

# Entry Checklist

## Mission Operations Directorate Operations Division

Generic, Rev G  
January 16, 2004

### NOTE

For STS-114 and subsequent flights

National Aeronautics and  
Space Administration

Lyndon B. Johnson Space Center  
Houston, Texas



Verify this is the correct version for the pending operation (training, simulation or flight).  
Electronic copies of FDF books are available. URL: <http://mod/jsc/nasa.gov/do3/FDF/index.html>



ENTRY C/L

GENERIC, REV G (Jan 16, 2004)

## PCN-9 (Feb 14, 2007) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1775A

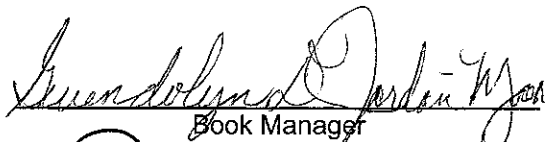
Incorporate the following:

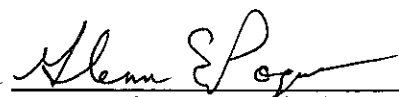
1. Replace vii and viii
2. Replace 3-11 and 3-12
3. Replace 5-17 and 5-18
4. Replace 6-1 thru 6-4

**NOTE**

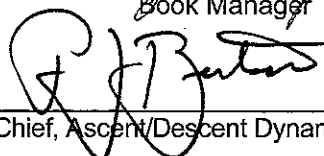
For STS-117 and subsequent flights

Prepared by:

  
Book Manager

  
Lead, Entry GPO

Approved by:

  
Chief, Ascent/Descent Dynamics Branch

Encl: 10 pages

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



ENTRY C/L

GENERIC, REV G (Jan 16, 2004)

## PCN-8 (Oct 30, 2006) Sheet 1 of 1

List of Implemented Change Requests (482s):

ENT-844A (P)

ENT-856

ENT-857

P - Partial

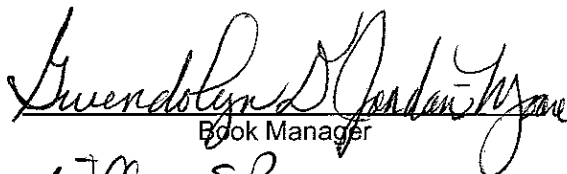
**NOTE**

For STS-116 and subsequent flights

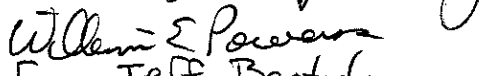
Incorporate the following:

1. Replace vii thru x
2. Replace 3-9 & 3-10, 3-13 & 3-14, 3-39 thru 3-42

Prepared by:

  
Book Manager  
Lead, Entry GPO

Approved by:

  
For Jeff Bertsch  
Chief, Ascent/Descent Dynamics Branch

Encl: 12 pages

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



ENTRY C/L

GENERIC, REV G (Jan 16, 2004)

## PCN-7 (Aug 11, 2006) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1761B

**NOTE**

For STS-115 and subsequent flights

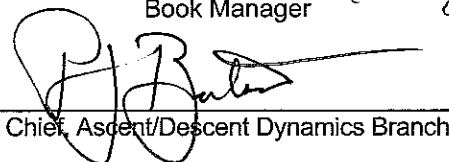
Incorporate the following:

1. Replace vii thru x
2. Replace 4-3 thru 4-6, 4-9 & 4-10
3. Replace CC 8-15 thru CC 8-18

Prepared by:

  
Book Manager  
Lead, Entry GPO

Approved by:

  
Chief, Ascent/Descent Dynamics Branch

Encl: 14 pages

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





ENTRY C/L	GENERIC, REV G (Jan 16, 2004)
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PCN-6 (Aug 9, 2006) Sheet 1 of 1

List of Implemented Change Requests (482s):

ENT-844A

<p align="center"><b>NOTE</b> For STS-115 and subsequent flights</p>
--

Incorporate the following:

1. Replace vii & viii
2. Replace 3-13 & 3-14, 3-39 thru 3-42

Prepared by: Allison McCagg  
Book Manager 07/28/06

Larry Hendrickson  
Lead, Entry GPO

Approved by: Richard B. Magister FOR P.J. BERTSCH  
Chief, Ascent/Descent Dynamics Branch

Encl: 8 pages

File this PCN immediately behind the front cover as a permanent record
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ENTRY C/L

GENERIC REV G (Jan 16, 2004)

## PCN-5 (June 15, 2006) Sheet 1 of 1

List of Implemented Change Requests (482s):

MULTI-1753

Incorporate the following:

1. Replace vii & viii
2. Replace 3-9 & 3-10

**NOTE**

For STS-121 and subsequent flights

Prepared by: *Marcia Druemp*  
Book Manager*Joseph Jones* ~~81~~  
Lead, Entry GPOApproved by: *[Signature]*  
Chief, Ascent/Descent Dynamics Branch

Encl: 4 pages

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



ENTRY C/L

GENERIC REV G (Jan 16, 2004)

## PCN-4 (Apr 14, 2006) Sheet 1 of 1

List of Implemented Change Requests (482s):

ENT-845  
ENT-849**NOTE**

For STS-121 and subsequent flights


Incorporate the following:

1. Replace vii thru x
2. Replace 2-3 & 2-2 (five pages each in Flt Qual only)  
Replace 2-3 & 2-4
3. Replace 3-11 & 3-12, 3-19 thru 3-28, 3-41 & 3-42
4. Replace 6-3 & 6-4
5. Replace CC 8-5 thru CC 8-16

Prepared by:

  
Book Manager  
Lead, Entry GPO

Approved by:

  
Chief, Ascent/Descent Dynamics BranchEncl: 34 pages (Bond)  
44 pages (Flt Qual)**File this PCN immediately behind the front cover as a permanent record**



ENTRY C/L

GENERIC REV G (Jan 16, 2004)

## PCN-3 (Dec 8, 2005) Sheet 1 of 1

List of Implemented Change Requests (482s):

ENT-840            MULTI-1711B  
ENT-841            MULTI-1724  
ENT-842  
ENT-843

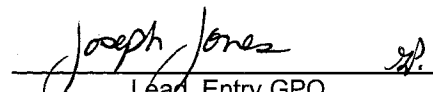
**NOTE**

For STS-121 and subsequent flights

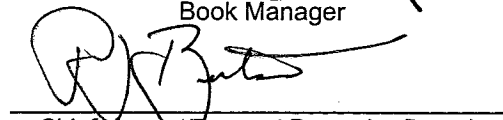
Incorporate the following:

1. Replace vii thru x
2. Replace 3-11 thru 3-14, 3-41 & 3-42
3. Replace 4-5 & 4-6, 4-9 & 4-10
4. Replace 5-5 & 5-6, 5-13 & 5-14
5. Replace CC 8-17 & CC 8-18

Prepared by:

  
Book Manager  
Lead, Entry GPO

Approved by:

  
Chief, Ascent/Descent Dynamics Branch

Encl: 20 pages

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





ENTRY C/L

GENERIC REV G (Jan 16, 2004)

## PCN-2 (Apr 25, 2005) Sheet 1 of 1

List of Implemented Change Requests (482s):

ENT-830	MULTI-1682A
ENT-832	MULTI-1683A
ENT-833	MULTI-1684
ENT-835	MULTI-1700
	MULTI-1701

**NOTE**

For STS-114 and subsequent flights

Incorporate the following:

1. Replace vii thru x
2. Replace 3-37 & 3-38
3. Replace 4-3 thru 4-6, 4-9 & 4-10, 4-15 & 4-16
4. Replace section 5 (24 pages)
5. Replace 6-1 & 6-2
6. Replace CC 8-15 thru 8-20

Prepared by:

  
Book Manager  
Lead, Entry GPO

Approved by:

  
Chief, Ascent/Descent Dynamics Branch

Encl: 46 pages

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



ENTRY C/L

GENERIC REV G (Jan 16, 2004)

## PCN-1 (Jan 21, 2005) Sheet 1 of 1

List of Implemented Change Requests (482s):

ENT-822	MULTI-1660
ENT-824A	MULTI-1663(S)
ENT-825	MULTI-1672
ENT-829	MULTI-1680A
	MULTI-1681

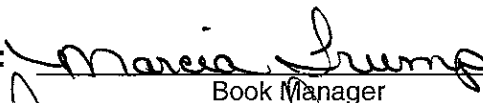
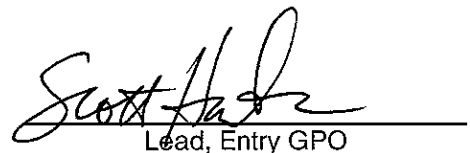
**NOTE**

For STS-114 and subsequent flights

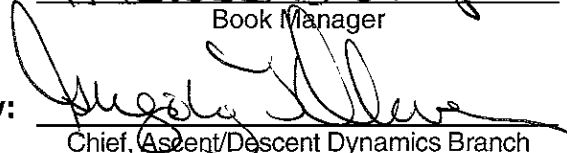
Incorporate the following:

1. Replace vii thru x, xv & xvi
2. Replace 3-5 & 3-6, 3-9 thru 3-12
3. Replace 4-3 thru 4-6, 4-9 & 4-10, 4-15 & 4-16
4. Replace 5-3 thru 5-6, 5-9 & 5-10
5. Replace 7-1 & 7-2  
Delete 7-3 thru 7-10
6. Replace CC 8-17 thru 8-20

Prepared by:

  
Book Manager  
Lead, Entry GPO

Approved by:

  
Chief, Ascent/Descent Dynamics Branch

Encl: 32 pages

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



MISSION OPERATIONS DIRECTORATE

**ENTRY CHECKLIST**

GENERIC, REVISION G

January 16, 2004

PREPARED BY:

---

Marcia M. Trump  
Book Manager

APPROVED BY:

---

VITT Lead

---

Lead Entry GPO

---

Gregory T. Oliver  
Chief, Ascent/Descent  
Dynamics Branch

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ENT/ALL/GEN G

Incorporates the following:	
482#: ENT-812	MULTI-1643 MULTI-1654

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager                      DM43/M. Trump    281-483-8029  
Deorbit Burn to Entry Interface   DM43/J. Patterson   281-483-1987  
Entry Interface thru Rollout      DM43/J. Patterson   281-483-1987  
Post Landing

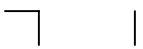


Replace this page with page(s) from Flight Supplement





Replace this page with page(s) from Flight Supplement





## NOTES

1. The Wheels Stop/Egress Switch List, section 7, gives the vehicle configuration at these discrete times. If switch position difference exists between wheels stop and crew egress, egress position will be boxed beside wheels stop position. Section 7 contains switch configuration only for panels that are reconfigured during crew execution of procedures in sections 3, 4, and 5. Refer to DEORBIT PREP, section 3, for egress configuration for remaining panels.
2. This checklist is an all-vehicle book and is not complete for a specified flight without a Flight Supplement. To obtain complete checklist, incorporate Flight Supplement for specific flight of interest using instructions in Flight Supplement List of Effective Pages.
3. Entry related cue cards are contained in this document. Cue cards are listed in Entry Cue Card Config section. Some cue cards are printed in the body of checklist for MS use and also in the Entry Cue Card Config section for reference of crop marks and fabrication instructions.
4. Velcro placement, size, and shape of cue cards are controlled by Cue Card Book Manager.
5. Vehicle configuration or procedural steps that are applicable to a specific vehicle are indicated by xxx.



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ENTRY CHECKLIST

**LIST OF EFFECTIVE PAGES**

GENERIC	02/01/88	PCN-5	06/15/06
REV G	01/16/04	PCN-6	08/09/06
PCN-1	01/21/05	PCN-7	08/11/06
PCN-2	04/25/05	PCN-8	10/30/06
PCN-3	12/08/05	PCN-9	02/14/07
PCN-4	04/14/06		

Sign Off.....	*	ALL/GEN G	3-7.....	ALL/GEN G
ii .....	*	ALL/GEN G	3-8.....	ALL/GEN G
iii.....	*Δ	ALL/GEN G	3-9.....	ALL/GEN G,1
iv .....	*Δ	ALL/GEN G	3-10.....	ALL/GEN G,8
v .....	*	ALL/GEN G	3-11.....	ALL/GEN G,3
vi .....	*	ALL/GEN G	3-12.....	ALL/GEN G,9
vii .....	*	ALL/GEN G,9	3-13.....	ALL/GEN G,8
viii.....	*	ALL/GEN G,9	3-14.....	ALL/GEN G,8
ix .....	*	ALL/GEN G,8	3-15.....	ALL/GEN G
x .....	*	ALL/GEN G	3-16.....	ALL/GEN G
xi .....	*Δ	ALL/GEN G	3-17.....	ALL/GEN G
xii .....	*Δ	ALL/GEN G	3-18.....	ALL/GEN G
xiii.....	*	flt suppl	3-19.....	ALL/GEN G,4
xiv .....	*	flt suppl	3-20.....	ALL/GEN G
xv .....		ALL/GEN G,1	3-21.....	ALL/GEN G,4
xvi .....		ALL/GEN G	3-22.....	ALL/GEN G
1-1 (3 pgs)....	†	ALL/GEN G	3-23.....	ALL/GEN G,4
1-2 (3 pgs)....	†	ALL/GEN G	3-24.....	ALL/GEN G
2-1 .....		ALL/GEN G	3-25.....	ALL/GEN G,4
2-2 (6 pgs)....	†	ALL/GEN G	3-26.....	ALL/GEN G
2-3 (6 pgs)....	†	ALL/GEN G,4	3-27.....	ALL/GEN G,4
2-4 .....		ALL/GEN G	3-28.....	ALL/GEN G
2-5.....	Δ	ALL/GEN G	3-29.....	Δ ALL/GEN G
2-6.....	Δ	ALL/GEN G	3-30.....	Δ ALL/GEN G
3-1 .....	Δ	ALL/GEN G	3-31.....	ALL/GEN G
3-2.....	Δ	ALL/GEN G	3-32.....	ALL/GEN G
FS 3-3 .....		flt suppl	3-33.....	Δ ALL/GEN G
FS 3-4 .....		flt suppl	3-34.....	Δ ALL/GEN G
3-5.....		ALL/GEN G	3-35.....	ALL/GEN G
3-6.....		ALL/GEN G,1	3-36.....	ALL/GEN G

- \* – Omit from flight book
- Δ – Replace with page from Flight Supplement
- † – Extra pages in crew copy only

3-37.....	ALL/GEN G	5-19.....	Δ	ALL/GEN G
3-38.....	ALL/GEN G,2	5-20.....	Δ	ALL/GEN G
3-39.....	ALL/GEN G	5-21.....		ALL/GEN G,2
3-40.....	ALL/GEN G,8	5-22.....		ALL/GEN G,2
3-41.....	ALL/GEN G,8	5-23.....		ALL/GEN G,2
3-42.....	ALL/GEN G,4	5-24.....		ALL/GEN G
3-43.....	ALL/GEN G	6-1.....		ALL/GEN G
3-44.....	ALL/GEN G	6-2.....		ALL/GEN G,9
4-1.....	ALL/GEN G	6-3.....		ALL/GEN G
4-2.....	ALL/GEN G	6-4.....		ALL/GEN G,9
4-3.....	ALL/GEN G,1	7-1.....	*	ALL/GEN G,1
4-4.....	ALL/GEN G,7	7-2.....	*	ALL/GEN G,1
4-5.....	ALL/GEN G,7	8-1.....	*	ALL/GEN G
4-6.....	ALL/GEN G	CC 8-2.....	*	ALL/GEN G
4-7.....	Δ ALL/GEN G	CC 8-3.....	*	ALL/GEN G
4-8.....	Δ ALL/GEN G	CC 8-4.....	*	ALL/GEN G
4-9.....	ALL/GEN G,7	CC 8-5.....	*	ALL/GEN G,4
4-10.....	ALL/GEN G	CC 8-6.....	*	ALL/GEN G
4-11.....	Δ ALL/GEN G	CC 8-7.....	*	ALL/GEN G
4-12.....	Δ ALL/GEN G	CC 8-8.....	*	ALL/GEN G
4-13.....	ALL/GEN G	CC 8-9.....	*	ALL/GEN G,4
4-14.....	ALL/GEN G	CC 8-10.....	*	ALL/GEN G
4-15.....	ALL/GEN G,2	CC 8-11.....	*	ALL/GEN G,4
4-16.....	ALL/GEN G	CC 8-12.....	*	ALL/GEN G
5-1.....	ALL/GEN G	CC 8-13.....	*	ALL/GEN G,4
5-2.....	ALL/GEN G,2	CC 8-14.....	*	ALL/GEN G
5-3.....	ALL/GEN G,2	CC 8-15.....	*	ALL/GEN G,4
5-4.....	ALL/GEN G,2	CC 8-16.....	*	ALL/GEN G,7
5-5.....	ALL/GEN G	CC 8-17.....	*	ALL/GEN G,7
5-6.....	ALL/GEN G,3	CC 8-18.....	*	ALL/GEN G,1
5-7.....	ALL/GEN G,2	CC 8-19.....	*	ALL/GEN G,2
5-8.....	ALL/GEN G,2	8-20.....	*	ALL/GEN G,1
5-9.....	ALL/GEN G,2	CC 8-21.....	*	ALL/GEN G
5-10.....	ALL/GEN G,2	CC 8-22.....	*	ALL/GEN G
5-11.....	ALL/GEN G,2	8-23.....	*Δ	ALL/GEN G
5-12.....	ALL/GEN G,2	8-24.....	*Δ	ALL/GEN G
5-13.....	ALL/GEN G,2			
5-14.....	ALL/GEN G,3			
5-15.....	ALL/GEN G,2			
5-16.....	ALL/GEN G,2			
5-17.....	ALL/GEN G			
5-18.....	ALL/GEN G,9			

Δ – Replace with page from Flight Supplement

\* – Omit from flight book

## ENTRY CUE CARDS

<u>Title</u>	<u>Ref. Page</u>	<u>Card No.</u>
DEORBIT BURN FLIGHT		
RULES (Front) .....	CC 8-2	ENT-1a/D/K
(Back).....	CC 8-3	ENT-1b/D/K
DEORBIT BURN (RCS)		
(Front) (Top).....	CC 8-4	ENT-3a/D/L
(Front) (Bottom).....	CC 8-5	ENT-3aa/D/M
(Back) (Top) .....	CC 8-6	ENT-3b/D/E
(Back) (Bottom) .....	CC 8-7	ENT-3bb/D/E
DEORBIT BURN (2 ENG)		
(Front) (Top).....	CC 8-8	ENT-4a/D/L
(Front) (Bottom).....	CC 8-9	ENT-4aa/D/K
DEORBIT BURN (1 ENG)		
(Back) (Top) .....	CC 8-10	ENT-4b/D/J
(Back) (Bottom) .....	CC 8-11	ENT-4bb/D/L
UNBALANCED PRPLT		
DEORBIT BURN		
(Front) (Top).....	CC 8-12	ENT-5a/D/M
(Front) (Bottom).....	CC 8-13	ENT-5aa/D/O
DEORBIT BURN (MIXED XFEED)		
(Back) (Top) .....	CC 8-14	ENT-5b/D/J
(Back) (Bottom) .....	CC 8-15	ENT-5bb/D/K
ENTRY MANEUVERS		
(Front).....	CC 8-16	ENT-6a/E/O
(Back).....	CC 8-17	ENT-6b/E/W
ENTRY NO-GO CHECKLIST		
(Front).....	CC 8-18	ENT-7a/E/K
ADTA MGMT (Back) .....	CC 8-19	ENT-7b/E/R
ENTRY CONTROL		
(Front).....	CC 8-21	ENT-10a/A,E/B
(Back).....	CC 8-22	ENT-10b/A,E/B
DEORBIT BURN MONITOR		
(Front).....	see flt suppl	flt suppl
OMS FAILURES (Back).....	see flt suppl	flt suppl

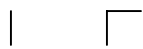


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ENT/ALL/GEN G





Replace this page with page(s) from Flight Supplement





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CONTENTS

PAGE

DEORBIT MNVR PADS.....	1-1
OMS PRPLT AND DEL PADS.....	2-1
DEORBIT BURN.....	3-1
OMS BURN PREP (CIL) .....	3-9
OMS/RCS POST BURN RECONFIG (CIL).....	3-32
ENTRY CUE CARDS.....	4-1
h = 10K LES VISORS (HC).....	4-5
POST LANDING PROCEDURES.....	5-1
1-ORBIT LATE DEORBIT PROCEDURES.....	6-1
SWITCH LIST AT WHEEL STOP <span style="border: 1px solid black; padding: 0 2px;">EGRESS</span> .....	deleted
ENTRY CUE CARD CONFIG .....	8-1



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## 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

**RCS I'CNCT:**

L OMS → RCS

R OMS → RCS

NONE

**NOTES**

1-1

ENT/ALL/GEN G

**MNVR  
PADS**

**MNVR  
PADS**

**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 

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TIG 10 

		/		:		:		.	
--	--	---	--	---	--	---	--	---	--

TGT PEG 4

C1 14 

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

C2 15 

( )		.			
-----	--	---	--	--	--

HT 16 

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

θT 17 

		.			
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PRPLT 18 

( )					
-----	--	--	--	--	--

BURN ATT

R 24 


P 25 


Y 26 


REI 

--	--	--	--

TXX 

		:		
--	--	---	--	--

ΔVTOT 

		.	
--	--	---	--

TGO 

	:		
--	---	--	--

VGO X 

( )		.	
-----	--	---	--

VGO Y 

( )		.	
-----	--	---	--

VGO Z 

( )		.	
-----	--	---	--

HA 

--	--

HP 

( )	
-----	--

TGT 

--	--

**RCS I'CNCT:**

	L OMS → RCS
	R OMS → RCS
	NONE

**NOTES**

1-2

ENT/ALL/GEN G



**PRPLT/  
DEL PADS**

**OMS PRPLT AND DEL PADS**

2-1

ENT/ALL/GEN G



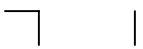
PRPLT/  
DEL PADS

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





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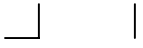
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3-2

ENT/ALL/GEN G



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

TIG-46

**B FINAL DEORB UPDATE/UPLINK**

MCC UPDATE:  
 DEL PAD  
 OMS PRPLT PAD  
 MCC UPLINK:  
 PASS SV  
 BFS SV  
 PASS TGT  
 BFS TGT  
 BFS IMU GYRO/ACCEL

C **G50** √LAND SITE per DEL PAD  
 SET TACAN tw

On MCC GO:  
 C CRT1 LOAD – ITEM 22 EXEC  
 TIMER – ITEM 23 EXEC

CRT1,3 √PASS & BFS TGTs per MNVR PAD:  
 BURN ATT  
 ΔVTOT  
 TGO  
 HA HP

**G51** SEL ATMOSPHERE:  
 incl ≤ 50° ITEM 22 EXEC  
 incl > 50° SEL ITEM NR (table)

Hemi	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>N Desc</b>	23	23	23	23	22	24	24	24	22	23	23	23
<b>S Asc</b>	24	24	22	23	23	23	23	23	23	23	22	24
<b>N Asc</b>	22											
<b>S Desc</b>	22											

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

3: BFS, GNC DEORB MNVR COAST

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

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

- \* If down arrow(s) or Ms: \*
- \* Select good GMBL \*

MS LES Pressure Integrity Check

**P APU PRE-START**  
(Perform during S-band AOS)

R4 √HYD BK ISOL VLV (three) tb – CL  
√LG EXTD ISO VLV tb – CL

- \* If tb not CL: \*
- \* R2 (Aff) HYD CIRC PUMP – ON \*
- \* R4 (Aff) ISOL VLV – CL \*
- \* Hold 5 sec, √tb – CL \*
- \* R2 HYD CIRC PUMP – OFF \*

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

3: BFS, SM SYS SUMM 2

P R2 APU FU TK VLV (three) – OP  
√APU/HYD RDY tb (three) – gray  
APU FU TK VLV (three) – CL

2: GNC 50 HORIZ SIT

3: BFS, GNC 50 HORIZ SIT

1: GNC DEORB MNVR COAST	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 (DEL PAD)		√41		√41
RWY (DEL PAD)		√3		√3
		√4		√4
TACAN (DEL PAD)		√5		√5
RA	blank	√46		
TAEM TGT				
G&N	OVHD	√6	blank	
HSI	blank		blank	
XEP	NEP	√7	NEP	√7
AIM (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
DES any failed TACANs		√		√
TAC	DELTA	√35		
AIF_G	INH	√48		

- \* If BFS engaged: \*
- \* Set BFS HSD ITEMS to PASS config \*

1: GNC DEORB MNVR COAST | 2: GNC 50 HORIZ SIT

3: GNC 51 OVERRIDE

- √ELEVON AUTO – ITEM 17 (\*)
- √SSME REPOS – ITEM 19 (ENA)
- √WRAP MODE – ITEM 45 (ENA)
- If PLB holding > 10K lb:
  - FILTER ALT – ITEM 21 EXEC (\*)

3: BFS, GNC 51 OVERRIDE

- √ELEVON AUTO – ITEM 17 (\*)
- √SSME REPOS – ITEM 19 (ENA)
- √WRAP MODE – ITEM 45 (ENA)
- If PLB holding > 10K lb:
  - √FILTER ALT – ITEM 21 (\*)

- \* DES any failed/comm faulted \*
- \* IMU, RGA, AA, or SURF feedback \*

2: GNC DEORB MNVR COAST

3: BFS, GNC DEORB MNVR COAST

- √BFS GMBL sel config same as PASS GMBL sel config



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

**P OMS BURN PREP**

CRT2 OMS ENG TRIMS

2 ENG BURN:

√TRIM LOAD per MNVR PAD or:

L,R – ITEM 6 +0.0 -5.7 +5.7 EXEC

**1 ENG BURN:**

√TRIM LOAD per MNVR PAD or:

P – ITEM 6 +0.0 EXEC

Good eng Y:

LY – ITEM 7 +5.2 EXEC

RY – ITEM 8 -5.2 EXEC

XFEED: Failed engine prop to  
good engine

**RCS DEORBIT OR RCS**

**He/PRPLT TK FAIL**

Do not terminate OMS/RCS

Interconnect

O7 AFT L,R RCS

He PRESS (four) – OP (tb-OP)

TK ISOL (six) – GPC (tb-OP)

MANF ISOL (eight) – OP (tb-OP)

XFEED (four) – GPC (tb-CL)

√MSTR RCS XFEED – OFF

O8 L,R OMS

√He PRESS/VAP ISOL (four) – CL

√TK ISOL (four) – OP (tb-OP)

√XFEED (four) – CL (tb-CL)

FWD RCS

He PRESS (two) – OP (tb-OP)

MANF ISOL (four) – OP (tb-OP)

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

3: BFS, GNC DEORB MNVR COAST

**RCS BURN PREP**

DAP: INRTL/PULSE

P O7 AFT L,R RCS  
TK ISOL (six) – CL (tb-CL)  
XFEED (four) – OP (tb-OP)

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

DAP: AUTO/DISC

**WARNING**

Eye and skin UV damage can  
occur in as little as 10 sec

Don Sunglasses

MS3 Remove and stow Side Hatch UV Filter and  
Locking Device, and Pyro Box Safing Pin

TIG-25 **VENT DOOR CLOSE**

**NOTE**

VENT DOOR CLOSE must be  
performed prior to MM302 transition

2: GNC 51 OVERRIDE

CRT2 VENT DOOR CNTL CLOSE – ITEM 44  
EXEC

1: GNC DEORB MNVR COAST 2: GNC 51 OVERRIDE

3: BFS, GNC DEORB MNVR COAST

2: GNC DEORB MNVR COAST

**B DEORB UPDATE/UPLINK** (if reqd)

MCC UPDATE:  
DEL PAD  
OMS PRPLT PAD  
MCC UPLINK:  
PASS,BFS SV  
PASS,BFS TGT

C **G50** √LAND SITE per DEL PAD  
SET TACAN tw  
MS1/MS2 SEAT INGRESS

On MCC GO:

CRT1 LOAD – ITEM 22 EXEC  
TIMER – ITEM 23 EXEC

CRT1,3 √PASS & BFS TGTs per MNVR PAD:  
BURN ATT  
ΔVTOT  
TGO  
HA HP

C CRT1 GNC, OPS 302 PRO

1: GNC DEORB MNVR EXEC 2: GNC 51 OVERRIDE

3: BFS, GNC DEORB MNVR EXEC

**MCC/CREW GO/NO-GO FOR DEORBIT BURN**

\* **IF NO-GO FOR DEORBIT BURN:** \*  
\* P R2 HYD MN PUMP PRESS (three) – \*  
\* NORM \*  
\* C CRT1 GNC, OPS 301 PRO \*

**IF 1 ORBIT DELAY:**  
Go to section 6, 1-ORB LATE

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

**IF 24-HR EXTENSION**

P O7 AFT L,R RCS  
 He PRESS A (two) – GPC (tb-OP)  
 B (two) – CL (tb-CL)  
 TK ISOL (six) – OP (tb-OP)  
 MANF ISOL (eight) – GPC (tb-OP)  
 XFEED (four) – CL (tb-CL)

O8 FWD RCS  
 He PRESS A – GPC (tb-OP)  
 B – CL (tb-CL)  
 MANF ISOL (four) – GPC (tb-OP)

C6 Unstow ORB PKT C/L  
 Terminate Deorbit Procedures, go to  
 DEORB PREP, D/O PREP BACKOUT

TIG-20> **MNVR TO DEORBIT BURN ATT**

C C3 √DAP: AUTO  
 B F6/F8 √ADI ATT (two) – INRTL  
 √ERR (two) – MED  
 √RATE (two) – MED

CRT1 C MNVR – ITEM 27 EXEC (\*)  
 (√ADI ATT with CRT BURN ATT)  
 B Copy last DEL PAD and OMS PRPLT PAD  
 data on DEORBIT BURN Cue Cards  
 F6/F8 √DEORBIT BURN and DEORBIT BURN  
MONITOR Cue Cards installed

A14 RCS/OMS HTR  
 FWD RCS – OFF  
 L POD (two) – A OFF,B OFF  
 R POD (two) – A OFF,B OFF  
 OMS CRSFD LINES (two) –  
 A AUTO,B AUTO  
 FWD RCS JET 5 (one) – OFF  
 AFT RCS JET 5 (one) – OFF

TIG-12 **APU HTR DEACT**

MS A12 APU HTR GAS GEN/FU PUMP (three) – OFF

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

►TIG-5 P **SINGLE APU START** (Attempt one APU)

**WARNING**  
Do not start APU while APU TEMP INJ  
> 437 or APU TEMP GG BED > 456

- \* If APU TEMP INJ > 437 or APU \*
- \* TEMP GG BED > 456: \*
- \* ♦ Start any available APU \*
- \* within temperature limits \*

R2 APU FU TK VLV – OP  
OPER – START/RUN  
MDU √HYD PRESS ind – LO green

- \* If no start: \*
- \* • Do not execute Deorbit Burn \*
- \* • Shut down APU: \*
- \* APU SHUTDN (ENT PKT, \*
- \* APU/HYD) >> \*

R2 √HYD CIRC PUMP (three) – OFF

3: BFS, GNC SYS SUMM 2

C √BURN ATT ± 5°

B Go to DEORBIT BURN (Cue Card)

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

►TIG-5 P **SINGLE APU START** (Attempt two APUs)

<p><b>WARNING</b>          Do not start APU while APU TEMP INJ &gt; 437 or APU TEMP GG BED &gt; 456</p>
---

- \* If APU TEMP INJ > 437 or APU \*
- \* TEMP GG BED > 456: \*
- \* ♦ Start any available APU \*
- \* within temperature limits \*

R2 APU FU TK VLV – OP  
 OPER – START/RUN  
 MDU √HYD PRESS ind – LO green

- \* If no start: \*
- \* APU OPER – OFF \*
- \* Start another APU \*
- \* \*
- \* If second APU starts, \*
- \* shut down unstarted APU: \*
- \* APU SHUTDN (ENT PKT, \*
- \* APU/HYD) \*
- \* If neither starts: \*
- \* • Do not start third APU \*
- \* • Do not execute Deorbit Burn \*
- \* • Shut down unstarted APUs: \*
- \* APU SHUTDN (ENT PKT, \*
- \* APU/HYD) >> \*

R2 √HYD CIRC PUMP (three) – OFF

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

C √BURN ATT ± 5°

B Go to DEORBIT BURN (Cue Card)



**DEORBIT BURN CARDS**

**BURN  
CARDS**

MS ONLY

3-15

ENT/ALL/GEN G



**DEORBIT BURN FLIGHT RULES  
ONE-ORBIT LATE AVAILABLE**

ENT-1a/D/K

**BURN  
CARDS**

	FAILURE	PRE TIG		POST TIG
		Delay (max)		Stop Burn, > Safe HP
		One Orbit	One Day	
	<b>APU/HYD</b>			
1	No APU operating .....	... X ...	.....	
	<b>DPS</b>			
2	RDNT fail, Split.....	.....	...X...	.....X
3	1 GPC.....	... X ...	.....	
4	BFS.....	.....	...X...	
5	GPC BITE (Multiple GPCs) .....	.....	...X...	
	<b>ECLS</b>			
6	2 Av Bay Fans in Bay 3.....	... X ...	.....	
7	2 Av Bay Fans in Bay 1 or 2.....	.....	...X...	
	<b>ELEC</b>			
8	H2 Manf or TK leak (not in depleted tk(s) _____).....	... X ...	.....	
9	2 MN Buses.....	.....	...X...	.....X
10	CNTL CA1 (No BFS Engage in GPC 3/5).....	.....	...X...	
11	Multi Φ AC BUS (unshorted) .....	... X ...	.....	
	<b>GNC</b>			
12	1 MLS (if reqd), IMU, or TACAN (C-band/GPS redun not avail) .....	... X ...	.....	
13	IMU Dilemma.....	.....	...X...	.....X
14	RHC Dilemma .....	... X ...	.....	
15	2 IMUs (Not targeting EDW/NOR) .....	.....	...X...	
16	2 ADTAs (Winds>80kts or Dynamic Wx) .....	... X ...	.....	
	<b>HOOK VELCRO</b>			<b>HOOK VELCRO</b>
17	2 FCS Channels (same surface) (Not targeting NOR/EDW) .....	... X ...	.....	
18	2 AAs, RGAs (Not targeting EDW/NOR) .....	... X ...	.....	
	<b>OMS</b>			
19	Prplt Tank .....	... X ...	.....	.....X ①
20	Ignition (neither eng ignites).....	... X ...	.....	
21	Both OMS Eng fail.....	.....	.....	.....X ②
22	Prplt Lk after LAST LOS.....	perigee adjust		
	<b>AFT RCS</b>			
23	2 jets, same direction, same pod .....	... X ...	.....	
24	Prplt Lk after LAST LOS.....	... X ...	.....	
25	1 AFT RCS PROP TK fail.....	... X ...	.....	
	<b>COMM</b>			
26	MCC GO for DEORBIT not rcvd .....	.....	...X...	

① Stop Burn > OMS PRPLT FAIL HP (Ref: DEL PAD/BURN Card)  
 ② Stop Burn > OMS ENG FAIL HP (Ref: DEL PAD/BURN Card)



**DEORBIT BURN FLIGHT RULES**  
**ONE-ORBIT LATE NOT AVAILABLE** ENT-1b/D/K

	FAILURE	PRE TIG	POST TIG
		Delay (max)	Stop Burn, > Safe HP
		One Day	
1	<b>APU/HYD</b> No APU operating .....	..... X .....	
2	<b>DPS</b> RDNT fail, Split.....	..... X .....	.....X
3	1 GPC.....	..... X .....	
4	BFS.....	..... X .....	
5	GPC BITE (Multiple GPCs) .....	..... X .....	
6	<b>ECLS</b> 2 Av Bay Fans in Bay 3.....	..... X .....	
7	2 Av Bay Fans in Bay 1 or 2.....	..... X .....	
8	<b>ELEC</b> H2 Manf or TK leak (not in depleted tk(s) _____) .....	..... X .....	
9	2 MN Buses.....	..... X .....	.....X
10	CNTL CA1 (No BFS Engage in GPC 3/5).....	..... X .....	
11	Multi $\Phi$ AC BUS (unshorted) .....	..... X .....	
12	<b>GNC</b> 1 MLS (if reqd), IMU, or TACAN (C-band/GPS redun not avail) .....	..... X .....	
13	IMU Dilemma.....	..... X .....	.....X
14	RHC Dilemma .....	..... X .....	
15	2 IMUs (Not targeting EDW/NOR) .....	..... X .....	
16	2 ADTAs (Winds>80kts or Dynamic Wx) .....	..... X .....	
	<b>HOOK VELCRO</b>		<b>HOOK VELCRO</b>
17	2 FCS Channels (same surface) (Not targeting NOR/EDW) .....	..... X .....	
18	2 AAs, RGAs (Not targeting EDW/NOR) .....	..... X .....	
19	<b>OMS</b> Prplt Tank .....	..... X .....	.....X ①
20	Ignition (neither eng ignites).....	..... X .....	
21	Both OMS Eng fail.....	..... X .....	.....X ②
22	Prplt Lk after LAST LOS.....	perigee adjust	
23	<b>AFT RCS</b> 2 jets, same direction, same pod .....	..... X .....	
24	Prplt Lk after LAST LOS.....	..... X .....	
25	1 AFT RCS PROP TK fail.....	..... X .....	
26	<b>COMM</b> MCC GO for DEORBIT not rcvd .....	..... X .....	

① Stop Burn > OMS PRPLT FAIL HP (Ref: DEL PAD/BURN Card)

② Stop Burn > OMS ENG FAIL HP (Ref: DEL PAD/BURN Card)



\* **RCS COMPLETION:**

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

\* At AFT QTY 1 If CUR HP:   
 \* THC +X to CAPTURE HP or   
 \* TOT AFT QTY 2   % then   
 \* PREBANK/FRCS COMPLETION   
 \* to downrange site

\* CAPTURE HP   PREBANK/FRCS COMPLETION   
 \* to downrange site

\* PREBANK/FLIP HP   PREBANK/FRCS COMPLETION

\* AFT HP   THC +X to TGT HP

\* TGT HP

\* **FRCS COMPLETION (if applicable):**

\* MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)   
 \* THC -X to TGT HP 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)

ENT-4aa/D/K

## DEORBIT BURN (1 ENG)

√MM302    √OMS L or R  
 √OMS BURN CONFIG (L or R XFEED)  
 Enter TGO + 10 sec  
 √TRIM per MNVR PAD or P +0.0, 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 (NO EXEC > TIG +  :  )  
 - :15 If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec  
 :00 TIG Start watch (√P<sub>C</sub>, ΔVTOT, ENG VLVs)  
       \* If no OMS ignition: APUs – SHUT DN \*  
 OMS XFEED RETURN at ΔVTOT =     
                                   or    at   %  
 L,R OMS TK ISOL (four) – OP  
                                   XFEED (four) – CL

```

* OMS PRPLT FAIL:
* OMS ENG – OFF
*
* STOP BURN:
* APUs – SHUT DN
* SAFE   Secure aff OMS
* HP  -----
*
* CONTINUE BURN:
* Secure aff OMS
* ITEM 18 +0 EXEC
* √ADI – LVLH, center needles
* Interconnect good OMS to RCS
* THC +X(√OMS% vs RCS Burn Time)
* AFT RCS RECONFIG
* RCS COMPLETION
*
* OMS ENG FAIL:
* OMS ENG – OFF
*
* STOP BURN:
* ENG APUs – SHUT DN
* FAIL   
* HP  -----
*
* CONTINUE BURN:
* √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:
* STOP BURN:
* SAFE   APUs – SHUT DN
* HP  -----
*
* CONTINUE BURN:
* ITEM 18 +0 EXEC
*  Resel jets
  
```

ENT-4b/D/J

\* **RCS COMPLETION:**

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

\* At AFT QTY 1 If CUR HP: THC +X to CAPTURE HP or  
 \* TOT AFT QTY 2   % then  
 \* PREBANK/FRCS COMPLETION  
 \* to downrange site

\* CAPTURE HP   -----  
 \* PREBANK/FRCS COMPLETION  
 \* to downrange site

\* PREBANK/FLIP HP   -----  
 \* PREBANK/FRCS COMPLETION

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

\* TGT HP   -----

\* **FRCS COMPLETION (if applicable):**

\* MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)  
 \* THC -X to TGT HP 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)

ENT-4bb/D/L

## 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 (No Deorbit > TIG +  : )  
       Maintain PITCH ATT ERR ± 3°  
       Monitor ΔVTOT:  
           RCS I'CNCT TK SW at ΔVTOT =   
           R OMS XFEED (two) – OP  
           L OMS XFEED (two) – CL

<b>OMS PRPLT LOW</b> AFT RCS RECONFIG AT ΔVTOT = <input type="text"/> <input type="text"/> <input type="text"/> RCS COMPLETION
--

*	<b>OMS PRPLT FAIL (MULTIPLE JETS FAIL OFF):</b>	*
*	Secure aff OMS	*
*	STOP BURN:	*
*	SAFE <input type="text"/> <input type="text"/> APU <sub>s</sub> – SHUT DN	*
*	HP _____	*
*	CONTINUE BURN:	*
*	ITEM 18 +0 EXEC	*
*	G23 Resel jets	*
*	Interconnect good OMS to RCS	*
*	THC +X (√OMS% vs RCS Burn Time)	*
*	AFT RCS RECONFIG	*
*	RCS COMPLETION	*
*	<b>RCS +X JET FAIL OFF:</b>	*
*	STOP BURN:	*
*	SAFE <input type="text"/> <input type="text"/> APU <sub>s</sub> – SHUT DN	*
*	HP _____	*
*	CONTINUE BURN:	*
*	ITEM 18 +0 EXEC	*
*	G23 Resel jets	*

ENT-3a/D/L

\* **RCS COMPLETION:**

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

\* At AFT QTY 1 If CUR HP: THC +X to CAPTURE HP or  
 \* TOT AFT QTY 2   % then  
 \* PREBANK/FRCS COMPLETION  
 \* to downrange site

\* CAPTURE HP   PREBANK/FRCS COMPLETION  
 \* to downrange site

\* PREBANK/FLIP HP   PREBANK/FRCS COMPLETION

\* AFT HP   THC +X to TGT HP

\* TGT HP

\* **FRCS COMPLETION (if applicable):**

\* MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)  
 \* THC -X to TGT HP 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)  
 ENT-3aa/D/M

## UNBALANCED PRPLT DEORBIT BURN

```

√MM302    √OMS BOTH
Enter TGO + 5 sec
√TRIM per MNVR PAD or P +0.0, LY -5.7, RY +5.7
√DAP – AUTO(PASS)/DISC
ADI – LVLH(REF)/HI/MED
FLT CNTLR PWR (two) – ON
Feed 2 ENG from 1 POD
  L,R OMS He PRESS/VAP ISOL A (two) – GPC
  B (two) – OP
   OMS TK ISOL (two) – CL (tb-CL)
  L,R OMS XFEED (four) – OP (tb-OP)
TIG-2:    OMS ENG (two) – ARM/PRESS
- :15    EXEC (NO EXEC > TIG +  :  )
- :15    If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec
:00     TIG Start watch (√PC, ΔVTOT, ENG VLVs)
If no OMS ignition: APU – SHUT DN
* While feeding 2 OMS from 1 POD:
* OMS PRPLT FAIL:
*   Failed OMS ENG(s) – OFF
*   STOP BURN:
*   APU – SHUT DN
*   Secure  OMS
SAFE   -----
HP  
* CONTINUE BURN:
*   ITEM 18 +0 EXEC
*   If Both ENGS ↓↓:
*     Secure  OMS
*     √ADI – LVLH, center needles
*     Interconnect  OMS to RCS
*     THC +X for  : 
*     AFT RCS RECONFIG
*     RCS COMPLETION
*     If  (XFEED) ENG ↓↓:
*       When  OMS QTY:
*         5%:  OMS TK ISOL (two) – OP
*         4%:  OMS TK ISOL (two) – CL
*           If OMS PC < 80 or OMS TEMP,
*             OMS ENG – OFF
*             √ADI – LVLH, center needles
*             RCS COMPLETION
*           If  (STRAIGHT FEED) ENG ↓↓:
*             OMS ENG FAIL
* OMS ENG FAIL (CONTINUE BURN):
*   Failed OMS ENG – OFF
*   at ΔVTOT =   
*   or    at   %
*    TK ISOL (two) – OP
*    TK ISOL (two) – CL
* Return to 2 ENG, 2 POD FLOW at ΔVTOT:   
 OMS TK ISOL (two) – OP (tb-OP)
L,R OMS XFEED (four) – CL (tb-CL)

```

ENT-5a/D/M

MS ONLY

3-24

ENT/ALL/GEN G



```

* OMS PRPLT FAIL:
* Failed OMS ENG – OFF
*
*                               STOP BURN:
*                               Good OMS ENG – OFF
*                               APU – SHUT DN
*                               Secure aff OMS
*
*   L OMS   R OMS
*   FAIL HP FAIL HP
*   [ ][ ][ ][ ][ ]
* -----
*                               CONTINUE BURN:
*                               ITEM 18 +Q EXEC
*                               When good OMS QTY:
*                               5%: L,R OMS XFEED (four) – OP
*                               4%: Good OMS TK ISOL (two) – CL
*                               If OMS Pc < 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
*
*   Both   Either
*   ENG FAIL PRPLT FAIL
*   HP      (SAFE) HP
*   [ ][ ][ ][ ][ ]
* -----
*                               STOP BURN:
*                               APU – SHUT DN
*
*                               CONTINUE BURN:
*                               √ADI – LVLH, center needles
*                               Interconnect good OMS to RCS
*                               THC +X (√OMS% vs RCS Burn Time)
*                               RCS I'CNCT TK SW (N/A PRPLT FAIL)
*                               THC +X (√OMS% vs RCS Burn Time)
*                               AFT RCS RECONFIG
*                               RCS COMPLETION
*
* RCS COMPLETION:
* THC +X to TGT HP or TOT AFT QTY 1 [ ][ ][ ] %
*
* At AFT QTY 1 THC +X to CAPTURE HP or TOT AFT QTY 2 [ ][ ][ ] %
* If CUR HP: then PREBANK/FRCS COMPLETION
* to downrange site
*
* CAPTURE HP [ ][ ] PREBANK/FRCS COMPLETION to downrange site
* -----
* PREBANK/FLIP [ ][ ] PREBANK/FRCS COMPLETION
* HP
* -----
* AFT [ ][ ] THC +X to TGT HP
* HP
* -----
* TGT [ ][ ]
* HP
*
* FRCS COMPLETION (if applicable):
* MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)
* THC -X to TGT HP 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)

```

ENT-5aa/D/O

## DEORBIT BURN (MIXED XFEED)

√MM302    √OMS L(R) or RCS  
 Enter TGO + 10 sec  
 √L,R OMS TK ISOL (four) – GPC  
     √XFEED (four) – GPC  
 √tb config from table (OMS SSR-1)  
 √DAP – AUTO(PASS)/DISC  
 ADI – LVLH(REF)/HI/MED  
 FLT CNTLR PWR (two) – ON  
 Man repress to maintain good OMS Tk Ps > 234 psi (simo)  
 If OMS BURN INITIATION:  
     √TRIM per MNVR PAD or: P +0.0, LY +5.2, RY -5.2  
     Good OMS ENG – ARM/PRESS  
 TIG-2:    EXEC (No EXEC > TIG +  :  )  
     - :15    If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec  
     - :15    TIG Start watch (√P<sub>c</sub>, ΔVTOT, ENG VLVs)  
     :00    \* If no OMS ignition, APUs – SHUT DN \*  
 If RCS BURN INITIATION:  
     Man repress L,R OMS > L,R RCS TK Ps  
     L,R RCS XFEED (four) – OP  
     TK ISOL (six) – CL  
     :00    THC +X (No Deorbit > TIG +  :  )  
     Maintain PITCH ATT ERR ± 3°  
 FEED FROM GOOD POD:  
     at ΔVTOT =  :  :   
     or  :  :  at  :  %  
      OMS He PRESS/VAP ISOL (two) – OP  
     TK ISOL (two) – OP (tb-OP)  
     XFEED (two) – OP (tb-OP)  
     SECURE  OMS

**OMS PRPLT LOW**

AFT RCS RECONFIG at ΔVTOT =  :  :

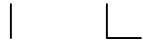
RCS COMPLETION

```

* OMS PRPLT FAIL: *
* OMS ENG – OFF *
* *
* STOP BURN: *
* APUs – SHUT DN *
* Secure L,R OMS *
SAFE   ----- *
HP  
* CONTINUE BURN: *
* Secure L,R OMS *
* ITEM 18 +0 EXEC *
* √ADI – LVLH, center needles *
* RCS COMPLETION *
* OMS ENG FAIL: *
* OMS ENG – OFF *
* *
* STOP BURN: *
* APUs – SHUT DN *
ENG    ----- *
FAIL   
HP  
* CONTINUE BURN: *
* Man repress L,R OMS > L,R RCS TK Ps *
* FEED FROM GOOD POD: *
*  OMS HE PRESS/VAP ISOL *
* (two) – OP *
* TK ISOL (two) – OP *
*  OMS XFEED (two) – CL *
* L,R RCS XFEED (four) – OP *
* TK ISOL (six) – CL *
* √ADI – LVLH, center needles *
* THC +X (√Lowest OMS % vs *
* RCS Burn Time) *
* AFT RCS RECONFIG *
* RCS COMPLETION *
* RCS +X JET FAIL OFF: *
* *
* STOP BURN: *
* APUs – SHUT DN *
SAFE    ----- *
HP   
* CONTINUE BURN: *
* ITEM 18 +0 EXEC *
*  Resel jet *
* RCS COMPLETION: *
* THC +X to TGT HP or TOT AFT QTY 1    % *
* At AFT QTY 1 THC +X to CAPTURE HP or TOT AFT QTY 2   % *
* If CUR HP: then PREBANK/FRCS COMPLETION *
* to downrange site *
* CAPTURE HP   PREBANK/FRCS COMPLETION to downrange site *
* PREBANK/FLIP   PREBANK/FRCS COMPLETION *
* HP  
* AFT   THC +X to TGT HP *
* HP  
* TGT   *
* HP  
* FRCS COMPLETION (if applicable): *
* MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT) *
* THC -X to TGT HP or FRCS depletion (JETS FAIL OFF) *
*
CUTOFF VGOx = 0, Release THC
+ :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)

```

ENT-5bb/D/K



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MS ONLY

3-28

ENT/ALL/GEN G





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

```

*           If no OMS IGNITION at TIG:           *
*           OMS ENG (two) – OFF                       *
*           √APU – SHUT DN                             *
* C3        MSTR MADS PWR – OFF                       *
* O8        L,R OMS                                   *
*           He PRESS/VAP ISOL (four) – CL            *
*           √XFEED (four) – CL                       *
*           GNC, OPS 301 PRO                          *
* F6,F8     FLT CNTLR PWR (two) – OFF                 *
* C3        √DAP: AUTO                               *
*           √MCC at next AOS                          *
*           *                                         *
*           If burn terminated with HP > SAFE HP: *
*           √OMS ENG (two) – OFF                       *
*           √APU – SHUT DN                             *
* C3        MSTR MADS PWR – OFF                       *
*           OPS 301 PRO                               *
*           If I'CNCT:                                *
*           DAP: INRTL/PULSE                          *
* O8        L,R OMS                                   *
*           He PRESS/VAP ISOL (four) – CL            *
*           √XFEED (four) – CL                       *
* O7        AFT L,R RCS                               *
*           He PRESS A (two) – GPC (tb-OP)            *
*           B (two) – CL (tb-CL)                     *
*           TK ISOL (six) – OP (tb-OP)               *
*           XFEED (four) – CL (tb-CL)                *
* O8        FWD RCS                                   *
*           He PRESS A – GPC (tb-OP)                 *
*           B – CL (tb-CL)                            *
* F6,F8     FLT CNTLR PWR (two) – OFF                 *
* C3        √DAP: AUTO                               *
*           √MCC at next AOS on DEORBIT DELAY        *
*           of 24 hr                                  *

```

POST  
BURN

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

MS Stow Flight Deck SpOC

L10 REC pb – press, hold  
(VTR) PLAY pb – press, simo  
(√red dot displayed)  
Install VIP, VTR covers

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

**OMS/RCS POST BURN RECONFIG**

P O7 AFT L,R RCS  
√He PRESS (four) – OP (tb-OP)  
√TK ISOL (six) – GPC (tb-OP)  
√XFEED (four) – GPC (tb-CL)

O8 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)

O3 RCS/OMS PRESS sel – RCS as reqd  
PRPLT QTY sel – RCS as reqd

POST  
BURN





Replace this page with page(s) from Flight Supplement





Replace this page with page(s) from Flight Supplement



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

EI-20 C **SECONDARY ACTUATOR CHECK**  
(if not previously performed and time permits)

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
- MDU √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 (\*)  
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 ‘↓’  
FCS CH 1 – AUTO
- 8. Repeat steps 5 thru 7 for CH 2,3,4

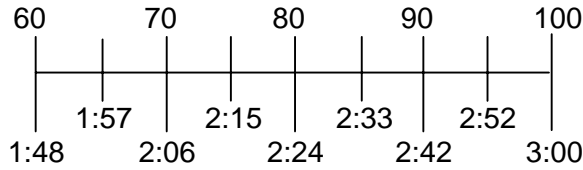
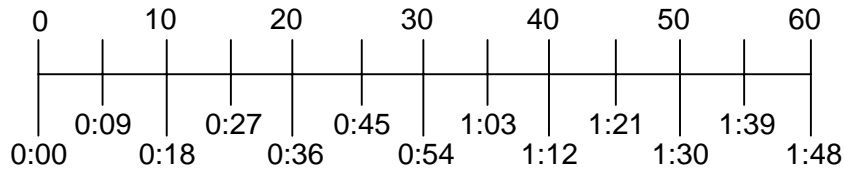
1: GNC 23 RCS	2: GNC DEORB MNVR COAST
3: BFS, GNC SYS SUMM 2	

EI-18 P **FORWARD RCS DUMP**  
 (Use for off-nominal X cg entry)

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

FOUR JET DUMP:

F RCS PRPLT TO BE DUMPED (%)



TIME FROM DUMP INITIATION (M:S)

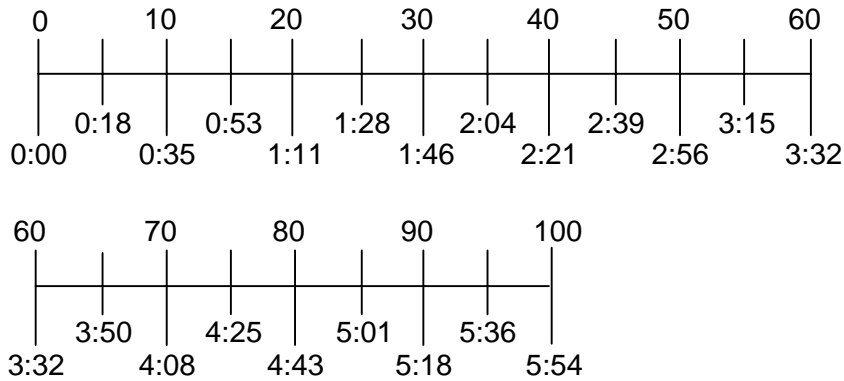
NOTE

During dump, disregard FRCS qty

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

TWO JET DUMP:

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

### ENTRY SW CHECK

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

X: GNC 51 OVERRIDE

√ROLL MODE – AUTO

B L2/C3 √SPD BK – Full Fwd

P C3 √SRB SEP – AUTO  
√ET SEP – AUTO

B F6/F8 √AIR DATA – NAV  
ADI ERR – MED  
RATE – MED

√HSI SEL MODE – ENTRY

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

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

Exercise BRAKE PEDALS

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

NOTE

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

- |    |    |                           |
|----|----|---------------------------|
| C  | F6 | √RADAR ALTM – 1           |
| P  | F8 | – 2                       |
|    |    |                           |
| O8 |    | √RADAR ALTM (two) – ON    |
|    |    | √MLS (three) – ON (PASS)  |
|    |    | √MLS CH (three), FS 3-2   |
|    |    |                           |
| O7 |    | √TACAN MODE (three) – GPC |
|    |    | √ANT SEL (three) – AUTO   |
|    |    |                           |
|    |    | √TACAN CH (three), FS 3-2 |

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

EI-13      **REMAINING APUs START**

<b>WARNING</b> Do not start APU while APU TEMP INJ > 437 or APU TEMP GG BED > 456
---

\* If an APU failed to start at TIG-5, \*  
 \* start remaining good APU only \*

*	If remaining APU TEMP INJ > 437 or *	*
*	APU TEMP GG BED > 456:	*
* A12	(Aff) APU HTR GAS GEN/FU	*
*	PUMP – OFF	*
*	Start aff APU when within	*
*	temperature limits	*

R2      APU FU TK VLV (two) – OP  
 √APU/HYD RDY tb (two) – gray

\* If tb – bp, attempt normal start \*

APU OPER (two) – START/RUN  
 MDU √HYD PRESS ind (two) – LO green

R2      √APU/HYD RDY tb (two) – bp

\* If APU OIL OUT P < 25 and APU \*  
 \* TEMP OIL OUT not increasing \*  
 \* after APU start or no start: \*  
 \* Perform APU SHUTDN (ENT \*  
 \* PKT, APU/HYD) \*



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

- |       |                                   |   |
|-------|-----------------------------------|---|
| *     | If two APUs operating:            | * |
| *     | • Delete HYD FLUID THERMAL        | * |
| *     | CONDITIONING                      | * |
| *     | • Delay following until EI-6:     | * |
| * R2  | HYD MN PUMP PRESS (two) – NORM    | * |
| * MDU | √PRESS ind (two) – HI green       | * |
| *     | Perform SSME HYD REPRESS          | * |
| *     | • At TAEM:                        | * |
| * R2  | APU SPEED SEL (two) – HI >>       | * |
| *     |                                   | * |
| *     | If only one APU operating:        | * |
| * R2  | • APU AUTO SHTDN (one) – INH      | * |
| *     | • Delete SSME HYD REPRESS and     | * |
| *     | HYD FLUID THERMAL CONDITIONING    | * |
| *     | • Delay MM304 trans until EI-2;   | * |
| *     | immediately prior to MM304 trans: | * |
| *     | HYD MN PUMP PRESS (one) – NORM    | * |
| * MDU | √PRESS ind (one) – HI green       | * |
| * R2  | APU SPEED SEL (one) – HI >>       | * |
|       |                                   |   |
|       | HYD MN PUMP PRESS (three) – NORM  |   |
| MDU   | √PRESS ind (three) – HI green     |   |

**P SSME HYD REPRESS**

- |    |   |
|----|---|
| R2 | √HYD MN PUMP PRESS (three) – NORM   |
|    | <ul style="list-style-type: none"> <li>* If HYD SYS 2 or SYS 1 failed, *</li> <li>* perform following steps using *</li> <li>* SYS 3 in place of failed system *</li> </ul>   |
| R4 | <p>HYD MPS/TVC ISOL VLV</p> <p>SYS 2 – OP (hold 5 sec, tb-OP) (MA possible)</p> <p>Wait 10 sec</p> <p>SYS 2 – CL (hold 5 sec, tb-CL)</p> <p>SYS 1 – OP (hold 5 sec, tb-OP) (MA possible)</p> <p>Wait 10 sec</p> <p>SYS 1 – CL (hold 5 sec, tb-CL)</p> |

1: GNC DEORB MNVR COAST	2: GNC DEORB MNVR COAST
3: BFS, SM 0 THERMAL	

```

* EI-11> P  HYD FLUID THERMAL CONDITIONING      *
*           (MCC CALL)                            *
*           CRT2  SURF DRIVE ON – ITEM 39 EXEC      *
*                   Start TIMER                    *
*           MDU   √SPI: Observe AEROSURFACES        *
*                   CYCLING                        *
*                   ELEV      U33 to D18 deg        *
*                   RUD       R5 to L5 deg         *
*                   SPDBK     15 to 10 %           *
*                   BDY FLP   93.6 to 3.5 %        *
*           CRT2  When SURF DRIVE ON (5 min),      *
*                   SURF DRIVE OFF – ITEM 40 EXEC  *

```

B            Stow DEORBIT BURN and DEORBIT BURN  
              MONITOR Cue Cards  
              √ENTRY Cue Cards installed

```

*           If 8 psi cabin entry,                  *
* ALL      √Tabs/Visor – CL/LES O2 – ON *

```

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

### G SUIT INFLATION

ALL Load – 1.5 (three turns cw if reqd)

\* **FCS CH CONFIG** \*

\* If less than four PASS GPCs, config FCS \*

\* CHs so that each GPC cmds equal \*

\* number of CHs (see table) \*

\* \*

\* **GNC 53 CONTROLS** \*

\* Config SURF FBK (see table) \*

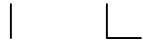
AVAILABLE GPCs	FCS CHs	FCH CH CONFIG			SURF FDBK	
		AUTO	ORIDE	OFF	SEL	DESEL
3	4	3		1	3	1 *
	3	3		1	3	1 *
	2		2	2	2	2
2	4		4		4	
	3		2	2	2	2
	2		2	2	2	2

\* \* If CH 4 – OFF, do not desel PASS SURF FDBK \*

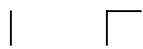
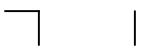
1: GNC DEORB MNVR COAST	2: GNC DEORB MNVR COAST
3: BFS, GNC DEORB MNVR COAST	

B F6,F8 FLT CNTLR PWR (two) – ON

EI-6 Go to ENTRY MANEUVERS (Cue Card)



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## ENTRY CUE CARDS

**ENT CUE  
CARDS**



MS ONLY

4-1

ENT/ALL/GEN G





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**ENT CUE  
CARDS**



MS ONLY

4-2

ENT/ALL/GEN G



### ENTRY NO-GO CHECKLIST

FAILURE OF:	AERO PTI DTO	AUTO FCS MODE	XWIND DTO ①
<b>APU/HYD:</b> 1 APU .....			X
2 APUs .....	X		X
<b>DISPLAYS:</b> 2 ADIs .....	X		
CDR HUD .....			X ②
<b>CONTROLLERS:</b>			
RHC: 1L .....			X
2L & 2R .....	X		X
RPTA: 2L or 2R .....			X
<b>GNC:</b> 2 AAs (LAT) .....	X		X
2 AAs (NORM) .....	X (M < 2.5)	X ③	
2 RGAs .....	X		X
2 R DDU PWR SPLY .....			X
2 IMU (or 1 IMU + BITE) .....	X		X
2 ADTAs .....			X
ADTA NOT INCORP OR DLMA .....		X (M < 2)	
MLS NOT INCORP .....		X (< 6K ft)	
2 FCS CH (same surface) .....	X		X
<b>DPS:</b> 1 GPC (not restrung) .....			X ④
2 GPC (restrung) .....	X		
2 GPC (not restrung) .....	X	X ③	X
1 FF .....			X ④
2 FF .....	X	X ③	X
2 FA .....	X		X
<b>RCS:</b> LEAK (AFT – during ENT) .....	X		
2 YAW JETs (same side) .....	X		
MIN RCS QTY .....	X		
<b>TRIM:</b> Ail > ± 2.0 deg .....	X		
<b>DOWNMODE:</b>			
FCS problem .....	X	X	X
AOA .....	X		X
<b>PLB:</b> PLBD Latch Gang .....	X		
<b>LDG/DECEL:</b>			
Tire Leak .....			X
HYD BRAKE ISOL VLV .....			X
< 100% Brakes .....			X
NWS .....			X
<b>ENERGY – OFF NOMINAL:</b>			
Roll Ref Alert .....	X		
Above Upper Traj Line .....	X		
MCC GCA, or VEL & PSN update .....	X	X	
No A/L by 6K ft .....		X	
<b>DATA:</b> SOLID STATE RECORDERS .....	X (LOS)		
<b>XWIND:</b>			
< 10 Knots Peak .....			X
> 15 Knots Peak .....			X
> 10 Knots Gust .....			X
<b>GROUND SYSTEMS:</b>			
No Runway Aim Point .....			X

**NOTES**

- ① Consider runway redesignation (M > 6) to avoid Xwind landing
- ② GO if PAPI and BALL BAR available
- ③ Pitch AUTO mode NO-GO for M < 2.5
- ④ GO if only string 4 affected

ENT-7a/E/K

MS ONLY

4-3

ENT/ALL/GEN G,1

### ENTRY MANEUVERS

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

ENT-6a/E/O



V = 7K	√TACAN status * If ELS: UHF MODE – G T/R *
V = 5K	ADTA PROBES – DEPLOY (√HEAT) Begin AIL and RUD trim monitoring
M = 3.5	If previous OMS OX TK, He TK, or RCS OX TK leak: G51 VENT DOOR CNTL OPEN – ITEM 43 EXEC
M = 2.7	√APUs HUD PWR (two) – ON
* If M < 2.5; P CSS for ADTA to G&C incorp *	
M = 2.0	Ensure ADTA to G&C else √Theta limits
M < 1.0	√R FLT CNTLR – ON P,R/Y – CSS as reqd √SPDBK CMD vs POS      MAX N <sub>z</sub> <input type="text"/> . <input type="text"/> √NWS – 1 Lock Inertia Reels
M = 0.7	√LG EXTD ISO VLV – OP
h = 15K	√MLS
h = 10K	√A/L (KSC – Tabs, Visors, Suit O2)
h = 2K	LDG GEAR ARM pb – push (ARM It on)
h = 300	LDG GEAR DN pb – push (DN It on)
MAIN GEAR TD	√SPDBK – 100%
V = 195 KEAS	DRAG CHUTE ARM, DPY pb (two) – push (simo) (All Its on)
V = 185 KEAS	DEROTATE
NOSE GEAR TD	SRB SEP – MAN/AUTO and depress pb √Auto Load Relief √HYD BK ISOL VLV (three) – OP
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/W  
(Partial)



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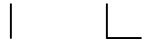
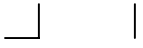


MS ONLY

4-6

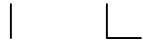
ENT/ALL/GEN G



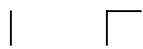
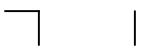


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**DRAG CHUTE DEPLOY**

<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	

**ENTRY  
MISC**

**FAILED TIRE TECHNIQUE**

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

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

ENT-6b/E/W  
(Partial)

MS ONLY

4-9

ENT/ALL/GEN G,7

ENTRY  
MISC

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MS ONLY

4-10

ENT/ALL/GEN G

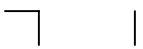


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## ENTRY CONTROL

### ARCS QTY (L + R) < 10 %

ARCS QTY = 0 & JETS FAIL OFF	1. ENTRY MODE – NO Y JET (R/Y CSS; expect sluggish control)
$\bar{q} \geq 20$ & $M > 6$	2. [G51] ELEVON FIXED – ITEM 18 EXEC (*)
CONTROL PROBLEMS* & ARCS QTY > 0	3. ENTRY MODE – AUTO When control regained: 4. ENTRY MODE – NO Y JET 5. $\sqrt{\text{AIL}}$ trim
$M < 6$ & ARCS QTY > 0	6. ENTRY MODE – AUTO
$M < 5$	7. TRIM/RHC PNL – ENA 8. TRIM ROLL – away from AIL trim (to < 1)

\*Region of least margin: M 12-8

### AIL TRIM $\geq 3^\circ$

TAL	1. [G51] WRAP MODE – ITEM 45 EXEC (ACT)														
AIL trim = 5	2. BF – MAN 3. BF – UP (to 0%)														
NO Y JET	4. Perform roll reversals at 3°/s (expect sluggish control)														
$M < 13$ & AIL trim = 5	5. P – CSS 6. Fly $\alpha$ per schedule: <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="border: none; padding: 0 5px;">M</td> <td style="border: 1px solid black; padding: 2px 5px;">12</td> <td style="border: 1px solid black; padding: 2px 5px;">11</td> <td style="border: 1px solid black; padding: 2px 5px;">10</td> <td style="border: 1px solid black; padding: 2px 5px;">9</td> <td style="border: 1px solid black; padding: 2px 5px;">8-6</td> <td style="border: 1px solid black; padding: 2px 5px;">5</td> </tr> <tr> <td style="border: none; padding: 0 5px;"><math>\alpha</math></td> <td style="border: 1px solid black; padding: 2px 5px;">37</td> <td style="border: 1px solid black; padding: 2px 5px;">36</td> <td style="border: 1px solid black; padding: 2px 5px;">35</td> <td style="border: 1px solid black; padding: 2px 5px;">33</td> <td style="border: 1px solid black; padding: 2px 5px;">30</td> <td style="border: 1px solid black; padding: 2px 5px;">26</td> </tr> </table>	M	12	11	10	9	8-6	5	$\alpha$	37	36	35	33	30	26
M	12	11	10	9	8-6	5									
$\alpha$	37	36	35	33	30	26									
$M < 5$	7. TRIM/RHC PNL – ENA 8. TRIM ROLL – away from AIL trim (to < 1) 9. P – AUTO														
$M < 2$	10. BF – AUTO														

ENT-10a/A,E/B

### HIGH-FREQ OSC OR SURF/JET CYCLE

Returning PL > 10K lb	1. [G51] $\sqrt{\text{FILTER ALT}}$ – ITEM 21 (*)
	2. P, R/Y – CSS
Osc/Cycle continues	3. ENTRY MODE – LO GAIN
Osc/Cycle stops	4. ENTRY MODE – AUTO 5. P, R/Y – AUTO

ENT-10b/A,E/B



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MS ONLY

4-14

ENT/ALL/GEN G



**ADTA MGMT**

		NAV			G&C
		RATIO > 1			Two or more good ADTAs
RATIO < 1		IF BAD ADTA	IF BAD NAV STATE		
COMM OK	MCC: AUTO or INH*	MCC: INH	MCC: FORCE		Evaluate h,α,M MCC: AUTO (G&C)
NO COMM	AUTO	TACAN OK	NO TACAN		Evaluate h,α,M If reasonable: AUTO (G&C)
			ADTA ERRATIC	ADTA STEADY	
		INH	AUTO	FORCE	

\*(If ADTA H will degrade NAV state)

V = 6K

**NO COMM TACAN MGMT**

RATIO < 1	RATIO > 1		ONE TACAN LOCKED	NO LOCK
AUTO	TROUBLESHOOT		BELOW V = 5.5K DESELECT MISSING TACANS, then – AUTO	BELOW V = 5.5K Select Alternate TACAN <b>G50</b> ITEM 5 EXEC
	IF BAD TACAN	IF BAD NAV STATE		
	AUTO	If 1st acq – FORCE If NOT – ZERO Δ STATE		

**NAV DELTA PAD**

ΔX 10	( )						
ΔY 11	( )						
ΔZ 12	( )						
ΔX 13		( )					
ΔY 14		( )					
ΔZ 15		( )					

For Δ STATE UPDATES (on MCC call):

P, R/Y – CSS

DRAG H, TACAN, ADTA – INH

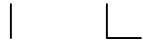
On MCC call, back to AUTO

ENT-7b/E/R  
(Partial)

MS ONLY

4-15

ENT/ALL/GEN G,2



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MS ONLY

4-16

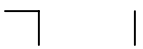
ENT/ALL/GEN G





**POST  
LDG**

## **POST LANDING PROCEDURES**



POST  
LDG

- \* **LOSS OF COMM** \*
- \* In event of loss of comm (day or night), the following signals \*
- \* will be utilized to indicate onboard status to convoy: \*
- \* NOTE \*
- \* Before declaring loss of comm, attempt to contact \*
- \* convoy on 259.7 using PRC-112 radio channel A \*
- \* Crew should continue signals until acknowledged by convoy \*
- \* From Crew (with Mini Mag light stowed in ACES or Spotlight \*
- \* stowed in volume 3b) \*
- \* Crew OK Circular motion \*
- \* OMS/RCS & Hatch safed Circular motion \*
- \* APU shutdn Circular motion \*
- \* Crew needs assistance; \*
- \* will open/blow hatch Vertical motion \*
- \* Crew needs assistance; \*
- \* will not open/blow hatch Horizontal motion \*
- \* From Convoy \*
- \* Convoy will acknowledge crew signals with sequence of \*
- \* three flashes of headlights on convoy vehicle \*
- \* Continuous flashing – Emer pwrdsn and egress \*
- \* \*\*\*\*\* \*
- \* **EXPEDITED PWRDN** \*
- \* Accomplish for: \*
- \* • Loss of all comm, including hand signals, with \*
- \* convoy elements \*
- \* • Loss of telemetry and onboard systems monitoring \*
- \* visibility \*
- \* • Fuel leak (OMS, RCS, or APU) if: \*
- \* - Nonisolatable, or \*
- \* - Leak occurs during RTLS, TAL, AOA, or \*
- \* POST D/O TIG \*
- \* • Fire Suppression Bottle discharged during entry for \*
- \* confirmed or suspected fire \*
- \* If APU, OMS, RCS Fuel Leak: \*
- \* APUs OFF ASAP \*
- \* As time permits: \*
- \* RCS,OMS SAFING (RJDs), 5-4 \*
- \* GPC DEACT \*
- \* O6 GPC MODE 1,2,3,4,5 (five) – STBY (tb-bp) \*
- \* – HALT \*
- \* ET UMBILICAL DOOR OPENING, 5-5 (RTLS/TAL only) \*
- \* ‘MODE 5’ POST LANDING EGRESS Cue Card (CDR or \*
- \* MCC call) then EMER PWRDN Cue Card \*

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

**POST LANDING**

<p><u>WARNING</u>  APUs OFF ASAP for APU  hydrazine, OMS, RCS (FWD or  AFT), or MPS propellant leak</p>
---

- 00:00
- C      After orbiter stops:  
Report, "WHEELS STOP"  
Establish COMM with NCC
  
  - L2      SPD BK – MAN, full fwd  
NWS – OFF
  
  - P      If RTLS or TAL abort:  
Perform ET UMBILICAL DOOR  
OPENING, 5-5
  
  - R2      √APU AUTO SHTDN (three) – ENA  
√SPEED SEL (three) – NORM
  
  - R1      √AC BUS SNSR (three) – AUTO
  
  - C F6      FLT CNTLR PWR – OFF
  
  - B F3      HUD PWR (two) – OFF
  
  - P C3      If ELS:  
MSTR MADS PWR – OFF  
DoD ELS, MCC call DoD OSC on NCC

NOTE  
MCC will report "GO/NO-GO  
TO DOFF SUITS" (post safety  
assessment)

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

**CDR**

NOTE

CDR activities are now on even numbered pages and PLT activities on odd numbered pages

**RCS, OMS SAFING (RJDs)**

- C3       √OMS ENG (two)       – OFF
- O14:F     RJD DRIVER (nine) – OFF
- O15:F       LOGIC (eight)   – OFF
- O16:F     OMS ENG VLV (two) – OFF

C,P,MS

**DRAG CHUTE SAFING**

(Not performed if ELS)

- O15:E     cb MNB DRAG CHUTE SYS 2 – op
- O16:E     MNC DRAG CHUTE SYS 1 – op
- F2,F3,   √DRAG CHUTE pb (six)       – It off
- F4

**DEACT AIR DATA PROBE HTRS**

- C3       √AIR DATA PROBE (two) – DPY

C,P,MS

**LANDING GEAR SAFING**

(Not performed if ELS)

- R14:F     cb ESS 1BC LDG GEAR ARM/DN  
RESET – cl

NOTE

SM0 TIRE PRESS msgs occur when LG ARM/DN RESET performed

- A12       LG ARM/DN RESET – RESET
- F6,F8     √LDG GEAR pb (four) – It off
- A12       LG ARM/DN RESET – dn
- R14:F     cb ESS 1BC LDG GEAR ARM/DN  
RESET – op

Check with MS3. Report to MCC: "RJDs OFF, SIDE HATCH, DRAG CHUTE, AND LANDING GEAR SAFED" (MCC report to NCC)



1: GNC VERT SIT 2                      2: GNC SYS SUMM 1

3: BFS, GNC VERT SIT 2

**PLT                      ET UMBILICAL DOOR OPENING**

Report to MCC, "ET UMBILICAL DOORS ARE COMING OPEN"

- R2                      ET UMB DR
- MODE – GPC/MAN
- R LAT – REL (tb-bp, REL ~6 sec)
- OFF
- DR – OP (tb-bp)
- Wait 12 sec, R DR – OFF (tb-bp)
- L LAT – REL (tb-bp, REL ~6 sec)
- OFF
- DR – OP (tb-bp)
- Wait 12 sec, L DR – OFF (tb-bp)
- MODE – GPC

**HYDRAULIC LOAD TEST (ON MCC CALL)**

NOTE

Minimum of two operating hyd systems is reqd for this test

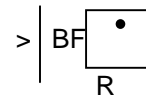
- F4                      BDY FLP pb – MAN
- F8                      √FLT CNTLR PWR – ON

NOTE

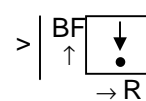
If only two systems are operating, do not depressurize either hyd pump

- R2                      HYD MN PUMP PRESS 1 – LO (MA)
- C3                      Run Full Load Test:
  - BDY FLP – TRAIL
  - RHC – Forward ctr
  - Rudder full left
  - When set, do following simo:
    - BDY FLP – UP (to ≤ 6%)
    - RHC – move to aft ctr
    - Rudder full right
    - RHC – release
    - Rudder – neutral
    - BDY FLP – reset to TRAIL
- R2                      HYD MN PUMP
  - PRESS 1 – NORM
  - 3 – LO (MA)
- C3                      Repeat Load Test
- R2                      HYD MN PUMP PRESS 3 – NORM

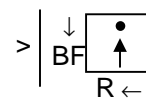
SETUP:



LOAD TEST:



RELEASE:



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

**CDR**

MCC Report GO/NO-GO for DPS transition

**DPS TRANSITION – GNC 9 (If PASS)**

NOTE

No keyboard entries or sw throws 10 sec:  
 Before and after moding PASS GPCs to RUN  
 Before OPS transition or set expansion/contraction requests until new OPS base page is displayed

MCC will call for BFS to be taken from RUN to STBY for Solid State Recorder dumping and PL monitoring as reqd

√BFC CRT DISP – ON

CRT3 BFS, GNC, OPS 000 PRO

3: BFS, GNC BFS MEMORY
------------------------

1: GNC 0 GPC MEMORY
---------------------

Verify:

CONFIG GPC	9	12340
STR 1	1	
2	2	
3	3	
4	4	
PL 1/2	1	
CRT 1	1	
2	2	
3	3	
4	0	
L 1	1	
2	2	
MM 1	1	
2	2	

CRT1 GNC, OPS 901 PRO

1: GNC VERT SIT 2                      2: GNC SYS SUMM 1

3: BFS, GNC VERT SIT 2

**PLT            SET BODY FLAP (Prior to OPS 9)**

F4            BODY FLAP pb – MAN  
C3            BODY FLAP     – DOWN (100%)

**SSME REPO (If PASS, OPS 9, and GO from MCC)**

NOTE

Do not resume GNC SPEC 105 until 'VFB 84 – COMPLETE' msg rcvd

2: GNC 105 TCS CONTROL

R4            HYD MPS/TVC ISOL VLV SYS (three) – OP  
Hold 5 sec, √tb – OP

- \* If less than two HYD MPS/TVC \*
- \* ISOL VLVs open, √MCC            \*

CRT2        CLEAR MSG – ITEM 8 EXEC  
SELECT ID – ITEM 1 +0 2 EXEC  
√NAME VFB 84 (~15 sec)  
MM READ – ITEM 2 EXEC  
√'AI MODE 1(0,3) COMPLETE' msg (~2.5 min)  
√'VFB 84 – COMPLETE' msg

- \* If any 'AI MODE X FAILED RETEST' msg: \*
- \* √MCC, report ECP ERROR            \*
- \* To terminate: CANCEL – ITEM 5 EXEC \*

Go to APU/HYD SHUTDN >>

**SPDBK REPO (No SSME REPO, ON MCC GO) |**

R4            √HYD MPS/TVC ISOL VLV SYS (three) – CL

2: GNC 113 ACTUATOR CONTROL

CRT2        AI MODE 1 MDM – ITEM 23 EXEC (\*)  
√ACTUATOR GIMBALING STATUS – RUN, CPLT  
SB – ITEM 1 EXEC (\*)  
RATE – ITEM 29 +1 EXEC  
FIN POS – ITEM 30 +8 EXEC  
√START 31 – → ←  
START – ITEM 31 EXEC (\*→ ←)  
√STATUS – RUN, CPLT (~30 sec)

- \* If STATUS – STOP or BUSY:            \*
- \* √MCC, (To terminate: ITEM 32 EXEC) \*

Go to APU/HYD SHUTDN >>

1: AS DESIRED	2: AS DESIRED
3: AS DESIRED	

**CDR RAD RECONFIG**

(On MCC call, unless no COMM)

- O1 When FREON EVAP OUT TEMP > 40 degF:  
If RTLS/TAL/AOA, go to NH3 RECONFIG, 5-22 >>
- L1 RAD OUT TEMP – HI  
H2O PUMP LOOP 1 – ON  
Proceed to NH3 ACT

**NH3 ACT**

- O1 When FREON EVAP OUT TEMP > 55 degF, select one of the following as specified by MCC:
- L1 NH3 CNTLR A – PRI/GPC ( )  
– SEC/ON ( )  
B – PRI/GPC ( )  
– SEC/ON ( )

- \* During NH3 ops: \*
- \* If EVAP OUT TEMP alarm and \*
- \* O1 FREON EVAP OUT TEMP < 32 degF: \*
- \* L1 1. FREON PUMP LOOP 1,2 \*
- \* (two) – OFF (ASAP) \*
- \* 2. √H2O PUMP LOOP 1 – ON \*
- \* 3. NH3 CNTLR A(B) – OFF \*
- \* If no PL H2O Loop present: \*
- \* 4. FLOW PROP VLV LOOP 1,2 \*
- \* (two) – PL HX (tb-PL) \*
- \* If PL H2O Loop present: \*
- \* 5. Activate PL H2O Loop \*
- \* 6. FREON PUMP LOOP 1 – B \*
- \* Wait 3 min, then: \*
- \* 7. FREON PUMP LOOP 2 – B \*
- \* 8. Go to NH3 RECONFIG, 5-22 >> \*
- \* If EVAP OUT TEMP alarm and \*
- \* O1 FREON EVAP OUT TEMP > 65 degF: \*
- \* 9. Go to NH3 RECONFIG, 5-22 \*

1: AS DESIRED	2: AS DESIRED
3: BFS, SM SYS SUM 2	

**PLT            APU/HYD SHUTDN**

√SSME REPO complete (if PASS)            |

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

R2            BLR PWR (three)            – OFF  
N2 SPLY (three) – OFF

APU OPER  
(1,2,3; 5 sec interval) – OFF (MA)  
APU FU TK VLV (three) – CL

√Shutdn (HYD PRESS < 200)  
CNTLR PWR (three) – OFF

MCC            Report to MCC, “APU/HYD SHUTDOWN”  
Report to Convoy 1, “SSME REPO  
COMPLETE AND APU/HYD  
SHUTDOWN”  
Report, “GO/NO-GO FOR VENT DOOR  
PURGE POSITIONING”            |

**POST LANDING MPS RECONFIG  
(After APU/HYD shutdn + 1 min)**

NOTE

Expect multiple MAs for MPS  
He P as regs bleed down

R2            MPS He ISOL (six)            – CL  
I’CNCT L                            – OUT OP  
PNEU L ENG He XOVR – CL

1: AS DESIRED	2: AS DESIRED
3: AS DESIRED	

**C,MS**

**C**

**PCS DEACTIVATION**

L2 O2 SYS 1,2 SPLY (two) – CL (tb-CL)  
√EMER tb – bp

**MS**

**GPS PWRDN**

A13

- \* If landing not at KSC, EDW, or NOR \*
- \* GPS ENCRYPT – ZEROIZE \*
- \* Wait 1 sec \*
- \* GPS ENCRYPT – NORMAL \*

GPS POWER – OFF  
PRE AMPL UC – OFF  
LC – OFF

**MCC**

Report, “GO/NO-GO FOR EXTENDED  
PWR UP”

**If GO for EXTENDED PWR UP, go to  
SYS DEACT FOR EXTENDED PWR UP,  
5-14**

1: AS DESIRED	2: GNC 105 TCS CONTROL
3: AS DESIRED	

**PLT VENT DOOR PURGE POSITIONING (PASS)**

(on MCC GO, not performed if ELS)  
(Do not perform during SYS DEACT FOR  
EXTENDED PWRUP)

CRT2 CLEAR MSG – ITEM 8 EXEC  
SELECT ID – ITEM 1 +0 3 EXEC  
√NAME 'VFB89' (~15 sec)  
MM READ – ITEM 2 EXEC  
After 'VFB89 – ENTERING 30 MIN  
DELAY' msg, CANCEL – ITEM 5 EXEC

**RCS, OMS VALVE TEST**

Pause 1 sec between each line

O7 √MSTR RCS XFEED – OFF  
O8 L,R OMS He PRESS/VAP ISOL (four) –  
CL,GPC  
L OMS XFEED (two) – OP (tb-OP),  
then – CL (tb-CL)  
R OMS XFEED (two) – OP (tb-OP),GPC  
then – CL (tb-CL),GPC  
L,R OMS TK ISOL  
(four) – CL (tb-CL),  
then – OP (tb-OP),GPC  
L OMS XFEED (two) – OP (tb-OP),GPC  
FWD RCS  
He PRESS (two) – CL (tb-CL),GPC  
TK ISOL (two) – CL (tb-CL),  
then – OP (tb-OP),GPC  
MANF ISOL (five) – CL (tb-CL)  
then – OP(tb-OP),GPC  
O7 L,R RCS  
He PRESS (four) – CL (tb-CL),GPC  
MANF ISOL (ten) – CL (tb-CL),  
then – OP (tb-OP),GPC  
TK ISOL (six) – CL (tb-CL)  
XFEED (four) – OP (tb-OP),  
then – CL (tb-CL),GPC  
TK ISOL (six) – OP (tb-OP),GPC





1: OFF	2: OFF
3: OFF	

**PLT**

NOTE

**If GO for EXTENDED PWR UP, go to SYS DEACT FOR EXTENDED PWR UP, 5-15.**

If NO-GO for EXTENDED PWR UP, continue ops

**HATCH OPENING (not KSC,EDW,NOR)**

Before hatch opening:  
√Tabs/Visor – CL

Green Apple – PULL

**EXTEND  
PWR UP**

**VEHICLE PWRDN (on GO from CDR)**

NOTE

All vehicle lighting and orbiter O2 will be lost at pwrdn

- |    |                           |       |
|----|---------------------------|-------|
| R1 | MN BUS TIE (three)        | – OFF |
|    | FC/MN BUS (three)         | – OFF |
|    | ESS BUS SOURCE FC (three) | – OFF |

**EGRESS**

Pull G SUIT controller clip (if inflated)  
Egress seat, orbiter  
(Helmet reqd if ELS)

**MCC TO KSC HANDOVER (at crew egress)**

1: GNC 0 GPC MEMORY	2: AS DESIRED
3: AS DESIRED	

**CDR      SYS DEACT FOR EXTENDED PWR UP**  
 (Do not perform during VENT DOOR PURGE POSITION, SSME REPO, or SPDBK REPO sequence)

**NOTE**

No keyboard entries or sw throws 10 sec:  
 Before and after moding PASS GPCs to RUN  
 Before OPS transition or set expansion/contraction requests until new OPS base page is displayed

**EXTEND  
PWR UP**

1: GNC 0 GPC MEMORY
---------------------

CONFIG GPC	9	10000
STR 1	1	
2	1	
3	1	
4	1	
PL 1/2	1	
CRT 1	1	
2	1	
3	1	
4	0	
L 1	1	
2	1	
MM 1	1	
2	1	

CRT1      GNC, OPS 901 PRO

**GPC PWRDN**

O6      GPC MODE 2,3,4 (three) – STBY (tb-bp)  
 – HALT

CRT1      If no GPC failure,  
 ERR LOG RESET – ITEM 48 EXEC

O6      GPC PWR 2,3,4 (three) – OFF  
 LTG (five) – OFF

C2      IDP/CRT 2 PWR – OFF

Inform MS2 to proceed with MS Sys  
 Deact activities, 5-18

1: GNC 0 GPC MEMORY	2: AS DESIRED
3: AS DESIRED	

**PLT            SYS DEACT FOR EXTENDED PWR UP**

F8	FLT CNTLR PWR – OFF
F3	TRIM PNL            – OFF
	√RHC            – INH
R4	HYD BK HTR (three) – OFF
O8	LTG (five)    – OFF
O17:A	ATVC (four) – OFF

1: AS DESIRED	2: OFF
3: AS DESIRED	

**C,MS,PS**

C	L2	ANTISKID	- OFF
		√NWS	- OFF
	C3	√FCS CH (four)	- AUTO
	F3	TRIM PNL	- OFF
		√RHC	- INH

**IDP/CRT 4 PWRDN**

MS	R12	IDP/CRT 4 PWR	- OFF
----	-----	---------------	-------

**EGRESS**

(After MS Sys Deact complete, and ASP Comm check with MCC complete)

C	L5	L COMM PWR	- OFF
---	----	------------	-------

C,MS,PS		Pull G SUIT controller clip (if inflated)	
		Egress seat	

MS MS,PS	A11,A15, MO39M	COMM CCU PWR	- OFF
-------------	-------------------	--------------	-------

Unstow 'Return to Houston' Bags

C,MS,PS		Egress orbiter	
---------	--	----------------	--

1: AS DESIRED	2: OFF
3: AS DESIRED	

**PLT**

**EGRESS**

(When desired after ground support personnel establishes comm at PS station)

- R6            R COMM PWR – OFF
- Pull G SUIT controller clip (if inflated)
- Egress seat, orbiter

**MCC TO KSC HANDOVER**

(At crew egress or GSE cooling activation, whichever occurs later)

**MS EXT  
PWR UP**

1: AS DESIRED	2: OFF
3: AS DESIRED	

MS EXT  
PWR UP

**MS MS SYS DEACT FOR EXTENDED PWR UP**  
MS1 Perform POST LANDING PAYLOAD ACTIVITIES  
(if reqd), FS 5-19

**MS2 LRU DEACTIVATION**  
(After APU/HYD SHUTDN)

- O14,O15,  
O16
- BRAKES (three) – OFF
  - cb GPS PRE AMPL (four) – op  
(OV103,105 only)
  - cb GPS 2 PRE AMPL UPPER – op  
LOWER – op  
(OV104 only)
  - RGA (four) – OFF
  - IMU (three) – OFF
  - ASA (four) – OFF
  - cb ADTA (four) – op
  - cb/sw ACCEL (four) – op/OFF
  - cb DDU (six) – op
    - MNA NWS – op
    - MNB NWS – op
  - O7 TACAN MODE (three) – OFF
  - O8 RADAR ALTM (two) – OFF
  - MLS (three) – OFF
  - C L1 IMU FAN (three) – OFF

**APU HEATER DEACTIVATION**  
(After APU/HYD SHUTDN)

- A12 APU HTR
- TK/FU LN/H2O SYS (six) – OFF
  - √GAS GEN/FU PUMP (three) – OFF
  - LUBE OIL LN (three) – OFF

**RCS/OMS HEATERS PWRDN**

- A14 OMS CRSFD LINE A,B (two) – OFF  
If reqd, install and lock PL Bay Window  
Shades
- MS2 Inform CDR, “POST LANDING  
PROCEDURE COMPLETE”

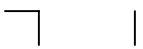


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1: AS DESIRED	2: OFF
3: AS DESIRED	

**ASP INTEGRATED POST LANDING PROCEDURES FOR EXTENDED PWR UP**

ASP 1	A15	Connect Comm (PS) PS Comm CCU PWR – ON
		Comm ck with MCC
ASP to MCC		Report when “CREW READY TO EGRESS”
		Report “POST LANDING PROCEDURE COMPLETE”

**ASP EXT  
PWR UP**

1: AS DESIRED	2: OFF
3: AS DESIRED	

**CDR      SYS DEACT FOR EXTENDED PWR UP**

**NH3 RECONFIG**

(On MCC call; Cooling Cart not ready)

- L1      1. NH3 CNTLR A(B) – OFF  
           If RTLS/TAL/AOA:  
             2. RAD BYP VLV LOOP 1,2 –  
                RAD FLOW  
                Wait 1 min  
                H2O PUMP LOOP 1 – ON

- O1      When FREON EVAP OUT TEMP  
           > 55 degF, select one of the following  
           as specified by MCC:

- L1      3. NH3 CNTLR A – PRI/GPC (  )  
                   A – SEC/ON (  )  
                   B – PRI/GPC (  )  
                   B – SEC/ON (  )

**ASP EXT  
PWR UP**

- |      |                                |   |
|------|--------------------------------|---|
| *    | During NH3 ops:                | * |
| *    | If EVAP OUT TEMP alarm and     | * |
| * O1 | FREON EVAP OUT TEMP < 32 degF: | * |
| * L1 | 1. FREON PUMP LOOP 1,2         | * |
| *    | (two) – OFF (ASAP)             | * |
| *    | 2. √H2O PUMP LOOP 1 – ON       | * |
| *    | 3. NH3 CNTLR A(B) – OFF        | * |
| *    | If no PL H2O Loop present:     | * |
| *    | 4. FLOW PROP VLV LOOP 1,2      | * |
| *    | (two) – PL HX (tb-PL)          | * |
| *    | If PL H2O Loop present:        | * |
| *    | 5. Activate PL H2O Loop        | * |
| *    | √MCC for steps                 | * |
| *    | If no comm:                    | * |
| *    | 6. Go to VEHICLE PWRDN,        | * |
| *    | 5-13 >>                        | * |
| *    | 7. √MCC                        | * |
| *    | If EVAP OUT TEMP alarm and     | * |
| * O1 | FREON EVAP OUT TEMP > 65 degF: | * |
| *    | 8. Go to POST LANDING LOSS     | * |
| *    | OF COOLING, 5-24               | * |

1: AS DESIRED	2: OFF
3: AS DESIRED	

**CDR NH3 DEACT**

(On MCC call if Cooling Cart ready)

- L1
1. NH3 CNTLR A(B) – OFF
  2. RAD OUT TEMP – NORM

```

*           After NH3 TERMINATION:           *
*           If EVAP OUT TEMP alarm and       *
* O1       FREON EVAP OUT TEMP < 32 degF: *
* L1       1. FREON PUMP LOOP 1,2           *
*           (two) – OFF (ASAP)               *
*           2. √H2O PUMP LOOP 1 – ON         *
*           If no PL H2O Loop present:       *
*           | 3. FLOW PROP VLV LOOP 1,2 *
*           | (two) – PL HX (tb-PL)         *
*           | If PL H2O Loop present:       *
*           | 4. Activate PL H2O Loop      *
*           | √MCC for steps                *
*           | If no comm:                   *
*           | 5. Go to VEHICLE PWRDN,      *
*           | 5-13 >>                       *
*           | 6. √MCC                       *
*           If EVAP OUT TEMP alarm and       *
* O1       FREON EVAP OUT TEMP > 65 degF *
*           for 5 min:                       *
*           7. Go to POST LANDING LOSS     *
*           OF COOLING, 5-24                *

```

1: AS DESIRED	2: OFF
3: AS DESIRED	

**POST LANDING LOSS OF COOLING (NH3  
FAILED OR DEPLETED)**

- |        |    |   |
|--------|----|---|
| C      | L1 | 1. NH3 CNTLR A,B (two) – OFF  |
|        |    | 2. √RAD BYP VLV MAN SEL (two) – RAD FLOW (tb-RAD, 3 sec)  |
|        |    | 3. √RAD CNTLR OUT TEMP – NORM   |
| C,P,MS |    | 4. √Complete post landing procedures thru ENT C/L, 5-18 & FS 5-19 ASAP<br>Assume GO for EXTENDED PWR UP |
| B      | C3 | 5. √BFC CRT SEL – 3+1<br>DISP – ON  |

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

- |   |      |   |
|---|------|---|
|   |      | Terminate monitoring if ground cooling established (Convoy commander call) >>                                     |
|   | CRT3 | 6. Monitor AV BAY TEMP (three)<br>When AV BAY TEMP 1 or 2 > 113 or AV BAY TEMP 3 > 107 or no temperature insight: |
| P |      | 7. Go to VEHICLE PWRDN, 5-13 >>   |
| A |      | 8. Crew egress if not already complete  |

**1-ORBIT LATE DEORBIT PROCEDURES**

Refer to DEORBIT BURN FLIGHT RULES  
Cue Card for failures that require 1-orbit  
delay

**1-ORB  
LATE**

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

### 1-ORBIT LATE DEORBIT PROCEDURES

TRANS B  
DAP

These procedures assume:

1. All DEORB PREP completed
2. DEORBIT BURN completed up to but not including SINGLE APU START, 3-13. If activities are not complete, then do them during troubleshooting time

C CRT1 GNC, OPS 301 PRO

R2 √HYD MN PUMP PRESS (three) – NORM

MS A12 APU HTR GAS GEN/FU PUMP (three) – A AUTO

B A14 RCS/OMS HTR  
FWD RCS – A AUTO  
L POD (two) – A AUTO, B OFF  
R POD (two) – A AUTO, B OFF  
OMS CRSFD LINES (two) – A AUTO, B OFF  
FWD RCS JET 5 (one) – AUTO  
AFT RCS JET 5 (one) – AUTO

TIG-1:10> **IMU/IMU ALIGN**

Perform IMU/IMU alignment using best IMU as reference. √MCC for reference IMU

1: GNC 21 IMU ALIGN

C CRT1 IMU/IMU – ITEM 14 + \_\_ EXEC  
ALIGN IMU 1(2,3) –  
ITEM 10(11,12) EXEC (\*)  
If no comm, EXEC – ITEM 16 EXEC (\*)  
Rcd MET \_\_/\_\_:\_\_  
√EXEC, ITEM 16 – (no \*) (4-6 min)

1-ORB  
LATE

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

C           MCC UPDATE:  
              DEL PAD  
              PRPLT PAD  
              MCC UPLINK:  
              PASS TGT  
              BFS TGT

CRT2   GNC, OPS 302 PRO

**ALL FLUID LOADING: 1-ORBIT LATE**

Approx 1 hr prior to new TIG, drink 8 fluid oz water plus take 2 salt tablets every 15 min for total of 16 fluid oz water and 4 salt tablets per crewmember

**FINAL DEORB UPDATE/UPLINK**

C           MCC UPDATE:  
              DEL PAD  
              PRPLT PAD  
              MCC UPLINK:  
              PASS SV  
              BFS SV  
              PASS TGT  
              BFS TGT  
              BFS IMU GYRO/ACCEL

G50   √LAND SITE as reqd  
          SET TACAN tw

On MCC GO:

CRT1   LOAD – ITEM 22 EXEC  
          TIMER – ITEM 23 EXEC

CRT1,3 √PASS & BFS TGTS per MNVR PAD:  
          BURN ATT  
          ΔVTOT  
          TGO  
          HA HP

1: GNC DEORB MNVR EXEC | 2: GNC DEORB MNVR EXEC

3: BFS, GNC DEORB MNVR EXEC

**IF WAVEOFF**

Go to IF NO-GO FOR  
DEORBIT BURN, 3-11

TIG-15> B A14 RCS/OMS HTR  
FWD RCS – OFF  
L POD (two) – A OFF,B OFF  
R POD (two) – A OFF,B OFF  
OMS CRSFD LINES (two) –  
A AUTO,B AUTO  
FWD RCS JET 5 (one) – OFF  
AFT RCS JET 5 (one) – OFF

TIG-12 **APU HTR DEACT**  
MS A12 APU HTR GAS GEN/FU PUMP (three) – OFF

TIG-10> **MNVR TO 1-ORBIT LATE DEORBIT ATT**

C3 √DAP: AUTO  
B F6,F8 √ADI ATT (two) – INRTL  
√ERR (two) – MED  
√RATE (two) – MED  
CRT1 C MNVR – ITEM 27 EXEC (\*)  
(√ADI ATT with CRT BURN ATT)  
B Copy last DEL PAD and OMS PRPLT PAD  
data on DEORBIT BURN Cue Cards  
F6/F8 √DEORBIT BURN and DEORBIT BURN  
MONITOR Cue Cards installed

3: BFS, SM SYS SUMM 2

R2 HYD MN PUMP PRESS (three) – LO

Return to DEORBIT BURN Cue Cards and  
SINGLE APU START, 3-13





**SWITCH LIST AT WHEELS STOP EGRESS |**

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7-1

ENT/ALL/GEN G,1



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CUE CARD  
CONFIG

## ENTRY CUE CARD CONFIG

FAB USE ONLY

8-1

ENT/ALL/GEN G

DEORBIT BURN FLIGHT RULES  
ONE-ORBIT LATE AVAILABLE

ENT-1a/D/K

FAILURE	PRE TIG		POST TIG
	Delay (max)		Stop Burn, > Safe HP
	One Orbit	One Day	
<b>APU/HYD</b>			
1 No APU operating .....	... X ...	.....	
<b>DPS</b>			
2 RDNT fail, Split.....	.....	...X...	.....X
3 1 GPC.....	... X ...	.....	
4 BFS.....	.....	...X...	
5 GPC BITE (Multiple GPCs) .....	.....	...X...	
<b>ECLS</b>			
6 2 Av Bay Fans in Bay 3 .....	... X ...	.....	
7 2 Av Bay Fans in Bay 1 or 2 .....	.....	...X...	
<b>ELEC</b>			
8 H2 Manf or TK leak (not in depleted tk(s) .....) .....	... X ...	.....	
9 2 MN Buses .....	.....	...X...	.....X
10 CNTL CA1 (No BFS Engage in GPC 3/5) .....	.....	...X...	
11 Multi $\Phi$ AC BUS (unshorted) .....	... X ...	.....	
<b>GNC</b>			
12 1 MLS (if reqd), IMU, or TACAN (C-band/GPS redun not avail) .....	... X ...	.....	
13 IMU Dilemma.....	.....	...X...	.....X
14 RHC Dilemma .....	... X ...	.....	
15 2 IMUs (Not targeting EDW/NOR) .....	.....	...X...	
16 2 ADTAs (Winds>80kts or Dynamic Wx) .....	... X ...	.....	
<b>HOOK VELCRO</b>		<b>HOOK VELCRO</b>	
17 2 FCS Channels (same surface) (Not targeting NOR/EDW) .....	... X ...	.....	
18 2 AAs, RGAs (Not targeting EDW/NOR) .....	... X ...	.....	
<b>OMS</b>			
19 Prplt Tank .....	... X ...	.....	.....X ①
20 Ignition (neither eng ignites).....	... X ...	.....	
21 Both OMS Eng fail.....	.....	.....	.....X ②
22 Prplt Lk after LAST LOS.....	perigee adjust		
<b>AFT RCS</b>			
23 2 jets, same direction, same pod .....	... X ...	.....	
24 Prplt Lk after LAST LOS.....	... X ...	.....	
25 1 AFT RCS PROP TK fail.....	... X ...	.....	
<b>COMM</b>			
26 MCC GO for DEORBIT not rcvd .....	.....	...X...	

① Stop Burn > OMS PRPLT FAIL HP (Ref: DEL PAD/BURN Card)  
② Stop Burn > OMS ENG FAIL HP (Ref: DEL PAD/BURN Card)

(reduced copy)

TOP  
BACK OF 'DEORBIT BURN FLIGHT RULES'

**DEORBIT BURN FLIGHT RULES**  
**ONE-ORBIT LATE NOT AVAILABLE** ENT-1b/D/K

FAILURE	PRE TIG	POST TIG
	Delay (max)	Stop Burn, > Safe HP
	One Day	
<b>APU/HYD</b>		
1 No APU operating .....	..... X .....	
<b>DPS</b>		
2 RDNT fail, Split.....	..... X .....	.....X
3 1 GPC.....	..... X .....	
4 BFS.....	..... X .....	
5 GPC BITE (Multiple GPCs) .....	..... X .....	
<b>ECLS</b>		
6 2 Av Bay Fans in Bay 3 .....	..... X .....	
7 2 Av Bay Fans in Bay 1 or 2.....	..... X .....	
<b>ELEC</b>		
8 H2 Manf or TK leak (not in depleted tk(s) _____).....	..... X .....	
9 2 MN Buses.....	..... X .....	.....X
10 CNTL CA1 (No BFS Engage in GPC 3/5) .....	..... X .....	
11 Multi $\Phi$ AC BUS (unshorted) .....	..... X .....	
<b>GNC</b>		
12 1 MLS (if reqd), IMU, or TACAN (C-band/GPS redun not avail) .....	..... X .....	
13 IMU Dilemma.....	..... X .....	.....X
14 RHC Dilemma .....	..... X .....	
15 2 IMUs (Not targeting EDW/NOR) .....	..... X .....	
16 2 ADTAs (Winds>80kts or Dynamic Wx) .....	..... X .....	
<b>HOOK VELCRO</b>		
17 2 FCS Channels (same surface) (Not targeting NOR/EDW) .....	..... X .....	
18 2 AAs, RGAs (Not targeting EDW/NOR) .....	..... X .....	
<b>OMS</b>		
19 Prplt Tank .....	..... X .....	.....X ①
20 Ignition (neither eng ignites).....	..... X .....	
21 Both OMS Eng fail.....	..... X .....	.....X ②
22 Prplt Lk after LAST LOS.....	perigee adjust	
<b>AFT RCS</b>		
23 2 jets, same direction, same pod .....	..... X .....	
24 Prplt Lk after LAST LOS.....	..... X .....	
25 1 AFT RCS PROP TK fail.....	..... X .....	
<b>COMM</b>		
26 MCC GO for DEORBIT not rcvd .....	..... X .....	

① Stop Burn > OMS PRPLT FAIL HP (Ref: DEL PAD/BURN Card)  
② Stop Burn > OMS ENG FAIL HP (Ref: DEL PAD/BURN Card)

(reduced copy)

FAB USE ONLY

CC 8-3

ENT/ALL/GEN G

TOP

HOOK  
VELCRO

DEORBIT  
BURN  
(RCS)

HOOK  
VELCRO

√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 (No Deorbit > TIG +  :  )  
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  
\* STOP BURN:  
\* SAFE  APU<sub>s</sub> – SHUT DN  
\* HP -----  
\* CONTINUE BURN:  
\* 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:**

\* STOP BURN:  
\* SAFE  APU<sub>s</sub> – SHUT DN  
\* HP -----  
\* CONTINUE BURN:  
\* ITEM 18 +0 EXEC  
\* **G23** Resel jets

ENT-3a/D/L

HINGE

(reduced copy)

FAB USE ONLY

CC 8-4

ENT/ALL/GEN G

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

\* **RCS COMPLETION:**

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

\* At AFT QTY 1 If CUR HP: THC +X to CAPTURE HP or  
TOT AFT QTY 2   % then  
PREBANK/FRCS COMPLETION  
to downrange site

\* CAPTURE HP   PREBANK/FRCS COMPLETION  
to downrange site

\* PREBANK/FLIP HP   PREBANK/FRCS COMPLETION

\* AFT HP   THC +X to TGT HP

\* TGT HP

\* **FRCS COMPLETION** (if applicable):

\* MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)

\* THC -X to TGT HP 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)

ENT-3aa/D/M

(reduced copy)

FAB USE ONLY

CC 8-5

ENT/ALL/GEN G,4



TOP  
 BACK OF 'DEORBIT BURN (RCS)'



**HOOK  
 VELCRO**

**HOOK  
 VELCRO**



HINGE

ENT-3b/D/E

(reduced copy)  
 CC 8-6

FAB USE ONLY

ENT/ALL/GEN G







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



ENT-3bb/D/E



FAB USE ONLY

(reduced copy)  
CC 8-7

ENT/ALL/GEN G



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

\* **RCS COMPLETION:**

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

\* At AFT QTY 1 If CUR HP: THC +X to CAPTURE HP or  
TOT AFT QTY 2   % then  
PREBANK/FRCS COMPLETION  
to downrange site

\* CAPTURE HP   PREBANK/FRCS COMPLETION  
to downrange site

\* PREBANK/FLIP HP   PREBANK/FRCS COMPLETION

\* AFT HP   THC +X to TGT HP

\* TGT HP

\* **FRCS COMPLETION (if applicable):**

\* MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)

\* THC -X to TGT HP 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)

ENT-4aa/D/K

(reduced copy)

FAB USE ONLY

CC 8-9

ENT/ALL/GEN G,4

TOP  
BACK OF 'DEORBIT BURN (2 ENG)'

<b>HOOK VELCRO</b>	<b>DEORBIT BURN (1 ENG)</b>	<b>HOOK VELCRO</b>
------------------------	---------------------------------	------------------------

√MM302    √OMS L or R  
 √OMS BURN CONFIG (L or R XFEED)  
 Enter TGO + 10 sec  
 √TRIM per MNVR PAD or P +0.0, 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  
 Good OMS ENG – ARM/PRESS  
 EXEC (NO EXEC > TIG +  :  )  
 - :15 If OMS AFT QTY < 11%, THC +X to OMS IGN + 1 sec  
 - :15 TIG Start watch (√P<sub>C</sub>, ΔVTOT, ENG VLVs)  
 :00  
 \* If no OMS ignition: APUs – SHUT DN \*  
 OMS XFEED RETURN at ΔVTOT =     
 or    at   %  
 L,R OMS TK ISOL (four) – OP  
 XFEED (four) – CL

```

* OMS PRPLT FAIL:
* OMS ENG – OFF
* STOP BURN:
* APUs – SHUT DN
SAFE   -----
HP 
* CONTINUE BURN:
* Secure aff OMS
* ITEM 18 +Q EXEC
* √ADI – LVLH, center needles
* Interconnect good OMS to RCS
* THC +X(√OMS% vs RCS Burn Time)
* AFT RCS RECONFIG
* RCS COMPLETION
* OMS ENG FAIL:
* OMS ENG – OFF
* STOP BURN:
* APUs – SHUT DN
ENG    -----
FAIL   
HP 
* CONTINUE BURN:
* √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:
* STOP BURN:
* APUs – SHUT DN
SAFE   -----
HP 
* CONTINUE BURN:
* ITEM 18 +Q EXEC
*  Resel jets
  
```

ENT-4b/D/J

HINGE

(reduced copy)

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

\* **RCS COMPLETION:**

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

\* At AFT QTY 1 If CUR HP: THC +X to CAPTURE HP or  
TOT AFT QTY 2   % then  
PREBANK/FRCS COMPLETION  
to downrange site

\* CAPTURE HP   PREBANK/FRCS COMPLETION  
to downrange site

\* PREBANK/FLIP HP   PREBANK/FRCS COMPLETION

\* AFT HP   THC +X to TGT HP

\* TGT HP

\* **FRCS COMPLETION (if applicable):**

\* MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)

\* THC -X to TGT HP 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)

ENT-4bb/D/L

(reduced copy)

FAB USE ONLY

CC 8-11

ENT/ALL/GEN G,4



TOP  
HINGED AT BOTTOM OF 'UNBALANCED PRPLT DEORBIT BURN'  
HINGE

\* **OMS PRPLT FAIL:**

Failed OMS ENG – OFF

STOP BURN:

Good OMS ENG – OFF  
APUs – SHUT DN  
Secure aff OMS

L OMS FAIL HP	R OMS FAIL HP								
<table border="1" style="width: 100%; height: 20px;"> <tr><td style="width: 25%;"></td><td style="width: 25%;"></td><td style="width: 25%;"></td><td style="width: 25%;"></td></tr> </table>					<table border="1" style="width: 100%; height: 20px;"> <tr><td style="width: 25%;"></td><td style="width: 25%;"></td><td style="width: 25%;"></td><td style="width: 25%;"></td></tr> </table>				

CONTINUE BURN:

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

Both ENG FAIL HP	Either PRPLT FAIL (SAFE) HP								
<table border="1" style="width: 100%; height: 20px;"> <tr><td style="width: 25%;"></td><td style="width: 25%;"></td><td style="width: 25%;"></td><td style="width: 25%;"></td></tr> </table>					<table border="1" style="width: 100%; height: 20px;"> <tr><td style="width: 25%;"></td><td style="width: 25%;"></td><td style="width: 25%;"></td><td style="width: 25%;"></td></tr> </table>				

STOP BURN:

APUs – SHUT DN

CONTINUE BURN:

√ADI – LVLH, center needles  
Interconnect good OMS to RCS  
THC +X (√OMS% vs RCS Burn Time)  
RCS I'CNCT TK SW (N/A PRPLT FAIL)  
THC +X (√OMS% vs RCS Burn Time)  
AFT RCS RECONFIG  
RCS COMPLETION

\* **FRCS COMPLETION:**

THC +X to TGT HP or TOT AFT QTY 1 

--	--	--	--

 %

At AFT QTY 1 THC +X to CAPTURE HP or TOT AFT QTY 2 

--	--	--	--

 %

If CUR HP: then PREBANK/FRCS COMPLETION to downrange site

CAPTURE HP 

--	--	--	--

 PREBANK/FRCS COMPLETION to downrange site

PREBANK/FLIP HP 

--	--	--	--

 PREBANK/FRCS COMPLETION

AFT HP 

--	--	--	--

 THC +X to TGT HP

TGT HP 

--	--	--	--

\* **FRCS COMPLETION (if applicable):**

MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)

THC -X to TGT HP 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)

ENT-5aa/D/O

(reduced copy)

FAB USE ONLY

CC 8-13

ENT/ALL/GEN G,4





TOP  
HINGED AT BOTTOM OF 'DEORBIT BURN (MIXED XFEED)'  
HINGE

\* **OMS PRPLT FAIL:**

\* OMS ENG - OFF

\* SAFE     
\* HP

STOP BURN:  
APUs - SHUT DN  
Secure L,R OMS

CONTINUE BURN:  
Secure L,R OMS  
ITEM 18 +Q EXEC  
√ADI - LVLH, center needles  
RCS COMPLETION

\* **OMS ENG FAIL:**

\* OMS ENG - OFF

\* ENG     
\* FAIL     
\* HP

STOP BURN:  
APUs - SHUT DN

CONTINUE BURN:  
Man repress L,R OMS > L,R RCS TK Ps  
FEED FROM GOOD POD:  
 OMS HE PRESS/VAP ISOL (two) - OP  
 TK ISOL (two) - OP  
 OMS XFEED (two) - CL  
L,R RCS XFEED (four) - OP  
 TK ISOL (six) - CL  
√ADI - LVLH, center needles  
THC +X (√Lowest OMS % vs RCS Burn Time)  
AFT RCS RECONFIG  
RCS COMPLETION

\* **RCS +X JET FAIL OFF:**

\* SAFE     
\* HP

STOP BURN:  
APUs - SHUT DN

CONTINUE BURN:  
ITEM 18 +Q EXEC  
 Resel jet

\* **RCS COMPLETION:**

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

\* At AFT QTY 1 THC +X to CAPTURE HP or TOT AFT QTY 2   %  
\* If CUR HP: then PREBANK/FRCS COMPLETION to downrange site

\* CAPTURE HP   PREBANK/FRCS COMPLETION to downrange site

\* PREBANK/FLIP HP   PREBANK/FRCS COMPLETION

\* AFT HP   THC +X to TGT HP

\* TGT HP

\* **FRCS COMPLETION (if applicable):**

\* MNVR to -X Att (pitch up at 3°/sec to VGOz = +1/4 ΔVTOT)  
\* THC -X to TGT HP or FRCS depletion (JETS FAIL OFF)

CUTOFF VGOx = 0, Release THC  
+ :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)

ENT-5bb/D/K

(reduced copy)

FAB USE ONLY

CC 8-15

ENT/ALL/GEN G,4

TOP

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

ENT-6a/E/O

PILE VELCRO

PILE VELCRO

PILE VELCRO

PILE VELCRO

(reduced copy)

FAB USE ONLY

CC 8-16

ENT/ALL/GEN G,7

TOP  
BACK OF 'ENTRY MANEUVERS'

HOOK  
VELCRO

FLIGHT CONDITIONS	MANEUVER
V = 7K	√TACAN status * If ELS: UHF MODE - G T/R *
V = 5K	ADTA PROBES - DEPLOY (√HEAT) Begin ALL and RUD trim monitoring
M = 3.5	If previous OMS OX TK, He TK, or RCS OX TK leak: [GSI] VENT DOOR CNTL OPEN - ITEM 43 EXEC
M = 2.7	√APUs HUD PWR (two) - ON
* If M < 2.5, P CSS for ADTA to G&C incorp *	
M = 2.0	Ensure ADTA to G&C else √Theta limits
M < 1.0	√R FLT CNTLR - ON P,R/Y - CSS as reqd √SPDBK CMD vs POS √NWS - 1 Lock Inertia Reels MAX Nz <input type="text"/> . <input type="text"/> <input type="text"/>
M = 0.7	√LG EXT 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 <sup>+</sup> 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, POST LANDING PROCEDURES

HOOK  
VELCRO

DRAG CHUTE DEPLOY	
MCC Call	Flight Condition
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	

HOOK  
VELCRO

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	/

HOOK  
VELCRO

ENT-6b/E/W

(reduced copy)

FAB USE ONLY

CC 8-17

ENT/ALL/GEN G,7

TOP

HOOK  
VELCRO

HOOK  
VELCRO

**ENTRY NO-GO CHECKLIST**

FAILURE OF:	AERO PTI DTO	AUTO FCS MODE	XWIND DTC (1)
APU/HYD: 1 APU.....			X
2 APUs.....	X		X
DISPLAYS: 2 ADIs.....	X		
CDR HUD.....			X (2)
<b>CONTROLLERS</b>			
RHC: 1L.....			X
2L & 2R.....	X		X
RPTA: 2L or 2R.....	X		X
GNC: 2 AAs (LAT).....	X		X
2 AAs (NORM).....	X (M < 2.5)	X (3)	
2 RCSs.....			X
2 R ODU PWR SPLY.....			X
2 IMU (or 1 IMU + BITE).....	X		X
2 ADTAs.....			X
ADTA NOT INCORP.....			X (M < 2)
OR DLMA.....	X (M < 2)		X (-6K ft)
MLS NOT INCORP.....	X		X
2 FCS CH (same surface).....	X		X (4)
EPS: 1 GPC (not resting).....			X (4)
2 GPC (resting).....	X		X (4)
2 GPC (not resting).....	X	X (4)	X (4)
1 FF.....			X (4)
2 FF.....	X	X (4)	X (4)
2 FA.....	X		X
RCS: LEAK (AFT - during ENT).....	X		
2 YAW JETs (same side).....	X		
MIN RCS QTY.....	X		
TRIM: AI > ± 2.0 deg.....	X		
<b>DOWNMODE:</b>			
FCS problem.....	X	X	X
AOA.....	X		X
PLB: PLBD Latch Gng.....	X		
<b>LDG/DECEL</b>			
Tire Leak.....			X
HYD BRAKE ISCL VLV.....			X
< 100% Brakes.....			X
NWS.....			X
<b>ENERGY - OFF NOMINAL:</b>			
Roll Ref Alert.....	X		
Above Upper Traj Line.....	X		
MCC GCA or VEL & PSN update.....	X		
No AI by 6K ft.....	X		
<b>DATA: SOLID STATE RECORDERS: X (LOS)</b>			
<b>XWIND:</b>			
< 10 Knots Peak.....			X
> 15 Knots Peak.....			X
> 10 Knots Gust.....			X
<b>GROUND SYSTEMS:</b>			
No Runway Aim Point.....			X

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

HOOK  
VELCRO

HOOK  
VELCRO

HOOK  
VELCRO

HOOK  
VELCRO

ENT-7a/EK

- NOTES**
- ① Consider runway redesignation (M > 6) to avoid Xwind landing
  - ② GO if PAPI and BALL BAR available
  - ③ Pitch AUTO mode NO-GO for M < 2.5
  - ④ GO if only string 4 affected

(reduced copy)

FAB USE ONLY

CC 8-18

ENT/ALL/GEN G,1

TOP  
BACK OF 'ENTRY NO-GO CHECKLIST'

HOOK  
VELCRO

- BAILOUT  
MODE 8**
- REPORT POSITION  
 $\sqrt{MACH} < 1.0$   
 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

- POST LANDING  
MODE 5**
- TABS - RELEASE  
 VISOR - CLOSE/LOCK  
 SUIT O2 - ON  
 GREEN APPLE - PULL  
 KNEEBOARDS - REMOVE  
 COOLING - DISCONNECT  
 SEAT RESTRAINT - RELEASE  
 PARACHUTE (four) - RELEASE  
 COMM - DISCONNECT  
 (G-SUIT CLIP - PULL)  
 SUIT O2 - DISCONNECT  
 PLT - EMER PWR DOWN  
 EGRESS SEAT  
 SLIDE/ESCAPE PANEL

HOOK  
VELCRO

HOOK  
VELCRO

**ADTA MGMT**

		NAV		G&C
		RATIO > 1		
RATIO < 1		IF BAD ADTA	IF BAD NAV STATE	Two or more good ADTAs
COMM OK	MCC: AUTO or INH*	MCC: INH	MCC: FORCE	Evaluate h,α,M MCC: AUTO (G&C)
NO COMM	AUTO	TACAN OK	NO TACAN	Evaluate h,α,M if reasonable: AUTO (G&C)
		INH	ADTA ERRATIC ADTA STEADY FORCE	

\*(If ADTA H will degrade NAV state)

V = 6K

**NO COMM TACAN MGMT**

RATIO < 1	RATIO > 1		ONE TACAN LOCKED	NO LOCK
AUTO	TROUBLESHOOT	BELOW V = 5.5K	DESELECT MISSING TACANS, then - AUTO	BELOW V = 5.5K Select Alternate TACAN [GSO] ITEM 5 EXEC
	IF BAD TACAN AUTO	IF BAD NAV STATE If 1st acq - FORCE If NOT - ZERO Δ STATE		

**NAV DELTA PAD**

ΔX 10	( )						
ΔY 11	( )						
ΔZ 12	( )						
ΔX 13	( )						
ΔY 14	( )						
ΔZ 15	( )						

For Δ STATE UPDATES (on MCC call):  
 P, R/Y - CSS  
 DRAG H, TACAN, ADTA - INH  
 On MCC call, back to AUTO

HOOK  
VELCRO

ENT-7b/E/R

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FAB USE ONLY

CC 8-19

ENT/ALL/GEN G,2



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FAB USE ONLY

8-20

ENT/ALL/GEN G,1



FAB USE ONLY

CC 8-21

ENT/ALL/GEN G

(reduced copy)

TOP

**ENTRY CONTROL**

**ARCS QTY (L + R) < 10 %**

ARCS QTY = 0 & JETS FAIL OFF	1. ENTRY MODE – NO Y JET (R/Y CSS; expect sluggish control)
$\bar{q} \geq 20$ & $M > 6$	2. <b>G51</b> ELEVON FIXED – ITEM 18 EXEC (*)
CONTROL PROBLEMS* & ARCS QTY > 0	3. ENTRY MODE – AUTO When control regained: 4. ENTRY MODE – NO Y JET 5. $\sqrt{}$ AIL trim
$M < 6$ & ARCS QTY > 0	6. ENTRY MODE – AUTO
$M < 5$	7. TRIM/RHC PNL – ENA 8. TRIM ROLL – away from AIL trim (to < 1)

\*Region of least margin: M 12-8

**AIL TRIM  $\geq 3^\circ$**

TAL	1. <b>G51</b> WRAP MODE – ITEM 45 EXEC (ACT)														
AIL trim = 5	2. BF – MAN 3. BF – UP (to 0%)														
NO Y JET	4. Perform roll reversals at 3°/s (expect sluggish control)														
$M < 13$ & AIL trim = 5	5. P – CSS 6. Fly $\alpha$ per schedule:														
	<table border="1"> <tr> <td>M</td> <td>12</td> <td>11</td> <td>10</td> <td>9</td> <td>8-6</td> <td>5</td> </tr> <tr> <td><math>\alpha</math></td> <td>37</td> <td>36</td> <td>35</td> <td>33</td> <td>30</td> <td>26</td> </tr> </table>	M	12	11	10	9	8-6	5	$\alpha$	37	36	35	33	30	26
M	12	11	10	9	8-6	5									
$\alpha$	37	36	35	33	30	26									
$M < 5$	7. TRIM/RHC PNL – ENA 8. TRIM ROLL – away from AIL trim (to < 1) 9. P – AUTO														
$M < 2$	10. BF – AUTO														

(Continued on back for 'HIGH-FREQ OSC OR SURF/JET CYCLE')

ENT-10a/A,E/B

HOOK VELCRO

HOOK VELCRO

HOOK VELCRO

HOOK VELCRO

TOP  
BACK OF 'ENTRY CONTROL'

HOOK  
VELCRO

HOOK  
VELCRO

**HIGH-FREQ OSC OR SURF/JET CYCLE**

Returning PL > 10K lb	1. <b>G51</b> √FILTER ALT – ITEM 21 (*)
	2. P, R/Y – CSS
Osc/Cycle continues	3. ENTRY MODE – LO GAIN
Osc/Cycle stops	4. ENTRY MODE – AUTO
	5. P, R/Y – AUTO

HOOK  
VELCRO

ENT-10b/A,E/B

HOOK  
VELCRO

FAB USE ONLY

(reduced copy)  
CC 8-22

ENT/ALL/GEN G





Replace this page with page(s) from Flight Supplement



FAB USE ONLY

8-23

ENT/ALL/GEN G





Replace this page with page(s) from Flight Supplement



FAB USE ONLY

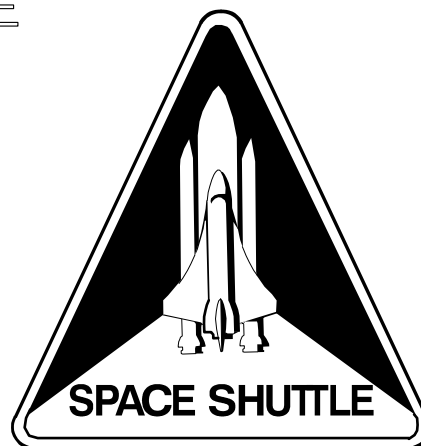
8-24

ENT/ALL/GEN G



Space Shuttle Program  
FLIGHT DATA FILE

JSC-48019  
GENERIC, REV G



**ENTRY  
CHECKLIST**

**STS  
ALL**

Flight Cover (trim bottom to expose tabs)