

Entry Checklist

STS-117 Flight Supplement

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

**Final
December 8, 2006**

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



MISSION OPERATIONS DIRECTORATE

**ENTRY CHECKLIST
STS-117 FLIGHT SUPPLEMENT**

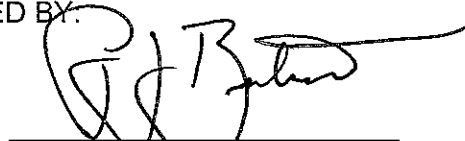
FINAL
December 8, 2006

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Dynamics Branch

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

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

| |
|-----------------------------|
| Incorporates the following: |
| 482#: ENT FS-0001 |

AREAS OF TECHNICAL RESPONSIBILITY

| | | |
|---|----------------------|--------------|
| Book Manager | DM43/G. Jordan-Moore | 281-483-1261 |
| Deorbit Burn to Entry Interface | DM43/J. Patterson | 281-483-1987 |
| Contingency Procedures and Entry Interface thru Rollout | DM43/J. Patterson | 281-483-1987 |

NOTE

This Flight Supplement must be integrated into the generic Entry Checklist to have a complete document for flight. Insert the Flight Supplement (FS) pages in the proper numerical order in the generic Entry Checklist by using the List of Effective Pages (LOEP) which provides the sequence for merging pages to create a complete Entry Checklist.

ENTRY CHECKLIST
STS-117 FLIGHT SUPPLEMENT

LIST OF EFFECTIVE PAGES

FINAL 12/08/06

| | | | | |
|------------------|---|---------|--------------|---------|
| Sign Off | * | generic | 3-9..... | generic |
| ii..... | * | generic | 3-10..... | generic |
| Sign Off | * | 117/FIN | 3-11..... | generic |
| FS iv..... | * | 117/FIN | 3-12..... | generic |
| v..... | * | generic | 3-13..... | generic |
| vi..... | * | generic | 3-14..... | generic |
| vii..... | * | generic | 3-15..... | generic |
| viii..... | * | generic | 3-16..... | generic |
| ix..... | * | generic | 3-17..... | generic |
| x..... | * | generic | 3-18..... | generic |
| FS xi..... | * | 117/FIN | 3-19..... | generic |
| FS xii..... | * | 117/FIN | 3-20..... | generic |
| FS xiii..... | * | 117/FIN | 3-21..... | generic |
| FS xiv..... | * | 117/FIN | 3-22..... | generic |
| xv..... | | generic | 3-23..... | generic |
| xvi..... | | generic | 3-24..... | generic |
| 1-1 (3 pgs)..... | † | generic | 3-25..... | generic |
| 1-2 (3 pgs)..... | † | generic | 3-26..... | generic |
| 2-1..... | | generic | 3-27..... | generic |
| 2-2 (6 pgs)..... | † | generic | 3-28..... | generic |
| 2-3 (6 pgs)..... | † | generic | FS 3-29..... | 117/FIN |
| 2-4..... | | generic | FS 3-30..... | 117/FIN |
| FS 2-5..... | | 117/FIN | 3-31..... | generic |
| FS 2-6..... | | 117/FIN | 3-32..... | generic |
| FS 3-1..... | | 117/FIN | FS 3-33..... | 117/FIN |
| FS 3-2..... | | 117/FIN | FS 3-34..... | 117/FIN |
| FS 3-3..... | | 117/FIN | 3-35..... | generic |
| FS 3-4..... | | 117/FIN | 3-36..... | generic |
| 3-5..... | | generic | 3-37..... | generic |
| 3-6..... | | generic | 3-38..... | generic |
| 3-7..... | | generic | 3-39..... | generic |
| 3-8..... | | generic | 3-40..... | generic |

* – Omit from flight book

† – Extra pages in crew copy only

| | | | |
|--------------|---------|------------------|---------|
| 3-41..... | generic | FS 5-19..... | 117/FIN |
| 3-42..... | generic | FS 5-20..... | 117/FIN |
| 3-43..... | generic | 5-21..... | generic |
| 3-44..... | generic | 5-22..... | generic |
| 4-1..... | generic | 5-23..... | generic |
| 4-2..... | generic | 5-24..... | generic |
| 4-3..... | generic | 6-1..... | generic |
| 4-4..... | generic | 6-2..... | generic |
| 4-5..... | generic | 6-3..... | generic |
| 4-6..... | generic | 6-4..... | generic |
| FS 4-7..... | 117/FIN | 7-1.....* | generic |
| FS 4-8..... | 117/FIN | 7-2.....* | generic |
| 4-9..... | generic | 8-1.....* | generic |
| 4-10..... | generic | CC 8-2.....* | generic |
| FS 4-11..... | 117/FIN | CC 8-3.....* | generic |
| FS 4-12..... | 117/FIN | CC 8-4.....* | generic |
| 4-13..... | generic | CC 8-5.....* | generic |
| 4-14..... | generic | CC 8-6.....* | generic |
| 4-15..... | generic | CC 8-7.....* | generic |
| 4-16..... | generic | CC 8-8.....* | generic |
| 5-1..... | generic | CC 8-9.....* | generic |
| 5-2..... | generic | CC 8-10.....* | generic |
| 5-3..... | generic | CC 8-11.....* | generic |
| 5-4..... | generic | CC 8-12.....* | generic |
| 5-5..... | generic | CC 8-13.....* | generic |
| 5-6..... | generic | CC 8-14.....* | generic |
| 5-7..... | generic | CC 8-15.....* | generic |
| 5-8..... | generic | CC 8-16.....* | generic |
| 5-9..... | generic | CC 8-17.....* | generic |
| 5-10..... | generic | CC 8-18.....* | generic |
| 5-11..... | generic | CC 8-19.....* | generic |
| 5-12..... | generic | 8-20.....* | generic |
| 5-13..... | generic | CC 8-21.....* | generic |
| 5-14..... | generic | CC 8-22.....* | generic |
| 5-15..... | generic | FS CC 8-23.....* | 117/FIN |
| 5-16..... | generic | FS CC 8-24.....* | 117/FIN |
| 5-17..... | generic | | |
| 5-18..... | generic | | |

* – 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 | generic |
| (Back)..... | CC 8-3 | generic |
| DEORBIT BURN (RCS) | | |
| (Front) | CC 8-4 | generic |
| (Back)..... | CC 8-6 | generic |
| DEORBIT BURN (2 ENG) | | |
| (Front) | CC 8-8 | generic |
| DEORBIT BURN (1 ENG) | | |
| (Back)..... | CC 8-10 | generic |
| UNBALANCED PRPLT | | |
| DEORBIT BURN | | |
| (Front) | CC 8-12 | generic |
| DEORBIT BURN (MIXED | | |
| XFEED) (Back)..... | CC 8-14 | generic |
| ENTRY MANEUVERS | | |
| (Front) | CC 8-16 | generic |
| (Back)..... | CC 8-17 | generic |
| ENTRY NO-GO CHECKLIST | | |
| (Front) | CC 8-18 | generic |
| ADTA MGMT (Back) | CC 8-19 | generic |
| ENTRY CONTROL | | |
| (Front) | CC 8-21 | generic |
| (Back)..... | CC 8-22 | generic |
| DEORBIT BURN MONITOR | | |
| (Front) | FS CC 8-23 | ENT-2a/117/A,O,D,E/A |
| OMS FAILURES (Back) | FS CC 8-24 | ENT-2b/117/A,O,D,E/A |



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OMS/
RCS ΔV

OMS/RCS ΔV

FS 2-5

ENT/117/FIN



OMS He PRESS/ Δ V/BURN TIME

OMS/
RCS Δ V

| OMS% GAGE | OMS He Press * | OMS Δ V | RCS Δ V | RCS BURN MIN:SEC |
|--------------|-------------------|-------------------|-------------------|---------------------|
| 50 | 3260 | 284 | 236 | 7:18 |
| 40 | 2860 | 222 | 185 | 5:43 |
| 38 | 2780 | 210 | 175 | 5:23 |
| 36 | 2700 | 197 | 164 | 5:04 |
| 34 | 2620 | 185 | 154 | 4:45 |
| 32 | 2540 | 172 | 144 | 4:26 |
| 30 | 2460 | 160 | 134 | 4:07 |
| 28 | 2380 | 147 | 123 | 3:48 |
| 26 | 2300 | 135 | 113 | 3:29 |
| 24 | 2220 | 122 | 103 | 3:10 |
| 22 | 2140 | 110 | 92 | 2:51 |
| 20 | 2060 | 97 | 82 | 2:32 |
| 18 | 1980 | 85 | 72 | 2:12 |
| 16 | 1900 | 72 | 61 | 1:53 |
| 14 | 1820 | 59 | 50 | 1:33 |
| 12 | 1740 | 47 | 40 | 1:14 |
| 10 | 1660 | 34 | 29 | 0:54 |
| 8 | 1580 | 22 | 18 | 0:34 |
| 6 | 1500 | 9 | 8 | 0:15 |
| 5 | 1460 | 3 | 2 | 0:05 |

* He pressure not valid until 1 hr after last burn

| ΔV CAPABILITY | |
|--|--|
| ARCS Δ V fps = | $\boxed{0.9} \times [L\% + R\% - \text{AFT QTY } 1]$ |
| FRCS Δ V fps = | $\boxed{1.0} \times \text{FRCS } \%$ |
| OMS Δ V fps = | $\boxed{6.2} \times \text{OMS } \%$ |

NOTE: Uses assumed vehicle weight of 212,175 lb



DEORBIT BURN

DEORBIT
BURN



FS 3-1

ENT/117/FIN

**STS-117 LANDING SITE TABLE
(50° to 63.5° INCLINATION)**

**DEORBIT
BURN**

| S I T E | LOCATION | RWY | TACANS | | MLS CH | LG | + OVR RUN |
|------------------|---------------|--------------------|----------|-----------|-----------|----------------|-----------------|
| | | | | ITEM 5 | | | |
| 1 | KSC | KSC 15 KSC 33 | TTS 59Y | COF 97 | 8 6 | 15000 15000 | 1000 1000 |
| 2 | BEN GUERIR | BEN 36 BEN 18 | MAK 80 ■ | CBA 116 ■ | - - | 13720 13220 | 0 1000 |
| 3 | MORON AB | MRN 20 MRN 02 | MRN 100 | AOG 23 | ◆6 - | 11730 11730 | 1000 1000 |
| 4 | ZARAGOZA | ZZA 30L ZZA 12R | ZZA 64 | ZAR 77 ■ | ◆6 - | 12200 12200 | 1000 1010 |
| 5 | MYRTLE BEACH | MYR 36 MYR 18 | ILM 117 | FLO 99 | - - | 9500 9500 | 1000 1000 |
| 6 | WILMINGTON | ILM 06 ILM 24 | ILM 117 | DIW 107 ■ | - - | 7500 7500 | 0 0 |
| 7 | CHERRY POINT | NKT 32L NKT 23R | EWN 83 ■ | NCA 101 | - - | 7110 7100 | 800 880 |
| 8 | OCEANA NAS | NTU 32R NTU 23L | NGU 48 | ORF 116 | - - | 7500 11500 | 0 0 |
| 9 | WALLOPS | WAL 28 WAL 04 | SBY 49 | SWL 71 | - - | 7510 8750 | 0 0 |
| 10 | DOVER AFB | DOV 32 DOV 19 | SIE 95 | CYN 81 | - - | 12400 9100 | 0 0 |
| 11 | ATLANTIC CITY | ACY 31 ACY 13 | CYN 81 | SIE 95 | - - | 9500 9500 | 0 0 |
| 12 | BEN GUERIR | BEN 36 BEN 18 | MAK 80 ■ | CBA 116 ■ | - - | 13720 13220 | 0 1000 |
| 13 | *MORON AB | MRN 20 MRN 02 | MRN 100 | AOG 23 | ◆6 - | 11730 11730 | 1000 1000 |
| 14 | *ZARAGOZA | ZZA 30L ZZA 12R | ZZA 64 | ZAR 77 ■ | ◆6 - | 12200 12200 | 1000 1010 |
| 15 | GABRESKI | FOK 06 FOK 24 | HTO 83 | GON 45Y ■ | - - | 8500 8500 | 1000 1000 |

◆ Available for TAL Only

* LO XRNG TAL Site

■ DME

Length after displaced threshold

**STS-117 LANDING SITE TABLE
(50° to 63.5° INCLINATION)**

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

◆ Available for TAL Only

■ DME

Length after displaced threshold

**STS-117 LANDING SITE TABLE
(50° to 63.5° INCLINATION)**

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

† MSBLS Jr. Ch 8 - Requires Uplink

■ DME

Length after displaced threshold

DEORBIT BURN MONITOR

| | | | | | | | | | | |
|---|--|--|--|--------------------------------|---|-----|--|--------------|----------------|--|
| OMS TEMP* FU IN P \geq <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 50px;">L</td> <td style="width: 50px;">R</td> </tr> <tr> <td style="text-align: center;">230</td> <td style="text-align: center;">230</td> </tr> <tr> <td style="text-align: center;">214</td> <td style="text-align: center;">212</td> </tr> </table> or No FU IN P | L | R | 230 | 230 | 214 | 212 | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50px;">Oms Eng Fail</td> </tr> <tr> <td>Oms PRPLT Fail</td> </tr> </table> | Oms Eng Fail | Oms PRPLT Fail | |
| L | R | | | | | | | | | |
| 230 | 230 | | | | | | | | | |
| 214 | 212 | | | | | | | | | |
| Oms Eng Fail | | | | | | | | | | |
| Oms PRPLT Fail | | | | | | | | | | |
| OMS PC* & OMS ↓ (BFS: √accel) ENG VLV 1 or 2 < 70 or OX IN P > 227 OX IN P ≤ 227 or No OX IN P | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50px;">Oms Eng Fail</td> </tr> <tr> <td>Oms PRPLT Fail</td> </tr> </table> | Oms Eng Fail | Oms PRPLT Fail | | | | | | | |
| Oms Eng Fail | | | | | | | | | | |
| Oms PRPLT Fail | | | | | | | | | | |
| OMS OX/FU TK P (√ENG IN P) OX/FU LOW OX & FU HIGH | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50px;">He PRESS/VAP ISOL (two) – OP If aff TK P not incr: He PRESS/VAP ISOL (two) – CL At PC < 72 or OMS TEMP: Oms PRPLT Fail</td> </tr> <tr> <td>He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284</td> </tr> </table> | He PRESS/VAP ISOL (two) – OP If aff TK P not incr: He PRESS/VAP ISOL (two) – CL At PC < 72 or OMS TEMP: Oms PRPLT Fail | He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284 | | | | | | | |
| He PRESS/VAP ISOL (two) – OP If aff TK P not incr: He PRESS/VAP ISOL (two) – CL At PC < 72 or OMS TEMP: Oms PRPLT Fail | | | | | | | | | | |
| He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284 | | | | | | | | | | |
| OMS GMBL PRI fail SEC fail | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50px;">L(R) Oms GMBL – SEC (twice)</td> </tr> <tr> <td>If high RCS usage: Oms Eng Fail</td> </tr> </table> | L(R) Oms GMBL – SEC (twice) | If high RCS usage: Oms Eng Fail | | | | | | | |
| L(R) Oms GMBL – SEC (twice) | | | | | | | | | | |
| If high RCS usage: Oms Eng Fail | | | | | | | | | | |
| GPC 1(4) & Burning Oms aff SEC GMBL lost 2 FAs lost | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50px;">aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF, ON L(R) Oms GMBL – SEC (twice)</td> </tr> <tr> <td>If high RCS usage: Oms Eng Fail</td> </tr> <tr> <td>√MAN SHUTDN</td> </tr> </table> | aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF, ON L(R) Oms GMBL – SEC (twice) | If high RCS usage: Oms Eng Fail | √MAN SHUTDN | | | | | | |
| aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF, ON L(R) Oms GMBL – SEC (twice) | | | | | | | | | | |
| If high RCS usage: Oms Eng Fail | | | | | | | | | | |
| √MAN SHUTDN | | | | | | | | | | |
| I/O ERROR FA 1(4) 2 FAs lost | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50px;">L(R) Oms GMBL – SEC</td> </tr> <tr> <td>I/O RESET (if recov: BFS I/O RESET) If high RCS usage: Oms Eng Fail</td> </tr> <tr> <td>√MAN SHUTDN</td> </tr> </table> | L(R) Oms GMBL – SEC | I/O RESET (if recov: BFS I/O RESET) If high RCS usage: Oms Eng Fail | √MAN SHUTDN | | | | | | |
| L(R) Oms GMBL – SEC | | | | | | | | | | |
| I/O RESET (if recov: BFS I/O RESET) If high RCS usage: Oms Eng Fail | | | | | | | | | | |
| √MAN SHUTDN | | | | | | | | | | |
| BCE STRG D 1(4) | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50px;">I/O RESET (if recov: >>)</td> </tr> <tr> <td>If high RCS usage: L(R) Oms GMBL – SEC (twice)</td> </tr> </table> | I/O RESET (if recov: >>) | If high RCS usage: L(R) Oms GMBL – SEC (twice) | | | | | | | |
| I/O RESET (if recov: >>) | | | | | | | | | | |
| If high RCS usage: L(R) Oms GMBL – SEC (twice) | | | | | | | | | | |
| RM DLMA IMU or GPC SET SPLIT or 2 MN BUSES HP ⇒ <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table> HP ⇒ | | | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50px;">STOP BURN: Oms Eng(s) – OFF >></td> </tr> <tr> <td>IMU DLMA: After C/O: √timer G21 If any IMU ACC > 0.03: aff IMU – desel I'cnct Oms to RCS (√RCS Burn Time) THC +X to TGT HP (EOM) or 3.5 x timer at C/O (AOA) SET SPLIT: Go to "GPC" above</td> </tr> </table> | STOP BURN: Oms Eng(s) – OFF >> | IMU DLMA: After C/O: √timer G21 If any IMU ACC > 0.03: aff IMU – desel I'cnct Oms to RCS (√RCS Burn Time) THC +X to TGT HP (EOM) or 3.5 x timer at C/O (AOA) SET SPLIT: Go to "GPC" above | | | | | |
| | | | | | | | | | | |
| STOP BURN: Oms Eng(s) – OFF >> | | | | | | | | | | |
| IMU DLMA: After C/O: √timer G21 If any IMU ACC > 0.03: aff IMU – desel I'cnct Oms to RCS (√RCS Burn Time) THC +X to TGT HP (EOM) or 3.5 x timer at C/O (AOA) SET SPLIT: Go to "GPC" above | | | | | | | | | | |
| I/O ERROR PCM | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50px;">OI PCMMU PWR – 2(1)</td> </tr> </table> | OI PCMMU PWR – 2(1) | | | | | | | | |
| OI PCMMU PWR – 2(1) | | | | | | | | | | |

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

ENT-2a/117/A,O,D,E/A

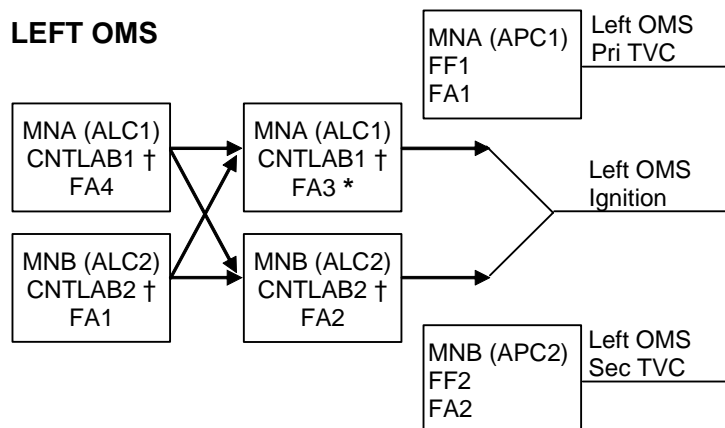
MS ONLY

FS 3-29

ENT/117/FIN

OMS FAILURES

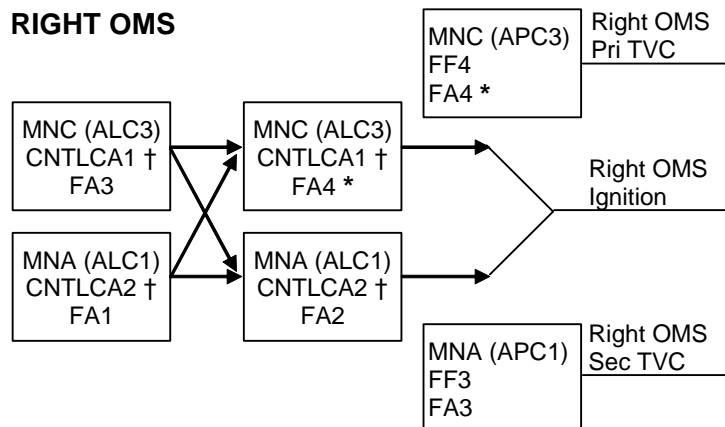
LEFT OMS



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

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

RIGHT OMS



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

ENT-2b/117/A,O,D,E/A

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

- * **UNDERBURN** *
- * Determine Δ HP (CUR HP – TGT HP) *
- * Record prebank on ENTRY MANEUVERS Cue Card *

| | | | | | | | | | |
|--|---|-----|-----|-----|-------------|-----|-----|------|---------|
| * PREBANK TABLE EDW (HA = 183 NM) * | | | | | | | | | |
| * EDW * | | | | | | | | | |
| Δ HP | 0 | 2 | 6 | 13 | REDES. | 14 | 15 | (16) | REDES. |
| PREBANK | 0 | 50 | 95 | 135 | NOR ELS | 145 | 160 | 175 | YR |
| * NOR | | | | | IF NOR NOGO | | | | |
| * <u>G50</u> ITEM 41+ <u>4</u> <u>2</u> , \sqrt RWY 17 SET TACAN tw (three) 121Y * | | | | | | | | | |
| Δ HP | | 11 | 12 | 14 | 15 | 16 | 17 | (18) | REDES. |
| PREBANK | | 110 | 115 | 130 | 135 | 145 | 160 | 170 | YR |
| * YR * | | | | | | | | | |
| * <u>G50</u> ITEM 41+ <u>2</u> <u>2</u> , \sqrt RWY 26 SET TACAN tw (three) 040X * | | | | | | | | | |
| Δ HP | | | | | | 17 | 20 | 24 | (26) 28 |
| PREBANK | | | | | | 80 | 95 | 125 | 145 180 |
| * PREBANK TABLE KSC (HA = 183 NM) * | | | | | | | | | |
| * KSC * | | | | | | | | | |
| Δ HP | 0 | 2 | 4 | 6 | 8 | 11 | 14 | (16) | REDES. |
| PREBANK | 0 | 50 | 75 | 95 | 105 | 120 | 145 | 175 | YQX |
| * YQX * | | | | | | | | | |
| * <u>G50</u> ITEM 41+ <u>2</u> <u>1</u> , \sqrt RWY 21 SET TACAN tw (three) 074X * | | | | | | | | | |
| Δ HP | | | | | | 17 | 22 | (25) | RED. |
| PREBANK | | | | | | 100 | 135 | 170 | INN |
| * INN * | | | | | | | | | |
| * <u>G50</u> ITEM 41+ <u>2</u> <u>6</u> , \sqrt RWY 06 SET TACAN tw (three) 080X * | | | | | | | | | |
| Δ HP | | | | | | | | | 26 28 |
| PREBANK | | | | | | | | | 135 180 |

1170CFR2

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

C CRT1 **GNC, OPS 303 PRO**

| | |
|-------------------------|-------------------------|
| 1: GNC DEORB MNVR COAST | 2: GNC DEORB MNVR COAST |
|-------------------------|-------------------------|

C CRT1 √Uplinked INRTL EI-5 MM303 ATT with DEL PAD

- * If no deorbit TGT uplink, enter INRTL EI-5 *
- * MM303 ATT from DEL PAD *
- * R – ITEM 24 + _____ *
- * P – ITEM 25 + _____ *
- * Y – ITEM 26 + _____ *

| Mnvr to EI-5 ATT – ITEM 27 EXEC (*) | TIME to EI (min) | LVLH PITCH (deg) |
|-------------------------------------|------------------|------------------|
| | 20 | 339 |
| | | 343 |
| | | 347 |
| * If UNDERBURN or no * | | 351 |
| * DEL PAD, manually * | | 355 |
| * mnvr to LVLH R 001, * | 15 | 359 |
| * Y 358, P per table * | | 3 |
| | | 7 |
| | | 11 |
| | | 15 |
| | 10 | 19 |
| | | 23 |
| | | 27 |
| | | 31 |
| | | 35 |
| | 5 | 39 |

C **OMS GMBL PWRDN (PASS ONLY)**

CRT1 Verify GMBL positions:

| | | |
|---|----------|----------|
| | <u>L</u> | <u>R</u> |
| P | +5.9 | +5.9 |
| Y | +6.4 | -6.4 |

GMBL OFF – ITEM 32 EXEC
– ITEM 33 EXEC



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MS ONLY

FS 4-7

ENT/117/FIN





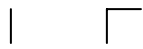
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MS ONLY

FS 4-8

ENT/117/FIN



ENTRY ALPHA

| VR | α_{ref} | R | H | Href | Rref |
|----|----------------|------------|-----|------|------|
| 25 | 40 | 4327 | 400 | | |
| 24 | HI | 40 LO 2586 | 249 | -47 | L79 |
| 23 | 43 | 40 37 2135 | 241 | -64 | 69 |
| 22 | 43 | 40 37 1791 | 235 | -83 | 63 |
| 21 | 43 | 40 37 1515 | 228 | -105 | 60 |
| 20 | 43 | 40 37 1294 | 221 | -122 | 58 |
| 19 | 43 | 40 37 1121 | 215 | -144 | 59 |
| 18 | 43 | 40 37 978 | 208 | -167 | 60 |
| 17 | 43 | 40 37 864 | 201 | -186 | 61 |
| 16 | 43 | 40 37 766 | 195 | -197 | 63 |

KSC 15

| MAX L/D | |
|---------|----------|
| M | α |
| 3 | 17 |
| 2 | 15 |
| 1 | 12 |

ASC-14b/117/A,E/A

(117 OCFR2 CY)

HOOK
VELCRO

HOOK
VELCRO

| | | | | | | | |
|-----|----|----|----|-----|-----|------|-----|
| 15 | 43 | 40 | 37 | 683 | 188 | -119 | 62 |
| 14 | 43 | 40 | 37 | 615 | 184 | -126 | 60 |
| 13 | 43 | 40 | 37 | 543 | 180 | -137 | 58 |
| 12 | 43 | 40 | 37 | 485 | 175 | -151 | 56 |
| 11 | 42 | 39 | 36 | 424 | 172 | -195 | R54 |
| 10 | 41 | 38 | 35 | 372 | 166 | -176 | 49 |
| 9 | 39 | 36 | 33 | 322 | 160 | -209 | 46 |
| 8 | 37 | 34 | 31 | 274 | 152 | -242 | 42 |
| 7 | 33 | 30 | 27 | 227 | 142 | -271 | 41 |
| 6 | 30 | 27 | 24 | 183 | 131 | -274 | L39 |
| 5 | 26 | 23 | 20 | 144 | 119 | -272 | 39 |
| 4 | 23 | 20 | 18 | 106 | 104 | -264 | 40 |
| 3 | 19 | 16 | 15 | 74 | 90 | -248 | R37 |
| 2.5 | 15 | | | 61 | 83 | -250 | |
| 2 | 12 | | | 50 | 77 | -268 | |
| 1.5 | 9 | | | 37 | 67 | -323 | |
| 1 | 8 | | | 27 | 52 | -267 | |

HOOK VELCRO

MS ONLY

FS 4-11

ENT/117/FIN



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MS ONLY

FS 4-12

ENT/117/FIN



| | |
|----|----|
| 1: | 2: |
| 3: | |

POST LANDING PAYLOAD ACTIVITIES

N/A



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HOOK
VELCRO

HOOK
VELCRO

**DEORBIT
BURN
MONITOR**

| | | | | | | |
|--|---|---|-----|--------------------------------|-----|--------------|
| OMS TEMP* | | | | | | |
| | L R | | | | | |
| FU IN P | ≥ <table border="1" style="display: inline-table;"><tr><td>230</td><td>230</td></tr><tr><td>214</td><td>212</td></tr></table> | 230 | 230 | 214 | 212 | OMS ENG FAIL |
| 230 | 230 | | | | | |
| 214 | 212 | | | | | |
| | ≤ | OMS PRPLT FAIL | | | | |
| or No FU IN P | | | | | | |
| OMS PC* & OMS ↓ (BFS: √accel) | | | | | | |
| ENG VLV 1 or 2 | < 70 | OMS ENG FAIL | | | | |
| or | OX IN P > 227 | | | | | |
| | OX IN P ≤ 227 | OMS PRPLT FAIL | | | | |
| or No OX IN P | | | | | | |
| OMS OX/FU TK P (√ENG IN P) | | | | | | |
| OX/FU LOW | | He PRESS/VAP ISOL (two) – OP If aff TK P not incr: He PRESS/VAP ISOL (two) – CL At PC < 72 or OMS TEMP: OMS PRPLT FAIL | | | | |
| OX & FU HIGH | | He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284 | | | | |
| OMS GMBL | PRI fail | L(R) OMS GMBL – SEC (twice) | | | | |
| | SEC fail | If high RCS usage: OMS ENG FAIL | | | | |
| GPC | 1(4) & Burning OMS aff | aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF, ON L(R) OMS GMBL – SEC (twice) | | | | |
| | SEC GMBL lost | If high RCS usage: OMS ENG FAIL | | | | |
| | 2 FAs lost | √MAN SHUTDN | | | | |
| I/O ERROR FA | 1(4) | L(R) OMS GMBL – SEC | | | | |
| | | I/O RESET (if recov: BFS I/O RESET) If high RCS usage: OMS ENG FAIL | | | | |
| | 2 FAs lost | √MAN SHUTDN | | | | |
| BCE STRG D | | I/O RESET (if recov: >>) | | | | |
| | 1(4) | If high RCS usage: L(R) OMS GMBL – SEC (twice) | | | | |
| RM DLMA IMU | | | | | | |
| or | ABOVE SAFE HP ⇒ <table border="1" style="display: inline-table;"><tr><td> </td><td> </td></tr></table> | | | STOP BURN: OMS ENG(s) – OFF >> | | |
| | | | | | | |
| GPC SET SPLIT | | | | | | |
| or | BELOW SAFE HP ⇒ | IMU DLMA: After C/O: √timer G21 If any IMU ACC > 0.03: aff IMU – desel I'cncnt OMS to RCS (√RCS Burn Time) THC +X to TGT HP (EOM) or 3.5 x timer at C/O (AOA) SET SPLIT: Go to "GPC" above | | | | |
| I/O ERROR PCM | | OI PCMMU PWR – 2(1) | | | | |

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

ENT-2a/117/A,O,D,E/A

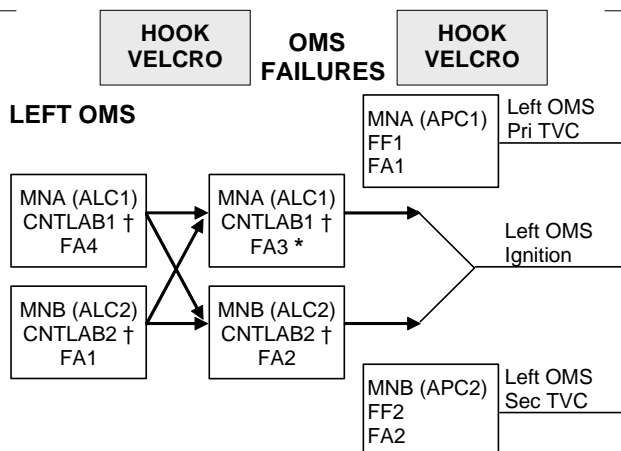
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FAB USE ONLY

FS CC 8-23

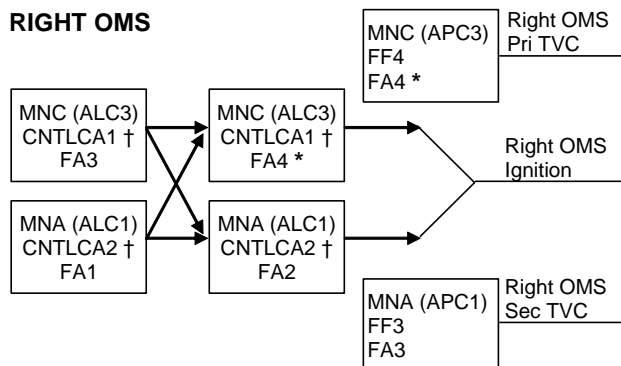
ENT/117/FIN

TOP
BACK OF 'DEORBIT BURN MONITOR'



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| 2,3 | LEFT (IGN) | RIGHT |
| 2,4 | RIGHT (IGN) | LEFT |
| 3,4 | RIGHT (TVC) | BOTH |

ENT-2b/117/A,O,D,E/A

(reduced copy)

FAB USE ONLY

FS CC 8-24

ENT/117/FIN

Space Shuttle Program
FLIGHT DATA FILE

JSC-48020-117
FINAL



ENTRY CHECKLIST

STS
117

Flight Cover (trim bottom to expose tabs)