ASC-10a/116/A/A
ECAL – ZZA or MRN PRIME TAL		
(Back)	CC 10-23	ASC-10b/116/A/B
BEN TAL REDESIGNATION		
(Front)	CC 10-24	ASC-12a/116/A/A
ECAL – BEN PRIME TAL		
(Back)	CC 10-25	ASC-12b/116/A/A
ASCENT/ABORT SUMMARY		
(Front)	CC 10-26	ASC-11a/116/A/A
(Back)	CC 10-26	ASC-11b/A/C
EMERGENCY EGRESS		
(Front)	CC 10-27	ASC-15a/A,E/I
(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/G
(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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TAL CDR (CIL)	FB 2-14
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OMS FAILURE	6-37
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WEATHER PADS	8-1
SWITCH LIST	9-1
CUE CARD CONFIG	10-1

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PRELAUNCH PROCEDURES

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

-3:00:00
(Hold)

ASP configures OI PCMMU PWR – 1*** (C3),
INST PWR – FLT/MPS (F6) (OV103,5),
INST PWR – ON (F8) (OV103,5). 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)

A6U $\sqrt{\text{PL RETEN PL SEL}} - \text{MON}$

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

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)

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

1-5

ASC/116/FIN A,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

O5,O9, L,R AUD A/G 1 (two) – T/R
R10,L9, 2 (two) – T/R
MO42F Voice check with MCC

Side hatch closure

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

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

01 $\sqrt{\text{CAB PRESS}}$ – incr to 16.7 (MA)

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)

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)

	$\sqrt{tb}$	– OP
O1	$\sqrt{PRESS}$	– 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
(-58:30)

C

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)	2(3,4)	√40	2(3,4)	√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
 (~-17:00) P **CLEAR HARDWARE C/W MEMORY**

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 lt – 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

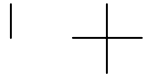
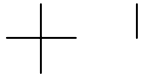
√Tabs/visor – cl/LES O2 – ON

MS1 ICOM RCDR – ON (if reqd)



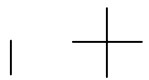
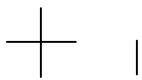
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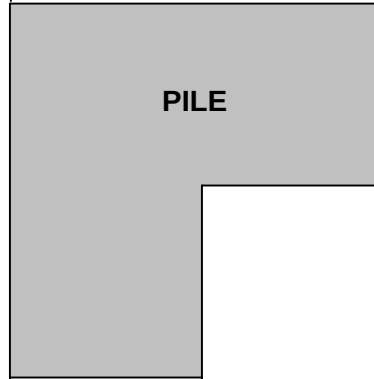


ASCENT PROCEDURES
(FLIP BOOK)

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

TOP
BACK OF 'EMERGENCY EGRESS'

BAILOUT
EGRESS

PILE

SYS FLIGHT RULES

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

NO COMM MODE BOUNDARIES

NEG RETURN (104)	8200	2 ENG ZZA (104)	5800
PRESS TO ATO (104)	9900	ABORT TAL ZZA (4)	
SE OPS 3 (109)	12100	EO VI	
SE ZZA (104)	14200	SE OPS 3 ZZA (109) (14)	
PRESS TO MECO (104)	14900	SE ZZA (104) (4)	
NEG BEN (2 @ 67)	18400	2 ENG MRN (104) 5700	
SE PRESS (104)	18600	ABORT TAL MRN (3)	
NEG MRN (2 @ 67)	20000	EO VI	
LAST PRE MECO TAL	23000	SE OPS 3 MRN (109) (13)	
LAST TAL		SE MRN (104) (3)	
YJT	20100	2 ENG BEN (104) 5700	
YYT	20200	ABORT TAL BEN (2)	
YQX	21900	EO VI	
LAJ	23400	SE OPS 3 BEN (109) (12)	
IKF	23700	SE BEN (104) (2)	
INN	24100		
MRN, BEJ, FFA	24300		
FMI, KBO	24500		
ESN	24900		
ZZA	25000		
KKI	25100		
JDG	25200		

ASCENT PROCEDURES

HOOK

R180

LVLH

.82M

 $\sqrt{P_c} \rightarrow 72\%$

1.09M

 $\sqrt{P_c} \rightarrow 104\%$ $P_c < 50+5$ s $\sqrt{\text{SRB SEP (Backup AUTO SEP 2:21)}}$ $\sqrt{\text{TMECO}}$ * If NOT STABLE (10 sec): *

* NO COMM – CSS & MAN THROT *

MM103+10 s

 $\sqrt{\text{OMS assist}}$

Close suit O2, open visor

3:00

 $\sqrt{\text{EVAP OUT (T < 60)}}$

* If Systems ABORT reqd: *

* RTLS at 3:40 or *

* TAL Select prior to 23000 *

* Otherwise Manual MECO 23700 *

 $V_I = 13.2K$ $\sqrt{\text{Roll Heads Up}}$

* If Man Throttle (3 eng): *

* Man Shutdn at 25700 *

* If 1 eng: *

* TRAJ $\sqrt{\text{SERC ON}}$ *

* When MPS PRPLT = 2%: *

* MAN THROT, $P_c \rightarrow 67\%$ ** Man MECO @ CO mark **BFS** *

MECO

 $\sqrt{V_I = 25819}$

MECO+20 s

 $\sqrt{\text{ET SEP}}$

* 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 ($\sqrt{\text{BFS 104}}$) ** NOTE: Expect – 'Illegal Entry' (PASS) *

* 'Illegal TIG' (BFS) *

► MM104+2 s

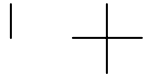
If ET Sep complete and HA > 72 :
+X xlation for 11 sec $\sqrt{\text{TGTS}}$ $\sqrt{\text{ASC PKT for failures}}$

If OMS 1 not reqd:

OMS ENG (two) – OFF

Go to POST OMS 1OMS 1
TGTING

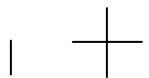
TOP
BACK OF 'ASCENT PROCEDURES'



PILE

ASC

STS-116
OMS 1/2 TARGETING
RENDEZVOUS RECOVERY
(TBS)



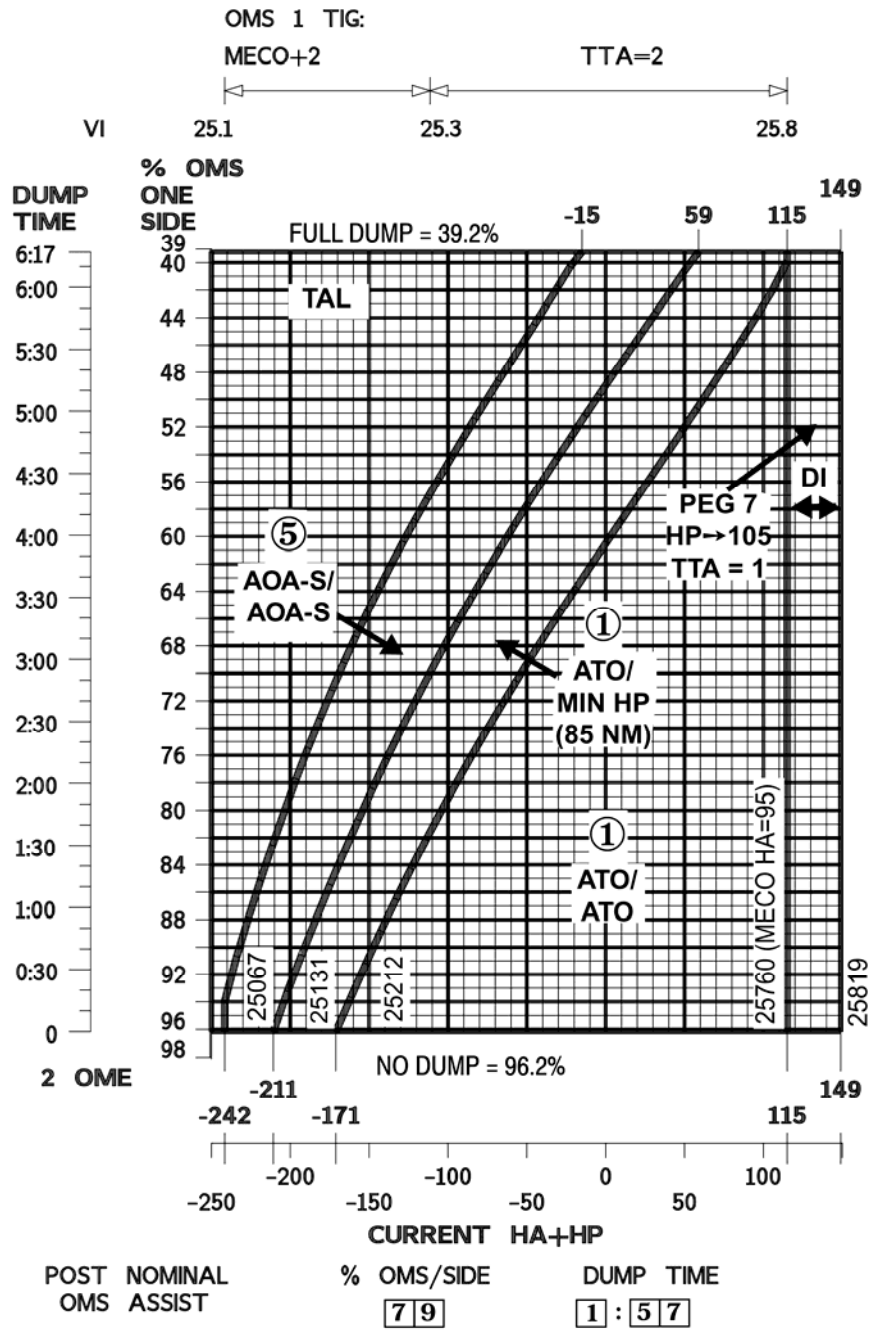
FB 2-6

ASC/116/FIN A

TOP

STS-116 OCFR1 CY
OMS 1/2 TGTING

HOOK



FB 2-7

ASC/116/FIN A

OMS 1
TGTING

PILE

OMS 1 BURN

```
* IF TIG LATER THAN MECO + 6 min:
*   MECO + 4 min: √BDY FLP pb – lt off (MPS dump complete) *
*                 √MCC for APU shutdn (if time permits) *
* FEEDLINE FAIL:
*   Expect 'Illegal Entry' (PASS)/'Illegal TIG' (BFS) @ tgt select *
*   pre ET Sep; input TIG manually & LOAD tgt
*   If TIG > MECO + 6 min:
*     TIG-1:30 or MECO + 6 min (whichever comes first):
*     ET SEP – SEP >>
*   If TIG < MECO + 6 min:
*     MPS PRPLT DUMP SEQ – STOP
*     TIG-1:30: ET SEP – SEP
*     Post ET SEP -Z xlation:
*     MPS PRPLT DUMP SEQ – GPC
* 1 OMS ENG FAIL and ΔVTOT > 500:
*   Burn good OMS + l'cnct both OMS to RCS, THC +X at TIG
*   DAP – AUTO/DISC
*   √ENG/TRIM CONFIG, LOAD TGTS, MNVR – (√INRTL)
*   OMS XFEED (four) – OP
*   √CNTLR PWR (two) – ON
*   √OMS ENG (two) – ARM/PRESS
*   Note ΔVTOT ____ TIG [ ] [ ] : [ ] [ ]
-:15 EXEC
:00 TIG; start watch (√PC, ΔVTOT, ENG VLVs)
* OMS ENG FAIL:
*   Failed ENG – OFF
*   If ΔVTOT < 500:
*     At QTY = 5%, good OMS TK ISOL (two) – CL
*   If ΔVTOT > 500:
*     RCS XFEED (four) – OP
*     RCS TK ISOL (six) – CL
*     THC +X
*     At first QTY = 5%, good OMS TK ISOL (two) – CL
*     At second QTY = 5%, THC – Release
* RCS COMPLETION:
*   Interconnect to either
*   OMS that was ENG FAIL
*   THC +X (OMS% vs RCS ΔV)
*   OMS TK SW (if reqd)
CUTOFF
+:02 OMS ENG (two) – OFF
      Trim inplane X,Z residuals < 2 fps
      OMS XFEED (four) – CL (√RCS straightfeed)
```

HOOK

OMS 1 BURN MONITOR

OMS TEMP*		L	R	
FU IN P ≥		225	220	OMS ENG FAIL
≤		205	204	OMS ENG FAIL (PRPLT FAIL if 1 Pod Feed)
or No FU IN P				
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 (√[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 N2 REG P HIGH or LOW				OMS ENG – ARM
OMS N2 TK P LOW (√[OMS/MPS])				At N2 TK P < 470: OMS ENG – ARM
OMS GMBL		PRI fail		L(R) OMS GMBL – SEC (twice)
		SEC fail		If high RCS usage: OMS ENG FAIL
GPC		1(4) & Burning OMS aff		aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF, ON L(R) OMS GMBL – SEC (twice)
		SEC GMBL lost		If high RCS usage: OMS ENG FAIL
		2 FAs lost		√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				I/O RESET (if recov: >>)
		1(4)		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

OMS 2
TGTING

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	%
4800	96	2960	50
4560	90	2560	40
4160	80	2160	30
3760	70	1760	20
3360	60	1360	10
		960	0

TOP

HOOK

ATO

NOTE

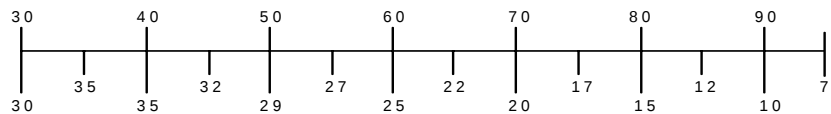
These tables apply only after ATO OMS 1 burn
(ITGT = ①, AOA to KSC). Assumes OMS and ARCS deorbit

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	52.3	38.0	57.6	41.1
90	53.7	35.7	55.3	38.0
85	55.3	34.3	53.0	35.2
80	57.2	33.9	50.4	32.4
75	59.2	35.6	47.4	29.5
70	61.0	37.6	44.4	27.1
65	62.2	38.9	42.0	25.3
60	63.0	40.3	41.4	23.2
55	63.4	41.4	42.3	21.2
50	64.1	42.6	42.1	19.4
45	---	44.0	44.7	17.6

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	47.7	33.5	53.1	36.6
90	49.1	31.2	50.7	33.5
85	50.7	29.7	48.4	30.6
80	52.6	29.3	45.9	27.8
75	54.6	31.0	42.8	24.9
70	56.4	33.0	39.8	22.6
65	57.6	34.4	37.5	20.7
60	58.5	35.7	36.8	18.6
55	58.9	36.8	37.8	16.6
50	59.5	38.0	37.6	14.9
45	---	39.4	40.1	13.0

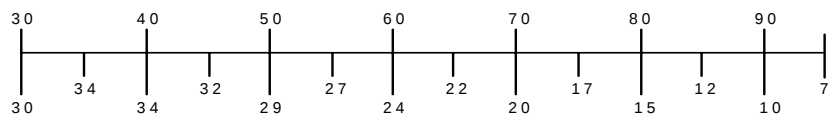
OMS BLOWDOWN

LEFT OMS GAGE QTY (%)



LEFT OMS BLDN EQUIV (%)

RIGHT OMS GAGE QTY (%)



RIGHT OMS BLDN EQUIV (%)

FB 2-11

ASC/116/FIN A

RTLS

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

After PPA: √BFS ITEM 1 (*)

TRAJ √Bugs, HSI √, 

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

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, INCORPORATEMM603 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 – OPH = 10K $\sqrt{BDY}$ FLP – TRAIL $\sqrt{A/L}$ (KSC – Tabs, Visors, Suit O2)POST LANDING: ENT, POST LDG

TAL

TOP
BACK OF 'RTLS PLT'

PILE

TAL CDR

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

$[G50]$ $\sqrt{\text{SITE \& RWY (PASS/BFS)}}$, $\sqrt{\text{HDG}}$

TAL	HDG
ZZA 010	
MRN 016	
BEN 022	

*LO XRNG

SITE	RWY	TACANS	ITEM 5	MLS	LENGTH
2	BEN 36/18	BEN 108	MAK 80 (DME)	6/-	13720/12720
3	MRN 20/02	MRN 100	AOG 23	6/-	11730/11730
4	ZZA 30L/12R	ZZA 64	ZZA 77 (DME)	6/-	12200/12200
12	*BEN 36/18	BEN 108	MAK 80 (DME)	6/-	13720/12720
13	*MRN 20/02	MRN 100	AOG 23	6/-	11730/11730
14	*ZZA 30L/12R	ZZA 64	ZZA 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 22/31	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	IRE 28 (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	NIM 53	ITR 104	-/-	11800/12300
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: $[TRAJ]$ $\sqrt{\text{SERC ON}}$ *
* $[G50]$ $\sqrt{\text{SITE (}\sqrt{\text{Redes card}})}$ *

$V_1 = [15.0K]$ $\sqrt{\text{Roll Heads Up}}$

----- MECO

$V_1 \sim 24.0K$ @ CO mark **BFS**

----- MECO

MECO+20 s $\sqrt{\text{ET SEP, } \sqrt{\text{AUTO -Z TRANS}}}$
MECO+37 s $\sqrt{\text{MM104}}$

Abort TAL (if reqd):

$\sqrt{\text{TAL flag set: } [G50] \text{ ITEM 41 = TAL SITE (any site)}}$

$\sqrt{\text{MECO } V_1 \text{ vs HI/LO Energy (TAL PLT)}}$

$\sqrt{\text{Rates } < .5^\circ/\text{sec; } \theta > 15^\circ, Y = 0 \pm 30^\circ}$

PASS, OPS 301 PRO ($\sqrt{304}$)

* No joy in 68 sec: BFS – ENGAGE *

* BFS, OPS 301 PRO *

----- MM304 -----

BFS, OPS 301 PRO ($\sqrt{304}$)

$[G50]$ $\sqrt{\text{SITE, RWY, TACAN}}$

S/B & ALTM (PASS/BFS)

$[TRAJ]$ $\sqrt{\text{BUGS, } [HSI] \sqrt{H}, \text{ RANGE, } [AMI] \sqrt{\alpha = 43^\circ}}$

* Low energy: $[TRAJ]$ ITEM 3 (Lo Energy ENA)*

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

$\sqrt{\text{SPDBK} \rightarrow 81\%}$
Go to ENTRY MANEUVERS
(Cue Card)

SURF WIND	/
SPDBK @ 3000 FT	
ALTM	
AIM PT	
SPDBK	

FB 2-14

ASC/116/FIN A

RTLS

TAL PLT

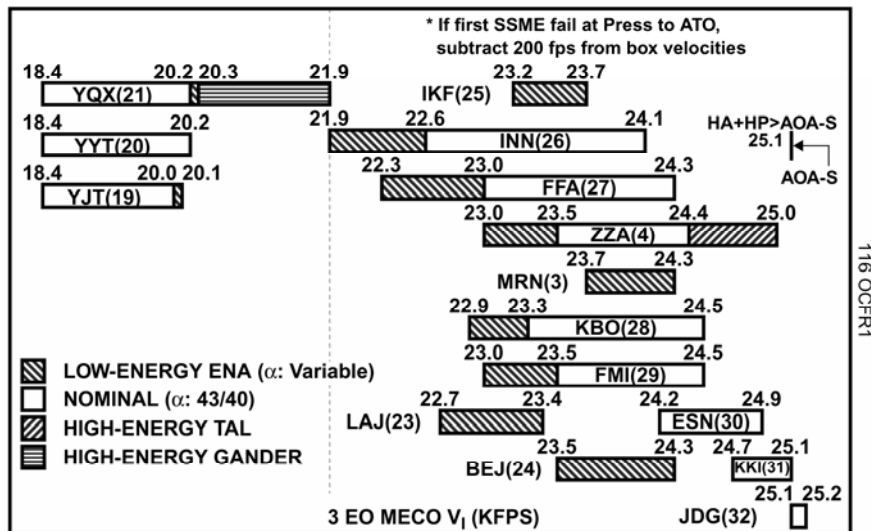
HOOK

 $\sqrt{\text{OMS DUMP}}$

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

 $\sqrt{\text{AUTO THROT}}$

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

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

MM304

 $\sqrt{\text{OMS DUMP}}$ $\sqrt{\text{ET DOORS}}$ – 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 ($\sqrt{\text{channels}}$)
I/O RESET
Go to ENTRY MANEUVERS (Cue Card)

ECAL

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 RTLS	6.7-7.9 *7.9-8.0 RTLS	Cherry Point	7	NKT 32L	EWN 83 (D)
*8.6-9.7	*8.4-8.6 8.6-9.3	*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 24	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 22	YQX 74
		17.3-17.6	Goose Bay	22	YYR 26	UYR 40

*Probable bailout region

(D) - DME only

TAL

HOOK

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, $\sqrt$ AIL/RUD TRIM****BFS, G50 $\sqrt$ SITE and TACAN****Nz Hold:****Expect prebank = 20° if TGT Nz < ~3.3g and Δ AZ > 20°****At H = -600 $\uparrow$ expect initial bank 2x Δ AZ (70° max)****If E/W $\geq$ STN, expect bank = 70° until Δ AZ increased to 15-30°
past site, then 2x Δ Az****G50 $\sqrt$ TACANS, INCORPORATE****M < 5 and EAS < 333 $\downarrow$:****AIR DATA PROBE (two) – Deploy ($\sqrt$ Heat)****G50 INCORPORATE Air Data ASAP****M = 3.2: $\sqrt$ OPS 603****Select UHF-G T/R****NO COMM ECAL LNDG CRITERIA****@H = 70K, $\sqrt$ Range:**

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

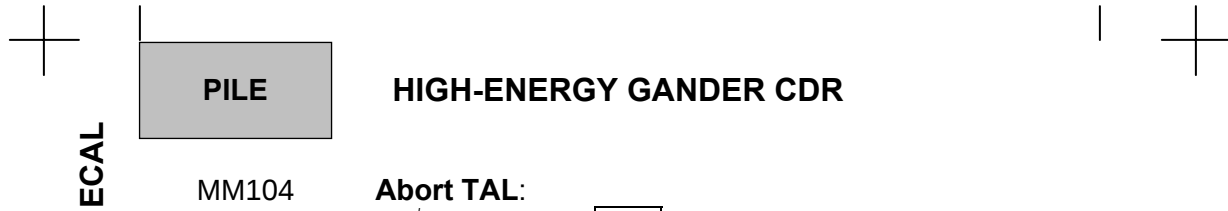
G50 $\sqrt$ SPDBK (ITEM 39) per ECAL LANDING Table**ECAL LANDING:**

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

MAIN GEAR TD: EARLY CHUTE, DEROTATE, $\sqrt$ 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



MM104

Abort TAL:

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

MM304

MM304

P, R/Y – CSS
√VREL

VREL	ROLL (CSS)	ALPHA (CSS)
$VREL \geq 19,900$	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 $Nz \geq 3.5$: *
- * 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-----

HI-ENER
TAL

BFS, OPS 301 PRO (√304)

☐G50 Select Site YQX – ITEM 41 +2 1☐TRAJ √BUGS, ☐HSI √ ☐H, RANGE√ET DOORS – closed and latched
(MM304 +1:30) $\dot{H} = -800\uparrow$ 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)



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-----

MM304

P, R/Y – CSS
√VREL

VREL	ROLL (CSS)	ALPHA (CSS)
$VREL \geq 23,800$	180°	80° ($\theta = 280^\circ$)
$23,300 \leq VREL < 23,800$	180°	55°
$VREL < 23,300$	0°	55°

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

Earlier of
 $\dot{H} = -700 \downarrow$
or Guid Init

Roll Heads Up, 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 () < 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] √ $\hat{H}$, RANGE

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

ABORT
DUMPS

Guid Init:
(D = 3, $\bar{q}$ = 8,
EAS = 48)

- * If no comm and [ZZA/FMI] *
- * initial Commanded Drag ($\leftarrow$) ≥ [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

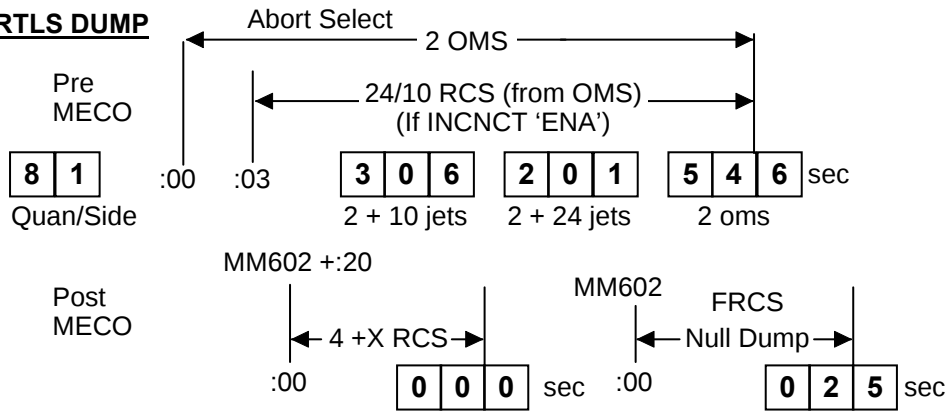
Go to ENTRY MANEUVERS (Cue Card)

HI-ENER
TAL

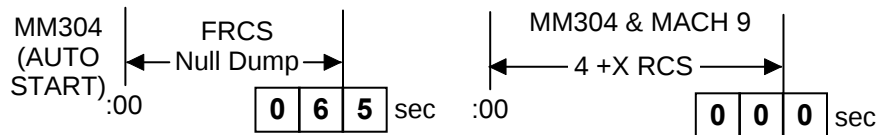
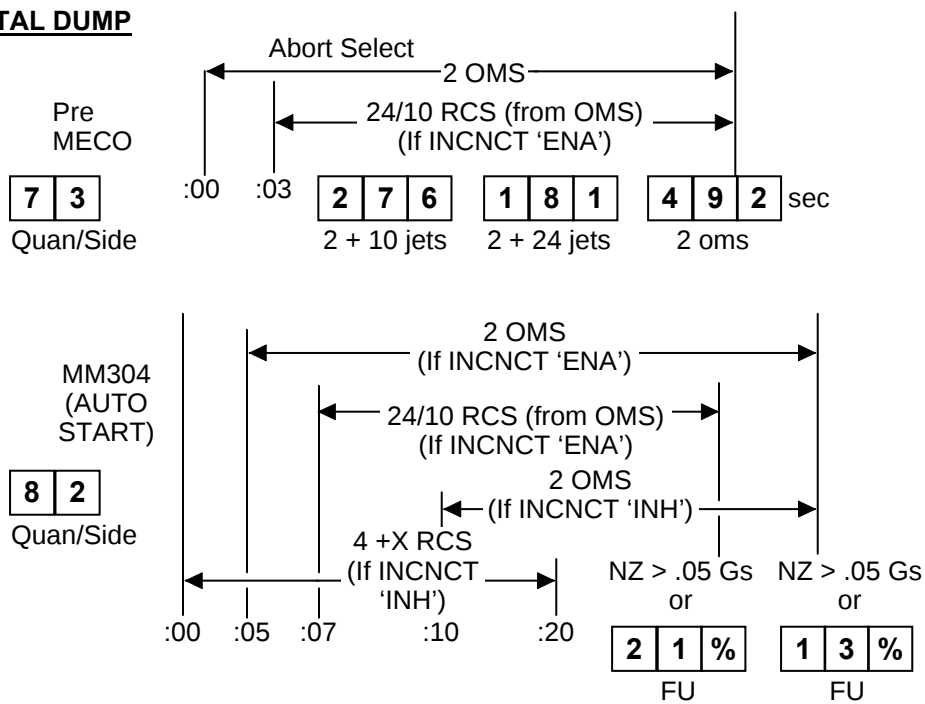
PILE

RTLS/TAL DUMPS

RTLS DUMP

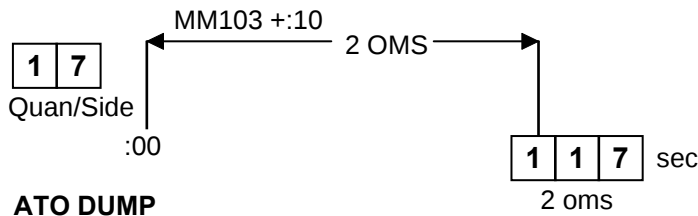


TAL DUMP

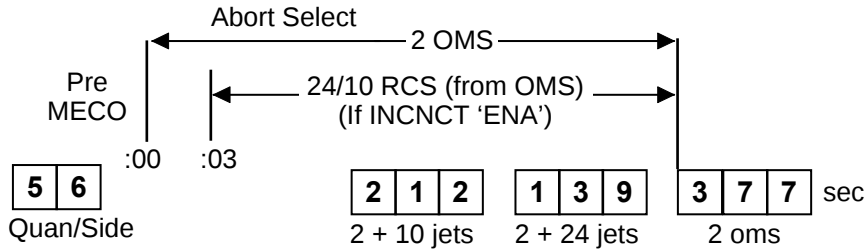


ASSIST/ATO/G51 DUMPS
ASSIST DUMP

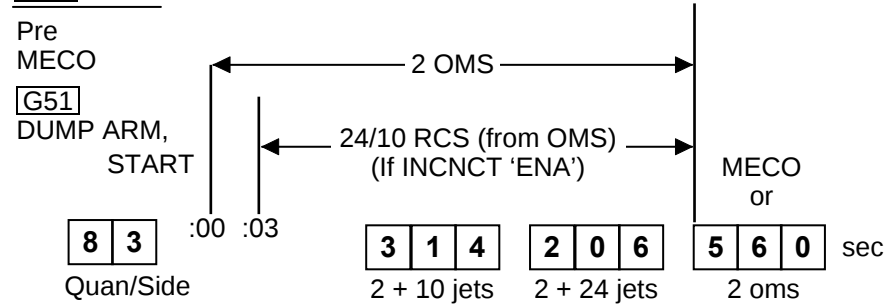
HOOK



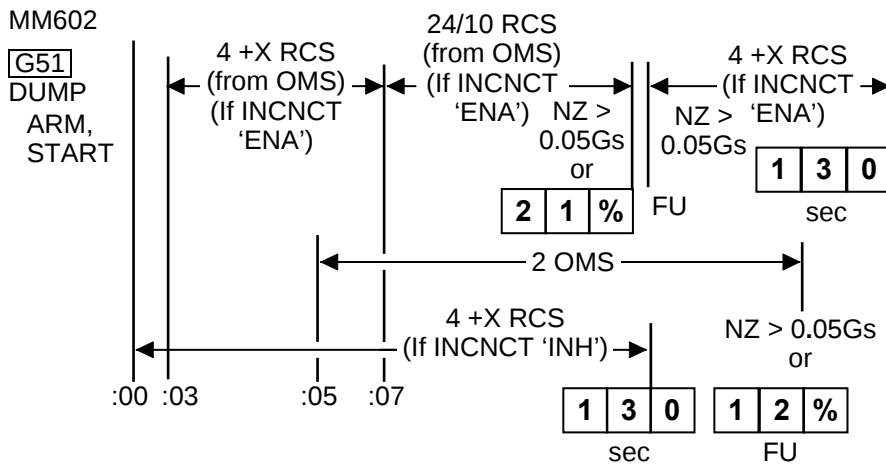
ATO DUMP



G51 DUMP



PWRD
CSS



PILE

POWERED CSS – UPHILL/TAL

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

Yaw to  until 2:30
Then  uphill
or  if TAL

If TAL $\sqrt{\text{HDG}}$	
ZZA	010
MRN	016
BEN	022

Man MECO @ CO mark **BFS**

$$\dot{H} = \boxed{274}$$

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

Max H = 400 – 420K
for early TAL

Roll heads up @

15.0
13.2

 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

1 eng @ 104% = 4%/min

ABORT
DUMPS

POWERED CSS – RTLS**HOOK**

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

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

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

 Yaw to 

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

-1200 max
neg. $\dot{H}$

PPA on PRPLT

✓ RATE – HIGH
8°/sec

✓ RATE – MED

Yaw to  and then

TGT $\dot{H} = +800$ @ PPD

✓ PRPLT

If < 26% (-60 sec)
or < 18% ($V_{rel} = 0$)
Throttle up

AFTER ABORT:

Fly Outbound θ
per RTLS PLT table

Post SEP:

Pull to $\alpha = 50^\circ$
TGT Nz ~2.2g

Pc < 50:
Hands off

1st Stage: use
 θ on ASC ADI
Cue Card
+3° if 1 EO

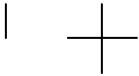
1 eng @ 104% = 4%/min

If CSS: Man Throt
Man MECO

TOP
BACK OF 'POWERED CSS – RTLS'

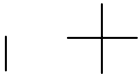


PILE



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PWRD
CSS



ASCENT/ENTRY CUE CARDS

ASC/ENT
CUE CARDS

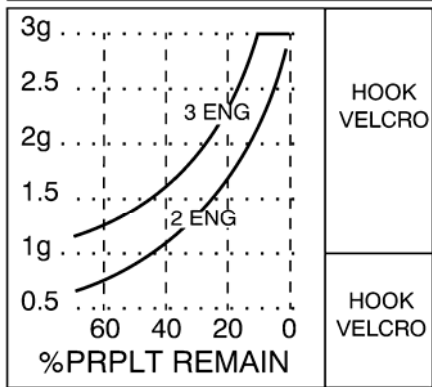
MS ONLY

2-27

ASC/116/FIN A

ASCENT ADI - NOMINAL

TIME	θ	H	$\dot{H}$	(116 OCFR1 CY)
0:30	68	9K	656	
0:50	61	26K	993	
1:10	53	50K	1429	
1:30	39	84K	1892	
1:50	30	125K	2195	



-STAGING-

V_I	θ	H	$\dot{H}$	ASC-14a/116/A/A
6	19	217K	1721	
7	16	274	1270	
8	13	309	921	
9	11	331	638	
10	9	345	407	
12	6	356	66	
14	9	355	-143	
16	25	350	-226	
18	23	344	-263	
20	21	339	-214	
22	19	337	-102	
24	17	337	66	
25819	13	345	274	

ENTRY ALPHA

VR	α_{ref}	R	H	H _{ref}	R _{ref}
25	40	4396	400		
24	HI 40 LO	2623	246	-46	L79
23	43 40 37	2166	238	-63	69
22	43 40 37	1809	232	-82	62
21	43 40 37	1534	225	-103	59
20	43 40 37	1309	219	-119	58
19	43 40 37	1130	212	-141	58
18	43 40 37	988	205	-162	59
17	43 40 37	869	198	-180	60
16	43 40 37	767	192	-191	61

KSC 15

MAX L/D	
M	α
3	17
2	15
1	12

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

HOOK VELCRO	HOOK VELCRO
----------------	----------------

15	43 40 37	685	186	-203	63
14	43 40 37	612	180	-127	61
13	43 40 37	544	177	-137	58
12	43 40 37	481	173	-153	56
11	42 39 36	424	167	-195	R54
10	41 38 35	372	164	-174	49
9	39 36 33	322	157	-209	46
8	37 34 31	274	149	-242	43
7	33 30 27	227	140	-271	42
6	30 27 24	183	128	-275	L42
5	26 23 20	143	117	-273	40
4	23 20 18	105	103	-264	42
3	19 16 15	74	89	-248	R35
2.5	14	60	82	-273	
2	12	49	75	-282	
1.5	9	37	64	-331	
1	8	28	50	-263	



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ENTRY MANEUVERS

FLIGHT CONDITIONS	MANEUVER
EI-5	√LVLH ATT GNC, OPS 304 PRO * If PREBANK, R/Y – CSS * * Roll at 1°/sec to * * Maintain PREBANK ±5° * If previous OMS OX TK, He TK, or RCS OX TK leak: G51 VENT DOOR CNTL OPEN – ITEM 43 EXEC (AOA) SPI When SB position – 0%: √HYD MN PUMP PRESS (three) – LO
$\bar{q} = 1$	(AOA) HYD MN PUMP PRESS (three) – NORM
'Guidance Box' @ $\bar{q} \sim 8$ or D ~ 3	CLOSED LOOP GUIDANCE ____:____:____ * If PREBANK: P,R/Y – AUTO * Begin AIL trim monitoring
V = 24K	If previous OMS OX TK, He TK, or RCS OX TK leak: 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

ENT-6a/E/O

ENT
MNV

ENT
MNV

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 √NWS – 1 Lock Inertia Reels	MAX N _Z	.
M = 0.7	√LG EXTD ISO VLV – OP		
h = 15K	√MLS		
h = 10K	√A/L (KSC – Tabs, Visors, Suit O2)		
h = 2K	LDG GEAR ARM pb – push (ARM It on)		
h = 300	LDG GEAR DN pb – push (DN It on)		
MAIN GEAR TD	√SPDBK – 100%		
V = 195 KEAS	DRAG CHUTE ARM, DPY pb (two) – push (simo) (All Its on)		
V = 185 KEAS	DEROTATE		
NOSE GEAR TD	SRB SEP – MAN/AUTO and depress pb √Auto Load Relief √HYD BK ISOL VLV (three) – OP		
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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CONT
ABORT

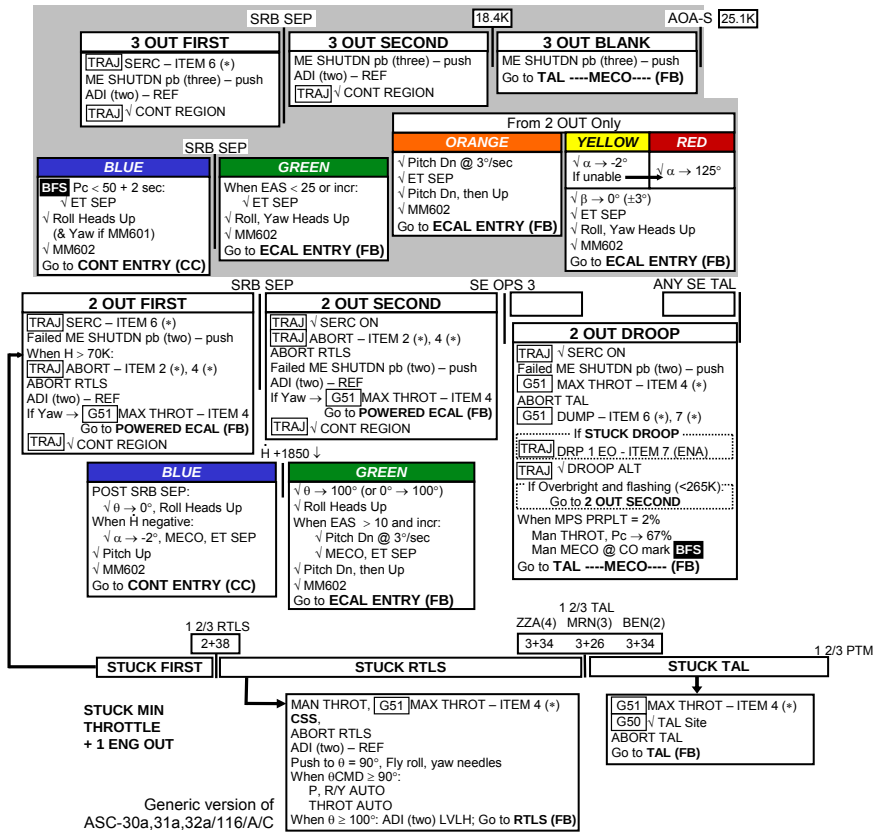
ABORT CUE CARDS

NOT FLOWN

2-35

ASC/116/FIN A

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

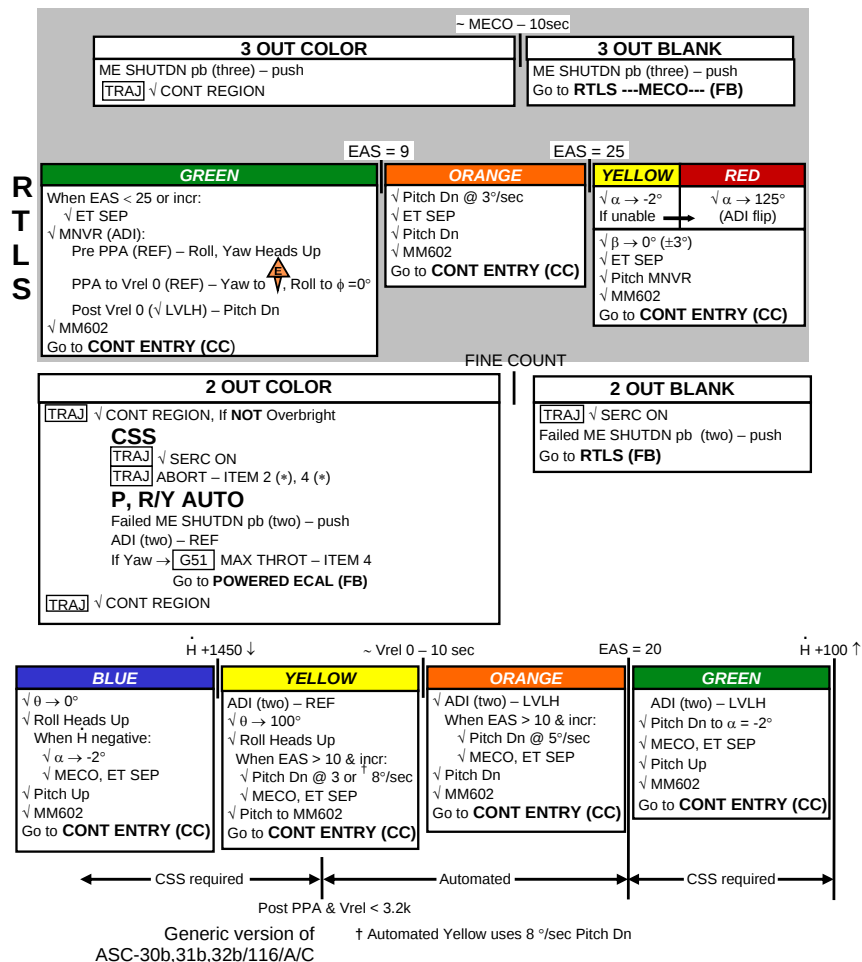
When $M < 1.0$

Go to **BAILOUT (FB)**

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

RTLS CONTINGENCY

High Inclination
51.6°



NOT FLOWN

2-38

ASC/116/FIN A,1

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 OCFR1 CYC)**

1st E.O. VI		5800	5900	6000	6100	6200	6300	6400
SE OPS 3 ZZA 109	(14)	10800	10800	10900	10900	10900	11000	11000
SE ZZA 104	(4)	17500	17300	17100	16800	16600	16400	16200

1st E.O. VI		6500	6600	6700	6800	6900	7000	7100
SE OPS 3 ZZA 109	(14)	11000	11000	11100	11100	11100	11200	11200
SE ZZA 104	(4)	15900	15700	15500	15300	15000	14800	14600

1st E.O. VI		7200	7300	7400	7500	7600	7700	7800
SE OPS 3 ZZA 109	(14)	11200	11200	11300	11300	11300	11300	11400
SE ZZA 104	(4)	14500	14300	14100	14000	13900	13800	13700

1st E.O. VI		7900	8000	8100	8200	8300	8400	8500
SE OPS 3 ZZA 109	(14)	11400	11400	11400	11400	11500	11500	11500
SE ZZA 104	(4)	13600	13600	13500	13500	13400	13400	13400

1st E.O. VI		8600	8700	8800	8900	9000	9100	9200
SE OPS 3 ZZA 109	(14)	11500	11500	11500	11600	11600	11600	11600
SE ZZA 104	(4)	13400	13400	13400	13400	13500	13500	13500

1st E.O. VI		9300	9400	9500	9600	9700	9800	9900
SE OPS 3 ZZA 109	(14)	11600	11600	11600	11700	11700	11700	11700
SE ZZA 104	(4)	13500	13500	13500	13500	13500	13500	13500

ASC-9a/116/A/A

NOT FLOWN

2-40

ASC/116/FIN A

ECAL – ZZA or MRN 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/B

NOT FLOWN

2-41

ASC/116/FIN A

**MRN TAL REDESIGNATION
(116 OCFR1 CYC)**

1st E.O. VI		5700	5800	5900	6000	6100	6200	6300
SE OPS 3 MRN 109	(13)	10900	10900	11000	11000	11000	11100	11100
SE MRN 104	(3)	17200	17000	16800	16600	16300	16100	15900

1st E.O. VI		6400	6500	6600	6700	6800	6900	7000
SE OPS 3 MRN 109	(13)	11100	11100	11200	11200	11200	11300	11300
SE MRN 104	(3)	15700	15500	15200	15000	14800	14600	14400

1st E.O. VI		7100	7200	7300	7400	7500	7600	7700
SE OPS 3 MRN 109	(13)	11300	11300	11400	11400	11400	11400	11400
SE MRN 104	(3)	14200	14100	13900	13800	13700	13600	13500

1st E.O. VI		7800	7900	8000	8100	8200	8300	8400
SE OPS 3 MRN 109	(13)	11500	11500	11500	11500	11500	11500	11500
SE MRN 104	(3)	13400	13400	13300	13300	13300	13300	13200

1st E.O. VI		8500	8600	8700	8800	8900	9000	9100
SE OPS 3 MRN 109	(13)	11500	11600	11600	11600	11600	11600	11600
SE MRN 104	(3)	13200	13300	13300	13300	13300	13300	13300

1st E.O. VI		9200	9300	9400	9500	9600	9700	9800
SE OPS 3 MRN 109	(13)	11600	11600	11600	11600	11700	11700	11700
SE MRN 104	(3)	13400	13400	13400	13400	13400	13400	13400

1st E.O. VI		9900	
SE OPS 3 MRN 109	(13)	11700	
SE MRN 104	(3)	13400	

ASC-10a/116/A/A

NOT FLOWN

2-42

ASC/116/FIN A

ECAL – ZZA or MRN 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/B

NOT FLOWN

2-43

ASC/116/FIN A

**BEN TAL REDESIGNATION
(116 OCFR1 CYC)**

1st E.O. VI		5700	5800	5900	6000	6100	6200	6300
SE OPS 3 BEN 109	(12)	10700	10700	10800	10800	10800	10900	10900
SE BEN 104	(2)	17200	17000	16800	16600	16400	16200	15900

1st E.O. VI		6400	6500	6600	6700	6800	6900	7000
SE OPS 3 BEN 109	(12)	10900	10900	11000	11000	11000	11100	11100
SE BEN 104	(2)	15700	15500	15300	15100	14900	14700	14500

1st E.O. VI		7100	7200	7300	7400	7500	7600	7700
SE OPS 3 BEN 109	(12)	11100	11100	11200	11200	11200	11200	11300
SE BEN 104	(2)	14300	14200	14000	13900	13800	13700	13600

1st E.O. VI		7800	7900	8000	8100	8200	8300	8400
SE OPS 3 BEN 109	(12)	11300	11300	11300	11300	11400	11400	11400
SE BEN 104	(2)	13500	13500	13400	13400	13400	13400	13400

1st E.O. VI		8500	8600	8700	8800	8900	9000	9100
SE OPS 3 BEN 109	(12)	11500	11500	11600	11600	11600	11600	11600
SE BEN 104	(2)	13400	13400	13400	13400	13400	13400	13400

1st E.O. VI		9200	9300	9400	9500	9600	9700	9800
SE OPS 3 BEN 109	(12)	11600	11600	11600	11700	11700	11700	11700
SE BEN 104	(2)	13500	13500	13500	13500	13500	13500	13500

1st E.O. VI		9900						
SE OPS 3 BEN 109	(12)	11700						
SE BEN 104	(2)	13500						

ASC-12a/116/A/A

NOT FLOWN

2-44

ASC/116/FIN A

ECAL - BEN PRIME TAL

1st EO VI (KFPS)	5.6	5.8	6.0	6.2	6.4	6.6	6.8
CHERRY POINT (7)		6.5 - 6.8	6.6 - 7.0	6.7 - 7.2	6.7 - 7.3	6.8 - 7.4	6.9 - 7.5
OTIS ANGB (16)							
GABRESKI (15)							
PEASE INT'L (17)							

1st EO VI (KFPS)	7.0	7.2	7.4	7.6	7.8	8.0	8.2
CHERRY POINT (7)	7.0 - 7.6	7.2 - 7.7	7.4 - 7.7	7.6 - 7.8	7.8 - 7.9		
OTIS ANGB (16)							11.0 - 11.3
GABRESKI (15)							
PEASE INT'L (17)							

1st EO VI (KFPS)	8.4	8.6	8.8	9.0	9.2	9.4	9.6
CHERRY POINT (7)							
OTIS ANGB (16)	10.9 - 11.4	10.9 - 11.6	10.9 - 11.7	10.9 - 11.8	10.9 - 11.8	10.9 - 11.9	10.9 - 12.0
GABRESKI (15)							
PEASE INT'L (17)							

1st EO VI (KFPS)	9.8	10.0	10.2	10.4	10.6	10.8	11.0
CHERRY POINT (7)							
OTIS ANGB (16)	10.9 - 12.1	10.9 - 12.2	10.9 - 12.2	10.9 - 12.4	10.9 - 12.4	10.9 - 12.5	11.0 - 12.5
GABRESKI (15)				11.0 - 11.3	11.0 - 11.5	11.0 - 11.6	11.0 - 11.7
PEASE INT'L (17)							

1st EO VI (KFPS)	11.2	11.4	11.6	11.8	12.0	12.2	12.4
CHERRY POINT (7)							
OTIS ANGB (16)	11.2 - 12.6	11.4 - 12.7	11.6 - 12.7	11.8 - 12.8	12.0 - 12.9	12.2 - 13.0	12.4 - 13.0
GABRESKI (15)	11.2 - 11.9	11.4 - 12.0	11.6 - 12.0	11.8 - 12.1	12.0 - 12.2	12.2 - 12.2	
PEASE INT'L (17)	12.1 - 12.1	12.0 - 12.4	12.0 - 12.6	12.0 - 12.8	12.0 - 12.9	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
CHERRY POINT (7)							
OTIS ANGB (16)	12.6 - 13.1	12.8 - 13.2	13.0 - 13.3	13.2 - 13.3	13.4 - 13.4		
GABRESKI (15)							
PEASE INT'L (17)	12.6 - 13.0	12.8 - 13.0	13.0 - 13.1				

ASC-12b/116/A/A

NOT FLOWN

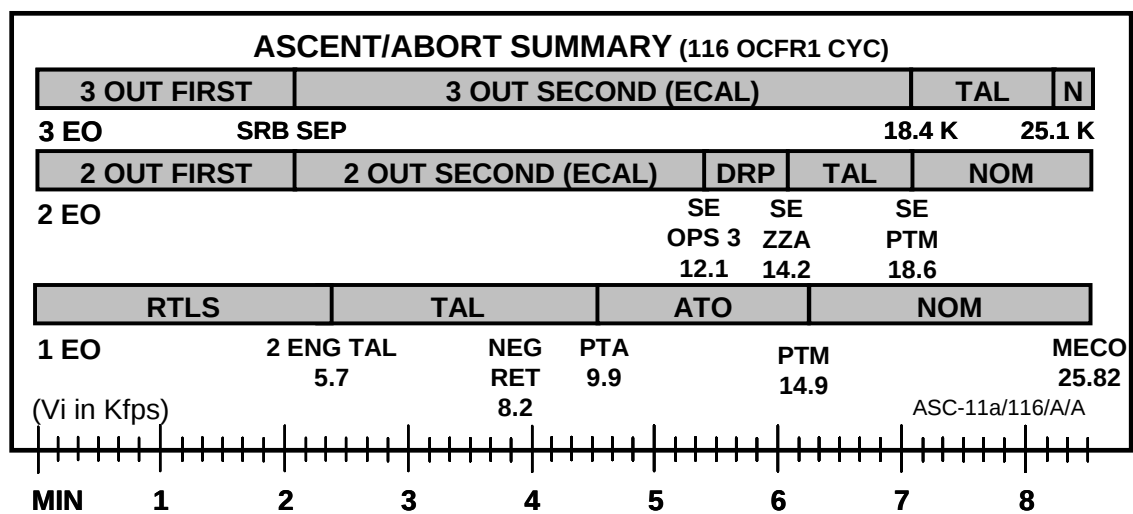
2-45

ASC/116/FIN A

NOT FLOWN

2-46

ASC/116/FIN A



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°) *

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 $\leq$ 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

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

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

TAIL ONLY CONTROL (√MCC)

	2: GNC 23 RCS
CRT2	OVRD FWD RCS MANF STATs 1,2,3,4 – CL

FES & HEATER ACTIVATION

C	L1	FLASH EVAP CNTLR PRI A – ON
	L2	FDLN HTR (two) – 1
P	R1	O2 TK1,2 HTRS B (two) – AUTO
		H2 TK1,2 HTRS B (two) – AUTO
MS1	A12	APU HTR TK/FU LN/H2O SYS 1A,2A,3A (three) –
		AUTO

AC BUS SNSR

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

MAJOR MODE CHANGE

CRT1	GNC, OPS 105 PRO
------	------------------

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

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

B OMS 2 BURN SETUP

√OMS 2 TARGETING, Flip Book

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

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

NOTE

Onboard computed TIG may vary slightly but is acceptable

√Targets, OMS TARGETS

LOAD – ITEM 22 EXEC
TIMER – ITEM 23 EXEC

CRT3 √BFS TGT

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

P MPS 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 *

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

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 A



OMS 2 BURN MONITOR

OMS TEMP*		
FU IN P ≥	L	R
	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		OMS ENG FAIL
or OX IN P > 227		
OX IN P ≤ 227		OMS PRPLT FAIL
or No OX IN P		
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 PC < 72 or OMS TEMP or HP > 85:
		OMS PRPLT FAIL
OX & FU HIGH		He PRESS/VAP ISOL (two) – CL
		Cycle He A(B) to maintain TK P 234-284
OMS He TK P LOW		
(√OMS/MPS)		At He P < 640 or QTY ≤ 41:
		If HP < 85: OMS XFEED from good OMS
		At HP > 85: OMS PRPLT FAIL
OMS N2 REG P HIGH or LOW		OMS ENG – ARM
OMS N2 TK P LOW		
(√OMS/MPS)		At N2 TK P < 470: OMS ENG – ARM
OMS GMBL		
PRI fail		L(R) OMS GMBL – SEC (twice)
SEC fail		If high RCS usage: OMS ENG FAIL
GPC		
1(4) &		aff GPC PWR – OFF
Burning OMS aff		If SEC GMBL avail:
		aff MDM FF 1(4) – OFF, ON
		L(R) OMS GMBL – SEC (twice)
SEC GMBL lost		If high RCS usage: OMS ENG FAIL
2 FAs lost		√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/ORBIT OMS BURNS

√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 burn)

	GPC	OP	CL
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 PRPLT 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

MS ONLY

4-3

ASC/116/FIN A

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 = 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

POST OMS 2 BURN PROCEDURES

POST
OMS 2

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



DIRECT INSERTION AOA DEL PAD

<u>DEORBIT</u>									
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		9
AFT ΔV									0
B/U SITE					N		/		A
FRCS: DUMP TO % (USE TIME AS CUE)					☐ OX		☐ FU		
<u>ENTRY / LANDING</u>									
EI - 5 MM303 INRTL ATT (6-30)					R		P		Y
MM304 PREBANK (ENT MNVR Cue Card)					☐ L		☐ R		
ALTM SET (6-34)									.
CLG INIT							:		:
EXPECTED AIL TRIM					☐ L		☐ R		.
VREL 1ST REVERSAL									.
XCG AT TD									.
LAND SITE					RWY		50K		/
☐ L					☐ OVHD		38K		/
☐ R					☐ STRT		28K		/
ΔT MACH < 1 TO HAC					MAX Nz		20K		/
					Nz LIMIT		12K		/
ΔT HAC INIT TO H = 20K							7K		/
							3K		/
AIMPOINT					SPEEDBRAKE		1K		/
☐ NOM					☐ NOM		SURFACE		/
☐ CLOSE-IN					☐ S.F.				
REMARKS:									

AOA
PADS

WIOMS 1 AOA DEL PAD

<u>DEORBIT</u>									
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 + OR 1 9 0 7 STEEP SHALLOW + (2 5) =									
					($\frac{\text{FLIP } \Delta V}{2}$)				
AFT HP = () TGT HP + 0 =									
					($\frac{\text{AFT } \Delta V}{2}$)				
B/U SITE					N / A				
FRCS: DUMP TO % (USE TIME AS CUE)					☐ OX		☐ FU		
<u>ENTRY / LANDING</u>									
EI - 5 MM303 INRTL ATT (6-30)					R		P		Y
MM304 PREBANK (ENT MNVR Cue Card)					☐ L		☐ R		
ALTM SET (6-34)									.
CLG INIT							:		:
EXPECTED AIL TRIM					☐ L		☐ R		.
VREL 1ST REVERSAL									.
XCG AT TD									.
LAND SITE					RWY		50K		/
							38K		/
							28K		/
							20K		/
							12K		/
							7K		/
							3K		/
							1K		/
							SURFACE		/
☐ L ☐ OVHD deg MLS									
☐ R ☐ STRT TAC									
ΔT MACH < 1 TO HAC MAX Nz Nz LIMIT WINDS: (ENT MNVR Cue Card)									
ΔT HAC INIT TO H = 20K									
AIMPOINT SPEEDBRAKE % @ 3K									
☐ NOM ☐ NOM ☐ CLOSE-IN ☐ S.F.									
<u>REMARKS:</u>									

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 $\Delta VTOT$ = or at %
DEORBIT BURN (RCS)	RCS I'CNCT TK SW at $\Delta VTOT$ = OMS PRPLT LOW: $\Delta VTOT$ =
UNBALANCED PRPLT DEORBIT BURN	INITIAL CONFIG: TK ISOLs – CL While feeding 2 OMS from 1 POD: OMS PRPLT FAIL: Secure OMS Secure OMS Interconnect OMS to RCS THC + X for : If (XFEED) ENG '↓' When OMS QTY: 5%: OMS TK ISOL (two) – OP 4%: OMS TK ISOL (two) – CL If (STRAIGHT FEED) ENG '↓' OMS ENG FAIL: At $\Delta VTOT$ = or at % TK ISOL (two) – OP TK ISOL (two) – CL Return to 2 ENG, 2 POD FLOW: At $\Delta VTOT$ = TK ISOLs – OP OMS ENG FAIL: (XFEED CUE) OMS QTY %L or %R
DEORBIT BURN (MIXED XFEED)	FEED FROM GOOD POD: At $\Delta VTOT$ = or at % OMS He PRESS (two) – OP TK ISOL (two) – OP XFEED (two) – OP Secure OMS OMS PRPLT LOW: AFT RCS RECONFIG at $\Delta VTOT$ = OMS ENG FAIL: OMS He PRESS (two) – OP TK ISOL (two) – OP 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 AOA DEORBIT BURN and DEORBIT BURN MONITOR Cue Cards (R3A)

IF APUs SHUTDN:

WARNING

Ice in W/B Steam Vent may cause loss of APU/HYD

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 *

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

* 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

C OMS TVC GMBL CHECK
(Perform during S-band AOS)

Perform SEC L,R then PRI L,R GMBL CK

- ## SEAT ADJUSTMENT

P OMS BURN PREP

- O8 L,R OMS
 $\sqrt{\text{He}}$ PRESS/VAP ISOL A (two) – GPC
 B (two) – CL
 $\sqrt{\text{TK}}$ ISOL (four) – GPC (tb-OP)
 $\sqrt{\text{XFEED}}$ (four) – GPC (tb-CL)

P	O8	L,R OMS	
		He PRESS/VAP ISOL (four) – CL	
		TK ISOL (four) – OP (tb-OP)	
		L OMS XFEED (two) – OP (tb-OP)	
		R OMS XFEED (two) – CL (tb-CL)	
	O7	AFT L,R RCS	
		XFEED (four) – OP (tb-OP)	
		TK ISOL (six) – CL (tb-CL)	

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 $\sqrt{\text{BFS TGT}}$

MNVR TO DEORBIT BURN ATTITUDE

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

C MNVR – ITEM 27 EXEC (*)
 ($\sqrt{\text{ADI ATT}}$ 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 A

DEORBIT BURN MONITOR

OMS TEMP*	L	R	
	FU IN P	≥	225 220
		≤	205 204
or No FU IN P			
OMS PC* & OMS ↓ (BFS: √accel)			
ENG VLV 1 or 2 < 70			OMS ENG FAIL
or OX IN P > 227			
OX IN P ≤ 227			OMS PRPLT FAIL
or No OX IN P			
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 PC < 72 or OMS TEMP: OMS PRPLT FAIL
OX & FU HIGH			He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284
OMS GMBL			
PRI fail			L(R) OMS GMBL – SEC (twice)
SEC fail			If high RCS usage: OMS ENG FAIL
GPC			
1(4) &			aff GPC PWR – OFF
Burning OMS aff			If SEC GMBL avail: aff MDM FF 1(4) – OFF, ON L(R) OMS GMBL – SEC (twice)
SEC GMBL lost			If high RCS usage: OMS ENG FAIL
2 FAs lost			√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)
RM DLMA IMU			
or			
ABOVE SAFE			STOP BURN: OMS ENG(s) – OFF >>
HP ⇒ ☐			
GPC SET SPLIT			
or			
2 MN BUSES			
BELOW SAFE			IMU DLMA:
HP ⇒			After C/O: √timer ☐ G21
			If any IMU ACC > 0.03: aff IMU – desel
			I'cnct OMS to RCS (√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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Enter TGO + 5 sec

L,R OMS He PRESS/VAP ISOL A (two) – GPC
B (two) – OP

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 ($\sqrt{P_G}$, $\Delta VTOT$, ENG VLVs)

*

* Failed OMS ENG – OFF

```
*      ITEM 18 +0 EXEC
```

When good OMS OTY:

* 5%: L, R OMS XFEED (four) – OP

* 4%: Good OMS TK ISOL (two) – CL

* If OMS $P_G < 80$ or OMS TEMP,

* OMS ENG – OFF

* $\sqrt{\text{ADI} - \text{LVLH}}$, center needles

* RCS COMPLETION

* OMS ENG FAIL:

* Failed OMS ENG – OFF

* OMS XFEED at 1/2 ΔV_{TOT} at fail			
* or OMS QTY		%L or	

* 2nd OMS FAIL (ENG or PRPLT):

* Failed OMS ENG – OFF

* If PRPLT FAIL:

* Secure aff OMS

```
* ITEM 18 +0 EXEC
```

* $\sqrt{\text{ADI} - \text{LVLH}}$, center needles

- * Interconnect good OMS to RCS

* THC +X ($\sqrt{\text{OMS\%}}$ 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

HINGE

* RCS COMPLETION:

If DIRECT INSERTION:

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

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

FLIP
 ΔV

FRCS COMPLETION

AFT
 ΔV

THC +X to TGT ΔV

TGT
 ΔV

If w/OMS 1:

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

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

FLIP
HP

FRCS COMPLETION

AFT
HP

THC +X to TGT HP

TGT
HP

* FRCS COMPLETION:

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/A

AOA DEORBIT BURN (1 ENG)

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

OMS XFEED RETURN at ΔVTOT =

--	--	--

or

--

 at

--	--

 %
L,R OMS TK ISOL (four) – OP
XFEED (four) – CL

* OMS PRPLT FAIL (CONTINUE BURN):	*	
* OMS ENG – OFF	*	
* ITEM 18 +0 EXEC	*	
* Secure aff OMS	*	
* √ADI – LVLH, center needles	*	
* Interconnect good OMS to RCS	*	
* THC +X (√OMS% vs RCS Burn Time)	*	
* AFT RCS RECONFIG	*	
* RCS COMPLETION	*	
* OMS ENG FAIL (CONTINUE BURN):	*	
* OMS ENG – OFF	*	
* √ADI – LVLH, center needles	*	
* Interconnect good OMS to RCS	*	
* THC +X (√OMS% vs RCS Burn Time)	*	
* RCS I'CNCT TK SW	*	
* THC +X (√OMS% vs RCS Burn Time)	*	
* AFT RCS RECONFIG	*	
* RCS COMPLETION	*	
* RCS +X JET FAIL OFF:	*	
* ITEM 18 +0 EXEC	*	
* <table border="1" style="display: inline-table; vertical-align: middle;">G23</table> Resel jet	*	

ASC-8b/A/B

HINGE

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/A

AOA DEORBIT BURN (RCS)

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

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

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

TIG THC +X
Maintain PITCH ATT ERR $\pm 3^\circ$
Monitor $\Delta VTOT$

RCS I'CNCT TK SW at $\Delta VTOT$ =
R OMS XFEED (two) – OP
L OMS XFEED (two) – CL

OMS PRPLT LOW
AFT RCS RECONFIG AT $\Delta VTOT$ =
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 A

HINGE

* RCS COMPLETION:

If DIRECT INSERTION:

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

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

FLIP
 ΔV

FRCS COMPLETION

AFT
 ΔV

THC +X to TGT ΔV

TGT
 ΔV

If w/OMS 1:

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

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

FLIP
HP

FRCS COMPLETION

AFT
HP

THC +X to TGT HP

TGT
HP

* FRCS COMPLETION:

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

CUTOFF:

VGOx = 0, release THC

AFT RCS RECONFIG

Trim Inplane X,Z residuals < 2 fps (< 0.5 fps if shallow)

ASC-7aa/116/A/A



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POST D/O
BURN

AOA POST DEORBIT BURN

6-27

ASC/116/FIN A

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) *									
* <u>NOTE:</u> APPLICABLE <u>ONLY</u> IF OMS 1 REQD *									
* (ATO/AOA steep entries) KSC *									
* Δ HP	0	4	8	12	16	(19)	22	25	28
* PREBANK	0	50	80	100	110	120	135	150	175
* (ATO/AOA shallow entries) KSC *									
* Δ HP	0	1	3	4	5	6	(7)	8	9
* PREBANK	90	105	120	125	135	145	155	165	175
* 160CFR1 *									

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 √SPI: Stop drive test when elevon posns within +12° to -27°:

SURF DRIVE OFF, ITEM 40 EXEC (*)

CRT1 3. √POS STIM ENA, ITEM 7 – (no *)

C3 4. √FCS CH 1,2,3,4 – AUTO

CRT1 5. SEC ACT CK, CH 1 – ITEM 1 EXEC (*)
CK START – ITEM 5 EXEC (*)

6. √All CH 1 ports bypass '↓'
STOP – ITEM 6 EXEC (*)

C3 7. FCS CH 1 – ORIDE

CRT1 √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 53 CONTROLS	2: BFS, GNC SYS SUMM 2
3: GNC DEORB MNVR COAST	

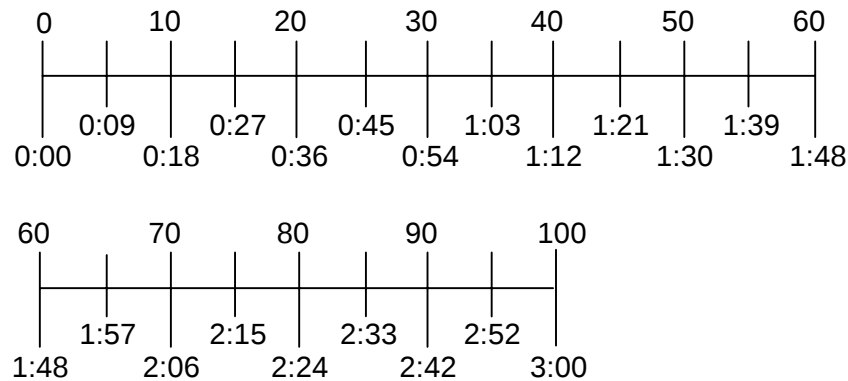
1: GNC 23 RCS	2: GNC DEORB MNVR COAST
3: BFS, GNC SYS SUMM 2	

P FRCS DUMP

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

FOUR JET DUMP:

FRCS PRPLT TO BE DUMPED (%)



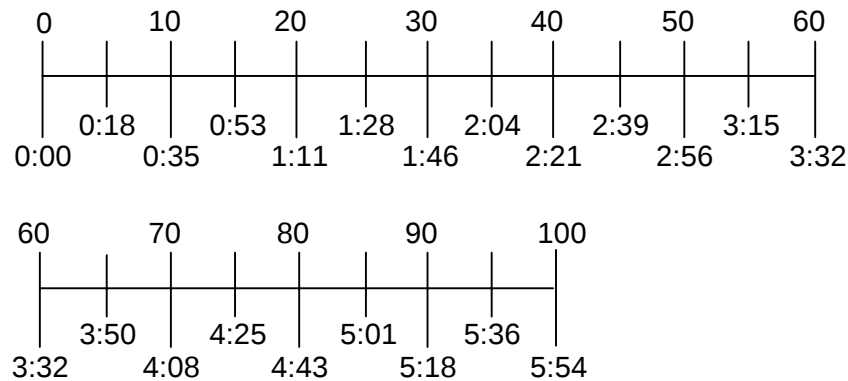
TIME FROM DUMP INITIATION (M:S)

NOTE
During dump, disregard FRCS qty

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

TWO JET DUMP:

FRCS PRPLT TO BE DUMPED (%)



TIME FROM DUMP INITIATION (M:S)

NOTE

During dump, disregard FRCS qty

CRT2 FWD RCS ARM – ITEM 36 EXEC
 DUMP – ITEM 37 EXEC
 (Start watch)
 When dump time achieved:
 FWD RCS OFF – ITEM 38 EXEC

1: GNC DEORB MNVR COAST

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: BFS, GNC 50 HORIZ SIT	

ENTRY SW CHECK

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

NOTE

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

P O7 √TACAN MODE (three) – GPC
 √ANT SEL (three) – AUTO
 CH (three) –

111

 (EDW)
 –

059Y

 (KSC)
 –

121Y

 (NOR)

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

EDW 22	KSC 15
--------	--------

 – 6

KSC 33	EDW 04
--------	--------

NOR 17	NOR 23
--------	--------

I/O RESET

C L2 √CAB RELIEF (two) – ENA (tb-ENA)
 √ANTISKID – ON
 √NWS – 1
 √ENTRY MODE – AUTO

3: GNC 51 OVERRIDE

B L2,C3 √ROLL MODE – AUTO
C3 √SBTC (two) – full fwd
 √SRB SEP – AUTO
 √ET SEP – AUTO

F6,F8 √AIR DATA (two) – NAV
 √ADI ERR (two) – 5
 √RATE (two) – 5
 √HSI SEL MODE (two) – ENTRY

C F6 √SOURCE (two) – NAV, 1
P F8 √SOURCE (two) – NAV, 2

B F3 √TRIM RHC/PNL (two) – INH
 √PNL (two) – ON

F6,F8 √RADAR ALTM (two) – 1(C), 2(P)

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

* **If APUs shut down:** *

* Perform APU RESTART *

* (ENT PKT, APU/HYD) *

PRE EI CHECKLIST

* If less than four PASS GPCs, config FCS *

* CHs so that each GPC cmd equals number *

* of CHs. See table on POST OPS 3/GRTLS *

* TRANSITION RESTRING (Cue Card) *

* GNC 53 CONTROLS *

* Config SURF FBK (See table on POST *

* OPS 3/GRTLS TRANSITION RESTRING *

* (Cue Card) *

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

B F6,F8 FLT CNTLR PWR (two) – ON

P If SECONDARY ACTUATOR CHECK performed:

R2 HYD MN PUMP PRESS (one) – NORM

Go to ENTRY MANEUVERS (Cue Card)



OMS FAILURE

OMS
FAILURE



MS ONLY

6-37

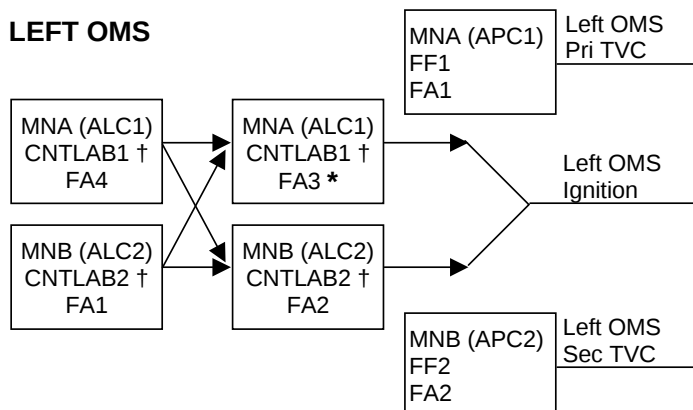
ASC/116/FIN A



OMS
FAILURE

OMS FAILURES

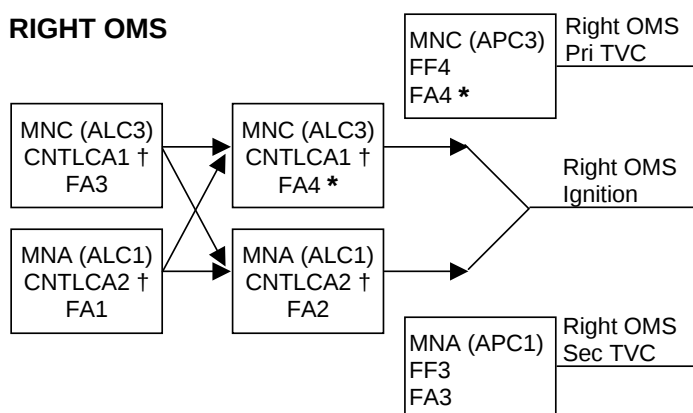
LEFT OMS



† 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)

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/ΔV/BURN TIME

OMS% GAGE	OMS He Press	OMS ΔV	RCS ΔV	RCS BURN MIN:SEC
96.1	4800	484	399	14:44
95	4760	479	394	14:33
90	4560	453	373	13:45
85	4360	427	351	12:57
80	4160	401	330	12:09
75	3960	375	309	11:21
70	3760	348	287	10:33
65	3560	322	266	09:45
60	3360	296	244	08:56
55	3160	270	223	08:08
50	2960	243	201	07:20
45	2760	217	179	06:32
40	2560	190	158	05:44
35	2360	164	136	04:56
30	2160	137	114	04:08
25	1960	110	92	03:20
20	1760	83	70	02:32
15	1560	56	48	01:43
10	1360	29	25	00:54
5	1160	2	2	00:04

OMS/
RCS ΔV

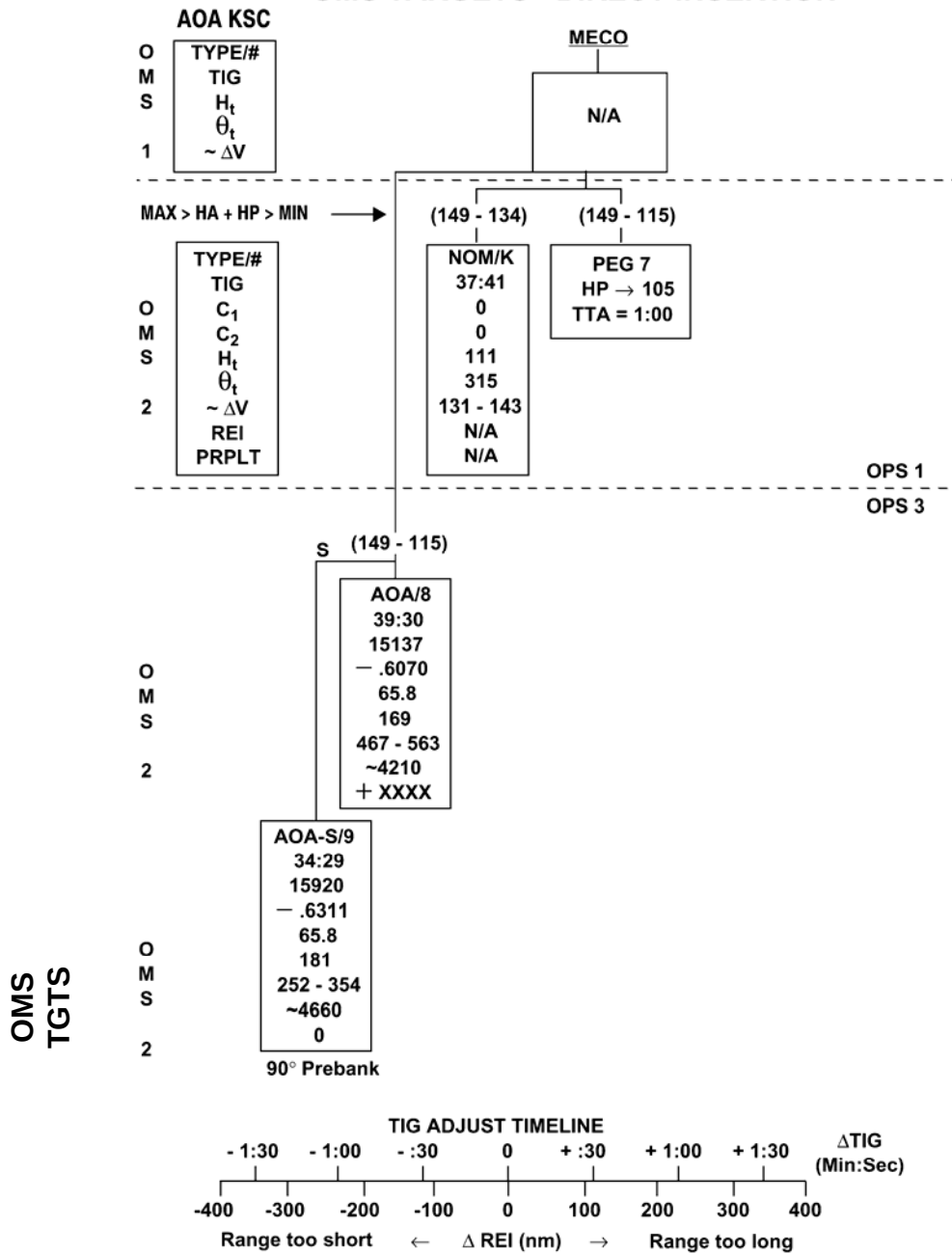
OMS-2/AOA ΔV	
ARCS ΔV fps = $\boxed{0.7} \times [L\% + R\% - \text{AFT QTY } 1]$	
FRCS ΔV fps = $\boxed{0.8} \times \text{FRCS } \%$	
OMS ΔV fps = $\boxed{5.2} \times \text{OMS } \%$	

NOTE: Uses assumed vehicle weight of $\boxed{254,212}$ lb

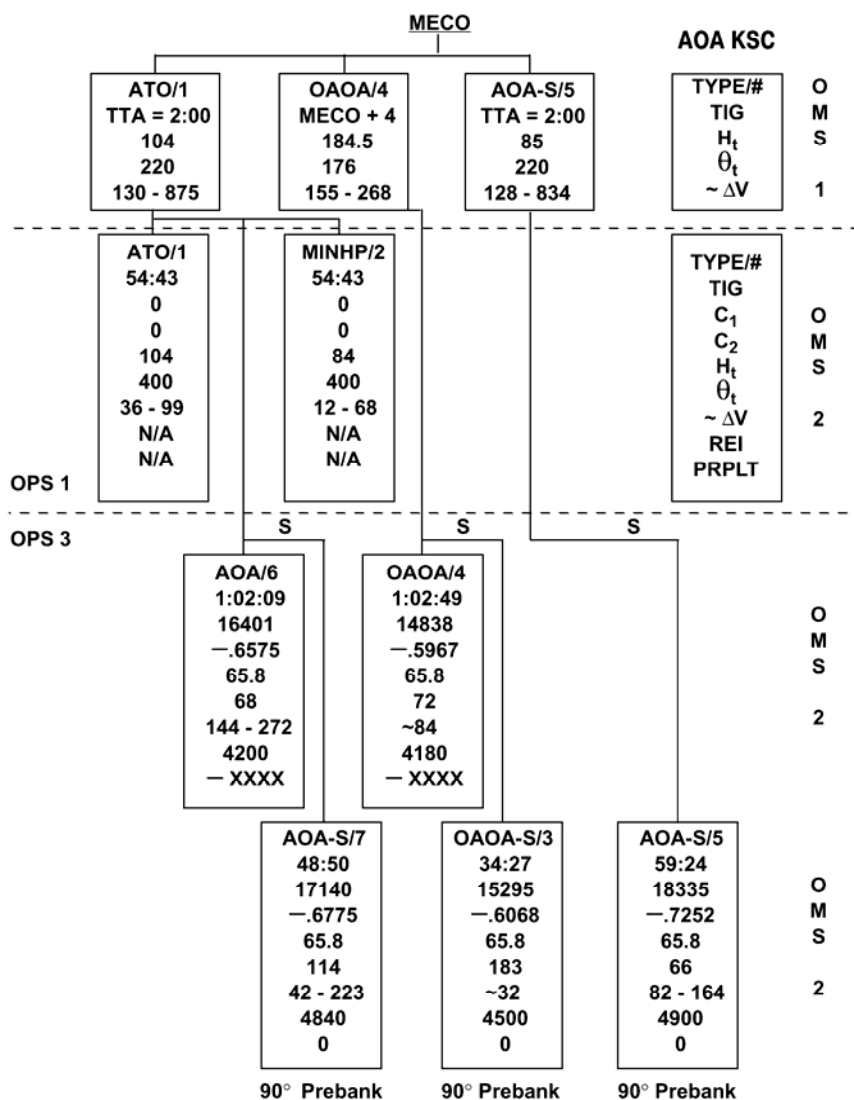
OMS TARGETS, COMM COVERAGE, LAND SITES

OMS
TGTS

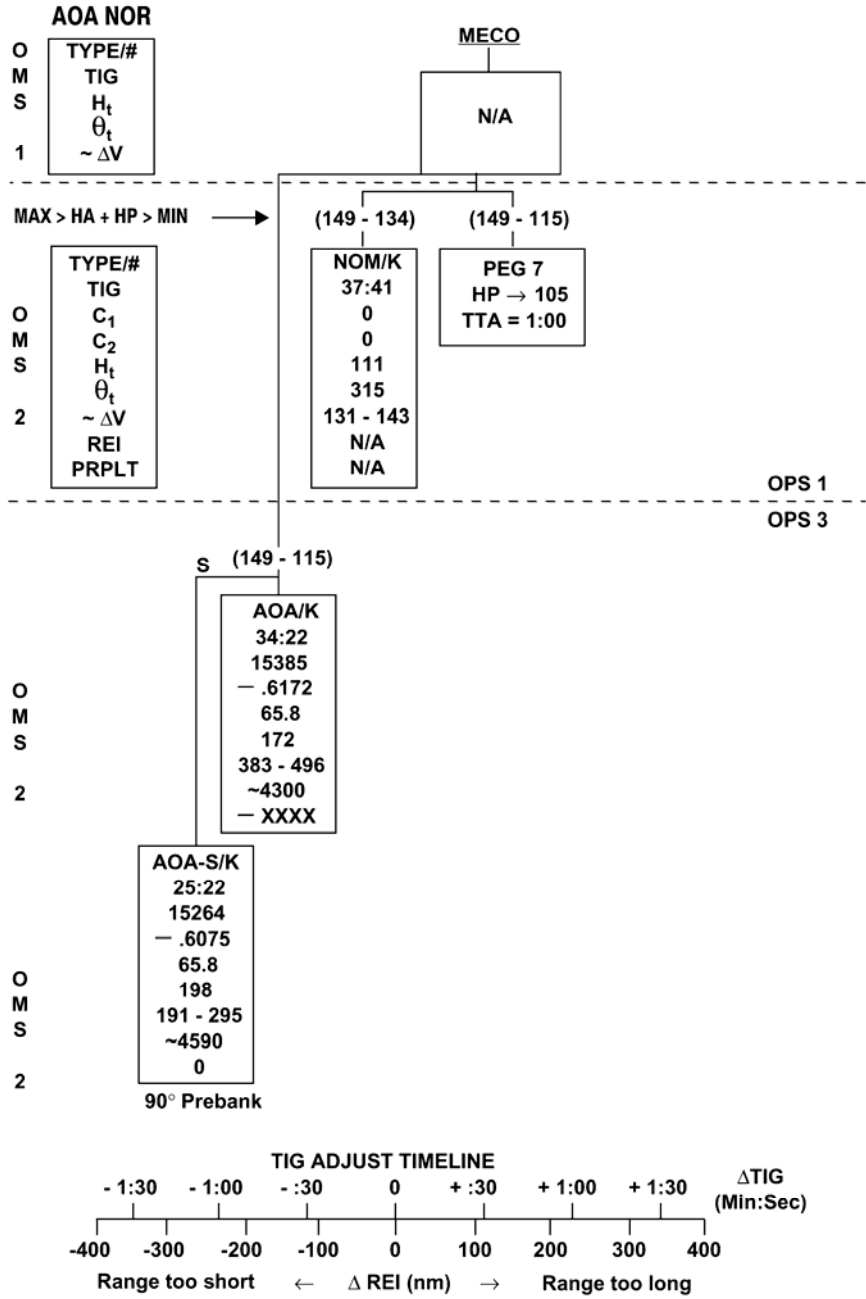
STS-116 OCFR1 CY OMS TARGETS - DIRECT INSERTION



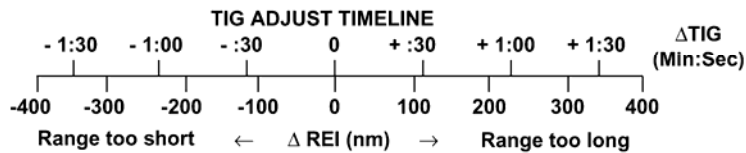
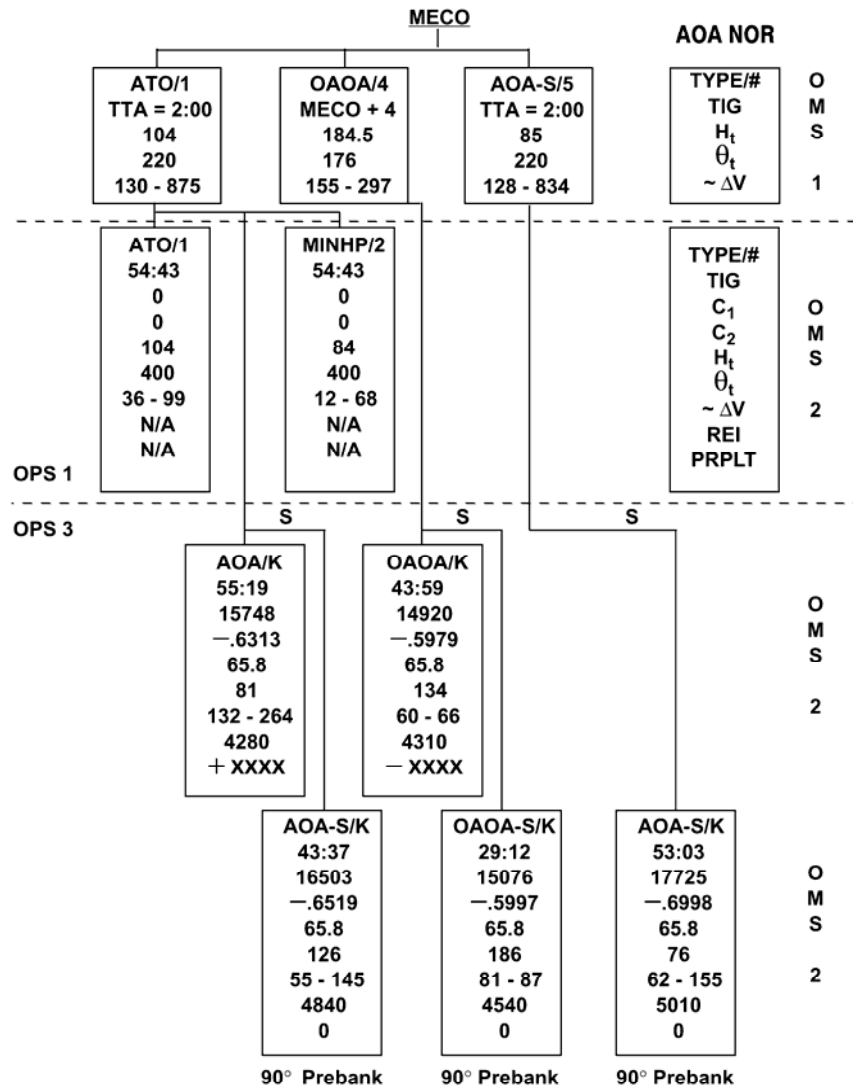
STS-116 OCFR1 CY OMS TARGETS - W/OMS 1



STS-116 OCFR1 CY OMS TARGETS - DIRECT INSERTION

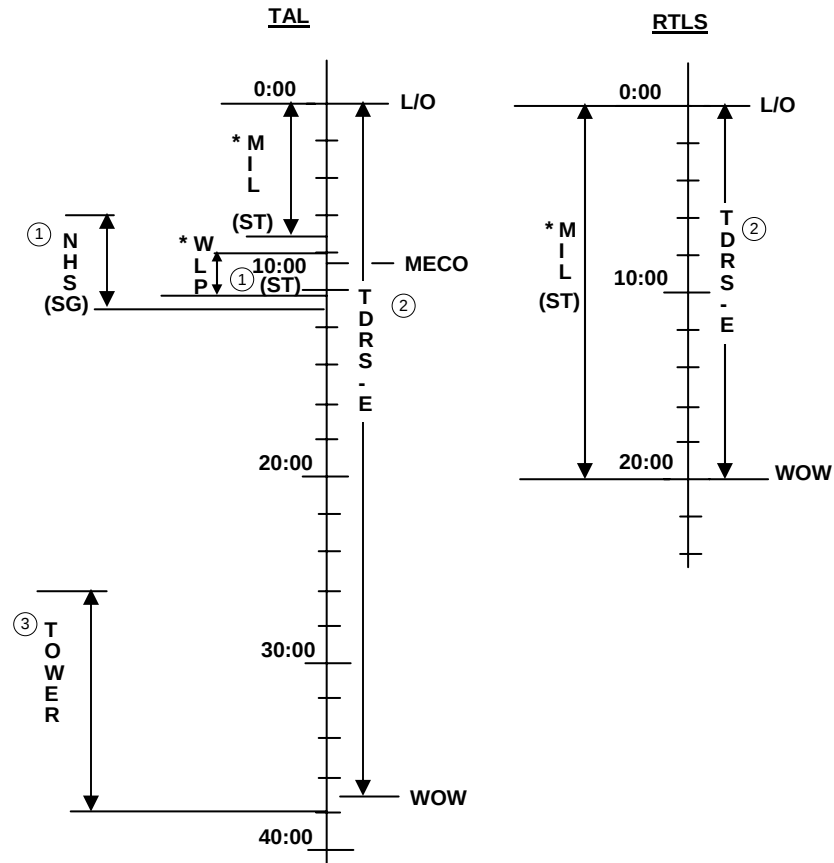


STS-116 OCFR1 CY OMS TARGETS - W/OMS 1



COMM
COVER

COMMUNICATION COVERAGE – (TAL/RTLS)



MODE

ST – STDN
SG – SGLS

*UHF available

NOTE: ① NHS/WLP coverage only on high inclinations

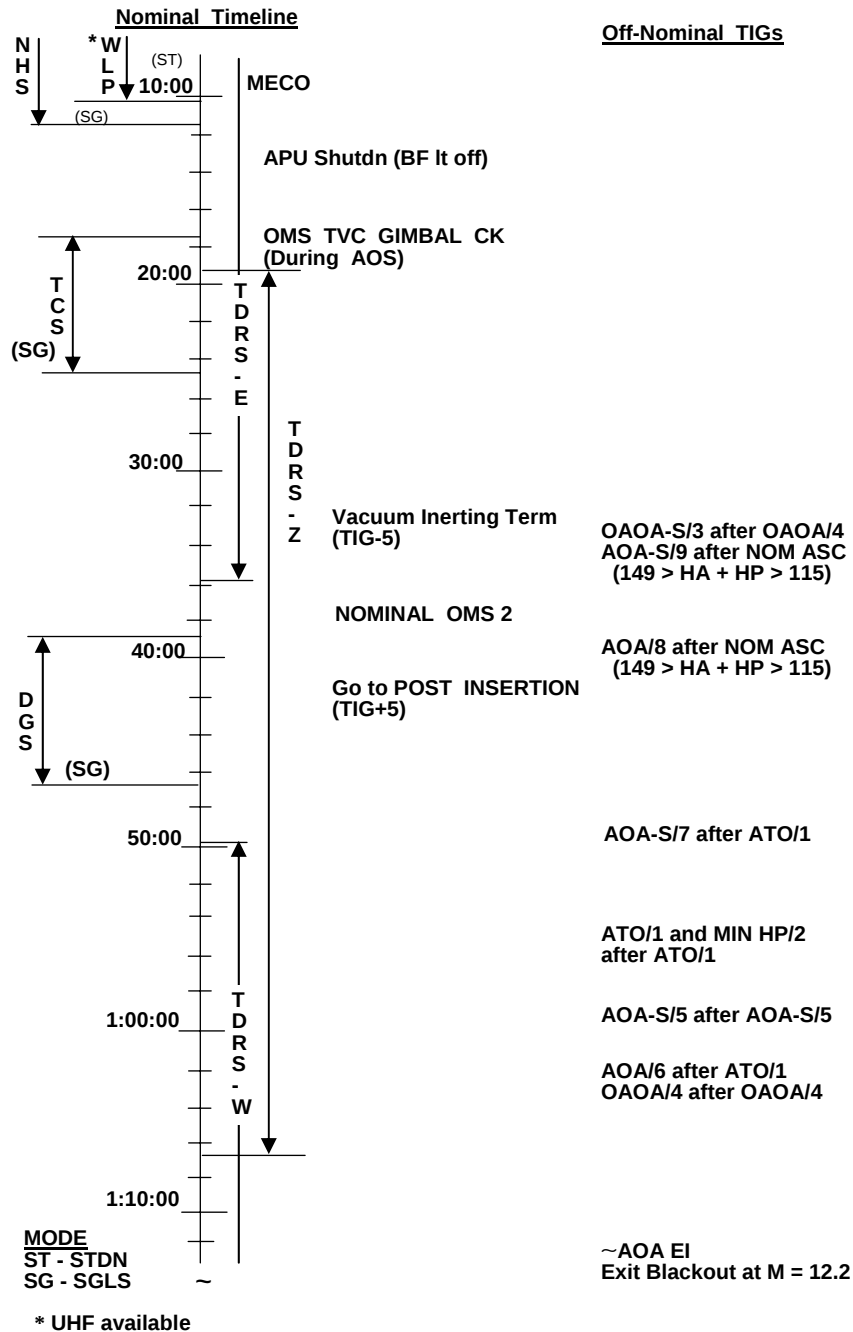
② ET blocks coverage until vehicle upright

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)**

S I T E	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	◆BEN 108	MAK 80 ■	◆6 -	13720 12720	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	ZZA 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	DQO 87	- -	8650 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	◆BEN 108	MAK 80 ■	◆6 -	13720 12720	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	ZZA 77 ■	◆6 -	12200 12200	1000 1010
15	GABRESKI	FOK 06 FOK 24	HTO 83	TMU 45Y ■	- -	8500 8500	1000 1000

◆ Available for TAL Only

* LO XRNG TAL Site

■ 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			
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 24	UAW 38	YHZ 98 ■	-	8800	0
		YHZ 33			-	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 22	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	IRE 28 ■	-	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	LE TUBE	FMI 33	NIM 53	ITR 104	-	11800	3960
		FMI 15			-	12300	0
30	ESENBOGA	ESN 03R	BAG 78 ■	BUK 90 ■	-	11800	0
		ESN 21L			-	11800	0

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

† MSBLS Jr. Ch 8 - Requires Uplink

■ DME

Length after displaced threshold



WEATHER PADS

8-1

ASC/116/FIN A



**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	/	/	/			

[illegible]

[illegible]

BLOCK 1 TRAJECTORY MESSAGE

DEORB ORB	APPROX TIG	SITE/RWY	OOP TIG WINDOW	
			OPEN	CLOSE

<u>MAX RATES (1st STAGE)</u> <u>NOTE:</u> IGNORE ATTITUDE ERRORS DURING LOAD RELIEF ROLL _____°/sec at _____ PITCH _____°/sec at _____ YAW _____°/sec <u>TRAJECTORY LOFTING (2nd STAGE)</u> LOFTED/DEPRESSED _____ K ft at VI _____ K fps	<u>MISCELLANEOUS</u> NOTAMS: _____ _____ _____ _____
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SW LIST

SWITCH LIST



SW LIST

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CUE CARD CONFIG

CUE CARD
CONFIG



FAB USE ONLY

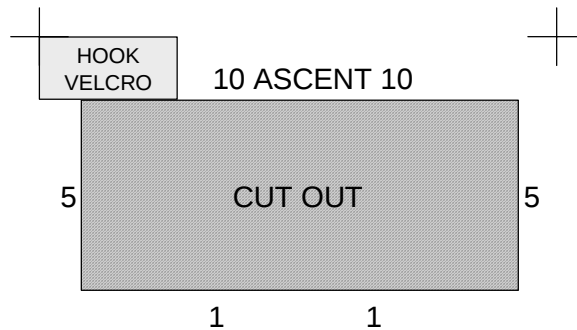
10-1

ASC/116/FIN A



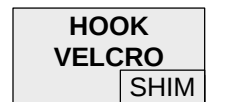
CUE CARD
CONFIG

TOP



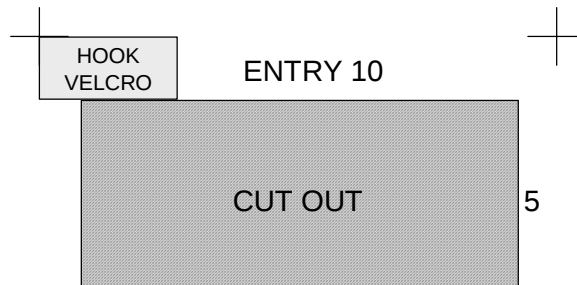
**ADI ERROR/RATE
SWITCH**

ASC-1a/A,E/D



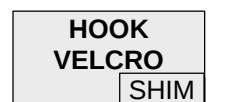
TOP

BACK OF 'ADI ERROR/RATE SWITCH'



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

1
ASC-1b/A,E/D



FAB USE ONLY

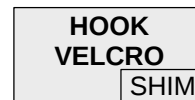
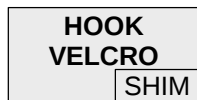
CC 10-2

ASC/116/FIN A

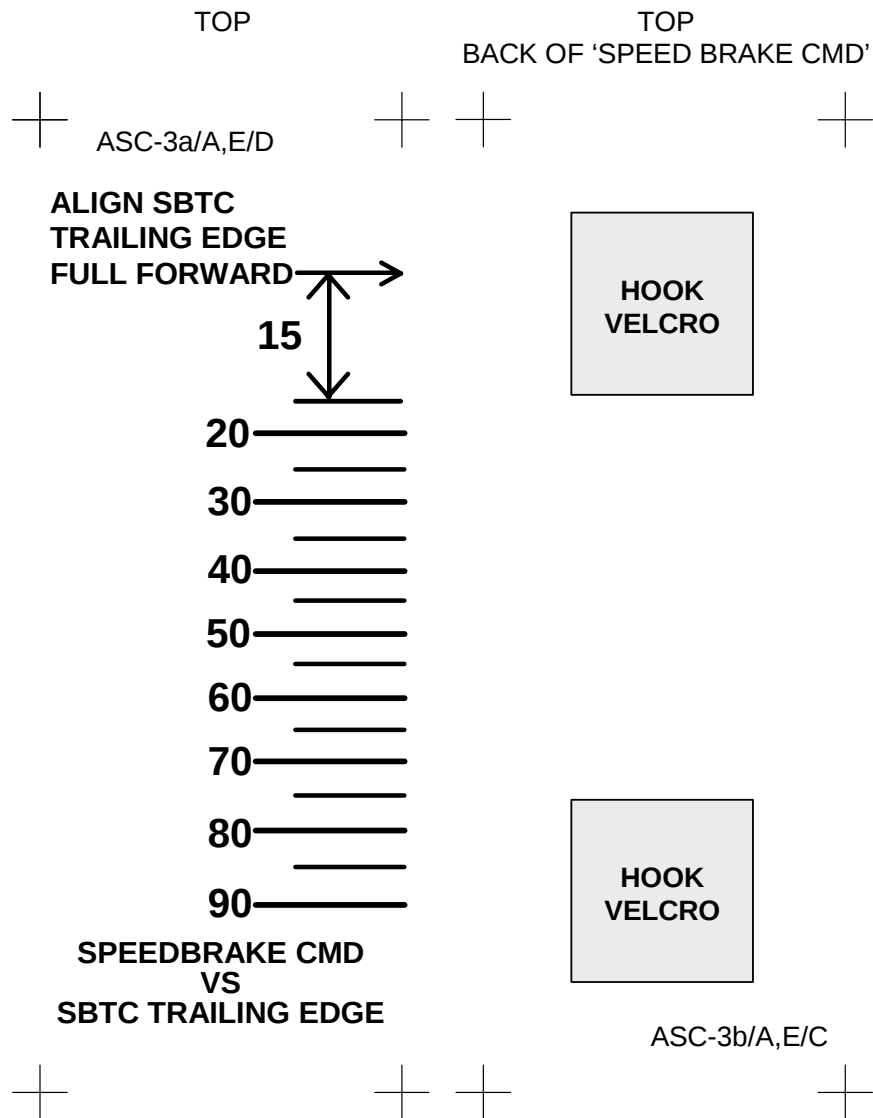
TOP

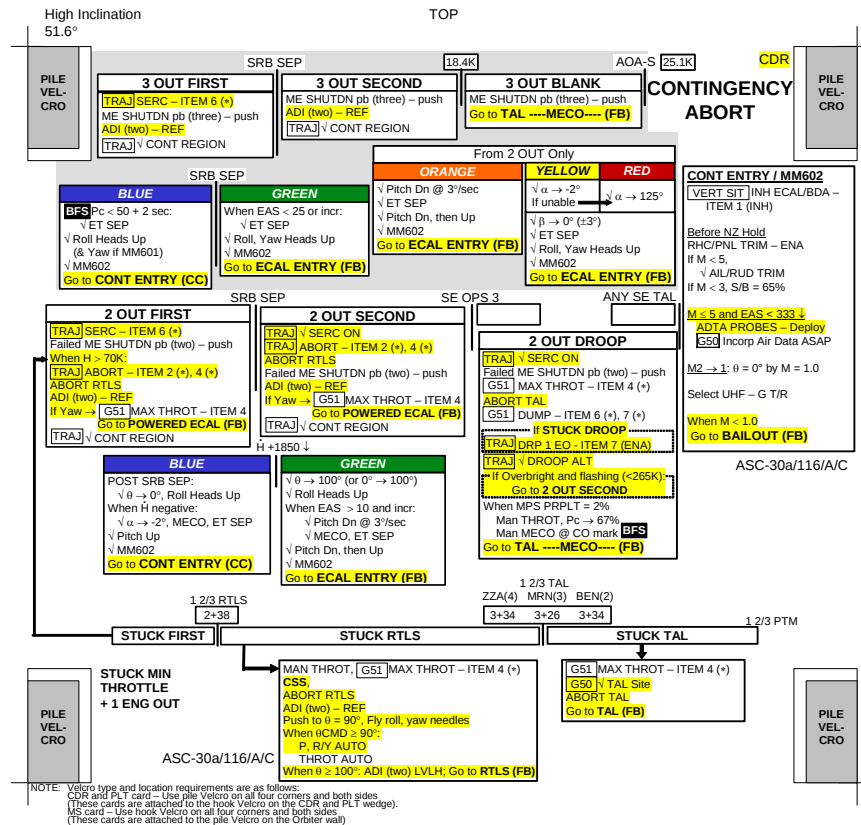
ASCENT/ENTRY SPEC PASS	NO.	ASC-2a/A,E/E BFS	NO.
GPC MEMORY	0	BFS MEMORY	0
IMU ALIGN (301)	21	<u>GNC</u>	
STRK/COAS CNTL (301)	22	HORIZ SIT	50
RCS (OPS 3)	23	OVERRIDE	51
HORIZ SIT	50	GPS STATUS	55
OVERRIDE	51	<u>SM</u>	
ENT CONTROL (OPS 3)	53	PL BAY DOORS	63
GPS STATUS	55		

TOP
BACK OF 'ASCENT/ENTRY SPEC'



ASC-2b/A,E/C



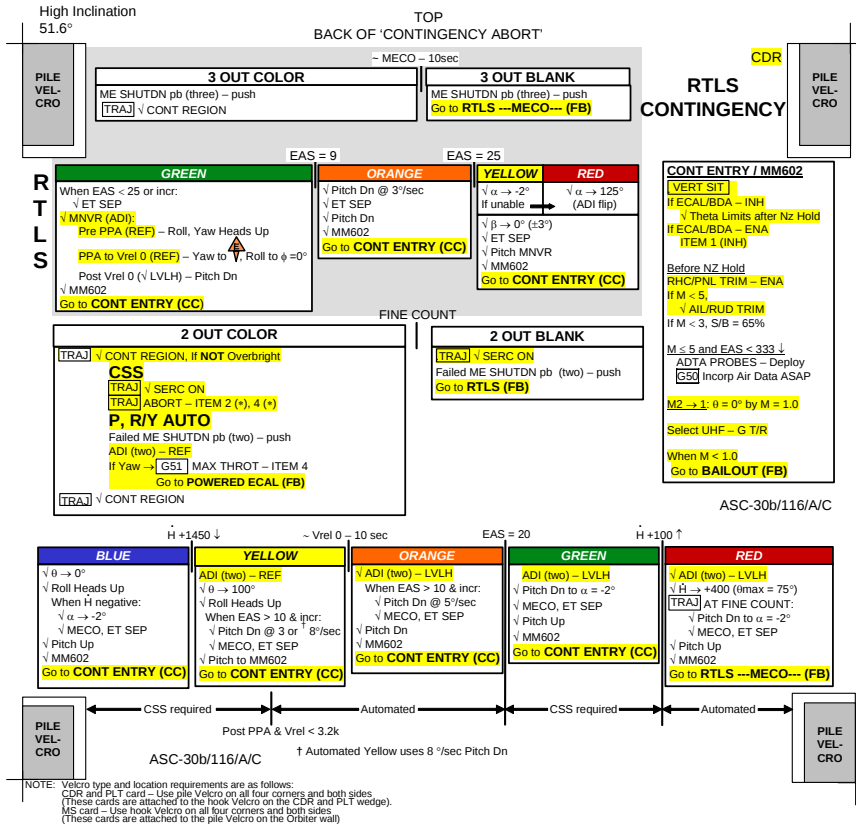


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FAB USE ONLY

(A)CC 10-5

CDR
ASC/116/FIN A,1

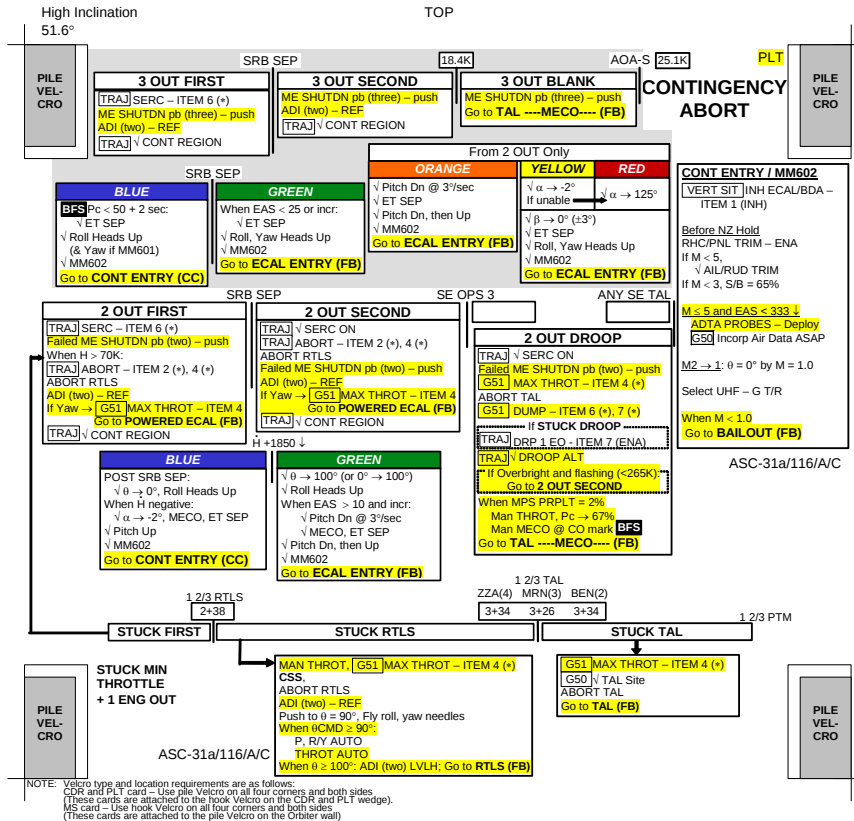


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FAB USE ONLY

(A)CC 10-6

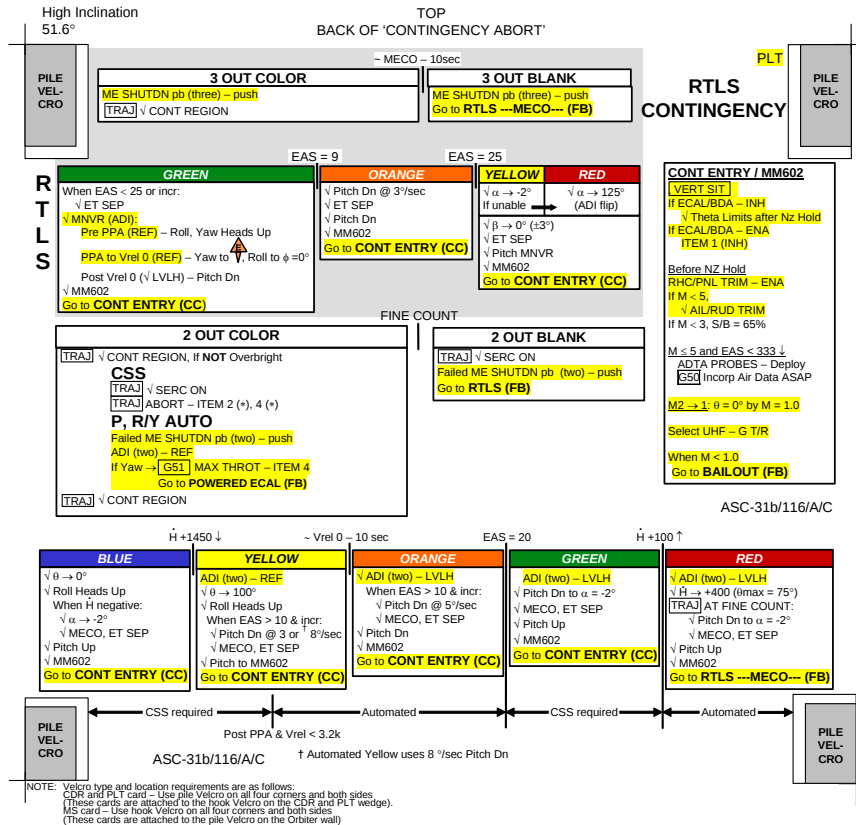
CDR
ASC/116/FIN A,1



FAB USE ONLY

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(B)CC 10-5

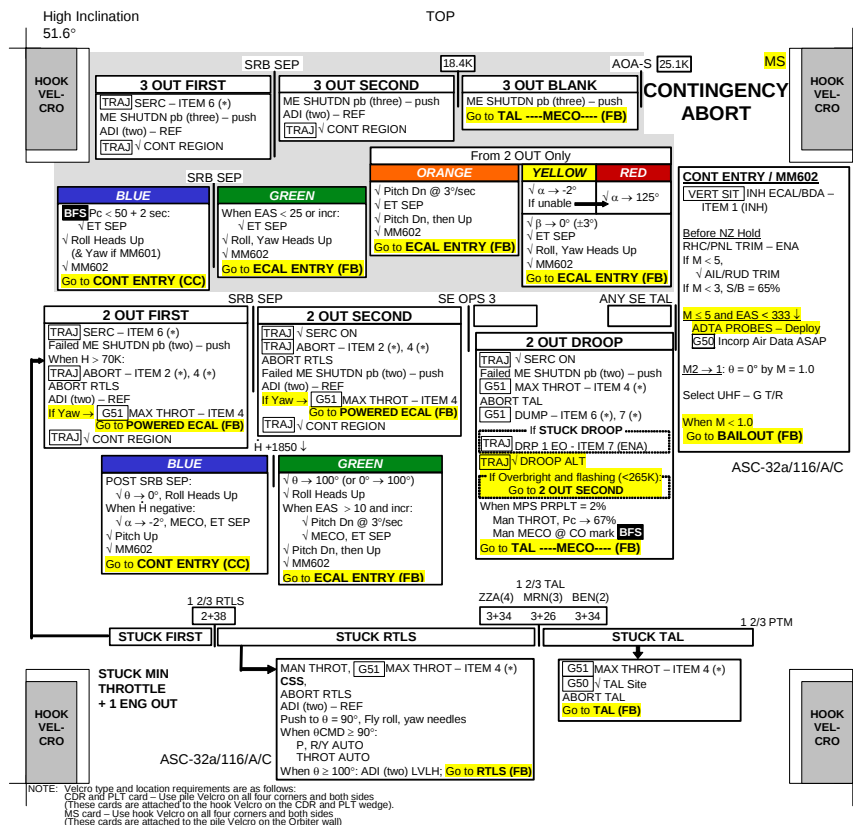
PLT
ASC/116/FIN A,1



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(B)CC 10-6

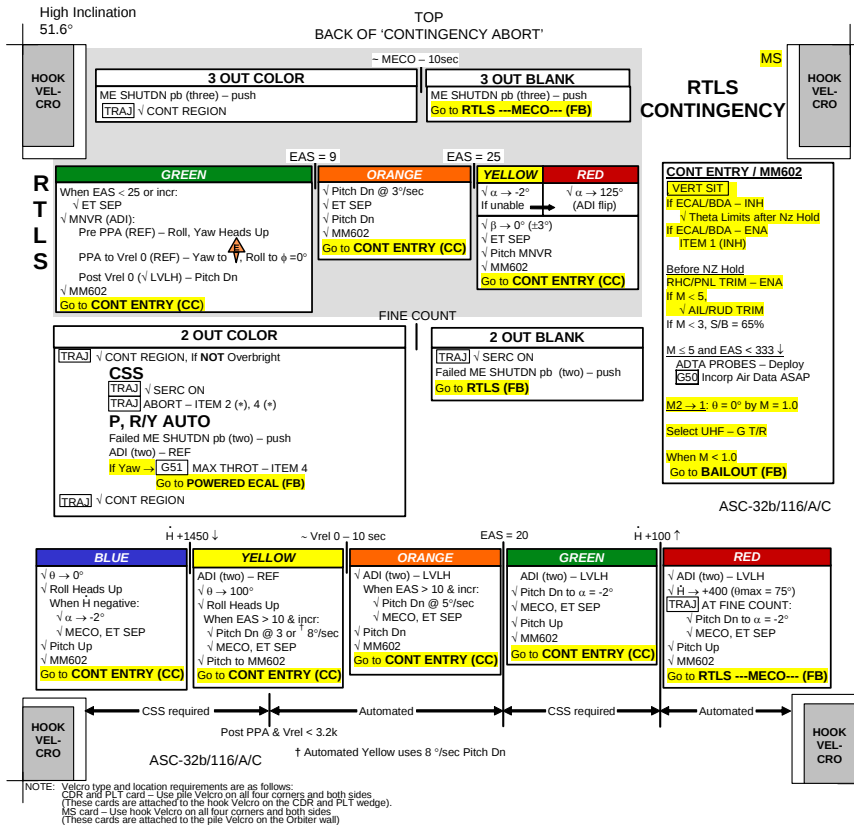
PLT
ASC/116/FIN A,1

FAB USE ONLY



(reduced copy) MS

FAB USE ONLY (C)CC 10-5 ASC/116/FIN A,1



(reduced copy)

FAB USE ONLY

(C)CC 10-6

MS

ASC/116/FIN A,1

TOP

HOOK VELCRO		OMS 2 BURN MONITOR		HOOK VELCRO	
OMS TEMP*		L	R		
FU IN P ≥		225	220	OMS ENG FAIL	
≤		205	204	OMS PRPLT FAIL	
or No FU IN P					
OMS PC* & OMS ↓ (BFS: √accel)					
ENG VLV 1 or 2 < 70				OMS ENG FAIL	
or OX IN P > 227					
OX IN P ≤ 227				OMS PRPLT FAIL	
or No OX IN P					
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 PC < 72 or OMS TEMP or HP > 85:	
				OMS PRPLT FAIL	
OX & FU HIGH				He PRESS/VAP ISOL (two) – CL	
				Cycle He A(B) to maintain TK P 234-284	
OMS He TK P LOW					
(√OMS/MPS)				At He P < 640 or QTY ≤ 41:	
				If HP < 85: OMS XFEED from good OMS	
				At HP > 85: OMS PRPLT FAIL	
OMS N2 REG P HIGH or LOW				OMS ENG – ARM	
OMS N2 TK P LOW				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) &				aff GPC PWR – OFF	
Burning OMS aff				If SEC GMBL avail:	
				aff MDM FF 1(4) – OFF, ON	
				L(R) OMS GMBL – SEC (twice)	
SEC GMBL lost				If high RCS usage: OMS ENG FAIL	
2 FAs lost				√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

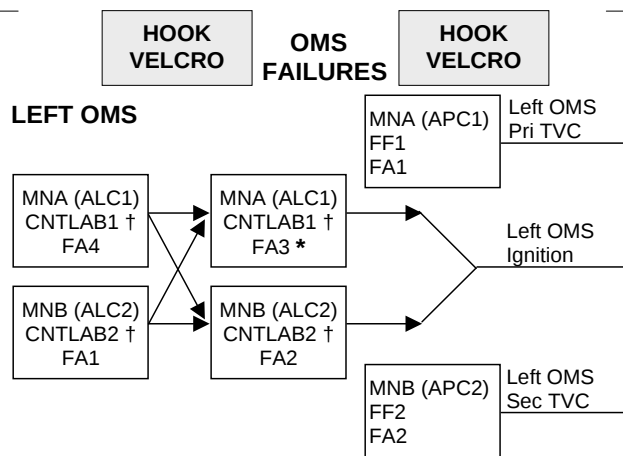
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FAB USE ONLY

CC 10-7

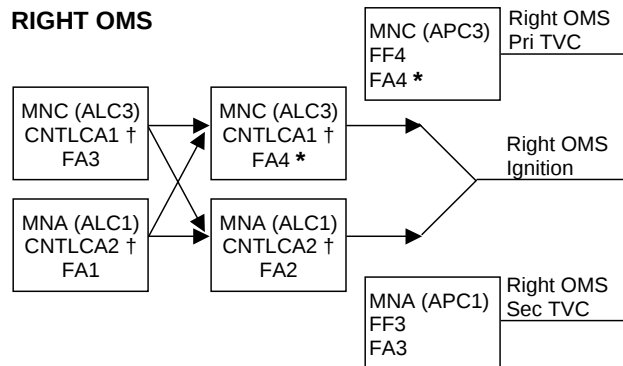
ASC/116/FIN A

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 A

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)

FAB USE ONLY

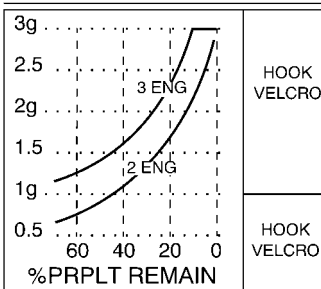
CC 10-10

ASC/116/FIN A

TOP

ASCENT ADI - NOMINAL

TIME	θ	H	$\dot{H}$	(116 OCFR1 CY)
0:30	68	9K	656	
0:50	61	26K	993	
1:10	53	50K	1429	
1:30	39	84K	1892	
1:50	30	125K	2195	



-STAGING-

V_I	θ	H	$\dot{H}$	ASC-14a/116/A/A
6	19	217K	1721	
7	16	274	1270	
8	13	309	921	
9	11	331	638	
10	9	345	407	
12	6	356	66	
14	9	355	-143	
16	25	350	-226	
18	23	344	-263	
20	21	339	-214	
22	19	337	-102	
24	17	337	66	
25819	13	345	274	

TOP
BACK OF 'ASCENT
ADI - NOMINAL'

ENTRY ALPHA

VR	α_{ref}	R	H	$\dot{H}_{ref}$	Rref
25	40	4396	400		
24	HI 40 LO	2623	246	-46	L79
23	43 40 37	2166	238	-63	69
22	43 40 37	1809	232	-82	62
21	43 40 37	1534	225	-103	59
20	43 40 37	1309	219	-119	58
19	43 40 37	1130	212	-141	58
18	43 40 37	988	205	-162	59
17	43 40 37	869	198	-180	60
16	43 40 37	767	192	-191	61

KSC 15

MAX L/D	
M	α
3	17
2	15
1	12

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

HOOK VELCRO	HOOK VELCRO
-------------	-------------

15	43 40 37	685	186	-203	63
14	43 40 37	612	180	-127	61
13	43 40 37	544	177	-137	58
12	43 40 37	481	173	-153	56
11	42 39 36	424	167	-195	R54
10	41 38 35	372	164	-174	49
9	39 36 33	322	157	-209	46
8	37 34 31	274	149	-242	43
7	33 30 27	227	140	-271	42
6	30 27 24	183	128	-275	L42
5	26 23 20	143	117	-273	40
4	23 20 18	105	103	-264	42
3	19 16 15	74	89	-248	R35
2.5	14	60	82	-273	
2	12	49	75	-282	
1.5	9	37	64	-331	
1	8	28	50	-263	

(reduced copy)

FAB USE ONLY

CC 10-11

ASC/116/FIN A

TOP

HOOK
VELCRO

AOA
DEORBIT
BURN (2 ENG)

HOOK
VELCRO

√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 A

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

*** RCS COMPLETION:**

* If DIRECT INSERTION:

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

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

* FLIP -----
* ΔV FRCS COMPLETION

* AFT -----
* ΔV THC +X to TGT ΔV

* TGT -----
* ΔV

* If w/OMS 1:

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

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

* FLIP -----
* HP FRCS COMPLETION

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

* TGT -----
* HP

*** FRCS COMPLETION:**

* Mnv to -X Att (pitch up at 3°/sec to VGOz = +1/4 $\Delta VTOT$)

* THC -X to $\Delta VTOT = 0$ or FRCS depletion (JETS FAIL OFF)

CUTOFF

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

* AFT RCS RECONFIG if INTERCONNECT *

Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ASC-8aa/116/A/A

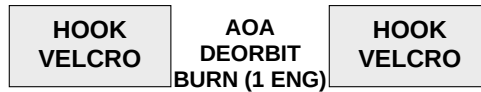
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FAB USE ONLY

CC 10-13

ASC/116/FIN A

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 A

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'r 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/A

(reduced copy)

FAB USE ONLY

CC 10-15

ASC/116/FIN A

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 $\pm 3^\circ$
Monitor $\Delta VTOT$

RCS I'CNCT TK SW at $\Delta VTOT$ =
R OMS XFEED (two) – OP
L OMS XFEED (two) – CL

OMS PRPLT LOW

AFT RCS RECONFIG AT $\Delta VTOT$ =
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

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ASC-7a/A/B

HINGE

(reduced copy)

FAB USE ONLY

CC 10-16

ASC/116/FIN A

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:**

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

CUTOFF:

VGOx = 0, release THC

AFT RCS RECONFIG

Trim Inplane X,Z residuals < 2 fps (< 0.5 fps if shallow)

ASC-7aa/116/A/A

(reduced copy)

FAB USE ONLY

CC 10-17

ASC/116/FIN A



TOP
BACK OF 'AOA DEORBIT BURN (RCS)'



HOOK
VELCRO

HOOK
VELCRO



HINGE

ASC-7b/A/B



(reduced copy)

FAB USE ONLY

CC 10-18

ASC/116/FIN A



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 A

TOP

PILE
VELCRO

HOOK
VELCRO

PILE
VELCRO

**ZZA TAL REDESIGNATION
(116 OCFR1 CYC)**

1st E.O. VI		5800	5900	6000	6100	6200	6300	6400
SE OPS 3 ZZA 109	(14)	10800	10800	10900	10900	10900	11000	11000
SE ZZA 104	(4)	17500	17300	17100	16800	16600	16400	16200

1st E.O. VI		6500	6600	6700	6800	6900	7000	7100
SE OPS 3 ZZA 109	(14)	11000	11000	11100	11100	11100	11200	11200
SE ZZA 104	(4)	15900	15700	15500	15300	15000	14800	14600

1st E.O. VI		7200	7300	7400	7500	7600	7700	7800
SE OPS 3 ZZA 109	(14)	11200	11200	11300	11300	11300	11300	11400
SE ZZA 104	(4)	14500	14300	14100	14000	13900	13800	13700

1st E.O. VI		7900	8000	8100	8200	8300	8400	8500
SE OPS 3 ZZA 109	(14)	11400	11400	11400	11400	11500	11500	11500
SE ZZA 104	(4)	13600	13600	13500	13500	13400	13400	13400

1st E.O. VI		8600	8700	8800	8900	9000	9100	9200
SE OPS 3 ZZA 109	(14)	11500	11500	11500	11600	11600	11600	11600
SE ZZA 104	(4)	13400	13400	13400	13400	13500	13500	13500

1st E.O. VI		9300	9400	9500	9600	9700	9800	9900
SE OPS 3 ZZA 109	(14)	11600	11600	11600	11700	11700	11700	11700
SE ZZA 104	(4)	13500	13500	13500	13500	13500	13500	13500

ASC-9a/116/A/A

PILE
VELCRO

HOOK
VELCRO

PILE
VELCRO

(reduced copy)

FAB USE ONLY

CC 10-20

ASC/116/FIN A

TOP
BACK OF 'ZZA TAL REDESIGNATION'

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

ECAL – ZZA or MRN 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/B

HOOK
VELCRO

HOOK
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HOOK
VELCRO

(reduced copy)

FAB USE ONLY

CC 10-21

ASC/116/FIN A

TOP



**MRN TAL REDESIGNATION
(116 OCFR1 CYC)**

1st E.O. VI		5700	5800	5900	6000	6100	6200	6300
SE OPS 3 MRN 109	(13)	10900	10900	11000	11000	11000	11100	11100
SE MRN 104	(3)	17200	17000	16800	16600	16300	16100	15900

1st E.O. VI		6400	6500	6600	6700	6800	6900	7000
SE OPS 3 MRN 109	(13)	11100	11100	11200	11200	11200	11300	11300
SE MRN 104	(3)	15700	15500	15200	15000	14800	14600	14400

1st E.O. VI		7100	7200	7300	7400	7500	7600	7700
SE OPS 3 MRN 109	(13)	11300	11300	11400	11400	11400	11400	11400
SE MRN 104	(3)	14200	14100	13900	13800	13700	13600	13500

1st E.O. VI		7800	7900	8000	8100	8200	8300	8400
SE OPS 3 MRN 109	(13)	11500	11500	11500	11500	11500	11500	11500
SE MRN 104	(3)	13400	13400	13300	13300	13300	13300	13200

1st E.O. VI		8500	8600	8700	8800	8900	9000	9100
SE OPS 3 MRN 109	(13)	11500	11600	11600	11600	11600	11600	11600
SE MRN 104	(3)	13200	13300	13300	13300	13300	13300	13300

1st E.O. VI		9200	9300	9400	9500	9600	9700	9800
SE OPS 3 MRN 109	(13)	11600	11600	11600	11600	11700	11700	11700
SE MRN 104	(3)	13400	13400	13400	13400	13400	13400	13400

1st E.O. VI		9900
SE OPS 3 MRN 109	(13)	11700
SE MRN 104	(3)	13400

ASC-10a/116/A/A



(reduced copy)

FAB USE ONLY

CC 10-22

ASC/116/FIN A

TOP
BACK OF 'MRN TAL REDESIGNATION'

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

ECAL – ZZA or MRN 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/B

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

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FAB USE ONLY

CC 10-23

ASC/116/FIN A

TOP



**BEN TAL REDESIGNATION
(116 OCFR1 CYC)**

1st E.O. VI		5700	5800	5900	6000	6100	6200	6300
SE OPS 3 BEN 109	(12)	10700	10700	10800	10800	10800	10900	10900
SE BEN 104	(2)	17200	17000	16800	16600	16400	16200	15900

1st E.O. VI		6400	6500	6600	6700	6800	6900	7000
SE OPS 3 BEN 109	(12)	10900	10900	11000	11000	11000	11100	11100
SE BEN 104	(2)	15700	15500	15300	15100	14900	14700	14500

1st E.O. VI		7100	7200	7300	7400	7500	7600	7700
SE OPS 3 BEN 109	(12)	11100	11100	11200	11200	11200	11200	11300
SE BEN 104	(2)	14300	14200	14000	13900	13800	13700	13600

1st E.O. VI		7800	7900	8000	8100	8200	8300	8400
SE OPS 3 BEN 109	(12)	11300	11300	11300	11300	11400	11400	11400
SE BEN 104	(2)	13500	13500	13400	13400	13400	13400	13400

1st E.O. VI		8500	8600	8700	8800	8900	9000	9100
SE OPS 3 BEN 109	(12)	11500	11500	11600	11600	11600	11600	11600
SE BEN 104	(2)	13400	13400	13400	13400	13400	13400	13400

1st E.O. VI		9200	9300	9400	9500	9600	9700	9800
SE OPS 3 BEN 109	(12)	11600	11600	11600	11700	11700	11700	11700
SE BEN 104	(2)	13500	13500	13500	13500	13500	13500	13500

1st E.O. VI		9900
SE OPS 3 BEN 109	(12)	11700
SE BEN 104	(2)	13500

ASC-12a/116/A/A



(reduced copy)

FAB USE ONLY

CC 10-24

ASC/116/FIN A

TOP
BACK OF 'BEN TAL REDESIGNATION'

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

ECAL - BEN PRIME TAL

1st EO VI (KFPS)	5.6	5.8	6.0	6.2	6.4	6.6	6.8
CHERRY POINT (7)		6.5 - 6.8	6.6 - 7.0	6.7 - 7.2	6.7 - 7.3	6.8 - 7.4	6.9 - 7.5
OTIS ANGB (16)							
GABRESKI (15)							
PEASE INT'L (17)							

1st EO VI (KFPS)	7.0	7.2	7.4	7.6	7.8	8.0	8.2
CHERRY POINT (7)	7.0 - 7.6	7.2 - 7.7	7.4 - 7.7	7.6 - 7.8	7.8 - 7.9		
OTIS ANGB (16)							11.0 - 11.3
GABRESKI (15)							
PEASE INT'L (17)							

1st EO VI (KFPS)	8.4	8.6	8.8	9.0	9.2	9.4	9.6
CHERRY POINT (7)							
OTIS ANGB (16)	10.9 - 11.4	10.9 - 11.6	10.9 - 11.7	10.9 - 11.8	10.9 - 11.8	10.9 - 11.9	10.9 - 12.0
GABRESKI (15)							
PEASE INT'L (17)							

1st EO VI (KFPS)	9.8	10.0	10.2	10.4	10.6	10.8	11.0
CHERRY POINT (7)							
OTIS ANGB (16)	10.9 - 12.1	10.9 - 12.2	10.9 - 12.2	10.9 - 12.4	10.9 - 12.4	10.9 - 12.5	11.0 - 12.5
GABRESKI (15)				11.0 - 11.3	11.0 - 11.5	11.0 - 11.6	11.0 - 11.7
PEASE INT'L (17)							

1st EO VI (KFPS)	11.2	11.4	11.6	11.8	12.0	12.2	12.4
CHERRY POINT (7)							
OTIS ANGB (16)	11.2 - 12.6	11.4 - 12.7	11.6 - 12.7	11.8 - 12.8	12.0 - 12.9	12.2 - 13.0	12.4 - 13.0
GABRESKI (15)	11.2 - 11.9	11.4 - 12.0	11.6 - 12.0	11.8 - 12.1	12.0 - 12.2	12.2 - 12.2	
PEASE INT'L (17)	12.1 - 12.1	12.0 - 12.4	12.0 - 12.6	12.0 - 12.8	12.0 - 12.9	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
CHERRY POINT (7)							
OTIS ANGB (16)	12.6 - 13.1	12.8 - 13.2	13.0 - 13.3	13.2 - 13.3	13.4 - 13.4		
GABRESKI (15)							
PEASE INT'L (17)	12.6 - 13.0	12.8 - 13.0	13.0 - 13.1				

ASC-12b/116/A/A

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

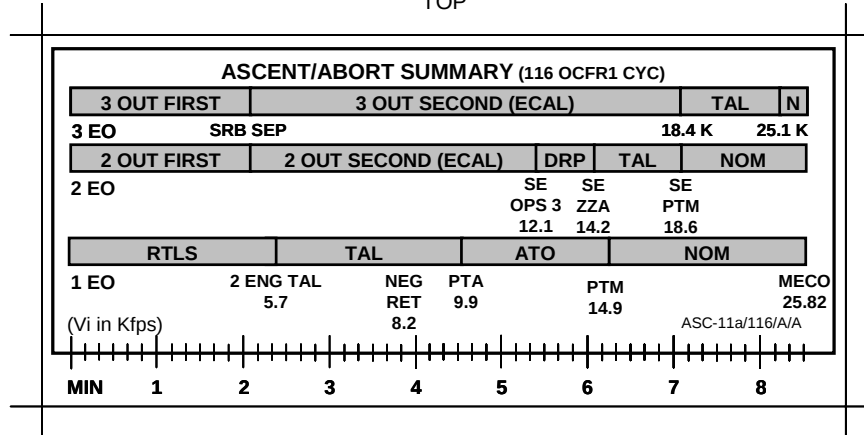
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FAB USE ONLY

CC 10-25

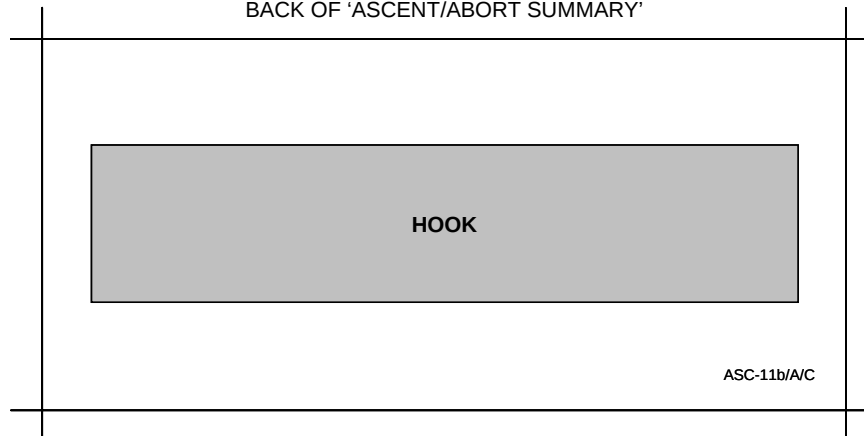
ASC/116/FIN A

TOP



TOP

BACK OF 'ASCENT/ABORT SUMMARY'



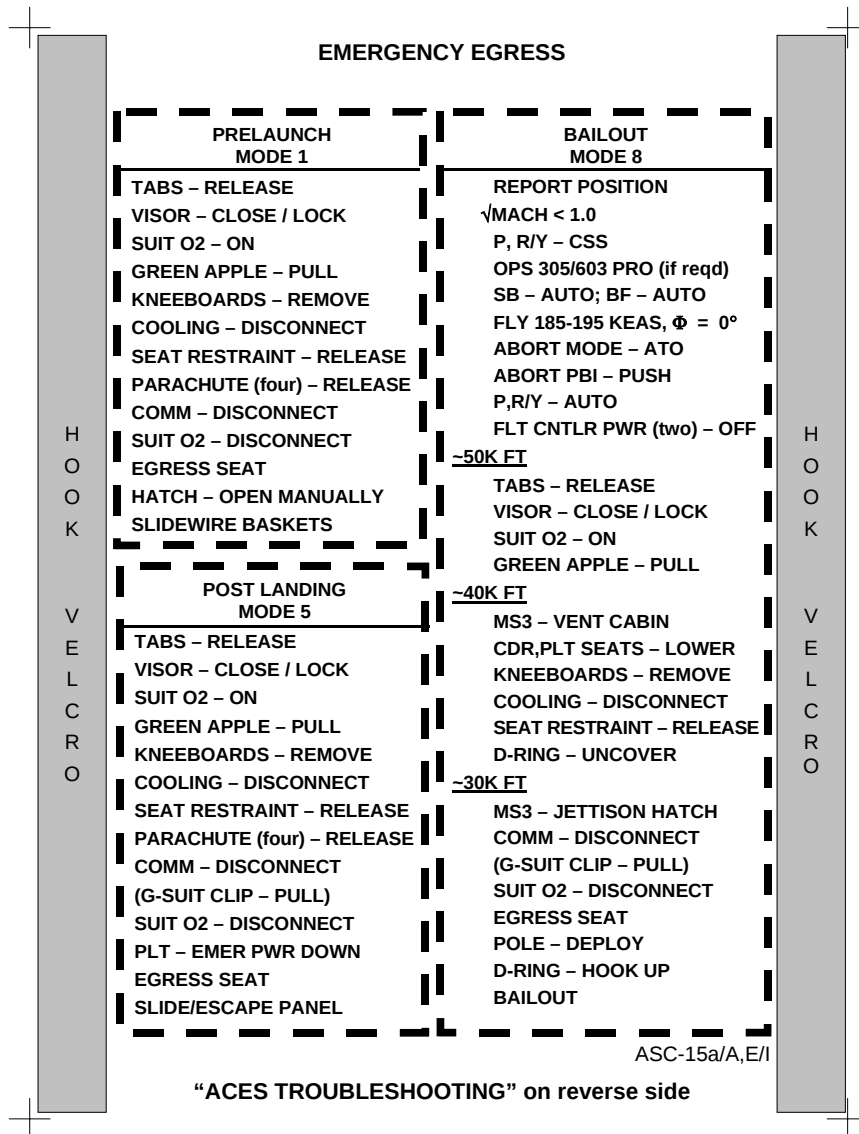
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FAB USE ONLY

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ASC/116/FIN A

TOP



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FAB USE ONLY

CC 10-27

ASC/116/FIN A

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

ASC-15b/A,E/E

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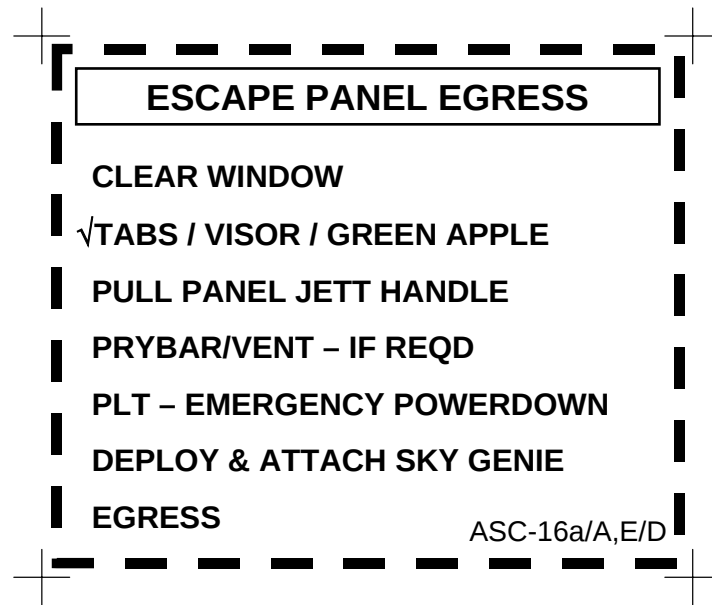
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FAB USE ONLY

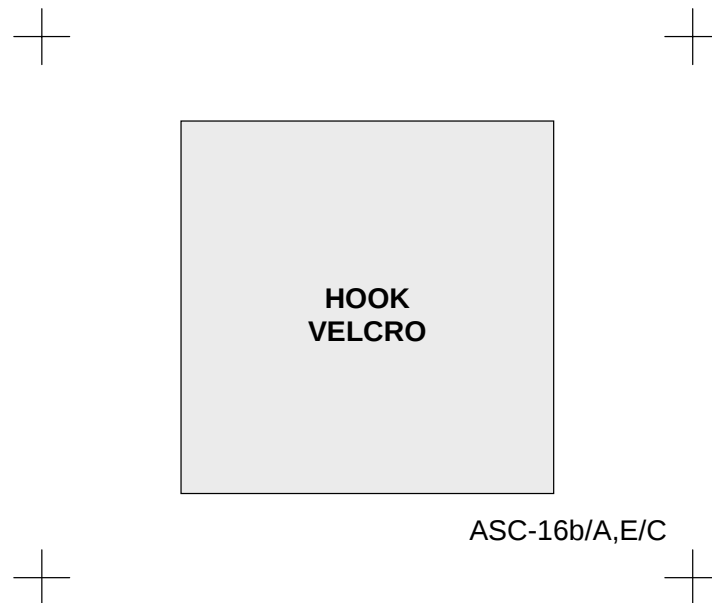
CC 10-28

ASC/116/FIN A

TOP



TOP
BACK OF 'ESCAPE PANEL EGRESS'



FAB USE ONLY

(reduced copy)
CC 10-29

ASC/116/FIN A

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'

ASC-17b/ A,O,E/B	HOOK VELCRO
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Fabrication Notes

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

(reduced copy)

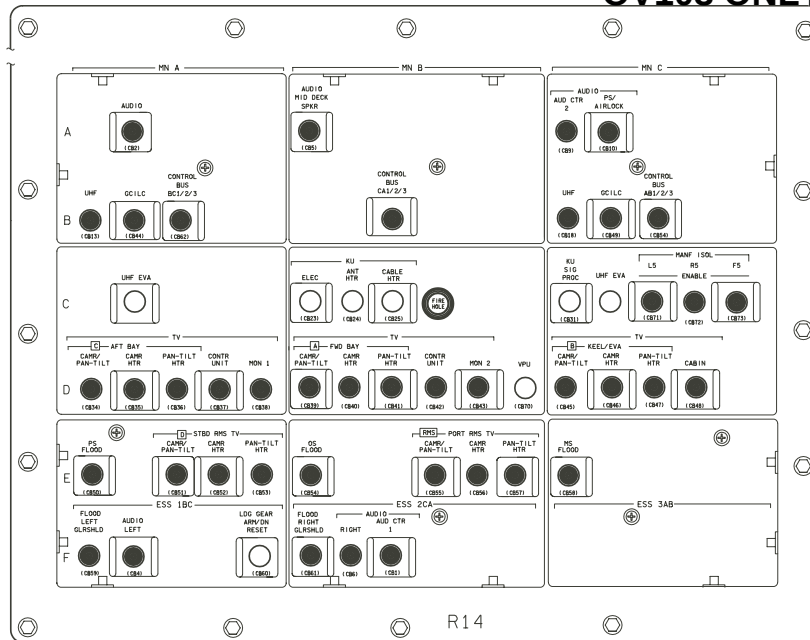
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ASC/116/FIN A

TOP
PANEL R14 - OV103 ONLY

OV103 ONLY



4800502_114, PNL 1

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

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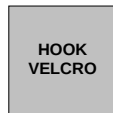
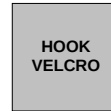
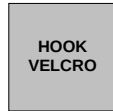
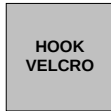
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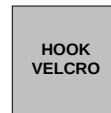
ASC/116/FIN A



TOP
BACK OF 'PANEL R14 - OV103 ONLY'



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



(reduced copy)
CC 10-32

FAB USE ONLY

ASC/116/FIN A



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/A/D

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

(reduced copy)

FAB USE ONLY

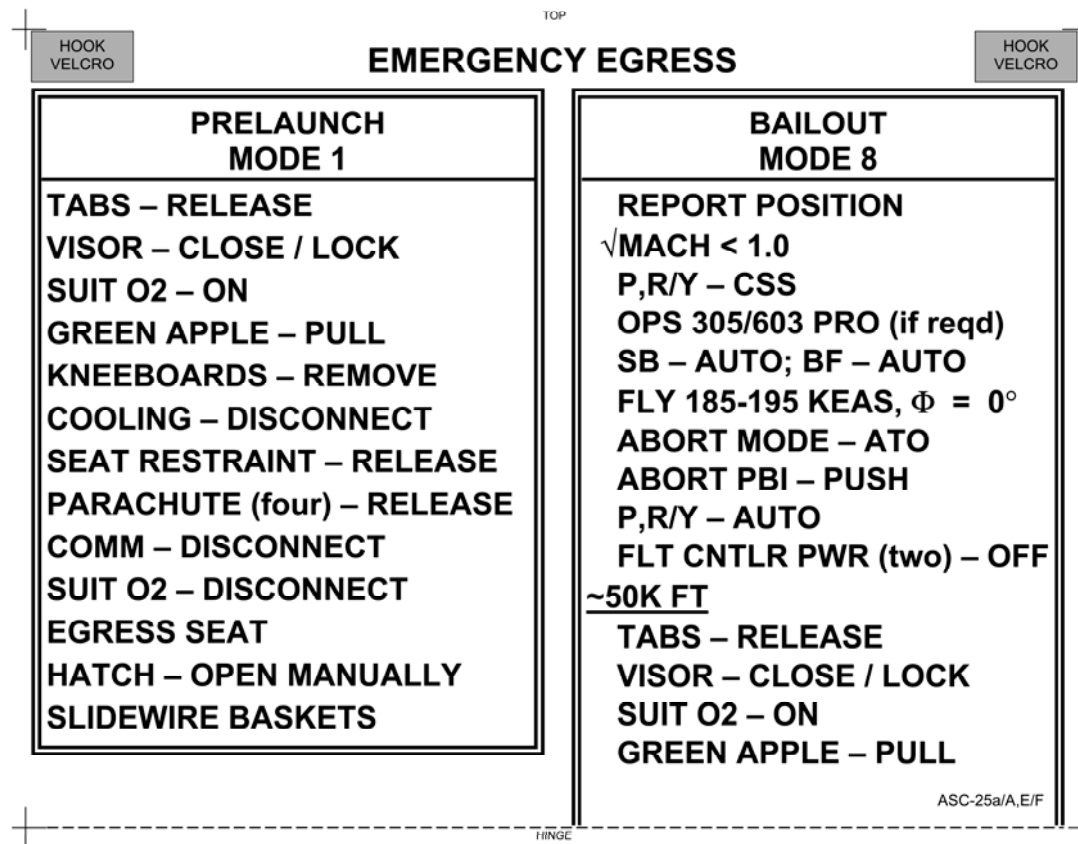
CC 10-33

ASC/116/FIN A

FAB USE ONLY

(reduced copy)
CC 10-34

ASC/116/FIN A



FAB USE ONLY

CC 10-35

ASC/116/FIN A

(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

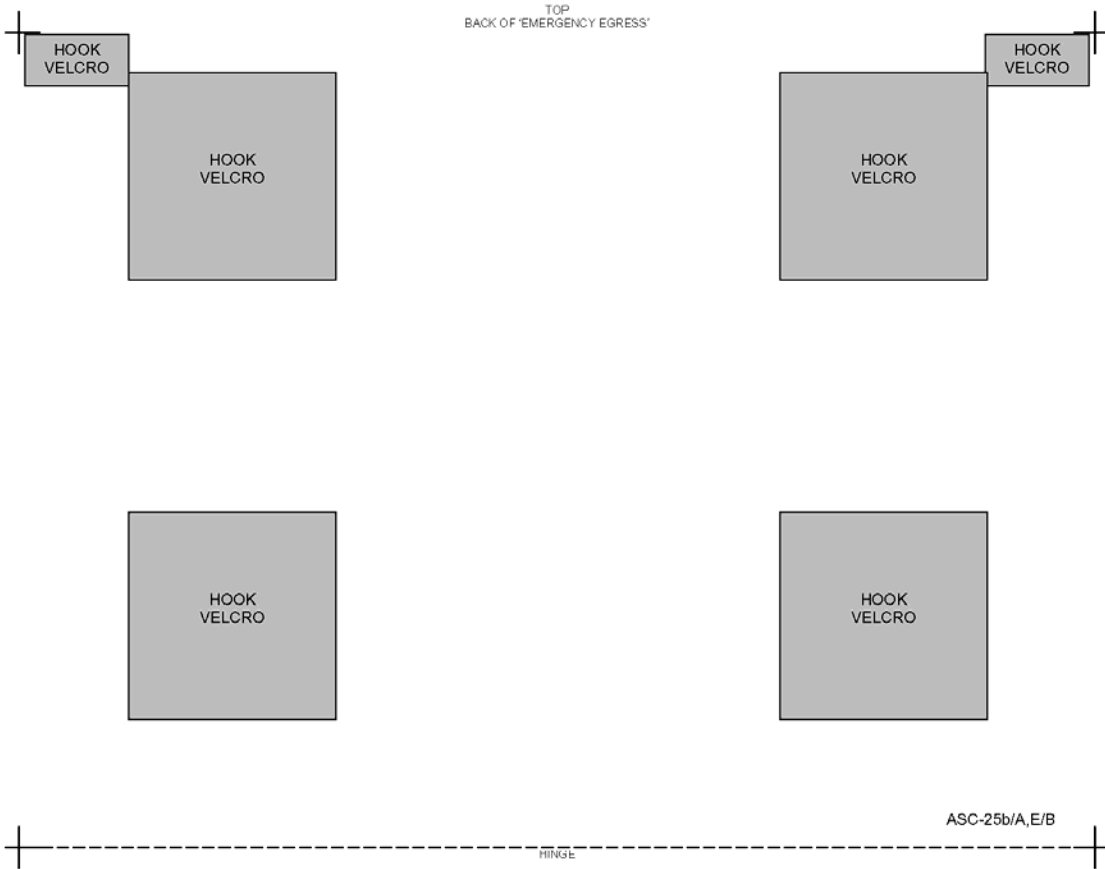
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VELCRO

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CC 10-36

ASC/116/FIN A



FAB USE ONLY

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CC 10-37

ASC/116/FIN A

TOP, HINGED AT BOTTOM OF 'EMERGENCY EGRESS'
HINGE



ASC-25bb/A,E/B



FAB USE ONLY

CS 10-38

ASC/116/FIN A

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

ASC-26a/A,E/D

НИЗ

FAB USE ONLY

СС 10-39

ASC/116/FIN A

(reduced copy)

TOP, HINGED AT BOTTOM OF 'EMERGENCY EGRESS'
HINGE

**РЕЖИМ 5
ПОСЛЕ ПОСАДКИ**

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

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

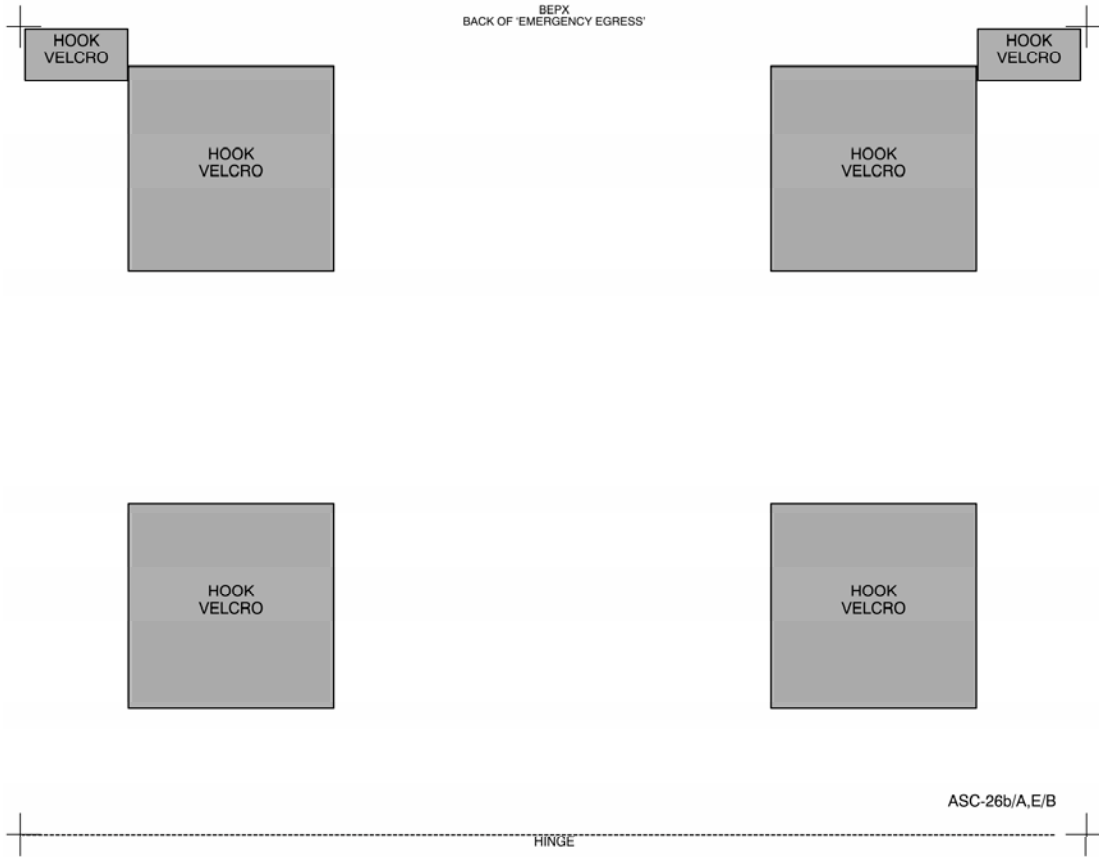
ASC-26aa/A,E/C

PILE
VELCRO

FAB USE ONLY

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CC 10-40

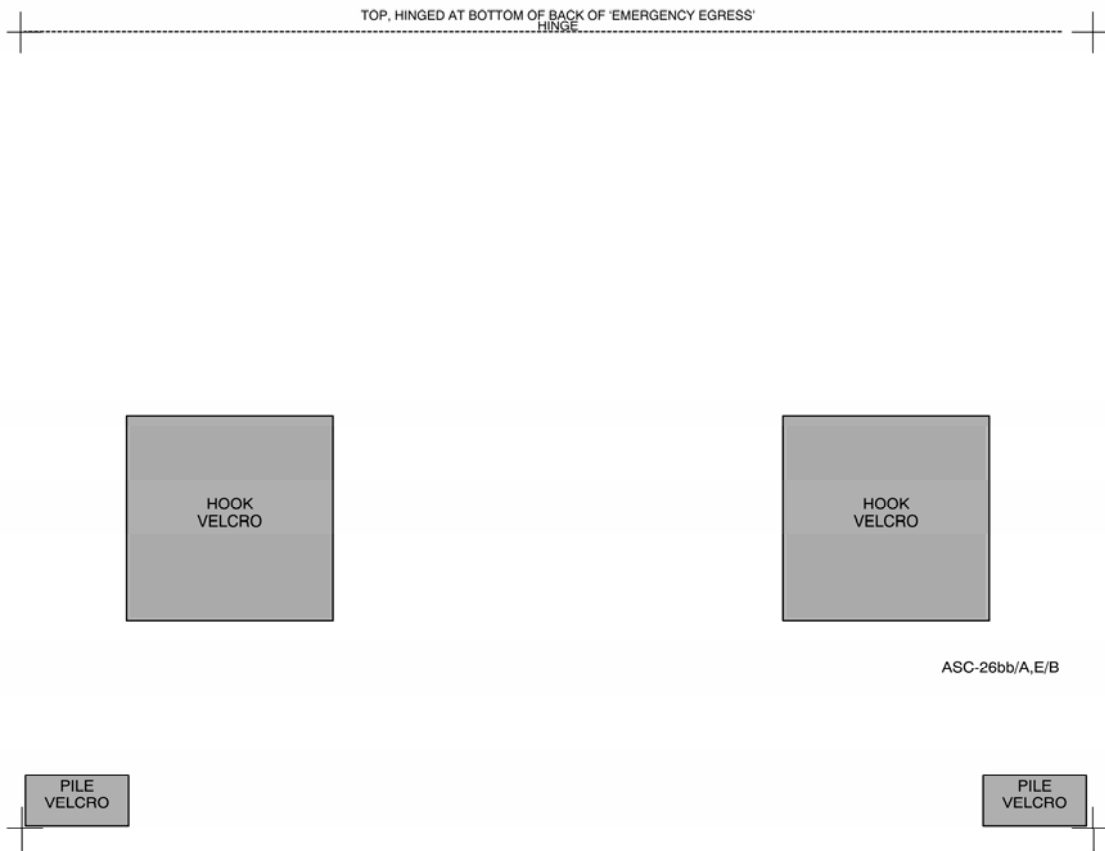
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ASC/116/FIN A



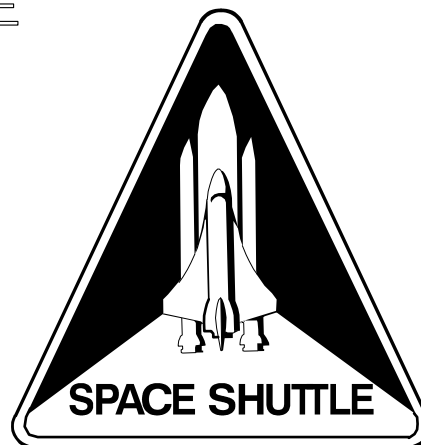


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Space Shuttle Program
FLIGHT DATA FILE

JSC-48005-116
FINAL, REV A



ASCENT CHECKLIST

STS
116

Flight Cover (trim bottom to expose tabs)