

# Ascent Checklist

## STS-121

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

**Final  
May 24, 2005**

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas





ASCENT C/L STS-121

FINAL (May 24, 2005)

## PCN-3 (June 19, 2006) Sheet 1 of 1

List of Implemented Change Requests (482s):

ASC-1731  
ASC-1734  
ASC-1735  
ASC-1738B  
ASC-1739  
ASC-1741

Incorporate the following:

1. Replace v thru x
2. Replace FB 2-3 thru FB 2-6, FB 2-19 & FB 2-20, FB 2-23 & FB 2-24, 2-27 & 2-28, 2-35 thru 2-46
3. Replace 3-1 & 3-2
4. Replace 6-3 & 6-4, 6-29 & 6-30
5. Replace 9-9 & 9-10, 9-21 & 9-22, 9-25 & 9-26
6. Replace (A)CC 10-5 thru (C)CC 10-6 (6 pages), CC 10-11 & CC 10-12, CC 10-19 thru CC 10-26, CC 10-31 & CC 10-32

Prepared by:

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Book Manager

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Lead Ascent GPO

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Approved by:

*Richard B. Mozinski* ACTING FOR P.J. BERTSCH  
Chief, Ascent/Descent Dynamics Branch

Encl: 58 pages

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



ASCENT C/L STS-121

FINAL (May 24, 2005)

## PCN-2 (Apr 10, 2006) Sheet 1 of 1

List of Implemented Change Requests (482s):

ASC-1723A	MULTI-1739
ASC-1728	MULTI-1741
ASC-1732	MULTI-1743

Incorporate the following:

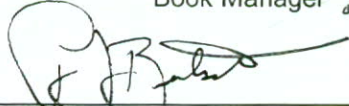
1. Replace v thru viii
2. Replace 1-5 & 1-6, 1-11 & 1-12
3. Replace FB 2-3 & FB 2-4, FB 2-9 & FB 2-10, FB 2-15 & FB 2-16
4. Replace 3-7 & 3-8
5. Replace 4-1 & 4-2
6. Replace 6-15 thru 6-18, 6-29 & 6-30
7. Replace 9-27 & 9-28
8. Replace CC 10-7 & CC 10-8

Prepared by:

  
Book Manager *04/10/06*

  
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Chief, Ascent/Descent Dynamics Branch

Encl: 28 pages

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ASCENT C/L STS-121

FINAL (May 24, 2005)

## PCN-1 (Feb 7, 2006) Sheet 1 of 1

List of Implemented Change Requests (482s):

ASC-1709	ASC-1720	MULTI-1711B
ASC-1713	ASC-1721	
ASC-1717	ASC-1725	
ASC-1718	ASC-1726	
ASC-1719	ASC-1727	

Incorporate the following:

1. Replace iii thru x
2. Replace FB 2-5 thru FB 2-8, FB 2-11 thru FB 2-14, FB 2-17 & FB 2-18, FB 2-25 & FB 2-26, 2-31 thru 2-40
3. Replace 3-3 & 3-4
4. Replace 6-3 & 6-4, 6-29 & 6-30
5. Replace 9-1 thru 9-28
6. Replace (A)CC 10-5 thru (C)CC 10-6 (6 pgs), CC 10-31 & CC 10-32

Prepared by:

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Book Manager

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Approved by:

*[Signature]*  
Chief, Ascent/Descent Dynamics Branch

*Stephen C. Keppo*  
VITT Lead

Encl: 72 pages

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MISSION OPERATIONS DIRECTORATE

**ASCENT CHECKLIST  
STS-121**

FINAL  
May 24, 2005

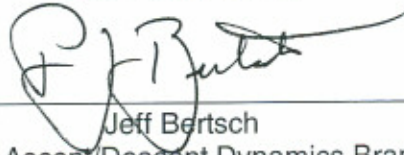
PREPARED BY:

  
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APPROVED BY:



Tom G. Schmidt  
Lead Ascent GPO



Jeff Bertsch  
Chief, Ascent/Descent Dynamics Branch

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

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ASC/121/FIN

Incorporates the following:	
482#:	ASC-1704A ASC-1706 ASC-1707A

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DM4/A. McCagg	281-483-7752
Switch List	CA4/M. Menard	281-244-8778
Entry	DM4/M. Trump	281-483-8029
Cue Cards	DO3/TBD	

## NOTES

1. The STS-121 trajectory data in this checklist is based on the STS-121 One Cycle to Flight load and the July environment.
2. The Handover/Ingress Switch List gives the vehicle configuration at LCC/MCC handover (SRB Ignition) and flight crew ingress (T-3:00). If there is a switch position difference between ingress and handover, the ingress position will be boxed beside the handover position.
3. The time reference used in the Prelaunch procedures is the T- (Time to Launch) that LCC uses. This time does not reflect planned holds. The second time referenced in parentheses reflects the planned holds. The mission elapsed time (MET) has MET = 0 at SRB ignition.
4. Normal Flight Procedures are for liftoff through the OMS 2 burn.
5. The Abort to Orbit (ATO) procedures and the Backup Flight System (BFS) procedures are integrated into the appropriate parts of this checklist.
6. AOA procedures terminate with ENTRY MANEUVERS Cue Cards.
7. Ascent Flip Book for the CDR and PLT will be fabricated from the FB pages in section 2.
8. Ascent related cue cards are contained in this document. The cue cards are listed in the Ascent Cue Card section. Some cards are printed in the body of the checklist for MS use and also in the Cue Card Config section for reference of crop marks and fabrication instructions. The size, shape, and Velcro location of the cue cards are controlled by the Cue Card Book Manager.
9. Mission STS-121 is flown with vehicle OV103. |



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ASCENT CHECKLIST  
STS-121

**LIST OF EFFECTIVE PAGES**

FINAL 05/24/05  
PCN-1 02/07/06  
PCN-2 04/10/06  
PCN-3 06/19/06

Sign Off .....	* 121/FIN	FB 2-5.....	121/FIN 3
ii.....	* 121/FIN	FB 2-6.....	121/FIN 1
iii.....	* 121/FIN 1	FB 2-7.....	121/FIN
iv.....	* 121/FIN	FB 2-8.....	121/FIN 1
v.....	* 121/FIN 3	FB 2-9.....	121/FIN 2
vi.....	* 121/FIN 3	FB 2-10.....	121/FIN
vii.....	* 121/FIN 3	FB 2-11.....	121/FIN
viii.....	* 121/FIN 3	FB 2-12.....	<input checked="" type="checkbox"/> 121/FIN 1
ix.....	* 121/FIN 3	FB 2-13.....	121/FIN 1
x.....	* 121/FIN	FB 2-14.....	<input checked="" type="checkbox"/> 121/FIN
xi.....	121/FIN	FB 2-15.....	121/FIN 2
xii.....	121/FIN	FB 2-16.....	121/FIN
1-1.....	121/FIN	FB 2-17.....	121/FIN 1
1-2.....	121/FIN	FB 2-18.....	121/FIN
1-3.....	121/FIN	FB 2-19.....	121/FIN
1-4.....	121/FIN	FB 2-20.....	121/FIN 3
1-5.....	121/FIN 2	FB 2-21.....	121/FIN
1-6.....	121/FIN	FB 2-22.....	121/FIN
1-7.....	121/FIN	FB 2-23.....	121/FIN
1-8.....	121/FIN	FB 2-24.....	121/FIN 3
1-9.....	121/FIN	FB 2-25.....	121/FIN 1
1-10.....	<input checked="" type="checkbox"/> 121/FIN	FB 2-26.....	121/FIN
1-11.....	121/FIN 2	2-27.....	121/FIN
1-12.....	121/FIN	2-28.....	121/FIN 3
1-13.....	121/FIN	2-29.....	121/FIN
1-14.....	121/FIN	2-30.....	121/FIN
2-1.....	121/FIN	2-31.....	121/FIN
FB 2-2.....	121/FIN	2-32.....	121/FIN 1
FB 2-3.....	121/FIN	2-33.....	121/FIN 1
FB 2-4.....	121/FIN 3	2-34.....	121/FIN

\* – Omit from flight book

– Prelift-off information required

2-35.....	*	121/FIN	6-13.....	121/FIN
2-36.....	*	121/FIN 3	6-14.....	121/FIN
2-37.....	*	121/FIN 3	6-15.....	121/FIN 2
2-38.....	*	121/FIN 1	6-16.....	121/FIN
2-39.....	*	121/FIN 1	6-17.....	121/FIN
2-40.....	*	121/FIN 3	6-18.....	121/FIN 2
2-41.....	*	121/FIN	6-19.....	121/FIN
2-42.....	*	121/FIN 3	6-20.....	121/FIN
2-43.....	*	121/FIN	6-21.....	121/FIN
2-44.....	*	121/FIN 3	6-22.....	121/FIN
2-45.....	*	121/FIN	6-23.....	121/FIN
2-46.....	*	121/FIN 3	6-24.....	121/FIN
3-1.....		121/FIN	6-25.....	121/FIN
3-2.....		121/FIN 3	6-26.....	121/FIN
3-3.....		121/FIN 1	6-27.....	121/FIN
3-4.....		121/FIN	6-28.....	121/FIN
3-5.....		121/FIN	6-29.....	121/FIN 3
3-6.....		121/FIN	6-30.....	121/FIN 2
3-7.....		121/FIN	6-31.....	121/FIN
3-8.....		121/FIN 2	6-32.....	121/FIN
4-1.....		121/FIN	6-33.....	121/FIN
4-2.....		121/FIN 2	6-34.....	121/FIN
4-3.....		121/FIN	6-35.....	121/FIN
4-4.....		121/FIN	6-36.....	121/FIN
5-1.....		121/FIN	6-37.....	121/FIN
5-2.....		121/FIN	6-38.....	121/FIN
5-3.....		121/FIN	6-39.....	121/FIN
5-4.....		121/FIN	6-40.....	121/FIN
6-1.....		121/FIN	7-1.....	121/FIN
6-2.....		121/FIN	7-2.....	121/FIN
6-3.....		121/FIN 3	7-3.....	121/FIN
6-4.....		121/FIN	7-4.....	121/FIN
6-5.....		121/FIN	7-5.....	121/FIN
6-6.....		121/FIN	7-6.....	121/FIN
6-7.....		121/FIN	7-7.....	121/FIN
6-8.....		121/FIN	7-8.....	121/FIN
6-9.....		121/FIN	7-9.....	121/FIN
6-10.....		121/FIN	7-10.....	121/FIN
6-11.....		121/FIN	8-1.....	121/FIN
6-12.....		121/FIN	8-2.....	121/FIN

\* – Omit from flight book

8-3.....	<input checked="" type="checkbox"/>	121/FIN	(B)CC 10-5.....	*	121/FIN 3
8-4.....	<input checked="" type="checkbox"/>	121/FIN	(B)CC 10-6.....	*	121/FIN 1
8-5.....	<input checked="" type="checkbox"/>	121/FIN	(C)CC 10-5.....	*	121/FIN 3
8-6.....	<input checked="" type="checkbox"/>	121/FIN	(C)CC 10-6.....	*	121/FIN 1
8-7.....	<input checked="" type="checkbox"/>	121/FIN	CC 10-7.....	*	121/FIN 2
8-8.....		121/FIN	CC 10-8.....	*	121/FIN
9-1.....	*	121/FIN 1	CC 10-9.....	*	121/FIN
9-2.....	*	121/FIN 1	CC 10-10.....	*	121/FIN
9-3.....	*	121/FIN 1	CC 10-11.....	*	121/FIN 3
9-4.....	*	121/FIN 1	CC 10-12.....	*	121/FIN
9-5.....	*	121/FIN 1	CC 10-13.....	*	121/FIN
9-6.....	*	121/FIN 1	CC 10-14.....	*	121/FIN
9-7.....	*	121/FIN 1	CC 10-15.....	*	121/FIN
9-8.....	*	121/FIN 1	CC 10-16.....	*	121/FIN
9-9.....	*	121/FIN 3	CC 10-17.....	*	121/FIN
9-10.....	*	121/FIN 1	CC 10-18.....	*	121/FIN
9-11.....	*	121/FIN 1	CC 10-19.....	*	121/FIN
9-12.....	*	121/FIN 1	CC 10-20.....	*	121/FIN 3
9-13.....	*	121/FIN 1	CC 10-21.....	*	121/FIN
9-14.....	*	121/FIN 1	CC 10-22.....	*	121/FIN 3
9-15.....	*	121/FIN 1	CC 10-23.....	*	121/FIN
9-16.....	*	121/FIN 1	CC 10-24.....	*	121/FIN 3
9-17.....	*	121/FIN 1	CC 10-25.....	*	121/FIN
9-18.....	*	121/FIN 1	CC 10-26.....	*	121/FIN 3
9-19.....	*	121/FIN 1	CC 10-27.....	*	121/FIN
9-20.....	*	121/FIN 1	CC 10-28.....	*	121/FIN
9-21.....	*	121/FIN 1	CC 10-29.....	*	121/FIN
9-22.....	*	121/FIN 3	CC 10-30.....	*	121/FIN
9-23.....	*	121/FIN 1	CC 10-31.....	*	121/FIN 3
9-24.....	*	121/FIN 1	CC 10-32.....	*	121/FIN 1
9-25.....	*	121/FIN 3	CC 10-33.....	*	121/FIN
9-26.....	*	121/FIN 1	CC 10-34.....	*	121/FIN
9-27.....	*	121/FIN 2	CC 10-35.....	*	121/FIN
9-28.....	*	121/FIN 1	CC 10-36.....	*	121/FIN
10-1.....	*	121/FIN	CC 10-37.....	*	121/FIN
CC 10-2.....	*	121/FIN	CC 10-38.....	*	121/FIN
CC 10-3.....	*	121/FIN	CC 10-39.....	*	121/FIN
CC 10-4.....	*	121/FIN	CC 10-40.....	*	121/FIN
(A)CC 10-5....	*	121/FIN 3	CC 10-41.....	*	121/FIN
(A)CC 10-6....	*	121/FIN 1	10-42.....	*	121/FIN

– Prelift-off information required  
 \* – Omit from flight book

## ASCENT CUE CARDS

<u>Title</u>	<u>Ref. Page</u>	<u>Card No.</u>
ADI ERROR/RATE SWITCH		
ASCENT (Front).....	CC 10-2	ASC-1a/A,E/D
ENTRY (Back).....	CC 10-2	ASC-1b/A,E/D
ASCENT/ENTRY SPEC		
(Front).....	CC 10-3	ASC-2a/A,E/E
(Back).....	CC 10-3	ASC-2b/A,E/C
SPEED BRAKE CMD		
(Front).....	CC 10-4	ASC-3a/A,E/D
(Back).....	CC 10-4	ASC-3b/A,E/C
CONTINGENCY ABORT		
CDR (Front).....	(A)CC 10-5	ASC-30a/121/A/C
RTLS CONTINGENCY		
CDR (Back).....	(A)CC 10-6	ASC-30b/121/A/B
CONTINGENCY ABORT		
PLT (Front).....	(B)CC 10-5	ASC-31a/121/A/C
RTLS CONTINGENCY		
PLT (Back).....	(B)CC 10-6	ASC-31b/121/A/B
CONTINGENCY ABORT		
MS (Front).....	(C)CC 10-5	ASC-32a/121/A/C
RTLS CONTINGENCY		
MS (Back).....	(C)CC 10-6	ASC-32b/121/A/B
OMS 2 BURN MONITOR (Front)	CC 10-7	ASC-5a/121/A,O/B
OMS FAILURES (Back).....	CC 10-8	ASC-5b/A,O,E/I
OMS 2/ORBIT OMS BURNS		
(Front).....	CC 10-9	ASC-6a/121/A,O/A
OPS 1 RCS BURN (Back).....	CC 10-10	ASC-6b/121/A,O/A
ASCENT ADI – NOMINAL		
(Front).....	CC 10-11	ASC-14a/121/A/B
ENTRY ALPHA – KSC 15		
(Back).....	CC 10-11	ASC-14b/121/A,E/A
AOA DEORBIT BURN (2 ENG)		
(Top/Front).....	CC 10-12	ASC-8a/A/E
(Bottom/Front).....	CC 10-13	ASC-8aa/121/A/A
AOA DEORBIT BURN (1 ENG)		
(Top/Back).....	CC 10-14	ASC-8b/A/B
(Bottom/Back).....	CC 10-15	ASC-8bb/121/A/A
AOA DEORBIT BURN (RCS)		
(Top/Front).....	CC 10-16	ASC-7a/A/B
(Bottom/Front).....	CC 10-17	ASC-7aa/121/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/121/A/B	
ECAL – ZZA or MRN or FMI PRIME TAL (Back).....	CC 10-21	ASC-9b/121/A/A	
MRN TAL REDESIGNATION (Front).....	CC 10-22	ASC-10a/121/A/B	
ECAL – ZZA or MRN or FMI PRIME TAL (Back).....	CC 10-23	ASC-10b/121/A/A	
FMI TAL REDESIGNATION (Front).....	CC 10-24	ASC-12a/121/A/B	
ECAL – ZZA or MRN or FMI PRIME TAL (Back).....	CC 10-25	ASC-12b/121/A/A	
ASCENT/ABORT SUMMARY (Front).....	CC 10-26	ASC-11a/121/A/B	
(Back).....	CC 10-26	ASC-11b/A/C	
EMERGENCY EGRESS (Front).....	CC 10-27	ASC-15a/A,E/I	
ACES TROUBLESHOOTING (ASCENT/ENTRY) (Back) .....	CC 10-28	ASC-15b/A,E/E	
ESCAPE PANEL EGRESS (Front).....	CC 10-29	ASC-16a/A,E/D	
(Back).....	CC 10-29	ASC-16b/A,E/C	
GPC/FCS CHANNEL CONFIG (Front).....	CC 10-30	ASC-17a/A,O,E/B	
(Back).....	CC 10-30	ASC-17b/A,O,E/B	
PANEL R14 – OV103 ONLY (Front).....	CC 10-31	ASC-18a/A,O,E/H	
(Back).....	CC 10-32	ASC-18b/A,O,E/C	
LOC/BREAK-UP.....	CC 10-33	ASC-21a/A/D	
EMERGENCY EGRESS (OVERSIZED) (Top/Front) .....	CC 10-34	ASC-25a/A,E/F	
(Bottom/Front) .....	CC 10-35	ASC-25aa/A,E/D	
(Top/Back).....	CC 10-36	ASC-25b/A,E/B	
(Bottom/Back).....	CC 10-37	ASC-25bb/A,E/B	
EMERGENCY EGRESS (RUSSIAN) (Top/Front) .....	CC 10-38	ASC-26a/A,E/D	
(Bottom/Front) .....	CC 10-39	ASC-26aa/A,E/C	
(Top/Back).....	CC 10-40	ASC-26b/A,E/B	
(Bottom/Back).....	CC 10-41	ASC-26bb/A,E/B	

PLT & CDR Ascent

<u>Flip Book</u> .....	FB 2-2 thru FB 2-26
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<u>CONTENTS</u>	<u>PAGE</u>
PRELAUNCH PROCEDURES .....	1-1
ASCENT PROCEDURES (FLIP BOOK).....	2-1
RTL 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
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AOA PROCEDURES .....	6-7
AOA DEORBIT BURN AND DEORBIT BURN MONITOR CARDS.....	6-17
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OMS/RCS POST BURN RECONFIG (CIL).....	6-28
OMS FAILURE .....	6-37
OMS/RCS $\Delta V$ .....	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),  
INST PWR – FLT/MPS (F6) (OV103,5),  
INST PWR – ON (F8) (OV103,5). ESS BUS  
SOURCE FC (three) – ON, AC BUS SNSR  
(three) – OFF (1 sec) then AUTO TRIP (R1), cb  
APU FU TK VLV ENA (six) – cl (R2). OTC will  
call: (~2 min) ESS BUS SOURCE FC (three) –  
OFF, AC BUS SNSR (three) – OFF (1 sec) then  
MON (R1), cb ESS MN CONTR (three) – cl  
(O13), cb MN CONTR (three) – cl  
(O14,O15,O16), cb AC1 H2O LOOP PUMP 1 A/2  
(three) – op (L4)

### PAYLOAD ACTIVATION

A6U √PL RETEN PL SEL – MON

### NAVAIDS ACTIVATION

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

If OV103:

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

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

### INGRESS ORBITER & SEATS

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

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

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

Install ASC Flip Cards  
 ✓ Cue Card positions

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

**POST INGRESS SW RECONFIG**

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

NOTE

ASP doing C/W VOL adjust,  
 expect MA

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

**(IDP Equivalent)**

NOTE

IMU preflight align begins

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

**LCC ASTRO COMM CHECK**

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

**A MCC A/G VOICE CHECK**

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

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

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

1: GNC GPC MEMORY

2: GNC 104 GND IMU CNTL/MON

3: GNC GPC MEMORY

A SIMO VOICE CHECK (LAUNCH CONFIG)

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

NOTE

Side hatch closure

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

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

O1 √CAB PRESS – incr to 16.7 (MA)

NOTE

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

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

NOTE

Vent vlv operation may occur earlier or later at LCC direction

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

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

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

√tb – OP  
O1 √PRESS – decr

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

3: GNC GPC MEMORY

-32:00    C  
(-1:22:00)

**PASS/BFS TRANSFER PREP**

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

3: GNC BFS MEMORY

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

NOTE

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

-30:00    C  
(-1:20:00)

**OMS GN2 PRESS**

C3    OMS ENG (two) – ARM/PRESS

**P    WSB GN2 SUPPLY ACTIVATION**

R2    BLR N2 SPLY (three) – ON

-25:00    A  
(-1:15:00)

**A/G VOICE CHECK**

SIMO VOICE CHECK (LAUNCH CONFIG)  
Voice check with MCC

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

NOTE

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

-22:00    C  
(-1:12:00)

**REPORT CABIN PRESS**

3: BFS, SM SYS SUMM 1

CRT3,O1 Report cabin pressure (two) to OTC

3: BFS, GNC BFS MEMORY

**C    CLOSE VENT VLVS**

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

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

NOTE

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

TRAJECTORY UPDATE

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

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

**OPS 1 LOAD (IDP Equivalent)**

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

Report faults other than from unpwr  
equipment

CRT1 GNC, SPEC 99 PRO

-18:30 C  
(-58:30)

**BFS TO OPS 1**

3: BFS, GNC FAULT
-------------------

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

CRT3 GNC, OPS 101 PRO

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

Report faults other than from unpwr  
equipment

CRT3 GNC, SPEC 99 PRO

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

3: BFS, GNC FAULT
-------------------

2: GNC 50 HORIZ SIT
---------------------

3: BFS, GNC 50 HORIZ SIT
--------------------------

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

ALTM – ITEM 9 + 

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

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

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

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

C **CONFIG CONT ABORT YAW STEER**

CRT1 √ITEM 5 

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

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

-16:00  
(-56:00)

**P MPS He RECONFIG**

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

NOTE

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

**C √INTERCOM VOICE**

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

**WEATHER UPDATE (if reqd)**

Update Abort winds, RWY and ALTM  
setting

-9:00  
(~17:00)

**P CLEAR HARDWARE C/W MEMORY**

C3 C/W MEM – CLEAR

-9:00 MS1  
(~15:00)

Activate V10 Recorder

**-9:00 'GO FOR LAUNCH' (All)**

C2 EVENT TIMER – START  
F7 √TIME ind – counting down

NOTE

GLS starts

**-8:00 P CONNECT ESS BUSES TO FC (GLS √@ T-7:24)**

R1 ESS BUS SOURCE FC (three) – ON

-7:30

NOTE

Access arm retract

√ACES gloves  
Cinch down shoulder harness and lap belt

1: GNC LAUNCH TRAJ      2: GNC SYS SUMM 1

3: BFS, GNC SYS SUMM 2

3: BFS, SM SYS SUMM 2

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

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

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

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

R2      APU OPER (three) – START/RUN

HYD/  
APU      √HYD PRESS ind (three) – LO green

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

HYD/  
APU      √PRESS ind (three) – HI green

R2      CIRC PUMP (three) – OFF

F7      √PRESS It – off



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

**C HTR RECONFIG**

L2 FLASH EVAP FDLN HTR (two) – OFF

NOTE

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

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

2: GNC FAULT	
3: BFS, GNC FAULT	

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

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

C3 C/W MEM – CLEAR

-2:00 **A SUIT PREP**

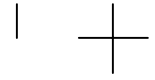
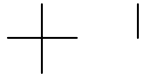
√Tabs/visor – cl/LES O2 – ON

MS1 ICOM RCDR – ON (if reqd)



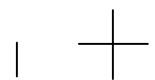
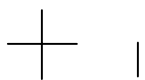
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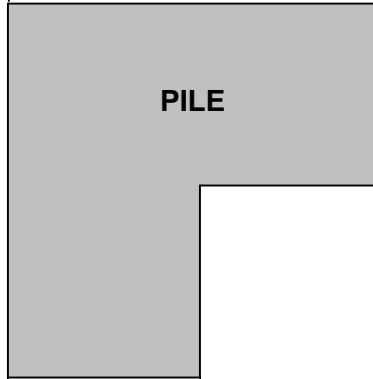


ASCENT PROCEDURES  
(FLIP BOOK)

**BAILOUT  
EGRESS**



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



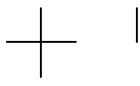
**ASCENT FLIP BOOK  
(EMERGENCY EGRESS)**

**PRELAUNCH  
MODE 1**

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

**POST LANDING  
MODE 5**

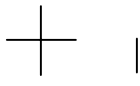
TABS – RELEASE  
VISOR – CLOSE / LOCK  
SUIT O2 – ON  
GREEN APPLE – PULL  
KNEEBOARDS – REMOVE  
COOLING – DISCONNECT  
SEAT RESTRAINT – RELEASE  
PARACHUTE (four) – RELEASE  
COMM – DISCONNECT  
(G-SUIT CLIP – PULL)  
SUIT O2 – DISCONNECT  
PLT – EMER PWR DOWN  
EGRESS SEAT  
SLIDE/ESCAPE PANEL



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



ASC



TOP  
BACK OF 'EMERGENCY EGRESS'

BAILOUT  
EGRESS

PILE

**SYS FLIGHT RULES**

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

**NO COMM MODE BOUNDARIES**

<b>NEG RETURN (104)</b>	8100	<b>2 ENG ZZA (104)</b>	6000
<b>PRESS TO ATO (104)</b>	10800	<b>ABORT TAL ZZA (4)</b>	
<b>SE OPS 3 (109)</b>	12100	EO VI	<input type="text"/>
<b>SE ZZA (104)</b>	14300	<b>SE OPS 3 ZZA (109)</b>	(4) <input type="text"/>
<b>PRESS TO MECO (104)</b>	17600	<b>SE ZZA (104)</b>	(4) <input type="text"/>
<b>SE PRESS (104)</b>	19100	<b>2 ENG MRN (104)</b>	
<b>NEG MRN (2 @ 67)</b>	20000	5900	
<b>LAST PRE MECO TAL</b>	23000	<b>ABORT TAL MRN (3)</b>	
<b>LAST TAL</b>		EO VI	<input type="text"/>
YJT	19900	<b>SE OPS 3 MRN (109)</b>	(3) <input type="text"/>
YYT	20200	<b>SE MRN (104)</b>	(3) <input type="text"/>
YQX	21900	<b>2 ENG FMI (104)</b>	
IKF	23700	6300	
INN	24000	<b>ABORT TAL FMI (29)</b>	
FFA	24200	EO VI	<input type="text"/>
BEJ	24300	<b>SE OPS 3 FMI (109)</b>	(29) <input type="text"/>
MRN	24400	<b>SE FMI (104)</b>	(29) <input type="text"/>
KBO	24500		
ZZA,ESN	25000		
FMI,KKI	25100		
JDG	25300		

**ASCENT PROCEDURES**



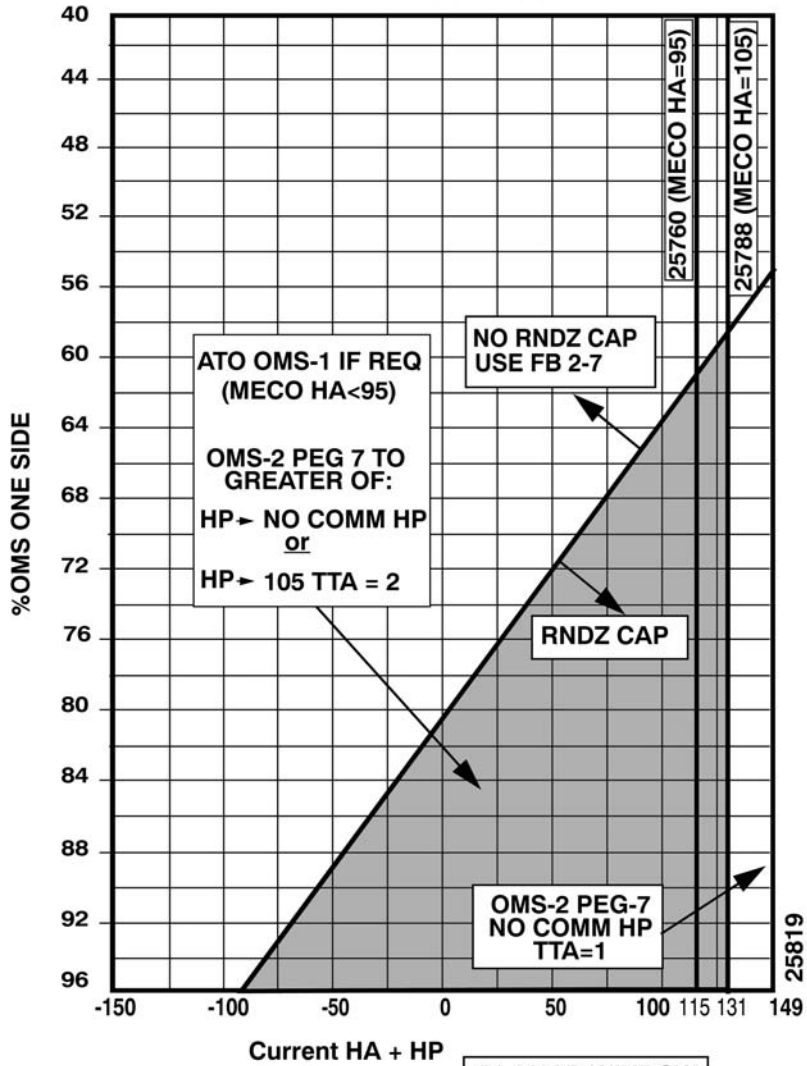
R180	LVLH	
.80M	√P <sub>c</sub> → 67%	
1.37M	√P <sub>c</sub> → 104%	
P <sub>c</sub> < 50+5 s	√SRB SEP (Backup AUTO SEP 2:21)	
	√TMECO	
	* If <u>NOT STABLE</u> (10 sec):	*
	* NO COMM – CSS & MAN THROT	*
MM103+10 s	√OMS assist	
	Close suit O2, open visor	
3:00	√EVAP OUT (T < 60)	
	* If NO COMM & 3 eng & 1 stuck in bucket	*
	* TAL Select at V <sub>1</sub> = 10800	*
	* If Systems ABORT reqd:	*
	* RTLS at 3:40 or	*
	* TAL Select prior to 23000	*
	* Otherwise Manual MECO 23700	*
V <sub>1</sub> = 13.2K	√Roll Heads Up	
	* If Man Throttle (3 eng):	*
	* Man Shutdn at 25700	*
	* If 1 eng:	*
	* TRAJ √SERC ON	*
	* When MPS PRPLT = 2%:	*
	* MAN THROT, P <sub>c</sub> → 67%	*
	* Man MECO @ CO mark BFS	*
MECO	√V <sub>1</sub> = 25819	
MECO+20 s	√ET SEP	
	* If 'SEP INH':	*
	* ET SEP – MAN	*
	* If Rates > .7,.7,.7:	*
	* MPS PRPLT DUMP SEQ – STOP	*
	* Null rates	*
	* ET SEP – SEP	*
	* Post ET Sep -Z xlation:	*
	* MPS PRPLT DUMP SEQ – GPC	*
	* If Rates < .7,.7,.7:	*
	* Assume Feedline Fail	*
	* If V <sub>1</sub> < 25760 or BFS Engaged:	*
	* OPS 104 – PRO (√BFS 104)	*
	* NOTE: Expect – 'Illegal Entry' (PASS)	*
	* 'Illegal TIG' (BFS)	*
▶ MM104+2 s	If ET Sep complete and HA > 72:	
	+X xlation for 11 sec	
	√TGTS	
	√ASC PKT for failures	
	If OMS 1 not reqd:	
	OMS ENG (two) – OFF	
	Go to <u>POST OMS 1</u>	

OMS 1  
TGTING

PILE

**STS-121 OCFR1 CY  
OMS 1/2 TGTING  
RENDEZVOUS RECOVERY**

ASC



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



TOP

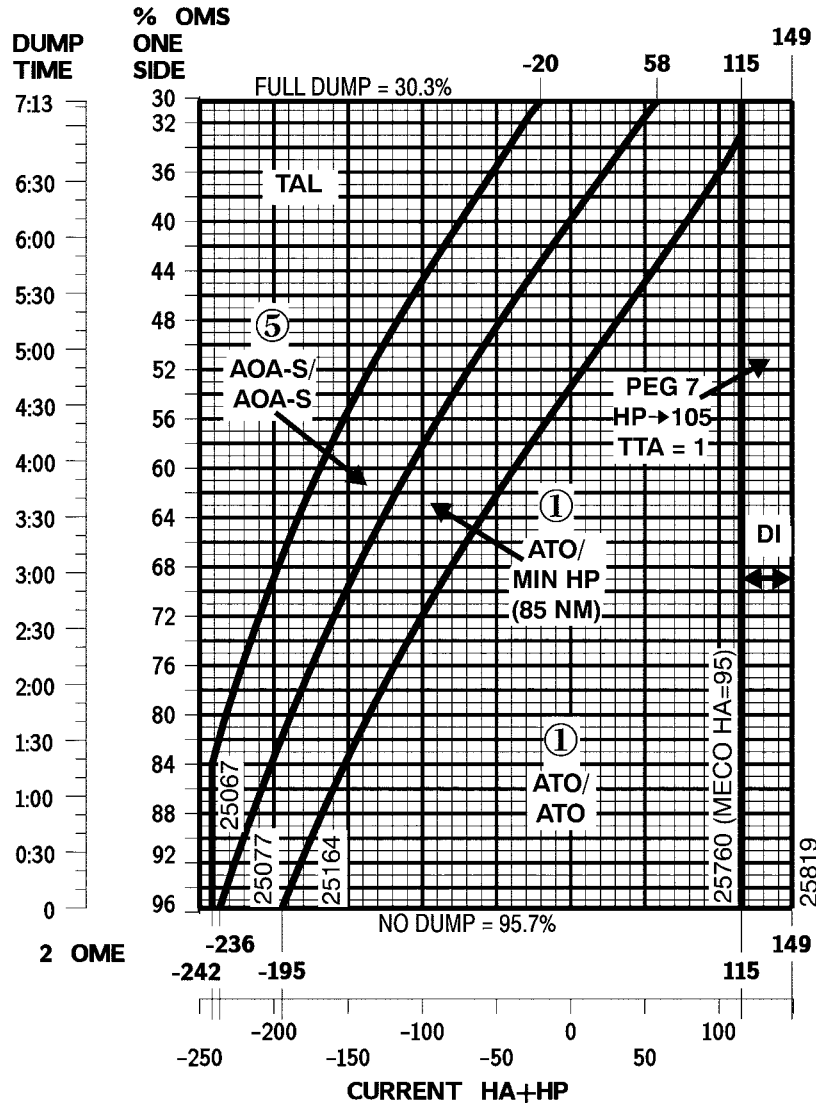
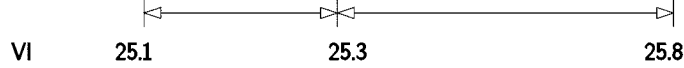
# STS-121 OCFR1 CY OMS 1/2 TGTING

HOOK

OMS 1 TIG:

MECO+2

TTA=2



OMS 1  
BURN

POST NOMINAL  
OMS ASSIST

% OMS/SIDE  
7 | 4

DUMP TIME  
2 : 2 | 2

FB 2-7

ASC/121/FIN

PILE

OMS 1 BURN

OMS 1  
TGTING

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

DAP – AUTO/DISC  
√ENG/TRIM CONFIG, LOAD TGTS, MNVR – (√INRTL) |  
OMS XFEED (four) – OP  
√CNTLR PWR (two) – ON  
√OMS ENG (two) – ARM/PRESS  
Note ΔVTOT \_\_\_\_ : \_\_\_\_

-:15 EXEC  
:00 TIG; start watch (√P<sub>c</sub>, ΔVTOT, ENG VLVs)

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

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

HOOK

**OMS 1 BURN MONITOR**

<b>OMS TEMP*</b> FU IN P ≥ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td><td>R</td></tr><tr><td>225</td><td>220</td></tr></table> ≤ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>205</td><td>204</td></tr></table> or No FU IN P	L	R	225	220	205	204	OMS ENG FAIL OMS ENG FAIL (PRPLT FAIL if 1 Pod Feed)
L	R						
225	220						
205	204						
<b>OMS PC* &amp; OMS ↓</b> (BFS: √accel)	OMS ENG FAIL						
<b>OMS OX/FU TK P</b> (√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						
<b>OMS He TK P LOW</b> (√ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>OMS/MPS</td></tr></table> )	OMS/MPS	At He P < 640 √OMS XFEED (four) – OP Aff OMS TK ISOL (two) – CL At Good OMS Qty = 5% OMS TK ISOL (four) – OP XFEED (four) – CL					
OMS/MPS							
<b>OMS N2 REG P HIGH or LOW</b>	OMS ENG – ARM						
<b>OMS N2 TK P LOW</b> (√ <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>OMS/MPS</td></tr></table> )	OMS/MPS	At N2 TK P < 470: OMS ENG – ARM					
OMS/MPS							
<b>OMS GMBL</b>	PRI fail L(R) OMS GMBL – SEC (twice) SEC fail If high RCS usage: OMS ENG FAIL						
<b>GPC</b> <b>1(4) &amp;</b> Burning OMS aff	aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF,ON L(R) OMS GMBL – SEC (twice)						
SEC GMBL lost 2 FAs lost	If high RCS usage: OMS ENG FAIL √MAN SHUTDN						
<b>I/O ERROR FA</b> <b>1(4)</b>	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						
<b>BCE STRG D</b> <b>1(4)</b>	I/O RESET (if recov: >>) If high RCS usage: L(R) OMS GMBL – SEC (twice)						
<b>I/O ERROR PCM</b>	OI PCMMU PWR – 2(1)						

OMS 2  
TGTING

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

TOP  
BACK OF 'OMS 1 BURN MONITOR'

PILE

**OMS 2 TARGETING**  
(DIR INSERTION)

**OMS 1  
BURN**

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

OMS

He	%	He	%
4800	96	2980	50
4580	90	2580	40
4180	80	2180	30
3780	70	1780	20
3380	60	1380	10
		980	0

TOP

HOOK

**ATO**

NOTE

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

<b>DUAL POD - OMS REQUIRED</b>				
<b>Includes 9.1 % Unusable ( 4.6 % per pod)</b>				
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	38.0	19.6	38.4	21.8
90	39.4	17.3	36.0	18.6
85	41.0	15.9	33.7	15.8
80	42.9	15.5	31.1	13.0
75	45.0	17.2	28.0	10.1
70	46.8	19.2	25.0	9.1
65	47.9	20.6	22.7	9.1
60	48.8	21.9	22.0	9.1
55	49.2	23.0	23.0	9.1
50	49.9	24.2	22.8	9.1
45	---	25.6	25.3	9.1

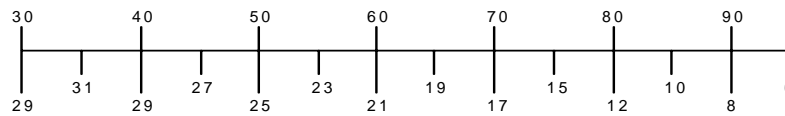
STS-121 OCFR1 CY

<b>SINGLE POD - OMS REQUIRED</b>				
<b>Includes 4.6 % Unusable</b>				
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	33.5	15.1	33.8	17.2
90	34.8	12.8	31.5	14.1
85	36.5	11.3	29.1	11.2
80	38.4	10.9	26.6	8.4
75	40.4	12.6	23.5	5.5
70	42.2	14.6	20.5	4.6
65	43.4	16.0	18.1	4.6
60	44.3	17.3	17.5	4.6
55	44.7	18.4	18.4	4.6
50	45.4	19.7	18.2	4.6
45	---	21.1	20.8	4.6

RTLS

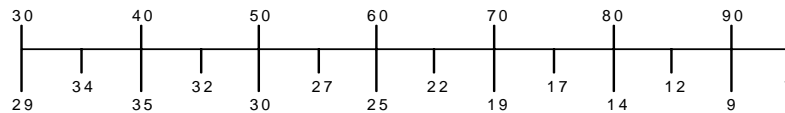
**OMS BLOWDOWN**

LEFT OMS GAGE QTY (%)



LEFT OMS BLDN EQUIV (%)

RIGHT OMS GAGE QTY (%)



RIGHT OMS BLDN EQUIV (%)

FB 2-11

ASC/121/FIN

**PILE**

**RTLS CDR**

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

**ABORT RTLS**

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



√GUIDANCE STATUS on RTLS TRAJ  
Expect PPA when GUID % to go = 0

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

**WINDS**

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

After PPA: √BFS ITEM 1 (\*)

TRAJ √Bugs, HSI √, 

SURF

**SPDBK @ 3000 FT**

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

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

**OMS 2  
TGTING**

- √ET SEP (MECO + 16 sec)
- √MM602 ( $\alpha > 10^\circ$  and SEP + 10 sec)
- √P,R/Y, SPDBK, BDY FLP – AUTO
- $\alpha = 50^\circ$  until ~1.8g, maintain 2.2g

Adjust seat

$\dot{H} > -320 \uparrow$  VERT SIT √ $\alpha$  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 $\theta$	PITCHAROUND at % (8°/sec)	FLYBACK INITIAL $\theta$
Liftoff	60°	44%	64°
:30	56°	47%	63°
1:00	57°	47%	63°
:30	56°	48%	62°
2:00	49°	51%	61°
:30	42°	51%	52°
3:00	38°	52%	50°
:30	34°	53%	48°
4:00	Last RTLS	52%	46°

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

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

\* **G51** MAX THROT – ITEM 4 (\*) \*

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

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

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

\* If KSC TACAN Fail: \*

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

**G51**  $\sqrt{AIR}$  DATA, INCORPORATE

MM603 HYD MPS/TVC ISOL VLV (three) – CL  
 (hold 5 sec, tb-CL)

H = 85K MLS (three) – ON  
 If Rwy 33(15): MLS CH (three) – 6(8)  
 I/O RESET

M = 2.7 R HUD PWR – ON

M < 1.0  $\sqrt{R}$  FLT CNTLR PWR – ON

Lock Inertia Reels

M = 0.7  $\sqrt{LG}$  EXTD ISO VLV – OP

H = 10K  $\sqrt{BDY}$  FLP – TRAIL

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

POST LANDING: ENT, POST LDG

TAL

TOP  
BACK OF 'RTL PLT'

**PILE**

**TAL CDR**

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

ABORT TAL

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

TAL	HDG
ZZA	010
MRN	016
FMI	006

\*LO XRNG

SITE	RWY	TACANS	ITEM 5	MLS	LENGTH
2	BEN 36/18	BEN 108	MAK 80 (DME)	6/-	13720/12720
3	MRN 20/02	MRN 100	AOG 23	6/-	11730/11730
4	ZZA 30L/12R	ZZA 64	ZZA 77 (DME)	6/-	12200/12200
12	*BEN 36/18	BEN 108	MAK 80 (DME)	6/-	13720/12720
13	*MRN 20/02	MRN 100	AOG 23	6/-	11730/11730
14	*ZZA 30L/12R	ZZA 64	ZZA 77 (DME)	6/-	12200/12200
19	YJT 09/27	YJT 78	YDF 80 (DME)	-/-	9500/9500
20	YYT 29/11	UYT 23	YYT 82 (DME)	-/-	8500/8500
21	YQX 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	HL44 (DME)	-/-	9520/9560
26	INN 06/24	SHA 80 (DME)	CRN 37 (DME)	-/-	9540/9540
27	FFA 27/09	FFA 81	BZN 56	-/-	9490/9490
28	KBO 14L/32R	GIX 18	DOR 23Y (DME)	-/-	12020/12020
29	FMI 33/15	FMI 16	NIM 53	6/-	11300/12300
30	ESN 03R/21L	BAG 78 (DME)	BUK 90 (DME)	-/-	11800/11800
31	KKI 15R/33L	RIY 92	KIA 80	-/-	13300/13300
32	JDG 31/13	NKW 57	NKW 57	-/-	12000/12000

\* If second eng fails:  $TRAJ$   $\checkmark$  SERC ON \*

\*  $G50$   $\checkmark$  SITE ( $\checkmark$  Redes card) \*

$V_1 = 15.0K$

$\checkmark$  Roll Heads Up

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

**MECO**

MECO+20 s  
MECO+37 s

$\checkmark$  ET SEP,  $\checkmark$  AUTO -Z TRANS  
 $\checkmark$  MM104

**MECO**

**Abort TAL (if reqd):**

$\checkmark$  TAL flag set:  $G50$  ITEM 41 = TAL SITE (any site)

$\checkmark$  MECO  $V_1$  vs HI/LO Energy (TAL PLT)

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

**PASS, OPS 301 PRO ( $\checkmark 304$ )**

\* No joy in 68 sec: BFS - ENGAGE \*

\* BFS, OPS 301 PRO \*

RTL

**BFS, OPS 301 PRO ( $\checkmark 304$ ) MM304**

$G50$   $\checkmark$  SITE, RWY, TACAN  
S/B & ALTM (PASS/BFS)

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

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

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

\* Pitch - AUTO when  $H = 0 \uparrow$  (2nd pullout) \*

$V = 10K$

$V = 7K$

$\checkmark$  SPDBK  $\rightarrow 81\%$

Go to ENTRY MANEUVERS

(Cue Card)

SURF WIND

**SPDBK @ 3000 FT**

ALTM

AIM PT

SPDBK

/



TAL PLT



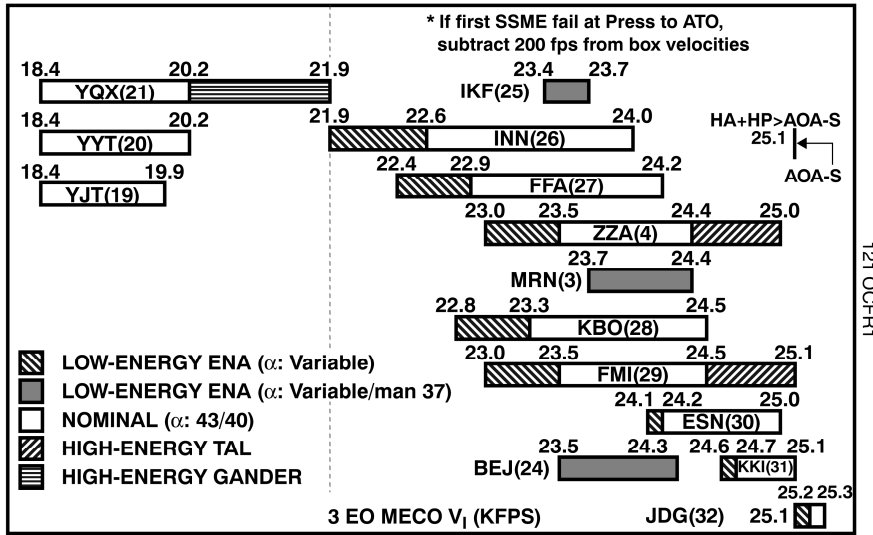
√OMS DUMP

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

√AUTO THROT

- \* If second eng fail or STUCK TAL: \*
- \* When MPS PRPLT = 2%: \*
- \* MAN THROT, P<sub>c</sub> → 67% \*
- \* Man MECO @ CO mark **BFS** \*

----- MECO --- V<sub>1</sub> ~24.0K @ CO mark **BFS** ----- MECO -----



----- MM304 -----

√OMS DUMP

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

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

V = 7K      MLS (three) – ON (√channels)  
I/O RESET  
Go to ENTRY MANEUVERS (Cue Card)

ECAL

TOP  
BACK OF 'TAL PLT'

PILE

**POWERED ECAL**

**G51** √MAX THROT – ITEM 4 (\*)


√ADI (two) – REF

√θ → 60°, Yaw → 45°

√Roll to Heads Up

**G50** Select SITE and TACAN

When EAS > 4 and incr:

√Yaw to 

√Pitch down at 3°/sec

√MECO, ET SEP

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

√MM602 (BFS, OPS 602 PRO)

Go to ECAL ENTRY

**2 E/O ECAL (51.6°)**

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

\*Probable bailout region

(D) - DME only

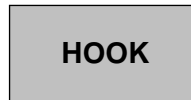
**3 E/O ECAL (51.6°)**

MM 602 Velocity (Vrel)			Location	Site	RWY	TACANs
IP - 2:30	In Plane	IP + 2:30				
*5.3-6.6	*5.3-6.6	*5.3-6.7	Wilmington	6	ILM 06	ILM 117
*6.6-8.9	*6.6-8.7	*6.7-7.3 7.3-8.0 *8.0-8.6	Cherry Point	7	NKT 32L	EWN 83 (D)
*8.9-10.2	*8.7-10.0	*8.6-9.7	Oceana NAS	8	NTU 32R	NFE 19Y
*10.2-10.9	*10.0-10.7	*9.7-10.6	Wallops	9	WAL 28	SBY 49
	*10.7-11.0	*10.6-11.0	Atlantic City	11	ACY 31	CYN 81
*10.9-11.9 11.9-13.9	*11.0-11.6 11.6-14.4	*11.0-11.2 11.2-14.7	Otis ANGB	16	FMH 32	BOS 74
	11.8-12.4	11.2-13.0	Gabreski	15	FOK 06	HTO 83
	12.8-13.8	12.9-14.2	Pease Int'l	17	PSM 34	ENE 118
13.5-17.2	13.3-17.4	13.1-17.2	Halifax Int'l	18	YHZ 24	UAW 38
15.2-18.0	15.0-18.0	14.9-18.0	Stephenville	19	YJT 09	YJT 78
15.4-18.0	15.3-18.0	15.3-18.0	St. Johns Int'l	20	YYT 29	UYT 23
15.5-18.0	15.4-18.0	15.2-18.0	Gander Int'l	21	YQX 21	YQX 74
		17.3-17.6	Goose Bay	22	YYR 26	UYR 40

\*Probable bailout region

(D) - DME only

TAL



HI-ENER  
GANDER

**ECAL ENTRY**

If 3 OUT ECAL or 2 OUT SECOND GREEN:

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

Before NZ Hold:

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

BFS, **G50** √SITE and TACAN

Nz Hold:

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

**G50** √TACANS, INCORPORATE

M < 5 and EAS < 333↓:

AIR DATA PROBE (two) – Deploy (√Heat)

**G50** INCORPORATE Air Data ASAP

M = 3.2: √OPS 603

Select UHF-G T/R

**NO COMM ECAL LNDG CRITERIA**

@H = 70K, √Range:

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

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

**ECAL LANDING:**

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

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

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

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



ECAL



PILE

MM104

**HIGH-ENERGY GANDER CDR**

**Abort TAL:**

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



-----**MM304**-----

MM304 P, R/Y – CSS  
√VREL

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

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

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

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

Go to ENTRY MANEUVERS (Cue Card)



## HIGH-ENERGY GANDER PLT

HOOK

## -----MM304-----

BFS, OPS 301 PRO (√304)

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



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

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

**Earlier of**  
 $\dot{H} = -700 \downarrow$   
**or Guid Init** Roll Heads Up, maintain Alpha = 55°

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

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

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

Go to ENTRY MANEUVERS (Cue Card)



## HIGH-ENERGY TAL PLT

HOOK

## -----MM304-----

BFS, OPS 301 PRO (√304)

[G50] If [FMI] GO TAL Site – Select [FMI] –  
ITEM 41 + [29]

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

[TRAJ] √BUGS, [HSI] √<sup>H</sup>, RANGE

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

**Guid Init:**  
(D = 3, q̄ = 8,  
EAS = 48)

- \* If no comm and [ZZA/FMI] \*
- \* initial Commanded Drag (←) ≥ [35] , \*
- \* [G50] Select Site [ESN] – ITEM 41 + [30] \*
- \* \*

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

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

V = 10K √SPDBK → 81%

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

Go to ENTRY MANEUVERS (Cue Card)

ABORT  
DUMPS

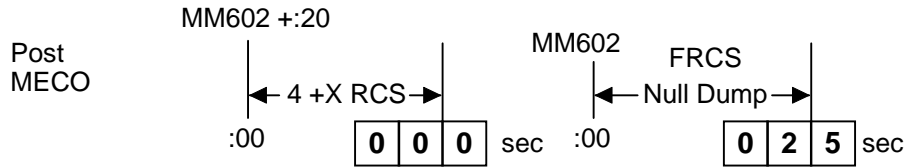
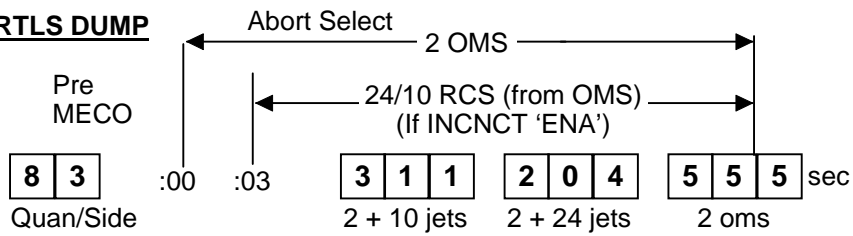
TOP  
BACK OF 'ECAL ENTRY'

**PILE**

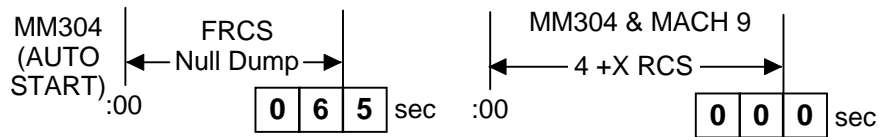
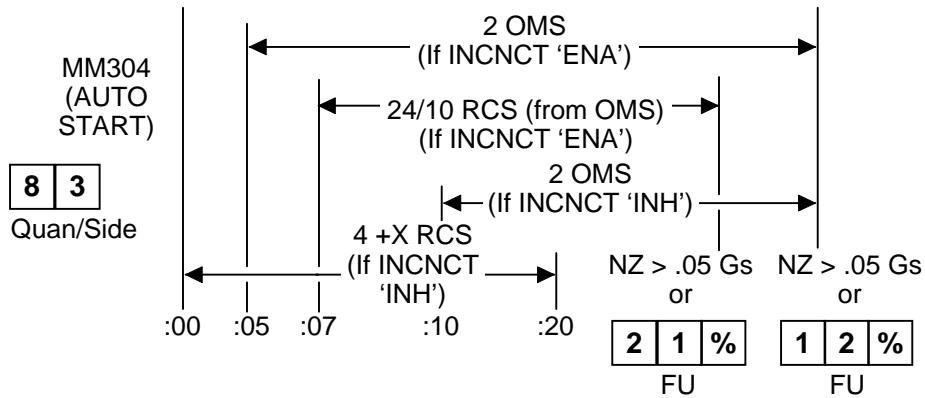
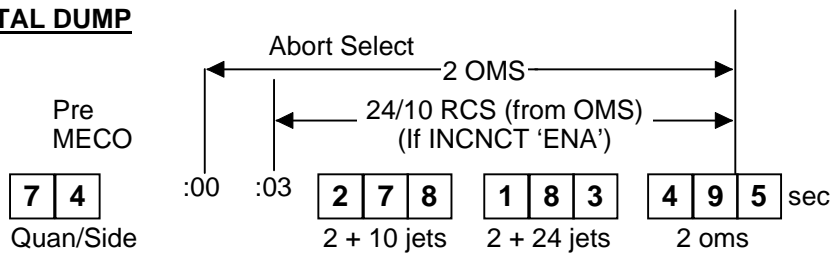
**RTLS/TAL DUMPS**

HI ENER  
TAL

**RTLS DUMP**



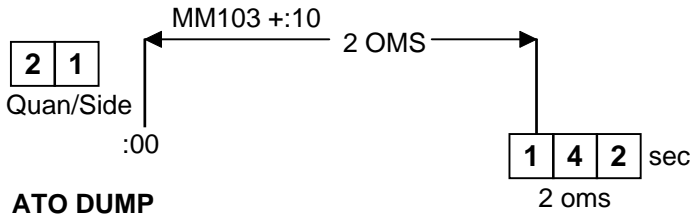
**TAL DUMP**



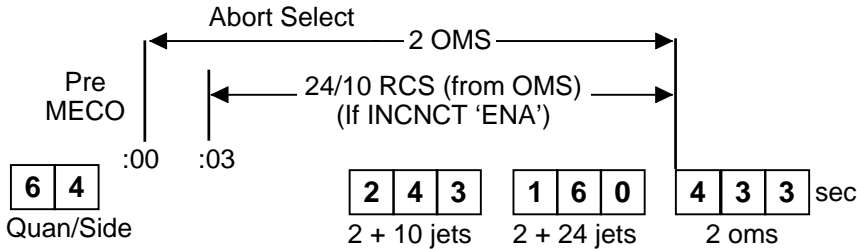




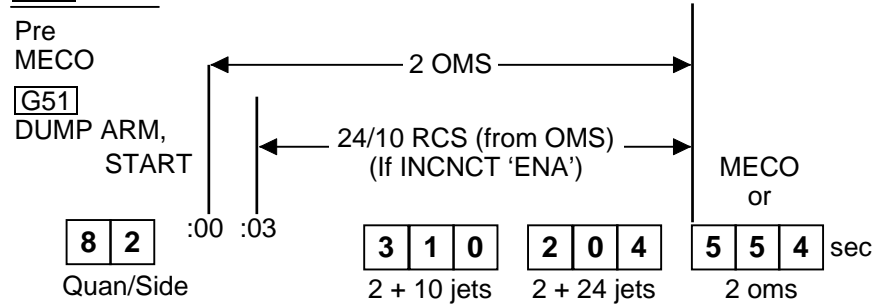
**ASSIST/ATO/G51 DUMPS**  
**ASSIST DUMP**



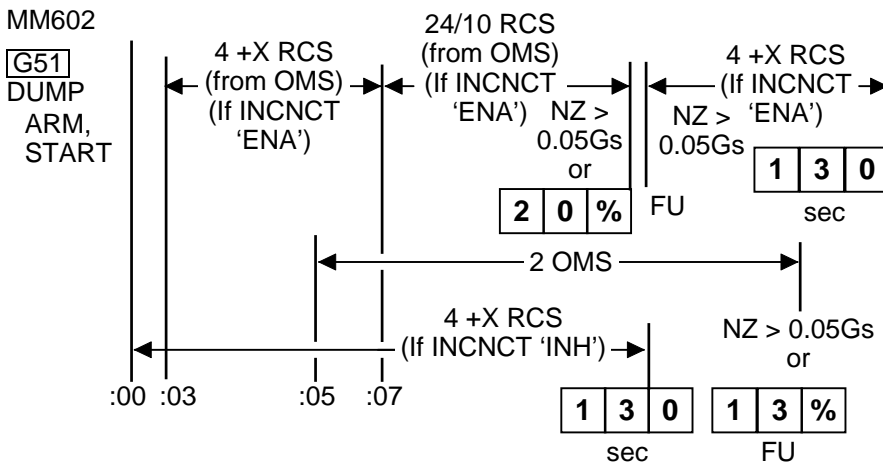
**ATO DUMP**



**G51 DUMP**



PWRD  
CSS



TOP  
BACK OF 'ASSIST/ATO/G51 DUMPS'



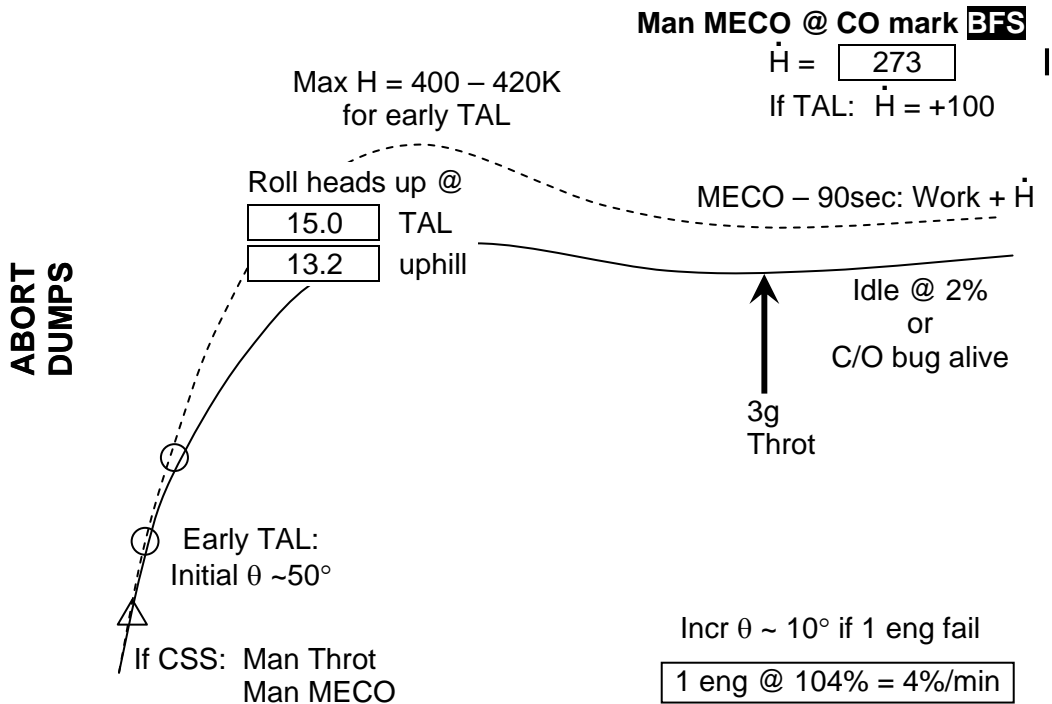
**PILE**

**POWERED CSS – UPHILL/TAL**

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

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

If TAL $\sqrt{HDG}$	
ZZA	010
MRN	016
FMI	006



# POWERED CSS – RTLS

**HOOK**

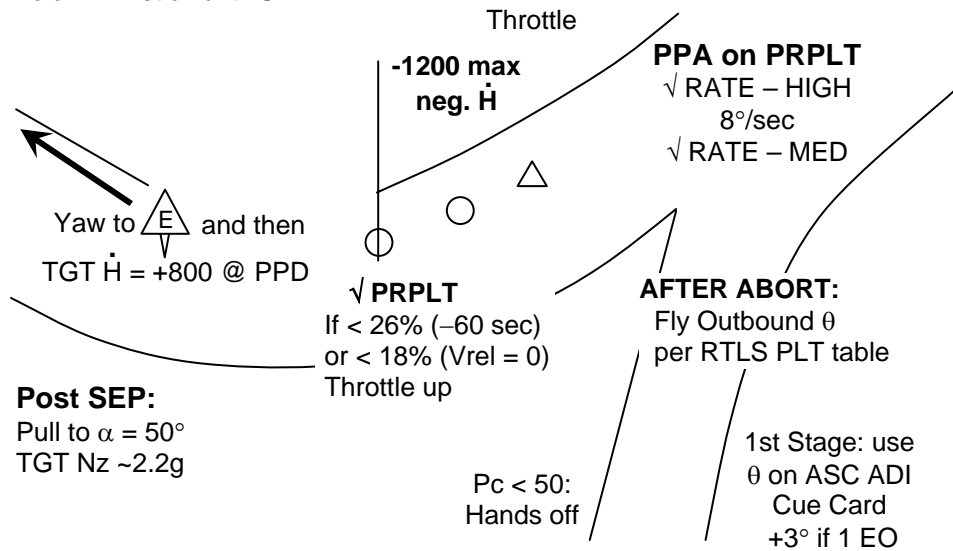
CSS & MAN THROT  
(IF MET < 1:30, ENGAGE BFS)

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

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

**R** Yaw to **R**

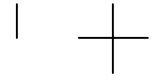
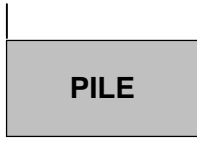
$\dot{H}$  control:  
Use  $\theta$  then  
Throttle



1 eng @ 104% = 4%/min

If CSS: Man Throt  
Man MECO

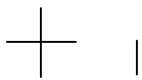
TOP  
BACK OF 'POWERED CSS – RTLS'



PILE

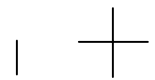
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PWRD  
CSS



FB 2-26

ASC/121/FIN





ASCENT/ENTRY CUE CARDS

**ASC/ENT  
CUE CARDS**



MS ONLY

2-27

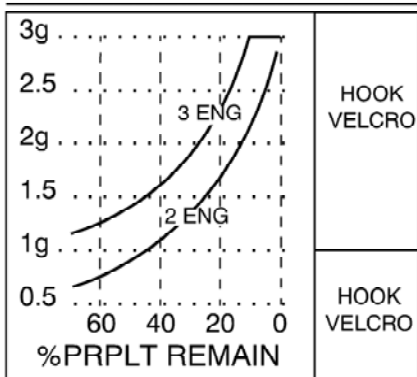
ASC/121/FIN



ASC/ENT  
CUE CARDS

**ASCENT ADI - NOMINAL**

TIME	$\theta$	H	$\dot{H}$	(121 OCFLQ CY)
0:30	71	10K	675	
0:50	63	27K	1008	
1:10	53	50K	1404	
1:30	40	84K	1885	
1:50	31	125K	2195	



-STAGING-

$V_1$	$\theta$	H	$\dot{H}$	ASC-14a/121/A/B
6	20	229K	1626	
7	16	283	1193	
8	14	316	857	
9	11	336	585	
10	10	348	362	
12	6	357	36	
14	9	355	-161	
16	25	350	-236	
18	23	344	-267	
20	21	339	-214	
22	19	337	-100	
24	17	337	68	
25819	13	345	273	

### ENTRY ALPHA

VR	$\alpha_{ref}$	R	H	H <sub>ref</sub>	R <sub>ref</sub>
25	40	4472	400		
24	HI 40 LO	2634	245	-46	R80
23	43 40 37	2158	237	-63	71
22	43 40 37	1801	231	-82	66
21	43 40 37	1522	225	-104	L63
20	43 40 37	1302	218	-121	60
19	43 40 37	1127	211	-142	61
18	43 40 37	978	205	-166	62
17	43 40 37	864	198	-184	63
16	43 40 37	766	191	-196	64

## KSC 15

MAX L/D	
M	$\alpha$
3	17
2	15
1	12

ASC-14b/121/A,E/A

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

121 OCFR1 CY

15	43 40 37	683	185	-119	64
14	43 40 37	615	181	-126	62
13	43 40 37	547	178	-136	59
12	43 40 37	481	173	-154	57
11	42 39 36	426	168	-195	R55
10	41 38 35	376	164	-174	46
9	39 36 33	327	158	-205	43
8	37 34 31	278	150	-237	40
7	33 30 27	230	141	-266	39
6	30 27 24	184	130	-272	40
5	26 23 20	141	117	-275	42
4	22 19 18	106	105	-263	L41
3	19 16 15	75	89	-248	40
2.5	14	61	82	-216	
2	12	49	76	-282	
1.5	9	37	65	-331	
1	8	28	51	-263	



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MS ONLY

2-30

ASC/121/FIN





### ENTRY MANEUVERS

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

ENT-6a/E/N

**ENT  
MNVR**

FLIGHT CONDITIONS	MANEUVER
V = 7K	√TACAN status * If ELS: UHF MODE – G T/R *
V = 5K	ADTA PROBES – DEPLOY (√HEAT) Begin AIL and RUD trim monitoring
M = 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 <sup>2</sup> , -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 <sup>2</sup> (-0.2G) (Antiskid cutout)
WHEEL STOP	Go to ENT C/L, <u>POST LANDING PROCEDURES</u>

ENT-6b/E/V  
(Partial)

ENT  
MNV

**DRAG CHUTE DEPLOY**

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

**FAILED TIRE TECHNIQUE**

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

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

ENT-6b/E/V  
(Partial)



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MS ONLY

2-34

ASC/121/FIN





CONT  
ABORT

ABORT CUE CARDS



NOT FLOWN

2-35

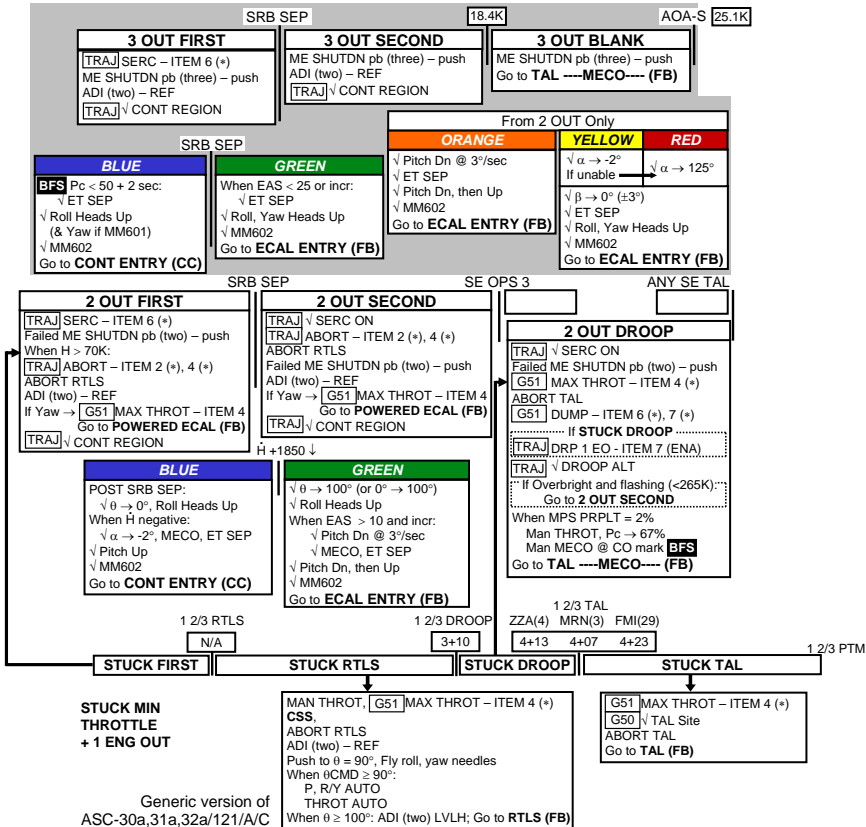
ASC/121/FIN



**CONT  
ABORT**

**CONTINGENCY ABORT**

High Inclination  
51.6°



# CONTINGENCY ABORT

## CONT ENTRY / MM602

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

Before NZ Hold  
RHC/PNL TRIM – ENA  
If  $M < 5$ ,  
√ AIL/RUD TRIM  
If  $M < 3$ , S/B = 65%

$M \leq 5$  and  $EAS < 333$  ↓  
ADTA PROBES – Deploy  
G50 Incorp Air Data ASAP

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

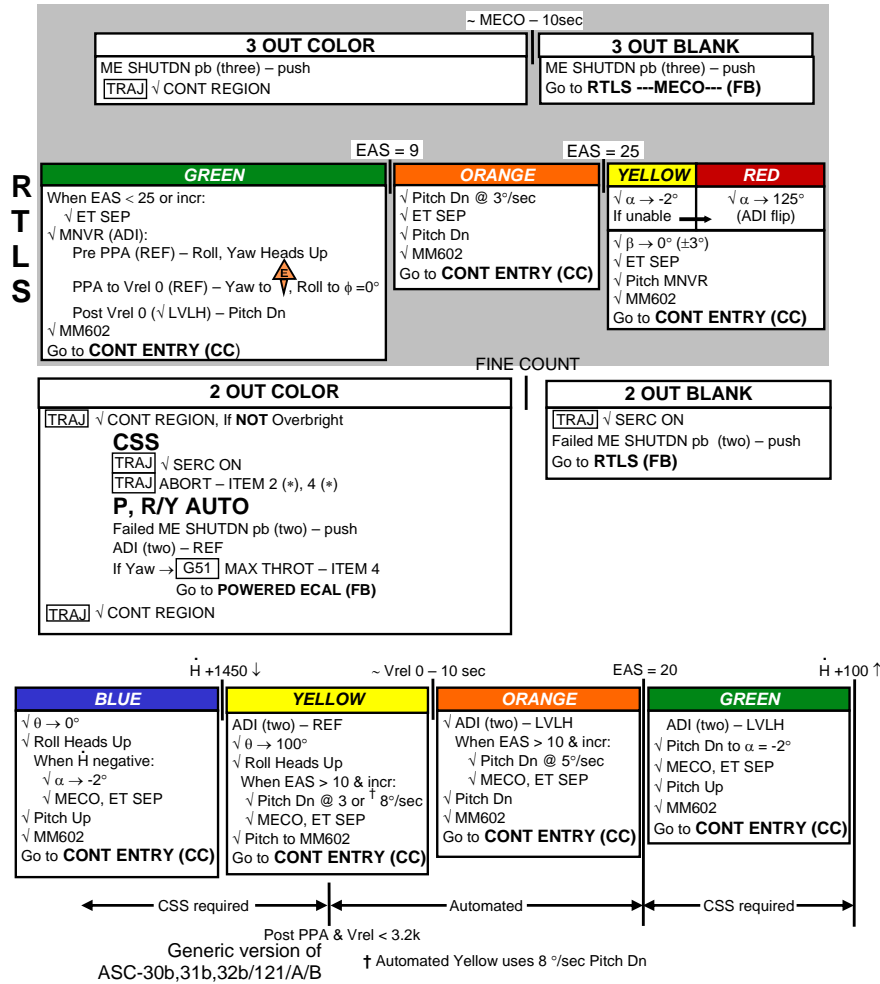
Select UHF – G T/R

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

Generic version of  
ASC-30a,31a,32a/121/A/C

# 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 ≤ 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)**

**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 →

Generic version of  
ASC-30b,31b,32b/121/A/B

NOT FLOWN

2-39

ASC/121/FIN 1

**ZZA TAL REDESIGNATION  
(121 OCFLQ)**

1st E.O. VI		6000	6100	6200	6300	6400	6500	6600	6700
SE OPS 3 ZZA 109	(4)	10900	11000	11000	11000	11100	11100	11100	11200
SE ZZA 104	(4)	17600	17400	17200	17000	16800	16600	16400	16200

1st E.O. VI		6800	6900	7000	7100	7200	7300	7400	7500
SE OPS 3 ZZA 109	(4)	11200	11200	11300	11300	11300	11400	11400	11400
SE ZZA 104	(4)	16000	15800	15600	15500	15300	15100	15000	14800

1st E.O. VI		7600	7700	7800	7900	8000	8100	8200	8300
SE OPS 3 ZZA 109	(4)	11400	11500	11500	11500	11500	11600	11600	11600
SE ZZA 104	(4)	14700	14500	14400	14300	14100	14000	13900	13900

1st E.O. VI		8400	8500	8600	8700	8800	8900	9000	9100
SE OPS 3 ZZA 109	(4)	11600	11600	11700	11700	11700	11700	11700	11700
SE ZZA 104	(4)	13800	13700	13600	13600	13500	13500	13500	13500

1st E.O. VI		9200	9300	9400	9500	9600	9700	9800	9900
SE OPS 3 ZZA 109	(4)	11800	11800	11800	11800	11800	11800	11800	11800
SE ZZA 104	(4)	13400	13400	13400	13400	13400	13400	13400	13400

1st E.O. VI		10000	10100	10200	10300	10400	10500	10600	10700
SE OPS 3 ZZA 109	(4)	11900	11900	11900	11900	11900	11900	11900	11900
SE ZZA 104	(4)	13400	13500	13500	13500	13500	13600	13600	13600

1st E.O. VI		10800							
SE OPS 3 ZZA 109	(4)	11900							
SE ZZA 104	(4)	13600							

ASC-9a/121/A/B

NOT FLOWN

2-40

ASC/121/FIN 3

**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/121/A/A

NOT FLOWN

2-41

ASC/121/FIN

**MRN TAL REDESIGNATION  
(121 OCFLQ)**

1st E.O. VI		5900	6000	6100	6200	6300	6400	6500	6600
SE OPS 3 MRN 109	(3)	10900	11000	11000	11000	11000	11100	11100	11100
SE MRN 104	(3)	17100	17000	16800	16600	16400	16200	16100	15900

1st E.O. VI		6700	6800	6900	7000	7100	7200	7300	7400
SE OPS 3 MRN 109	(3)	11100	11200	11200	11200	11200	11300	11300	11300
SE MRN 104	(3)	15700	15500	15400	15200	15100	14900	14800	14600

1st E.O. VI		7500	7600	7700	7800	7900	8000	8100	8200
SE OPS 3 MRN 109	(3)	11300	11400	11400	11400	11400	11400	11500	11500
SE MRN 104	(3)	14500	14400	14300	14100	14000	13900	13900	13800

1st E.O. VI		8300	8400	8500	8600	8700	8800	8900	9000
SE OPS 3 MRN 109	(3)	11500	11500	11500	11600	11600	11600	11600	11600
SE MRN 104	(3)	13700	13600	13600	13500	13500	13500	13400	13400

1st E.O. VI		9100	9200	9300	9400	9500	9600	9700	9800
SE OPS 3 MRN 109	(3)	11700	11700	11700	11700	11700	11700	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)	11800	11800	11800	11800	11900	11900	11900	11900
SE MRN 104	(3)	13400	13400	13400	13500	13500	13500	13600	13600

1st E.O. VI		10700	10800						
SE OPS 3 MRN 109	(3)	11900	11900						
SE MRN 104	(3)	13600	13600						

ASC-10a/121/A/B

**ECAL – ZZA or MRN or FMI PRIME TAL**

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

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

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

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

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

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

ASC-10b/121/A/A

NOT FLOWN

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ASC/121/FIN

**FMI TAL REDESIGNATION  
(121 OCFLQ)**

1st E.O. VI		6300	6400	6500	6600	6700	6800	6900	7000
SE OPS 3 FMI 109	(29)	11000	11100	11100	11100	11100	11200	11200	11200
SE FMI 104	(29)	18000	17800	17600	17400	17200	17000	16800	16600

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)	16400	16200	16000	15800	15600	15400	15300	15100

1st E.O. VI		7900	8000	8100	8200	8300	8400	8500	8600
SE OPS 3 FMI 109	(29)	11500	11500	11500	11500	11500	11600	11600	11600
SE FMI 104	(29)	15000	14800	14700	14600	14400	14300	14200	14200

1st E.O. VI		8700	8800	8900	9000	9100	9200	9300	9400
SE OPS 3 FMI 109	(29)	11600	11600	11700	11700	11700	11700	11700	11700
SE FMI 104	(29)	14100	14000	14000	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	11800	11900
SE FMI 104	(29)	13800	13800	13800	13800	13800	13800	13800	13800

1st E.O. VI		10300	10400	10500	10600	10700	10800		
SE OPS 3 FMI 109	(29)	11900	11900	11900	11900	11900	11900		
SE FMI 104	(29)	13800	13800	13900	13900	13900	13900		

ASC-12a/121/A/B

NOT FLOWN

2-44

ASC/121/FIN 3

**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	10.3 - 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/121/A/A

NOT FLOWN

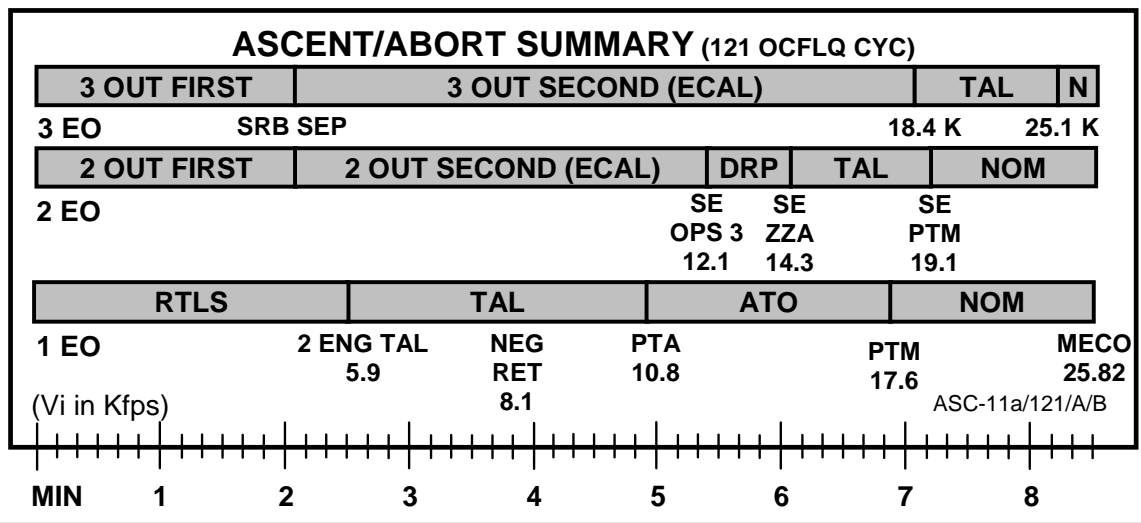
2-45

ASC/121/FIN

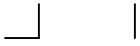
NOT FLOWN

2-46

ASC/121/FIN 3







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: (14:29 Nom) \* |
- \* ET SEP – SEP \*
- \* At MM104 + 2 sec \*
- \* +X xlation for 11 sec \*
- \* At OMS 1 TIG: (16:11 Nom) \* |
- \* Pitch up at 2°/sec until ET in O/H \*
- \* window (P ~100°) \*
- \* 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)  
(10:32 Nom) |

C At OMS 1 TIG + 0 sec: (MECO + 2:03)

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

Control pitch rate 2°/sec max (P down – accel)

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

When ET in O/H window (MS call or P ~110°):

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) (12:30 Nom) |

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

POST  
OMS 1

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

**C POST BURN STATUS**

NOMINAL  OMS 1 TIG TO MCC  :

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

P When MPS dump complete: |

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

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

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

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

**P APU/HYD SHUTDN**

√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 \*

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

NOTE

Double times for single motor operation

R2

ET UMB DR

MODE – GPC/MAN  
CTRLLINE LAT – STO

√After 6 sec, CTRLLINE LAT tb – STO

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

CTRLLINE LAT – GND  
L,R DR (two) – CL (tb-bp)

√After 24 sec, L,R DR tb (two) – CL

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

L,R DR (two) – OFF  
LAT (two) – LAT (tb-bp)

√After 6 sec, L,R LAT tb (two) – LAT

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

L,R LAT (two) – OFF  
MODE – GPC

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

**OMS BURN PREP**

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

P O8 L,R OMS  
 √He PRESS/VAP ISOL A (two) – GPC  
 B (two) – CL  
 √TK ISOL (four) – GPC (tb-OP)  
 √XFEED (four) – GPC (tb-CL)

B Wedge Install OMS 2/ORBIT OMS BURN and  
OMS 2 BURN MONITOR Cue Cards  
 (F6,F8)

If FRCS reqd,  
 Go to OPS 1 RCS BURN (Cue Card)

**OMS 2 BURN ATTITUDE MNVR**

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

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

**B SEAT SAFING AND ADJUSTMENT**

Adjust Back Angle

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





OMS 2 BURN CARDS

**OMS 2**

MS ONLY

4-1

ASC/121/FIN



### OMS 2 BURN MONITOR

<b>OMS TEMP*</b> FU IN P $\geq$ <span style="border: 1px solid black; padding: 2px;">L 225 R 220</span> $\leq$ <span style="border: 1px solid black; padding: 2px;">205 204</span> or No FU IN P	OMS ENG FAIL OMS PRPLT FAIL
<b>OMS PC* &amp; OMS</b> $\downarrow$ (BFS: $\sqrt{\text{accel}}$ ) ENG VLV 1 or 2 < 70 or OX IN P > 227 OX IN P $\leq$ 227 or No OX IN P	OMS ENG FAIL OMS PRPLT FAIL
<b>OMS OX/FU TK P</b> ( $\sqrt{\text{ENG IN P}}$ ) OX/FU LOW OX & FU HIGH	He PRESS/VAP ISOL (two) – OP If aff TK P not incr: He PRESS/VAP ISOL (two) – CL At PC < 72 or OMS TEMP or HP > <span style="border: 1px solid black; padding: 2px;">85</span> : OMS PRPLT FAIL He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284
<b>OMS He TK P LOW</b> ( $\sqrt{\text{OMS/MPS}}$ )	At He P < 640 or QTY $\leq$ 41: If HP < <span style="border: 1px solid black; padding: 2px;">85</span> : OMS XFEED from good OMS At HP > <span style="border: 1px solid black; padding: 2px;">85</span> : OMS PRPLT FAIL
<b>OMS N2 REG P HIGH or LOW</b> <b>OMS N2 TK P LOW</b> ( $\sqrt{\text{OMS/MPS}}$ )	OMS ENG – ARM At N2 TK P < 470: OMS ENG – ARM
<b>OMS GMBL</b> PRI fail SEC fail	L(R) OMS GMBL – SEC (twice) If high RCS usage: OMS ENG FAIL
<b>GPC</b> <b>1(4)</b> & Burning OMS aff SEC GMBL lost 2 FAs lost	aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF, ON L(R) OMS GMBL – SEC (twice) If high RCS usage: OMS ENG FAIL $\sqrt{\text{MAN SHUTDN}}$
<b>I/O ERROR FA</b> <b>1(4)</b> 2 FAs lost	L(R) OMS GMBL – SEC I/O RESET (if recov: BFS I/O RESET) If high RCS usage: OMS ENG FAIL $\sqrt{\text{MAN SHUTDN}}$
<b>BCE STRG D</b> <b>1(4)</b>	I/O RESET (if recov: $\rightarrow$ ) If high RCS usage: L(R) OMS GMBL – SEC (twice)
<b>I/O ERROR PCM</b>	OI PCMMU PWR – 2(1)

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

ASC-5a/121/A,O/B

OMS 2

**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			
	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<sub>c</sub> 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<sub>c</sub>, 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	OMS 2	TAIL ONLY CNTL	Orbit
Residuals:	VGO X < 0.2 fps	VGO X < +0.2 fps	All axes < 0.2 fps
	VGO Y,Z < 2 fps		

ASC-6a/121/A,O/A

## OPS 1 RCS BURN

### AFT RCS

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

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

### FWD RCS

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

#### NOTE

Error needles invalid during burn

Burn time = ~2X TGO

TGT Hp =  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/121/A,O/A

POST OMS 2 BURN PROCEDURES

**POST  
OMS 2**

5-1

ASC/121/FIN

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

**C POST BURN STATUS**

NOMINAL

$\Delta$ 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/121/FIN



# DIRECT INSERTION AOA DEL PAD

DEORBIT										
PRPLT	( ) [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]									
BURN CUE CARD:										
	OMS ENG FAIL XFEED QTY CUE				%L	[ ] [ ]	%R	[ ] [ ]		
TOT AFT QTY 1 (%)							1	1	7	
TOT AFT QTY 2 (%)								5	3	
FLIP ΔV								4	8	
AFT ΔV								1	9	
B/U SITE							N	/	A	
FRCS: DUMP TO % (USE TIME AS CUE)					<input type="checkbox"/> OX	<input type="checkbox"/> FU				
ENTRY / LANDING										
EI - 5 MM303 INRTL ATT (6-30)	R	[ ] [ ] [ ] [ ]	P	[ ] [ ] [ ] [ ]	Y	[ ] [ ] [ ] [ ]				
MM304 PREBANK (ENT MNVR Cue Card)			<input type="checkbox"/> L	<input type="checkbox"/> R						
ALTM SET (6-34)					.					
CLG INIT	[ ] [ ]	:	[ ] [ ]	:	[ ] [ ]					
EXPECTED AIL TRIM			<input type="checkbox"/> L	<input type="checkbox"/> R		.				
VREL 1ST REVERSAL					.					
XCG AT TD					.					
LAND SITE	[ ] [ ]	RWY	[ ] [ ] [ ] [ ] [ ] [ ]			50K	/			
		<input type="checkbox"/> L	<input type="checkbox"/> OVHD	[ ] [ ] [ ] [ ]	deg	[ ] [ ]	MLS	38K	/	
		<input type="checkbox"/> R	<input type="checkbox"/> STRT	[ ] [ ] [ ] [ ]	TAC			28K	/	
ΔT MACH < 1 TO HAC	[ ] [ ]	:	[ ] [ ]	MAX Nz	[ ] [ ] [ ] [ ]	Nz LIMIT	[ ] [ ] [ ] [ ]	WINDS: (ENT MNVR Cue Card)	12K	/
ΔT HAC INIT TO H = 20K	[ ] [ ]	:	[ ] [ ]	[ ] [ ] [ ] [ ]	.	[ ] [ ] [ ] [ ]	.	7K	/	
AIMPOINT			<input type="checkbox"/> NOM			<input type="checkbox"/> NOM	[ ] [ ]	%	3K	/
		<input type="checkbox"/> CLOSE-IN			<input type="checkbox"/> S.F.			SURFACE	/	
REMARKS:										

AOA  
PADS

# W/OMS 1 AOA DEL PAD

DEORBIT																															
PRPLT					( )																										
BURN CUE CARD:																															
OMS ENG FAIL XFEED QTY CUE					%L		%R																								
TOT AFT QTY 1 (%)							1 1 7																								
TOT AFT QTY 2 (%)							5 3																								
FLIP HP =		( )		+		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>						OR		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>1</td><td>8</td></tr> <tr><td>0</td><td>6</td></tr> </table>		1	8	0	6	STEEP SHALLOW		+		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>2</td><td>4</td></tr> </table>		2	4	=		( )	
1	8																														
0	6																														
2	4																														
		TGT HP				ΔHP (REDES SITE)		ΔHP (PRI SITE)				( $\frac{FLIP \Delta V}{2}$ )																			
AFT HP =		( )		+		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>1</td><td>0</td></tr> </table>		1	0	=		( )		( $\frac{AFT \Delta V}{2}$ )																	
1	0																														
		TGT HP																													
B/U SITE					N / A																										
FRCS: DUMP TO % (USE TIME AS CUE)					<input type="checkbox"/> OX		<input type="checkbox"/> FU																								
ENTRY / LANDING																															
EI - 5 MM303 INRTL ATT (6-30)					R		P			Y																					
MM304 PREBANK (ENT MNVR Cue Card)							<input type="checkbox"/> L		<input type="checkbox"/> R																						
ALTM SET (6-34)									.																						
CLG INIT									:																						
EXPECTED AIL TRIM							<input type="checkbox"/> L		<input type="checkbox"/> R																						
VREL 1ST REVERSAL									.																						
XCG AT TD									.																						
LAND SITE		( )		RWY		( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )				50K		/																			
		<input type="checkbox"/> L				<input type="checkbox"/> OVHD		( ) ( ) ( ) ( ) deg		( ) ( )		28K		/																	
		<input type="checkbox"/> R				<input type="checkbox"/> STRT		( ) ( ) ( ) ( ) TAC		MLS		20K		/																	
ΔT MACH < 1 TO HAC					( ) ( ) ( ) ( )		MAX Nz		( ) ( ) ( ) ( )		Nz LIMIT		( ) ( ) ( ) ( )		12K		/														
					:		( ) ( ) ( ) ( )		( ) ( ) ( ) ( )		( ) ( ) ( ) ( )		7K		/																
ΔT HAC INIT TO H = 20K					( ) ( ) ( ) ( )		:		( ) ( ) ( ) ( )		( ) ( ) ( ) ( )		3K		/																
					:		( ) ( ) ( ) ( )		( ) ( ) ( ) ( )		( ) ( ) ( ) ( )		1K		/																
AIMPOINT		<input type="checkbox"/> NOM				SPEEDBRAKE		<input type="checkbox"/> NOM		( ) ( )		SURFACE		/																	
		<input type="checkbox"/> CLOSE-IN						<input type="checkbox"/> S.F.		% @ 3K																					
<u>REMARKS:</u>																															

6-4

ASC/121/FIN

### DEORBIT MNVR PAD

OMS BOTH 1

L 2

R 3

RCS SEL 4

TV ROLL 5

TRIM LOAD

P 6 ( ) .

LY 7 ( ) .

RY 8 ( ) .

WT 9

TIG 10  /  :  :  .

TGT PEG 4

C1 14

C2 15 ( ) .

HT 16

θT 17

PRPLT 18 ( )

#### BURN ATT

R 24

P 25

Y 26

REI

TXX

#### ΔVTOT

TGO

VGO X ( ) .

VGO Y ( ) .

VGO Z ( ) .

HA

HP

TGT

#### NOTES

##### RCS I'CNCT:

L OMS → RCS

R OMS → RCS

NONE

BURN CARD

OMS PRPLT PAD

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



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AOA

AOA PROCEDURES

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:**

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

P **W/B STEAM VENT HTR ACT**

3: BFS, SM SYS SUMM 2
-----------------------

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

NOTE

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

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

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

**P MPS ISOL**

NOTE

Expect multiple MAs for MPS He P  
as regs bleed down

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

**MPS GH2 INERTING**

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

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

**P ET UMBILICAL DOOR CLOSURE**

\* If Feedline fail, √MCC before closure \*

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

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

2: GNC 51 OVERRIDE
--------------------

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

**NOTE**

Double times for single motor operation

R2

ET UMB DR

MODE – GPC/MAN  
CTRLINE LAT – STO

√After 6 sec, CTRLINE LAT tb – STO

\* If CTRLINE LAT does not stow within 12 sec: \*

\* CTRLINE LAT – GND \*

\* √MCC \*

CTRLINE LAT – GND  
L,R DR (two) – CL (tb-bp)

√After 24 sec, L,R DR tb (two) – CL

\* If doors do not close within 48 sec: \*

\* L,R DR (two) – OFF \*

\* √MCC \*

L,R DR (two) – OFF  
LAT (two) – LAT (tb-bp)

√After 6 sec, L,R LAT tb (two) – LAT

\* If doors do not latch within 12 sec: \*

\* L,R LAT (two) – OFF \*

\* √MCC \*

L,R LAT (two) – OFF  
MODE – GPC

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

**RECONFIG DPS FOR ENTRY**

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

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

CRT1 GNC, OPS 302 PRO

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

√RWY Selection  
 AOA RWY OPTIONS

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

† MSBLS Jr. Channel 8 – Requires Uplink

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

1: GNC DEORB MNVR EXEC

## B OMS 2 BURN SETUP

CRT1   √Or enter Target (steep or shallow based on  $\Delta V$  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  $\theta_t$  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  $\Delta$ TIG (if REI – REF > 50)  
from OMS TARGETS

CRTX Enter new TIG

LOAD – ITEM 22 EXEC  
TIMER – ITEM 23 EXEC

Repeat until  $\Delta$ 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/121/FIN

DEORBIT CARDS

### DEORBIT BURN MONITOR

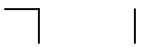
<b>OMS TEMP*</b> FU IN P $\geq$ <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="padding: 2px;">L</td> <td style="padding: 2px;">R</td> </tr> <tr> <td style="padding: 2px;">225</td> <td style="padding: 2px;">220</td> </tr> <tr> <td style="padding: 2px;">205</td> <td style="padding: 2px;">204</td> </tr> </table> or No FU IN P	L	R	225	220	205	204	OMS ENG FAIL OMS PRPLT FAIL
L	R						
225	220						
205	204						
<b>OMS PC* &amp; OMS ↓</b> (BFS: $\sqrt{\text{accel}}$ ) ENG VLV 1 or 2 < 70 or OX IN P > 227 OX IN P $\leq$ 227 or No OX IN P	OMS ENG FAIL OMS PRPLT FAIL						
<b>OMS OX/FU TK P</b> ( $\sqrt{\text{ENG IN P}}$ ) OX/FU LOW OX & FU HIGH	He PRESS/VAP ISOL (two) – OP If aff TK P not incr: He PRESS/VAP ISOL (two) – CL At PC < 72 or OMS TEMP: OMS PRPLT FAIL He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284						
<b>OMS GMBL</b> PRI fail SEC fail	L(R) OMS GMBL – SEC (twice) If high RCS usage: OMS ENG FAIL						
<b>GPC 1(4) &amp;</b> Burning OMS aff SEC GMBL lost 2 FAs lost	aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF,ON L(R) OMS GMBL – SEC (twice) If high RCS usage: OMS ENG FAIL $\sqrt{\text{MAN SHUTDN}}$						
<b>I/O ERROR FA 1(4)</b> 2 FAs lost	L(R) OMS GMBL – SEC I/O RESET (if recov: BFS I/O RESET) If high RCS usage: OMS ENG FAIL $\sqrt{\text{MAN SHUTDN}}$						
<b>BCE STRG D 1(4)</b>	I/O RESET (if recov: >>) If high RCS usage: L(R) OMS GMBL – SEC (twice)						
<b>RM DLMA IMU</b> or <b>ABOVE SAFE</b> HP $\Rightarrow$ <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px; height: 15px;"></td> <td style="width: 20px; height: 15px;"></td> </tr> </table>			STOP BURN: OMS ENG(s) – OFF >>				
<b>GPC SET SPLIT</b> or <b>BELOW SAFE</b> 2 MN BUSES HP $\Rightarrow$	IMU DLMA: After C/O: $\sqrt{\text{timer}}$ <span style="border: 1px solid black; padding: 0 2px;">G21</span> If any IMU ACC > 0.03: aff IMU – desel l'cncnt OMS to RCS ( $\sqrt{\text{RCS Burn Time}}$ ) THC +X to TGT HP (EOM) or 3.5 x timer at C/O (AOA) SET SPLIT: Go to "GPC" above						
<b>I/O ERROR PCM</b>	OI PCMMU PWR – 2(1)						

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

ENT-2a/121/A,O,D,E/B



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MS ONLY

6-19

ASC/121/FIN





HINGE

```

* RCS COMPLETION:
* If DIRECT INSERTION:
*   THC +X to  $\Delta VTOT = 0$  or TOT AFT QTY 1  %
*
*   At AFT QTY 1      THC +X to FLIP  $\Delta V$  or
*   if CUR  $\Delta VTOT$ :  TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP   $\Delta V$  -----
*                   FRCS COMPLETION
*
*   AFT   $\Delta V$  -----
*                   THC +X to TGT  $\Delta V$ 
*
*   TGT   $\Delta V$  -----
*
* If W/OMS 1:
*   THC +X to TGT HP or TOT AFT QTY 1  %
*
*   At AFT QTY 1      THC +X to FLIP HP or
*   if CUR HP:        TOT AFT QTY 2  % then
*                   FRCS COMPLETION
*
*   FLIP  HP -----
*                   FRCS COMPLETION
*
*   AFT  HP -----
*                   THC +X to TGT HP
*
*   TGT  HP -----
*
* FRCS COMPLETION:
*   Mnvr to -X Att (pitch up at 3°/sec to VGOz = +1/4  $\Delta VTOT$ )
*   THC -X to  $\Delta VTOT = 0$  or FRCS depletion (JETS FAIL OFF)
*
CUTOFF
+ :02  OMS ENG(s) – OFF (If < 3 IMU, at :)
      * AFT RCS RECONFIG if INTERCONNECT *
      Trim X,Z residuals < 2 fps (< 0.5 fps if shallow)

```

ASC-8aa/121/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<sub>C</sub>, ΔVTOT, ENG VLVs)

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

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

ASC-8b/A/B

HINGE

MS ONLY

6-22

ASC/121/FIN

HINGE

\* **RCS COMPLETION:**

\* If DIRECT INSERTION:

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

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

\* FLIP   $\Delta V$  -----  
\* FRCS COMPLETION

\* AFT   $\Delta V$  -----  
\* THC +X to TGT  $\Delta V$

\* TGT   $\Delta V$  -----

\* If W/OMS 1:

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

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

\* FLIP  HP -----  
\* FRCS COMPLETION

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

\* TGT  HP -----

\* **FRCS COMPLETION:**

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

CUTOFF

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

ASC-8bb/121/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 \*
- \*     Resel jets \*
- \*    Interconnect good OMS to RCS \*
- \*    THC +X (√OMS% vs RCS Burn Time) \*
- \*    AFT RCS RECONFIG \*
- \*    RCS COMPLETION \*
- \* **RCS +X JET FAIL OFF:** \*
- \*    ITEM 18 +0 EXEC \*
- \*     Resel jets \*

ASC-7a/A/B

HINGE

MS ONLY

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ASC/121/FIN



HINGE

\* **RCS COMPLETION:** \*  
\* If DIRECT INSERTION: \*  
\* THC +X to  $\Delta VTOT = 0$  or TOT AFT QTY 1    % \*  
\* \* \* \* \*  
\* At AFT QTY 1 THC +X to FLIP  $\Delta V$  or \*  
\* if CUR  $\Delta VTOT$ : TOT AFT QTY 2    % then \*  
\* FRCS COMPLETION \*  
\* \* \* \* \*  
\* FLIP   ----- \*  
\*  $\Delta V$    FRCS COMPLETION \*  
\* \* \* \* \*  
\* AFT   ----- \*  
\*  $\Delta V$    THC +X to TGT  $\Delta V$  \*  
\* \* \* \* \*  
\* TGT   ----- \*  
\*  $\Delta V$    \*  
\* \* \* \* \*  
\* If W/OMS 1: \*  
\* THC +X to TGT HP or TOT AFT QTY 1    % \*  
\* \* \* \* \*  
\* At AFT QTY 1 THC +X to FLIP HP or \*  
\* if CUR HP: TOT AFT QTY 2    % then \*  
\* FRCS COMPLETION \*  
\* \* \* \* \*  
\* FLIP   ----- \*  
\* HP   FRCS COMPLETION \*  
\* \* \* \* \*  
\* AFT   ----- \*  
\* HP   THC +X to TGT HP \*  
\* \* \* \* \*  
\* TGT   ----- \*  
\* HP   \*  
\* \* \* \* \*

\* **FRCS COMPLETION:** \*  
\* Mnvtr 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/121/A/A



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MS ONLY

6-26

ASC/121/FIN



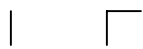


**POST D/O  
BURN**

AOA POST DEORBIT BURN

6-27

ASC/121/FIN



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

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

**P OMS/RCS POST BURN RECONFIG**

**POST D/O  
BURN**

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

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

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

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

XFEED (four) – CL (tb-CL)

Determine Prebank  
 Determine ΔHP (CUR HP -TGT HP)

Use RECOVERY PREBANK TABLES  
 Record Prebank on ENTRY MANEUVERS  
 Cue Card

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

\* **RECOVERY PREBANK TABLES (KSC)** \*  
 \* NOTE: APPLICABLE ONLY IF OMS 1 REQD \*  
 \* (ATO/AOA steep entries) KSC \*  

$\Delta$ HP	0	3	6	9	12	15	18	22	28
PREBANK	0	45	70	90	100	110	115	130	175

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

$\Delta$ HP	0	1	2	3	4	5	6	7	8
PREBANK	90	110	115	120	125	135	145	160	180

 \* \* \* \* \*  
 \* 121 OCFR1 \* \* \* \* \*

**C POST BURN STATUS**

NOMINAL

$\Delta$ 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

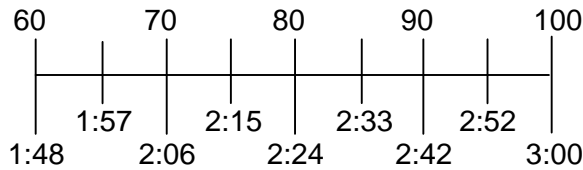
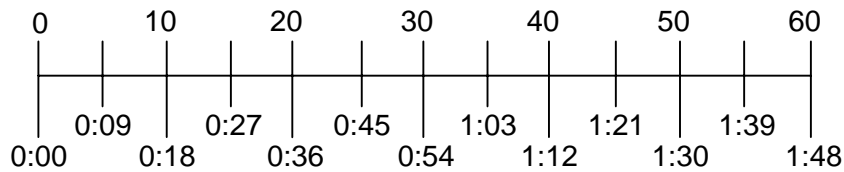
3: BFS, GNC SYS SUMM 2

**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

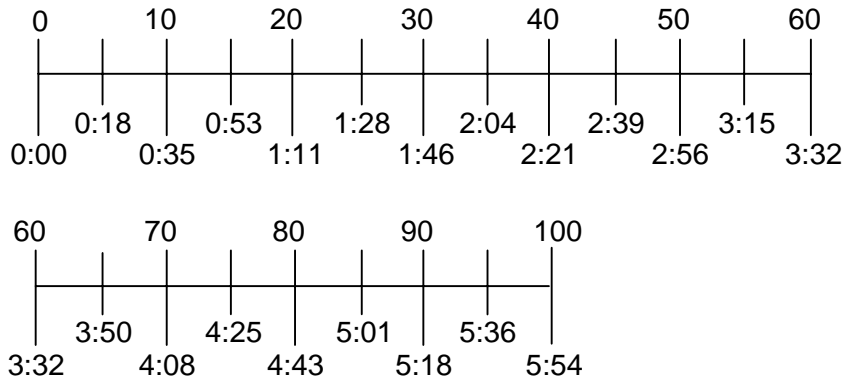
During dump, disregard FRCS qty



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
--------------------

 √ROLL MODE – AUTO

B L2,C3 √SBTC (two) – full fwd  
 C3 √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

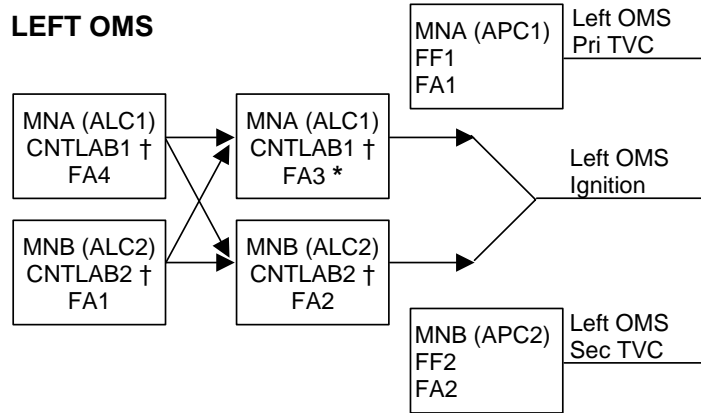
6-37

ASC/121/FIN



## OMS FAILURES

### LEFT OMS

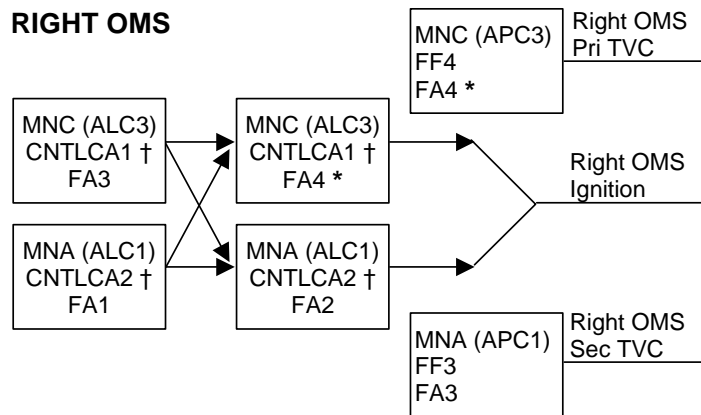


† If CNTL AB1 or AB2 (CA1 or CA2) failed and ign path still exists at OMS fail, assume L(R) OMS ↓ is PRPLT FAIL

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

OMS FAILURE

### RIGHT OMS



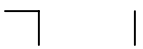
If two FA MDMs lost		
MDMs	Preburn: ENG – OFF	During burn: MAN SHUTDN
1,2	LEFT (TVC)	BOTH
1,3	RIGHT (IGN)	LEFT
1,4	LEFT (IGN)	RIGHT
2,3	LEFT (IGN)	RIGHT
2,4	RIGHT (IGN)	LEFT
3,4	RIGHT (TVC)	BOTH

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



OMS/RCS ΔV

**OMS/  
RCS ΔV**



### OMS He PRESS/ $\Delta$ V/BURN TIME

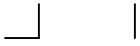
OMS% GAGE	OMS He Press	OMS $\Delta$ V	RCS $\Delta$ V	RCS BURN MIN:SEC
96	4800	478	395	14:39
95	4780	475	393	14:33
90	4580	449	372	13:45
85	4380	424	350	12:57
80	4180	398	329	12:09
75	3980	372	308	11:21
70	3780	346	286	10:33
65	3580	320	265	09:45
60	3380	294	244	08:57
55	3180	268	222	08:09
50	2980	241	200	07:20
45	2780	215	179	06:32
40	2580	189	157	05:44
35	2380	162	135	04:56
30	2180	136	114	04:08
25	1980	109	92	03:20
20	1780	83	70	02:32
15	1580	56	47	01:43
10	1380	29	25	00:54
5	1180	2	2	00:04

OMS/  
RCS  $\Delta$ V

<b>OMS-2/AOA <math>\Delta</math>V</b>
<b>ARCS <math>\Delta</math>V fps =</b> $\boxed{0.7} \times [L\% + R\% - \text{AFT QTY } 1]$
<b>FRCS <math>\Delta</math>V fps =</b> $\boxed{0.8}$ x FRCS %
<b>OMS <math>\Delta</math>V fps =</b> $\boxed{5.2}$ x OMS %

**NOTE:** Uses assumed vehicle weight of  $\boxed{254,939}$  lb



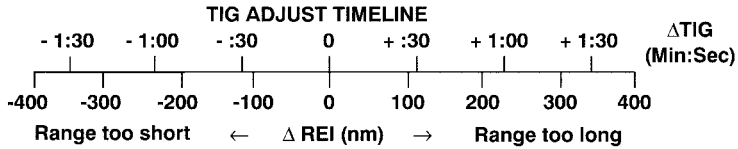
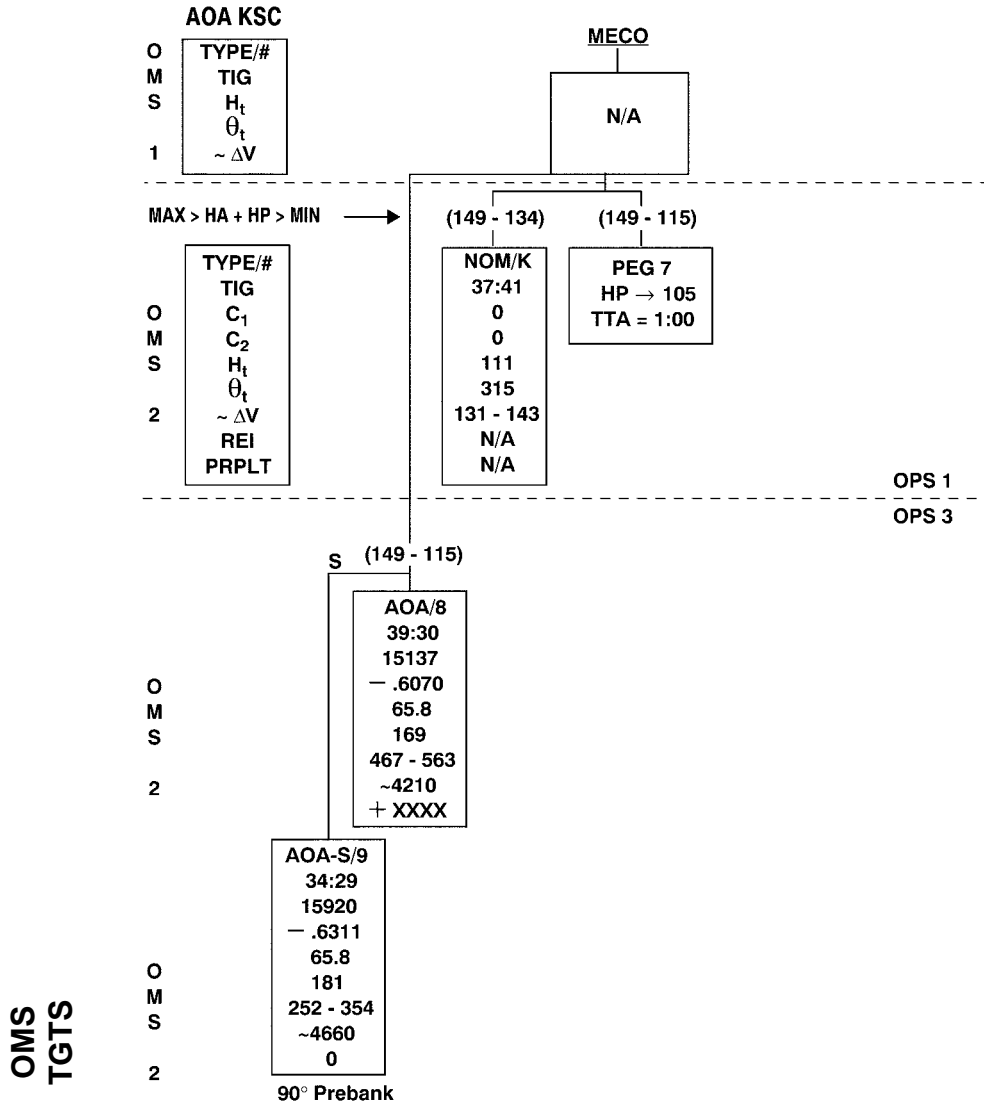


OMS TARGETS, COMM COVERAGE, LAND SITES

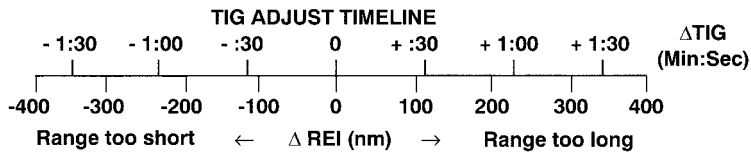
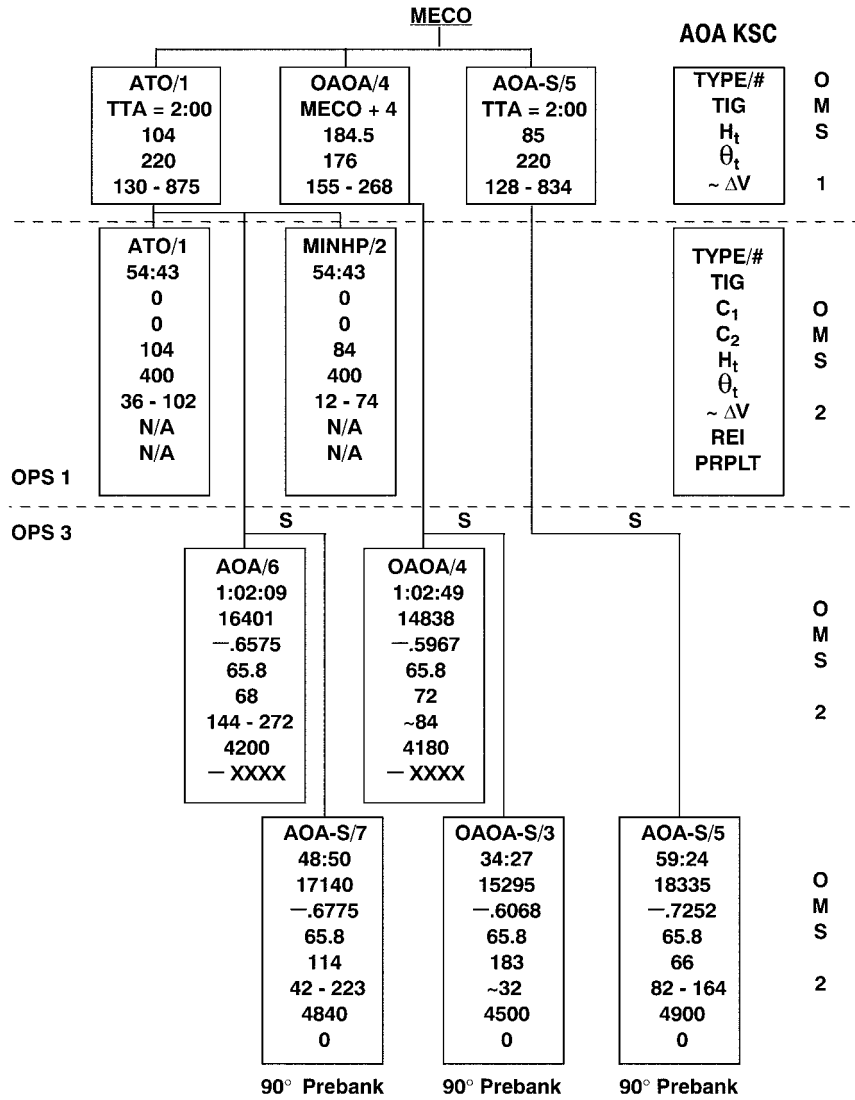
**OMS  
TGTS**



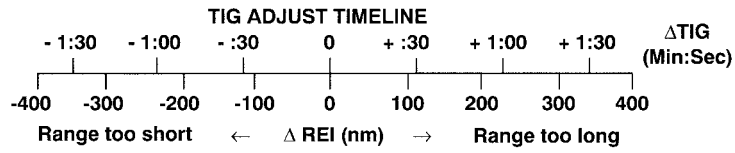
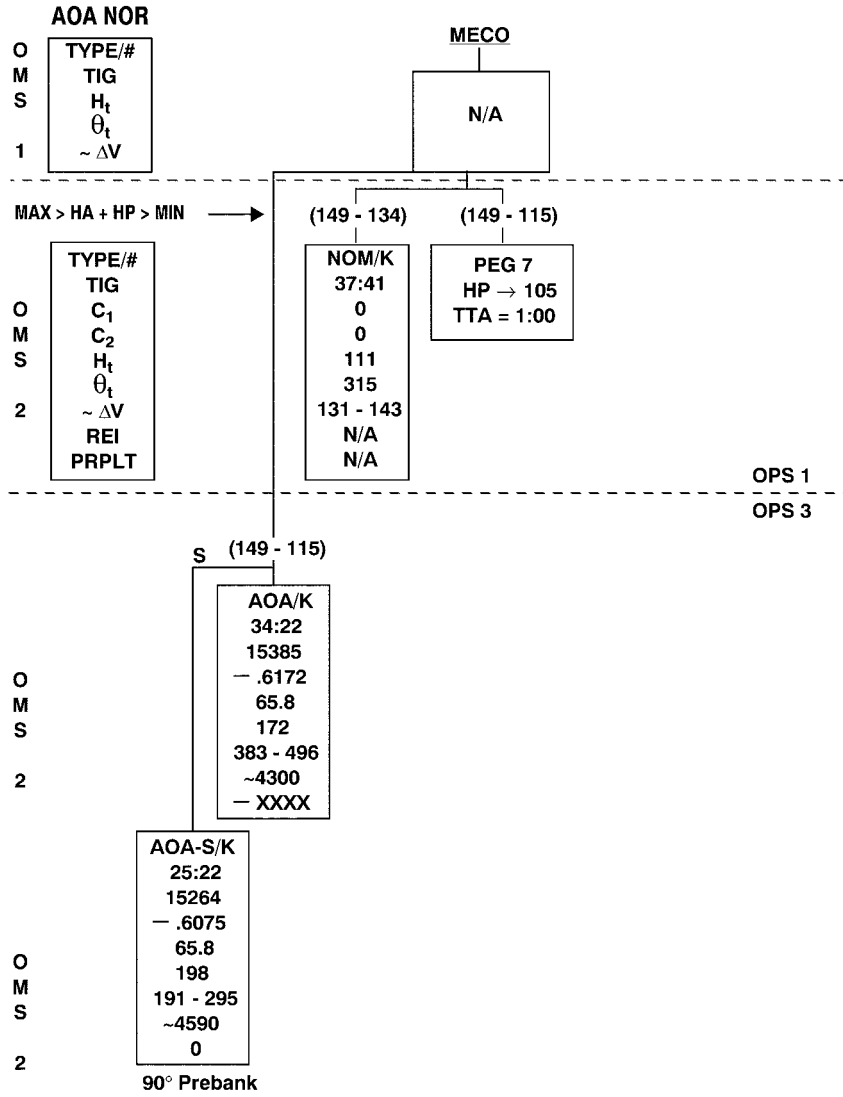
# STS-121 OCFR1 CY OMS TARGETS - DIRECT INSERTION



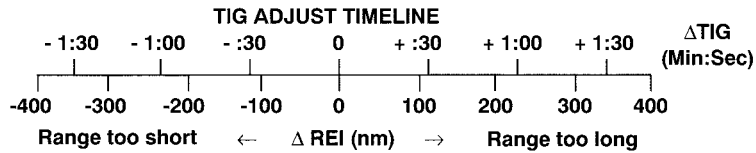
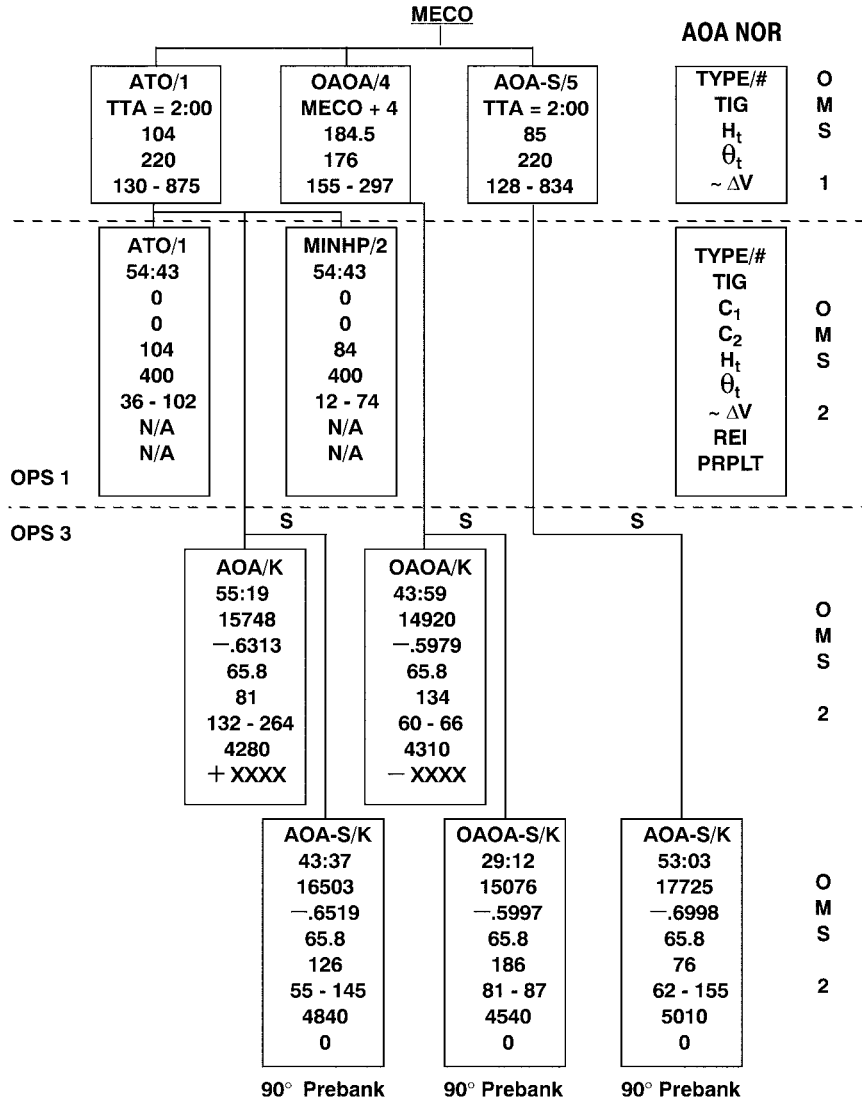
# STS-121 OCFR1 CY OMS TARGETS - W/OMS 1



# STS-121 OCFR1 CY OMS TARGETS - DIRECT INSERTION

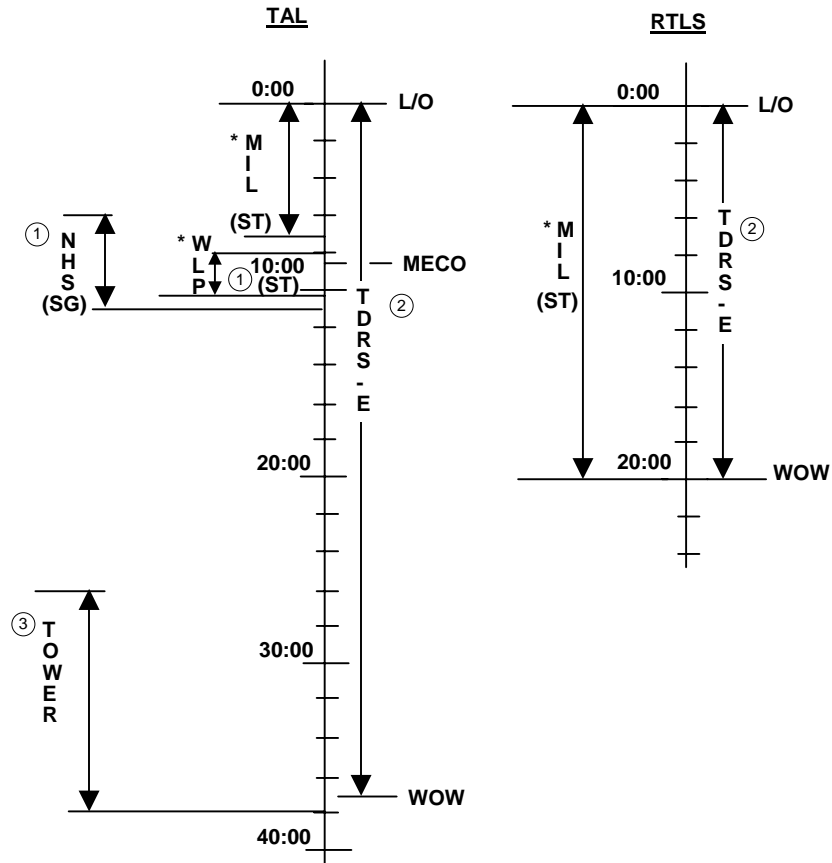


# STS-121 OCFR1 CY OMS TARGETS - W/OMS 1



**COMM  
COVER**

## COMMUNICATION COVERAGE – (TAL/RTLS)



**MODE**

ST – STDN  
SG – SGLS

\*UHF available

**NOTE:** ① NHS/WLP coverage only on high inclinations

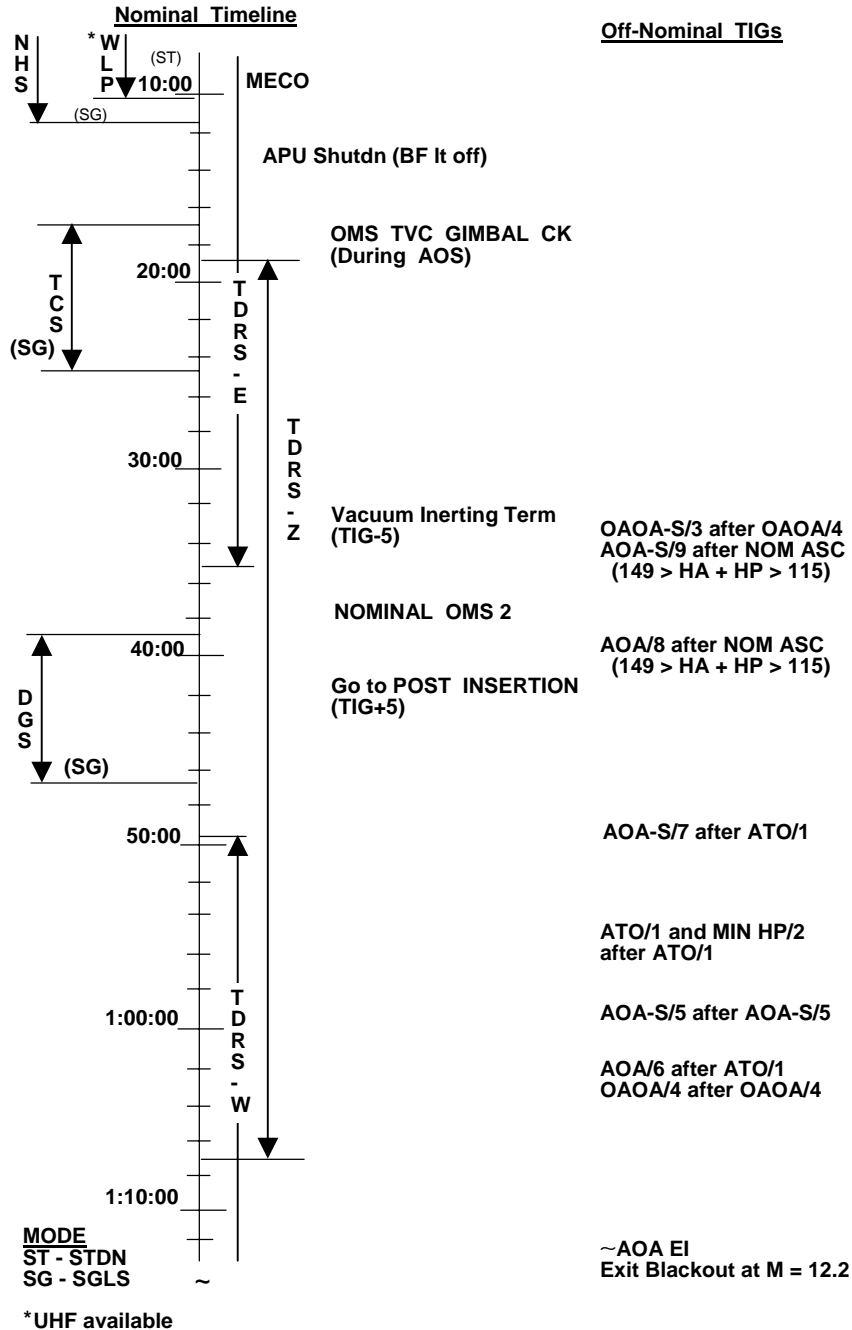
② ET blocks coverage until vehicle upright

③ Tower UHF installed at all TAL sites

**COMM  
COVER**

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

LAND  
SITE



**STS-121 LANDING SITE TABLE  
(50° to 63.5° INCLINATION)**

SITE	LOCATION	RWY	TACANS		MLS CH	LG	+ OVR RUN
				ITEM 5			
1	KSC	KSC 15 KSC 33	TTS 59Y	OMN 73	8 6	15000 15000	1000 1000
2	BEN GUERIR	BEN 36 BEN 18	◆BEN 108	MAK 80 ■	◆6 -	13720 12720	0 1000
3	MORON AB	MRN 20 MRN 02	MRN 100	AOG 23	◆6 -	11730 11730	1000 1000
4	ZARAGOZA	ZZA 30L ZZA 12R	ZZA 64	ZZA 77 ■	◆6 -	12200 12200	1000 1010
5	MYRTLE BEACH	MYR 36 MYR 18	ILM 117	FLO 99	- -	9500 9500	1000 1000
6	WILMINGTON	ILM 06 ILM 24	ILM 117	DIW 107 ■	- -	7500 7500	0 0
7	CHERRY POINT	NKT 32L NKT 23R	EWN 83 ■	NCA 101	- -	7110 7100	800 880
8	OCEANA NAS	NTU 32R NTU 23L	NFE 19Y	NGU 48	- -	7500 11500	0 0
9	WALLOPS	WAL 28 WAL 04	SBY 49	SWL 71	- -	7510 8750	0 0
10	DOVER AFB	DOV 32 DOV 19	SIE 95	DQO 87	- -	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	◆BEN 108	MAK 80 ■	◆6 -	13720 12720	0 1000
13	*MORON AB	MRN 20 MRN 02	MRN 100	AOG 23	◆6 -	11730 11730	1000 1000
14	*ZARAGOZA	ZZA 30L ZZA 12R	ZZA 64	ZZA 77 ■	◆6 -	12200 12200	1000 1010
15	GABRESKI	FOK 06 FOK 24	HTO 83	TMU 45Y ■	- -	8500 8500	1000 1000

◆ Available for TAL Only

\* LO XRNG TAL Site

■ DME

Length after displaced threshold



**STS-121 LANDING SITE TABLE  
(50° to 63.5° INCLINATION)**

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

◆ Available for TAL Only

■ DME

**Length** after displaced threshold

**STS-121 LANDING SITE TABLE  
(50° to 63.5° INCLINATION)**

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

† MSBLS Jr. Ch 8 - Requires Uplink

■ DME

Length after displaced threshold



WEATHER PADS

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ASC/121/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	/	/	/			

**ELS TERMINAL FORECASTS (Site Generated)**

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

**ELS TERMINAL FORECASTS (Site Generated) (Cont)**

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



**BLOCK 1 TRAJECTORY MESSAGE**

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



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## SWITCH LIST FOR HANDOVER INGRESS

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

SW LIST

NOT FLOWN

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NOTES

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

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

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

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

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

- Before turning OI PCMMU PWR switch on C3, indicated by \*\*\*, to OFF, notify LCC so gnd power can be connected; also notify LCC before turning it to 1 after crew ingress
- All unspecified/unlabeled switches - dn (2 position)/ctr (3 position), tb - bp, cb - op, rotaries - full counter clockwise
- PL RETEN PL SEL switch on panel A6U will nominally be 1 for deployable payload missions using only a single PL SEL position but will be MON until PRE-INGRESS SW CONFIG. All other missions will be in MON (Fit Rule A10-281)
- Circuit Breaker snapping color codes:
  - { R } - Red - open all times
  - { G } - Green - open on orbit only
  - { Y } - Yellow - open ascent, closed per procedure
  - { O } - Orange - open orbit thru entry
  - { } - Blank (no ring) - always closed or as required
- STS-121 options affecting switch list:
  - 1) OV103
  - 2) GMTLO
  - 3) Orbit incln = 51.6°
  - 4) Payload: MPLM, two APCUs, ICC, LMC
  - 5) Crew size of 7 up, 6 down
  - 6) Installed: TK CRYO sets (5), SORG, Ku Ant, GN2 (6), External Airlock (ISS), RMS, OBSS, OIU, VPU, WVS, DTV
  - 7) Options N/R: RCRS
- Changes are with respect to STS-114 Switch List as published in FIN A,2

## FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

L5	L COMM PWR – ON <span style="border: 1px solid black; padding: 2px;">OFF</span>	
<hr/>		
L side OVHD Flood – BRT		
<hr/>		
L4:	All cbs – cl { } except:	
:B	All cbs – op {Y}	
:D	All cbs – cl {O}	
:E	All cbs – cl {O}	
:F	cb AC1 H2O LOOP PUMP 1 A/2 (three) – op {R} <span style="border: 1px solid black; padding: 2px;">cl</span>	
:J	AC3 SIG CONDR (two) – op {Y}	
:N	AC2 ΦC RAD ISOL A – cl { }	
	AC3 ΦC RAD ISOL B – cl { }	
:P	AC1 ΦC TACAN 1 (OV105) – op {R}	
	AC2 ΦC TACAN 2 (OV105) – op {R}	
	AC3 ΦC TACAN 3 (OV105) – op {R}	
	blank cbs (three) (OV103,4) – op {R}	
:Q	cb AC1 ΦC LTG INST OS – op {Y}	
	AC2 ΦC LTG NUMERIC OS – op {Y}	
	AC3 LTG (three) – op {Y}	
<hr/>		
L1	HUM SEP A – OFF	
	B – ON	
	CAB TEMP sel – COOL	
	CNTRLR – OFF	
	FAN A – ON	
	B – OFF	
	IMU FAN A,C (two) – OFF	
	B – ON	
	H2O PUMP LOOP 1 (two) – OFF,B	
	2 – ON	
	LOOP BYP MAN (two) – ctr	
	MODE (two) – MAN	

L1	AV BAY 1,3 FAN A (two) – OFF	
	B (two) – ON	
	2 FAN A – ON	
	B – OFF	
	FLOW PROP VLV LOOP (two) – ctr (tb-ICH)	
	FREON PUMP LOOP (two) – B	
	RAD CNTLR OUT TEMP – NORM	
	LOOP (two) – OFF*	
	BYP VLV MAN SEL (two) – ctr (tb-BYP)	
	MODE (two) – MAN	
	NH3 CNTLR A – OFF	
	B – PRI/GPC	
	H2O ALT PRESS – CL	
	FLASH EVAP CNTLR PRI A – GPC	
	B – OFF	
	SEC (two) – A SPLY,OFF	
	HI LOAD EVAP – ENA	
	TOP EVAP HTR NOZ (two) – A AUTO	
	DUCT sel – A	
	HI LOAD DUCT HTR sel – A	
<hr style="border-top: 1px dashed black;"/>		
	FIRE SUPPR AV BAY (three) – SAFE	
	pb (three) – lt off	
	SMOKE DETN lts (ten) – off	
	SNSR – dn	
	CKT TEST – OFF	
<hr/>		
L2	CAB RELIEF (two) – ctr (tb-ENA)	
	VENT (two) – ctr (tb-CL)	

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## FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

L2	FLASH EVAP FDLN HTR SPLY (two) – OFF <span style="border: 1px solid black; padding: 0 2px;">2</span> 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 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	F3	L HUD PWR – OFF TRIM RHC/PNL – INH PNL – ON NWS FAIL It – off ANTISKID FAIL It – off R TRIM RHC/PNL – INH PNL – ON HUD PWR – OFF DRAG CHUTE pb (six) – It off
S1	CDR SEAT PWR BUS SEL – AC2 (up) CONTR (two) – ctr	F8U	R HUD MODE – NORM MAN BRT sel – mid range HUD BRT – as reqd
F1	DC UTIL PWR MNB – OFF AC UTIL PWR AC1 – OFF	F4	All pb lts off except: BDY FLP pb – AUTO <span style="border: 1px solid black; padding: 0 2px;">It off</span> SPDBK/THROT pb – AUTO <span style="border: 1px solid black; padding: 0 2px;">It off</span> PITCH pb – AUTO <span style="border: 1px solid black; padding: 0 2px;">It off</span> ROLL/YAW pb – AUTO <span style="border: 1px solid black; padding: 0 2px;">It off</span>
F2	All pb lts off except: BDY FLP pb – AUTO <span style="border: 1px solid black; padding: 0 2px;">It off</span> SPDBK/THROT pb – AUTO <span style="border: 1px solid black; padding: 0 2px;">It off</span> PITCH pb – AUTO <span style="border: 1px solid black; padding: 0 2px;">It off</span> ROLL/YAW pb – AUTO <span style="border: 1px solid black; padding: 0 2px;">It off</span>	F6	BFC – right HUD DATA BUS – 1 MDU PWR (two) – ON BRT sel (two) – as reqd LDG GEAR pb (two) – It 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
F6U	L HUD MODE – NORM MAN BRT sel – mid range HUD BRT – as reqd		

NOT FLOWN

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## FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

F6	ABORT MODE – OFF pb – lt off RCS CMD lts (three) – off RANGE SAFE ARM lt – off AIR DATA – NAV		R1 PL PRI MNB,FC3 (two) – ctr (tb-OFF) AUX – OFF AFT MNB – OFF MNC – OFF INV PWR (three) – ctr (tb-ON) INV/AC BUS (three) – ctr (tb-ON) cb AC CONTR (nine) – op { } AC BUS SNSR (three) – MON
F7	MDU PWR (five) – ON BRT sel (five) – as reqd MN ENG STAT lts (six) – off C/W matrix lts – off <span style="border: 1px solid black; padding: 2px;">all off except HYD PRESS</span>		----- R1 (CRYO) O2 MANF VLV (two) – ctr (tb-OP) TK1,2 HTRS A (two) – AUTO B (two) – OFF RESET/TEST (two) – ctr TK3 HTRS (two) – OFF RESET/TEST – ctr FC REAC (three) – ctr tb (six) – OP (three) – ctr RDY tb (three) – gray COOL PUMP ΔP tb (three) – gray H2 MANF VLV (two) – ctr (tb-OP) TK1,2 HTRS A (two) – AUTO B (two) – OFF TK3 HTRS (two) – OFF
F8	HUD DATA BUS – 4 MDU PWR (two) – ON BRT sel (two) – as reqd LDG GEAR pb (two) – lt off tb (three) – UP HSI SEL MODE – ENTRY SOURCE (two) – NAV,2 FLT CNTLR PWR – ON RAD ALTM – 2 ADI ATT – REF ERR – MED RATE – MED AIR DATA – NAV		----- R2 MPS PRPLT DUMP (two) – GPC ENG PWR (six) – ON He ISOL (six) – OP <span style="border: 1px solid black; padding: 2px;">GPC</span> PNEU L ENG He XOVR – GPC He ISOL – OP <span style="border: 1px solid black; padding: 2px;">GPC</span> LH2 ULL PRESS – AUTO He l'CNCT (three) – GPC
F9	AC Volts sel – as reqd DC Volt/Amp sel – VOLTS MNB		
R1	CNTL BUS PWR (three) – dn ESS BUS SOURCE MN (three) – ON FC (three) – ON <span style="border: 1px solid black; padding: 2px;">OFF</span> FC/MN BUS (three) – ctr (tb-ON) MN BUS TIE (three) – ctr (tb-OFF) PL CAB – OFF PRI MNC – ctr (tb-OFF)		

NOT FLOWN

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## FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

R2	APU/HYD RDY tb (three) – bp APU OPER (three) – START/RUN <span style="border: 1px solid black; padding: 2px;">OFF</span> SPEED SEL (three) – NORM HYD MN PUMP PRESS (three) – NORM cb APU FU TK VLV ENA (six) – cl { } <span style="border: 1px solid black; padding: 2px;">op</span> HYD CIRC PUMP (three) – OFF <span style="border: 1px solid black; padding: 2px;">GPC</span> APU CNTLR PWR (three) – ON <span style="border: 1px solid black; padding: 2px;">OFF</span> FUEL TK VLV (three) – OP <span style="border: 1px solid black; padding: 2px;">CL</span> AUTO SHUTDN (three) – ENA BLR CNTLR/HTR (three) – A PWR (three) – ON N2 SPLY (three) – ON <span style="border: 1px solid black; padding: 2px;">OFF</span> ET UMB DR MODE – GPC CTRLINE LAT – GND (tb-bp) L,R DR (two) – OFF (tb-OP) LAT (two) – OFF (tb-REL)	C2	IDP/CRT PWR (three) – ON MAJ FUNC (three) – GNC SEL (two) – as reqd EVENT TIMER MODE – DN CNTL – ctr TIMER SET pb (four) – 0900 TIMER – ctr
<hr/>		<hr/>	
R4	HYD BRAKE HTR (three) – OFF ISOL VLV (three) – GPC (tb-CL) MPS/TVC ISOL VLV (three) – ctr (tb-OP) LG/NWS HYD SYS – AUTO 1/2 LG EXTEND ISOL VLV – GPC (tb-CL) MPS ENG CNTLR HTR (three) – OFF MANF PRESS (two) – GPC FILL/DRAIN (four) – GND H2 PRESS LINE VENT – GND LO2 PREVLV (three) – GPC LH2 PREVLV (three) – GPC FDLN RLF ISOL (two) – GPC	C3	OMS ENG (two) – ARM/PRESS <span style="border: 1px solid black; padding: 2px;">OFF</span> BFC CRT DISP – ON <span style="border: 1px solid black; padding: 2px;">OFF</span> 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 <span style="border: 1px solid black; padding: 2px;">OFF***</span> FORMAT – GPC S-BD PM CNTL – CMD ANT sel – GPC AIR DATA PROBE (two) – STOW FC REAC VLV (three) – dn cb FC REAC VLV CL ENA (three) – op { R } UPLK – ENA MSTR MADS PWR – ON C/W MEM – ctr MODE – NORM
R6	R COMM PWR – ON <span style="border: 1px solid black; padding: 2px;">OFF</span> R side OVHD Flood – BRT		

NOT FLOWN

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## 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 HTR (SH only) – OFF EMER LTG – OFF/ON	O5	L AUD TACAN ID (two) – OFF,1 VOX SENS sel – as reqd A/G (two) – T/R A/A – T/R ICOM (two) – T/R PWR – AUD/TONE CNTL sel – NORM XMIT/ICOM MODE sel – as reqd (PTT/VOX recommended) VOL pb (five) – as reqd TACAN pb – 5 PAGE – dn
C5 DIRECT O2 vlv – CL		O6	
S2	PL SEAT PWR BUS SEL – AC3 (dn) CONTR (two) – ctr	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	
C6 LEH O2 vlv (four) – OP		O7	
C7 LEH O2 SPLY vlv (two) – OP		O8	
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	O9	CRYO O2 HTR ASSY TEMP sel – TK1 1 O2/H2 sel – TK1 FC STACK TEMP sel – 1
O2		O10	
O3	RCS/OMS PRESS sel – RCS He X 10 PRPLT QTY sel – OMS FUEL MSN TIME – MET	O11	

NOT FLOWN

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ASC/121/FIN 1

## 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 <span style="border: 1px solid black; padding: 2px;">NORM</span> (tb-bp) IPL SOURCE – OFF GPC MODE 1,2,3,4 (four) – RUN (tb-RUN) 5 – RUN <span style="border: 1px solid black; padding: 2px;">STBY</span> (tb-RUN)		O8 RADAR ALTM (two) – ON <span style="border: 1px solid black; padding: 2px;">OFF</span> 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 (two) – GPC (tb-CL) R OMS He PRESS/VAP ISOL (two) – GPC TK ISOL (two) – GPC (tb-OP) XFEED (two) – GPC (tb-CL) FWD RCS He PRESS (two) – OP (tb-OP) TK ISOL (two) – GPC (tb-OP) MANF ISOL (five) – GPC (tb-OP) ANNUN LAMP TEST – ctr
O7	TACAN MODE sel (three) – GPC <span style="border: 1px solid black; padding: 2px;">OFF</span> ANT SEL (three) – AUTO <span style="border: 1px solid black; padding: 2px;">as is</span> CH pb/tw (three) – 059Y <span style="border: 1px solid black; padding: 2px;">as is</span> AFT L RCS He PRESS (two) – OP (tb-OP) TK ISOL (three) – GPC (tb-OP) MANF ISOL (five) – GPC (tb-OP) XFEED (two) – GPC (tb-CL) MSTR RCS XFEED – OFF AFT R RCS He PRESS (two) – OP (tb-OP) TK ISOL (three) – GPC (tb-OP) MANF ISOL (five) – GPC (tb-OP) XFEED (two) – GPC (tb-CL)	O9	R AUD PWR – AUD/TONE A/G (two) – T/R A/A – T/R ICOM (two) – T/R VOX SENS sel – as reqd TACAN ID (two) – OFF, as reqd

NOT FLOWN

9-8

ASC/121/FIN 1

## FWD FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

O09 R AUD PAGE - dn  
 VOL pb (five) - as reqd  
 TACAN pb - 5  
 XMIT/ICOM MODE sel - as reqd (PTT/VOX recommended)  
 CNTL sel - NORM

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

O14:A BRAKES MNA - ON  
 RGA 1 - ON  
 IMU 1 - ON  
 FC1 CNTLR - ON

:B,C,D,E All cbs - cl { } except:  
 :B cb MNA MNC CONTR - cl { } op  
 :C RAD ISOL CONTR - cl { }  
 :D GPS PRE AMPL UC (OV103) - cl { }  
 LC (OV103) - cl { }  
 1 PRE AMPL (two)(OV104) - op {R}  
 CAB VENT - cl {O}  
 ISOL - cl {O}

:E ADTA 1 - cl {G}  
 ACCEL 1 - cl {G}  
 DDU AFT - op {Y}

:F MMU 1 - ON  
 RJDA 1A L2/R2 LOGIC - ON  
 DRIVER - ON OFF  
 2A L4/R4 LOGIC - ON  
 DRIVER - ON OFF  
 RJDF 1B F1 LOGIC - ON  
 DRIVER - ON OFF

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

O15:A BRAKES MNB - ON  
 RGA (two) - ON  
 IMU 2 - ON  
 FC2 CNTLR - ON

:B,C,D,E All cbs - cl { } except:  
 :B cb MNB MNA CONTR - cl { } op  
 :C UTIL PWR F1/MO13Q - op {Y}  
 :E ADTA 2 - cl {G}  
 ACCEL 2 - cl {G}  
 DDU R - cl {G}

:F MMU 2 - ON  
 RJDA 1B L1/L5/R1 LOGIC - ON  
 L1/R1 DRIVER - ON OFF  
 RJDF 1A F2 LOGIC - ON  
 DRIVER - ON OFF  
 ASA 2 - ON  
 ACCEL 4 - ON

O16:A BRAKES MNC - ON  
 RGA 3 - ON  
 IMU 3 - ON  
 FC3 CNTLR - ON

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

NOT FLOWN

9-9

ASC/121/FIN 3

## 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	<span style="border: 1px solid black; padding: 2px;">OFF</span>
	RJDF 2A F3 LOGIC	- ON	
	DRIVER	- ON	<span style="border: 1px solid black; padding: 2px;">OFF</span>
	RJDF 2B F4/F5 LOGIC	- ON	
	F4 DRIVER	- ON	<span style="border: 1px solid black; padding: 2px;">OFF</span>
	R OMS ENG VLV	- ON	<span style="border: 1px solid black; padding: 2px;">OFF</span>
	ASA 3,4 (two)	- ON	
	ACCEL 3	- ON	
	RJD MANF L5/F5/R5/DRIVER	- OFF	
<hr/>			
O17:A	ATVC (four)	- ON	
:B	EIU (three)	- ON	
:C	SIG CONDR FREON A	- AC2	
	B	- AC3	
	OL 1/2	- ON	
	OR 1/2	- ON	
:D	SIG CONDR OA 1/2/3	- ON	
	MDM OA 1/2/3	- ON	
	MEC (two)	- ON	
<hr/>			
O19	TV PWR	- ON	<span style="border: 1px solid black; padding: 2px;">OFF</span>
	DC UTIL PWR MNA	- ON	
	COAS PWR	- OFF	

NOT FLOWN

9-10

ASC/121/FIN 1

## 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}	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}
: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}	: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}
:C	cb MNA EXT ARLK HTR LINE ZN1 - op {Y} ZN2 - op {Y} STRUC - op {Y}	: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)

NOT FLOWN

9-11

ASC/121/FIN 1

## MIDDECK SWITCH LIST FOR HANDOVER INGRESS

ML86B:E   cb MNB MAR 1   -op {Y}  
                   2   -cl { }  
           SEAT L   -cl { }  
                   R   -cl { }  
           CO2 COM INSTR (OV104,5) -op {R}  
           FLOOD TNL ADAPT 3 -op {R}  
                                   -op {Y} if SH flown)  
           MNC EMU 1 H2O SPLY   -op {Y}  
                   WASTE   -op {Y}  
           SEAT L   -cl { }  
                   R   -cl { }  
           CO2 SYS 2 CNTLR (OV104,5) -op {R}  
           FLOOD TNL ADAPT 4 -op {R}  
                                   -op {Y} if SH flown)  
 :F   cb MNA FLOODS MIDDECK 1/8 -cl { }  
                   WMC/MO13Q -op {Y}  
                   AIRLK 1   -op {Y}  
                   MIDDECK 9   -op {Y}  
           CRYO O2 HTR TK3 SNSR 1 -cl { }  
                   TK5 SNSR 1 -op {R}  
                                   -cl { } if  
                                   TK5 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 -op {R}  
                                   -cl { } if  
                                   TK4 flown)

ML86B:F   cb MNC FLOODS MIDDECK 5/7   -cl { }  
                                   3/4/MO13Q -cl { }  
                   BUNK 1/3   -op {Y}  
                   AIRLK 4   -op {Y}  
           CRYO O2 HTR TK5 SNSR 2 -op {R}  
                                   -cl { } if  
                                   TK5 flown)  
           TK4 SNSR 2 -op {R}  
                                   -cl { } if  
                                   TK4 flown)  
 :G   cb ESS 1BC FLOOD AIRLK 2   -op {Y}  
                   TNL ADAPT 1   -op {R}  
                                   -op {Y} if  
                                   SH flown)  
           CRYO CNTLR TK4 (two) -op {R}  
                                   -cl { } if  
                                   TK4 flown)  
           QTY TK4 (two)   -op {R}  
                                   -cl { } if  
                                   TK4 flown)  
           2CA CRYO CNTLR TK5 (two) -op {R}  
                                   -cl { } if  
                                   TK5 flown)  
           QTY TK5 (two)   -op {R}  
                                   -cl { } if  
                                   TK5 flown)  
           3AB CRYO CNTLR TK3 (two) -cl { }  
                   QTY TK3 (two)   -cl { }

NOT FLOWN

9-12

ASC/121/FIN 1

## MIDDECK SWITCH LIST FOR HANDOVER INGRESS

ML85E (MUP – if reqd)  
 AC S1 – OFF  
 cb AC CB1 – op { Y }  
 DC 10 AMP MNB S2 – OFF  
           S3 – OFF  
           S4 – OFF  
           S5 – 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  
 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 } except:  
       cb AC2 PL 3Φ – op { Y }  
       AC3 PL 3Φ – op { Y }

NOT FLOWN

9-13

ASC/121/FIN 1

## MIDDECK SWITCH LIST FOR HANDOVER INGRESS

MA73C:F cb AC1 RMS PRI ΦA – op { Y }  
 – (op { R } if no RMS flown)  
 MAR 3Φ – op { Y }  
 OPS INST HYD ACTR ΦC – cl { }  
 AC2 RMS B/U ΦA – op { Y }  
 – (op { R } if no RMS flown)  
 L SEAT 3Φ – cl { }  
 OPS INST HYD ACTR ΦC – cl { }  
 AC3 L SEAT 3Φ – cl { }  
 :G cb ARLK TNL FAN (six) – op { R }  
 – (op { Y } if SH flown or  
 ISS docking mission)  
 AC2 R SEAT 3Φ – cl { }  
 AC3 GALLEY FAN (three) – op { Y }  
 R SEAT 3Φ – cl { }  
 blank switch – dn  
 :H,l All cbs – cl { }  
 :l 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  
 COMMODE CNTL – DN/OFF  
 MODE – AUTO  
 VAC VLV – CL  
 FAN BYP (two) – OFF  
 SEP – OFF  
 HOSE BLOCK – SEP 1  
 COMPACTOR ANGLE – -0 or < 10%

---

MO30F DC UTIL PWR MNC – OFF

---

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



## 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 – op { Y }  
 RLY PWR – op { Y }

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

---

NOT FLOWN

9-15

ASC/121/FIN 1

MIDDECK EXPERIMENTS SWITCH LIST FOR HANDOVER **INGRESS**

MIDDECK (TEPC)  
SW-1 – OFF

---

NOT FLOWN

9-16

ASC/121/FIN 1

## 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

TW58T TNL FAN – OFF  
cb TNL FAN – op {Y}  
– (op {R} if SH flown)  
TNL LIGHT – OFF

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/121/FIN 1

## AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

R12L NOTE: Panel may be blank if no PL requirement  
(See 9-26 or 9-27)

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

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

NOT FLOWN

9-18

ASC/121/FIN 1

## AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

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

NOT FLOWN

9-19

ASC/121/FIN 1

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

A1R	S-BD FM CNTL	- CMD	A6U	PL RETEN LOGIC PWR (two)	- OFF
	ANT	- GPC		PL SEL	- MON
	PWR	- 1		LAT (five)	- OFF (tb-bp)
	DATA SOURCE sel	- ME		RDY tb (five)	- bp
	AUD CTR VOICE RCD SEL CH 1 sel	- ICOM A	-----		
		2 sel	A6L	(DSP)	
	DOCK RING (seven)	- OFF		cb ESS SYS PWR CNTL (two)	- op { Y }
	SL (seven)	- OFF		DEP (four)	- op { Y }
	UHF A/G (two)	- OFF		DOCK LT (four)	- op { Y }
	A/A	- OFF		MN LOG (six)	- op { Y }
	PL BAY OUTLETS ICOM (two)	- OFF		PMA 2/3 GRP 1 HOOKS SYS A (two)	- op { R }
					B (two) - op { R }
<hr/>					2 HOOKS SYS A (two) - op { R }
AFT MDU	MDU PWR	- OFF			B (two) - op { R }
	BRT sel	- as reqd		SYS PWR (two)	- ctr (tb-OFF)
<hr/>				PMA 2/3 HOOKS (two)	- ctr (tb-bp)
A6U	DAP	- all off		PYRO PWR (two)	- OFF
	SENSE: -Z			PSU PWR (two)	- OFF
	FLT CNTLR PWR	- OFF		VEST DEP VLV (four)	- ctr (tb-bp)**
	Unused rotary sw	- full ccw		LTS (four)	- OFF
	ADI ATT	- INRTL	<hr/>		
	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			

## AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

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

## AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

<p>A8U (This panel may be replaced or deleted if RMS not flown)</p> <ul style="list-style-type: none"> <li>RMS Mode lts (twelve) – off</li> <li>BRAKES – ON (tb-OFF)</li> <li>SAFING – AUTO (tb-bp)</li> <li>MODE sel – TEST</li> <li>AUTO SEQ – ctr</li> <li style="padding-left: 20px;">lts (two) – off</li> <li>S/W STOP tb – gray</li> <li>C/W TONE VOL – as reqd</li> <li style="padding-left: 20px;">lts (eleven) – off</li> <li>MSTR ALARM pb – lt off</li> <li>RATE MIN tb – OFF</li> <li style="padding-left: 20px;">HOLD tb – OFF</li> <li style="padding-left: 20px;">SCALE tb – gray</li> <li>EE MODE – OFF</li> <li style="padding-left: 20px;">MAN CONTR – ctr</li> <li style="padding-left: 20px;">tb (six) – bp</li> <li>B/U JOINT sel – SY</li> <li style="padding-left: 20px;">PL REL – OFF</li> <li style="padding-left: 20px;">DR – ctr</li> <li>PARAM sel – PORT TEMP</li> <li>LTG ANNUN/NUM sel (two) – VAR,LO</li> <li style="padding-left: 20px;">PNL/INST sel – OFF</li> <li>JOINT sel – CRIT TEMP</li> <li>SINGLE/DIRECT DR – ctr</li> <li>SHDLR BRACE REL – ctr (tb-bp)</li> </ul> <hr style="border-top: 1px dashed black;"/>	<p>A8L (This panel may be deleted if RMS not flown)</p> <ul style="list-style-type: none"> <li>STBD RMS – OFF (tb-STO)</li> <li style="padding-left: 20px;">– (OFF (tb-bp) if NO MPMs present)</li> <li style="padding-left: 40px;">RETEN LAT – OFF (tb-LAT)</li> <li style="padding-left: 20px;">– (OFF (tb-bp) if no MRLs present)</li> <li style="padding-left: 40px;">HTR (two) – OFF</li> <li style="padding-left: 20px;">R-F-L tb (three) – gray</li> <li style="padding-left: 40px;">– (bp if no RMS flown)</li> <li>RMS SEL – OFF</li> <li style="padding-left: 20px;">PWR – OFF</li> <li>PORT RMS – OFF (tb-STO)</li> <li style="padding-left: 20px;">– (OFF (tb-bp) if no MPMs present)</li> <li style="padding-left: 40px;">RETEN LAT – OFF (tb-LAT)</li> <li style="padding-left: 20px;">– (OFF (tb-bp) if no MRLs present)</li> <li style="padding-left: 40px;">HTR (two) – OFF</li> <li style="padding-left: 20px;">R-F-L tb (three) – gray</li> <li style="padding-left: 40px;">– (bp if no RMS flown)</li> <li>RMS RHC RATE – VERN</li> </ul> <hr/> <p>A3</p> <ul style="list-style-type: none"> <li>MON CONTRAST (two) – ctr</li> <li style="padding-left: 20px;">BRT (two) – ctr</li> <li style="padding-left: 20px;">COLOR (two) – as reqd</li> <li style="padding-left: 20px;">TINT (two) – as reqd</li> <li style="padding-left: 20px;">FUNCTION (two) – ctr</li> <li style="padding-left: 20px;">PWR (two) – OFF</li> </ul> <hr/>
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NOT FLOWN

9-22

ASC/121/FIN 3



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

L9	PS FLOOD sel (two) – ON,BRT – (OFF,BRT if night launch) AUD PWR                              – AUD/TONE A/G (two)                            – T/R A/A                                  – T/R ICOM (two)                          – T/R VOX SENS sel                        – as reqd PAGE                                – dn VOL pb (five)                      – as reqd XMIT/ICOM MODE sel – as reqd (PTT/VOX <span style="border: 1px solid black; padding: 2px;">PTT/PTT</span> recommended)	L10L	COUNTER SEL – TAPE REMAIN AUDIO MON – CH 1/2 TIMER – OFF REMOTE/LOCAL – LOCAL
<hr/>			
L10L	(MUX) Verify all lts off VTR/CC PWR – 0 (dn) RATE SEL (three) – 1 MUX BYPASS – ACT MUX/VTR/CC PWR – 0 (dn)		
<hr style="border-top: 1px dashed black;"/>			
L10L	(VIP) Verify all lts off PWR – 0 (dn) ATU – REC CCTV VIDEO IN – J3		
<hr style="border-top: 1px dashed black;"/>			
L10L	(VTR) Verify all lts off ON/STANDBY lt – off PHONE LEVEL – midrange AUDIO INPUT LEVEL CH-1 – 4 CH-2 – 6		

NOT FLOWN

9-23

ASC/121/FIN 1

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

L10U	(AVIU) SYNC/VIDEO – VIDEO HI-Z/75 – HI-Z PWR SELECT – HI		L12LL	SSP-2 (MPLM) MPLM KEEL CAM PWR – OFF HTR/ILLUM PWR – OFF cb SW PWR 3 – op PDIP 2 PWR 2/MPLM RLY – op C/L CAM PWR – OFF
L11U	(PDIP 2) MPLM DATA – OIU (ctr) DC PWR 1 CABIN P/L – OFF 2 CABIN P/L – OFF		L12LR	SSP-2 (PDIP 2 PWR) cb PDIP 2 PWR 1 – op
L12UL	SSP-1 (APCU/MPLM) Verify all tbs bp APCU 1 CONV – OFF OUTPUT RLY – OP 2 CONV – OFF OUTPUT RLY – OP cb SW PWR 1 – op PDIP 1 PWR 2/KuBAND RLY – op MPLM CHAN 1 HTR PWR – OFF 2 HTR PWR – OFF		L12L	(PDIP 1) Ku BAND RATE – OFF DC PWR 1 CABIN P/L – OFF 2 CABIN P/L – OFF
L12UR	SSP-1 (TCS/ODS) Verify all tbs bp TCS PWR – OFF cb SW PWR 2 – op X1/X2 SW PDIP 1 PWR 1 – op ODS CONN MATE X1 TLM PWR – OFF X2 TLM PWR – OFF OIU PWR – OFF		R12	(VPU/OPP) VPU PWR – OFF
			R12	(OPP) cb OBSS SW PWR cb1 – op {Y} OBSS SW PWR – OFF
			R12	(OBSS) RSC PWR – OFF ITVC ENA – OFF SPEE PWR – OFF

NOT FLOWN

9-24

ASC/121/FIN 1

## AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

<p>A15: (All Veh)            PS COMM CCU PWR – OFF <span style="border: 1px solid black; padding: 0 2px;">ON</span>            DC UTIL PWR MNC – OFF            AC UTIL PWR AC3 – OFF            :A CRYO TK5 HTRS (four) – OFF                O2 RESET/TEST – ctr                (OV104,5)            :B cb PPCA CONT PWR (two) – op { R }            :C PALLET PWR (two) – ctr (tb-OFF)                HTRS (two) – OFF            :D,E, HTRS (sixteen) – OFF                O2 RESET/TEST (four) – ctr            :H,I, cb PALLET ESS (sixteen) – op { R }                J,K HTR SNSR (eight) – op { R }</p> <hr/> <p>A14 RCS/OMS HTR FWD RCS – OFF                L POD (two) – A OFF, B OFF                R POD (two) – A OFF, B OFF                OMS KIT – OFF                CRSFD LINES (two) – A AUTO,              B AUTO                FWD RCS JET (five) – AUTO                AFT RCS JET (five) – AUTO                CARGO COOL LP HTRS ORB (three) (OV103,5) – OFF                CARGO LN (two) (OV103,5) – OFF                PYRO (twelve) – SAFE                RMS LAT – SAFE</p> <hr/>	<p>A13 OS AUD MSTR SPKR VOL sel – as reqd                SPKR PWR – OFF            GPS PRE AMPL UC (OV103) – MNC                LC (OV103) – MNC                (two) (OV104) – ON                PWR – ON <span style="border: 1px solid black; padding: 0 2px;">OFF</span>            GPS/SIGI PWR (OV103) – OFF            blank sw (OV104) – dn            GPS ENCRYPT – NORM            GPS/SIGI ENCRYPT (OV103) – NORM            blank sw (OV104) – dn</p> <hr/> <p>A12 APU HTR GAS GEN/FUEL PUMP (three) – OFF                LUBE OIL LINE (three) – OFF                TK/FU LINE/H2O SYS (six) – OFF            LG ARM/DN RESET – dn            FC3 STRUCT RTN – ctr (tb-ON)            HYD HTR RUD SPD BK A – OFF                B – AUTO                BDY FLP A – AUTO                B – OFF                ELEV A – AUTO                B – OFF                AFT FUS A – AUTO                B – OFF            CIRC PUMP PWR 1 – MNA                2 – MNB                3 – MNC</p> <hr/>
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NOT FLOWN

9-25

ASC/121/FIN 3

## AFT FLIGHT DECK SWITCH LIST FOR HANDOVER INGRESS

A11	CRYO TK4 HTR (four) – OFF O2 RESET/TEST – ctr MS COMM CCU PWR – ON <span style="border: 1px solid black; padding: 0 2px;">OFF</span> DC UTIL PWR MNC – ON (OV105) PALLET HTRS C,D (two) – OFF TK10 HTRS (four) – OFF O2 RESET/TEST – ctr TK11 HTRS (four) – OFF O2 RESET/TEST – ctr TK12 HTRS (four) – OFF O2 RESET/TEST – ctr TK13 HTRS (four) – OFF O2 RESET/TEST – ctr (OV104) CRYO TK SEL (eight) – ctr All cbs (104,5) – op {R}	R14:C   cb MNA UHF EVA – op {Y} MNB KU ELEC – op {Y} ANT HTR – op {Y} CABLE HTR – op {R} MNC UHF EVA – op {Y} KU SIG PROC – op {Y}
		:D   All cbs – op {Y} except: cb MNB VPU – op {Y} 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}
<hr/>		
R14:	All cbs – cl { } except: (OV104,5)	
:B	cb MNA PALLET DSC 1A/2B – op {R} 3A – op {R} MNB PALLET DSC 1B – op {R} 4B – op {R} MNC PALLET DSC 2A – op {R} 3B/4A – op {R}	

NOT FLOWN

9-26

ASC/121/FIN 1

## HARDWARE CAUTION & WARNING CONFIGURATION

### UPPER LIMIT CHANGE

4 CABIN PRESS  7 OMS TK P OX-L  17 OMS TK P FU-L 37 OMS TK P OX-R 39 MPS He Reg 1A P  47 OMS TK P FU-R 49 MPS He Reg 2A P  55 CAB FAN ΔP 59 MPS He Reg 3A P 65 PPO2 #1 74 CABIN FAN ΔP 75 PPCO2 #2 79 MANF P LH2 85 ARS FAN ΔP 95 CAB TOTAL PRESS 107 FREON LOOP 1 EVAP OUT T 117 FREON LOOP 2 EVAP OUT T	<u>TO</u> 3.85 V/15.36 psia (OV103) 3.90 V/15.53 psia (OV104) 3.85 V/15.35 psia (OV105) 3.60 V/288 psi (OV103,4) 3.70 V/296 psi (OV105) 3.60 V/288 psi 3.60 V/288 psi 4.00 V/816.3 psia (OV103) 4.10 V/815.5 psia (OV104) 4.10 V/808.4 psia (OV105) 3.60 V/288 psi 4.00 V/810.6 psia (OV103) 4.10 V/814.6 psia (OV105) 4.85 V/0.2" H2O (if SH flown) 4.00 V/811.5 psia (OV105) 2.30 V/2.7 psi (if SH flown) 4.25 V/6.80" H2O 3.80 V/7.6 mmHg (if SH flown) 3.25 V/65 psi 4.85 V/0.2" H2O (if SH flown) 1.55 V/13.8 psi (if SH flown) 4.30 V/115.2 °F 4.30 V/115.2 °F
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### LOWER LIMIT CHANGE

4 CABIN PRESS  39 MPS He Reg 1A P  49 MPS He Reg 2A P  59 MPS He Reg 3A P 74 CABIN FAN ΔP 106 FREON FLOW 1 116 FREON FLOW 2	<u>TO</u> 3.45 V/13.76 psia (OV103) 3.45 V/13.74 psia (OV104) 3.45 V/13.76 psia (OV105) 3.30 V/676 psia (OV103) 3.45 V/678.7 psia (OV105) 3.35 V/679.9 psia (OV103) 3.45 V/684.6 psia (OV105) 3.35 V/680.0 psia (OV105) 2.60 V/4.16" H2O 0.80 V/1186 lb/hr 0.80 V/1186 lb/hr
--	---

### INHIBIT

- 8 APU 1 EGT
- 18 APU 2 EGT
- 28 APU 3 EGT
- 30 CRYO O2 P TK4/5 (if TK4 and TK5 not flown)
- 40 CRYO O2 P TK5 (unless OV103,4,5 and TK5 flown)
- 55 CAB FAN ΔP (if SH flown)
- 61 CRYO O2 HTR1 TK4 (if TK4 and TK5 not flown)
- 65 PPO2 (if SH flown)
- 71 CRYO O2 HTR2 TK4 (if TK4 and TK5 not flown)
- 75 PPCO2 (if SH flown)
- 77 OMS PBK OXID TK ULL P
- 80 CRYO H2 P TK4/5 (if TK4 and TK5 not flown)
- 81 CRYO O2 HTR1 TK5 (unless OV103,4,5 and TK5 flown)
- 85 ARS FAN ΔP (if SH flown unpowered)
- 87 OMS PBK FUEL TK ULL P
- 90 CRYO H2 ΔP TK5 (unless OV103,4,5 and TK5 flown)
- 95 CAB TOTAL PRESS (if SH flown)

## MEDS CONFIGURATION FOR INGRESS

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



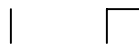
CUE CARD CONFIG

**CUE CARD  
CONFIG**

FAB USE ONLY

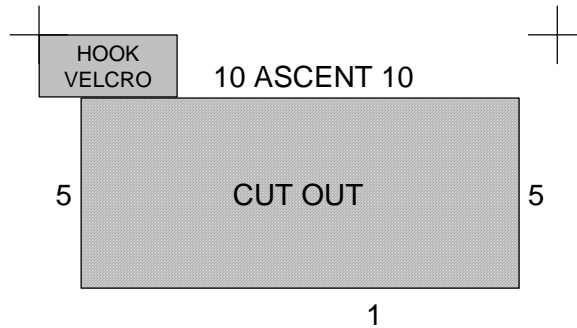
10-1

ASC/121/FIN



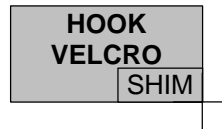
CUE CARD  
CONFIG

TOP



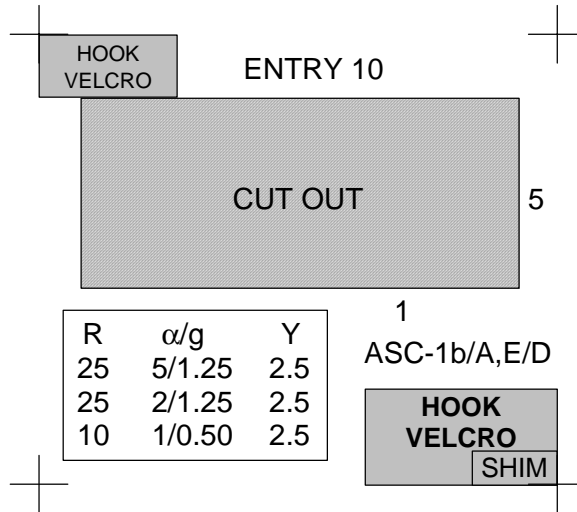
**ADI ERROR/RATE  
SWITCH**

ASC-1a/A,E/D



TOP

BACK OF 'ADI ERROR/RATE SWITCH'



FAB USE ONLY

CC 10-2

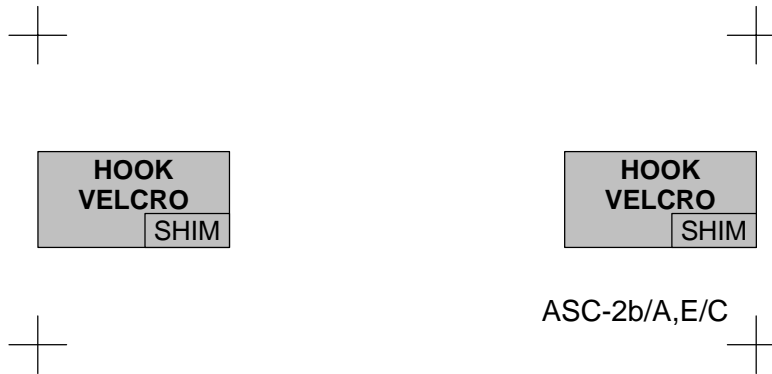
ASC/121/FIN



TOP

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

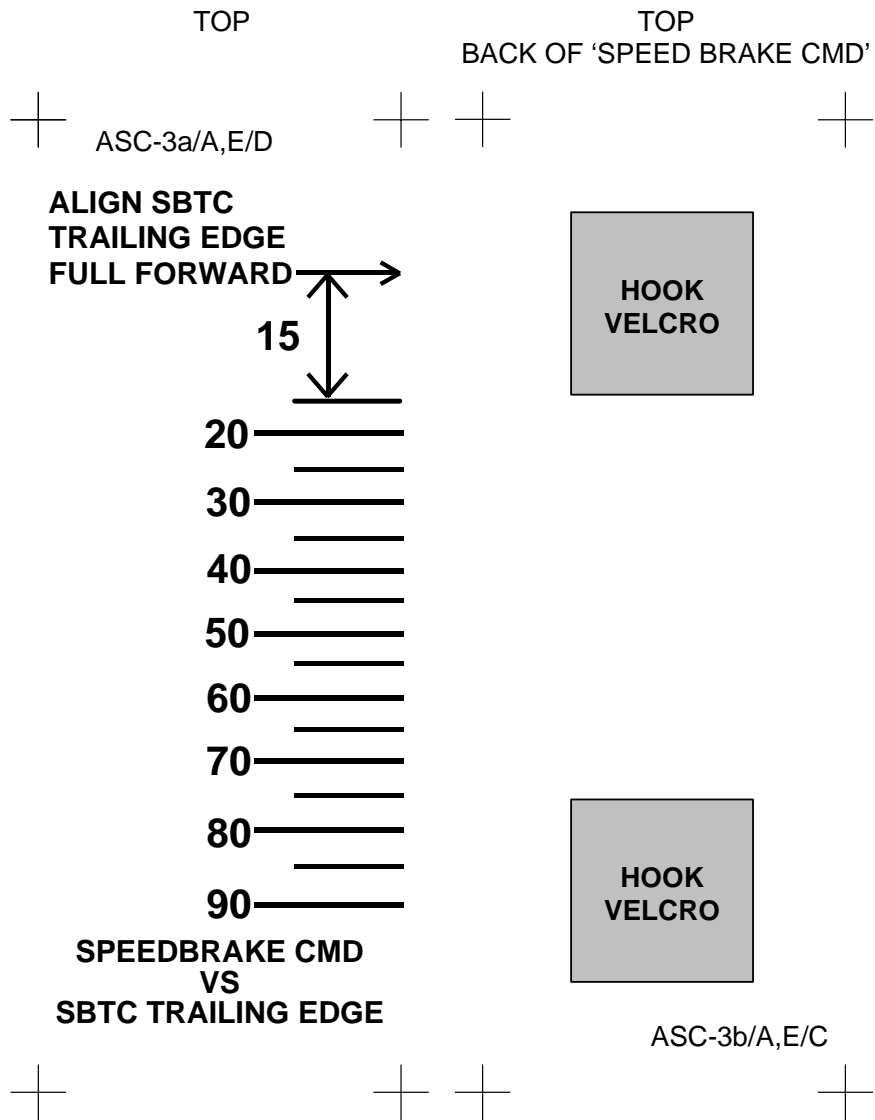
TOP  
BACK OF 'ASCENT/ENTRY SPEC'



FAB USE ONLY

CC 10-3

ASC/121/FIN

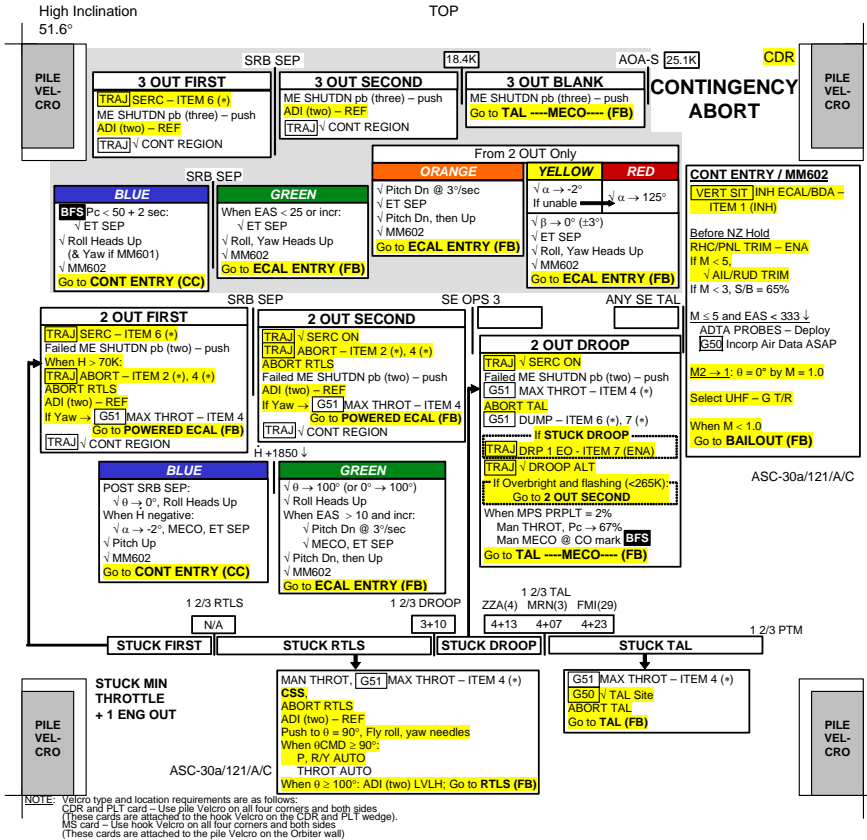


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FAB USE ONLY

CC 10-4

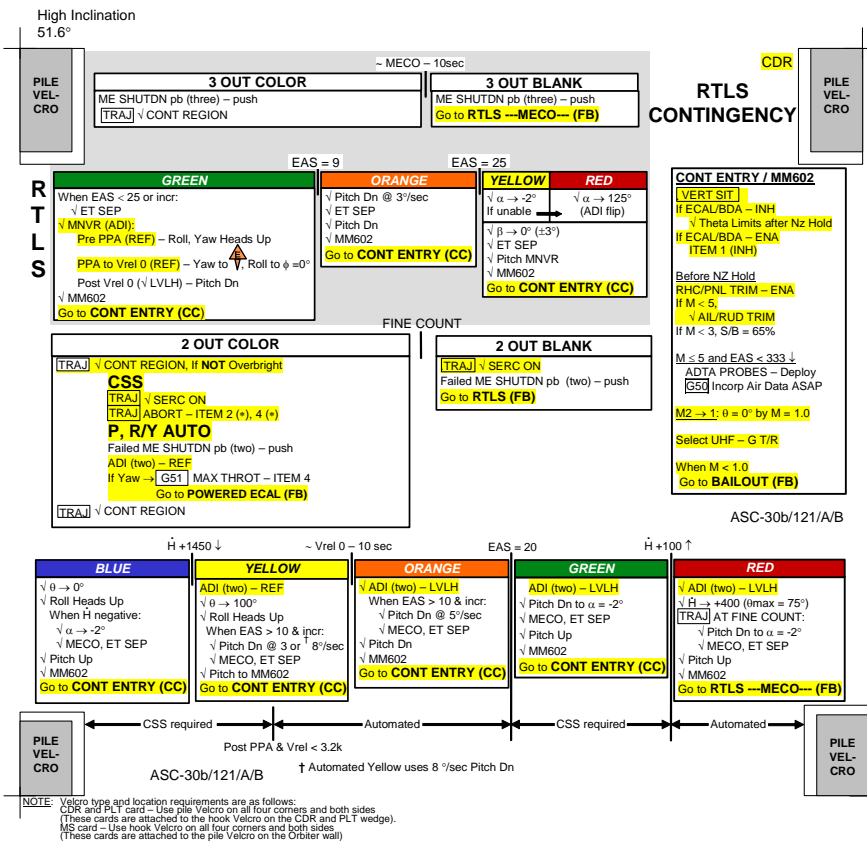
ASC/121/FIN



FAB USE ONLY

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 (A)CC 10-5

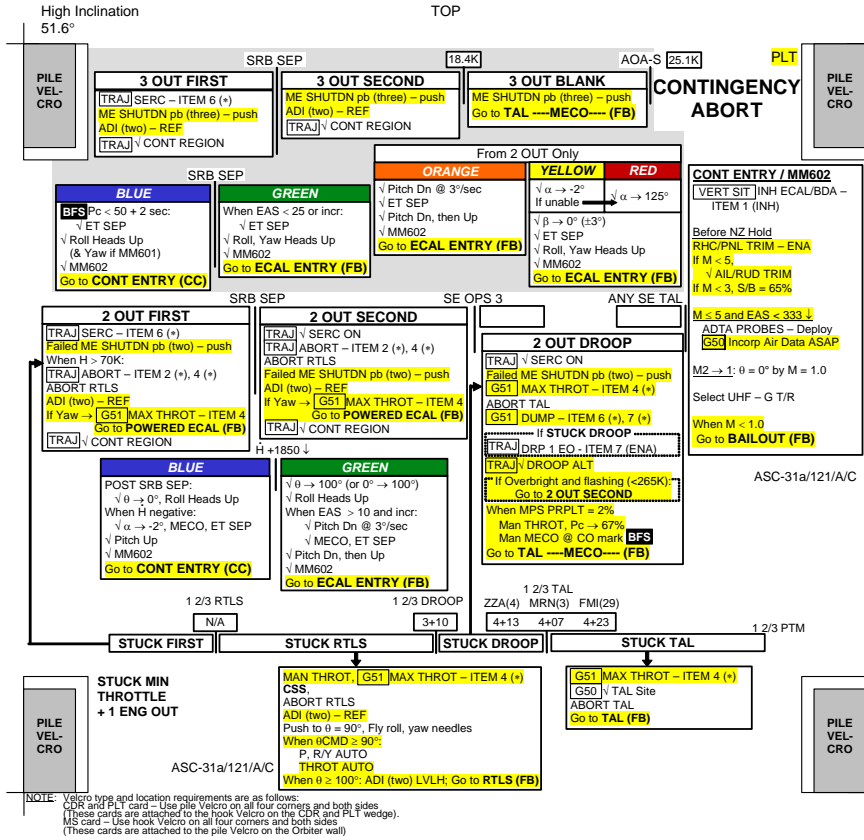
**CDR**  
 ASC/121/FIN 3



FAB USE ONLY

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(A)CC 10-6

**CDR**  
ASC/121/FIN 1



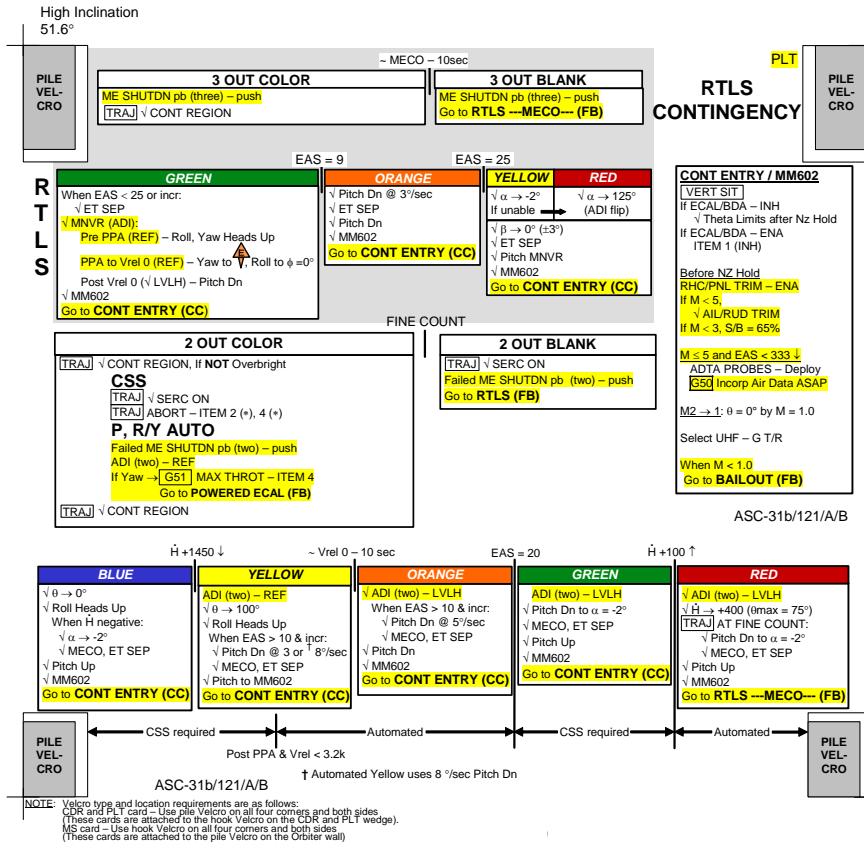
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FAB USE ONLY

PLT

ASC/121/FIN 3

(B)CC 10-5

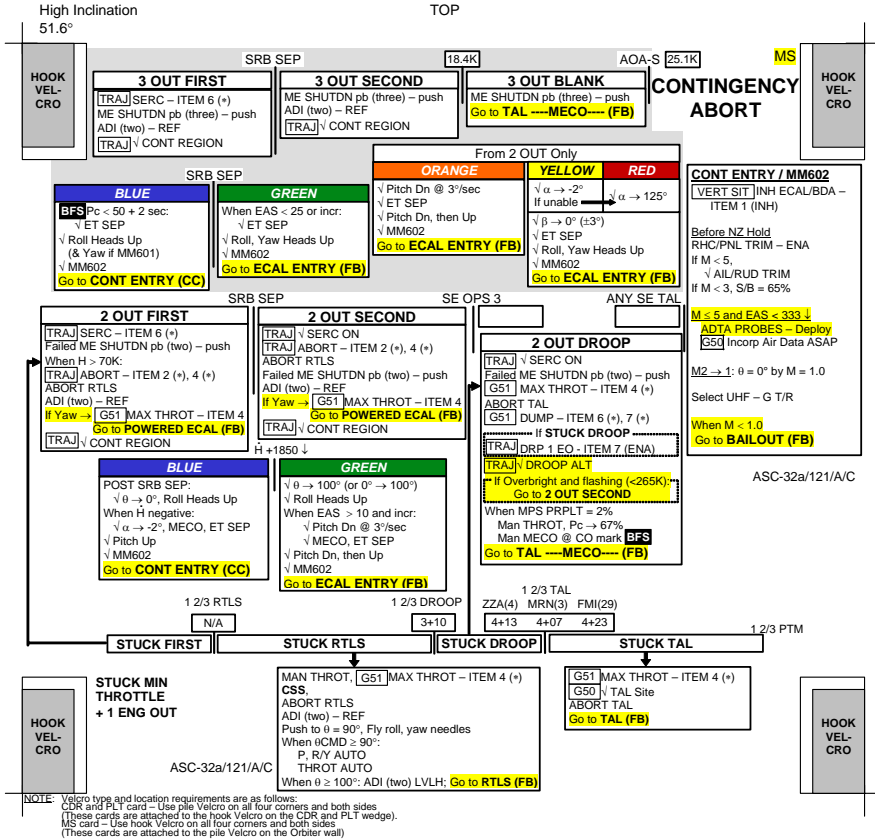


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**PLT**

ASC/121/FIN 1

FAB USE ONLY (B)CC 10-6

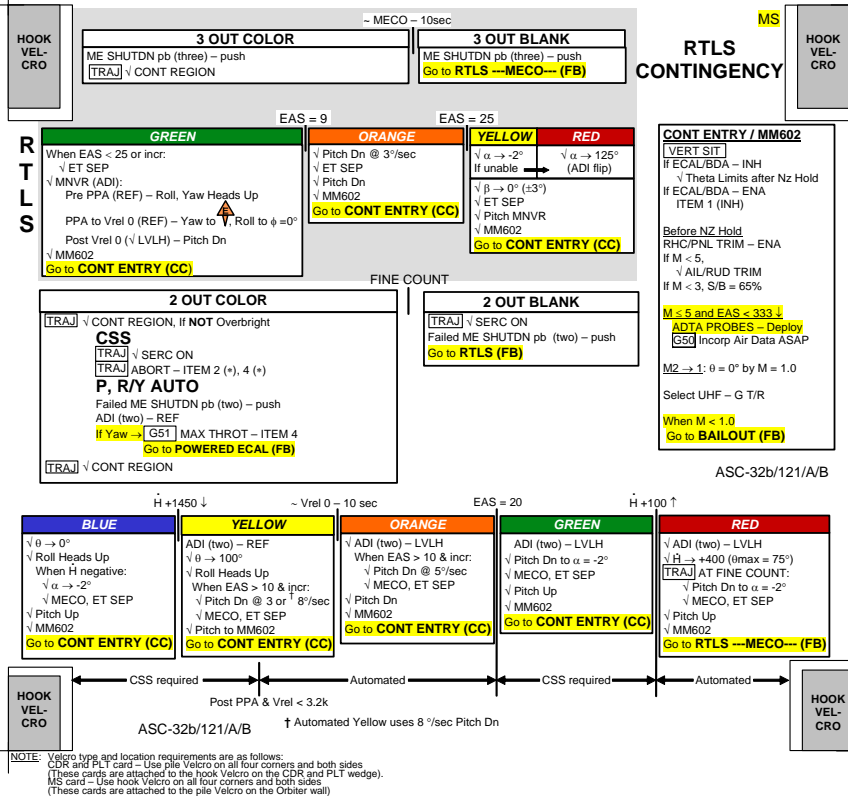


FAB USE ONLY

(reduced copy)  
(C)CC 10-5

**MS**  
ASC/121/FIN 3

High Inclination  
51.6°



FAB USE ONLY

(C)CC 10-6

**MS**  
ASC/121/FIN 1



TOP

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

<b>OMS TEMP*</b> FU IN P $\geq$ <table style="display: inline-table; border-collapse: collapse;"><tr><td style="border: 1px solid black; padding: 0 5px;">L</td><td style="border: 1px solid black; padding: 0 5px;">R</td></tr><tr><td style="border: 1px solid black; padding: 0 5px;">225</td><td style="border: 1px solid black; padding: 0 5px;">220</td></tr></table> or $\leq$ <table style="display: inline-table; border-collapse: collapse;"><tr><td style="border: 1px solid black; padding: 0 5px;">205</td><td style="border: 1px solid black; padding: 0 5px;">204</td></tr></table> or No FU IN P	L	R	225	220	205	204	OMS ENG FAIL OMS PRPLT FAIL
L	R						
225	220						
205	204						
<b>OMS PC* &amp; OMS ↓</b> (BFS: $\sqrt{\text{accel}}$ ) ENG VLV 1 or 2 < 70 or OX IN P > 227 OX IN P $\leq$ 227 or No OX IN P	OMS ENG FAIL OMS PRPLT FAIL						
<b>OMS OX/FU TK P</b> ( $\sqrt{\text{ENG IN P}}$ ) OX/FU LOW OX & FU HIGH	He PRESS/VAP ISOL (two) – OP If aff TK P not incr: He PRESS/VAP ISOL (two) – CL At PC < 72 or OMS TEMP or HP > [85]: OMS PRPLT FAIL He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284						
<b>OMS He TK P LOW</b> ( $\sqrt{\text{OMS/MPS}}$ )	At He P < 640 or QTY $\leq$ 41: If HP < [85]: OMS XFEED from good OMS At HP > [85]: OMS PRPLT FAIL						
<b>OMS N2 REG P HIGH or LOW</b>	OMS ENG – ARM						
<b>OMS N2 TK P LOW</b> ( $\sqrt{\text{OMS/MPS}}$ )	At N2 TK P < 470: OMS ENG – ARM						
<b>OMS GMBL</b> PRI fail SEC fail	L(R) OMS GMBL – SEC (twice) If high RCS usage: OMS ENG FAIL						
<b>GPC</b> <b>1(4) &amp;</b> Burning OMS aff	aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF, ON L(R) OMS GMBL – SEC (twice)						
SEC GMBL lost 2 FAs lost	If high RCS usage: OMS ENG FAIL $\sqrt{\text{MAN SHUTDN}}$						
<b>I/O ERROR FA</b> <b>1(4)</b>	L(R) OMS GMBL – SEC I/O RESET (if recov: BFS I/O RESET) If high RCS usage: OMS ENG FAIL						
2 FAs lost	$\sqrt{\text{MAN SHUTDN}}$						
<b>BCE STRG D</b> <b>1(4)</b>	I/O RESET (if recov: >>) If high RCS usage: L(R) OMS GMBL – SEC (twice)						
<b>I/O ERROR PCM</b>	OI PCMMU PWR – 2(1)						

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

ASC-5a/121/A,O/B

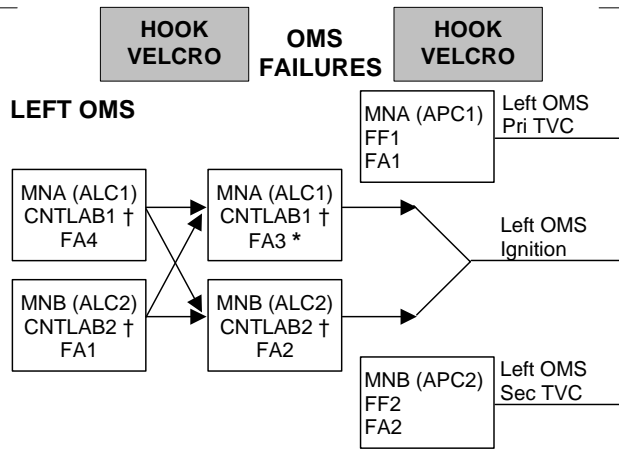
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FAB USE ONLY

CC 10-7

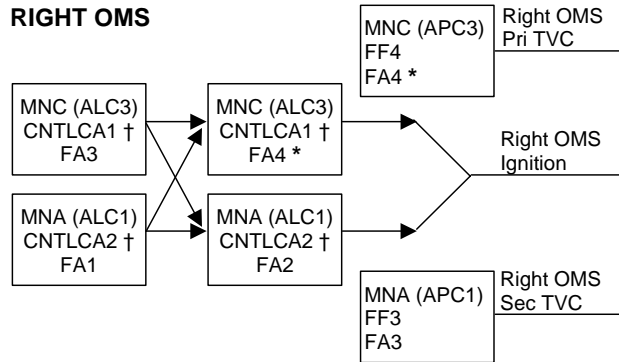
ASC/121/FIN 2

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) Pc 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/121/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)

ORB BURN A table with columns GPC, OP, CL and rows 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 Pc 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 (√Pc, 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 table with columns OMS 2, TAIL ONLY CNTL, Orbit and rows VGO X < 0.2 fps, VGO Y,Z < 2 fps, All axes < 0.2 fps

ASC-6a/121/A,O/A

(reduced copy)

FAB USE ONLY

CC 10-9

ASC/121/FIN

TOP  
BACK OF 'OMS2/ORBIT OMS BURNS'

<b>HOOK VELCRO</b>	<b>OPS 1 RCS BURN</b>	<b>HOOK VELCRO</b>
------------------------	---------------------------	------------------------

**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/121/A,O/A

(reduced copy)

FAB USE ONLY

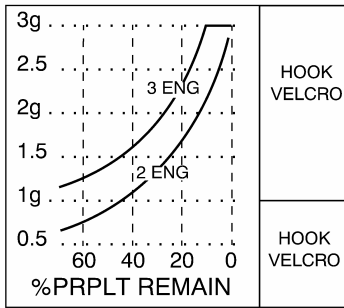
CC 10-10

ASC/121/FIN

TOP

**ASCENT ADI - NOMINAL**

TIME	$\theta$	H	$\dot{H}$	(121 OCFLQ CY)
0:30	71	10K	675	
0:50	63	27K	1008	
1:10	53	50K	1404	
1:30	40	84K	1885	
1:50	31	125K	2195	



-STAGING-

$V_I$	$\theta$	H	$\dot{H}$	ASC-14a/121/NB
6	20	229K	1626	
7	16	283	1193	
8	14	316	857	
9	11	336	585	
10	10	348	362	
12	6	357	36	
14	9	355	-161	
16	25	350	-236	
18	23	344	-267	
20	21	339	-214	
22	19	337	-100	
24	17	337	68	
25819	13	345	273	

HOOK VELCRO

TOP  
BACK OF 'ASCENT  
ADI-NOMINAL'

**ENTRY ALPHA**

VR	$\alpha_{ref}$	R	H	$\dot{H}_{ref}$	Rref
25	40	4472	400		
24	HI 40 LO	2634	245	-46	R80
23	43 40 37	2158	237	-63	71
22	43 40 37	1801	231	-82	66
21	43 40 37	1522	225	-104	L63
20	43 40 37	1302	218	-121	60
19	43 40 37	1127	211	-142	61
18	43 40 37	978	205	-166	62
17	43 40 37	864	198	-184	63
16	43 40 37	766	191	-196	64

**KSC 15**

MAX L/D	
M	$\alpha$
3	17
2	15
1	12

ASC-14b/121/A,E/A

HOOK VELCRO

15	43 40 37	683	185	-119	64
14	43 40 37	615	181	-126	62
13	43 40 37	547	178	-136	59
12	43 40 37	481	173	-154	57
11	42 39 36	426	168	-195	R55
10	41 38 35	376	164	-174	46
9	39 36 33	327	158	-205	43
8	37 34 31	278	150	-237	40
7	33 30 27	230	141	-266	39
6	30 27 24	184	130	-272	40
5	26 23 20	141	117	-275	42
4	22 19 18	106	105	-263	L41
3	19 16 15	75	89	-248	40
2.5	14	61	82	-216	
2	12	49	76	-282	
1.5	9	37	65	-331	
1	8	28	51	-263	

HOOK VELCRO

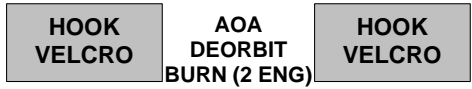
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FAB USE ONLY

CC 10-11

ASC/121/FIN 3

TOP



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

- TIG-2      OMS ENG (two) – ARM/PRESS
- :15 EXEC
- :15 If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
- :00 Start watch (√P<sub>c</sub>, 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<sub>c</sub> < 80 or OMS TEMP, \*
- \*         OMS ENG – OFF \*
- \*     √ADI – LVLH, center needles \*
- \*     RCS COMPLETION \*
- \* **OMS ENG FAIL:** \*
- \* Failed OMS ENG – OFF \*
- \* OMS XFEED at 1/2 ΔVTOT at fail  \*
- \*     or OMS QTY  %L or  %R \*
- \* **2nd OMS FAIL (ENG or PRPLT):** \*
- \* Failed OMS ENG – OFF \*
- \* If PRPLT FAIL: \*
- \*     Secure aff OMS \*
- \*     ITEM 18 +Q EXEC \*
- \*     √ADI – LVLH, center needles \*
- \*     Interconnect good OMS to RCS \*
- \*         THC +X (√OMS% vs RCS Burn Time) \*
- \*         RCS I'CNCT TK SW (N/A for OMS PRPLT FAIL) \*
- \*         THC +X (√OMS% vs RCS Burn Time) \*
- \*     AFT RCS RECONFIG \*
- \*     RCS COMPLETION \*

ASC-8a/A/E

HINGE

(reduced copy)

FAB USE ONLY

CC 10-12

ASC/121/FIN

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

\* **RCS COMPLETION:**

\* If DIRECT INSERTION:

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

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

\* FLIP   -----  
\*  $\Delta V$     FRCS COMPLETION

\* AFT   -----  
\*  $\Delta V$     THC +X to TGT  $\Delta V$

\* TGT   -----  
\*  $\Delta V$

\* If W/OMS 1:

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

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

\* FLIP   -----  
\* HP    FRCS COMPLETION

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

\* TGT   -----  
\* HP

\* **FRCS COMPLETION:**

\* Mnv'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/121/A/A

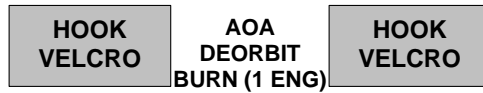
(reduced copy)

FAB USE ONLY

CC 10-13

ASC/121/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<sub>c</sub>, ΔVTOT, ENG VLVs)

OMS XFEED RETURN at ΔVTOT =     
or   at   %

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

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

ASC-8b/A/B

HINGE

(reduced copy)

FAB USE ONLY

CC 10-14

ASC/121/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  $\Delta V$  or \*

\*     if CUR  $\Delta VTOT$ :     TOT AFT QTY 2    % then \*

\*     FRCS COMPLETION \*

\*     FLIP    ----- \*

\*      $\Delta V$      FRCS COMPLETION \*

\*     AFT    ----- \*

\*      $\Delta V$      THC +X to TGT  $\Delta V$  \*

\*     TGT    ----- \*

\*      $\Delta V$  \*

\* If W/OMS 1: \*

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

\*     At AFT QTY 1     THC +X to FLIP HP or \*

\*     if CUR HP:     TOT AFT QTY 2    % then \*

\*     FRCS COMPLETION \*

\*     FLIP    ----- \*

\*     HP     FRCS COMPLETION \*

\*     AFT    ----- \*

\*     HP     THC +X to TGT HP \*

\*     TGT    ----- \*

\*     HP \*

\* **\* FRCS COMPLETION:** \*

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

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

**CUTOFF**

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

\* AFT RCS RECONFIG if INTERCONNECT \*

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

ASC-8bb/121/A/A

(reduced copy)

FAB USE ONLY

CC 10-15

ASC/121/FIN

TOP

**AOA  
DEORBIT  
BURN (RCS)**

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

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

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

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

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

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

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

ASC-7a/AB

HINGE

(reduced copy)

FAB USE ONLY

CC 10-16

ASC/121/FIN

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

**\* RCS COMPLETION:**

\* If DIRECT INSERTION:

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

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

\* FLIP    -----  
\*  $\Delta V$                            FRCS COMPLETION

\* AFT    -----  
\*  $\Delta V$                                       THC +X to TGT  $\Delta V$

\* TGT    -----  
\*  $\Delta V$

\* If W/OMS 1:

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

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

\* FLIP    -----  
\* HP                                        FRCS COMPLETION

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

\* TGT    -----  
\* HP

**\* FRCS COMPLETION:**

\* Mnv 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:**

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

ASC-7aa/121/A/A

(reduced copy)

FAB USE ONLY

CC 10-17

ASC/121/FIN



TOP  
 BACK OF 'AOA DEORBIT BURN (RCS)'



**HOOK  
 VELCRO**

**HOOK  
 VELCRO**



HINGE

ASC-7b/A/B



FAB USE ONLY

(reduced copy)  
 CC 10-18

ASC/121/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/121/FIN

TOP

PILE  
VELCRO

HOOK  
VELCRO

PILE  
VELCRO

**ZZA TAL REDESIGNATION  
(121 OCFLQ)**

1st E.O. VI		6000	6100	6200	6300	6400	6500	6600	6700
SE OPS 3 ZZA 109	(4)	10900	11000	11000	11000	11100	11100	11100	11200
SE ZZA 104	(4)	17600	17400	17200	17000	16800	16600	16400	16200

1st E.O. VI		6800	6900	7000	7100	7200	7300	7400	7500
SE OPS 3 ZZA 109	(4)	11200	11200	11300	11300	11300	11300	11400	11400
SE ZZA 104	(4)	16000	15800	15600	15500	15300	15100	15000	14800

1st E.O. VI		7600	7700	7800	7900	8000	8100	8200	8300
SE OPS 3 ZZA 109	(4)	11400	11500	11500	11500	11500	11600	11600	11600
SE ZZA 104	(4)	14700	14500	14400	14300	14100	14000	13900	13900

1st E.O. VI		8400	8500	8600	8700	8800	8900	9000	9100
SE OPS 3 ZZA 109	(4)	11600	11600	11700	11700	11700	11700	11700	11700
SE ZZA 104	(4)	13800	13700	13600	13600	13500	13500	13500	13500

1st E.O. VI		9200	9300	9400	9500	9600	9700	9800	9900
SE OPS 3 ZZA 109	(4)	11800	11800	11800	11800	11800	11800	11800	11800
SE ZZA 104	(4)	13400	13400	13400	13400	13400	13400	13400	13400

1st E.O. VI		10000	10100	10200	10300	10400	10500	10600	10700
SE OPS 3 ZZA 109	(4)	11900	11900	11900	11900	11900	11900	11900	11900
SE ZZA 104	(4)	13400	13500	13500	13500	13500	13600	13600	13600

1st E.O. VI		10800							
SE OPS 3 ZZA 109	(4)	11900							
SE ZZA 104	(4)	13600							

ASC-9a/121/A/B

PILE  
VELCRO

HOOK  
VELCRO

PILE  
VELCRO

(reduced copy)

FAB USE ONLY

CC 10-20

ASC/121/FIN 3

TOP  
BACK OF 'ZZA TAL REDESIGNATION'

HOOK  
VELCRO

HOOK  
VELCRO

HOOK  
VELCRO

**ECAL – ZZA or MRN or FMI PRIME TAL**

1st EO VI (KFPS)	<b>5.6</b>	<b>5.8</b>	<b>6.0</b>	<b>6.2</b>	<b>6.4</b>	<b>6.6</b>	<b>6.8</b>
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)	<b>7.0</b>	<b>7.2</b>	<b>7.4</b>	<b>7.6</b>	<b>7.8</b>	<b>8.0</b>	<b>8.2</b>
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)	<b>8.4</b>	<b>8.6</b>	<b>8.8</b>	<b>9.0</b>	<b>9.2</b>	<b>9.4</b>	<b>9.6</b>
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)	<b>9.8</b>	<b>10.0</b>	<b>10.2</b>	<b>10.4</b>	<b>10.6</b>	<b>10.8</b>	<b>11.0</b>
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)	<b>11.2</b>	<b>11.4</b>	<b>11.6</b>	<b>11.8</b>	<b>12.0</b>	<b>12.2</b>	<b>12.4</b>
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)	<b>12.6</b>	<b>12.8</b>	<b>13.0</b>	<b>13.2</b>	<b>13.4</b>	<b>13.6</b>	<b>13.8</b>
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/121/A/A

HOOK  
VELCRO

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(reduced copy)

FAB USE ONLY

CC 10-21

ASC/121/FIN

TOP

**PILE  
VELCRO**

**HOOK  
VELCRO**

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**MRN TAL REDESIGNATION  
(121 OCFLQ)**

1st E.O. VI		5900	6000	6100	6200	6300	6400	6500	6600
SE OPS 3 MRN 109	(3)	10900	11000	11000	11000	11000	11100	11100	11100
SE MRN 104	(3)	17100	17000	16800	16600	16400	16200	16100	15900

1st E.O. VI		6700	6800	6900	7000	7100	7200	7300	7400
SE OPS 3 MRN 109	(3)	11100	11200	11200	11200	11200	11300	11300	11300
SE MRN 104	(3)	15700	15500	15400	15200	15100	14900	14800	14600

1st E.O. VI		7500	7600	7700	7800	7900	8000	8100	8200
SE OPS 3 MRN 109	(3)	11300	11400	11400	11400	11400	11400	11500	11500
SE MRN 104	(3)	14500	14400	14300	14100	14000	13900	13900	13800

1st E.O. VI		8300	8400	8500	8600	8700	8800	8900	9000
SE OPS 3 MRN 109	(3)	11500	11500	11500	11600	11600	11600	11600	11600
SE MRN 104	(3)	13700	13600	13600	13500	13500	13500	13400	13400

1st E.O. VI		9100	9200	9300	9400	9500	9600	9700	9800
SE OPS 3 MRN 109	(3)	11700	11700	11700	11700	11700	11700	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)	11800	11800	11800	11800	11900	11900	11900	11900
SE MRN 104	(3)	13400	13400	13400	13500	13500	13500	13600	13600

1st E.O. VI		10700	10800						
SE OPS 3 MRN 109	(3)	11900	11900						
SE MRN 104	(3)	13600	13600						

ASC-10a/121/AB

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VELCRO**

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VELCRO**

(reduced copy)

FAB USE ONLY

CC 10-22

ASC/121/FIN 3



TOP  
BACK OF 'MRN TAL REDESIGNATION'

**HOOK  
VELCRO**

**HOOK  
VELCRO**

**HOOK  
VELCRO**

**ECAL – ZZA or MRN or FMI PRIME TAL**

1st EO VI (KFPS)	<b>5.6</b>	<b>5.8</b>	<b>6.0</b>	<b>6.2</b>	<b>6.4</b>	<b>6.6</b>	<b>6.8</b>
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)	<b>7.0</b>	<b>7.2</b>	<b>7.4</b>	<b>7.6</b>	<b>7.8</b>	<b>8.0</b>	<b>8.2</b>
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)	<b>8.4</b>	<b>8.6</b>	<b>8.8</b>	<b>9.0</b>	<b>9.2</b>	<b>9.4</b>	<b>9.6</b>
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)	<b>9.8</b>	<b>10.0</b>	<b>10.2</b>	<b>10.4</b>	<b>10.6</b>	<b>10.8</b>	<b>11.0</b>
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)	<b>11.2</b>	<b>11.4</b>	<b>11.6</b>	<b>11.8</b>	<b>12.0</b>	<b>12.2</b>	<b>12.4</b>
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)	<b>12.6</b>	<b>12.8</b>	<b>13.0</b>	<b>13.2</b>	<b>13.4</b>	<b>13.6</b>	<b>13.8</b>
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/121/A/A

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FAB USE ONLY

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ASC/121/FIN

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**FMI TAL REDESIGNATION  
(121 OCFLQ)**

1st E.O. VI		6300	6400	6500	6600	6700	6800	6900	7000
SE OPS 3 FMI 109	(29)	11000	11100	11100	11100	11100	11200	11200	11200
SE FMI 104	(29)	18000	17800	17600	17400	17200	17000	16800	16600

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)	16400	16200	16000	15800	15600	15400	15300	15100

1st E.O. VI		7900	8000	8100	8200	8300	8400	8500	8600
SE OPS 3 FMI 109	(29)	11500	11500	11500	11500	11500	11600	11600	11600
SE FMI 104	(29)	15000	14800	14700	14600	14400	14300	14200	14200

1st E.O. VI		8700	8800	8900	9000	9100	9200	9300	9400
SE OPS 3 FMI 109	(29)	11600	11600	11700	11700	11700	11700	11700	11700
SE FMI 104	(29)	14100	14000	14000	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	11800	11900
SE FMI 104	(29)	13800	13800	13800	13800	13800	13800	13800	13800

1st E.O. VI		10300	10400	10500	10600	10700	10800		
SE OPS 3 FMI 109	(29)	11900	11900	11900	11900	11900	11900		
SE FMI 104	(29)	13800	13800	13900	13900	13900	13900		

ASC-12a/121/A/B

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**HOOK  
VELCRO**

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VELCRO**

(reduced copy)

FAB USE ONLY

CC 10-24

ASC/121/FIN 3

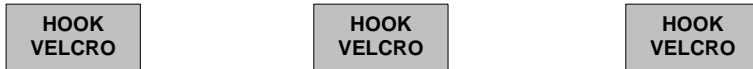
TOP  
BACK OF 'FMI TAL REDESIGNATION'



**ECAL – ZZA or MRN or FMI PRIME TAL**

1st EO VI (KFPS)	<b>5.6</b>	<b>5.8</b>	<b>6.0</b>	<b>6.2</b>	<b>6.4</b>	<b>6.6</b>	<b>6.8</b>
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)	<b>7.0</b>	<b>7.2</b>	<b>7.4</b>	<b>7.6</b>	<b>7.8</b>	<b>8.0</b>	<b>8.2</b>
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)	<b>8.4</b>	<b>8.6</b>	<b>8.8</b>	<b>9.0</b>	<b>9.2</b>	<b>9.4</b>	<b>9.6</b>
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)	<b>9.8</b>	<b>10.0</b>	<b>10.2</b>	<b>10.4</b>	<b>10.6</b>	<b>10.8</b>	<b>11.0</b>
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)	<b>11.2</b>	<b>11.4</b>	<b>11.6</b>	<b>11.8</b>	<b>12.0</b>	<b>12.2</b>	<b>12.4</b>
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)	<b>12.6</b>	<b>12.8</b>	<b>13.0</b>	<b>13.2</b>	<b>13.4</b>	<b>13.6</b>	<b>13.8</b>
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/121/A/A



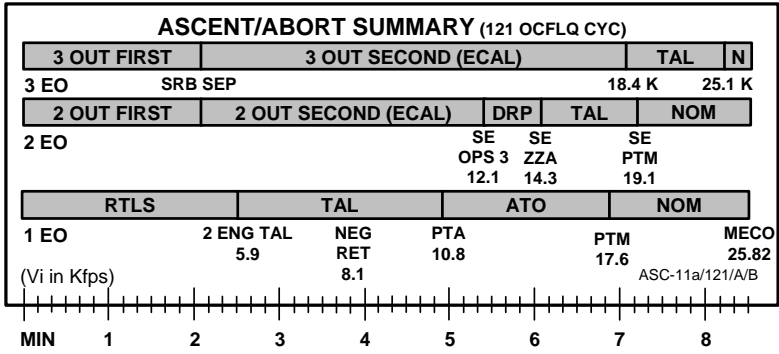
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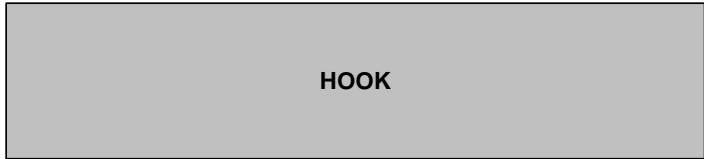
ASC/121/FIN

TOP



TOP

BACK OF 'ASCENT/ABORT SUMMARY'



ASC-11b/AC

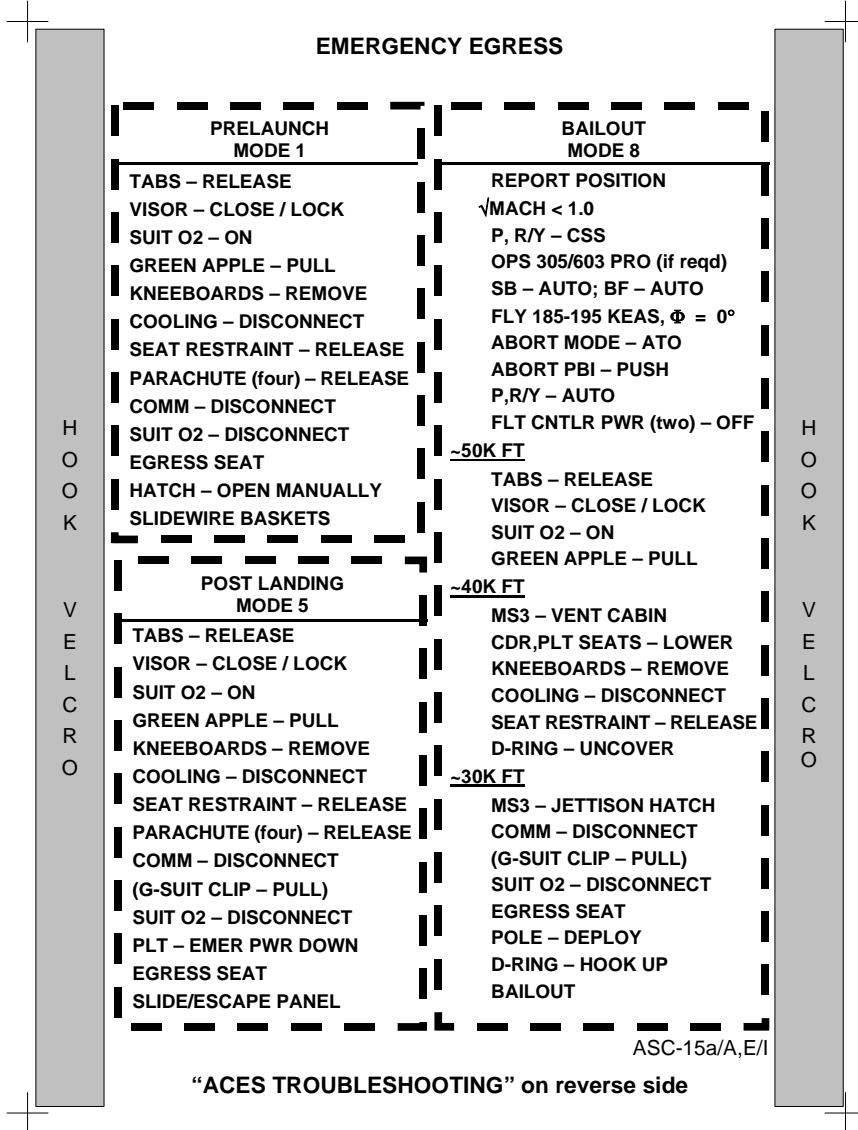
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FAB USE ONLY

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ASC/121/FIN 3

TOP



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

H  
O  
O  
K  
  
V  
E  
L  
C  
R  
O

H  
O  
O  
K  
  
V  
E  
L  
C  
R  
O

C6

ASC-15b/A,E/E

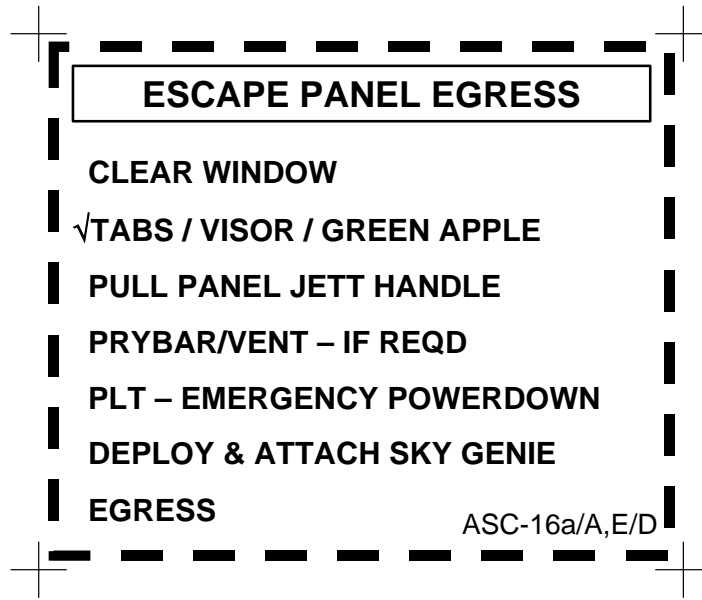
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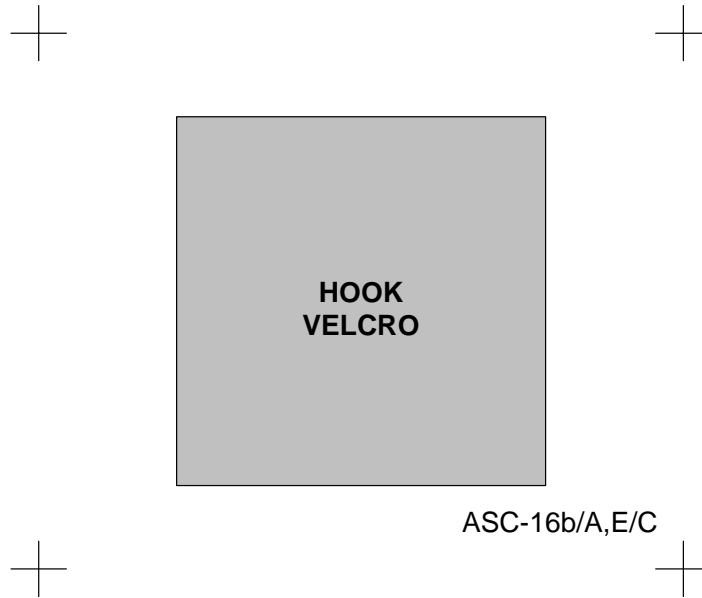
CC 10-28

ASC/121/FIN

TOP



TOP  
BACK OF 'ESCAPE PANEL EGRESS'



FAB USE ONLY

(reduced copy)  
CC 10-29

ASC/121/FIN

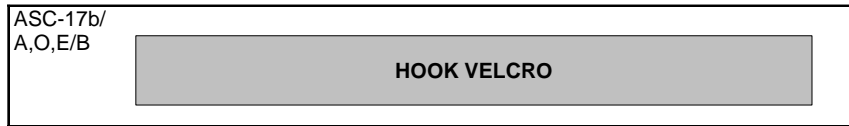
GPC/FCS CHANNEL CONFIGURATION

TOP

GPC

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

TOP  
BACK OF 'GPC'



Fabrication Notes

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

(reduced copy)

FAB USE ONLY

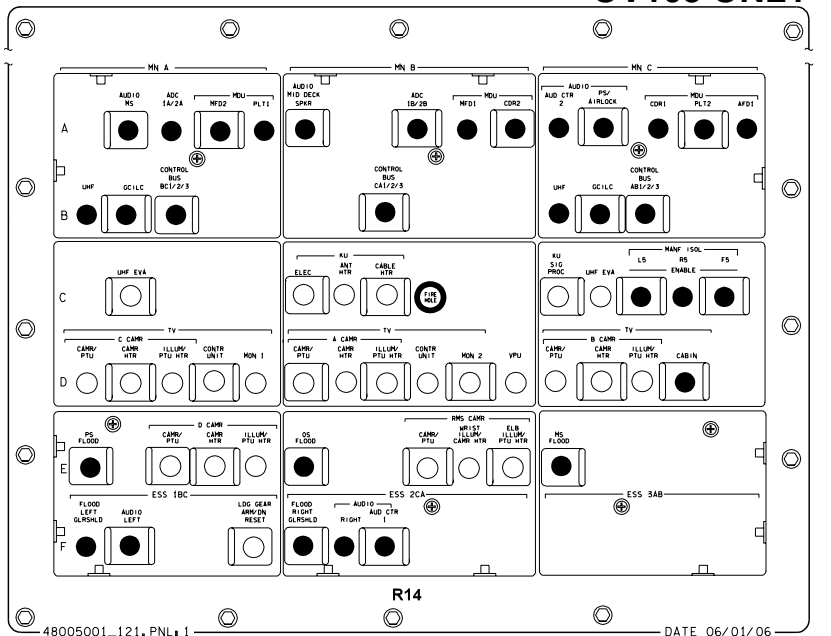
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ASC/121/FIN



TOP  
 PANEL R14 - OV103 ONLY

**OV103 ONLY**



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

(reduced copy)

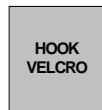
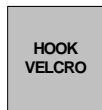
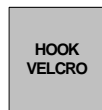
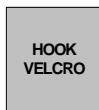
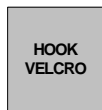
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CC 10-31

ASC/121/FIN 3



TOP  
BACK OF 'PANEL R14 - OV103 ONLY'



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

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FAB USE ONLY

CC 10-32

ASC/121/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/AVD

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

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HOOK  
VELCRO

TOP

## EMERGENCY EGRESS

HOOK  
VELCRO

### PRELAUNCH MODE 1

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

### BAILOUT MODE 8

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

ASC-25a/A,E/F

HINGE

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TOP, HINGED AT BOTTOM OF 'EMERGENCY EGRESS'  
HINGE

**POST LANDING  
MODE 5**

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

PILE  
VELCRO

**~40K FT**

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

**~30K FT**

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

ASC-25aa/A,E/D

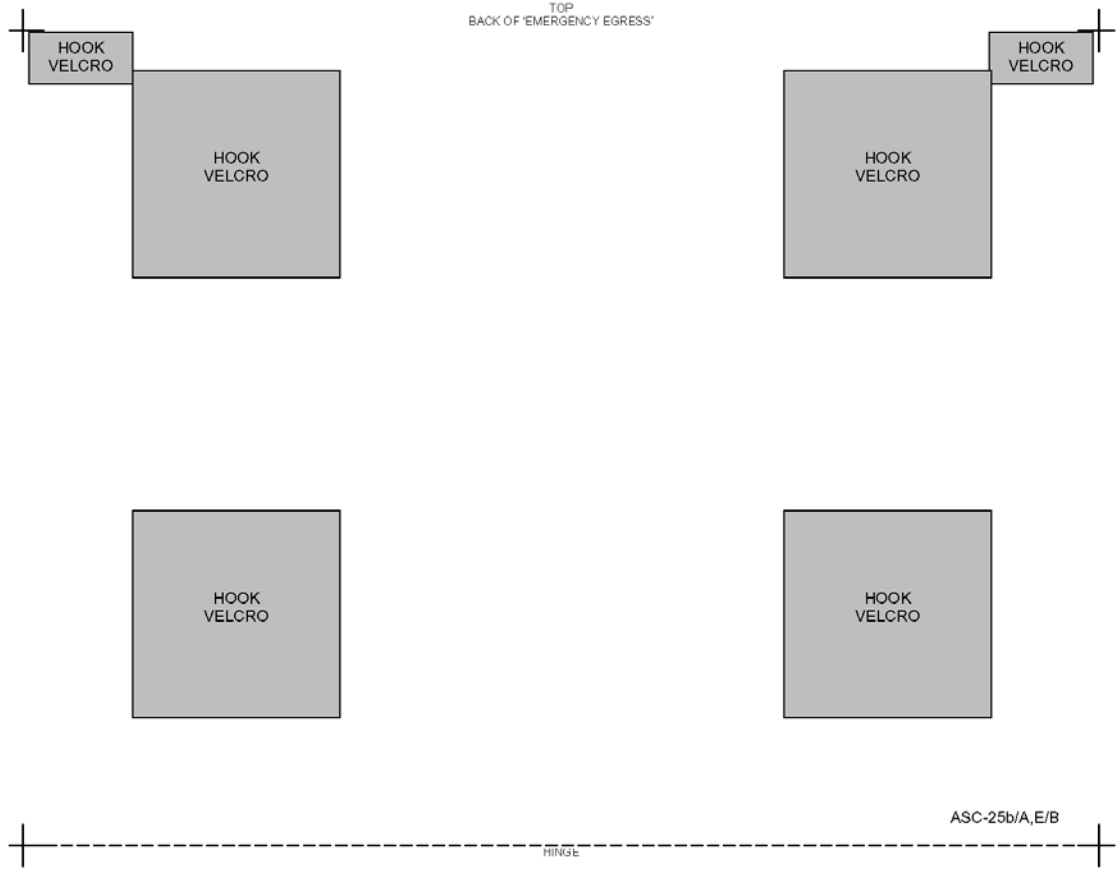
PILE  
VELCRO

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FAB USE ONLY

(reduced copy)  
CC 10-37

ASC/121/FIN



ASC-25bb/A,E/B



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ASC/121/FIN

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HOOK  
VELCRO

ВЕРХ

## АВАРИЙНОЕ ПОКИДАНИЕ

HOOK  
VELCRO

### РЕЖИМ 1 ДО СТАРТА

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

### РЕЖИМ 8 АВАРИЙНОЕ ДЕСАНТИРОВАНИЕ

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

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НИЗ



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TOP, HINGED AT BOTTOM OF 'EMERGENCY EGRESS'  
HINGE

**РЕЖИМ 5  
ПОСЛЕ ПОСАДКИ**

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

**~40 ТЫСЯЧ ФУТОВ**

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

**~30 ТЫСЯЧ ФУТОВ**

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

ASC-26aa/A,E/C

PILE  
VELCRO

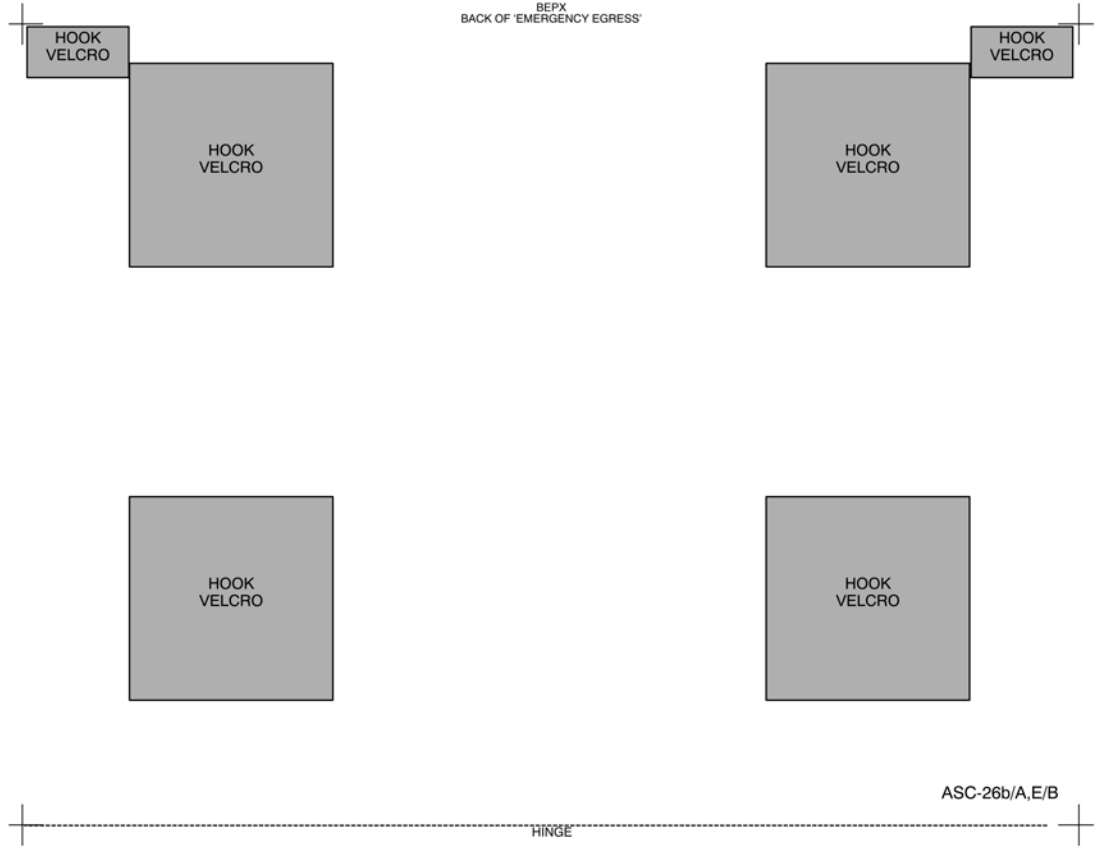
PILE  
VELCRO

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TOP, HINGED AT BOTTOM OF BACK OF 'EMERGENCY EGRESS'  
HINGE



ASC-26bb/A,E/B





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10-42

ASC/121/FIN



Space Shuttle Program  
FLIGHT DATA FILE

JSC-48005-121  
FINAL



# ASCENT CHECKLIST

STS  
121

Flight Cover (trim bottom to expose tabs)