

Ascent Checklist

STS-120

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

**Final
April 13, 2007**

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



SMS FDF CHANGE NOTIFICATION		SIM PACK		DATE INITIATED 8/23/07	DATE RECEIVED (PMO)
BOOK TITLE ASC C/L		BK ISSUE (Ed, Rev, PCN) 120, PCN 1		SIM PACK NUMBER SIM-443	
Change is for flights (Also give SMS load if load dependent):				SMS UNIQUE? ☐ YES ☒ NO	DEVELOPMENTAL? ☐ YES ☒ NO
FABRICATED ITEM CHANGE? ☒ NONE ☐ CUE CARDS ☐ TRANSPARENCIES ☐ Other _____					
INSTRUCTIONS TO USER: Replace pages 3-7, 3-8, 6-11, and 6-12.					
AUTHORITY FOR CHANGE* (Approved 482 numbers, approved issue at print shop, supervisors deem mandatory, etc.): MULTI-1800					
OTHER AFFECTED FDF BOOKS SYS AOA *Refer to Crew Procedures Management Plan Are all SIM PACKS submitted? ☒ YES ☐ NO					
IMPLEMENTATION REQUIREMENTS ☐ Limited Distribution (List in comments) ☐ NO EARLIER THAN _____ (Date and/or Sim ID) ☒ NO LATER THAN <u>08/29/2007</u> (Date and/or Sim ID)					
BOOK MGR (Signature/Date) <u>08/23/07</u> Allison McCagg		SUPERVISOR (If required, Signature/Date) [Signature] 8/23/07		FDF COORD or FDF MGR (Signature/Date) Thomas Julauf 8-24-07	
COMMENTS:					

SMS FDF CHANGE NOTIFICATION		SIM PACK		DATE INITIATED 8/20/07	DATE RECEIVED (PMO) 8-23-07
BOOK TITLE Ascent Checklist		BK ISSUE (Ed, Rev, PCN) FIN, PCN-1		SIM PACK NUMBER 514-442	
Change is for flights (Also give SMS load if load dependent): STS-120				SMS UNIQUE? ☐ YES ☒ NO	DEVELOPMENTAL? ☐ YES ☒ NO
FABRICATED ITEM CHANGE? ☐ NONE ☒ CUE CARDS ☐ TRANSPARENCIES ☐ Other _____					
INSTRUCTIONS TO USER: Replace pages FB 2-9, 4-2, 6-18, CC 10-7 with attached					
AUTHORITY FOR CHANGE* (Approved 482 numbers, approved issue at print shop, supervisors deem mandatory, etc.): Supervisor deems necessary					
*Refer to Crew Procedures Management Plan					
OTHER AFFECTED FDF BOOKS				Are all SIM PACKS submitted? ☒ YES ☐ NO	
IMPLEMENTATION REQUIREMENTS		☐ Limited Distribution (List in comments) ☐ NO EARLIER THAN _____ (Date and/or Sim ID) ☒ NO LATER THAN 08-29-07 (Date and/or Sim ID)			
BOOK MGR (Signature/Date) <i>Marcia J. [Signature]</i> 8/20/07		SUPERVISOR (if required, Signature/Date) <i>[Signature]</i> 8/21/07		FDF COORD or FDF MGR (Signature/Date) <i>Thomas J. [Signature]</i> 8/22/07	
COMMENTS: New load incorporates vehicle swap to OV103 resulting in different OMS engines and different Fuel Inlet Pressure Limits.					

ASCENT C/L STS-120

FINAL (Apr 13, 2007)

PCN-1 (Aug 8, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

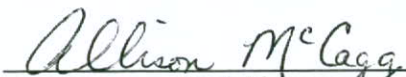
ASC-1775A (R)
ASC-1776
ASC-1781 (S)
ASC-1785A
ASC-1791A
ASC-1792
ASC-1793A (P)
ASC-1795

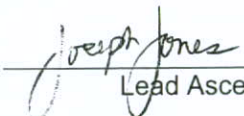
R – Remainder
S – Superseded
P – Partial

Incorporate the following:

1. Replace iii thru x
2. Replace 1-5 and 1-6
3. Replace FB 2-13 thru FB 2-20, 2-29 thru 2-34, 2-39 and 2-40
4. Replace 9-1 and 9-2, 9-23 and 9-24
5. Replace 10-1 thru CC 10-4, CC 10-11 and CC 10-12, CC 10-31 thru CC 10-42

Prepared by:


Book Manager 8/9/07


Lead Ascent GPO 8/9/07

Approved by:


Chief, Ascent/Descent Dynamics Branch

Encl: 48 pages

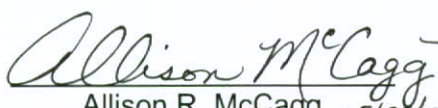
File this PCN immediately behind the front cover as a permanent record

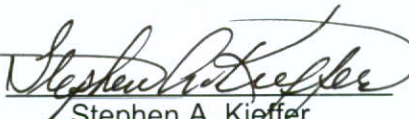
MISSION OPERATIONS DIRECTORATE

**ASCENT CHECKLIST
STS-120**

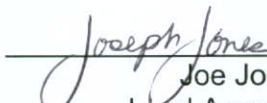
FINAL
April 13, 2007

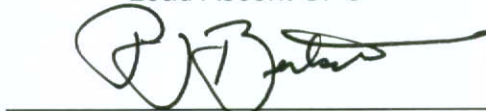
PREPARED BY:


Allison R. McCagg 03/24/07
Book Manager


Stephen A. Kieffer
VITT Lead

APPROVED BY:


Joe Jones 3-29-07
Lead Ascent GPO


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

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

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

ASC/120/FIN

Incorporates the following:
482#: MULTI-1784

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DM4/A. McCagg	281-483-7752
Switch List	CA4/S. Kieffer	281-244-8333
Entry	DM4/M. Trump	281-483-8029
	G. Jordan-Moore	281-483-1261

NOTES

1. The STS-120 trajectory data in this checklist is based on the STS-120 One Cycle to Flight R1 load and the August environment.
2. The Handover/Ingress Switch List gives the vehicle configuration at LCC/MCC handover (SRB Ignition) and flight crew ingress (T-3:00). If there is a switch position difference between ingress and handover, the ingress position will be boxed beside the handover position.
3. The time reference used in the Prelaunch procedures is the T- (Time to Launch) that LCC uses. This time does not reflect planned holds. The second time referenced in parentheses reflects the planned holds. The mission elapsed time (MET) has MET = 0 at SRB ignition.
4. Normal Flight Procedures are for liftoff through the OMS 2 burn.
5. The Abort to Orbit (ATO) procedures and the Backup Flight System (BFS) procedures are integrated into the appropriate parts of this checklist.
6. AOA procedures terminate with ENTRY MANEUVERS Cue Cards.
7. Ascent Flip Book for the CDR and PLT will be fabricated from the FB pages in section 2.
8. Ascent related cue cards are contained in this document. The cue cards are listed in the Ascent Cue Card section. Some cards are printed in the body of the checklist for MS use and also in the Cue Card Config section for reference of crop marks and fabrication instructions.
9. Mission STS-120 is flown with vehicle OV103.



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ASCENT CHECKLIST
STS-120

LIST OF EFFECTIVE PAGES

FINAL 04/13/07
PCN-1 08/08/07

Sign Off	* 120/FIN	FB 2-8	120/FIN
ii	* 120/FIN	FB 2-9	120/FIN
iii	* 120/FIN 1	FB 2-10	120/FIN
iv	* 120/FIN	FB 2-11	120/FIN
v	* 120/FIN 1	FB 2-12	☒ 120/FIN
vi	* 120/FIN 1	FB 2-13	120/FIN 1
vii	* 120/FIN 1	FB 2-14	☒ 120/FIN
viii	* 120/FIN 1	FB 2-15	120/FIN 1
ix	* 120/FIN 1	FB 2-16	120/FIN
x	* 120/FIN	FB 2-17	120/FIN 1
xi	120/FIN	FB 2-18	120/FIN
xii	120/FIN	FB 2-19	120/FIN
1-1	120/FIN	FB 2-20	120/FIN 1
1-2	120/FIN	FB 2-21	120/FIN
1-3	120/FIN	FB 2-22	120/FIN
1-4	120/FIN	FB 2-23	120/FIN
1-5	120/FIN 1	FB 2-24	120/FIN
1-6	120/FIN	FB 2-25	120/FIN
1-7	120/FIN	FB 2-26	120/FIN
1-8	120/FIN	2-27	120/FIN
1-9	120/FIN	2-28	120/FIN
1-10	☒ 120/FIN	2-29	120/FIN 1
1-11	120/FIN	2-30	120/FIN
1-12	120/FIN	2-31	120/FIN
1-13	120/FIN	2-32	120/FIN 1
1-14	120/FIN	2-33	120/FIN 1
2-1	120/FIN	2-34	120/FIN
FB 2-2	120/FIN	2-35	* 120/FIN
FB 2-3	120/FIN	2-36	* 120/FIN
FB 2-4	120/FIN	2-37	* 120/FIN
FB 2-5	120/FIN	2-38	* 120/FIN
FB 2-6	120/FIN	2-39	* 120/FIN 1
FB 2-7	120/FIN	2-40	* 120/FIN

* – Omit from flight book

☒ – Prelift-off information required

2-41	*	120/FIN	6-19.....	120/FIN
2-42	*	120/FIN	6-20.....	120/FIN
2-43	*	120/FIN	6-21.....	120/FIN
2-44	*	120/FIN	6-22.....	120/FIN
2-45	*	120/FIN	6-23.....	120/FIN
2-46	*	120/FIN	6-24.....	120/FIN
3-1		120/FIN	6-25.....	120/FIN
3-2		120/FIN	6-26.....	120/FIN
3-3		120/FIN	6-27.....	120/FIN
3-4		120/FIN	6-28.....	120/FIN
3-5		120/FIN	6-29.....	120/FIN
3-6		120/FIN	6-30.....	120/FIN
3-7		120/FIN	6-31.....	120/FIN
3-8		120/FIN	6-32.....	120/FIN
4-1		120/FIN	6-33.....	120/FIN
4-2		120/FIN	6-34.....	120/FIN
4-3		120/FIN	6-35.....	120/FIN
4-4		120/FIN	6-36.....	120/FIN
5-1		120/FIN	6-37.....	120/FIN
5-2		120/FIN	6-38.....	120/FIN
5-3		120/FIN	6-39.....	120/FIN
5-4		120/FIN	6-40.....	120/FIN
6-1		120/FIN	7-1.....	120/FIN
6-2		120/FIN	7-2.....	120/FIN
6-3		120/FIN	7-3.....	120/FIN
6-4		120/FIN	7-4.....	120/FIN
6-5		120/FIN	7-5.....	120/FIN
6-6		120/FIN	7-6.....	120/FIN
6-7		120/FIN	7-7.....	120/FIN
6-8		120/FIN	7-8.....	120/FIN
6-9		120/FIN	7-9.....	120/FIN
6-10.....		120/FIN	7-10.....	120/FIN
6-11.....		120/FIN	8-1.....	120/FIN
6-12.....		120/FIN	8-2.....	120/FIN
6-13.....		120/FIN	8-3.....	☒ 120/FIN
6-14.....		120/FIN	8-4.....	☒ 120/FIN
6-15.....		120/FIN	8-5.....	☒ 120/FIN
6-16.....		120/FIN	8-6.....	☒ 120/FIN
6-17.....		120/FIN	8-7.....	☒ 120/FIN
6-18.....		120/FIN	8-8.....	120/FIN

* – Omit from flight book

☒ – Prelift-off information required

9-1	*	120/FIN		CC 10-9	*	120/FIN
9-2	*	120/FIN	1	CC 10-10	*	120/FIN
9-3	*	120/FIN		CC 10-11	*	120/FIN 1
9-4	*	120/FIN		CC 10-12	*	120/FIN
9-5	*	120/FIN		CC 10-13	*	120/FIN
9-6	*	120/FIN		CC 10-14	*	120/FIN
9-7	*	120/FIN		CC 10-15	*	120/FIN
9-8	*	120/FIN		CC 10-16	*	120/FIN
9-9	*	120/FIN		CC 10-17	*	120/FIN
9-10	*	120/FIN		CC 10-18	*	120/FIN
9-11	*	120/FIN		CC 10-19	*	120/FIN
9-12	*	120/FIN		CC 10-20	*	120/FIN
9-13	*	120/FIN		CC 10-21	*	120/FIN
9-14	*	120/FIN		CC 10-22	*	120/FIN
9-15	*	120/FIN		CC 10-23	*	120/FIN
9-16	*	120/FIN		CC 10-24	*	120/FIN
9-17	*	120/FIN		CC 10-25	*	120/FIN
9-18	*	120/FIN		CC 10-26	*	120/FIN
9-19	*	120/FIN		CC 10-27	*	120/FIN
9-20	*	120/FIN		CC 10-28	*	120/FIN
9-21	*	120/FIN		CC 10-29	*	120/FIN
9-22	*	120/FIN		CC 10-30	*	120/FIN
9-23	*	120/FIN		CC 10-31	*	120/FIN 1
9-24	*	120/FIN	1	CC 10-32	*	120/FIN 1
9-25	*	120/FIN		CC 10-33	*	120/FIN
9-26	*	120/FIN		CC 10-34	*	120/FIN 1
9-27	*	120/FIN		CC 10-35	*	120/FIN 1
9-28	*	120/FIN		CC 10-36	*	120/FIN 1
10-1	*	120/FIN		CC 10-37	*	120/FIN 1
CC 10-2	*	120/FIN	1	CC 10-38	*	120/FIN 1
CC 10-3	*	120/FIN		CC 10-39	*	120/FIN 1
CC 10-4	*	120/FIN	1	CC 10-40	*	120/FIN 1
(A)CC 10-5	*	120/FIN		CC 10-41	*	120/FIN 1
(A)CC 10-6	*	120/FIN		10-42	*	120/FIN
(B)CC 10-5	*	120/FIN				
(B)CC 10-6	*	120/FIN				
(C)CC 10-5	*	120/FIN				
(C)CC 10-6	*	120/FIN				
CC 10-7	*	120/FIN				
CC 10-8	*	120/FIN				

* – Omit from flight book

ASCENT CUE CARDS

<u>Title</u>	<u>Ref. Page</u>	<u>Card No.</u>
ADI ERROR/RATE SWITCH		
ASCENT (Front).....	CC 10-2	ASC-1a/A,E/G
ENTRY (Back).....	CC 10-2	ASC-1b/A,E/E
ASCENT/ENTRY SPEC		
(Front).....	CC 10-3	ASC-2a/A,E/E
(Back).....	CC 10-3	ASC-2b/A,E/D
SPEED BRAKE CMD		
(Front).....	CC 10-4	ASC-3a/A,E/E
(Back).....	CC 10-4	ASC-3b/A,E/D
CONTINGENCY ABORT		
CDR (Front).....	(A)CC 10-5	ASC-30a/120/A/A
RTLS CONTINGENCY		
CDR (Back).....	(A)CC 10-6	ASC-30b/120/A/A
CONTINGENCY ABORT		
PLT (Front).....	(B)CC 10-5	ASC-31a/120/A/A
RTLS CONTINGENCY		
PLT (Back).....	(B)CC 10-6	ASC-31b/120/A/A
CONTINGENCY ABORT		
MS (Front).....	(C)CC 10-5	ASC-32a/120/A/A
RTLS CONTINGENCY		
MS (Back).....	(C)CC 10-6	ASC-32b/120/A/A
OMS 2 BURN MONITOR (Front)..	CC 10-7	ASC-5a/120/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/120/A,O/A
OPS 1 RCS BURN (Back).....	CC 10-10	ASC-6b/120/A,O/A
ASCENT ADI – NOMINAL		
(Front).....	CC 10-11	ASC-14a/120/A/A
ENTRY ALPHA – KSC 15		
(Back).....	CC 10-11	ASC-14b/120/A,E/A
AOA DEORBIT BURN (2 ENG)		
(Top/Front).....	CC 10-12	ASC-8a/A/E
(Bottom/Front).....	CC 10-13	ASC-8aa/120/A/A
AOA DEORBIT BURN (1 ENG)		
(Top/Back).....	CC 10-14	ASC-8b/A/B
(Bottom/Back).....	CC 10-15	ASC-8bb/120/A/A
AOA DEORBIT BURN (RCS)		
(Top/Front).....	CC 10-16	ASC-7a/A/B
(Bottom/Front).....	CC 10-17	ASC-7aa/120/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/120/A/A
ECAL – ZZA or MRN or FMI PRIME TAL		
(Back)	CC 10-21	ASC-9b/120/A/A
MRN TAL REDESIGNATION		
(Front)	CC 10-22	ASC-10a/120/A/A
ECAL – ZZA or MRN or FMI PRIME TAL		
(Back)	CC 10-23	ASC-10b/120/A/A
FMI TAL REDESIGNATION		
(Front)	CC 10-24	ASC-12a/120/A/A
ECAL – ZZA or MRN or FMI PRIME TAL		
(Back)	CC 10-25	ASC-12b/120/A/A
ASCENT/ABORT SUMMARY		
(Front)	CC 10-26	ASC-11a/120/A/A
(Back)	CC 10-26	ASC-11b/A/C
EMERGENCY EGRESS		
(Front)	CC 10-27	ASC-15a/A,E/I
ACES TROUBLESHOOTING		
(ASCENT/ENTRY) (Back)	CC 10-28	ASC-15b/A,E/E
ESCAPE PANEL EGRESS		
(Front)	CC 10-29	ASC-16a/A,E/D
(Back)	CC 10-29	ASC-16b/A,E/C
GPC/FCS CHANNEL CONFIG		
(Front)	CC 10-30	ASC-17a/A,O,E/B
(Back)	CC 10-30	ASC-17b/A,O,E/B
PANEL R14 – OV103 ONLY		
(Front)	CC 10-31	ASC-18a/A,O,E/H
(Back)	CC 10-32	ASC-18b/A,O,E/C
LOC/BREAK-UP	CC 10-33	ASC-21a/A/D
EMERGENCY EGRESS (OVERSIZED)		
(Top/Front)	CC 10-34	ASC-25a/A,E/G
(Bottom/Front)	CC 10-35	ASC-25aa/A,E/E
(Top/Back)	CC 10-36	ASC-25b/A,E/C
(Bottom/Back)	CC 10-37	ASC-25bb/A,E/C
EMERGENCY EGRESS (RUSSIAN)		
(Top/Front)	CC 10-38	ASC-26a/A,E/E
(Bottom/Front)	CC 10-39	ASC-26aa/A,E/D
(Top/Back)	CC 10-40	ASC-26b/A,E/C
(Bottom/Back)	CC 10-41	ASC-26bb/A,E/C

PLT & CDR Ascent

Flip Book..... FB 2-2 thru FB 2-26



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<u>CONTENTS</u>	<u>PAGE</u>
PRELAUNCH PROCEDURES.....	1-1
ASCENT PROCEDURES (FLIP BOOK).....	2-1
RTLS CDR (CIL)	FB 2-12
TAL CDR (CIL)	FB 2-14
ASCENT/ENTRY CUE CARDS	2-27
ABORT CUE CARDS.....	2-35
POST OMS 1 BURN PROCEDURES.....	3-1
OMS 2 BURN CARDS	4-1
POST OMS 2 BURN PROCEDURES.....	5-1
AOA PADS.....	6-1
AOA PROCEDURES	6-7
AOA DEORBIT BURN AND DEORBIT BURN MONITOR CARDS	6-17
AOA POST DEORBIT BURN.....	6-27
OMS/RCS POST BURN RECONFIG (CIL).....	6-28
OMS FAILURE	6-37
OMS/RCS ΔV	6-39
OMS TARGETS, COMM COVERAGE, LAND SITES	7-1
WEATHER PADS	8-1
SWITCH LIST	9-1
CUE CARD CONFIG	10-1

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PRELAUNCH PROCEDURES

PRE-
LAUNCH

PRELAUNCH PROCEDURES**ABORT/RECYCLE PROCEDURES**NOTE

These recycle procedures will be
used inside T-5 min

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

C BFS SAFING (On NTD call)

O6 GPC MODE 5 – HALT
Report BFS Safing complete

MS1 SRB SAFING (On NTD call – if reqd)

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

P APU SHUTDN (On OTC call)

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

Report APU SHUTDN complete

C HEATER RECONFIG (On OTC call)

L2 FLASH EVAP FDLN HTR (two) – 2

Report Heater Reconfig complete

NOTE

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

P **MPS He RECONFIG (On OTC call)**

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

Report MPS He Reconfig complete

P **OMS/RCS RECONFIG (On OTC call)**

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

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

Report OMS/RCS Reconfig complete

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

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

C C3 OMS ENG (two) – OFF

Report RCS Driver and OMS Safing
complete

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

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

Report Main Bus Switch Safing complete

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

-3:00:00
(Hold)

PRE-INGRESS SW RECONFIG

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

PAYLOAD ACTIVATION

A6U PL RETEN PL SEL – 1

NAVAIDS ACTIVATION

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

If OV103:

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

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

INGRESS ORBITER & SEATS

During seat ingress COMM
 PWR – ON (L5,R6)
 CCU PWR – ON (A11,A15,MO39M)
 O5,O9, AUD VOX SENS (as needed) – adj as reqd
 R10,L9, Contact LCC (OTC & NTD) and MCC on
 MO42F A/G 1

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

Install ASC Flip Cards
√ Cue Card positions

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

POST INGRESS SW RECONFIG

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

NOTE

ASP doing C/W VOL adjust,
expect MA

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

(IDP Equivalent)

NOTE

IMU preflight align begins

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

LCC ASTRO COMM CHECK

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

A MCC A/G VOICE CHECK

B

A/G 1 Voice Check

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

A/G 2 Voice Check

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

A/A Voice Check

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

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

3: GNC GPC MEMORY

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

PASS/BFS TRANSFER PREP

O6 √GPC MODE 5 – STBY (tb-RUN)

C3 √BFC CRT SEL: 3+1
 DISP – ON

3: GNC BFS MEMORY

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

NOTE

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

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

OMS GN2 PRESS

C3 OMS ENG (two) – ARM/PRESS

P **WSB GN2 SUPPLY ACTIVATION**

R2 BLR N2 SPLY (three) – ON

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

A/G VOICE CHECK

SIMO VOICE CHECK (LAUNCH CONFIG)

Voice check with MCC

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

NOTE

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

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

REPORT CABIN PRESS

3: BFS, SM SYS SUMM 1

CRT3,O1 Report cabin pressure (two) to OTC

3: BFS, GNC BFS MEMORY

C **CLOSE VENT VLVS**

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

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

NOTE

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

TRAJECTORY UPDATE

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

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

OPS 1 LOAD (IDP Equivalent)

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

Report faults other than from unpwr
equipment

CRT1 GNC, SPEC 99 PRO

-18:30 C
(-58:30)

BFS TO OPS 1

3: BFS, GNC FAULT

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

CRT3 GNC, OPS 101 PRO

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

Report faults other than from unpwr
equipment

CRT3 GNC, SPEC 99 PRO

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

3: BFS, GNC FAULT

2: GNC 50 HORIZ SIT

3: BFS, GNC 50 HORIZ SIT

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

ALTM – ITEM 9 +

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

	<u>PASS ITEM</u>		<u>BFS ITEM</u>	
PTI	INH	√1		
TAL SITE (MCC)	3(4,29)	√40	3(4,29)	√40
RTLS SITE	1	√41	1	√41
PRI (MCC)	KSC 15	√3	KSC 15	√3
SEC (MCC)	KSC 33	√4	KSC 33	√4
TAC	-59	√5	-59	√5
RA	blank	√46		
TAEM TGT				
G&N	OVHD	√6	OVHD	√6
HSI	blank		blank	
XEP	NEP	√7	NEP	√7
AIM	NOM	√8	NOM	√8
	(or CLSE)		(or CLSE)	
TAC	INH	√20	INH	√20
GPS	INH	√43	INH	√43
DRAG H	AUT	√22	AUT	√22
ADTA H	INH	√26	INH	√26
ADTA TO G&C	INH	√29	AUT	√28
TAC	DELTA	√35		
AIF_G	INH	√48		

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

3: BFS, GNC SYS SUMM 2

C **CONFIG CONT ABORT YAW STEER**

CRT1 √ITEM 5

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

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

-16:00 P **MPS He RECONFIG**
 (-56:00)

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

NOTE

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

C **✓INTERCOM VOICE**

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

WEATHER UPDATE (if reqd)

Update Abort winds, RWY and ALTM
 setting

-9:00
 (~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 It – off

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

C HTR RECONFIG

L2 FLASH EVAP FDLN HTR (two) – OFF

NOTE

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

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

	2: GNC FAULT
3: BFS, GNC FAULT	

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

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

C3 C/W MEM – CLEAR

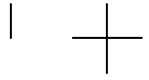
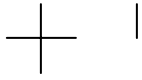
-2:00 **A SUIT PREP**

√Tabs/visor – cl/LES O2 – ON



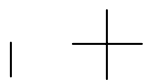
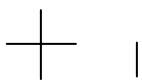
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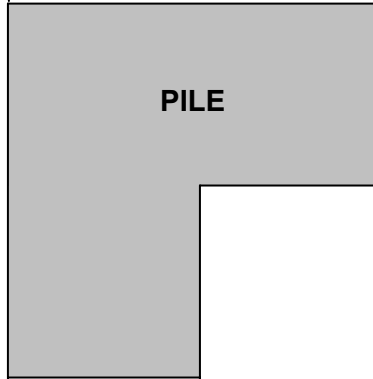


ASCENT PROCEDURES
(FLIP BOOK)

**BAILOUT
EGRESS**



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



**ASCENT FLIP BOOK
(EMERGENCY EGRESS)**

**PRELAUNCH
MODE 1**

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

**POST LANDING
MODE 5**

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

TOP

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

FB 2-3

ASC/120/FIN

TOP
BACK OF 'EMERGENCY EGRESS'

BAILOUT
EGRESS

PILE

SYS FLIGHT RULES

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

NO COMM MODE BOUNDARIES

NEG RETURN (104)	8100	2 ENG ZZA (104)	6000
PRESS TO ATO (104)	10700	ABORT TAL ZZA (4)	
SE OPS 3 (109)	12100	EO VI	
SE ZZA (104)	14300	SE OPS 3 ZZA (109) (4)	
PRESS TO MECO (104)	16400	SE ZZA (104) (4)	
SE PRESS (104)	18800		
NEG MRN (2 @ 67)	20000	2 ENG MRN (104)	5900
LAST PRE MECO TAL	23000	ABORT TAL MRN (3)	
LAST TAL		EO VI	
YJT	19900	SE OPS 3 MRN (109) (3)	
YYT	20200	SE MRN (104) (3)	
YQX	21900		
IKF	23700	2 ENG FMI (104)	6300
INN	24000	ABORT TAL FMI (29)	
BEJ	24300	EO VI	
FFA, MRN	24400	SE OPS 3 FMI (109) (29)	
KBO	24500	SE FMI (104) (29)	
ESN	25000		
ZZA, KKI	25100		
FMI	25200		
JDG	25300		

ASCENT PROCEDURES

HOOK

R180

LVLH

.83M

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

1.18M

 $\sqrt{P_c} \rightarrow 104\%$ $P_c < 50+5$ 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 $\sqrt{\text{SERC ON}}$ *

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 $V_I < 25760$: ** 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:

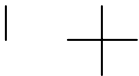
OMS ENG (two) – OFF

Go to POST OMS 1OMS 1
TGTING



PILE

**STS-120 OCFR1 CY
OMS 1/2 TGTING
RENDEZVOUS RECOVERY**



ASC

TBD



FB 2-6

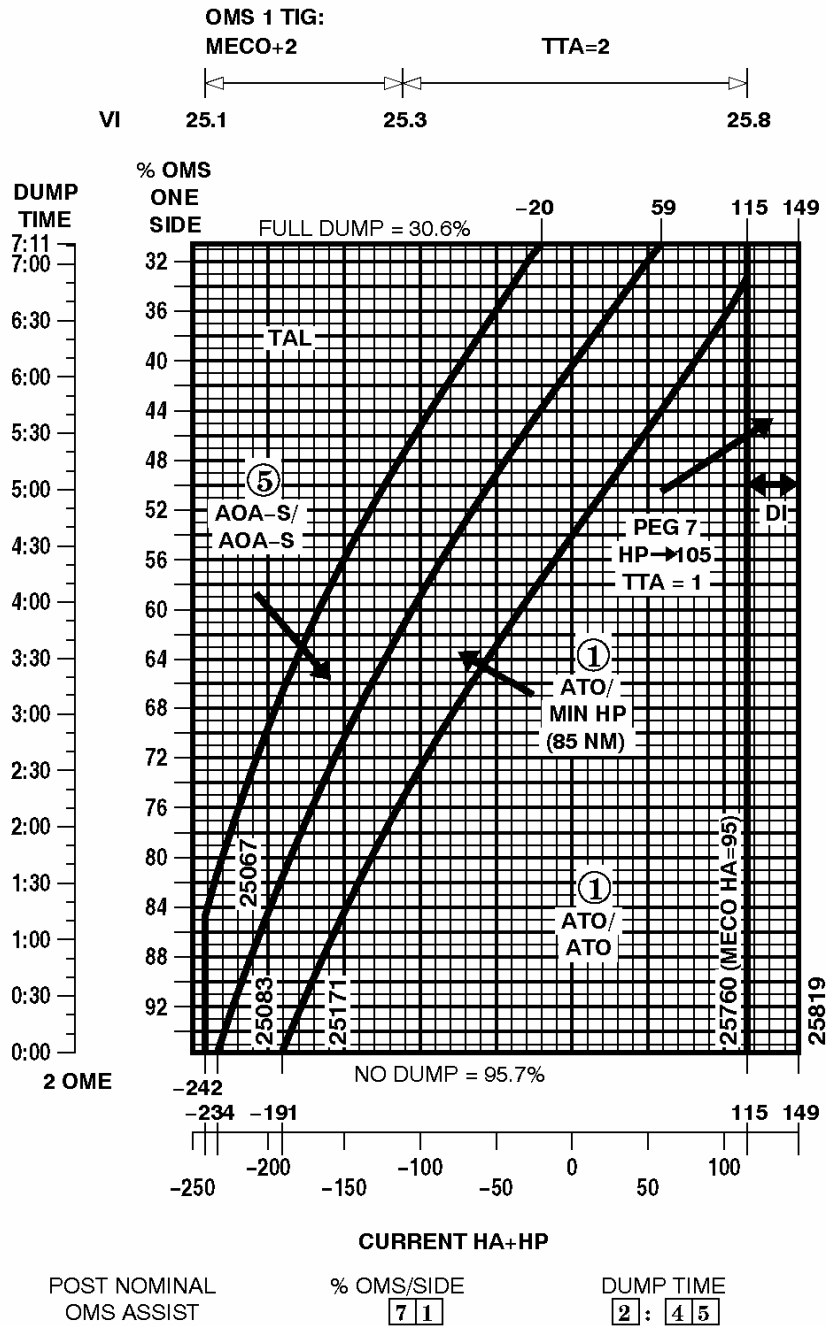
ASC/120/FIN



TOP

STS-120 OCFR1 CY
OMS 1/2 TGTING

HOOK



FB 2-7

ASC/120/FIN

PILE

OMS 1 BURN

OMS 1
TGTING

* **IF TIG LATER THAN MECO + 6 min:** *

* MECO + 4 min: $\sqrt{\text{BDY FLP pb - It off (MPS dump complete)}}$ *

* $\sqrt{\text{MCC for APU shutdn (if time permits)}}$ *

* **FEEDLINE FAIL:** *

* Expect 'Illegal Entry' (PASS)/'Illegal TIG' (BFS) @ tgt select *

* pre ET Sep; input TIG manually & LOAD tgt *

* If TIG > MECO + 6 min: *

* TIG-1:30 or MECO + 6 min (whichever comes first): *

* ET SEP - SEP >> *

* If TIG < MECO + 6 min: *

* MPS PRPLT DUMP SEQ - STOP *

* TIG-1:30: ET SEP - SEP *

* Post ET SEP -Z xlation: *

* MPS PRPLT DUMP SEQ - GPC *

* **1 OMS ENG FAIL and $\Delta\text{VTOT} > 500$:** *

* Burn good OMS + l'cnct both OMS to RCS, THC +X at TIG *

DAP - AUTO/DISC

$\sqrt{\text{ENG/TRIM CONFIG, LOAD TGTS, MNVR - (}\sqrt{\text{INRTL}}\text{)}}$

OMS XFEED (four) - OP

$\sqrt{\text{CNTLR PWR (two) - ON}}$

$\sqrt{\text{OMS ENG (two) - ARM/PRESS}}$

Note ΔVTOT _____ TIG :

-:15 EXEC

:00 TIG; start watch ($\sqrt{\text{Pc, } \Delta\text{VTOT, ENG VLVs}}$)

* **OMS ENG FAIL:** *

* Failed ENG - OFF *

* If $\Delta\text{VTOT} < 500$: *

* At QTY = 5%, good OMS TK ISOL (two) - CL *

* If $\Delta\text{VTOT} > 500$: *

* RCS XFEED (four) - OP *

* RCS TK ISOL (six) - CL *

* THC +X *

* At first QTY = 5%, good OMS TK ISOL (two) - CL *

* At second QTY = 5%, THC - Release *

* **RCS COMPLETION:** *

* Interconnect to either *

* OMS that was ENG FAIL *

* THC +X (OMS% vs RCS ΔV) *

* OMS TK SW (if reqd) *

CUTOFF

+ :02 OMS ENG (two) - OFF

Trim inplane X,Z residuals < 2 fps

OMS XFEED (four) - CL ($\sqrt{\text{RCS straightfeed}}$)

HOOK

OMS 1 BURN MONITOR

OMS TEMP*		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
	2 FAs lost			I/O RESET (if recov: BFS I/O RESET) If high RCS usage: OMS ENG FAIL √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 or 2 He TKs – 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	AOA-S
2 FREON LOOPS [Accum Qty (↓ and decr) and/or Flow (↓)] 2 H2O LOOPS CABIN LEAK (-EQ dP/dT ≥ .08)	AOA
APU/HYD – impending loss of all capability	AOA
CRYO – All O2(H2)	AOA

OMS

He	%	He	%
4650	95.6	2830	50
4430	90	2430	40
4030	80	2030	30
3630	70	1630	20
3230	60	1230	10
		830	0

FB 2-10

ASC/120/FIN

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	38.6	20.1	34.9	21.7
90	40.0	17.8	32.6	18.5
85	41.7	16.3	30.2	15.6
80	43.6	15.9	27.6	12.8
75	45.6	17.6	24.5	9.9
70	47.4	19.6	21.5	9.1
65	48.6	21.0	19.1	9.1
60	49.5	22.3	18.5	9.1
55	49.9	23.4	19.4	9.1
50	50.6	24.7	19.2	9.1
45	---	26.1	21.8	9.1

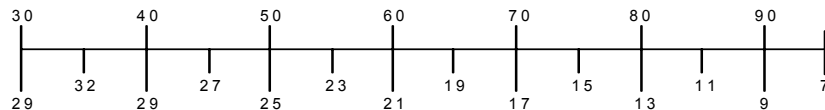
STS-120 OCFR1 CY

SINGLE POD - OMS REQUIRED				
Includes 4.6 % Unusable				
POST OMS 1 HP	ATO OMS 2 & STEEP D/O BURN (%)	MIN HP OMS 2 & SHALLOW D/O BURN (%)	AOA STEEP D/O BURN (%)	AOA SHALLOW D/O BURN (%)
95	34.1	15.5	30.4	17.1
90	35.4	13.2	28.1	14.0
85	37.1	11.7	25.7	11.1
80	39.0	11.3	23.1	8.3
75	41.1	13.0	20.0	5.3
70	42.9	15.1	17.0	4.6
65	44.1	16.4	14.6	4.6
60	45.0	17.8	13.9	4.6
55	45.4	18.9	14.9	4.6
50	46.1	20.1	14.7	4.6
45	---	21.5	17.2	4.6

RTLS

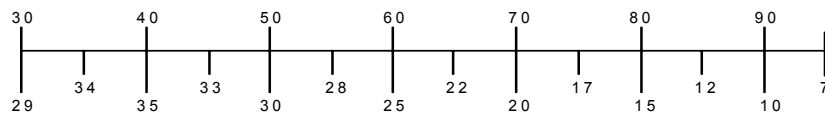
OMS BLOWDOWN

LEFT OMS GAGE QTY (%)



LEFT OMS BLDN EQUIV (%)

RIGHT OMS GAGE QTY (%)



RIGHT OMS BLDN EQUIV (%)

FB 2-11

ASC/120/FIN

PILE

RTLS CDR

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

ABORT RTLS

* No joy: *
* OPS 601 PRO *

√GUIDANCE STATUS on RTLS TRAJ

Expect PPA when GUID % to go = 0

* If GUID '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 √

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

WINDS

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

----- 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

G50 $\sqrt{TACANS}$ and GPS, INCORPORATE

* If KSC TACAN Fail: *

* TACAN Ch 097X (COF), ITEM 5 EXEC *

G50 $\sqrt{AIR}$ 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	
FMI 006	

*LO XRNG

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

* If second eng fails: $[TRAJ]$ $\sqrt{\text{SERC ON}}$ *
* $[G50]$ $\sqrt{\text{SITE (} \sqrt{\text{Redes card)}}}$ *

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

MECO

$V_1 \sim 24.0K$ @ CO mark

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) *

* If Variable/man 37: Pitch – CSS at $\alpha = 37^\circ$ *

* Pitch – AUTO when $\dot{H} = 0 \uparrow$ (2nd pullout) *

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

$\sqrt{\text{SPDBK}} \rightarrow 81\%$

Go to ENTRY MANEUVERS SURF WIND
(Cue Card)

SPDBK @ 3000 FT

ALTM

AIM PT

SPDBK

/

FB 2-14

ASC/120/FIN

RTLS

TAL PLT

HOOK

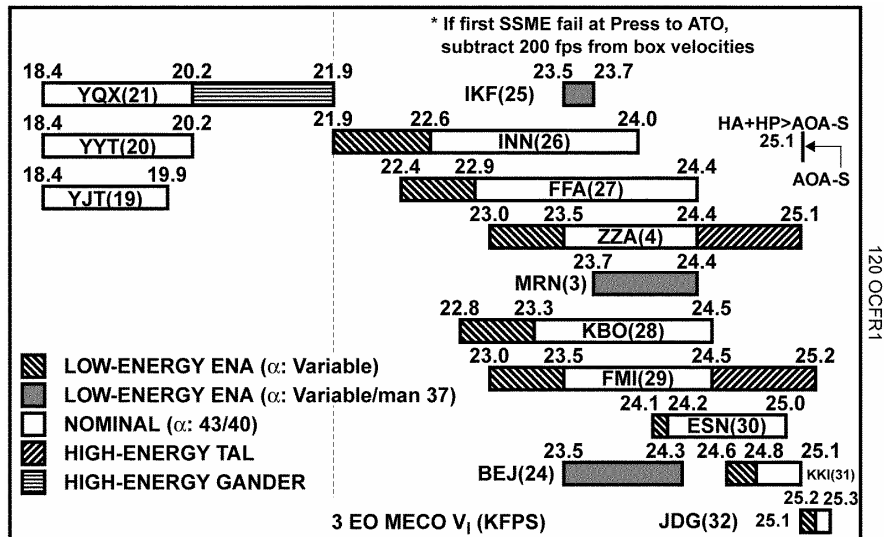
 $\sqrt{\text{OMS DUMP}}$

- * 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 STUCK TAL: *
- * When MPS PRPLT = 2%: *
- * MAN THROT, $P_c \rightarrow 67\%$ *
- * AUTO THROT *

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

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

MM304

 $\sqrt{\text{ET DOORS}}$ – Closed and latched (MM304 +1:30)

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

G50 $\sqrt{\text{GPS}}$, INCORPORATE

$V = 10K$ * If RCS < **57** % 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

√ $\theta \rightarrow 60^\circ$, Yaw $\rightarrow 45^\circ$

√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 $\alpha = 58^\circ$ 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	NGU 48
*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	NGU 48
*10.2-10.9	*10.0-10.7	*9.7-10.6	Wallops	9	WAL 28	SBY 49
	*10.7-11.0	*10.6-11.0	Atlantic City	11	ACY 31	CYN 81
*10.9-11.9 11.9-13.9	*11.0-11.6 11.6-14.4	*11.0-11.2 11.2-14.7	Otis ANGB	16	FMH 32	BOS 74
	11.8-12.4	11.2-13.0	Gabreski	15	FOK 06	HTO 83
	12.8-13.8	12.9-14.2	Pease Int'l	17	PSM 34	ENE 118
13.5-17.2	13.3-17.4	13.1-17.2	Halifax Int'l	18	YHZ 23	UAW 38
15.2-18.0	15.0-18.0	14.9-18.0	Stephenville	19	YJT 09	YJT 78
15.4-18.0	15.3-18.0	15.3-18.0	St. Johns Int'l	20	YYT 29	UYT 23
15.5-18.0	15.4-18.0	15.2-18.0	Gander Int'l	21	YQX 21	YQX 74
		17.3-17.6	Goose Bay	22	YYR 26	UYR 40

*Probable bailout region

(D) - DME only

TAL

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

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

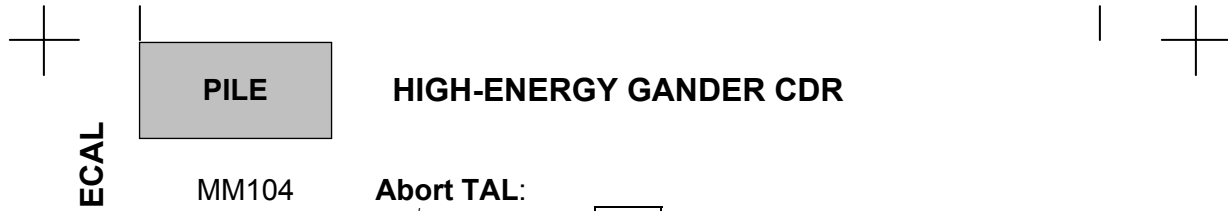
G50 √SPDBK (ITEM 39) per ECAL LANDING Table**ECAL LANDING:**

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

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

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

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



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

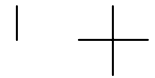
Go to ENTRY MANEUVERS (Cue Card)

HIGH-ENERGY GANDER PLT

HOOK

-----MM304-----

HI-ENER
TALBFS, OPS 301 PRO ($\sqrt{304}$) $\boxed{G50}$ Select Site YQX – ITEM 41 +2 1 $\boxed{TRAJ}$ $\sqrt{BUGS}$, $\boxed{HSI}$ $\sqrt{\hat{H}}$, RANGE $\sqrt{ET}$ 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,
 $\sqrt{P,R/Y}$ – AUTO**V = 19K** HYD MPS/TVC ISOL VLV (three) – CL
(hold 5 sec, tb-CL)**V = 15K** $\boxed{G50}$ $\sqrt{RWY}$, TACAN, S/B, ALTM
(PASS/BFS)**V = 10K** * If RCS < $\boxed{57}$ % either side: *
* $\boxed{G51}$ AFT RCS INH, ITEM 13 EXEC ***V = 10K** $\sqrt{SPDBK} \rightarrow 81\%$
Go to ENTRY MANEUVERS (Cue Card)



PILE

HIGH-ENERGY TAL CDR

MM104

Abort TAL:

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

HI-ENER
GANDER

-----MM304-----

MM304

P, R/Y – CSS
√VREL

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

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

Earlier of
 $\dot{H} = -600 \downarrow$
or Guid Init

Roll Heads Up at 4-5°/sec, maintain Alpha = 55°

$\dot{H} = -500 \uparrow$

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

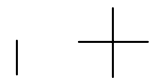
Orbiter bug
below
upper line

When commanded drag () < 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 ($\hookleftarrow$) ≥ [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 < [57] % either side: *

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

V = 10K √SPDBK → 81%

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

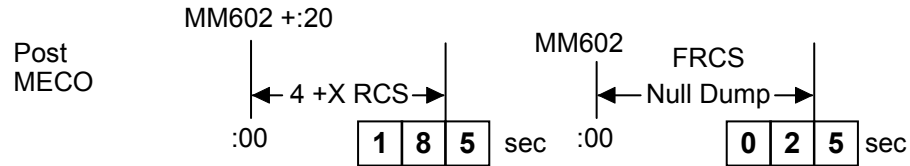
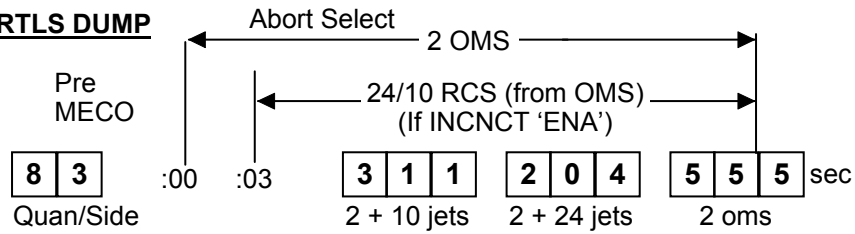
Go to ENTRY MANEUVERS (Cue Card)

HI-ENER
TAL

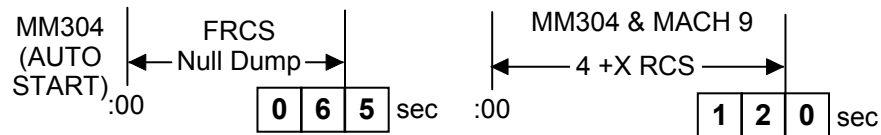
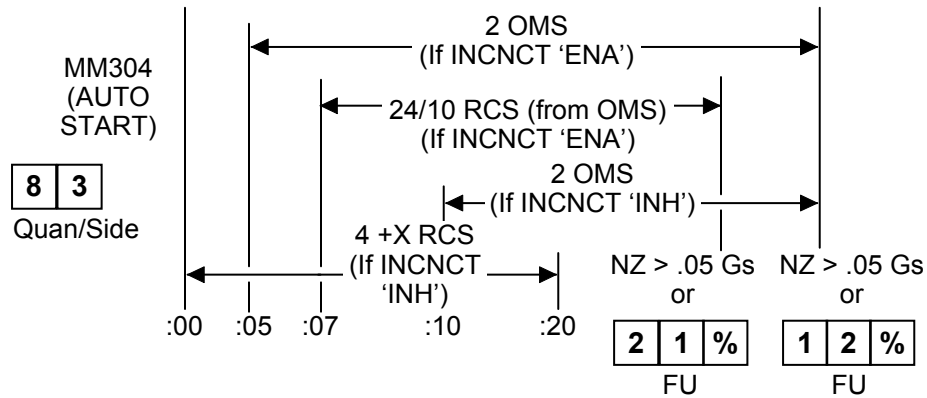
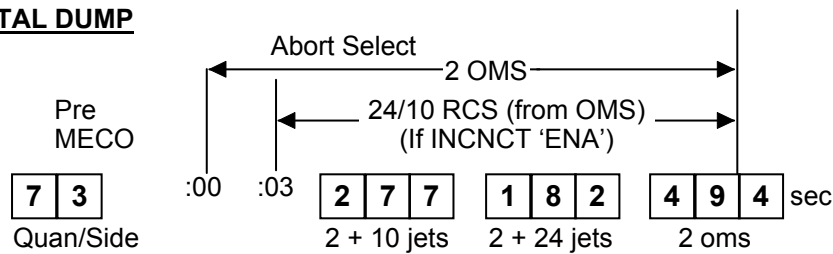
PILE

RTLS/TAL DUMPS

RTLS DUMP

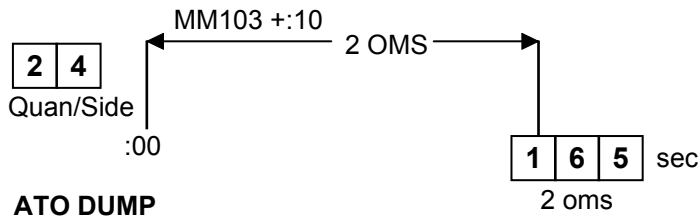


TAL DUMP

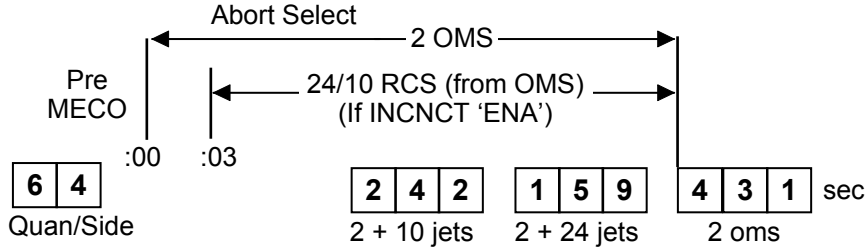


ASSIST/ATO/G51 DUMPS
ASSIST DUMP

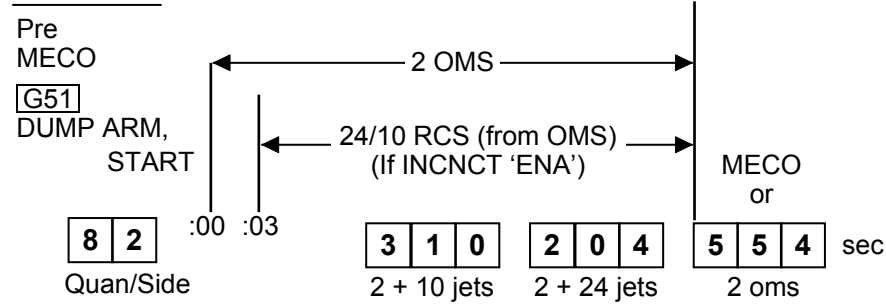
HOOK



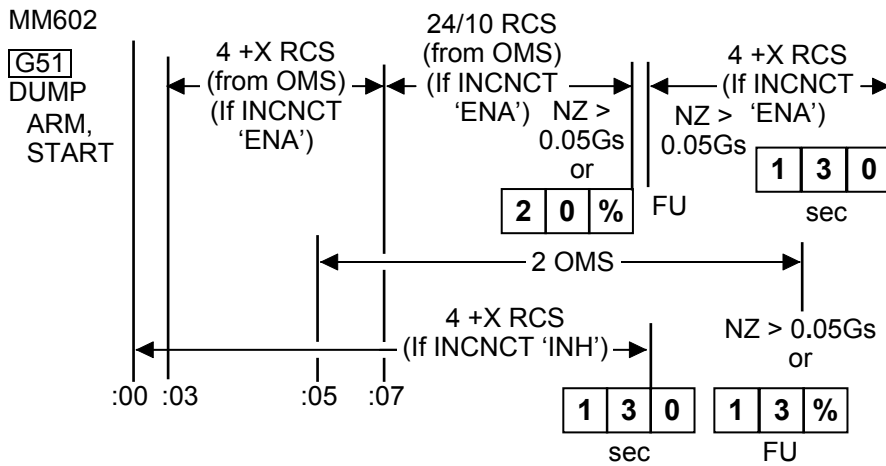
ATO DUMP



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
FMI	006

Man MECO @ CO mark

$\dot{H} =$ 272

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

Max H = 400 – 420K
for early TAL

Roll heads up @
15.0 TAL
13.2 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

$\sqrt{\text{RATE}} - \text{HIGH}$
8°/sec

$\sqrt{\text{RATE}} - \text{MED}$

Yaw to  and then

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

 $\sqrt{\text{PRPLT}}$

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

AFTER ABORT:

Fly Outbound θ
per RTLS PLT table

Post SEP:

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

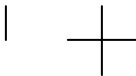
Pc < 50:
Hands off

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

This Page Intentionally Blank

PWRD
CSS



FB 2-26

ASC/120/FIN



ASCENT/ENTRY CUE CARDS

ASC/ENT
CUE CARDS

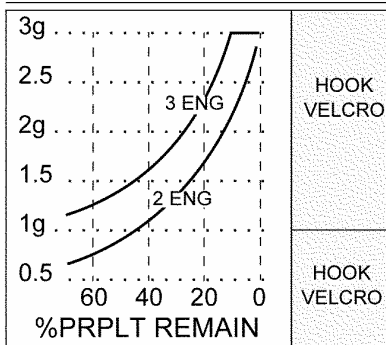
MS ONLY

2-27

ASC/120/FIN

ASCENT ADI - NOMINAL

TIME	θ	H	$\dot{H}$	(120 OCFR1 CY)
0:30	69	10K	670	
0:50	61	27K	1007	
1:10	52	51K	1443	
1:30	38	85K	1905	
1:50	30	126K	2200	



-STAGING-

V_i	θ	H	$\dot{H}$
6	19	220K	1691
7	16	277	1244
8	13	311	899
9	11	333	621
10	9	346	393
12	6	356	56
14	10	355	-147
16	25	350	-229
18	23	344	-263
20	21	339	-213
22	19	337	-100
24	17	337	68
25819	12	345	272

ASC-14a/120/A/A

HOOK VELCRO

ENTRY ALPHA

VR	α_{ref}	R	H	Href	Rref
25	40	4416	400		
24	HI	40 LO	2600	247	-47 L79
23	43	40 37	2137	239	-64 69
22	43	40 37	1778	233	-84 63
21	43	40 37	1503	227	-107 61
20	43	40 37	1285	220	-124 60
19	43	40 37	1110	213	-148 60
18	43	40 37	974	209	-171 R60
17	43	40 37	860	200	-189 62
16	43	40 37	768	194	-198 64

KSC 15

MAX L/D	
M	α
3	17
2	15
1	12

ASC-14b/120/A,E/A

(120 OCFR1 CY)

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

15	43	40	37	685	187	-118	64
14	43	40	37	612	183	-127	62
13	43	40	37	544	180	-137	60
12	43	40	37	482	175	-153	59
11	42	39	36	425	170	-195	57
10	41	38	35	375	166	-173	L51
9	39	36	33	326	161	-207	44
8	37	34	31	277	153	-239	41
7	33	30	27	229	144	-267	40
6	30	27	24	184	132	-272	41
5	26	23	20	143	120	-274	43
4	22	19	18	107	107	-263	R38
3	19	16	15	74	91	-247	34
2.5	14			61	83	-255	
2	13			51	78	-253	
1.5	10			39	69	-308	
1	8			29	55	-258	

HOOK VELCRO



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MS ONLY

2-30

ASC/120/FIN



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
$\Delta Az = 10.5^\circ$	FIRST ROLL REVERSAL (DEL PAD)
V = 19K	✓HYD MPS/TVC ISOL VLV SYS (three) – CL
V = 15K	✓NAVAIDS (I/O RESET if reqd)
V = 12K	RAD BYP VLV MODE (two) – AUTO CNTLR LOOP (two) – AUTO B(A)
V = 10K	✓SPDBK to 81%

ENT-6a/E/P

ENT
MNV

ENT
MNV

FLIGHT CONDITIONS	MANEUVER
V = 7K	G50 √TACAN and GPS, INCORPORATE ★ If ELS: UHF MODE – G T/R ★
V = 5K	ADTA PROBES – DEPLOY (√HEAT) Begin AIL and RUD trim monitoring
M = 3.5	If previous OMS OX TK, He TK, or RCS OX TK leak: 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
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/120/E/B
(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/120/E/B
(Partial)



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MS ONLY

2-34

ASC/120/FIN



CONT
ABORT

ABORT CUE CARDS

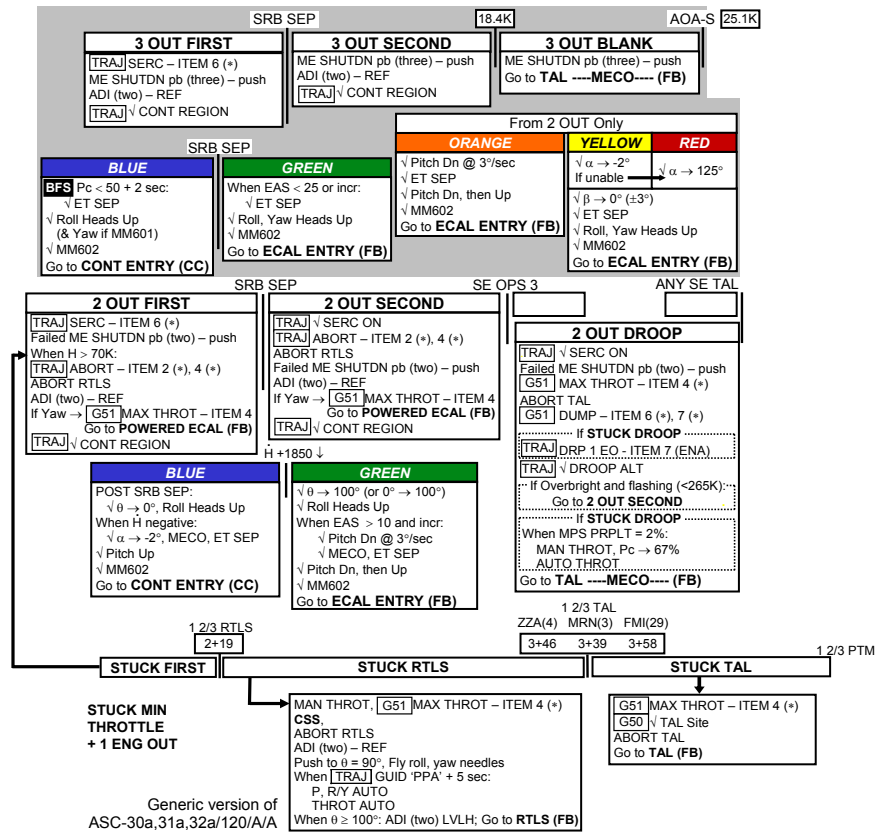
NOT FLOWN

2-35

ASC/120/FIN

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

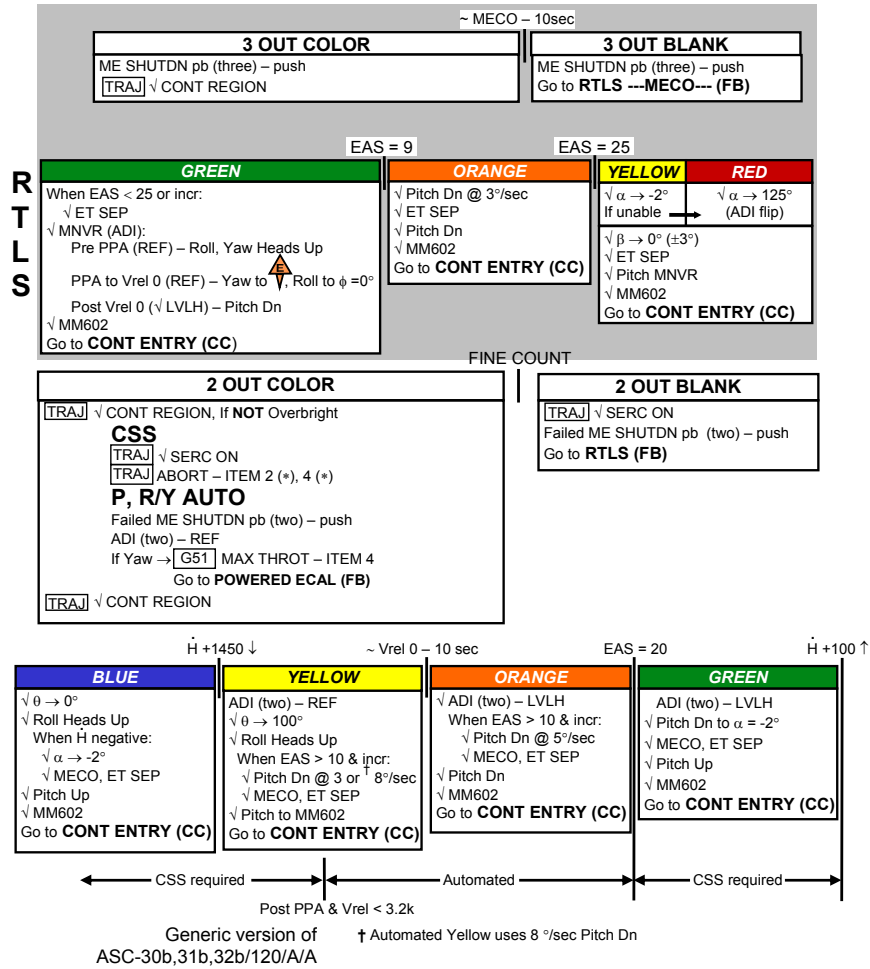
When $M < 1.0$

Go to **BAILOUT (FB)**

Generic version of
ASC-30a,31a,32a/120/A/A

RTLS CONTINGENCY

High Inclination
51.6°



RTLS CONTINGENCY

CONT ENTRY / MM602

VERT SIT -

If ECAL/BDA – INH

✓ Theta Limits after Nz Hold

If ECAL/BDA – ENA

ITEM 1 (INH)

Before NZ Hold

RHC/PNL TRIM – ENA

If $M < 5$,

✓ AIL/RUD TRIM

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

$M \leq 5$ and $EAS < 333 \downarrow$

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-30b,31b,32b/120/A/A

RED

✓ ADI (two) – LVLH

✓ $\dot{H} \rightarrow +400$ ($\theta_{max} = 75^\circ$)

TRAJ AT FINE COUNT:

✓ Pitch Dn to $\alpha = -2^\circ$

✓ MECO, ET SEP

✓ Pitch Up

✓ MM602

Go to **RTLS ---MECO--- (FB)**

← Automated →

NOT FLOWN

2-39

ASC/120/FIN 1

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

1st E.O. VI		6000	6100	6200	6300	6400	6500	6600	6700
SE OPS 3 ZZA 109	(4)	11000	11100	11100	11100	11100	11100	11200	11200
SE ZZA 104	(4)	16900	16800	16600	16400	16300	16100	15900	15800

1st E.O. VI		6800	6900	7000	7100	7200	7300	7400	7500
SE OPS 3 ZZA 109	(4)	11200	11200	11200	11300	11300	11300	11300	11300
SE ZZA 104	(4)	15600	15400	15300	15100	15000	14800	14700	14600

1st E.O. VI		7600	7700	7800	7900	8000	8100	8200	8300
SE OPS 3 ZZA 109	(4)	11400	11400	11400	11400	11400	11500	11500	11500
SE ZZA 104	(4)	14500	14300	14200	14100	14000	14000	13900	13800

1st E.O. VI		8400	8500	8600	8700	8800	8900	9000	9100
SE OPS 3 ZZA 109	(4)	11500	11500	11600	11600	11600	11600	11600	11600
SE ZZA 104	(4)	13700	13700	13600	13600	13600	13500	13500	13500

1st E.O. VI		9200	9300	9400	9500	9600	9700	9800	9900
SE OPS 3 ZZA 109	(4)	11700	11700	11700	11700	11700	11800	11800	11800
SE ZZA 104	(4)	13500	13500	13500	13500	13500	13500	13500	13500

1st E.O. VI		10000	10100	10200	10300	10400	10500	10600	10700
SE OPS 3 ZZA 109	(4)	11800	11800	11800	11900	11900	11900	11900	11900
SE ZZA 104	(4)	13500	13500	13500	13600	13600	13600	13600	13600

ASC-9a/120/A/A

NOT FLOWN

2-40

ASC/120/FIN

ECAL – ZZA or MRN or FMI PRIME TAL

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

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

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

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

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

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

ASC-9b/120/A/A

NOT FLOWN

2-41

ASC/120/FIN

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

1st E.O. VI		5900	6000	6100	6200	6300	6400	6500	6600
SE OPS 3 MRN 109	(3)	10900	11000	11000	11000	11100	11100	11100	11200
SE MRN 104	(3)	16700	16600	16400	16200	16100	15900	15800	15600

1st E.O. VI		6700	6800	6900	7000	7100	7200	7300	7400
SE OPS 3 MRN 109	(3)	11200	11200	11300	11300	11300	11400	11400	11400
SE MRN 104	(3)	15400	15300	15100	15000	14900	14700	14600	14500

1st E.O. VI		7500	7600	7700	7800	7900	8000	8100	8200
SE OPS 3 MRN 109	(3)	11400	11500	11500	11500	11500	11600	11600	11600
SE MRN 104	(3)	14300	14200	14100	14000	13900	13900	13800	13700

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

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

1st E.O. VI		9900	10000	10100	10200	10300	10400	10500	10600
SE OPS 3 MRN 109	(3)	11900	11900	11900	11900	11900	11900	11900	11900
SE MRN 104	(3)	13400	13400	13400	13400	13500	13500	13500	13500

1st E.O. VI		10700							
SE OPS 3 MRN 109	(3)	11900							
SE MRN 104	(3)	13500							

ASC-10a/120/A/A

NOT FLOWN

2-42

ASC/120/FIN

ECAL – ZZA or MRN or FMI PRIME TAL

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

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

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

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

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

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

ASC-10b/120/A/A

NOT FLOWN

2-43

ASC/120/FIN

**FMI TAL REDESIGNATION
(120 OCFR1 CYC)**

1st E.O. VI		6300	6400	6500	6600	6700	6800	6900	7000
SE OPS 3 FMI 109	(29)	11000	11100	11100	11100	11200	11200	11200	11200
SE FMI 104	(29)	17600	17400	17200	17000	16800	16600	16500	16300

1st E.O. VI		7100	7200	7300	7400	7500	7600	7700	7800
SE OPS 3 FMI 109	(29)	11300	11300	11300	11300	11400	11400	11400	11400
SE FMI 104	(29)	16100	15900	15700	15600	15400	15200	15100	14900

1st E.O. VI		7900	8000	8100	8200	8300	8400	8500	8600
SE OPS 3 FMI 109	(29)	11500	11500	11500	11500	11600	11600	11600	11600
SE FMI 104	(29)	14800	14700	14500	14400	14300	14300	14200	14100

1st E.O. VI		8700	8800	8900	9000	9100	9200	9300	9400
SE OPS 3 FMI 109	(29)	11600	11700	11700	11700	11700	11700	11700	11800
SE FMI 104	(29)	14000	14000	13900	13900	13900	13800	13800	13800

1st E.O. VI		9500	9600	9700	9800	9900	10000	10100	10200
SE OPS 3 FMI 109	(29)	11800	11800	11800	11800	11800	11800	11900	11900
SE FMI 104	(29)	13800	13800	13800	13800	13800	13800	13800	13800

1st E.O. VI		10300	10400	10500	10600	10700			
SE OPS 3 FMI 109	(29)	11900	11900	11900	11900	11900			
SE FMI 104	(29)	13900	13900	13900	13900	13900			

ASC-12a/120/A/A

NOT FLOWN

2-44

ASC/120/FIN

ECAL – ZZA or MRN or FMI PRIME TAL

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

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

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

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

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

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

ASC-12b/120/A/A

NOT FLOWN

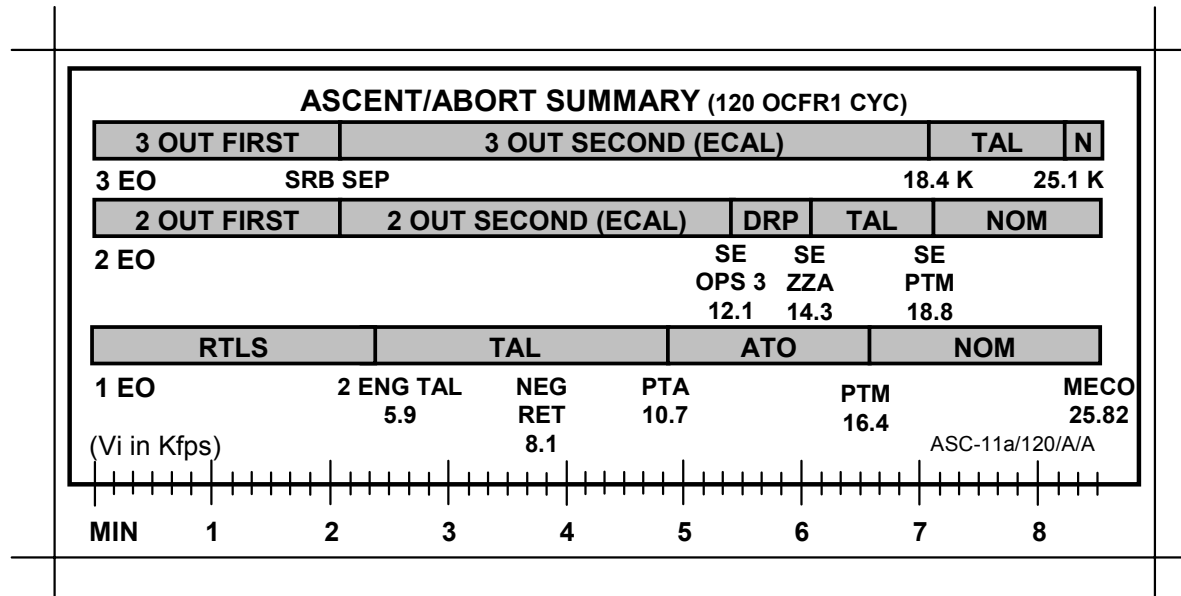
2-45

ASC/120/FIN

NOT FLOWN

2-46

ASC/120/FIN



POST OMS 1 BURN PROCEDURES

POST
OMS 1

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

ET PHOTO MANEUVER/MPS DUMP

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

B $\sqrt{\text{MCC}}$,
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 LAT (two) – LAT (tb-bp) |

√After 6 sec, L,R LAT tb (two) – LAT

* If doors do not latch within 12 sec: *

* L,R DR (two) – OFF *

* LAT (two) – OFF *

* √MCC *

L,R DR (two) – OFF |

LAT (two) – OFF

MODE – GPC

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

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/120/FIN



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/120/A,O/SIM-442

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)

ORB BURN A	GPC	OP	CL
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)

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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/120/A,O/A

MS ONLY

4-3

ASC/120/FIN

OPS 1 RCS BURN

AFT RCS

√RCS BURN CONFIG:
 OMS TK ISOL (all) – OP OMS TK
 L(R) OMS XFEED (two) – OP switch at
 R(L) OMS XFEED (two) – CL 1/2 ΔVTOT
 AFT L,R RCS XFEED (four) – OP (If reqd)
 TK ISOL (six) – CL ☐☐☐
 TIG-2 L,R OMS He PRESS/VAP ISOL A – OP
 . . . Wait 2 sec . . .
 L,R OMS He PRESS/VAP ISOL B – OP
 √MM105
 CNTLR PWR (two) – ON
 √BURN ATT (INRTL) then REF, pb – push
 √RCS SEL
 DAP: INRTL/DISC
 :00 + X
 Maintain PITCH ATT ERR ± 3°
 Monitor OMS data
 Monitor ΔVTOT
 CUTOFF Release THC
 CNTLR PWR (two) – OFF

FWD RCS

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

NOTE

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

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

ASC-6b/120/A,O/A

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

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

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

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

POST
OMS 2

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

MAJOR MODE CHANGE

CRT1 GNC, OPS 106 PRO

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

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

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

Go to POST INSERT, POST INSERTION



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AOA PADS

AOA
PADS

6-1

ASC/120/FIN



DIRECT INSERTION AOA DEL PAD

<u>DEORBIT</u>									
PRPLT					()				
BURN CUE CARD:									
OMS ENG FAIL XFEED QTY CUE					%L		%R		
TOT AFT QTY 1 (%)							9		1
TOT AFT QTY 2 (%)							5		3
FLIP ΔV							4		8
AFT ΔV							2		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									.
☐ L					☐ OVHD				
☐ R					☐ STRT				
ΔT MACH < 1 TO HAC					MAX Nz		Nz LIMIT		WINDS: (ENT MNVR Cue Card)
ΔT HAC INIT TO H = 20K									
AIMPOINT					SPEEDBRAKE				
☐ NOM					☐ NOM				
☐ CLOSE-IN					☐ S.F.				
REMARKS:									

AOA
PADS

W/OMS 1 AOA DEL PAD

<u>DEORBIT</u>									
PRPLT					()				
BURN CUE CARD:									
OMS ENG FAIL XFEED QTY CUE					%L		%R		
TOT AFT QTY 1 (%)							9		1
TOT AFT QTY 2 (%)							5		3
FLIP HP =		()	+		OR	1 9 0 7	STEEP SHALLOW	+	2 4
		TGT HP				ΔHP (REDES SITE)			($\frac{\text{FLIP } \Delta V}{2}$)
AFT HP =		()						+	1 0
		TGT HP							($\frac{\text{AFT } \Delta V}{2}$)
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		/
☐ L		☐ OVHD			deg		28K		/
☐ R		☐ STRT			TAC		20K		/
ΔT MACH < 1 TO HAC		MAX Nz		Nz LIMIT		WINDS: (ENT MNVR Cue Card)		12K	/
								7K	/
ΔT HAC INIT TO H = 20K								3K	/
								1K	/
AIMPOINT		SPEEDBRAKE						SURFACE	/
☐ 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 LAT (two) – LAT (tb-bp) |

√After 6 sec, L,R LAT tb (two) – LAT

* If doors do not latch within 12 sec: *

* L,R DR (two) – OFF *

* LAT (two) – OFF *

* √MCC *

L,R DR (two) – OFF |

LAT (two) – OFF

MODE – GPC

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

RECONFIG DPS FOR ENTRY

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

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

CRT1 GNC, OPS 302 PRO

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

√RWY Selection
AOA RWY OPTIONS

ALL INCLINATIONS				
SITE	RWY	TACANS	ITEM 5	MLS
1	KSC 15 KSC 33	TTS 59Y	COF 97	8 6
42	NOR 17 NOR 23	SNG 121Y	HMN 92	6 6
43	NOR 05 NOR 35	SNG 121Y	HMN 92	— —
44	EDW 15 EDW 18L	EDW 111	LHS 21	— —
45	EDW 22 EDW 04	EDW 111	LHS 21	8/† 6

† MSBLS Jr. Channel 8 – Requires Uplink

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

1: GNC DEORB MNVR EXEC

B OMS 2 BURN SETUP

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

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

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

NOTE

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

LOAD – ITEM 22 EXEC
TIMER – ITEM 23 EXEC

CRT3 √BFS TGT

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

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

OMS BURN TIG ADJUST (if reqd)

CRTX LOAD – ITEM 22 EXEC
 TIMER– ITEM 23 EXEC

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

CRTX Enter new TIG

LOAD – ITEM 22 EXEC
 TIMER– ITEM 23 EXEC

Repeat until Δ RANGE < 50

CRT3 $\sqrt$ BFS TGT

MNVR TO DEORBIT BURN ATTITUDE

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

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

3: BFS, GNC SYS SUMM 2

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



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DEORBIT
CARDS

AOA DEORBIT BURN AND DEORBIT BURN MONITOR CARDS

MS ONLY

6-17

ASC/120/FIN

DEORBIT BURN MONITOR

DEORBIT BURN MONITOR

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: 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) & 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)
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/120/A,O,D,E/SIM-124



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AOA DEORBIT BURN (2 ENG)

 $\sqrt{\text{MM302}}$ $\sqrt{\text{OMS BOTH}}$

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

 $\sqrt{\text{DAP} - \text{AUTO}(\text{PASS})/\text{DISC}}$

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 ($\sqrt{P_C}$, $\Delta VTOT$, 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

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

* RCS COMPLETION

*** OMS ENG FAIL:**

* Failed OMS ENG – OFF

* OMS XFEED at 1/2 Δ VTOT 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
```

* $\sqrt{\text{ADI} - \text{LVLH}}$, 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 ($\sqrt{\text{OMS\%}}$ 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 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(s) – OFF (If < 3 IMU, at :)
* AFT RCS RECONFIG if INTERCONNECT *
Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

ASC-8aa/120/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 * [G23] 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/120/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/120/FIN

HINGE

* RCS COMPLETION:

* If DIRECT INSERTION:

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

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

* FLIP -----
* ΔV FRCS COMPLETION

* AFT -----
* ΔV THC +X to TGT ΔV

* TGT -----
* ΔV

* If w/OMS 1:

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

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

* FLIP -----
* HP FRCS COMPLETION

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

* TGT -----
* HP

* FRCS COMPLETION:

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

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

CUTOFF:

VGOx = 0, release THC

AFT RCS RECONFIG

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

ASC-7aa/120/A/A



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POST D/O
BURN

AOA POST DEORBIT BURN



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

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

P OMS/RCS POST BURN RECONFIG

**POST D/O
BURN**

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

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

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

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

XFEED (four) – CL (tb-CL)

Determine Prebank
 Determine ΔHP (CUR HP -TGT HP)

Use RECOVERY PREBANK TABLES
 Record Prebank on ENTRY MANEUVERS
 Cue Card

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

* **RECOVERY PREBANK TABLES (KSC)** *

* NOTE: APPLICABLE ONLY IF OMS 1 REQD *

* (ATO/AOA steep entries) *

KSC

Δ HP	0	3	7	10	13	16	19	23	26
PREBANK	0	45	80	95	100	105	115	140	175

* (ATO/AOA shallow entries) *

KSC

Δ HP	0	1	2	3	4	5	6	7	8
PREBANK	90	105	110	120	125	135	145	160	180

120 OCFR1

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	

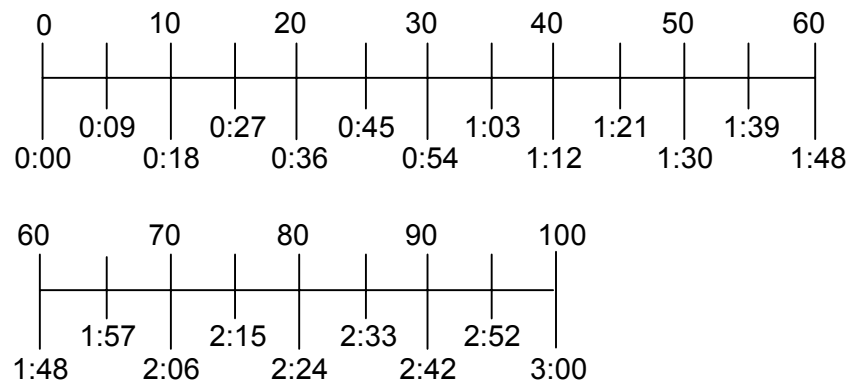
1: GNC 23 RCS	2: GNC DEORB MNVR COAST
3: BFS, GNC SYS SUMM 2	

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 (%)



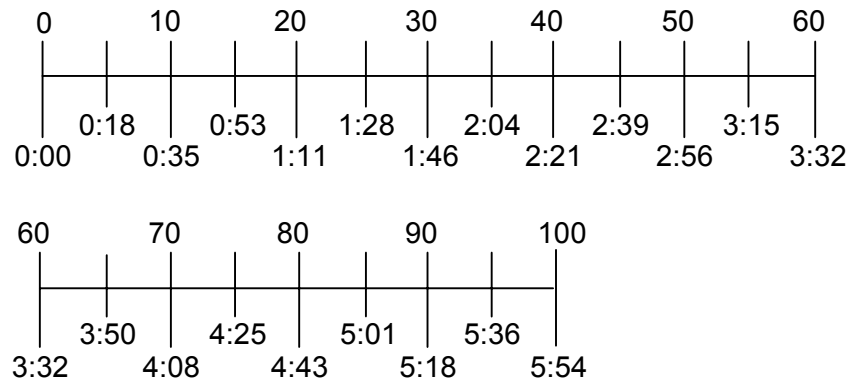
TIME FROM DUMP INITIATION (M:S)

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

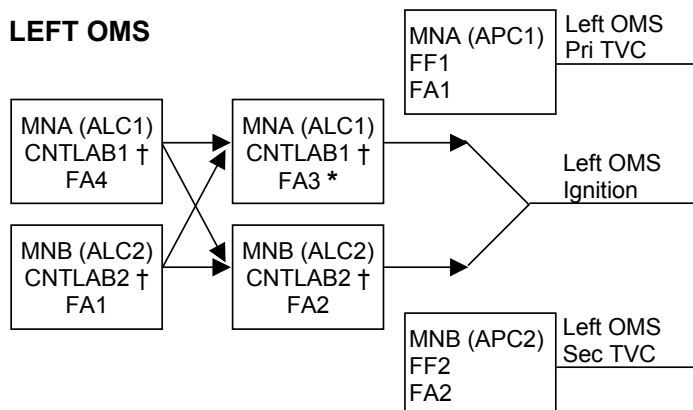
ASC/120/FIN



OMS
FAILURE

OMS FAILURES

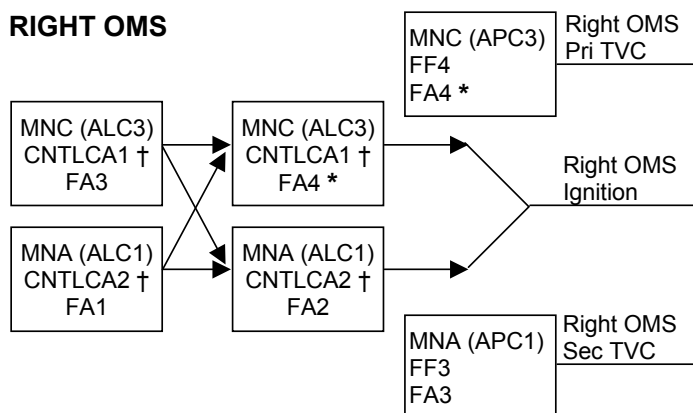
LEFT OMS



† 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/ Δ V/BURN TIME

OMS% GAGE	OMS He Press	OMS Δ V	RCS Δ V	RCS BURN MIN:SEC
95.6	4650	475	393	14:39
95	4630	472	390	14:34
90	4430	447	369	13:45
85	4230	421	348	12:57
80	4030	395	327	12:09
75	3830	370	306	11:21
70	3630	344	285	10:33
65	3430	318	263	09:45
60	3230	292	242	08:57
55	3030	266	221	08:09
50	2830	240	199	07:21
45	2630	214	178	06:32
40	2430	188	156	05:44
35	2230	161	135	04:56
30	2030	135	113	04:08
25	1830	109	91	03:20
20	1630	82	69	02:32
15	1430	56	47	01:43
10	1230	29	25	00:54
5	1030	2	2	00:04

OMS/
RCS Δ V

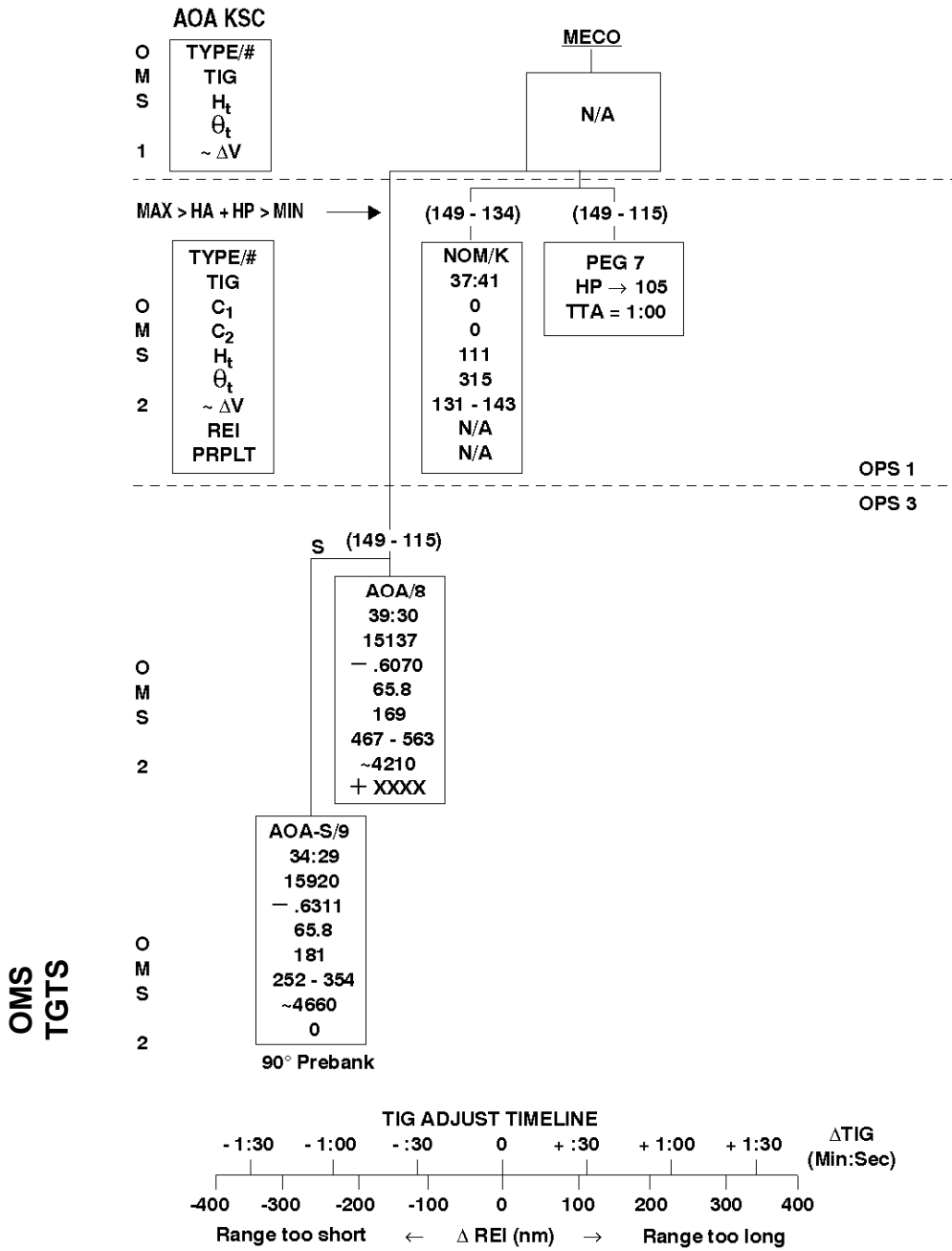
OMS-2/AOA Δ V	
ARCS ΔV fps =	
$\boxed{0.7} \times [L\% + R\% - \text{AFT QTY } 1]$	
FRCS ΔV fps =	
$\boxed{0.8} \times \text{FRCS } \%$	
OMS ΔV fps =	
$\boxed{5.1} \times \text{OMS } \%$	

NOTE: Uses assumed vehicle weight of $\boxed{256,393}$ lb

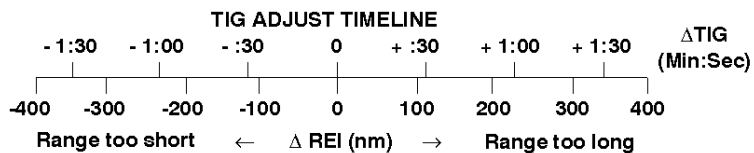
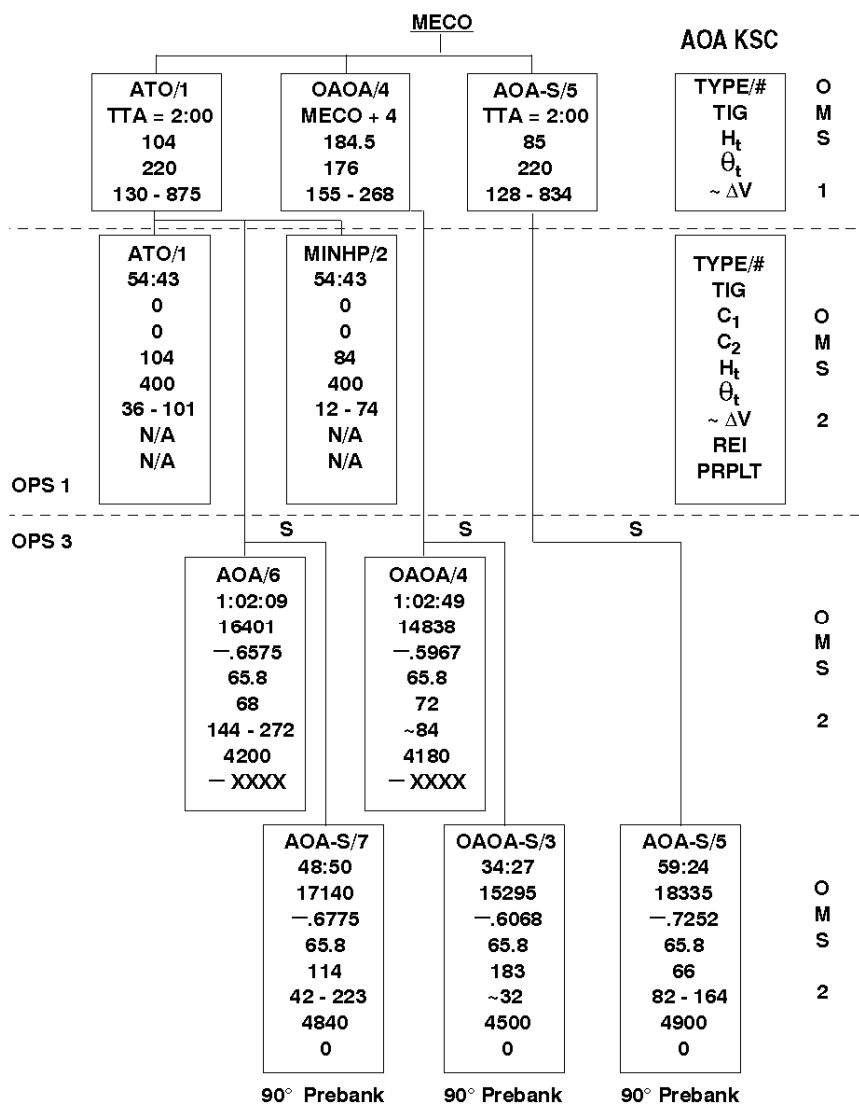
OMS TARGETS, COMM COVERAGE, LAND SITES

**OMS
TGTS**

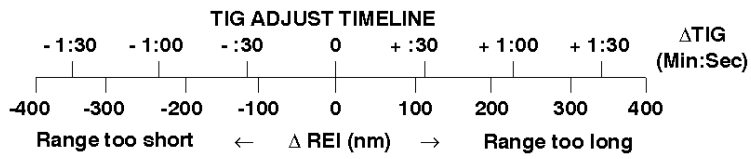
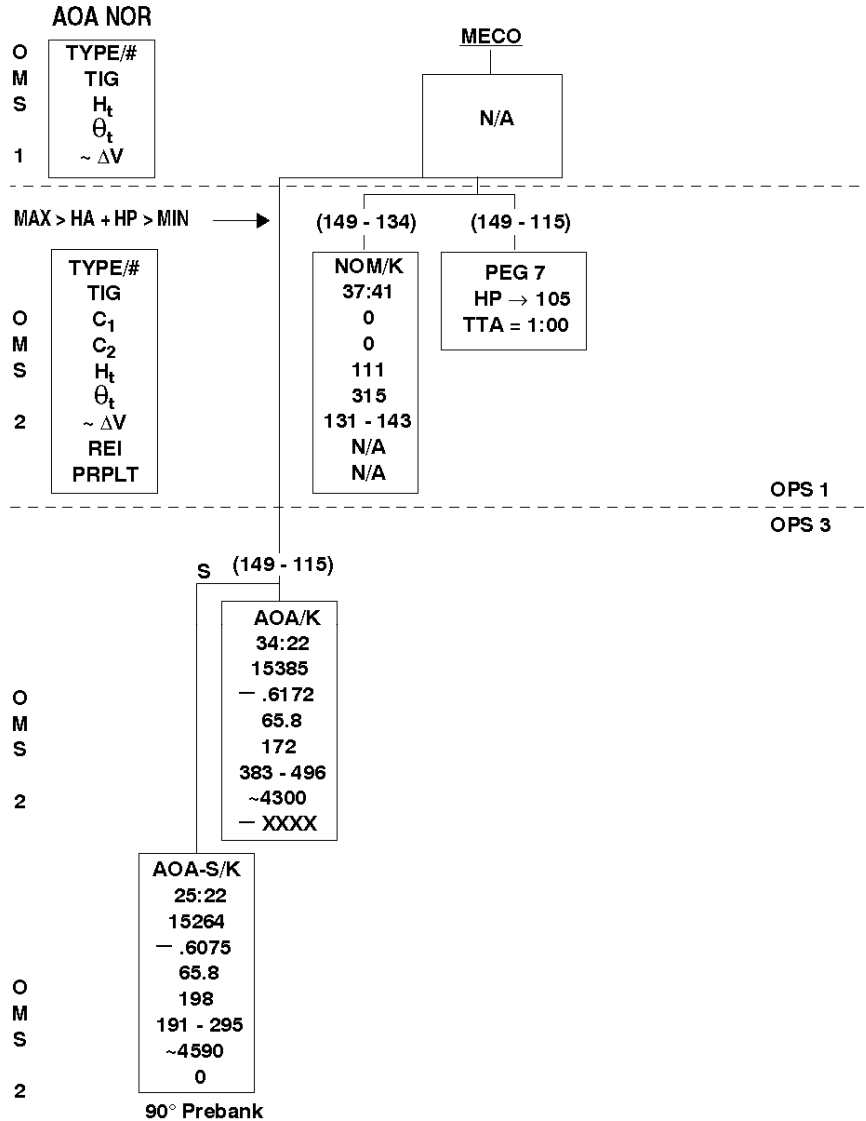
STS-120 OCFR1 CY OMS TARGETS - DIRECT INSERTION



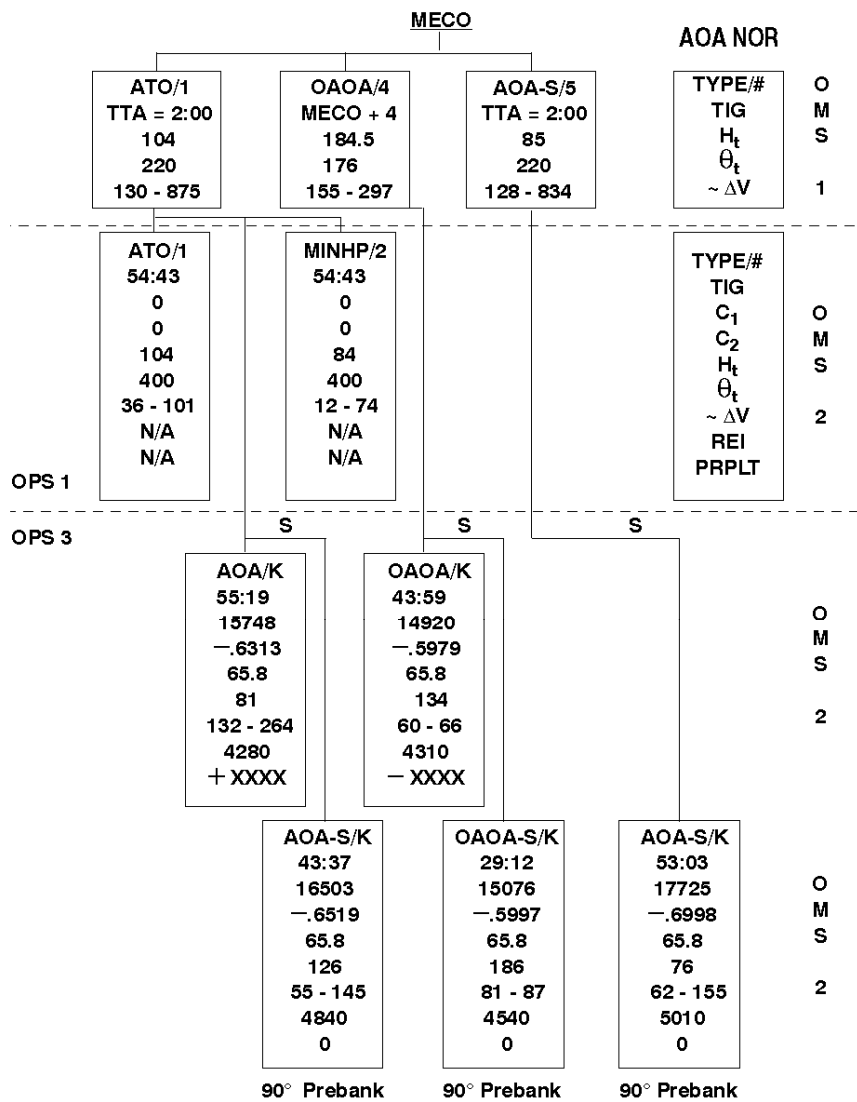
STS-120 OCFR1 CY OMS TARGETS - W/OMS 1



STS-120 OCFR1 CY **OMS TARGETS - DIRECT INSERTION**

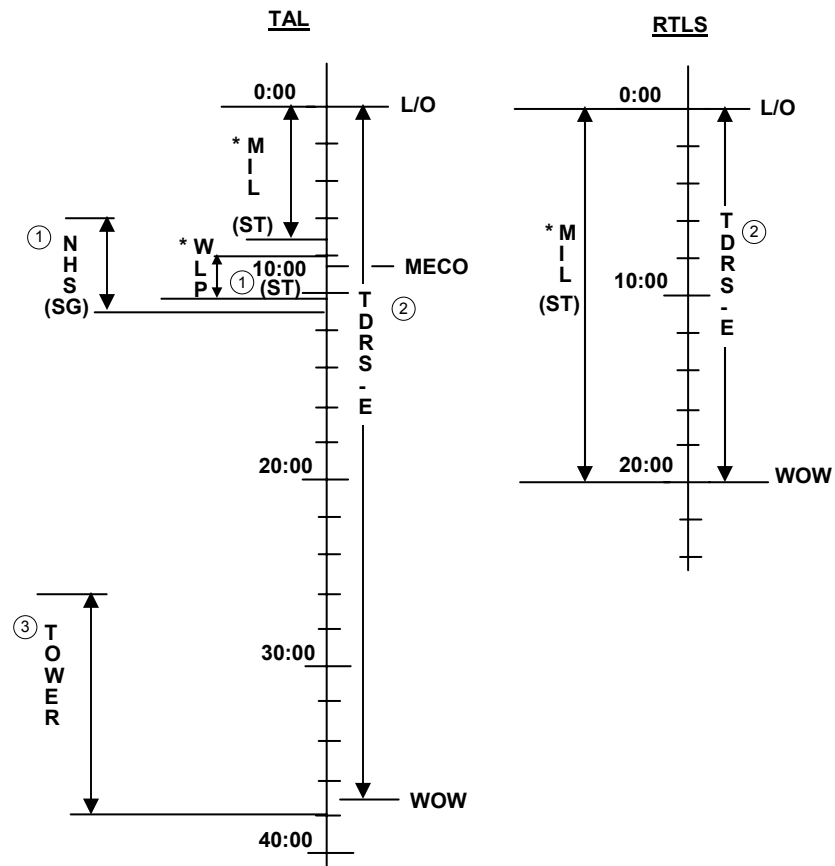


STS-120 OCFR1 CY OMS TARGETS - W/OMS 1



COMM
COVER

COMMUNICATION COVERAGE – (TAL/RTLS)



MODE

ST – STDN
SG – SGLS

*UHF available

NOTE: ① NHS/WLP coverage only on high inclinations

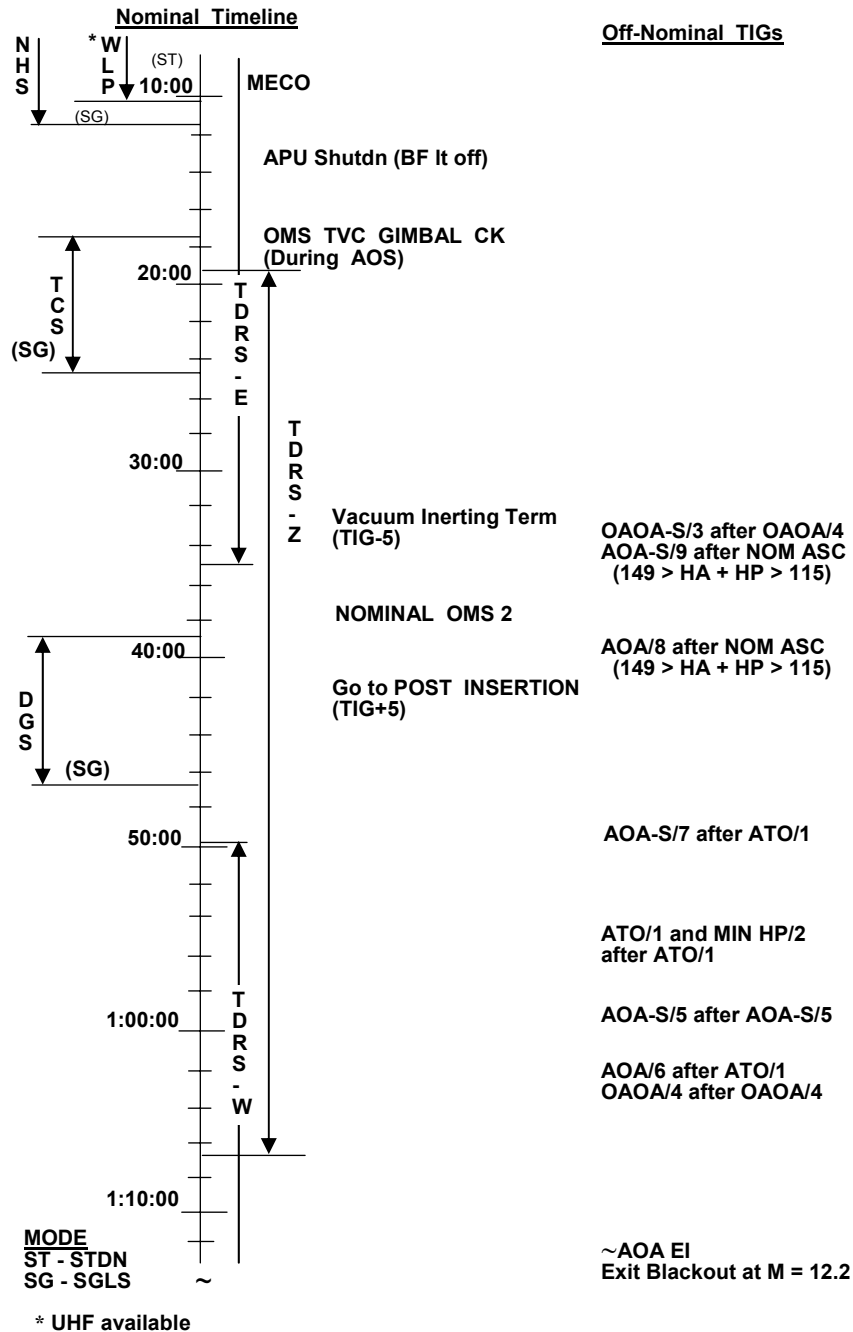
② ET blocks coverage until vehicle upright

③ Tower UHF installed at all TAL sites

COMM
COVER

COMMUNICATION COVERAGE – (AOA to **KSC**)

LAND
SITE



STS-120 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	COF 97	8 6	15000 15000	1000 1000
2	BEN GUERIR	BEN 36 BEN 18	MAK 80 ■	CBA 116 ■	- -	13720 13220	0 1000
3	MORON AB	MRN 20 MRN 02	MRN 100	AOG 23	◆6 -	11730 11730	1000 1000
4	ZARAGOZA	ZZA 30L ZZA 12R	ZZA 64	ZAR 77 ■	◆6 -	12200 12200	1000 1010
5	MYRTLE BEACH	MYR 36 MYR 18	ILM 117	FLO 99	- -	9500 9500	1000 1000
6	WILMINGTON	ILM 06 ILM 24	ILM 117	DIW 107 ■	- -	7500 7500	0 0
7	CHERRY POINT	NKT 32L NKT 23R	EWN 83 ■	NCA 101	- -	7110 7100	800 880
8	OCEANA NAS	NTU 32R NTU 23L	NGU 48	ORF 116	- -	7500 11500	0 0
9	WALLOPS	WAL 28 WAL 04	SBY 49	SWL 71	- -	7510 8750	0 0
10	DOVER AFB	DOV 32 DOV 19	SIE 95	CYN 81	- -	12400 9100	0 0
11	ATLANTIC CITY	ACY 31 ACY 13	CYN 81	SIE 95	- -	9500 9500	0 0
12	BEN GUERIR	BEN 36 BEN 18	MAK 80 ■	CBA 116 ■	- -	13720 13220	0 1000
13	*MORON AB	MRN 20 MRN 02	MRN 100	AOG 23	◆6 -	11730 11730	1000 1000
14	*ZARAGOZA	ZZA 30L ZZA 12R	ZZA 64	ZAR 77 ■	◆6 -	12200 12200	1000 1010
15	GABRESKI	FOK 06 FOK 24	HTO 83	GON45Y ■	- -	8500 8500	1000 1000

◆ Available for TAL Only

* LO XRNG TAL Site

■ DME

Length after displaced threshold

STS-120 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 FMH 23	BOS 74	PVD 103	- -	9000 7500	0 0
17	PEASE INT'L	PSM 34 PSM 16	ENE 118	BOS 74	- -	10020 10020	0 0
18	HALIFAX INT'L	YHZ 23 YHZ 32	UAW 38	YHZ 98 ■	- -	8800 7700	0 0
19	STEPHENVILLE	YJT 09 YJT 27	YJT 78	YDF 80 ■	- -	9500 9500	0 0
20	ST JOHNS INT'L	YYT 29 YYT 11	UYT 23	YYT 82 ■	- -	8500 8500	0 0
21	GANDER INT'L	YQX 21 YQX 31	YQX 74	IQX 32 ■	- -	9700 8900	0 0
22	GOOSE BAY	YYR 26 YYR 34	UYR 40	YYR 120 ■	- -	10550 9080	0 0
23	LAJES	LAJ 15 LAJ 33	TRM 109	LAJ 45	- -	10870 10870	970 990
24	BEJA	BEJ 01L BEJ 19R	MOJ 37	BEJ 105	- -	10820 10820	0 900
25	KEFLAVIK	IKF 20 IKF 29	KEF 57	HL 44 ■	- -	9520 9560	0 0
26	SHANNON	INN 06 INN 24	SHA 80 ■	CRN 37 ■	- -	9540 9540	0 0
27	FAIRFORD	FFA 27 FFA 09	FFA 81	BZN 56	- -	9490 9490	990 970
28	KOLN-BONN	KBO 14L KBO 32R	GIX 18	DOR 23Y ■	- -	12020 12020	0 0
29	ISTRES AB	FMI 33 FMI 15	◆FMI 16	NIM 53	◆6 -	11300 12300	3960 0
30	ESENBOGA	ESN 03R ESN 21L	BAG 78 ■	BUK 90 ■	- -	11800 11800	0 0

◆ Available for TAL Only

■ DME

Length after displaced threshold

STS-120 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 13 HAW 31	ASI 59	ASI 59	- -	9520 9520	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/120/FIN



**WEATHER
PADS**

**WEATHER
PADS**

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CONUS TERMINAL FORECASTS RTLS - ORB

↓ RTLS ACL pg 1-10

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

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

FIRST DAY PLS

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

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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SWITCH LIST FOR HANDOVER INGRESS

FWD		MIDDECK		AFT	
L5.....	9-3	ML86B.....	9-11	R12L.....	9-18
L side OVHD		ML85E.....	9-13	R11U.....	9-18
Flood.....	9-3	SORG.....	9-13	R11L.....	9-18
L4.....	9-3	MO13Q.....	9-13	R10.....	9-18
L1.....	9-3	ML31C.....	9-13	R13U.....	9-18
L2.....	9-3	ML26C.....	9-13	R13L.....	9-19
S1.....	9-4	ML18F.....	9-13		
		ML30N.....	9-13	A1U.....	9-19
F1.....	9-4	MA73C.....	9-13	A1L.....	9-19
F2.....	9-4	MO10W.....	9-14	A1R.....	9-20
F6U(HUD).....	9-4	WCS.....	9-14	AFT MDU.....	9-20
F3.....	9-4	MO30F.....	9-14	A6U.....	9-20
F8U(HUD).....	9-4	MO32M.....	9-14	A6L.....	9-20
F4.....	9-4	MO39M.....	9-14	A2.....	9-21
F6.....	9-4	MO42F.....	9-14	A7U.....	9-21
F7.....	9-5	MO51F.....	9-15	A7L.....	9-21
F8.....	9-5	MO58F.....	9-15	A4.....	9-21
F9.....	9-5	MO52J.....	9-15	A8U.....	9-22
		MO69M.....	9-15	A8L.....	9-22
R1.....	9-5	MD44F.....	9-15	A3.....	9-22
R2.....	9-5	MIDDECK FLOOR...	9-15		
R4.....	9-6	MO63P.....	9-15		
R6.....	9-6			L9.....	9-23
R side OVHD		MIDDECK EXPERIMENTS		L10L.....	9-23
Flood.....	9-6			L10U.....	9-24
		MIDDECK (NONE) ..	9-16	L11U.....	9-24
C2.....	9-6			L12UL.....	9-24
C3.....	9-6	AIRLOCK		L12UR.....	9-24
C5.....	9-7			L12LL.....	9-24
S2.....	9-7	AW18A.....	9-17	L12LR.....	9-24
C6.....	9-7	AW18D.....	9-17	L12L.....	9-24
C7.....	9-7	AW18H.....	9-17	R12.....	9-24
		AW82B.....	9-17		
O1.....	9-7	AW82D.....	9-17	A15.....	9-25
O2.....	9-7	AW82H.....	9-17	A14.....	9-25
O3.....	9-7	TW58T.....	9-17	A13.....	9-25
O5.....	9-7	A/L IN HATCH.....	9-17	A12.....	9-25
O6.....	9-7	A/L OUT HATCH....	9-17	A11.....	9-26
O7.....	9-8	SH HATCH.....	9-17		
O8.....	9-8	EXT A/L UPPER		R14.....	9-26
O9.....	9-8	HATCH.....	9-17		
O13.....	9-9	TNL ADP HATCH....	9-17	HARDWARE	
O14.....	9-9			C/W.....	9-27
O15.....	9-9			MEDS CONFIG	
O16.....	9-9			FOR INGRESS	9-28
O17.....	9-10				
O19.....	9-10				

SW LIST

NOT FLOWN

9-1

ASC/120/FIN

NOTES

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

L2: O2 EMER – CL
 R11L: SPLY H2O DUMP ISOL VLV – CL
 VLV – CL
 GALLEY SPLY VLV – CL

R13L: MMU GN2 SPLY ISOL VLV A – CL
 B – CL

A6L: VEST DEP VLV SYS 1 VENT ISOL – CL
 VENT – CL
 2 VENT ISOL – CL
 VENT – CL

ML31C: WASTE H2O DUMP ISOL VLV – CL
 VLV – CL
 VAC VENT ISOL VLV CNTL – CL

- Before turning OI PCMMU PWR switch on C3, indicated by ***, to OFF, notify LCC so gnd power can be connected; also notify LCC before turning it to 1 after crew ingress
- All unspecified/unlabeled switches – dn (2 position)/ctr (3 position), tb – bp, cb – op, rotaries – full counter clockwise
- PL RETEN PL SEL switch on panel A6U will nominally be 1 for deployable payload missions using only a single PL SEL position but will be MON until PRE-INGRESS SW CONFIG. All other missions will be in MON (Flt Rule A10-281)
- Circuit Breaker snapping color codes:
 { R } – Red – open all times
 { G } – Green – open on orbit only
 { Y } – Yellow – open ascent, closed per procedure
 { O } – Orange – open orbit thru entry
 { } – Blank (no ring) – always closed or as required
- STS-120 options affecting switch list:
 - 1) OV103
 - 2) GMTLO
 - 3) Orbit incln = 51.6°
 - 4) Payload: ISS-NODE 2, PDGF, SASA
 - 5) Crew size of 7 up, 7 down
 - 6) Installed: TK CRYO sets (5), SORG, Ku Ant, GN2 (5), External Airlock (ISS), RMS, OBSS, OIU, VPU, WVS, DTV, ODS
 - 7) Options N/R: RCRS
- Changes are with respect to STS-117 Switch List as published in FIN 1

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

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

NOT FLOWN

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

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

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

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

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

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

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

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

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

F6 BFC – right
 HUD DATA BUS – 1
 MDU PWR (two) – ON
 BRT sel (two) – as reqd
 LDG GEAR pb (two) – lt off
 tb (three) – UP
 HSI SEL MODE – ENTRY
 SOURCE (two) – NAV, 1
 RDR ALTM – 1
 FLT CNTLR PWR – ON
 ADI ATT – REF
 ERR – MED
 RATE – MED

NOT FLOWN

9-4

ASC/120/FIN

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

F6	ABORT MODE	- OFF	
	pb	- lt off	
	RCS CMD lts (three)	- off	
	RANGE SAFE ARM lt	- off	
	AIR DATA	- NAV	
F7	MDU PWR (five)	- ON	
	BRT sel (five)	- as reqd	
	MN ENG STAT lts (six)	- off	
	SM ALERT lt	- off	
	C/W matrix lts - off	all off except HYD PRESS	
F8	HUD DATA BUS	- 4	
	MDU PWR (two)	- ON	
	BRT sel (two)	- as reqd	
	LDG GEAR pb (two)	- lt off	
	tb (three)	- UP	
	HSI SEL MODE	- ENTRY	
	SOURCE (two)	- NAV,2	
	FLT CNTLR PWR	- ON	
	RAD ALTM	- 2	
	ADI ATT	- REF	
	ERR	- MED	
	RATE	- MED	
	AIR DATA	- NAV	
F9	AC Volts sel	- as reqd	
	DC Volt/Amp sel	- VOLTS MNB	
R1	CNTL BUS PWR (three)	- dn	
	ESS BUS SOURCE MN (three)	- ON	
	FC (three)	- ON OFF	
	FC/MN BUS (three)	- ctr (tb-ON)	
	MN BUS TIE (three)	- ctr (tb-OFF)	
	PL CAB	- OFF	
	PRI MNC	- ctr (tb-OFF)	
R1	PL PRI MNB,FC3 (two)	- ctr (tb-OFF)	
	AUX	- OFF	
	AFT MNB	- OFF	
	MNC	- OFF	
	INV PWR (three)	- ctr (tb-ON)	
	INV/AC BUS (three)	- ctr (tb-ON)	
	cb AC CONTR (nine)	- op { }	
	AC BUS SNSR (three)	- MON	
R1	(CRYO)		
	O2 MANF VLV (two)	- ctr (tb-OP)	
	TK1,2 HTRS A (two)	- AUTO	
	B (two)	- OFF	
	RESET/TEST (two)	- ctr	
	TK3 HTRS (two)	- OFF	
	RESET/TEST	- ctr	
	FC REAC (three)	- ctr	
	tb (six)	- OP	
	(three)	- ctr	
	RDY tb (three)	- gray	
	COOL PUMP ΔP tb (three)	- gray	
	H2 MANF VLV (two)	- ctr (tb-OP)	
	TK1,2 HTRS A (two)	- AUTO	
	B (two)	- OFF	
	TK3 HTRS (two)	- OFF	
R2	MPS PRPLT DUMP (two)	- GPC	
	ENG PWR (six)	- ON	
	He ISOL (six)	- OP GPC	
	PNEU L ENG He XOVR	- GPC	
	He ISOL	- OP GPC	
	LH2 ULL PRESS	- AUTO	
	He l'CNCT (three)	- GPC	

NOT FLOWN

9-5

ASC/120/FIN

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

R2	APU/HYD RDY tb (three)	- bp	
	APU OPER (three)	- START/RUN	OFF
	SPEED SEL (three)	- NORM	
	HYD MN PUMP PRESS (three)	- NORM	
	cb APU FU TK VLV ENA (six)	- cl { }	op
	HYD CIRC PUMP (three)	- OFF	GPC
	APU CNTLR PWR (three)	- ON	OFF
	FUEL TK VLV (three)	- OP	CL
	AUTO SHUTDN (three)	- ENA	
	BLR CNTLR/HTR (three)	- A	
	PWR (three)	- ON	
	N2 SPLY (three)	- ON	OFF
	ET UMB DR MODE	- GPC	
	CTRLINE LAT	- GND (tb-bp)	
L,R DR (two)	- OFF (tb-OP)		
	LAT (two)	- OFF (tb-REL)	
R4	HYD BRAKE HTR (three)	- OFF	
	ISOL VLV (three)	- GPC (tb-CL)	
	MPS/TVC ISOL VLV (three)	- GPC (tb-OP)	
	LG/NWS HYD SYS	- AUTO 1/2	
	LG EXTEND ISOL VLV	- GPC (tb-CL)	
	MPS ENG CNTLR HTR (three)	- OFF	
	MANF PRESS (two)	- GPC	
	FILL/DRAIN (four)	- GND	
	H2 PRESS LINE VENT	- GND	
	LO2 PREVLV (three)	- GPC	
LH2 PREVLV (three)	- GPC		
	FDLN RLF ISOL (two)	- GPC	
R6	R COMM PWR - ON OFF		
R side OVHD Flood - BRT			

C2	IDP/CRT PWR (three)	- ON	
	MAJ FUNC (three)	- GNC	
	SEL (two)	- as reqd	
	EVENT TIMER MODE	- DN	
	CNTL	- ctr	
	TIMER SET pb (four)	- 0900	
	TIMER	- ctr	
C3	OMS ENG (two)	- ARM/PRESS	OFF
	BFC CRT DISP	- ON	OFF
	SEL	- 3+1	
	FCS CH (four)	- AUTO	
	BDY FLP	- AUTO/OFF	
	AIR DATA PROBE STO (two)	- INH	
	MN ENG LIMIT SHUTDN	- AUTO	
	TRIM R,P,Y (three)	- ctr	
	SBTC	- full forward	
	DAP	- all off	
	SRB SEP	- AUTO	
	ET SEP	- AUTO	
	AUD CTR	- 1	
	OI PCMMU PWR	- 1	OFF ***
	FORMAT	- GPC	
	S-BD PM CNTL	- CMD	
	ANT sel	- GPC	
	AIR DATA PROBE (two)	- STOW	
	FC REAC VLV (three)	- dn	
	cb FC REAC VLV CL ENA (three)	- op { R }	
	UPLK	- ENA	
	MSTR MADS PWR	- ON	
	C/W MEM	- ctr	
	MODE	- NORM	

NOT FLOWN

9-6

ASC/120/FIN

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

C3	RTG PUMP (OV103,4 – no SH)	– PRI
	SHORT ENA (two) (OV104 – no SH)	– DSBL
	SHORT (two) (OV104 – no SH)	– OFF
	PL SAFING (four) (OV103 – no SH)	– SAFE
	(five) (OV105 – no SH)	– SAFE
	SH FIRE SUPPR ARM (two) (SH only)	– SAFE
	DISCH (two) (SH only)	– NO-OP
	H2O LN HTRS (SH only)	– OFF
	EMER LTG	– OFF/ON
C5	DIRECT O2 vlv – CL	
S2	PL SEAT PWR BUS SEL – AC3 (dn)	
	CONTR (two) – ctr	
C6	LEH O2 vlv (four) – OP	
C7	LEH O2 SPLY vlv (two) – OP	
O1	COAS	– OFF
	AIR TEMP sel	– CAB HX OUT
	H2O PUMP OUT PRESS sel	– LOOP 2
	FREON sel	– LOOP 1
	O2/N2 FLOW sel	– SYS 1 O2
	PPO2 sel	– SNSR A
O2	CRYO O2 HTR ASSY TEMP sel	– TK1 1
	O2/H2 sel	– TK1
	FC STACK TEMP sel	– 1
O3	RCS/OMS PRESS sel	– RCS He X 10
	PRPLT QTY sel	– OMS FUEL
	MSN TIME	– MET

O5	L AUD TACAN ID (two) (OV103,4)	– OFF,1
	VOX SENS sel	– as reqd
	A/G (two)	– T/R
	A/A	– T/R
	ICOM (two)	– T/R
	PWR	– AUD/TONE
	CNTL sel	– NORM
	XMIT/ICOM MODE sel	– as reqd (PTT/VOX recommended)
	VOL pb (five)	– as reqd
	TACAN pb	– 5
	PAGE	– dn
O6	LTG PNL sel (two)	– OFF
		– (1/4 brt if night launch)
	INST L/CTR sel	– OFF
		– (1/4 brt if night launch)
	OVHD sel	– as reqd
		– (1/4 brt if night launch)
	L GLRSHLD FLOOD sel (two)	– VAR, as reqd
	L SEAT/CTR CNSL FLOOD sel (two)	– OFF,BRT
	S TRK DR CNTL (two)	– OFF
	POS tb (two)	– CL
	PWR (two)	– OFF
	UHF SPLX/EVA XMIT FREQ	– 259.7/414.2
	PWR AMP	– ON
	SPLX SQUELCH	– ON
	EVA STRING	– 1
	ENCRYPT	– ON
	MODE	– SPLX

NOT FLOWN

9-7

ASC/120/FIN

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

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

NOT FLOWN

9-8

ASC/120/FIN

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

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

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

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

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

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

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

NOT FLOWN

9-9

ASC/120/FIN

FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

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

NOT FLOWN

9-10

ASC/120/FIN

MIDDECK SWITCH LIST FOR HANDOVER INGRESS

ML86B:A cb MNA SPLY H2O TKA INLET - cl { } TKB OUTLET - cl { } WASTE H2O DUMP VLV/NOZ HTR - op {Y} H2O LINE HTR A - op {Y} MNB SPLY H2O TKB INLET - cl { } TKC OUTLET - cl { } DUMP ISOL - op {Y} B SPLY ISOL VLV - cl { } H2O LINE HTR B - op {Y} MNC SPLY H2O TKA OUTLET - cl { } TKC INLET - cl { } DUMP VLV/NOZ HTR - op {Y} XOVR VLV - cl { } GALLEY SPLY - op {Y} :B cb MNA WASTE H2O TK1 VLV - cl { } SPLY H2O TKD OUTLET - cl { } WASTE H2O DUMP ISOL - op {Y} VAC VENT ISOL VLV - op {Y} WCS CNTLR - op {Y} GALLEY OVEN - op {Y} MNB WASTE H2O TK1 DRAIN - cl { } SPLY H2O TKD INLET - cl { } VAC VENT NOZ HTR - op {Y} ISOL VLV - op {Y} WCS CNTLR - op {Y} GALLEY H2O HTR - op {Y} :C cb MNA EXT ARLK HTR LINE ZN1 - op {Y} ZN2 - op {Y} STRUC - op {Y}	ML86B:C cb MNA EXT ARLK HTR VEST - op {Y} MNB EXT ARLK HTR LINE ZN1 - op {Y} ZN2 - op {Y} H2O S/O VLV - cl { } STRUC - op {Y} VEST - op {Y} MNC EXT ARLK HTR LINE ZN1 - op {Y} ZN2 - op {Y} :D cb MNA PYRO JETT SYS A KU ANT - op {R} STBD RMS - op {R} MMU GN2 SPLY ISOL VLV A - op {Y} PORT HTR A - op {R} STBD HTR A - op {R} MNB PYRO JETT SYS A PORT RMS - op {R} MMU GN2 SPLY ISOL VLV B - op {R} PORT HTR B - op {R} STBD HTR B - op {R} MNC PYRO JETT SYS B KU ANT - op {R} PORT RMS - op {R} STBD RMS - op {R} :E cb MNA EMU 2 H2O SPLY - op {Y} WASTE - op {Y} FC PCM - cl { } CO2 SYS 1 CNTLR (OV104,5) - op {R} FLOOD TNL ADAPT 2 - op {R} - (op {Y} if SH flown)
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NOT FLOWN

9-11

ASC/120/FIN

INGRESS

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.F      cb MNA FLOODS MIDDECK 1/8 - cl { }
        WMC/MO13Q - op { Y }
        AIRLK 1 - op { Y }
        MIDDECK 9 - op { Y }
        CRYO O2 HTR TK3 SNSR 1 - cl { }
        TK5 SNSR 1 - cl { }
                        - (op { R } if
                        TK5 not flown)
MNB FLOODS MIDDECK 2/6 - cl { }
        BUNK 2/4 - op { Y }
        MIDDECK 10 - op { Y }
        AIRLK 3 - op { Y }
        CRYO O2 HTR TK3 SNSR 2 - cl { }
        TK4 SNSR 1 - cl { }
                        - (op { R } if
                        TK4 not flown)

```

2CA CRYO CNTLR TK5 (two) – cl { }
 – (op {R} if
 TK5 not flown)
 QTY TK5 (two) – cl { }
 – (op {R} if
 TK5 not flown)
 3AB CRYO CNTLR TK3 (two) – cl { }
 QTY TK3 (two) – cl { }

ASC/120/FIN

MIDDECK SWITCH LIST FOR HANDOVER INGRESS

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

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

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

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

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

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

ML18F EMER LTG – ON/OFF
 WMC FLOOD – OFF

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

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

NOT FLOWN

9-13

ASC/120/FIN

INGRESS

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

```

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

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

MO30F DC UTIL PWR MNC – OFF

MO32M LEH O2 5 vlv – CL (OP if seat 5 flown)
6 vlv – CL (OP if seat 6 flown)

MO39M MIDDECK COMM CCU PWR – ON ☐ OFF

MO42F MIDDECK SPKR AUD PWR – AUD/TONE

A/G (two)	- T/R
A/A	- T/R
ICOM (two)	- T/R
VOX SENS sel	- as reqd
MSTR SPKR VOL sel	- as reqd
PAGE	- dn
VOL pb (five)	- as reqd
XMIT/ICOM MODE sel	- as reqd
	(PTT/PTT recommended)
TONES	- ACCU/BYP
SPKR PWR	- OFF

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

NOT FLOWN

MIDDECK SWITCH LIST FOR HANDOVER INGRESS

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

MO58F TV PWR – OFF

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

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

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

MIDDECK FLOOR

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

MO63P (OV103,4 only)

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

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

NOT FLOWN

9-15

ASC/120/FIN

MIDDECK EXPERIMENTS SWITCH LIST FOR HANDOVER **INGRESS**

(NONE)

NOT FLOWN

9-16

ASC/120/FIN

AIRLOCK SWITCH LIST FOR HANDOVER INGRESS

AW18A LTG FLOOD 1,3,4 (three) – OFF
2 – ON/OFF

AW18D AIRLK AUD PWR – OFF
A/G 1 – T/R
A/G 2 – RCV
A/A – T/R
ICOM (two) – T/R
PAGE – dn
VOL pb (five) – as reqd
CNTL – NORM
VOX SENS sel – as reqd
MSTR VOL 1 sel – MAX
XMIT/ICOM MODE sel – PTT/VOX
MSTR VOL 2 sel – MAX

AW18H PWR/BATT CHGR EMU BUS SEL (two) – OFF
MODE (two) – OFF
INPUT – EMU 1

AW82B AIRLK DEPRESS vlv – CL
cap – installed
O2 vlv (two) – CL

AW82D EMU H2O (four) – ctr (tb-CL)
CCU PWR (two) – OFF

AW82H EMU H2O SPLY WASTE reg (two) – REGULATING

TW58T (NOTE: Panel deleted if SH not flown)
TNL LTG FLOOD 1 – ON/OFF
2,3,4 (three) – OFF
ADP PL ISOL VLV – CL
cap – installed

AIRLOCK INNER HATCH

Actuator Handle – LAT
Lock Lever – LOCK
Equal vlv (two) – NORM
cap (two) – installed

AIRLOCK OUTER HATCH (if SH – C HATCH)

Actuator Handle – LAT
Lock Lever – LOCK
Equal vlv (two) – OFF
cap (two) – installed

SH HATCH (D HATCH) (if SH flown)

Actuator Handle – LAT
Lock Lever – LOCK
Equal vlv (two) – OFF
cap (two) – installed

EXT AIRLOCK UPPER HATCH (if EXT A/L flown)

Actuator Handle – LAT
Lock Lever – LOCK
Equal vlv (two) – OFF
cap (two) – installed

TUNNEL ADAPTER HATCH (if flown)

Actuator Handle – LAT
Lock Lever – LOCK
Equal vlv (two) – OFF
cap (two) – installed

NOT FLOWN

9-17

ASC/120/FIN

AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

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

R11U	FC GPC PURGE SEQ	- dn (tb-bp)
	PURGE HTR	- GPC
	VLVS (three)	- GPC
	STARTUP HTR (three)	- ENA
	H2O LINE HTR	- A AUTO
	RELIEF HTR	- A AUTO
	MDU PWR	- ON
	BRT sel	- as reqd

R11L	IDP/CRT4 PWR	- ON
	MAJ FUNC	- SM
	ENCRYPTOR	- NORM
	MS AUD CNTL	- NORM
	SPLY H2O TKA INLET	- ctr (tb-OP)
	OUTLET	- ctr (tb-CL)
	TKB INLET	- ctr (tb-OP)
	OUTLET	- ctr (tb-OP)
	TKC INLET	- ctr (tb-OP)
	OUTLET	- ctr (tb-OP)
	DUMP ISOL VLV	- ctr (tb-bp)**
	VLV	- ctr (tb-bp)**
	ENA/NOZ HTR	- OFF
	XOVR VLV	- ctr (tb-CL)
	GALLEY SPLY VLV	- ctr (tb-bp)**
	B SPLY ISOL VLV	- ctr (tb-OP)

R10	MS AUD PWR	- AUD/TONE
	A/G (two)	- T/R
	A/A	- T/R
	ICOM (two)	- T/R
	VOX SENS sel	- as reqd
	PAGE	- dn
	VOL pb (five)	- as reqd
	XMIT/ICOM MODE sel	- as reqd (PTT/VOX recommended)
	LTG PNL sel	- OFF
	FLOOD sel (two)	- ON,BRT
		- (OFF,BRT if night launch)
	BIOMED CH 1 sel	- MIDDECK CTR
	2 sel	- MIDDECK R

R13U	C/W TONE VOL (two)	- as is
	PARAM STATUS	- ctr
	MEM	- ctr
	LAMP TEST	- ctr
	PARAM SEL pb (three)	- 120
	LIMIT SET VALUE pb (three)	- 000
	LIMIT	- LOWER
	FUNC	- ctr
	PARAM	- ctr

NOT FLOWN

9-18

ASC/120/FIN

AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

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

NOT FLOWN

9-19

ASC/120/FIN

INGRESS

A1R	S-BD FM CNTL	– CMD
	ANT	– GPC
	PWR	– 1
	DATA SOURCE sel	– ME
	AUD CTR VOICE RCD SEL CH 1 sel	– ICOM A
		2 sel – ICOM B
	DOCK RING (seven)	– OFF
	SL (seven)	– OFF
	UHF A/G (two)	– OFF
	A/A	– OFF
	PL BAY OUTLETS ICOM (two)	– OFF

AFT MDU MDU PWR – OFF
BRT sel – as reqd

A6U	DAP – all off	
	SENSE: -Z	
	FLT CNTLR PWR	– OFF
	Unused rotary sw	– full ccw
	ADI ATT	– INRTL
	ERR	– MED
	RATE	– MED
	OS LTG FLOOD sel (two)	– ON,BRT
	PNL sel	– OFF
	INST sel	– OFF
	NUMERIC sel	– OFF
	ANNUN BUS SEL	– OFF
	LAMP TEST	– ctr
	INTEN sel (two)	– VAR,MED
	EVENT TIMER SET pb (four)	– as reqd
	MODE	– UP
	CNTL	– ctr
	TIMER	– ctr

A6U	PL RETEN	LOGIC PWR (two)	– OFF
		PL SEL	– MON
		LAT (five)	– tb-bp
		RDY tb (five)	– bp

```

A6L      (DSP)
         cb ESS SYS PWR CNTL (two) - op { Y }
           DEP (four)                - op { Y }
           DOCK LT (four)             - op { Y }
           MN LOG (six)               - op { Y }
           PMA 2/3 GRP 1 HOOKS SYS A (two) - op { R }
                                     B (two) - op { R }
                                     2 HOOKS SYS A (two) - op { R }
                                     B (two) - op { R }

```

SYS PWR (two) – ctr (tb-OFF)
PMA 2/3 HOOKS (two) – ctr (tb-bp)
PYRO PWR (two) – OFF
PSU PWR (two) – OFF
VEST DEP VLV (four) – ctr (tb-bp)**
LTS (four) – OFF

A6L	cb MADS PWR MNB	- cl { }
	MADS RCDR PWR	- PCM/WB ENA
	PB FWD	- CMD
	STRAIN GAGE	- PCM ENA
	WB/ACIP PCM	- CMD
	PCM	- CMD
	RCD MODE	- SAMPLE
	FDM CNTL	- DATA
	MAN CALBR sel	- DC 0
	ACIP HTR	- OFF

AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

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

NOT FLOWN

9-21

ASC/120/FIN

AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

A8U	(This panel may be replaced or deleted if RMS not flown)	A8L	(This panel may be deleted if RMS not flown)
	RMS Mode Its (twelve) – off		STBD RMS – OFF (tb-STO)
	BRAKES – ON (tb-OFF)		– (OFF (tb-bp) if NO MPMs present)
	SAFING – AUTO (tb-bp)		RETEN LAT – OFF (tb-LAT)
	MODE sel – TEST		– (OFF (tb-bp) if no MPMs present)
	AUTO SEQ – ctr		HTR (two) – OFF
	Its (two) – off		R-F-L tb (three) – gray
	S/W STOP tb – gray		– (bp if no RMS flown)
	C/W TONE VOL – as reqd		RMS SEL – OFF
	Its (eleven) – off		PWR – OFF
	MSTR ALARM pb – lt off		PORT RMS – OFF (tb-STO)
	RATE MIN tb – OFF		– (OFF (tb-bp) if no MPMs present)
	HOLD tb – OFF		RETEN LAT – OFF (tb-LAT)
	SCALE tb – gray		– (OFF (tb-bp) if no MRLs present)
	EE MODE – OFF		HTR (two) – OFF
	MAN CONTR – ctr		R-F-L tb (three) – gray
	tb (six) – bp		– (bp if no RMS flown)
	B/U JOINT sel – SY		RMS RHC RATE – VERN
	PL REL – OFF		
	DIRECT DR – ctr		
	PARAM sel – PORT TEMP		
	LTG ANNUN/NUM sel (two) – VAR,LO		
	PNL/INST sel – OFF		
	JOINT sel – CRIT TEMP		
	SINGLE/DIRECT DR – ctr		
	SHDLR BRACE REL – ctr (tb-bp)		
-----		A3	MON CONTRAST (two) – ctr
			BRT (two) – ctr
			COLOR (two) – as reqd
			TINT (two) – as reqd
			FUNCTION (two) – ctr
			PWR (two) – OFF

NOT FLOWN

9-22

ASC/120/FIN

INGRESS

PS FLOOD sel (two) – ON,BRT
– (OFF,BRT if night launch)

AUD PWR	– AUD/TONE
A/G (two)	– T/R
A/A	– T/R
ICOM (two)	– T/R
VOX SENS sel	– as reqd
PAGE	– dn
VOL pb (five)	– as reqd
XMIT/ICOM MODE sel	– as reqd (PT)

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

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

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

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

NOT FLOWN

9-23

ASC/120/FIN

AFT FLIGHT DECK PAYLOADS SWITCH LIST FOR HANDOVER INGRESS

L10U	(AVIU) SYNC/VIDEO – VIDEO HI-Z/75 – HI-Z PWR SEL – HI		L12LR	SSP-2 (PDIP 2 PWR) cb PDIP 2 PWR 1 – op	
L11U	(PDIP 2) T-0/OIU/OIU – OIU (ctr) DC PWR 1 CABIN P/L – OFF 2 CABIN P/L – OFF		L12L	(PDIP 1) Ku BAND RATE – OFF DC PWR 1 CABIN P/L – OFF 2 CABIN P/L – OFF	
L12UL	SSP-1 (PDIP 1 PWR) Verify all tbs bp cb SW PWR 1 – op PDIP 1 PWR 2/KuBAND RLY – op		R12	(VPU/OPP) VPU PWR – OFF	
L12UR	SSP-1 (TCS/OIU) Verify all tbs bp TCS PWR – OFF cb SW PWR 2 – op OIU PWR – OFF		R12	(OPP) cb OBSS SW PWR cb1 – op { Y } OBSS SW PWR – OFF	
L12LL	SSP-2 cb1 PDIP 2 PWR 2 – op C/L CAM PWR – OFF		R12	(OBSS) RSC PWR – OFF ITVC ENA – OFF SPEE PWR – OFF	

NOT FLOWN

9-24

ASC/120/FIN 1

INGRESS

• A

AIO

A12

CIRC PUMP PWR

A14

9-25

ASC/120/FIN

INGRESS

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A11      CRYO TK4 HTR (four)                - OFF
          O2 RESET/TEST - ctr
          MS COMM CCU PWR                    - ON  OFF
          DC UTIL PWR MNC                    - ON
          (OV105)
          PALLET HTRS C,D (two)               - OFF
          TK10 HTRS (four)                   - OFF
          O2 RESET/TEST - ctr
          TK11 HTRS (four)                   - OFF
          O2 RESET/TEST - ctr
          TK12 HTRS (four)                   - OFF
          O2 RESET/TEST - ctr
          TK13 HTRS (four)                   - OFF
          O2 RESET/TEST - ctr
          (OV104)
          CRYO TK SEL (eight) - ctr
          All cbs (104,5) - op { R }

```

```

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

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R14:C      cb MNA UHF EVA          - op {Y}
            MNB KU ELEC            - op {Y}
            ANT HTR                 - op {Y}
            CABLE HTR              - op {R}
            MNC KU SIG PROC        - op {Y}
            UHF EVA                 - op {Y}

:D          All cbs - op {Y} except:
            cb MNC TV CAB          - cl { }

:E          MNA D CAMR (three)     - op {Y}
            MNB RMS CAMR (three)  - op {Y}
            - (op {R} if no
            PORT RMS flown)

:F          ESS 1BC LDG GEAR ARM/DN RESET - op {R}

```

HARDWARE CAUTION & WARNING CONFIGURATION

UPPER LIMIT CHANGE

4	CABIN PRESS	3.85 V/15.36 psia (OV103)
		3.90 V/15.53 psia (OV104)
7	OMS TK P OX-L	3.85 V/15.42 psia (OV105)
		3.60 V/288 psi (OV103,5)
		3.70 V/296 psi (OV104)
17	OMS TK P FU-L	3.60 V/288 psi
37	OMS TK P OX-R	3.60 V/288 psi
39	MPS He Reg 1A P	4.00 V/816.3 psia (OV103)
		4.10 V/815.5 psia (OV104)
		4.10 V/807.0 psia (OV105)
47	OMS TK P FU-R	3.60 V/288 psi
49	MPS He Reg 2A P	4.00 V/810.6 psia (OV103)
55	CAB FAN ΔP	4.85 V/0.2" H2O (if SH flown)
59	MPS He Reg 3A P	3.90 V/806.5 psia (OV105)
65	PPO2 #1	2.30 V/2.7 psi (if SH flown)
74	CABIN FAN ΔP	4.25 V/6.80" H2O
75	PPCO2 #2	3.80 V/7.6 mmHg (if SH flown)
79	MANF P LH2	3.25 V/65 psi
85	ARS FAN ΔP	4.85 V/0.2" H2O (if SH flown)
95	CAB TOTAL PRESS	1.55 V/13.8 psi (if SH flown)
105	H2O LOOP 1 PUMP OUT P	2.85 V/85.5 psia (OV104)
107	FREON LOOP 1 EVAP OUT T	4.30 V/115.2 °F
117	FREON LOOP 2 EVAP OUT T	4.30 V/115.2 °F

LOWER LIMIT CHANGE

4	CABIN PRESS	3.45 V/13.76 psia (OV103)
		3.45 V/13.74 psia (OV104)
		3.40 V/13.62 psia (OV105)
39	MPS He Reg 1A P	3.30 V/676 psia (OV103)
		3.45 V/677.0 psia (OV105)
49	MPS He Reg 2A P	3.35 V/679.9 psia (OV103)
59	MPS He Reg 3A P	3.30 V/682.8 psia (OV105)
74	CABIN FAN ΔP	2.60 V/4.16" H2O
105	H2O LOOP 1 PUMP OUT P	0.85 V/25.5 psia (OV104)
106	FREON FLOW 1	0.80 V/1186 lb/hr
116	FREON FLOW 2	0.80 V/1186 lb/hr

INHIBIT

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

MEDS CONFIGURATION FOR INGRESS

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



CUE CARD CONFIG

CUE CARD
CONFIG



FAB USE ONLY

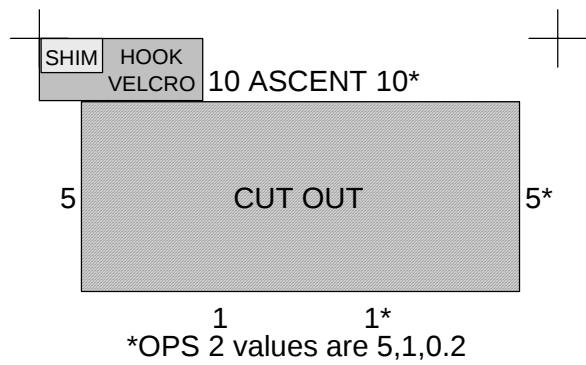
10-1

ASC/120/FIN



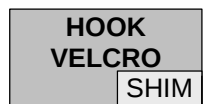
CUE CARD
CONFIG

TOP



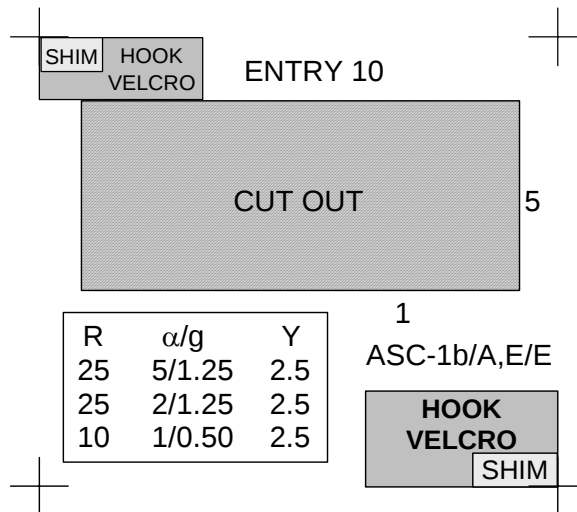
**ADI ERROR/RATE
SWITCH**

ASC-1a/A,E/G



TOP

BACK OF 'ADI ERROR/RATE SWITCH'



FAB USE ONLY

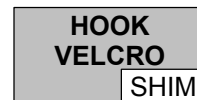
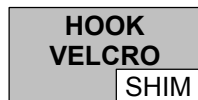
CC 10-2

ASC/120/FIN 1

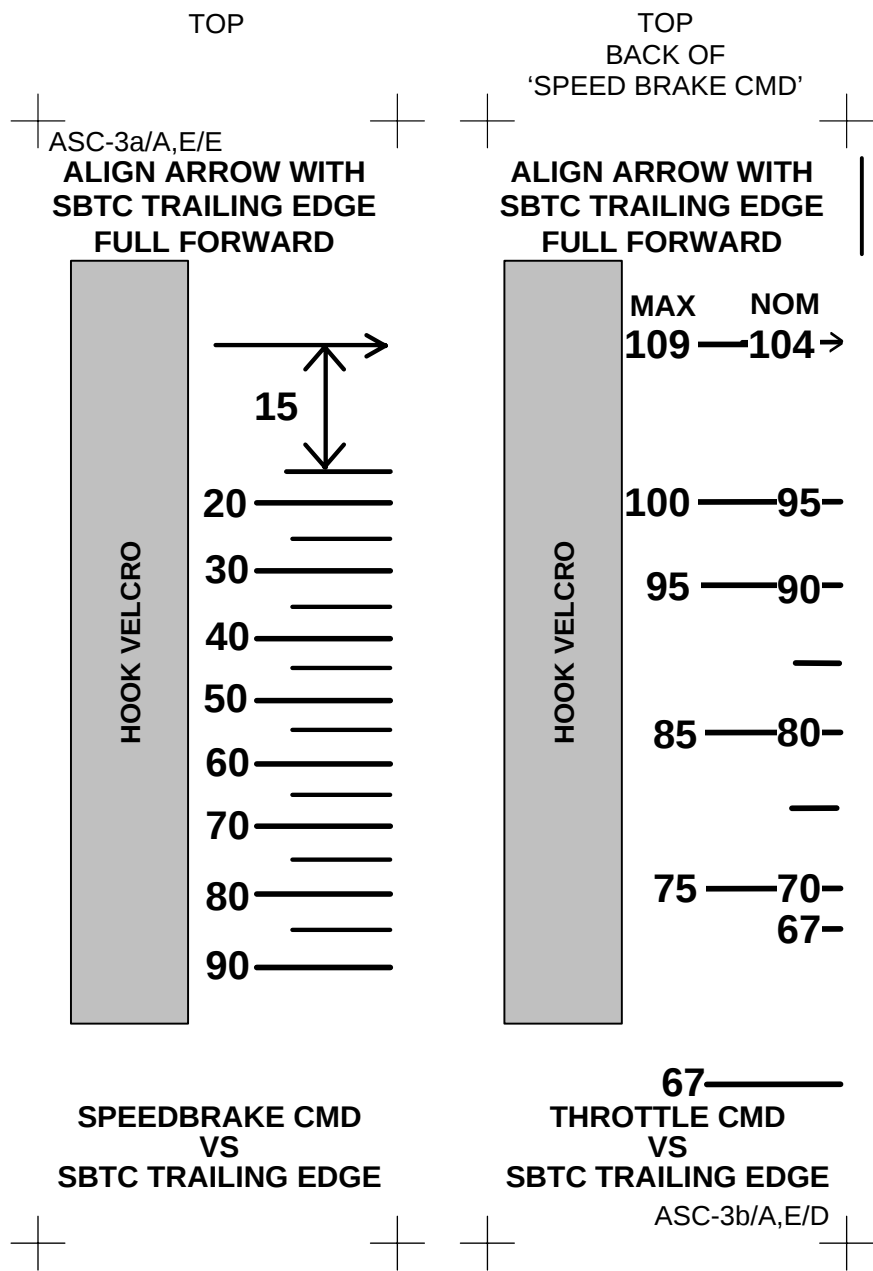
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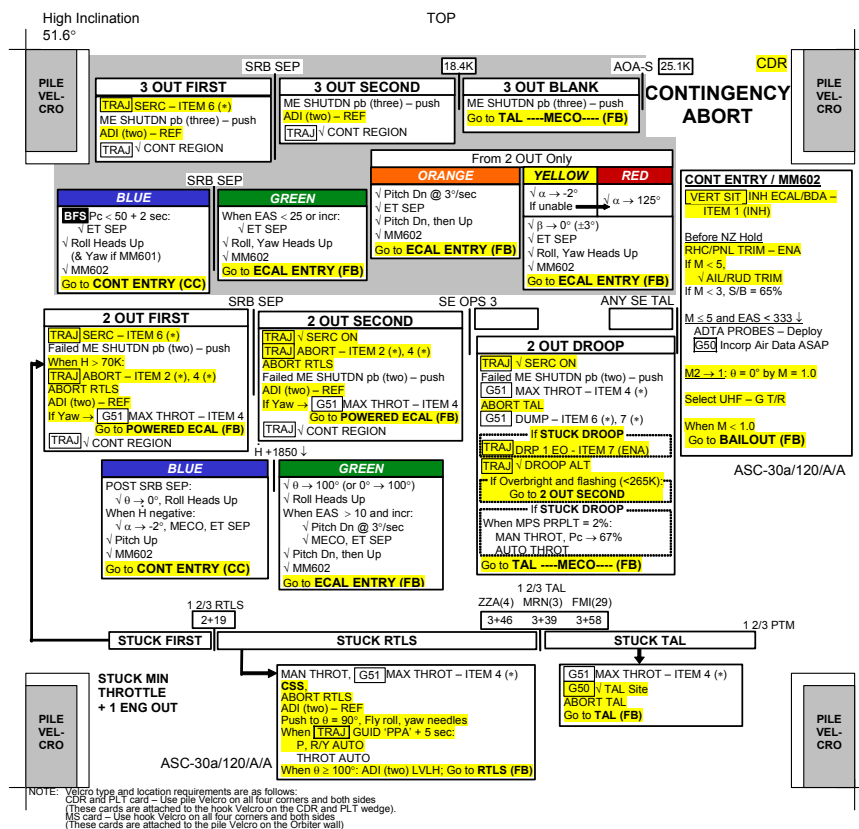
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GPC MEMORY	0	BFS MEMORY	0
IMU ALIGN (301)	21	<u>GNC</u>	
STRK/COAS CNTL (301)	22	HORIZ SIT	50
RCS (OPS 3)	23	OVERRIDE	51
HORIZ SIT	50	GPS STATUS	55
OVERRIDE	51	<u>SM</u>	
ENT CONTROL (OPS 3)	53	PL BAY DOORS	63
GPS STATUS	55		

TOP
BACK OF 'ASCENT/ENTRY SPEC'



ASC-2b/A,E/D

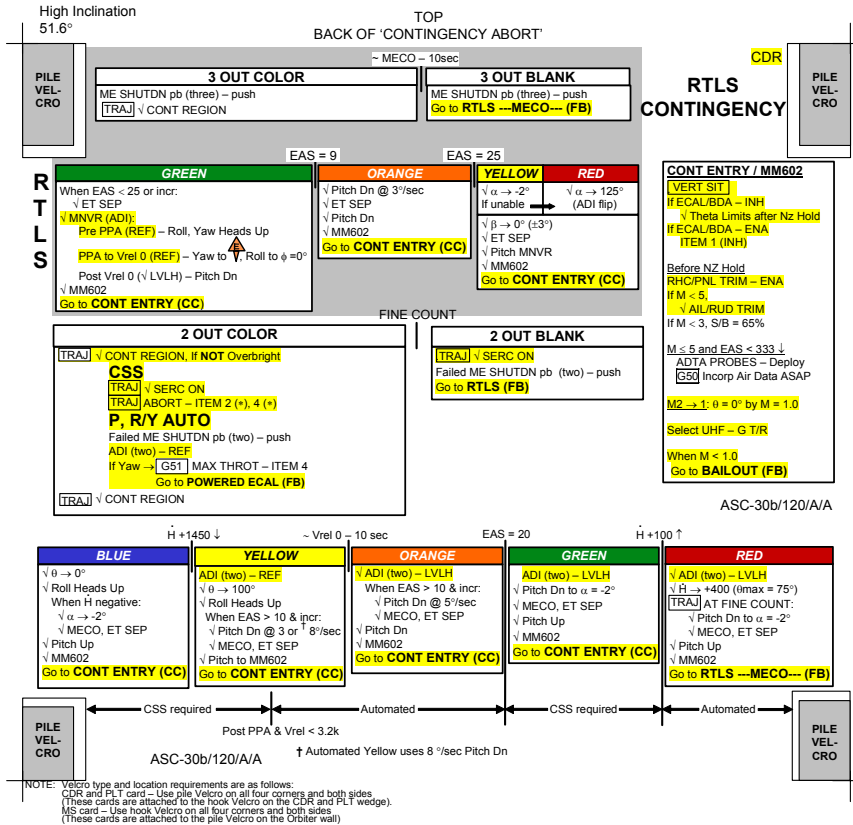




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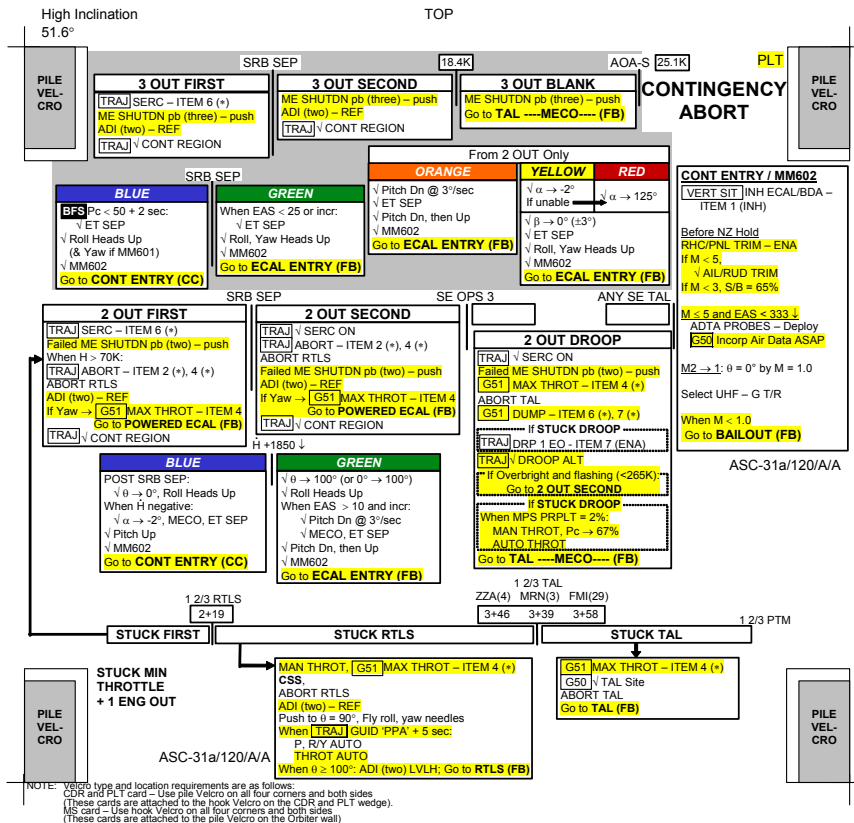
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ASC/120/FIN



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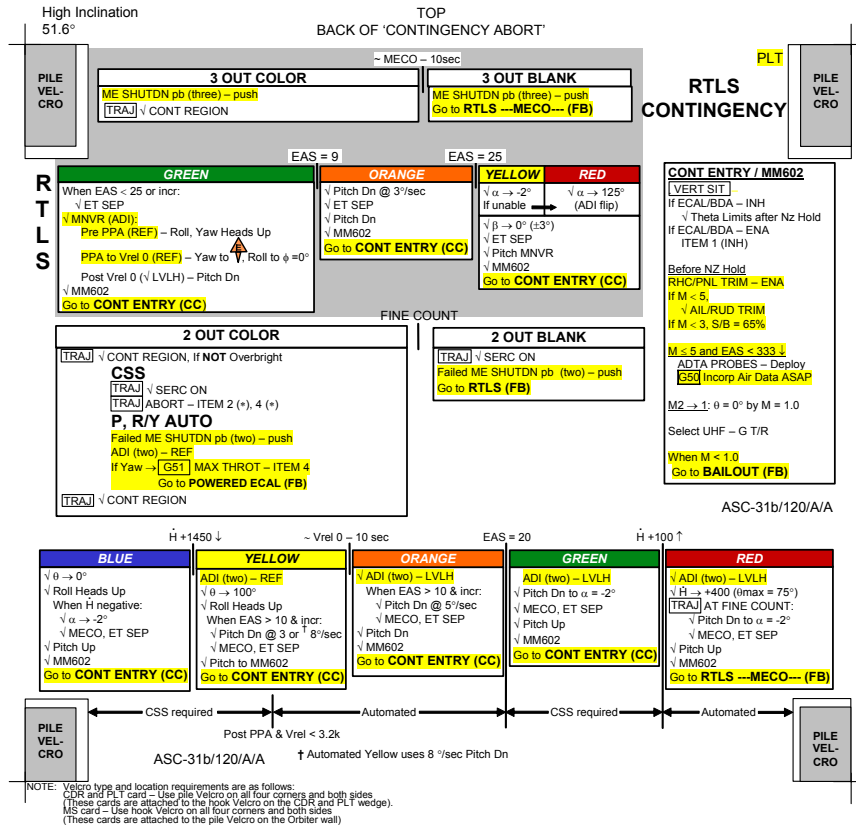
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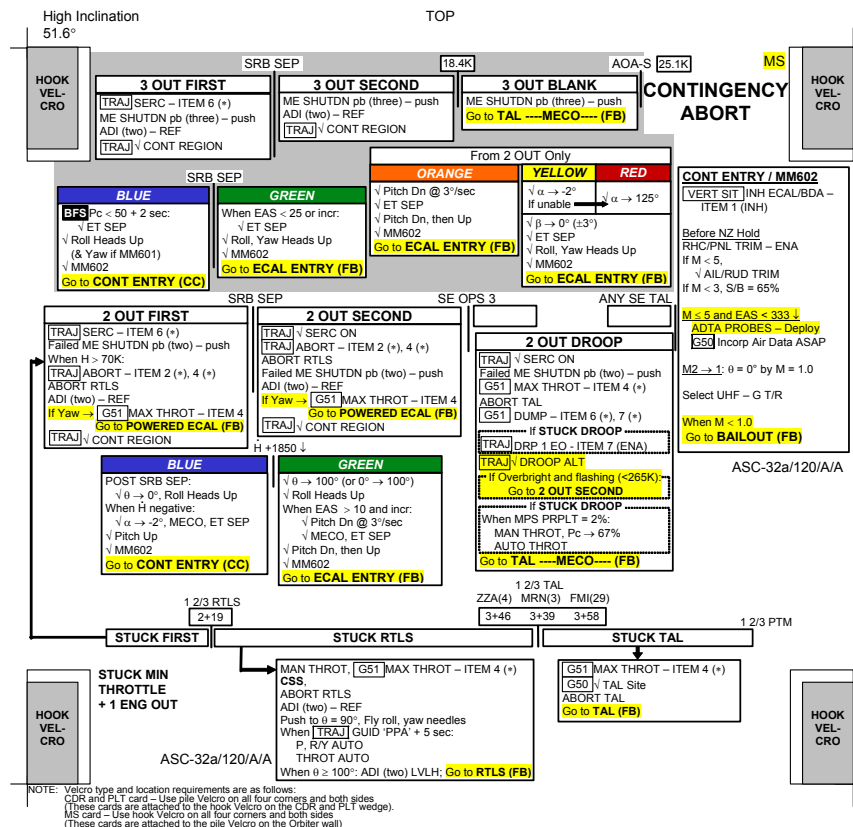
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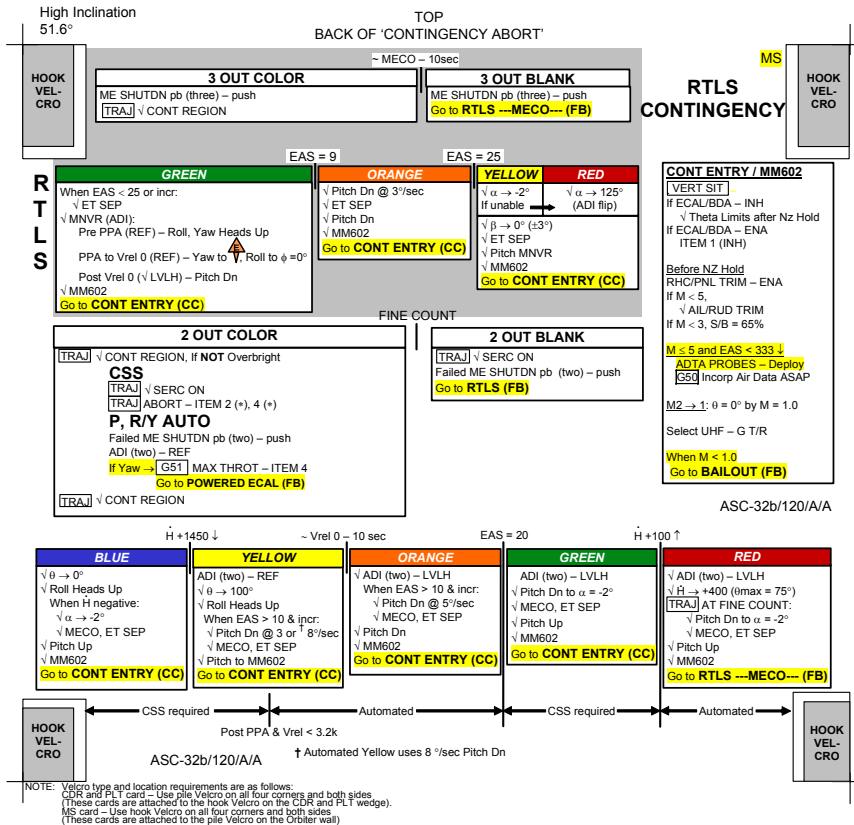
PLT
ASC/120/FIN



FAB USE ONLY

(reduced copy)
(C)CC 10-5

MS
ASC/120/FIN



FAB USE ONLY

(reduced copy)
(C)CC 10-6

MS
ASC/120/FIN

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/120/A,O/SIM-442

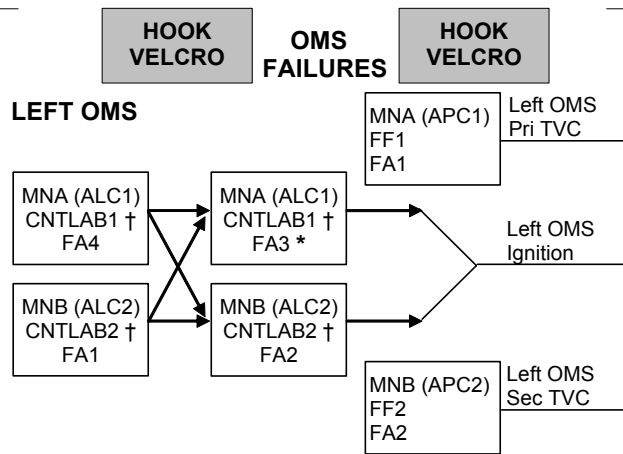
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FAB USE ONLY

CC 10-7

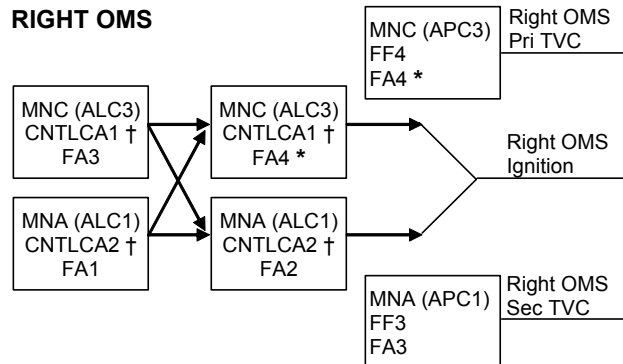
ASC/120/SIM-442

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/120/FIN

TOP

HOOK
VELCRO

OMS 2/
ORBIT OMS
BURNS

HOOK
VELCRO

√MM105/202(302)
Enter TGO +5 sec (2 eng) or TGO +10 sec (1 eng)
√BURN ATT (INRTL) then REF, pb – push
√ENG SEL √DAP TRANS – NORM (MM202)
CNTL PWR (two) – ON √DAP – AUTO(PASS)/DISC
√GMBL TRIM
2 engine: P = +0.4 LY = -5.7 RY = +5.7
1 engine: P = +0.4 LY = +5.2 RY = -5.2
L,R OMS He PRESS/VAP ISOL A (two) – OP
... Wait 2 sec ...
L,R OMS He PRESS/VAP ISOL B (two) – GPC (OP for SE
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/120/A,O/A

(reduced copy)

FAB USE ONLY

CC 10-9

ASC/120/FIN

TOP
BACK OF 'OMS2/ORBIT OMS BURNS'

HOOK
VELCRO

OPS 1
RCS BURN

HOOK
VELCRO

AFT RCS

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

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

FWD RCS

FRCS BURN PREP

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

NOTE

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

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

ASC-6b/120/A,O/A

(reduced copy)

FAB USE ONLY

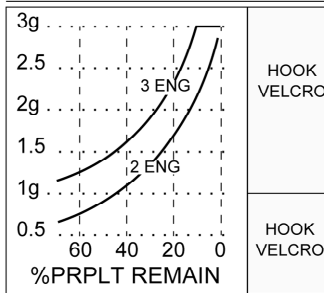
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ASC/120/FIN

TOP

ASCENT ADI - NOMINAL

TIME	θ	H	$\dot{H}$	CY
0:30	69	10K	670	(120 OCFR1
0:50	61	27K	1007	
1:10	52	51K	1443	
1:30	38	85K	1905	
1:50	30	126K	2200	



-STAGING-

V_i	θ	H	$\dot{H}$	
6	19	220K	1691	
7	16	277	1244	
8	13	311	899	
9	11	333	621	
10	9	346	393	
12	6	356	56	
14	10	355	-147	
16	25	350	-229	
18	23	344	-263	
20	21	339	-213	
22	19	337	-100	
24	17	337	68	
25819	12	345	272	

ASC-14a/120/A/A

HOOK VELCRO

TOP
BACK OF 'ASCENT
ADI - NOMINAL'

ENTRY ALPHA

VR	α_{ref}	R	H	$\dot{H}_{ref}$	Rref
25	40	4416	400		
24	HI	40	LO 2600	247	-47 L79
23	43	40	37 2137	239	-64 69
22	43	40	37 1778	233	-84 63
21	43	40	37 1503	227	-107 61
20	43	40	37 1285	220	-124 60
19	43	40	37 1110	213	-148 60
18	43	40	37 974	209	-171 R60
17	43	40	37 860	200	-189 62
16	43	40	37 768	194	-198 64

KSC 15

MAX L/D	
M	α
3	17
2	15
1	12

ASC-14b/120/A,E/A

(120 OCFR1 CY)

HOOK VELCRO

HOOK VELCRO

HOOK VELCRO

15	43	40	37	685	187	-118	64
14	43	40	37	612	183	-127	62
13	43	40	37	544	180	-137	60
12	43	40	37	482	175	-153	59
11	42	39	36	425	170	-195	57
10	41	38	35	375	166	-173	L51
9	39	36	33	326	161	-207	44
8	37	34	31	277	153	-239	41
7	33	30	27	229	144	-267	40
6	30	27	24	184	132	-272	41
5	26	23	20	143	120	-274	43
4	22	19	18	107	107	-263	R38
3	19	16	15	74	91	-247	34
2.5	14			61	83	-255	
2	13			51	78	-253	
1.5	10			39	69	-308	
1	8			29	55	-258	

HOOK VELCRO

(reduced copy)

FAB USE ONLY

CC 10-11

ASC/120/FIN 1

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 +Q 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

ASC-8a/A/E

HINGE

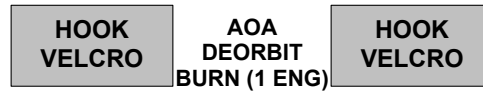
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FAB USE ONLY

CC 10-12

ASC/120/FIN

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



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

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

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

ASC-8b/A/B

HINGE

(reduced copy)

FAB USE ONLY

CC 10-14

ASC/120/FIN

TOP
HINGED AT BOTTOM OF
'AOA DEORBIT BURN (1 ENG)'
HINGE

* **RCS COMPLETION:**

* If DIRECT INSERTION:

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

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

* FLIP -----
* ΔV FRCS COMPLETION

* AFT -----
* ΔV THC +X to TGT ΔV

* TGT -----
* ΔV

* If w/OMS 1:

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

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

* FLIP -----
* HP FRCS COMPLETION

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

* TGT -----
* HP

* **FRCS COMPLETION:**

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

CUTOFF

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

ASC-8bb/120/A/A

(reduced copy)

FAB USE ONLY

CC 10-15

ASC/120/FIN

TOP

**AOA
DEORBIT
BURN (RCS)**

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

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

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

TIG THC +X
Maintain PITCH ATT ERR $\pm 3^\circ$
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/120/FIN

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CC 10-17

7



TOP
BACK OF 'AOA DEORBIT BURN (RCS)'



HOOK
VELCRO

HOOK
VELCRO



HINGE

ASC-7b/A/B



(reduced copy)
CC 10-18

FAB USE ONLY

ASC/120/FIN



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

ASC-7bb/A/B

FAB USE ONLY

(reduced copy)
CC 10-19

ASC/120/FIN

TOP

PILE
VELCRO

HOOK
VELCRO

PILE
VELCRO

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

1st E.O. VI		6000	6100	6200	6300	6400	6500	6600	6700
SE OPS 3 ZZA 109	(4)	11000	11100	11100	11100	11100	11100	11200	11200
SE ZZA 104	(4)	16900	16800	16600	16400	16300	16100	15900	15800

1st E.O. VI		6800	6900	7000	7100	7200	7300	7400	7500
SE OPS 3 ZZA 109	(4)	11200	11200	11200	11300	11300	11300	11300	11300
SE ZZA 104	(4)	15600	15400	15300	15100	15000	14800	14700	14600

1st E.O. VI		7600	7700	7800	7900	8000	8100	8200	8300
SE OPS 3 ZZA 109	(4)	11400	11400	11400	11400	11400	11500	11500	11500
SE ZZA 104	(4)	14500	14300	14200	14100	14000	14000	13900	13800

1st E.O. VI		8400	8500	8600	8700	8800	8900	9000	9100
SE OPS 3 ZZA 109	(4)	11500	11500	11600	11600	11600	11600	11600	11600
SE ZZA 104	(4)	13700	13700	13600	13600	13600	13500	13500	13500

1st E.O. VI		9200	9300	9400	9500	9600	9700	9800	9900
SE OPS 3 ZZA 109	(4)	11700	11700	11700	11700	11700	11800	11800	11800
SE ZZA 104	(4)	13500	13500	13500	13500	13500	13500	13500	13500

1st E.O. VI		10000	10100	10200	10300	10400	10500	10600	10700
SE OPS 3 ZZA 109	(4)	11800	11800	11800	11900	11900	11900	11900	11900
SE ZZA 104	(4)	13500	13500	13500	13600	13600	13600	13600	13600

ASC-9a/120/A/A

PILE
VELCRO

HOOK
VELCRO

PILE
VELCRO

(reduced copy)

FAB USE ONLY

CC 10-20

ASC/120/FIN

TOP
BACK OF 'ZZA TAL REDESIGNATION'

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

ECAL – ZZA or MRN or FMI PRIME TAL

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

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

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

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

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

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

ASC-9b/120/A/A

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

(reduced copy)

FAB USE ONLY

CC 10-21

ASC/120/FIN

TOP

PILE
VELCRO

HOOK
VELCRO

PILE
VELCRO

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

1st E.O. VI		5900	6000	6100	6200	6300	6400	6500	6600
SE OPS 3 MRN 109	(3)	10900	11000	11000	11000	11100	11100	11100	11200
SE MRN 104	(3)	16700	16600	16400	16200	16100	15900	15800	15600

1st E.O. VI		6700	6800	6900	7000	7100	7200	7300	7400
SE OPS 3 MRN 109	(3)	11200	11200	11300	11300	11300	11400	11400	11400
SE MRN 104	(3)	15400	15300	15100	15000	14900	14700	14600	14500

1st E.O. VI		7500	7600	7700	7800	7900	8000	8100	8200
SE OPS 3 MRN 109	(3)	11400	11500	11500	11500	11500	11600	11600	11600
SE MRN 104	(3)	14300	14200	14100	14000	13900	13900	13800	13700

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

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

1st E.O. VI		9900	10000	10100	10200	10300	10400	10500	10600
SE OPS 3 MRN 109	(3)	11900	11900	11900	11900	11900	11900	11900	11900
SE MRN 104	(3)	13400	13400	13400	13400	13500	13500	13500	13500

1st E.O. VI		10700							
SE OPS 3 MRN 109	(3)	11900							
SE MRN 104	(3)	13500							

ASC-10a/120/A/A

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TOP
BACK OF 'MRN TAL REDESIGNATION'

HOOK
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ECAL – ZZA or MRN or FMI PRIME TAL

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

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

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

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

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

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

ASC-10b/120/A/A

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**FMI TAL REDESIGNATION
(120 OCFR1 CYC)**

1st E.O. VI		6300	6400	6500	6600	6700	6800	6900	7000
SE OPS 3 FMI 109	(29)	11000	11100	11100	11100	11200	11200	11200	11200
SE FMI 104	(29)	17600	17400	17200	17000	16800	16600	16500	16300

1st E.O. VI		7100	7200	7300	7400	7500	7600	7700	7800
SE OPS 3 FMI 109	(29)	11300	11300	11300	11300	11400	11400	11400	11400
SE FMI 104	(29)	16100	15900	15700	15600	15400	15200	15100	14900

1st E.O. VI		7900	8000	8100	8200	8300	8400	8500	8600
SE OPS 3 FMI 109	(29)	11500	11500	11500	11500	11600	11600	11600	11600
SE FMI 104	(29)	14800	14700	14500	14400	14300	14300	14200	14100

1st E.O. VI		8700	8800	8900	9000	9100	9200	9300	9400
SE OPS 3 FMI 109	(29)	11600	11700	11700	11700	11700	11700	11700	11800
SE FMI 104	(29)	14000	14000	13900	13900	13900	13800	13800	13800

1st E.O. VI		9500	9600	9700	9800	9900	10000	10100	10200
SE OPS 3 FMI 109	(29)	11800	11800	11800	11800	11800	11800	11900	11900
SE FMI 104	(29)	13800	13800	13800	13800	13800	13800	13800	13800

1st E.O. VI		10300	10400	10500	10600	10700			
SE OPS 3 FMI 109	(29)	11900	11900	11900	11900	11900			
SE FMI 104	(29)	13900	13900	13900	13900	13900			

ASC-12a/120/A/A

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VELCRO

PILE
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ASC/120/FIN

TOP
BACK OF 'FMI TAL REDESIGNATION'



ECAL – ZZA or MRN or FMI PRIME TAL

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

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

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

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

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

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

ASC-12b/120/A/A



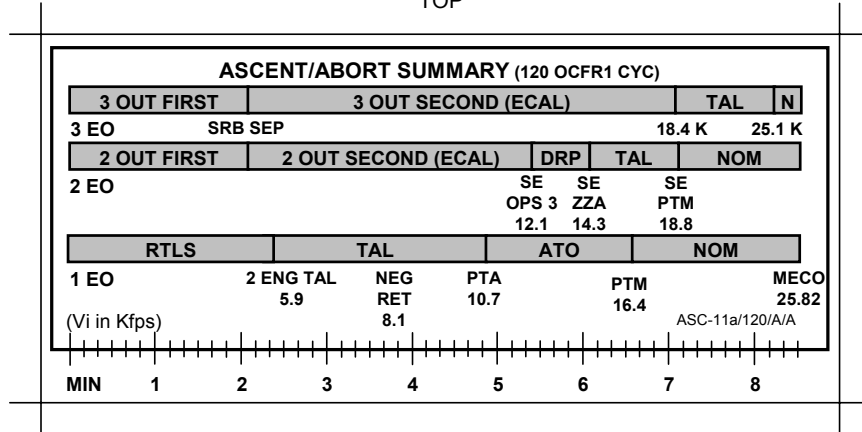
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FAB USE ONLY

CC 10-25

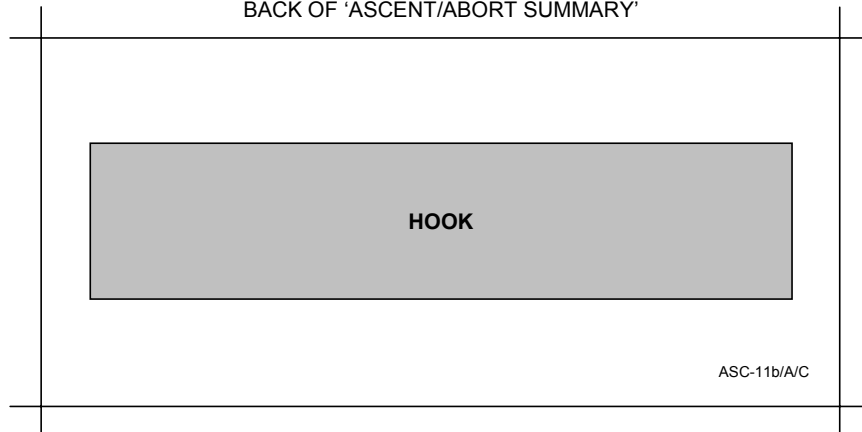
ASC/120/FIN

TOP



TOP

BACK OF 'ASCENT/ABORT SUMMARY'



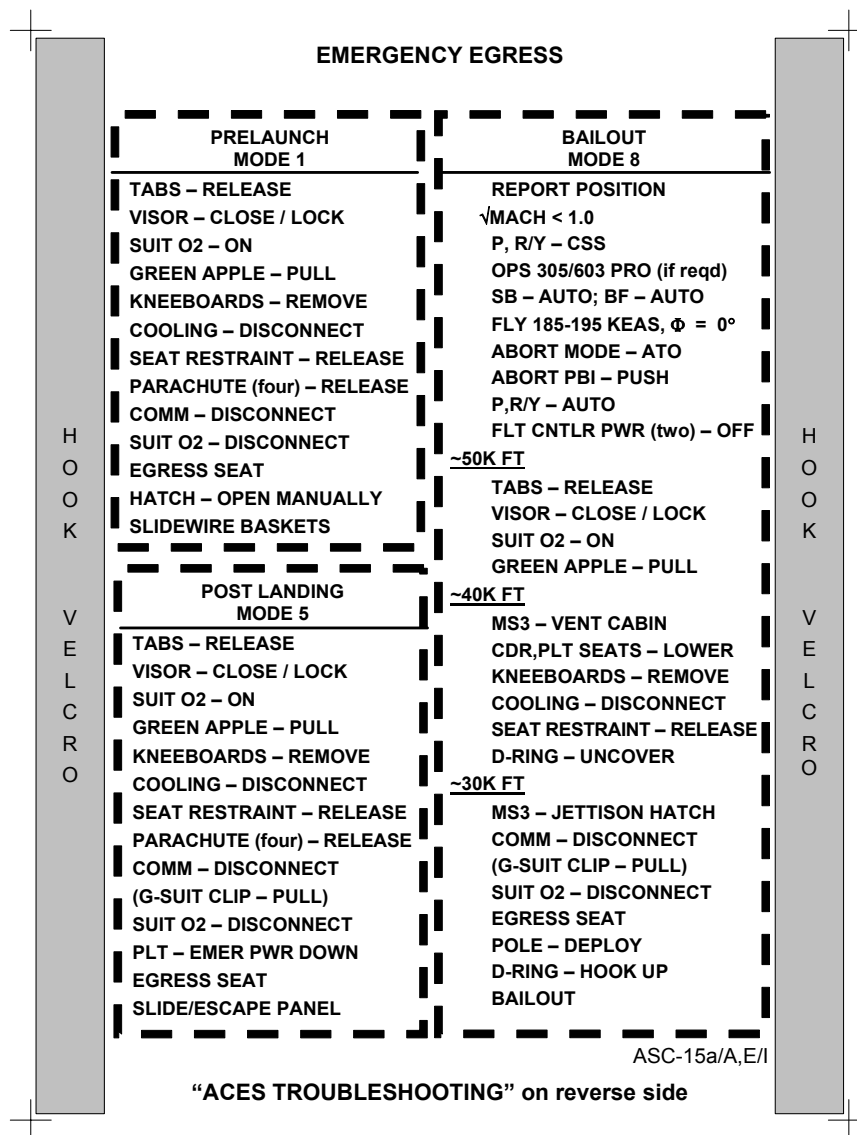
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FAB USE ONLY

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ASC/120/FIN

TOP



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FAB USE ONLY

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ASC/120/FIN

TOP
BACK OF "EMERGENCY EGRESS"

ACES TROUBLESHOOTING (ASCENT/ENTRY)

LOSS OF COMM

If LOSS OF XMIT:

NOTE

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

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

POWER BUS	ATU
ESS BUS 1BC	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 vlv – OP (Flight Deck)
3. ✓ O2 hose connected properly at LEH O2 (Flight Deck)

INADVERTENT EOS ACTIVATION (After T-2:00)

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

NOTE

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

ASC-15b/A,E/E

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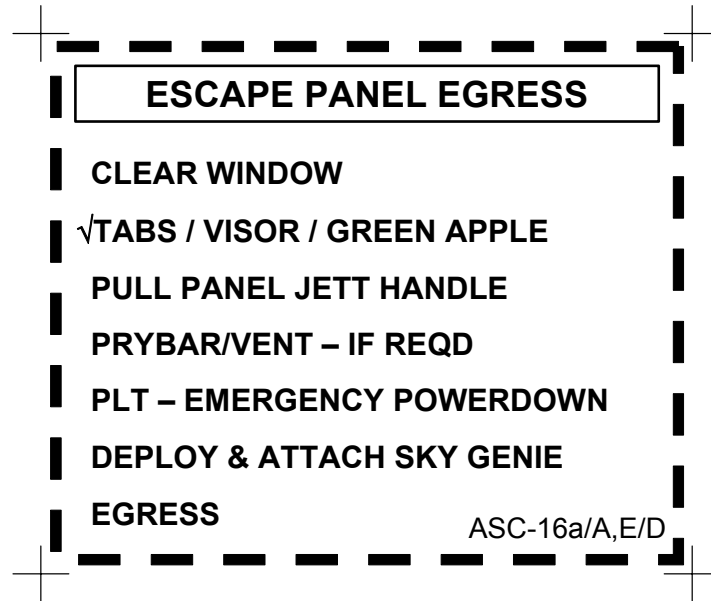
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FAB USE ONLY

CC 10-28

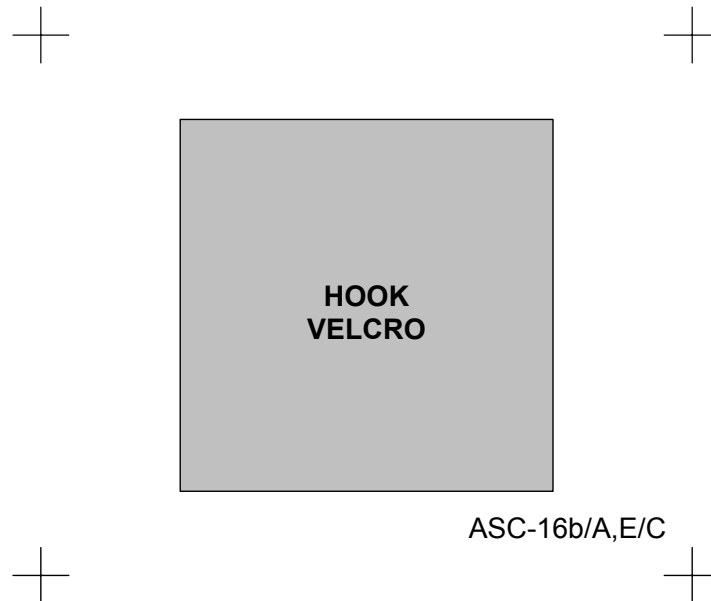
ASC/120/FIN

TOP



TOP

BACK OF 'ESCAPE PANEL EGRESS'



(reduced copy)

FAB USE ONLY

CC 10-29

ASC/120/FIN

GPC/FCS CHANNEL CONFIGURATION

TOP

GPC

G P C	G P C	G P C	G P C	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

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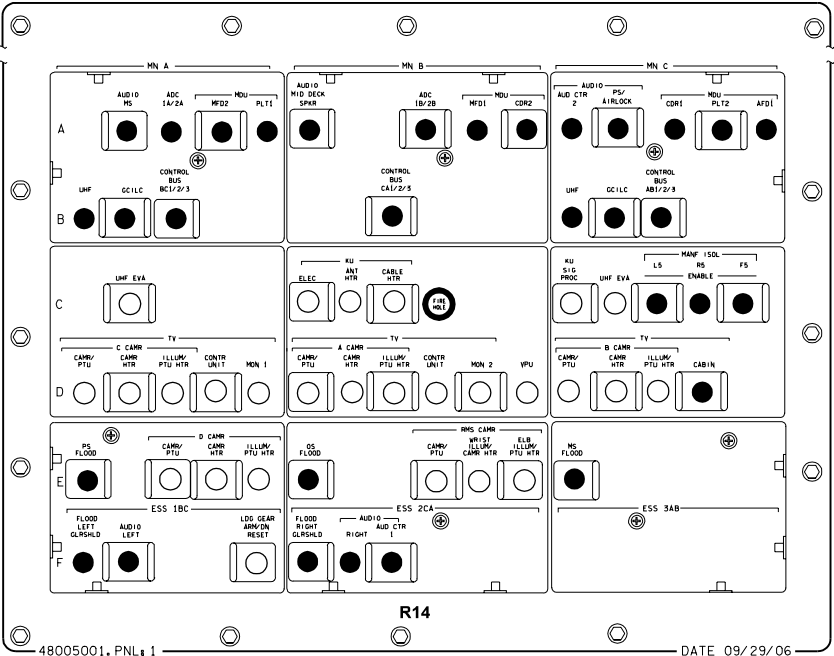
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CC 10-30

ASC/120/FIN

TOP
PANEL R14 - OV103 ONLY

OV103 ONLY



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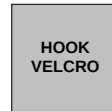
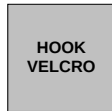
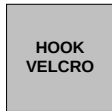
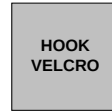
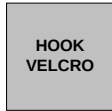
FAB USE ONLY

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ASC/120/FIN 1



TOP
BACK OF 'PANEL R14 - OV103 ONLY'



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



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CC 10-32

FAB USE ONLY

ASC/120/FIN 1



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/120/FIN

FAB USE ONLY

(reduced copy)
CC 10-34

ASC/120/FIN 1

HOOK
VELCRO

EMERGENCY EGRESS

TOP

NOTE
'LOSS OF COMM TROUBLESHOOTING'
ON REVERSE SIDE

HOOK
VELCRO

PRELAUNCH MODE 1

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

BAILOUT MODE 8

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

ASC-25a/A,E/G

HINGE

FAB USE ONLY

CC 10-35

ASC/120/FIN 1

(reduced copy)

TOP, HINGED AT BOTTOM OF 'EMERGENCY EGRESS'
HINGE

POST LANDING MODE 5

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

~40K FT

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

~30K FT

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

ASC-25aa/A,E/E

PILE
VELCRO

NOTE

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

PILE
VELCRO

FAB USE ONLY

CC 10-36

ASC/120/FIN 1

(reduced copy)

TOP
BACK/BOTTOM OF 'EMERGENCY EGRESS'

ACES TROUBLESHOOTING (ASCENT/ENTRY)

LOSS OF COMM

If LOSS OF XMIT:

NOTE

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

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

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

If LOSS OF RECEIVE:

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

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ASC-25b/A,E/C

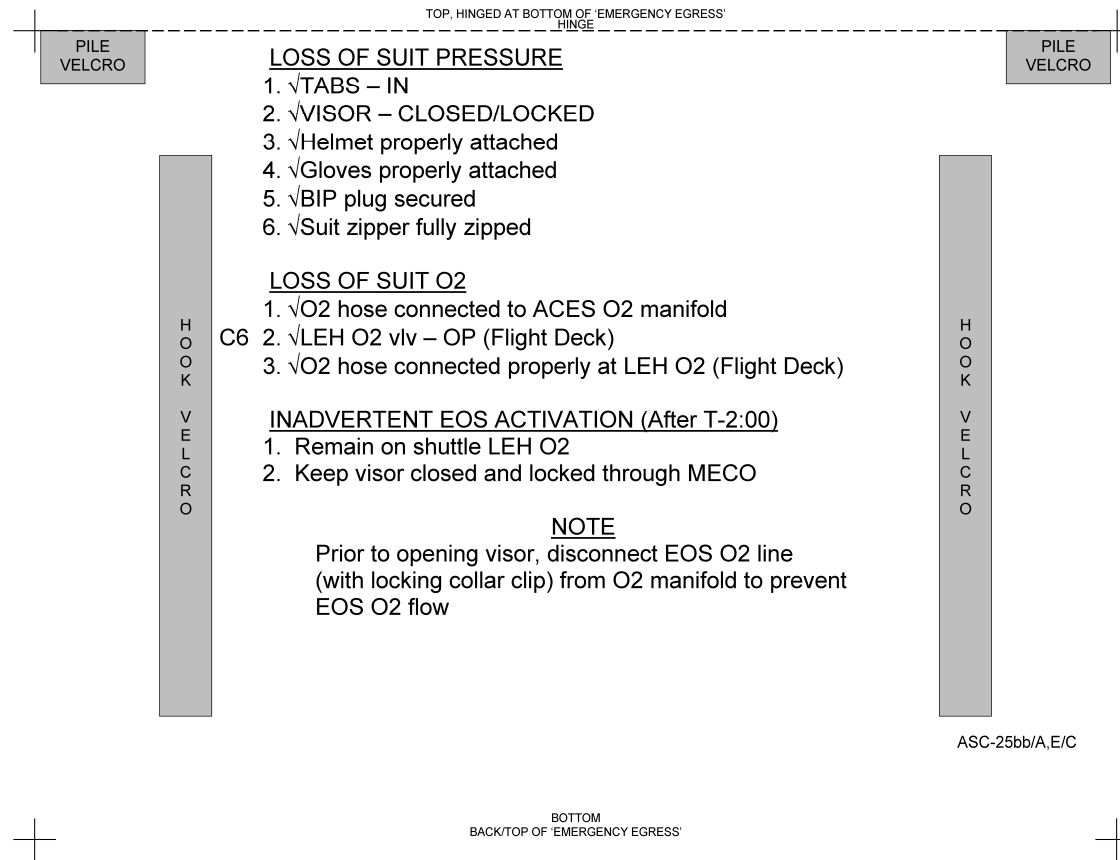
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CC 10-37

ASC/120/FIN 1



FAB USE ONLY

CS 10-38

ASC/120/FIN 1

(reduced copy)

HOOK
VELCRO

АВАРИЙНОЕ ПОКИДАНИЕ

ВЕРХ

ПРИМЕЧАНИЕ
"УСТРАНЕНИЕ НЕИСПРАВНОСТЕЙ ПРИ ПОТЕРЕ СВЯЗИ"
НА ОБРАТНОЙ СТОРОНЕ

HOOK
VELCRO

РЕЖИМ 1 ДО СТАРТА

ЯЗЫЧКИ ШЕЙНОЙ ПРОКЛАДКИ - УБРАТЬ
ШЛЕМ - ОПУСТИТЬ/ ЗАКРЫТЬ
СК 02 - ВКЛ
ЗЕЛЕНый ШАРИК - ПОТЯНУТЬ
НАКОЛЕННЫЕ ПЛАНШЕТЫ - УБРАТЬ
СИСТЕМУ ОХЛАЖДЕНИЯ - ОТСОЕДИНИТЬ
ПРИВЯЗНЫЕ РЕМНИ КРЕСЛА - ОСВОБОДИТЬ
ПАРАШЮТ (четыре) - ОТСТЕГНУТЬ
СВЯЗЬ - ОТСОЕДИНИТЬ
СК 02 - 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
KN ABORT - НАЖАТЬ
ТАНГАЖ, РЫСКАНИЕ/КРЕН - АВТО
ТМБ FLT CNTLR PWR (два) - ВЫКЛ
~50 ТЫСЯЧ ФУТОВ
ЯЗЫЧКИ ШЕЙНОЙ ПРОКЛАДКИ - УБРАТЬ
ШЛЕМ - ОПУСТИТЬ/ ЗАКРЫТЬ
СК 02 - ВКЛ
ЗЕЛЕНый ШАРИК - ПОТЯНУТЬ

ASC-26a/A,E/E

HINGE

FAB USE ONLY

CS 10-39

ASC/120/FIN 1

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TOP, HINGED AT BOTTOM OF 'EMERGENCY EGRESS'
HINGE

РЕЖИМ 5 ПОСЛЕ ПОСАДКИ

ЯЗЫЧКИ ШЕЙНОЙ ПРОКЛАДКИ - УБРАТЬ
ШЛЕМ - ОПУСТИТЬ/ ЗАКРЫТЬ
СК 02 - 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 02 - ОТСОЕДИНИТЬ
ПИЛОТ – ЭКСТРЕННО ОТКЛЮЧИТЬ
ПИТАНИЕ
ПОКИНУТЬ КРЕСЛО
ИСПОЛЬЗОВАТЬ СКЛИЗ/ВЫХОДНУЮ
ПАНЕЛЬ

~40 ТЫСЯЧ ФУТОВ

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

~30 ТЫСЯЧ ФУТОВ

MS3 - ОТСТРЕЛИТЬ ЛЮК
СВЯЗЬ - ОТСОЕДИНИТЬ
(СНЯТЬ КОНТРОВКУ С КЛАПАНА ППК)
СК 02 - ОТСОЕДИНИТЬ
ПОКИНУТЬ КРЕСЛО
РАЗЛОЖИТЬ НАПРАВЛЯЮЩУЮ ШТАНГУ
D-ОБРАЗНОЕ КОЛЬЦО - ПРИСТЕГНУТЬ
ПОКИНУТЬ КОРАБЛЬ

ASC-26aa/A, E/D

PILE
VELCRO

ПРИМЕЧАНИЕ
"УСТРАНЕНИЕ НЕИСПРАВНОСТЕЙ ПРИ ПОТЕРЕ ДАВЛЕНИЯ В СК, ПОДАЧЕ О2 И ВКЛЮЧЕНИИ СИСТЕМЫ EOS"
НА ОБРАТНОЙ СТОРОНЕ

PILE
VELCRO

FAB USE ONLY

CC 10-40

ASC/120/FIN 1

(reduced copy)

БЕРХ
BACK/BOTTOM OF 'EMERGENCY EGRESS'

УСТРАНЕНИЕ НЕИСПРАВНОСТЕЙ СК ACES (ВЫВЕДЕНИЕ/СПУСК)

ПОТЕРЯ СВЯЗИ

ЕСЛИ ПОТЕРЯ СВЯЗИ В РЕЖИМЕ ПЕРЕДАЧИ:

ПРИМЕЧАНИЕ

Поток О2 в шлеме загл микрофоны (т.е. дыхание, откр или негерм смотр щиток, негерм шейная прокладка)

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

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

ЕСЛИ ПОТЕРЯ СВЯЗИ В РЕЖИМЕ ПРИЕМА:

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

HOOK
VELCRO

HOOK
VELCRO

HOOK
VELCRO

ASC-26b/A,E/C

HOOK
VELCRO

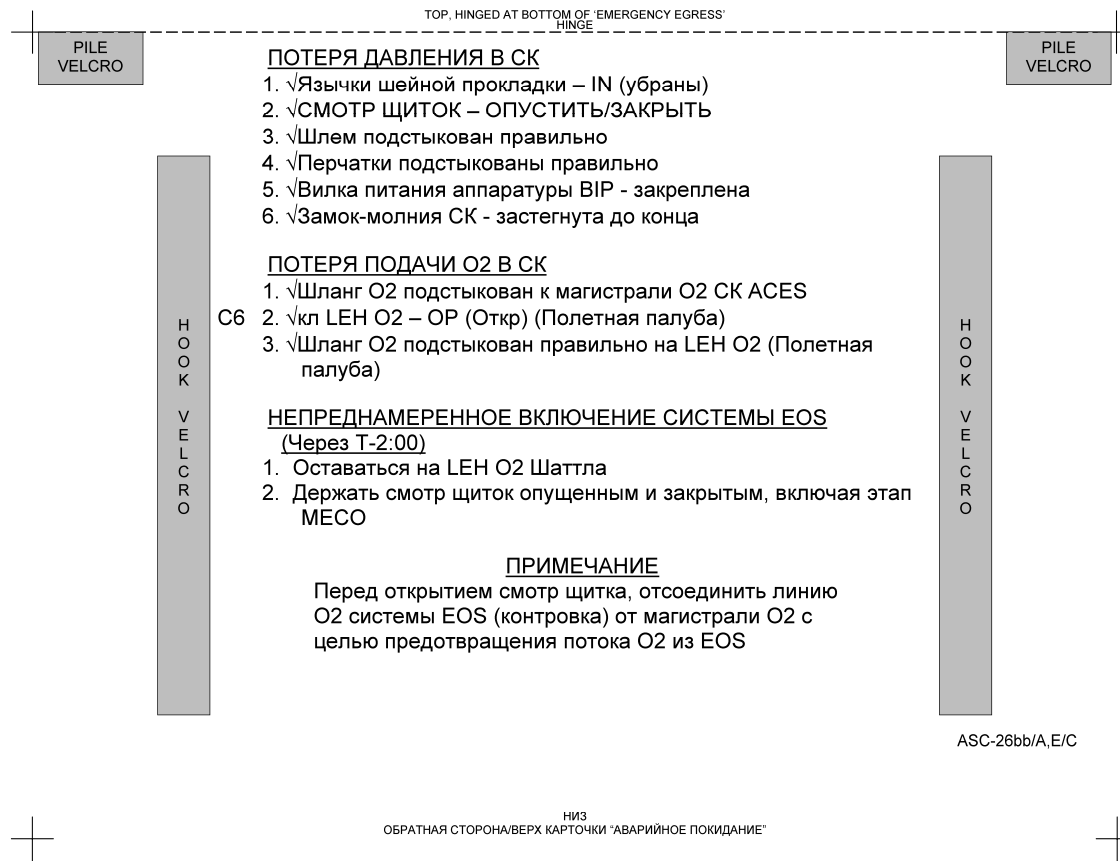
HINGE

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Space Shuttle Program
FLIGHT DATA FILE

JSC-48005-120
FINAL



ASCENT CHECKLIST

STS
120

Flight Cover (trim bottom to expose tabs)