INDEPENDENT ORBITER ASSESSMENT

ASSESSMENT OF THE EXTRAVEHICULAR MOBILITY UNIT
VOLUME 2 OF 2

10 MARCH 1988
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-379
NASA FMEA #: 330-FM16

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: EMU
MDAC ID: 379
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DUE TO NON-REDUNDANCY OF SCU, THE IOA AGREES WITH THE NASA CRITICALITY AND IS IN AGREEMENT WITH THE REMAINING ANALYSIS.

REPORT DATE 02/25/88  C-501
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-731X
NASA FMEA #: 330-FM17

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: EMU
MDAC ID: 731
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)

LEAD ANALYST: G. RAFFAElli

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-502
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
NASA DATA:
ASSessment ID: EMU-732X
NASA FMEA #: 330-FM18

SUBSYSTEM: EMU
MDAC ID: 732
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)

LEAD ANALYST: G. RAFFAElli

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88   C-503
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-372
NASA FMEA #: 330-FM19
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 372
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)

LEAD ANALYST: G. RAFFAElli

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-504
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-369
NASA FMEA #: 330-FM2

SUBSYSTEM: EMU
MDAC ID: 369
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
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RECOMMENDATIONS: (If different from NASA)

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*CIL RETENTION RATIONALE: (If applicable)

- ADEQUATE [ ]
- INADEQUATE [ ]

REMARKS:

THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
NASA DATA:
BASELINE [ ]
NEW [ X ]

ASSESSMENT ID: EMU-371
NASA FMEA #: 330-FM3

SUBSYSTEM: EMU
MDAC ID: 371
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
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REMARKS:
THE IOA AGREES WITH THE NASA SCREEN B AND IS IN AGREEMENT WITH
THE REMAINDER OF THE ANALYSIS. HOWEVER, THE IOA DOES RECOMMEND
COMBINING NASA FAILURE MODES 330-FM3 AND -FM4 TO REFLECT THE
MISSION SCENARIO.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-371A
NASA FMEA #: 330-FM4
SUBSYSTEM: EMU
MDAC ID: 371
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)
LEAD ANALYST: G. RAFFAELLI

NASA DATA:
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RECOMMENDATIONS:  (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA RECOMMENDS COMBINING NASA FAILURE MODES 330-FM3 AND -FM4 TO REFLECT THE COMPLETE MISSION SCENARIO. THEREFORE, A 2/1RB CRITICALITY SHOULD BE ASSIGNED.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
NASA DATA:
ASSESSMENT ID: EMU-370
NASA FMEA #: 330-FM5
SUBSYSTEM: EMU
MDAC ID: 370
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ / ] [ N ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ P ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AND THE NASA ARE IN AGREEMENT EXCEPT FOR SCREEN A WHICH
THE IOA RECOMMENDS PASSING DUE TO "CAPABILITY" FOR TEST.
ADDITIONALLY THE IOA RECOMMENDS COMBINING 330-FM5 AND -FM6 TO
REFLECT THE ENTIRE MISSION SCENARIO.

REPORT DATE 02/25/88 C-509
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86  NASA DATA:
ASSESSMENT ID: EMU-370A  BASELINE [ ]
NASA FMEA #: 330-FM6  NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 370
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-381
NASA FMEA #: 330-FM7
SUBSYSTEM: EMU
MDAC ID: 381
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)
LEAD ANALYST: G. RAFFAElli

NASA DATA:
BASELINE [ ]
NEW [ X ]

LEAD ANALYST: G. RAFFAElli

ASSESSMENT:

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COMPARiE [ / ] [ ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-380
NASA FMEA #: 330-FM8
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 380
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-512
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-374
NASA FMEA #: 330-FM9

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 374
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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*CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are in agreement. Causes should be expanded to include vibration.

REPORT DATE 02/25/88 C-513
**APPENDIX C**

**ASSESSMENT WORKSHEET**

**ASSESSMENT DATE:** 12/10/86

**ASSESSMENT ID:** EMU-484

**NASA FMEA #:** 350-FMI

**SUBSYSTEM:** EMU

**MDAC ID:** 484

**ITEM:** DCM ELECTRONICS (ITEM 350)

**LEAD ANALYST:** G. RAFFAELLI

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**RECOMMENDATIONS:** (If different from NASA)

| [ / ] | [ ] | [ ] | [ ] | [ ] |

**REMARKS:**

THE IOA AND THE NASA ARE IN AGREEMENT.

**REPORT DATE 02/25/88 C-514**
APPENDIX C
ASSESSMENT WORKSHEET

**ASSESSMENT DATE:** 8/06/87          **NASA DATA:**
**ASSESSMENT ID:** EMU-766X                **BASELINE [ ]**
**NASA FMEA #:** 350-FM10             **NEW [ X ]**

**SUBSYSTEM:** EMU
**MDAC ID:** 766
**ITEM:** DCM ELECTRONICS (ITEM 350)

**LEAD ANALYST:** G. RAFFAELLI

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**RECOMMENDATIONS:** (If different from NASA)

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(ADD/DELETE)

* **CIL RETENTION RATIONALE:** (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

**REMARKS:**
The IOA and the NASA are in agreement.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-767X
NASA FMEA #: 350-FM11

SUBSYSTEM: EMU
MDAC ID: 767
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-768X
NASA FMEA #: 350-FM12

SUBSYSTEM: EMU
MDAC ID: 768
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-769X
NASA FMEA #: 350-FM13
SUBSYSTEM: EMU
MDAC ID: 769
ITEM: DCM ELECTRONICS (ITEM 350)
LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

[ 3 /1R ] [ P ] [ P ] [ P ] [ P ] [ P ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA recommends a new criticality to reflect the following scenario. When the discrete fails on the CWS does not monitor for "High oxygen use rate" and "H20 off status". This can possibly combine with an oxygen leak and require emergency use of the SOP. SOP failure can result in loss of life.

REPORT DATE 02/25/88 C-518
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-472
NASA FMEA #: 350-FM14

NASA DATA:
BASELINE []
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 472
ITEM: DCM ELECTRONICS

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C

ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-471
NASA FMEA #: 350-FM15
SUBSYSTEM: EMU
MDAC ID: 471
ITEM: DCM ELECTRONICS
LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88  C-520
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-469
NASA FMEA #: 350-FM16
SUBSYSTEM: EMU
MDAC ID: 469
ITEM: DCM ELECTRONICS
LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-521
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-470
NASA FMEA #: 350-FM17

SUBSYSTEM: EMU
MDAC ID: 470
ITEM: DCM ELECTRONICS
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-498
NASA FMEA #: 350-FM18
SUBSYSTEM: EMU
MDAC ID: 498
ITEM: DCM ELECTRONICS
LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-499
NASA FMEA #: 350-FM19

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 499
ITEM: DCM ELECTRONICS

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-524
## APPENDIX C
### ASSESSMENT WORKSHEET

**ASSESSMENT DATE:** 12/10/86  
**NASA DATA:**  
**ASSESSMENT ID:** EMU-492  
**NASA FMEA #:** 350-FM20  
**SUBSYSTEM:** EMU  
**MDAC ID:** 492  
**ITEM:** DCM ELECTRONICS  
**LEAD ANALYST:** G. RAFFAELLI  

**ASSESSMENT:**

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**RECOMMENDATIONS:** (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]  
INADEQUATE [ ]

**REMARKS:**  
THE IOA AND THE NASA ARE IN AGREEMENT; HOWEVER, THE IOA RECOMMENDS CHANGING THE FAILURE MODE FROM DRIFTS LOW TO FAILS OFF DUE TO AN ELECTRICAL OPEN.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-493
NASA FMEA #: 350-FM21

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 493
ITEM: DCM ELECTRONICS

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-526
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-490
NASA FMEA #: 350-FM22
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 490
ITEM: DCM ELECTRONICS
LEAD ANALYST: G. RAFFAElli

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-527
ASSESSMENT DATE: 12/10/86  
ASSESSMENT ID: EMU-494  
NASA FMEA #: 350-FM22  

SUBSYSTEM: EMU  
MDAC ID: 494  
ITEM: DCM ELECTRONICS  
LEAD ANALYST: G. RAFFAELLI  

ASSESSMENT:  

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RECOMMENDATIONS:  
(If different from NASA)  
[ / ] [ ] [ ] [ ] [ ]  
(ADD/DELETE)  

* CIL RETENTION RATIONALE:  
(If applicable)  
ADEQUATE [ ]  
INADEQUATE [ ]  

REMARKS:  
THE IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-495
NASA FMEA #: 350-FM22

SUBSYSTEM: EMU
MDAC ID: 495
ITEM: DCM ELECTRONICS

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88   C-529
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-497
NASA FMEA #: 350-FM22

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 497
ITEM: DCM ELECTRONICS

LEAD ANALYST: G. RAFFAELEI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-530
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-481
NASA FMEA #: 350-FM23

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 481
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

CRITICALITY

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-770X
NASA FMEA #: 350-FM24

SUBSYSTEM: EMU
MDAC ID: 770
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

CRITICALITY
FLIGHT HDW/FUNC

REDUNDANCY SCREENS A B C

CIL ITEM

NASA [ 3 /1R ] [ P ] [ NA] [ P ] [ ] *

IOA [ 3 /1R ] [ P ] [ F ] [ P ] [ X ]

COMPARE [ / ] [ ] [ N ] [ ] [ N ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ F ] [ ] [ A ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]

INADEQUATE [ ]

REMARKS:

THE IOA AND THE NASA ARE IN AGREEMENT EXCEPT ON SCREEN B. THE IOA RECOMMENDS FAILURE OF SCREEN B BECAUSE THE FAILED FUNCTION IS NOT DETECTABLE NOR IS IT AUTOMATICALLY BACKED UP.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-771X
NASA FMEA #: 350-FM25

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 771
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are in agreement.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-772X
NASA FMEA #: 350-FM26

NASA DATA: BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 772
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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IOA [ 3 /1R ] [ P ] [ F ] [ P ] [ X ]
COMPARE [ / ] [ ] [ N ] [ ] [ N ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ F ] [ ] [ ] [ A ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT EXCEPT ON SCREEN B. THE IOA RECOMMENDS FAILURE OF SCREEN B BECAUSE THE FAILURE IS NOT DETECTABLE NOR IS THE FAILED FUNCTION AUTOMATICALLY BACKED UP.

REPORT DATE 02/25/88 C-534
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-773X
NASA FMEA #: 350-FM27

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 773
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-535
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-774X
NASA FMEA #: 350-FM28
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 774
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-536
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-775X
NASA FMEA #: 350-FM29
SUBSYSTEM: EMU
MDAC ID: 775
ITEM: DCM ELECTRONICS (ITEM 350)
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA DOES NOT CONSIDER THIS A FAILURE MODE OF THE SYSTEM BUT RATHER AN ANOMALY. AS SUCH, THE IOA RECOMMENDS ITS DELETION FROM THE NASA FMEA.
**APPENDIX C**
**ASSESSMENT WORKSHEET**

**ASSESSMENT DATE:** 12/10/86  
**ASSESSMENT ID:** EMU-475  
**NASA FMEA #:** 350-FM3  

**NASA DATA:**  
BASELINE [ ]  
NEW [ X ]

**SUBSYSTEM:** EMU  
**MDAC ID:** 475  
**ITEM:** DCM ELECTRONICS (ITEM 350)

**LEAD ANALYST:** G. RAFFAElli

**ASSESSMENT:**

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**NASA:**  
[ 2 /1R ]  
[ P ]  
[ P ]  
[ P ]  
[ X ] *

**IOA:**  
[ 2 /1R ]  
[ P ]  
[ P ]  
[ P ]  
[ X ]

**COMPARE:**  
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**RECOMMENDATIONS:** (If different from NASA)

[ / ]  
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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

**REMARKS:**

THE IOA AND THE NASA ARE IN AGREEMENT.

 REPORT DATE 02/25/88  
 C-538
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-477
NASA FMEA #: 350-FM3

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 477
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-539
ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-489
NASA FMEA #: 350-FM3

SUBSYSTEM: EMU
MDAC ID: 489
ITEM: DCM ELECTRONICS
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ / ] [ ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C  
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87  
ASSESSMENT ID: EMU-776X  
NASA FMEA #: 350-FM30

NASA DATA:
BASELINE [ ]  
NEW [ X ]

SUBSYSTEM:  
EMU

MDAC ID: 776

ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA DOES NOT CONSIDER THE IDENTIFIED NASA "FAILURE MODE" AS CREDIBLE. THE IOA CONSIDERS IT APPLICABLE TO A HAZARD ANALYSIS BUT NOT AN FMEA. THE IOA RECOMMENDS ITS DELETION FROM THE NASA FMEA.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-482
NASA FMEA #: 350-FM31

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 482
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT EXCEPT ON SCREEN B WHICH THE IOA NOW AGREES WITH.

REPORT DATE 02/25/88 C-542
ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-777X
NASA FMEA #: 350-FM32

SUBSYSTEM: EMU
MDAC ID: 777
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

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<td>[ P ]</td>
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COMPARE [ / ] [ ] [ N ] [ ] [ N ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ F ] [ ] [ A ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are in agreement except on screen B, the IOA recommends failure of the B screen because it is not detectable nor is the failed function automatically backed up.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-491
NASA FMEA #: 350-FM33
SUBSYSTEM: EMU
MDAC ID: 491
ITEM: DCM ELECTRONICS
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-544
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-778X
NASA FMEA #: 350-FM34

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 778
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ 2 /1R ] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA recommends a 2/1R to reflect a two failure scenario where
the identified failure occurs thereby causing loss of the "low
voltage electronics" which includes CO2 sensing. If a second
failure (high CO2 were to then occur, the crewperson could be
lost.

REPORT DATE 02/25/88 C-545
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-779X
NASA FMEA #: 350-FM35

SUBSYSTEM: EMU
MDAC ID: 779
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ / ] [ ] [ ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-483
NASA FMEA #: 350-FM4

SUBSYSTEM: EMU
MDAC ID: 483
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAElli

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS BUT WOULD INCLUDE ELECTRICAL OPENS ANYWHERE ALONG THE FEEDWATER VALVE CURRENT PATH.

REPORT DATE 02/25/88 C-547
**APPENDIX C**

**ASSESSMENT WORKSHEET**

**ASSESSMENT DATE:** 8/06/87  
**ASSESSMENT ID:** EMU-761X  
**NASA FMEA #:** 350-FM5

**SUBSYSTEM:** EMU  
**MDAC ID:** 761  
**ITEM:** DCM ELECTRONICS (ITEM 350)

**LEAD ANALYST:** G. RAFFAELLI

**ASSESSMENT:**

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**RECOMMENDATIONS:** (If different from NASA)

![/](/)(F)(F)(A)  
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)  
ADEQUATE [ ]  
INADEQUATE [ ]

**REMARKS:**  
THE IOA AND THE NASA ARE IN AGREEMENT EXCEPT ON SCREEN B. THE IOA RECOMMENDS FAILURE OF SCREEN B BECAUSE THE FAILURE MODE IS NOT DETECTABLE AND DOESN'T HAVE AUTOMATIC BACKUP FOR THE REQUIRED FUNCTION. THE IOA THEREFORE RECOMMENDS INCLUSION IN THE CIL.
APPENDIX C  
ASSESSMENT WORKSHEET  

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-762X
NASA FMEA #: 350-FM6

SUBSYSTEM: EMU
MDAC ID: 762
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-763X
NASA FMEA #: 350-FM7

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 763
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ ]

RECOMMENDATIONS: (If different from NASA)

[ ]

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]

INADEQUATE [ ]

REMARKS:

THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88  C-550
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-764X
NASA FMEA #: 350-FM8

ASSESSMENT ID: EMU-764X
NASA FMEA #: 350-FM8

SUBSYSTEM: EMU
MDAC ID: 764
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88    C-551
APPENDIX C  
ASSESSMENT WORKSHEET  

ASSESSMENT DATE: 8/06/87  
ASSESSMENT ID: EMU-765X  
NASA FMEA #: 350-FM9  

NASA DATA:  
BASELINE [ ]  
NEW [ X ]  

SUBSYSTEM: EMU  
MDAC ID: 765  
ITEM: DCM ELECTRONICS (ITEM 350)  

LEAD ANALYST: G. RAFFAELLI  

ASSESSMENT:  

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RECOMMENDATIONS: (If different from NASA)  
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* CIL RETENTION RATIONALE: (If applicable)  
ADEQUATE [ ]  
INADEQUATE [ ]  

REMARKS:  
THE IOA AND THE NASA ARE IN AGREEMENT.
ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-458
NASA FMEA #: 351-FM1

SUBSYSTEM: EMU
MDAC ID: 458
ITEM: BITE INDICATOR (ITEM 363)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[2/2] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
BECAUSE A FAILED ON BITE INDICATOR CAN CREATE A QUESTION OF SYSTEM VERACITY, THE IOA RECOMMENDS A 2/2 CRITICALITY. THIS IS ALSO BASED ON THE FACT MISSION TERMINATION WILL OCCUR ONCE DETECTED DURING A PERIODIC SEQUENCE CHECK.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-457
NASA FMEA #: 351-FM2

SUBSYSTEM: EMU
MDAC ID: 457
ITEM: BITE INDICATOR (ITEM 363)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-554
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-459
NASA FMEA #: 351-FM3

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 459
ITEM: ALPHANUMERIC DISPLAY (ITEM 369)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ /N ] [ N ] [ N ] [ N ] [ ]

RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA INCLUDING PARTIAL DISPLAY LOSS IN THIS FAILURE MODE AND WITH THE NASA ANALYSIS RESULTS. HOWEVER, THE IOA RECOMMENDS THAT UPON DETECTION DURING PERIODIC STATUS CHECK (OR TONE GENERATION) THE MISSION BE TERMINATED THEREFORE A HARDWARE CRITICALITY OF "2". THE IOA DOES NOT SEE A SECOND FAILURE AS CAUSING LOSS OF LIFE DUE TO TONE AVAILABILITY AND THE REQUIREMENT OF A SIGNIFICANT HARDWARE FAILURE.

REPORT DATE 02/25/88 C-555
APPENDIX C  
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87  
ASSESSMENT ID: EMU-780X  
NASA FMEA #: 351-FM4  
NASA FMEA #: 351-FM4  
ASSESSMENT ID:  
NASA FMEA #:  

SUBSYSTEM:  
MDAC ID:  
ITEM:  
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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| IOA [ 2 /1R ] | [ P ] | [ F ] | [ P ] | [ ] |
| COMPARE [ / ] | [ ] | [ ] | [ ] | [ ] | [ ] |

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]  
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]  
INADEQUATE [ ]

REMARKS:

THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-781X
NASA FMEA #: 351-FM5
NASA DATA:            BASELINE [ ]
                      NEW [ X ]
SUBSYSTEM: EMU
MDAC ID: 781
ITEM: DISPLAY (ITEM 351)
LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

:: 8/06/87
EMU-782X
351-FM6

EMU
782
DISPLAY (ITEM 351)

G. RAFFAELLI

NASA DATA:
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[S: (If different from NASA)]

RATIONAL: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

IF NASA ARE IN AGREEMENT.

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02/25/88 C-558
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-392
NASA FMEA #: 360-FM1, FM6

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 392
ITEM: VOLUME CONTROL (ITEM 360)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-559
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-393
NASA FMEA #: 360-FM2

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 393
ITEM: VOLUME CONTROL (ITEM 360)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-733X
NASA FMEA #: 360-FM3, FM8

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 733
ITEM: VOLUME CONTROL (ITEM 360)

LEAD ANALYST: G. RAFFAElli

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-734X
NASA FMEA #: 360-FM4, FM9
SUBSYSTEM: EMU
MDAC ID: 734
ITEM: COLUMN CONTROL (ITEM 360)
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88  C-562
APPENDIX C
ASSESSMENT WORKSHEET

ASSSESSMENT DATE: 12/10/86
ASSSESSMENT ID: EMU-391
NASA FMEA #: 360-FM5, FM10

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 391
ITEM: VOLUME CONTROL (ITEM 360)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]
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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are in agreement.

REPORT DATE 02/25/88 C-563
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-393A
NASA FMEA #: 360-FM7

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 393
ITEM: VOLUME CONTROL (ITEM 360)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ 3 /2R ] [ P ] [ P ] [ P ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA recommends a 3/2R criticality due to availability of second volume control channel and to maintain consistency with NASA FMEA 360-FM2.

REPORT DATE 02/25/88 C-564
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-396
NASA FMEA #: 361-FMI
SUBSYSTEM: EMU
MDAC ID: 396
ITEM: DISPLAY INTENSITY CONTROL (ITEM 361)
LEAD ANALYST: G. RAFFAELLI

NASA DATA:
BASELINE [ ]
NEW [ X ]

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

*CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are not in agreement. The IOA believes the worst case scenario can include EVA operations on the deep space side of the Earth without significant lunar reflection. Payload bay lighting, although available, cannot ensure readability. Therefore, the IOA recommends a 2/2 criticality and inclusion in the CIL. This will account for mission timeline impacts resulting from finding an acceptable light source.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-398
NASA FMEA #: 361-FMI1

SUBSYSTEM: EMU
MDAC ID: 398
ITEM: DISPLAY INTENSITY CONTROL (ITEM 361)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ 2 /2 ] [ ] [ ] [ ] [ ] [ A ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

THE IOA RECOGNIZES THE INCORPORATION OF THIS FAILURE MODE IN THE NASA FMEA 361-FMI1; HOWEVER, FOR THE SAME REASONS STATED IN IOA ASSESSMENT ID EMU-396 THE IOA RECOMMENDS A 2/2 CRITICALITY.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-735X
NASA FMEA #: 361-FM2

ASSESSMENT ID: EMU-735X
NASA FMEA #: 361-FM2

SUBSYSTEM: EMU
MDAC ID: 735
ITEM: DISPLAY INTENSITY CONTROL (ITEM 361)

LEAD ANALYST: G. RAFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are not in agreement. The IOA believes the worst case scenario can include EVA operations on the deep space side of the Earth without significant lunar reflection. Payload Bay lighting, although available, cannot ensure therefore, the IOA recommends a 2/2 criticality and inclusion in the CIL. This will account for mission timeline impacts resulting from finding an acceptable light source.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-397
NASA FMEA #: 361-FM3
NASA DATA: BASELINE [ ] NEW [ ]
SUBSYSTEM: EMU
MDAC ID: 397
ITEM: DISPLAY INTENSITY CONTROL (ITEM 361)
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ]

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-568
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-399
NASA FMEA #: 361-FM4

SUBSYSTEM: EMU
MDAC ID: 399
ITEM: DISPLAY INTENSITY CONTROL (ITEM 361)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ N /N ] [ N ] [ N ] [ N ] [ N ]

RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-736X
NASA FMEA #: 361-FM5

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 736
ITEM: DISPLAY INTENSITY CONTROL (ITEM 361)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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NASA [ 3 /3 ] [ ] [ ] [ ] [ ] [ ] *
IOA [ 3 /3 ] [ ] [ ] [ ] [ ] [ ]

COMPARE [ / ] [ ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ 2 /2 ] [ ] [ ] [ ] [ ] [ A ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
UPON FURTHER REVIEW, THE IOA BELIEVES THE WORST CASE SCENARIO CAN INCLUDE EVA OPERATIONS ON THE DEEP SPACE SIDE OF THE EARTH WITHOUT SIGNIFICANT LUNAR REFLECT. PAYLOAD BAY LIGHTING CANNOT ENSURE READABILITY. THEREFORE THE IOA RECOMMENDS A 2/2 CRITICALITY AND INCLUSION IN THE CIL. THIS WILL ACCOUNT FOR MISSION TIMELINE IMPACTS RESULTING FROM EFFORTS TO FIND AN ACCEPTABLE LIGHT SOURCE.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-410
NASA FMEA #: 362-FMI

SUBSYSTEM: EMU
MDAC ID: 410
ITEM: EVC SELECTOR SWITCH (ITEM 362)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-571
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-400
NASA FMEA #: 362-FM2

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 400
ITEM: EVC SELECTOR SWITCH (ITEM 362)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ]

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are in agreement. However, the causes should be revised to be more comprehensive.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-401
NASA FMEA #: 362-FM2

SUBSYSTEM: EMU
MDAC ID: 401
ITEM: EVC SELECTOR SWITCH (ITEM 362)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS: THE IOA AGREES WITH THE NASA SCREEN B ASSIGNMENT AND IS IN AGREEMENT WITH THE REMAINING ANALYSIS. HOWEVER, THE CAUSES SHOULD BE REVISED TO BE MORE COMPREHENSIVE.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-411
NASA FMEA #: 362-FM3

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 411
ITEM: EVC SELECTOR SWITCH (ITEM 362)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-402
NASA FMEA #: 362-FM4

SUBSYSTEM: EMU
MDAC ID: 402
ITEM: EVC SELECTOR SWITCH (ITEM 362)

LEAD ANALYST: G. RAFFAElli

NASA DATA:
BASELINE [ ]
NEW [ ]

NASA DATA:
BASELINE [ ]
NEW [ ]

CRITICALITY REDUNDANCY SCREENS

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RECOMMENDATIONS: (If different from NASA)
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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT. ADDITIONALLY, THE IOA RECOMMENDS A MORE COMPREHENSIVE TREATMENT OF CAUSES.

REPORT DATE 02/25/88 C-575
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-403
NASA FMEA #: 362-FM4
NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: EMU
MDAC ID: 403
ITEM: EVC SELECTOR SWITCH (ITEM 362)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT EXCEPT ON SCREEN B REGARDING WHICH THE IOA NOW AGREES WITH THE NASA. THE IOA ALSO RECOMMENDS A MORE COMPREHENSIVE TREATMENT OF CAUSES.

REPORT DATE 02/25/88 C-576
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-412
NASA FMEA #: 362-FM5

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 412
ITEM: EVC SELECTOR SWITCH (ITEM 362)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

CRITICALITY
FLIGHT
HDW/FUNC

REDUNDANCY SCREENS
A  B  C

CIL ITEM

NASA  [ 3 /2R ]  [ P ]  [ P ]  [ NA]  [ ] *
IOA  [ 3 /3 ]  [ P ]  [ P ]  [ NA]  [ ]

COMPARE  [ /N ]  [ ]  [ ]  [ ]  [ ]  [ ]

RECOMMENDATIONS: (If different from NASA)

[ 3 /3 ]  [ ]  [ ]  [ ]  [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-404
NASA FMEA #: 362-FM6

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 404
ITEM: EVC SELECTOR SWITCH (ITEM 362)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ / ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)
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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

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REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT. HOWEVER, THE IOA RECOMMENDS A MORE COMPREHENSIVE TREATMENT OF CAUSES.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-405
NASA FMEA #: 362-FM6

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 405
ITEM: EVC SELECTOR SWITCH (ITEM 362)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-406
NASA FMEA #: 362-FM7

SUBSYSTEM: EMU
MDAC ID: 406
ITEM: EVC SELECTOR SWITCH (ITEM 362)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT EXCEPT FOR SCREEN B WHICH THE IOA NOW CONCURS WITH.

REPORT DATE 02/25/88  C-580
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-407
NASA FMEA #: 362-FM7
SUBSYSTEM: EMU
MDAC ID: 407
ITEM: EVC SELECTOR SWITCH (ITEM 362)
LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

THE IOA AND THE NASA ARE IN AGREEMENT EXCEPT FOR SCREEN B;
REGARDING WHICH THE IOA NOW CONCURS WITH THE NASA FINDING.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86  
ASSESSMENT ID: EMU-413  
NASA FMEA #: 362-FM8

NASA DATA:
BASELINE [ ]  
NEW [ ]

SUBSYSTEM:  
MDAC ID: 413  
ITEM: EVC SELECTOR SWITCH (ITEM 362)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
BECAUSE THE FAILURE IS "FAIL OPERATIONAL" AND BECAUSE FURTHER LOSS OF REDUNDANCY IS NO IMPACT TO BACKUP MODE, THE IOA RECOMMENDS A 3/3 CRITICALITY.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-408
NASA FMEA #: 362-FM9

SUBSYSTEM: EMU
MDAC ID: 408
ITEM: EVC SELECTOR SWITCH (ITEM 362)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ / ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-583
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-409
NASA FMEA #: 362-FM9
SUBSYSTEM: EMU
MDAC ID: 409
ITEM: EVC SELECTOR SWITCH (ITEM 362)
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ D ]

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN GENERAL AGREEMENT. THE IOA NOW CONCURS WITH THE NASA SCREEN B.

REPORT DATE 02/25/88 C-584
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-423
NASA FMEA #: 364-FMI

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 423
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAElli

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-585
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-419
NASA FMEA #: 364-FMI0

SUBSYSTEM: EMU
MDAC ID: 419
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAElli

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are in agreement and the IOA agrees with the NASA SCREEN B ASSIGNMENT.

REPORT DATE 02/25/88 C-586
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-417A
NASA FMEA #: 364-FM11

ASSESSMENTID:
NASA FMEA #:
SUBSYSTEM:
MDAC ID:
ITEM:
LEAD ANALYST:
G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-418A
NASA FMEA #: 364-FM12

SUBSYSTEM: EMU
MDAC ID: 418
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are in agreement.

REPORT DATE 02/25/88  C-588
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-415
NASA FMEA #: 364-FM13

SUBSYSTEM: EMU
MDAC ID: 415
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-414
NASA FMEA #: 364-FM14

SUBSYSTEM: EMU
MDAC ID: 414
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAElli

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-590
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-416
NASA FMEA #: 364-FM15

SUBSYSTEM: EMU
MDAC ID: 416
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-414A
NASA FMEA #: 364-FM16

SUBSYSTEM: EMU
MDAC ID: 414
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-592
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-415A
NASA FMEA #: 364-FM17

SUBSYSTEM: EMU
MDAC ID: 415
ITEM: POWER MODE SELECTION SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAElli

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

THE IOA RECOMMENDS A 2/2 CRITICALITY DUE TO MISSION TERMINATION IMPACT AND BECAUSE THE OTHER FAILURES WHICH CAN CAUSE LOSS OF LIFE ARE NOT REDUNDANT IN NATURE OR FUNCTION AND THEREFORE, PER 22206, CANNOT BE EMPLOYED TO UPGRADE FUNCTIONAL CRITICALITY.

REPORT DATE 02/25/88 C-593
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
NASA DATA:
ASSESSMENT ID: EMU-426
NASA FMEA #: 364-FM18
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 426
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAELLI

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COMPARE [ ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)
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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-425
NASA FMEA #: 364-FM19

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 425
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-424
NASA FMEA #: 364-FM2
SUBSYSTEM: EMU
MDAC ID: 424
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-596
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
NASA DATA:
ASSESSMENT ID:  EMU-421  BASELINE [ ]
NASA FMEA #:  364-FM3  NEW [ X ]

SUBSYSTEM:  EMU
MDAC ID:  421
ITEM:  POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST:  G. RAFFAElli

ASSESSMENT:

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RECOMMENDATIONS:  (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-420
NASA FMEA #: 364-FM4

SUBSYSTEM: EMU
MDAC ID: 420
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-598
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86  
ASSESSMENT ID: EMU-422  
NASA FMEA #: 364-FM5

ASSESSMENT ID:  EMU-422  
NASA FMEA #:  364-FM5

SUBSYSTEM:  EMU  
MDAC ID:  422  
ITEM:  POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST:  G. RAFFAELLI

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RECOMMENDATIONS:  (If different from NASA)

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* CIL RETENTION RATIONALE:  (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
NASA DATA:
ASSESSMENT ID: EMU-420A
NASA FMEA #: 364-FM6
NASA DATA: BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 420
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-421A
NASA FMEA #: 364-FM7

SUBSYSTEM: EMU
MDAC ID: 421
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88    C-601
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-418
NASA FMEA #: 364-FM8

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 418
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-417
NASA FMEA #: 364-FM9

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 417
ITEM: POWER MODE SELECTOR SWITCH (ITEM 364)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are in agreement.

REPORT DATE 02/25/88 C-603
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-427
NASA FMEA #: 365-FMI

SUBSYSTEM: EMU
MDAC ID: 427
ITEM: PUSH-TO-TALK SWITCH (ITEM 365)

LEAD ANALYST: G. RAFFAELLI

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COMPARE [ / ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ P ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]

INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-435
NASA FMEA #: 365-FM2

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 435
ITEM: PUSH-TO-TALK SWITCH (ITEM 365)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-605
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-436
NASA FMEA #: 365-FM3
ASSESSMENT ID:
NASA FMEA #: 
SUBSYSTEM: EMU
MDAC ID: 436
ITEM: PUSH-TO-TALK SWITCH (ITEM 365)
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-606
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-432
NASA FMEA #: 365-FM4

SUBSYSTEM: EMU
MDAC ID: 432
ITEM: PUSH-TO-TALK SWITCH (ITEM 365)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA RECOGNIZES THE INCORPORATION OF THIS FAILURE MODE IN NASA FMEA 365-FM4; HOWEVER, THE IOA EFFECTS DIFFER. THE IOA BELIEVES THE VOX POSITION COULD BE LOST (IT IS NORMALLY IN OPEN POSITION) AND WOULD REQUIRE LOSS OF A REDUNDANT FUNCTION (E.G., PTT) TO CAUSE MISSION TERMINATION.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-433
NASA FMEA #: 365-FM4

NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: EMU
MDAC ID: 433
ITEM: PUSH-TO-TALK SWITCH (ITEM 365)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)
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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-608
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-434
NASA FMEA #: 365-FM5
NASA DATA:
BASELINE [ ]
NEW [ ]

SUBSYSTEM: EMU
MDAC ID: 434
ITEM: PUSH-TO-TALK SWITCH (ITEM 365)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

| CRITICALLY | REDUNDANCY SCREENS | CIL |
| FLIGHT | HDW/FUNC | A | B | C | ITEM |
| NASA [ 2 /2 ] | [ ] | [ ] | [ ] | [ ] | [ X ] * |
| IOA [ 2 /2 ] | [ P ] | [ P ] | [ F ] | [ X ] |
| COMPARE [ / ] | [ N ] | [ N ] | [ N ] | [ ] |

RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are in agreement.

REPORT DATE 02/25/88 C-609
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-429
NASA FMEA #: 365-FM6
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 429
ITEM: PUSH-TO-TALK SWITCH (ITEM 365)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)
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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-610
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-430A
NASA FMEA #: 365-FM7

SUBSYSTEM: EMU
MDAC ID: 430
ITEM: PUSH-TO-TALK SWITCH (ITEM 365)
LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

[ 3 /2R ] [ P ] [ P ] [ P ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-430
NASA FMEA #: 365-FM8

SUBSYSTEM: EMU
MDAC ID: 430
ITEM: PUSH-TO-TALK SWITCH (ITEM 365)

LEAD ANALYST: G. RAFFAELLI

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NASA [ 3 /2R ] [ P ] [ P ] [ P ] [ ] *

IOA [ 3 /2R ] [ P ] [ F ] [ P ] [ X ]

COMPARE [ / ] [ ] [ N ] [ ] [ N ]

RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AGREES WITH THE NASA SCREEN B ASSIGNMENT AND IS IN AGREEMENT ON THE REMAINDER OF THE ANALYSIS.

REPORT DATE 02/25/88 C-612
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-431
NASA FMEA #: 365-FM9

SUBSYSTEM: EMU
MDAC ID: 431
ITEM: PUSH-TO-TALK SWITCH (ITEM 365)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

[ 3 /2R ] [ P ] [ P ] [ P ] [ D ]
(ADD/DELETE)

*CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are not in agreement. A 3/2R CRITICALITY IS
recommended due to capability of CREWPERSON to switch to a
RENDANT COMMUNICATIONS POSITION (E.G. VOX).

REPORT DATE 02/25/88 C-613
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-444
NASA FMEA #: 366-FM1

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 444
ITEM: FAN SWITCH (ITEM 366)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-437
NASA FMEA #: 366-FM2

SUBSYSTEM: EMU
MDAC ID: 437
ITEM: FAN SWITCH (ITEM 366)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ / ] [ ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-615
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-443
NASA FMEA #: 366-FM2
SUBSYSTEM: EMU
MDAC ID: 443
ITEM: FAN SWITCH (ITEM 366)
LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA ACCEPTS THE NASA SCREEN B ASSIGNMENT DUE TO CAPABILITY TO RESPOND AND IS IN AGREEMENT WITH THE REMAINDER OF THE ANALYSIS.

REPORT DATE 02/25/88 C-616
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-441
NASA FMEA #: 366-FM3
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 441
ITEM: FAN SWITCH (ITEM 366)
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

| CRITICALLY REDUNDANCY SCREENS CIL |
|--|--|--|--|--|--|
| FLIGHT | HDW/FUNC | A | B | C | ITEM |
| NASA | [ 2 /2 ] | [ ] | [ ] | [ ] | [ X ] * |
| IOA | [ 2 /2 ] | [ P ] | [ P ] | [ P ] | [ X ] |
| COMPARE | [ / ] | [ N ] | [ N ] | [ N ] | [ ] |

RECOMMENDATIONS: (If different from NASA)

[ 2 /1R ] [ P ] [ F ] [ P ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

THE IOA AND THE NASA ARE IN AGREEMENT. HOWEVER, FURTHER REVIEW INDICATES THAT SUCH A FAILURE WHEN COMBINED WITH A HARD CHARGE, AN ITEM 172 FAILURE, AND AN SOP FAILURE COULD RESULT IN POSSIBLE LOSS OF LIFE (REFERENCE NASA FMEA 366-FM6). THE IOA THEREFORE NOW RECOMMENDS A 2/1R CRITICALITY. (NOTE: THIS ASSIGNMENT ALSO ENSURES CONSISTENCY BETWEEN FAILURE MODES WITHIN THE EMU.)
ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-438
NASA FMEA #: 366-FM4
SUBSYSTEM: EMU
MDAC ID: 438
ITEM: FAN SWITCH (ITEM 366)
LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

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REMARKS:

THE IOA AND THE NASA ARE IN AGREEMENT.
**APPENDIX C**

**ASSESSMENT WORKSHEET**

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**SUBSYSTEM:** EMU  
**MDAC ID:** 701  
**ITEM:** FAN SWITCH (ITEM 366)

**LEAD ANALYST:** G. RAFFAELLI

**ASSESSMENT:**

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**COMPARE [ /N ]**

**RECOMMENDATIONS:** (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]

INADEQUATE [ ]

**REMARKS:**

THE IOA AGREES WITH THE NASA ANALYSIS AND SCENARIO.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-702X
NASA FMEA #: 366-FM6

SUBSYSTEM: EMU
MDAC ID: 702
ITEM: FAN SWITCH (ITEM 366)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-445
NASA FMEA #: 367-FMI

SUBSYSTEM: EMU
MDAC ID: 445
ITEM: FEEDWATER VALVE SWITCH (ITEM 367)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

THE IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86  NASA DATA:
ASSESSMENT ID:  EMU-450  BASELINE [ ]
NASA FMEA #:  367-FM2  NEW [ X ]

SUBSYSTEM:  EMU
MDAC ID:  450
ITEM:  FEEDWATER VALVE SWITCH (ITEM 367)

LEAD ANALYST:  G. RAFFAElli

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-449
NASA FMEA #: 367-FM3

SUBSYSTEM: EMU
MDAC ID: 449
ITEM: FEEDWATER VALVE SWITCH (ITEM 367)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
UPON FURTHER REVIEW, THE IOA SCENARIO WOULD REQUIRE CREW ERROR DURING EVA TO SUPPORT THE IOA CRITICALITY. THE IOA THEREFORE AGREES WITH THE NASA FINDINGS.

REPORT DATE 02/25/88 C-623
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-446
NASA FMEA #: 367-FM4
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 446
ITEM: FEEDWATER VALVE SWITCH (ITEM 367)
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

CRITICALITY REDUNDANCY SCREENS CIL
FLIGHT HDW/FUNC A B C ITEM

NASA [ 2 /2 ] [ ] [ ] [ ] [ ] [ X ] *
IOA [ 2 /2 ] [ P ] [ F ] [ P ] [ X ]
COMPARE [ / ] [ N ] [ N ] [ N ] [ ]

RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-447
NASA FMEA #: 367-FM5

SUBSYSTEM: EMU
MDAC ID: 447
ITEM: FEEDWATER VALVE SWITCH (ITEM 367)
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
[ 2 /1R ] [ P ] [ P ] [ P ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA recommends a 2/1R criticality to address possible short
circuit from open to close lines. This can result in loss of
cooling and condensate removal; thereby, requiring SOP usage.
The concurrent loss of the SOP can result in loss of life.
The IOA also recommends modifying the failure mode description.
The screen B has been further reviewed and is now recommended to
be passed.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-448
NASA FMEA #: 367-FM6
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 448
ITEM: FEEDWATER VALVE SWITCH (ITEM 367)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ANALYSIS ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-451
NASA FMEA #: 368-FM1

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 451

ITEM: CAUTION AND WARNING SWITCH (ITEM 368)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

| CRITICALITY | REDUNDANCY SCREENS | CIL |
|             | A     | B    | C   |
| FLIGHT HDW/FUNC |      |      |     |
| NASA        | 2 /2  | [ ]  | [ ] | [ ] | [ X ] * |
| IOA         | 2 /2  | [ P ] | [ P ] | [ NA] | [ X ] |
| COMPARE     | [ / ] | [ N ] | [ N ] | [ N ] | [ ] |

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C  
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86  
ASSESSMENT ID:  EMU-453  
NASA FMEA #:  368-FM2  
NASA DATA:  
BASELINE [ ]  
NEW [ X ]  
SUBSYSTEM:  EMU  
MDAC ID:  453  
ITEM:  CAUTION AND WARNING SWITCH (ITEM 368)  
LEAD ANALYST:  G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS:  (If different from NASA)

[ 2 /1R ] [ P ] [ F ] [ P ] [ ]  
(ADD/DELETE)

* CIL RETENTION RATIONALE:  (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

THE IOA RECOMMENDS A 2/1R CRITICALITY TO REFLECT OCCURRENCE OF CONVERTER SHUTDOWN RESULTING IN MISSION TERMINATION AND, IF COMBINED WITH A CO2 CONTROL FUNCTION FAILURE, POSSIBLE LOSS OF LIFE.  ALSO, UPON FURTHER REVIEW THE IOA WOULD RECOMMEND FAILURE OF SCREEN B DUE TO THE FAILURE BEING NOT READILY DETECTABLE.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-452
NASA FMEA #: 368-FM3

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 452
ITEM: CAUTION AND WARNING SWITCH (ITEM 368)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-629
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-454
NASA FMEA #: 368-FM4
SUBSYSTEM: EMU
MDAC ID: 454
ITEM: CAUTION AND WARNING SWITCH (ITEM 368)
LEAD ANALYST: G. RAFFAELLI

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NASA [2 /IR ] [ P ] [ F ] [ P ] [ X ] *
IOA [2 /IR ] [ P ] [ P ] [ P ] [ X ]

COMPARE [ / ] [ ] [ N ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AGREES WITH THE NASA SCREEN B. THE REMAINING ANALYSIS ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-630
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-737X
NASA FMEA #: 368-FM5

SUBSYSTEM: EMU
MDAC ID: 737
ITEM: CAUTION AND WARNING SWITCH (ITEM 368)

LEAD ANALYST: G. RAFFAELLI

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| COMPARE       | [ / ] | [ N ] | [ N ] | [ N ] | [ ] |

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-631
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-455
NASA FMEA #: 368-FM6
ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-455
NASA FMEA #: 368-FM6
SUBSYSTEM: EMU
MDAC ID: 455
ITEM: CAUTION AND WARNING SWITCH (ITEM 368)
LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-632
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-456
NASA FMEA #: 368-FM7

SUBSYSTEM: EMU
MDAC ID: 456
ITEM: CAUTION AND WARNING SWITCH (ITEM 368)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ / ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-703X
NASA FMEA #: 368-FM8

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 703
ITEM: CAUTION AND WARNING SWITCH (ITEM 368)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

| CRITICALITY | REDUNDANCY SCREENS | CIL ITEM |
| HDW/FUNC | A | B | C |
| NASA [ 2 /2 ] | [ ] | [ ] | [ ] | [ X ] * |
| IOA [ 2 /2 ] | [ P ] | [ P ] | [ P ] | [ X ] |
| COMPARE [ / ] | [ N ] | [ N ] | [ N ] | [ ] |

RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-634
## APPENDIX C
### ASSESSMENT WORKSHEET

**ASSESSMENT DATE:** 08/06/87

**ASSESSMENT ID:** EMU-739X

**NASA FMEA #:** 384-FM1

**SUBSYSTEM:** EMU

**MDAC ID:** 739

**ITEM:** DCM TMG (ITEM 384)

**LEAD ANALYST:** G. RAFFAELLI

### ASSESSMENT:

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**RECOMMENDATIONS:** (If different from NASA)

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(ADD/DELETE)

* **CIL RETENTION RATIONALE:** (If applicable)
  
  ADEQUATE [ ]
  INADEQUATE [ ]

**REMARKS:**

THE IOA AND THE NASA ARE IN AGREEMENT.

---

**REPORT DATE 02/25/88**

C-635
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-388
NASA FMEA #: 385-FMI

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 388
ITEM: HARD UPPER TORSO (HUT) INTERFACE (ITEM 385)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ / ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]

INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-636
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-389
NASA FMEA #: 385-FM2

SUBSYSTEM: EMU
MDAC ID: 389
ITEM: HARD UPPER TORSO (HUT) INTERFACE (ITEM 385)

LEAD ANALYST: G. RAFFAELLI

NASA DATA:
BASELINE [ ]
NEW [ X ]

ASSESSMENT:
CRITICALITY REDUNDANCY SCREENS CIL
FLIGHT HDW/FUNC A B C ITEM

NASA [ 2 /1R ] [ P ] [ P ] [ P ] [ X ] *
IOA [ 2 /1R ] [ P ] [ P ] [ P ] [ X ]

COMPARE [ / ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ] *(ADD/DELETE)

*CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-637
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-390
NASA FMEA #: 385-FM2

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 390
ITEM: HARD UPPER TORSO (HUT) INTERFACE (ITEM 385)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA and the NASA are in agreement (also reference MDAC ID 389).

REPORT DATE 02/25/88 C-638
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-738X
NASA FMEA #: 385-FM3

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 738
ITEM: SUIT PRESSURE GAGE (ITEM 311)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-639
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-474
NASA FMEA #: 385-FM4

SUBSYSTEM: EMU
MDAC ID: 474
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAElli

NASA DATA:
BASELINE [ ]
NEW [ X ]

ASSESSMENT:
CRITICALITY REDUNDANCY SCREENS CIL ITEM
FLIGHT HDW/FUNC A B C

NASA [ 2 /2 ] [ ] [ ] [ ] [ ] [ X ] *
IOA [ 3 /2R ] [ P ] [ P ] [ P ] [ ]
COMPARE [ N /N ] [ N ] [ N ] [ N ] [ N ] [ N ]

RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-473
NASA FMEA #: 385-FM5

SUBSYSTEM: EMU
MDAC ID: 473
ITEM: DCM ELECTRONICS (ITEM 350)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ 2 /2 ] [ ] [ ] [ ] [ ] [ A ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
A SHORT TO GROUND WILL RESULT IN EXCESSIVE CURRENT DRAW FROM VEHICLE POWER UNTIL FINALLY LOST. THEREFORE, THE IOA RECOMMENDS A 2/2 CRITICALITY TO REFLECT MISSION IMPACTS, AND INCLUSION IN THE CIL FOR THIS FAILURE MODE. ADDITIONALLY, THE IOA RECOMMENDS MODIFICATION OF THIS FAILURE MODE TO SHORTS TO GROUND.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-323
NASA FMEA #: 410-FM1

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 323
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 410)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

CRITICALITY REDUNDANCY SCREENS CIL
FLIGHT HDW/FUNC A B C ITEM

NASA [2 /2 ] [ ] [ ] [ ] [ X ] *
IOA [3 /2R ] [ P ] [ P ] [ P ] [ ]
COMPARE [ N /N ] [ N ] [ N ] [ N ] [ N ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA agrees with the NASA criticality assignment and is in agreement with the remaining analysis. The IOA also recommends combining the two failure modes, 410-FM1 and FM2, to reflect the entire mission scenario.

REPORT DATE 02/25/88 C-642
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-323A
NASA FMEA #: 410-FM2
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 323
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 410)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ 2 /2 ] [ ] [ ] [ ] [ ] [ A ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

THE IOA RECOMMENDS A 2/2 CRITICALITY BECAUSE THIS FAILURE MODE WAS LIMITED TO THE EVA PHASE AND DID NOT ENCOMPASS THE ENTIRE MISSION WHICH WOULD HAVE INDICATED A 2/2. IF DONE (REFERENCE NASA FMEA 410-FM1). THE IOA ALSO RECOMMENDS COMBINING 410-FM1 AND FM2 INTO ONE FAILURE MODE.

REPORT DATE 02/25/88 C-643
### APPENDIX C

#### ASSESSMENT WORKSHEET

**ASSESSMENT DATE:** 12/10/86

**NASA DATA:**
- Baseline [ ]
- New [X]

**SUBSYSTEM:** EMU

**MDAC ID:** 325

**ITEM:** COMMON MULTIPLE CONNECTOR (ITEM 410)

**LEAD ANALYST:** G. RAFFAELLI

**ASSESSMENT:**

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**RECOMMENDATIONS:** (If different from NASA)
- [2/2] [ ] [ ] [ ] [ ] [A] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
  - ADEQUATE [ ]
  - INADEQUATE [ ]

**REMARKS:**
BECAUSE THE NASA LIMITED THIS FAILURE TO SELECTED MISSION PHASES THE IOA RECOMMENDS COMBINING IT WITH NASA FMEA 410-FM4 WITH A 2/2 CRITICALITY.
**ASSESSMENT WORKSHEET**

**ASSESSMENT DATE:** 12/10/86  
**ASSESSMENT ID:** EMU-325A  
**NASA FMEA #:** 410-FM4  

**SUBSYSTEM:** EMU  
**MDAC ID:** 325  
**ITEM:** COMMON MULTIPLE CONNECTOR (ITEM 410)  

**LEAD ANALYST:** G. RAFFAELLI

**ASSESSMENT:**

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**RECOMMENDATIONS:** (If different from NASA)

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**CIL RETENTION RATIONALE:** (If applicable)

ADEQUATE [ ]

INADEQUATE [ ]

**REMARKS:**

THE IOA SCENARIO IS NOT AS REPRESENTATIVE THE WORST CASE AS IS NASA; THE IOA, THEREFORE, AGREES WITH THE NASA CRITICALITY. THE IOA ALSO RECOMMENDS COMBINING NASA FMEAs 410-FM3 AND FM4 TO REPRESENT THE ENTIRE MISSION SCENARIO UNDER ONE ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-324
NASA FMEA #: 410-FM5

SUBSYSTEM: EMU
MDAC ID: 324
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 410)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ 2 /2 ] [ ] [ ] [ ] [ ] [ A ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

REPORT DATE 02/25/88 C-646
**APPENDIX C**
**ASSESSMENT WORKSHEET**

**ASSESSMENT DATE:** 12/10/86  
**ASSESSMENT ID:** EMU-324A  
**NASA FMEA #:** 410-FM6, FM7  
**NASA DATA:** 
- **BASELINE [ ]**  
- **NEW [ X ]**

**SUBSYSTEM:** EMU  
**MDAC ID:** 324  
**ITEM:** COMMON MULTIPLE CONNECTOR (ITEM 410)

**LEAD ANALYST:** G. RAFFAELLI

**ASSESSMENT:**

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**RECOMMENDATIONS:** (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]  
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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]  
INADEQUATE [ ]

**REMARKS:**

THE IOA AGREES WITH THE NASA ANALYSIS. THE IOA ALSO RECOMMENDS COMBINING NASA FMEAs 410-FM5, FM6, AND FM7 TO REFLECT THE ENTIRE MISSION SCENARIO FOR THIS FAILURE MODE UNDER ONE ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
NASA DATA: BASELINE [ ]
NASA FMEA #: 410-FM8
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 326
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 410)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AGREES WITH THE NASA CRITICALITY WHEN THE SECOND SCU IS NOT CONSIDERED REDUNDANT.

REPORT DATE 02/25/88 C-648
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-327
NASA FMEA #: 410-FM9
NASA DATA:
BASELINE [ ]
NEW [ X ]
SUBSYSTEM: EMU
MDAC ID: 327
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 410)
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-649
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-336
NASA FMEA #: 411-FMI

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 336
ITEM: HIGH PRESSURE OXYGEN LINE (ITEM 411)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA CRITICALITY SINCE THE SECOND SCU IS NOT EMPLOYED AS A REDUNDANT ITEM.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-337
NASA FMEA #: 412A-FMI
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 337
ITEM: PORTABLE H2O LINE (ITEM 412A)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ ] [ X ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

THE IOA AGREES WITH THE NASA CRITICALITY ASSIGNMENT WHEN THE SECOND SCU IS CONSIDERED TO BE NON-REDUNDANT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-338
NASA FMEA #: 412B&C-FMI
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 338
ITEM: COOLING H2O IN-LINE (ITEM 412B)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA CRITICALITY ASSIGNMENT SINCE THE SECOND SCU IS NON-REDUNDANT.

REPORT DATE 02/25/88 C-652
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-339
NASA FMEA #: 412B&C-FMI

SUBSYSTEM: EMU
MDAC ID: 339
ITEM: COOLING H2O OUT-LINE (ITEM 412C)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

| CRITICALITY | REDUNDANCY SCREENS | CIL |
|             |                  |     |
| FLIGHT      |                  |     |
| HDW/FUNC    | A                 | B   |
|             | [ 2 /2 ]        | [ ] |
|             | [ ]              | [ ] |
|             | [ ]              | [ ] |
|             | [ X ] *         |     |
| NASA        |                  |     |
| IOA         | [ 3 /2R ]       | [ P ] |
|             | [ F ]           | [ P ] |
|             | [ X ]           |     |
| COMPARE     | [ N /N ]        | [ N ] |
|             | [ N ]           | [ N ] |
|             | [ N ]           |     |

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA CRITICALITY ASSIGNMENT SINCE THE SECOND SCU IS NON-REDUNDANT.
ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-340
NASA FMEA #: 416-FMI

SUBSYSTEM: EMU
MDAC ID: 340
ITEM: BACTERIAL FILTER HOUSING (ITEM 416)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:

THE IOA AGREES WITH THE NASA CRITICALITY DUE TO THE SECOND SCU NOT BEING CONSIDERED REDUNDANT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-343
NASA FMEA #: 418-FM1

SUBSYSTEM: EMU
MDAC ID: 343
ITEM: CONDENSATE H2O REGULATOR (ITEM 418)

LEAD ANALYST: G. RAFFAElli

ASSESSMENT:

CRITICALLY REDUNDANCY SCREENS CIL
FLIGHT HDW/FUNC A B C ITEM

NASA [ 2 /2 ] [ ] [ ] [ ] [ X ] *
IOA [ 3 /2R ] [ P ] [ P ] [ P ] [ ]
COMPARE [ N /N ] [ N ] [ N ] [ N ] [ N ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-655
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-345
NASA FMEA #: 418-FM1
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 345
ITEM: CONDENSATE H2O REGULATOR (ITEM 418)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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IOA [ 3 /2R ] [ P ] [ P ] [ P ] [ X ]
COMPARE [ N /N ] [ N ] [ N ] [ N ] [ ]

RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-344
NASA FMEA #: 418-FM2
SUBSYSTEM: EMU
MDAC ID: 344
ITEM: CONDENSATE H2O REGULATOR (ITEM 418)
LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

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REMARKS:

THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88  C-657
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-346
NASA FMEA #: 418-FM2

SUBSYSTEM: EMU
MDAC ID: 346
ITEM: CONDENSATE H2O REGULATOR (ITEM 418)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-347
NASA FMEA #: 418-FM3

SUBSYSTEM: EMU
MDAC ID: 347
ITEM: CONDENSATE H2O REGULATOR (ITEM 418)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS RESULTS AND EFFECTS. ALSO, THE IOA WOULD RECOMMEND INCLUDING "CAM BINDING" AS A Viable CAUSE.

REPORT DATE 02/25/88 C-659
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-341
NASA FMEA #: 418-FM4
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 341
ITEM:
CONDENSATE H2O REGULATOR (ITEM 418)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

| CRITICALITY | REDUNDANCY SCREENS | CIL |
| FLIGHT | HDW/FUNC | A | B | C | ITEM |
| NASA | [ 2 /2 ] | [ ] | [ ] | [ ] | [ X ] * |
| IOA | [ 3 /2R ] | [ P ] | [ F ] | [ P ] | [ X ] |
| COMPARE | [ N /N ] | [ N ] | [ N ] | [ N ] | [ ] |

RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
AD Eq UATE [ ]
IN ADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA CRITICALITY DUE TO NON-REDUNDANCY OF SCUS.

REPORT DATE 02/25/88 C-660
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-349
NASA FMEA #: 419-FMI
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 349
ITEM: WATER SUPPLY PRESSURE REGULATOR (ITEM 419)

LEAD ANALYST: G. RAFFAELLI

ASSESMENT:

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RECOMMENDATIONS: (If different from NASA)
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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
BECAUSE THE SECOND SCU IS NOT REDUNDANT (BY GROUND RULE) AND BECAUSE RECHARGE IS TERMINATED UPON DETECTION OF THIS FAILURE MODE, THE IOA RECOMMENDS A 2/2 CRITICALITY. ADDITIONALLY, THE IOA DOES CONSIDER THE ITEM 419 CAPABLE OF GROUND TEST FOR THIS FAILURE MODE AND THEREFORE RECOMMENDS PASSAGE OF SCREEN A.
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-350
NASA FMEA #: 419-FM2

SUBSYSTEM: EMU
MDAC ID: 350
ITEM: WATER SUPPLY PRESSURE REGULATOR (ITEM 419)
LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
BECAUSE THE SECOND SCU IS CONSIDERED NON-REDUNDANT, THE IOA AGREES WITH THE NASA CRITICALITY OF 2/2 FOR THIS FAILURE MODE.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-348
NASA FMEA #: 419-FM3
SUBSYSTEM: EMU
MDAC ID: 348
ITEM: WATER SUPPLY PRESSURE REGULATOR (ITEM 419)
LEAD ANALYST: G. RAFFAElli

NASA DATA:
BASELINE [ ]
NEW [ X ]

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RECOMMENDATIONS: (If different from NASA)
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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA CRITICALITY AND ANALYSIS.

REPORT DATE 02/25/88 C-663
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-357
NASA FMEA #: 420-FMI

SUBSYSTEM: EMU
MDAC ID: 357
ITEM: 02 FILTER AND ORIFICE (ITEM 420)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA CRITICALITY DUE TO NON-REDUNDANCY OF THE SECOND SCU.

REPORT DATE 02/25/88 C-664
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-356
NASA FMEA #: 420-FM2

SUBSYSTEM: EMU
MDAC ID: 356
ITEM: O2 FILTER AND ORIFICE (ITEM 420)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

*CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AGREES WITH THE NASA CRITICALITY DUE TO NON-REDUNDANCY OF SECOND SCU.

REPORT DATE 02/25/88 C-665
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-353
NASA FMEA #: 423-FMI, FM2

SUBSYSTEM: EMU
MDAC ID: 353
ITEM: BACTERIA CARTRIDGE (ITEM 423)

LEAD ANALYST: G. RAFFAELLI

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 353
ITEM: BACTERIA CARTRIDGE (ITEM 423)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

CRITICALITY REDUNDANCY SCREENS CIL
FLIGHT HDW/FUNC A B C ITEM

NASA [ 2 /IR ] [ F ] [ P ] [ P ] [ X ] *
IOA [ 2 /IR ] [ P ] [ F ] [ P ] [ X ]

COMPARE [ / ] [ N ] [ N ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN GENERAL AGREEMENT EXCEPT ON SCREENS A AND B; REGARDING WHICH THE IOA NOW CONCURS WITH THE NASA.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-352
NASA FMEA #: 423-FM3

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 352
ITEM: BACTERIA CARTRIDGE (ITEM 423)

LEAD ANALYST: G. RAFFAElli

ASSESSMENT:

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COMPARE [ / ] [ N ] [ N ] [ N ] [ ]

RECOMMENDATIONS: (If different from NASA)
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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-351
NASA FMEA #: 423-FM4
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 351
ITEM: BACTERIA CARTRIDGE (ITEM 423)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
BECAUSE THE SECOND SCU IS NOT EMPLOYED AS REDUNDANT, THE IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-354
NASA FMEA #: 424-FM1
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 354
ITEM: POTABLE H2O FILTER (ITEM 424)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
BECAUSE THE SECOND SCU IS NOT CONSIDERED REDUNDANT, THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-669
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-355
NASA FMEA #: 424-FM2
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 355
ITEM: POTABLE H2O FILTER (ITEM 424)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSSESSMENT DATE: 12/10/86
NASA DATA:
ASSESSMENT ID: EMU-332
NASA FMEA #: 425-FM1
NASA FMEA #: 425-FM1
SUBSYSTEM: EMU
MDAC ID: 332
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 410)
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-333
NASA FMEA #: 425-FM1
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 333
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 410)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-672
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-328
NASA FMEA #: 425-FM2

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 328
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 410)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88  C-673
APPENDIX C
ASSESSMENT WORKSHEET

ASSessment DATE: 12/10/86
ASSessment ID:  EMU-329
NASA FMEA #:    425-FM3
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM:    EMU
MDAC ID: 329
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 410)

LEAD ANALYST: G. RAFFAELLI

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RECOMMENDATIONS: (If different from NASA)

[ ] [ ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-334
NASA FMEA #: 425-FM4

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 334
ITEM: COMMON MULTIPLE CONNECTOR

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS:  (If different from NASA)

[ / ] [ ] [ ] [ ] [ A ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DUE TO DEFINED NON-REDUNDANCY OF SCUs, THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88  C-675
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-335
NASA FMEA #: 425-FM5

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 335
ITEM: COMMON MULTIPLE CONNECTOR

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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| COMPARE     | [ N /N ]           | [ N ] | [ N ] | [ N ] | [ N ] |

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS DUE TO NON-REDUNDANCY OF SCU.

REPORT DATE 02/25/88 C-676
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-330
NASA FMEA #: 425-FM6
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 330
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 410)

LEAD ANALYST: G. RAFFAElli

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AGREES WITH THE NASA ANALYSIS (DUE TO NON-REDUNDANT SCUs).

REPORT DATE 02/25/88  C-677
ASSESSMENT DATE: 12/10/86
NASA DATA:
ASSESSMENT ID: EMU-331 BASELINE [ ]
NASA FMEA #: 425-FM7 NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 331
ITEM: COMMON MULTIPLE CONNECTOR (ITEM 410)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ ] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
DUE TO THE SECOND SCU BEING NON-REDUNDANT, THE IOA AGREES WITH THE NASA ANALYSIS.

REPORT DATE 02/25/88 C-678
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-749X
NASA FMEA #: 425-FM8

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 749
ITEM: COMMON MULTIPLE CONNECTOR

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-679
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-750X
NASA FMEA #: 425-FM9
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 750
ITEM: COMMON MULTIPLE CONNECTOR

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)
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* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-680
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-783X
NASA FMEA #: 440==FM5

ASSESSMENT ID: EMU-783X
NASA FMEA #: 440==FM5

SUBSYSTEM: EMU
MDAC ID: 783
ITEM: EEH

LEAD ANALYST: G. RAFFAELLI

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NASA [2 /1R] [P] [P] [P] [X] *

IOA [2 /1R] [P] [P] [P] [X]

COMPARE [ / ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]

INADEQUATE [ ]

REMARKS:
The IOA and the NASA are in agreement.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-743X
NASA FMEA #: 470-FMI

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 743
ITEM: AIRLOCK ADAPTER PLATE (ITEM 470)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-744X
NASA FMEA #: 470-FM2

SUBSYSTEM: EMU
MDAC ID: 744
ITEM: AIRLOCK ADAPTER PLATE (ITEM 470)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-683
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-745X
NASA FMEA #: 470-FM3

SUBSYSTEM: EMU
MDAC ID: 745
ITEM: AIRLOCK ADAPTER PLATE (ITEM 470)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ / ] [N] [N] [N] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]

INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-684
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-746X
NASA FMEA #: 480-FMI
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 746
ITEM: CONTAMINATE CONTROL CARTRIDGE (ITEM 480)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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IOA [ 2 /1R ] [ P ] [ P ] [ P ] [ X ]

COMPARE [ / ] [ N ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT EXCEPT ON SCREEN A;
HOWEVER, UPON FURTHER REVIEW, THE IOA AGREES WITH THE NASA SCREEN A ASSIGNMENT.

REPORT DATE 02/25/88 C-685
**APPENDIX C**  
**ASSESSMENT WORKSHEET**

**ASSESSMENT DATE:** 12/10/86  
**ASSESSMENT ID:** EMU-193  
**NASA FMEA #:** 480-FM2  

**NASA DATA:**  
**BASELINE [ ]**  
**NEW [X]**

**SUBSYSTEM:** EMU  
**MDAC ID:** 193  
**ITEM:** CONTAMINANT CONTROL CARTRIDGE (ITEM 480)

**LEAD ANALYST:** G. RAFFAELLI

**ASSESSMENT:**

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**RECOMMENDATIONS:** (If different from NASA)  
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(ADD/DELETE)

* **CIL RETENTION RATIONALE:** (If applicable)  
  ADEQUATE [ ]  
  INADEQUATE [ ]

**REMARKS:**
THE IOA AND THE NASA ARE IN AGREEMENT. (ALSO REFERENCE MDAC ID-194).
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-194
NASA FMEA #: 480-FM2

NASA DATA:
BASELINE [ ]
NEW [ X ]

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COMPARE [ / ]   [ ]   [ ]   [ ]   [ ]

RECOMMENDATIONS: (If different from NASA)

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(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)
ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT. (ALSO REFERENCE MDAC ID-193).

REPORT DATE 02/25/88 C-687
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-196
NASA FMEA #: 480-FM3
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 196
ITEM: CONTAMINANT CONTROL CARTRIDGE (ITEM 480)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ F ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA AND THE NASA ARE IN GENERAL AGREEMENT; HOWEVER, THE IOA RECOMMENDS FAILURE OF SCREEN B. THIS RECOMMENDATION IS MADE BECAUSE THE DETECTION METHOD IDENTIFIED BY THE NASA IS AN EFFECT OF THE FAILURE HAVING OCCURED SOME PREVIOUS TIME AND IS THEREFORE NOT READILY DETECTABLE.

REPORT DATE 02/25/88 C-688
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-747
NASA FMEA #: 480-FM4
SUBSYSTEM: EMU
MDAC ID: 747
ITEM: CONTAMINANT CONTROL CARTRIDGE (ITEM 480)
LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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NASA [ 2 /1R ] [ ] [ ] [ ] [ ] [ X ] *
IOA [ /NA ] [ ] [ ] [ ] [ ] [ ]
COMPARE [ N /N ] [ ] [ ] [ ] [ ] [ N ]

RECOMMENDATIONS: (If different from NASA)
[ / ] [ ] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA CONSIDERS THIS FAILURE MODE NON CREDIBLE FOR AN FMEA.
THE FAILURE SHOULD BE ADDRESSED IN A HAZARD ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 8/06/87
ASSESSMENT ID: EMU-748X
NASA FMEA #: 480-FM5, FM6

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 748
ITEM: CONTAMINANT CONTROL CARTRIDGE (ITEM 480)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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COMPARE [ / ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-192
NASA FMEA #: 480-FM7
NASA DATA: BASELINE [ ] NEW [ X ]
SUBSYSTEM: EMU
MDAC ID: 192
ITEM: CONTAMINANT CONTROL CARTRIDGE (ITEM 480)
LEAD ANALYST: G. RAFFAElli

ASSESSMENT:

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COMPARE [ / ] [ ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-691
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-192A
NASA FMEA #: 480-FM8
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 192
ITEM: CONTAMINANT CONTROL CARTRIDGE (ITEM 480)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ 2 /1R ] [ P ] [ F ] [ F ] [ ] (ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The NASA FAILURE MODE IMPLIES THE FAILURE OF THE SOP TO MAKE UP
OXYGEN FLOW DUE TO THE SEVERITY OF THE FAILURE MODE. THE IOA
RECOMMENDS A 2/1R, c CRITICALITY TO MORE ACCURATELY REFLECT THIS
SCENARIO AND A COMBINATION OF NASA FMEAS 480-FM7 AND FM8 UNDER
A SINGLE ANALYSIS.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-290
NASA FMEA #: 490-FMI

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 290
ITEM: BATTERY (ITEM 490)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-693
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86  NASA DATA: BASELINE [ ]  NEW [ X ]
ASSESSMENT ID:  EMU-292
NASA FMEA #:  490-FM1

SUBSYSTEM:  EMU
MDAC ID:  292
ITEM:  BATTERY (ITEM 490)

LEAD ANALYST:  G. RAFFAElli

ASSESSMENT:

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RECOMMENDATIONS:  (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE:  (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-694
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-289
NASA FMEA #: 490-FM2

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 289
ITEM: BATTERY (ITEM 490)

LEAD ANALYST: G. RAFFAElli

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ 2 /1R ] [ ] [ ] [ ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
The IOA recommends a 2/1R criticality to reflect possible loss of life resulting from a violent rupture of the battery due to a concurrent short which generates hydrogen gas. The IOA does agree with the NASA screen assignments.
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-288
NASA FMEA #: 490-FM3
NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 288
ITEM: BATTERY (ITEM 490)

LEAD ANALYST: G. RAFFAELLI

ASSESSMENT:

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RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ P ] [ ]

(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

Adequate [ ]
Inadequate [ ]

REMARKS:
The IOA agrees with the NASA criticality assignment, however, the IOA recommends passage of Screen B because a degradation/failure of battery would be detected and SOP usage would be the corrective action.

REPORT DATE 02/25/88 C-696
APPENDIX C
ASSESSMENT WORKSHEET

ASSESSMENT DATE: 12/10/86
ASSESSMENT ID: EMU-287
NASA FMEA #: 490-FM4

NASA DATA:
BASELINE [ ]
NEW [ X ]

SUBSYSTEM: EMU
MDAC ID: 287
ITEM: BATTERY (ITEM 490)

LEAD ANALYST: G. RAFFAELLI

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| NASA | [ 2 /IR ] | [ F ] | [ P ] | [ P ] | [ X ] * |
| IOA  | [ 2 /IR ] | [ P ] | [ P ] | [ P ] | [ X ] |

COMPARE [ / ] [ N ] [ ] [ ] [ ]

RECOMMENDATIONS: (If different from NASA)

[ / ] [ ] [ ] [ ] [ ]
(ADD/DELETE)

* CIL RETENTION RATIONALE: (If applicable)

ADEQUATE [ ]
INADEQUATE [ ]

REMARKS:
THE IOA AND THE NASA ARE IN AGREEMENT. THE IOA AGREES WITH THE NASA SCREEN A ASSIGNMENT.

REPORT DATE 02/25/88 C-697
**APPENDIX C**  
**ASSESSMENT WORKSHEET**

**ASSESSMENT DATE:** 12/10/86  
**ASSESSMENT ID:** EMU-291  
**NASA FMEA #:** 490-FM5  
**SUBSYSTEM:** EMU  
**MDAC ID:** 291  
**ITEM:** BATTERY (ITEM 490)  
**LEAD ANALYST:** G. RAFFAELLI

**ASSESSMENT:**

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**RECOMMENDATIONS:**  
(If different from NASA)

| [ / ] | [ ] | [ ] | [ ] | [ ] | [ ] |

(ADD/DELETE)

* **CIL RETENTION RATIONALE:**  
(If applicable)  
ADEQUATE [ ]  
INADEQUATE [ ]

**REMARKS:**
THE IOA AND THE NASA ARE IN AGREEMENT.

REPORT DATE 02/25/88 C-698
## APPENDIX D
### POTENTIAL CRITICAL ITEMS

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APPENDIX E
DETAILED ANALYSIS

This appendix contains the IOA analysis worksheets supplementing previous results reported in STSEOS Working Paper 1.0-WP-VA86001-15, Analysis of the Extravehicular Mobility Unit, (28 November 1986). Prior results were obtained independently and documented before starting the FMEA/CIL assessment activity. Supplemental analysis was performed to address failure modes not previously considered by the IOA. Each sheet identifies the hardware item being analyzed, parent assembly and function performed. For each failure mode possible causes are identified, and hardware and functional criticality for each mission phase are determined as described in NSTS 22206, Instructions for Preparation of FMEA and CIL, 10 October 1986. Failure mode effects are described at the bottom of each sheet and worst case criticality is identified at the top.

LEGEND FOR IOA ANALYSIS WORKSHEETS

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

Hardware Criticalities:
1 = Loss of life or vehicle
2 = Loss of mission or next failure of any redundant item (like or unlike) could cause loss of life/vehicle
3 = All others

Functional Criticalities:
1R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of life or vehicle.
2R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of mission.

Redundancy Screen A:
1 = Is Checked Out PreFlight
2 = Is Capable of Check Out PreFlight
3 = Not Capable of Check Out PreFlight
NA = Not Applicable

Redundancy Screens B and C:
P = Passed Screen
F = Failed Screen
NA = Not Applicable

E-1
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM: EMU  
MDAC ID: 701  

HIGHEST CRITICALITY HDW/FUNC  
FLIGHT: 3/2R

ITEM: FAN SWITCH (ITEM 366)  
FAILURE MODE: CLIV SWITCH FAILS IN "VALVE OPEN"

LEAD ANALYST: G. RAFFAELLI  
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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6)
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LOCATION:
PART NUMBER: SV771887-2

CAUSES: ELECTRICAL ARCING, MATERIAL FAILURE

EFFECTS/RATIONALE:
CONCURRENT FAILURE OF ITEM 134 CHECK VALVE WHEN MOTOR NOT OPERATING CAN RESULT IN FLOODING OF FAN SEPARATOR AND MISSION TERMINATION.

REFERENCES:

REPORT DATE 02/25/88 E-2
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 702

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2

ITEM: FAN SWITCH (ITEM 366)
FAILURE MODE: CLIV SWITCH FAILS IN "VALVE CLOSE"

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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LOCATION:
PART NUMBER: SV771887-2

CAUSES: ELECTRICAL ARCING, MATERIAL FAILURE

EFFECTS/RATIONALE:
DURING PRE- AND POST-EVA A FAILED CLOSED VALVE CAN RESULT IN INABILITY TO PERFORM LCVG CHANGING. DURING EVA, A CONCURRENT FAILURE OF THE 172 CHECK VALVE (WITH A "HARD" CHARGE) CAN RESULT IN SEPARATOR FLOODING DUE TO INABILITY TO REMOVE CONDESATE.

REFERENCES:

REPORT DATE 02/25/88 E-3
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU
MDAC ID: 703

HIGHEST CRITICALITY HDW/FUNC
FLIGHT:

ITEM: CAUTION AND WARNING SWITCH (ITEM 368)
FAILURE MODE: LOSS OF INPUT POWER

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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LOCATION:
PART NUMBER: SV767792-2

CAUSES: WIRE CHAFFING/SEVERS, CONTACT FRACTURES

EFFECTS/RATIONALE:
LOSS OF C&W DISPLAY RESULTS IN MISSION TERMINATION.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: EMU
MDAC ID: 704

HIGHEST CRITICALITY
HDW/FUNC

FLIGHT: 2/2

ITEM: CAUTION AND WARNING ELECTRONICS (ITEM 150)
FAILURE MODE: 5V POWER SUPPLY FAILS HIGH

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) C&W
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/2
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV785970-5

CAUSES: SHORT CIRCUIT, ELECTRONIC VOLTAGE CONTROL CIRCUIT FAILS

EFFECTS/RATIONALE:
LOSS OF REFERENCE VOLTAGE TO A/D CONVERTER RESULTS IN ANALOG-TO-
DIGITAL CONVERSION FUNCTION OF C&W SYSTEM. POSSIBLE FALSE
MESSAGES CAN RESULT. MISSION TERMINATION DUE TO LOSS OF C&W
FUNCTION.

REFERENCES:

REPORT DATE 02/25/88 E-5
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 705

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2

ITEM: CAUTION AND WARNING ELECTRONICS (ITEM 150)
FAILURE MODE: 5V REFERENCE SUPPLY FAILS LOW

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) C&W
3)
4)
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6)
7)
8)
9)

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/2
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV785970-5

CAUSES: OPEN OR SHORT CIRCUIT, ELECTRONIC VOLTAGE CONTROL CIRCUIT FAILS

EFFECTS/RATIONALE:
LOSS OF ANALOG-TO-DIGITAL CONVERSION FUNCTION FOR C&W PARAMETERS. MISSION TERMINATION.

REFERENCES:

REPORT DATE 02/25/88 E-6
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 706

HIGHEST CRITICALITY HDW/FUNC

ITEM: CAUTION AND WARNING ELECTRONICS (ITEM 150)
FAILURE MODE: EMU TIMELINE MEMORY FAILS

LEAD ANALYST: G. RAFFAELLI 
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU 
2) C&W 
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CRITICALITIES

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LOCATION:
PART NUMBER: SV785970-5

CAUSES: THERMAL STRESS ON MEMORY, BUS FAILURE

EFFECTS/RATIONALE:
INABILITY TO SEQUENCE PROGRAMS BETWEEN EMU "STATES". TERMINATE MISSION.

REFERENCES:

REPORT DATE 02/25/88 
E-7
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                                HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM:  EMU                        FLIGHT:    2/2
MDAC ID:    707

ITEM:       CAUTION AND WARNING ELECTRONICS (ITEM 150)
FAILURE MODE:  C&W TONE DISCRETE FAILS ON

LEAD ANALYST: G. RAFFAELLI       SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  C&W
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CRITICALITIES

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LOCATION:
PART NUMBER: SV785970-5

CAUSES: SHORT CIRCUIT, THERMAL STRESS, VIBRATION

EFFECTS/RATIONALE:
C&W TONE GENERATED CONTINUOUSLY CAUSING CREW DISCOMFORT AND DEPENDENCE UPON DISPLAY FOR C&W. TERMINATE MISSION.

REFERENCES:

REPORT DATE 02/25/88 E-8
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 708
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: CAUTION AND WARNING ELECTRONICS (ITEM 150)
FAILURE MODE: C&W TONE DISCRETE FAILS OFF

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) C&W
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9)

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV785970-5

CAUSES: ELECTRICAL OPEN, THERMAL STRESS, BUFFER FAILURE

EFFECTS/RATIONALE:
LOSS OF TONE CAN RESULT IN CREWPERSON NOT BEING MADE AWARE OF A PARTICULAR FAILURE (UPON ITS DETECTION BY THE C&W SYSTEM). IF A SECOND FAILURE (I.E., A SUIT LEAK, HIGH CO2, OR FAILED SUBLIMATOR) SHOULD OCCUR IN CONCERT WITH TONE FAILURE, CREWPERSON REACTION TIME COULD BE SIGNIFICANTLY REDUCED AND MAY RESULT IN LOSS OF LIFE. MISSION TERMINATION WOULD OCCUR FOR THE FIRST FAILURE IF DETECTED.

REFERENCES:

REPORT DATE 02/25/88 E-9
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 709

HIGHEST CRITICALITY HDW/FUNC 

ITEM: CAUTION AND WARNING ELECTRONICS (ITEM 150) 
FAILURE MODE: FAILURE OF PERMANENT MEMORY

LEAD ANALYST: G. RAFFAELLI 
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) C&W
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LOCATION:
PART NUMBER: SV785970-5

CAUSES: INPUT/OUTPUT FAILURE, THERMAL STRESS, VIBRATION

EFFECTS/RATIONALE:
INABILITY OF CWS TO PERFORM ITS FUNCTIONS WITH INTEGRITY. MISSION TERMINATION WILL RESULT.

REFERENCES:

REPORT DATE 02/25/88 E-10
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                       HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU              FLIGHT: 2/1R
MDAC ID: 710

ITEM:           CAUTION AND WARNING ELECTRONICS
FAILURE MODE:  CPU FAILURE

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) C&W
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CRITICALITIES

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LOCATION:
PART NUMBER: SV785970-5

CAUSES: I/O PORT FAILURE, GATE FAILURE, THERMAL STRESS, OPEN, SHORT

EFFECTS/RATIONALE:
INABILITY TO PERFORM C&W PROCESSING AND CHECKS. MISSION TERMINATION. IF CPU FAILURE INHIBITS TONE USAGE AND IS COMBINED WITH A SECOND CRITICAL EMU FAILURE LOSS OF LIFE CAN RESULT.

REFERENCES:

REPORT DATE 02/25/88   E-11
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 711

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: CAUTION AND WARNING ELECTRONICS (ITEM 150)
FAILURE MODE: ELECTRICAL SHORT

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) C&W
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV785970-5

CAUSES: CONTAMINATION, VIBRATION, WIRE CHAFFING

EFFECTS/RATIONALE:
LOSS OF ANY POWER SUPPLY OR MAJOR ELECTRONIC FUNCTION CAN SEVERELY INHIBIT CWS OPERATION. MISSION TERMINATION. POSSIBLE CREWPERSON LOSS IF COMBINED WITH A SECOND "CRITICAL" EMU FAILURE DURING EVA.

REFERENCES:

REPORT DATE 02/25/88 E-12
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 712

HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/3

ITEM: PRIMARY REGULATOR (ITEM 113D)
FAILURE MODE: OSCILLATING OUTPUT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS

CRITICALITIES

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LOCATION:
PART NUMBER: SV77873-12

CAUSES: CONTAMINATION, BALANCE STEM MISALIGNED

EFFECTS/RATIONALE:
OSCILLATING OUTPUT WITHIN ACCEPTABLE PRESSURE LIMITS WILL HAVE NO IMPACT TO MISSION OR CREWMEMBER.

REFERENCES:

REPORT DATE 02/25/88 E-13
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [ ] SUBSYSTEM: EMU HIGHEST CRITICALITY [ ] HDW/FUNC
MDAC ID: 713 FLIGHT: 3/3

ITEM: H2O REGULATOR (ITEM 113E)
FAILURE MODE: OSCILLATING OUTPUT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: SV77873-12

CAUSES: CONTAMINATION, BALANCE STEM MISALIGNED

EFFECTS/RATIONALE:
OSCILLATING OUTPUT WITHIN ACCEPTABLE PRESSURE LIMITS WILL HAVE NO IMPACT TO MISSION OR IMPACT CREWPERSON SAFETY.

REFERENCES:

REPORT DATE 02/25/88 E-14
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                         HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU                 FLIGHT: 2/2
MDAC ID: 714

ITEM: SHEAR PLATE ASSEMBLY (ITEM 115)
FAILURE MODE: FILTER CLOGS AT DCM FILL OR END FITTING

LEAD ANALYST: G. RAFFAELLI    SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
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CRITICALITIES
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REDUNDANCY SCREENS: A [ ]    B [ ]    C [ ]

LOCATION:
PART NUMBER: SV778540-26

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:
POSSIBLE INABILITY TO CHARGE THE PLSS WITH O2. MISSION TERMINATION WILL RESULT DURING PRE-EVA AND/OR POST-EVA.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 715 

HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/2R 

ITEM: SHEAR PLATE ASSEMBLY (ITEM 115) 
FAILRE MODE: CONTAMINATION BREAKTHROUGH AT DCM END FITTING 

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI 

BREAKDOWN HIERARCHY: 
1) EMU 
2) LSS 
3) PLSS 
4) 
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CRITICALITIES 

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<td>POST-EVA:</td>
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LOCATION: 
PART NUMBER: SV778540-26 

CAUSES: FILTER EROSION 

EFFECTS/RATIONALE: 
CONTAMINATION WOULD NORMALLY BE PICKED UP BY O2 MANIFOLD FILTERS; HOWEVER, IF THESE FILTERS WERE ALSO FAILED CONTAMINATION CAN RESULT IN FAILURE OF THE 113 REGULATOR AND REQUIRE SOP USAGE TO RETURN TO VEHICLE. 

REFERENCES: 

REPORT DATE 02/25/88  E-16
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 716

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: CO2 TRANSDUCER (ITEM 122)
FAILURE MODE: SLOW RESPONSE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV767798-1

CAUSES: CONTAMINATION, MEMBRANE DOES NOT PASS SAMPLE

EFFECTS/RATIONALE:
NO IMMEDIATE EFFECT RESULTS FROM THE SENSOR FAILURE; HOWEVER, IF THE CCC ALSO FAILED, HIGH CO2 LEVEL CAN RESULT IN CREWPERSON LOSS THROUGH DISORIENTATION.

REFERENCES:

REPORT DATE 02/25/88 E-17
## Independent Orbiter Assessment
### Orbiter Subsystem Analysis Worksheet

**DATE:**

**SUBSYSTEM:** EMU

**MDAC ID:** 717

**ITEM:** FAN (ITEM 123A)

**FAILURE MODE:** BLADE FRACTURES

**LEAD ANALYST:** G. RAFFAELLI

**SUBSYS LEAD:** G. RAFFAELLI

**BREAKDOWN HIERARCHY:**

1) EMU
2) LSS
3) PLSS
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### Criticalities

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**LOCATION:**

**PART NUMBER:** SV787994-8

**CAUSES:** MATERIAL DEFECT, VIBRATION

**EFFECTS/RATIONALE:**

FRACTURE OF FAN BLADE RESULTS IN LOSS OF VENT LOOP; IF SOP ALSO FAILS, CREWPERSON CAN BE LOST. ADDITIONALLY, SINCE THE FAN BLADES ARE METALLIC, A FAN BLADE STRIKING THE HOUSING CAN RESULT IN AN OXYGEN FIRE.

**REFERENCES:**

**REPORT DATE 02/25/88**

E-18
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 718

HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 3/1R

ITEM: PRIMARY H2O TANK ASSEMBLY (ITEM 131/162)
FAILURE MODE: LEVER LATCH ASSEMBLY FAILS - BATTERY

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) 
2) 
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: /NA
EVA: /NA
POST-EVA: /NA


LOCATION:
PART NUMBER: SV769592-24

CAUSES: SPRING FRACTURE, LATCH FRACTURE, MATERIAL DEFECT

EFFECTS/RATIONALE:
THE LATCH FEATURES TWO LOCKING MECHANISMS FOR THE BATTERY. THE BATTERY ELECTRICAL CONNECTION AND THE TMG PROVIDE ADDITIONAL RETENTION CAPABILITY. FAILURE OF ONE LOCK MECHANISM WILL HAVE NO IMPACT, HOWEVER, FAILURE OF ALL REDUNDANT MECHANISMS AND THE SOP CAN RESULT IN CREWPERSON LOSS.

REFERENCES:

REPORT DATE 02/25/88 E-19
PRIMARY WATER TANK ASSEMBLY (ITEM 131/162)

LEVER LATCH ASSEMBLY FAILS - CCC

HIGHEST CRITICALITY

FLIGHT: 3/1R

CRITICALITIES

FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/2R
EVA: 3/1R
POST-EVA: 3/2R

LOCATION:
PART NUMBER: SV769592-24

CAUSES: SPRING FRACTURE, LATCH FRACTURE, MATERIAL DEFECT

EFFECTS/RATIONALE:
THE LATCH FEATURES TWO LOCKING MECHANISMS FOR THE CCC. THE CCC CONNECTIONS AND THE TMG PROVIDE ADDITIONAL RETENTION CAPABILITY. FAILURE OF ONE LOCK MECHANISM WILL HAVE NO IMPACT, HOWEVER, FAILURE OF ALL REDUNDANT MECHANISMS FOR CCC RETENTION CAN RESULT IN CREWPERSON LOSS FROM DEPRESSURIZATION.

REFERENCES:

REPORT DATE 02/25/88 E-20
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: Subsystem: EMU
MDAC ID: 720

HIGHEST CRITICALITY: HDW/FUNC
FLIGHT: 2/1R

ITEM: PRIMARY WATER TANK ASSEMBLY (ITEM 131/162)
FAILURE MODE: GAS LINES CLOG

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV769592-24

CAUSES: EXCESSIVE KRYTOX OR BLADDERS MOVES AND BLOCKS LINES

EFFECTS/RATIONALE:
LOSS OF BLADDER PRESSUREANT WILL RESULT IN LOSS OF CAPABILITY TO
SUPPLY SUBLIMATOR PRESSURIZED FEEDWATER AND TO SUPPLY MAKEUP LCVG
H2O/COOLING H2O. THIS WILL RESULT IN LOSS OF COOLING FUNCTION
AND MISSION TERMINATION. IF SOP ALSO LOST, CREWPERSON CAN
BE LOST.

REFERENCES:

REPORT DATE 02/25/88 E-21
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: EMU
MDAC ID: 721

ITEM: SUBLIMATOR (ITEM 140)
FAILURE MODE: BREAKTHROUGH

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
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LOCATION:
PART NUMBER: SV783850-14

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF SUBLIMATOR RESULTS IN LOSS OF PRIMARY TEMPERATURE CONTROL TECHNIQUE. MISSION TERMINATION RESULTS; HOWEVER, IF COMBINED WITH LOSS OF SOP COOLING, CREWPERSOON CAN BE LOST.

REFERENCES:

REPORT DATE 02/25/88 E-22
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM:  EMU  
MDAC ID:  723  

HIGHEST CRITICALITY  HDW/FUNC  FLIGHT:  3/3

ITEM:  POSITIVE PRESSURE RELIEF VALVE (ITEM 146) 
FAILURE MODE:  VALVE CHATTER

LEAD ANALYST:  G. RAFFAElli  SUBSYS LEAD:  G. RAFFAElli

BREAKDOWN HIERARCHY:
1)  EMU
2)  LSS
3)  PLSS
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LOCATION:
PART NUMBER:  SV787036-3

CAUSES:  SPRING UNSEAT/RESEAT FORCE HIGH

EFFECTS/RATIONALE:
SUITE PRESSURE WILL BE "JUMPY" DURING DEPRESS DUE TO VALVE CHATTER BUT WILL NOT RESULT IN MISSION TERMINATION OR CREWPERSON INJURY.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:               HIGHEST CRITICALITY   HDW/FUNC
SUBSYSTEM: EMU      FLIGHT: 2/1R
MDAC ID: 724

ITEM: RESERVE WATER TANK (ITEM 148)
FAILURE MODE: GAS LINES CLOG

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
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LOCATION:
PART NUMBER: SV769592-24

CAUSES: EXCESSIVE KRYTOX ON BLADDERS MOVES AND BLOCKS LINES

EFFECTS/RATIONALE:
LOSS OF BLADDER PRESSURANT WILL RESULT IN LOSS OF CAPABILITY TO
EMPLOY SUBLIMATOR AND TO SUPPLY MAKEUP H2O FOR LCVG AND COOLING
LOOPS. MISSION TERMINATION. IF SOP ALSO LOST, CREWPERSON CAN BE
LOST.

REFERENCES:

REPORT DATE 02/25/88 E-24
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 726 

HIGHEST CRITICALITY HDW/FUNC: FLIGHT: 1/1

ITEM: PLSS/SOP TMG (ITEM 161)
FAILURE MODE: LOOSE TMG PARTIALLY EXPOSES PLSS/SOP

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3)
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CRITICALITIES

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<td>POST-EVA:</td>
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LOCATION:
PART NUMBER: SV772168-15

CAUSES: SEAM SEPARATION, THREAD/CORD BREAKS, FASTENER OPENS

EFFECTS/RATIONALE:
LOCAL "HOT/COLD" SPOT WILL RESULT. IF HEATING RESULTS ON PLSS O2 BOTTLES OR SOP O2 BOTTLES, GAS PRESSURE CAN SIGNIFICANTLY INCREASE DUE TO NO PRESSURE RELIEF AT THE BOTTLES. POSSIBLE RUPTURE/EXPLOSION OF OXYGEN TANK(S) CAN CAUSE LOSS OF CREWPERSON.

REFERENCES:

REPORT DATE 02/25/88 E-25
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 727

HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/3

ITEM: REAL TIME DATA SYSTEM (ITEM 174)
FAILURE MODE: LOSS OF SIGNAL

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
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7) 
8) 
9) 

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 3/3
POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: SV791230-2

CAUSES: ELECTRICAL OPEN, POWER LOSS, COMPONENT/SENSOR FAILURE

EFFECTS/RATIONALE:
EKG SIGNAL NOT REQUIRED FOR EVA.

REFERENCES:

REPORT DATE 02/25/88 E-26
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM:  EMU  
MDAC ID:  728  

HIGHEST CRITICALITY  HDW/FUNC  
FLIGHT:  2/1R

ITEM:  REAL TIME DATA SYSTEM
FAILURE MODE:  ELECTRICAL SHORT

LEAD ANALYST:  G. RAFFAELLI  
SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
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CRITICALITIES
FLIGHT PHASE  HDW/FUNC
PRE-EVA:  2/2
EVA:  2/1R
POST-EVA:  2/2


LOCATION:
PART NUMBER:  SV791230-2

CAUSES:  CONTAMINATION, VIBRATION

EFFECTS/RATIONALE:
ELECTRICAL SHORT CAN CAUSE PARTIAL TO TOTAL LOSS OF DC/DC CONVERTER OR EXCESSIVE CURRENT DRAW. MISSION TERMINATION RESULTS. IF SOP IS ALSO LOST, CREWPERSON CAN BE LOST.

REFERENCES:

REPORT DATE 02/25/88  E-27
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:    SUBSYSTEM: EMU
MDAC ID: 729     HIGHEST CRITICALITY     HDW/FUNC
               FLIGHT:  3/3

ITEM: FIRST STAGE REGULATOR (ITEM 213B)  MDAC ID: 729
FAILURE MODE: OSCILLATING OUTPUT

LEAD ANALYST: G. RAFFAELLI     SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) SOP
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CRITICALITIES

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REDUNDANCY SCREENS:   A [ ]   B [ ]   C [ ]

LOCATION:
PART NUMBER: SV778475-13

CAUSES: CONTAMINATION, BALANCE STEM AND SPRING NOT MATCHED UP

EFFECTS/RATIONALE:
AN OSCILLATING OUTPUT WITHIN PRESSURE LIMITS WILL HAVE NO EFFECT.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: EMU
MDAC ID: 730
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3
ITEM: SECOND STAGE REGULATOR (ITEM 213D)
FAILURE MODE: OSCILLATING OUTPUT
LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) SOP
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: SV778475-13

CAUSES: CONTAMINATION, MISMATCHED PARTS

EFFECTS/RATIONALE:
OSCILLATING OUTPUT WITHIN PRESSURE LIMITS WILL HAVE NO IMPACTS.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU FLIGHT: 2/2
MDAC ID: 731

ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)
FAILURE MODE: ELECTRICAL OPEN - BATTERY RECHARGE SENSE LINE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: SV778872-11

CAUSES: VIBRATION, CONTACT SEVERS

EFFECTS/RATIONALE:
LOSS OF SENSE SIGNAL WILL RESULT IN INABILITY TO RECHARGE BATTERY. MISSION TERMINATION CAN RESULT.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 732

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2

ITEM: COMMON MULTIPLE CONNECTOR (ITEM 330)
FAILURE MODE: ELECTRICAL SHORT - BATTERY RECHARGE SENSE LINE

LEAD ANALYST: G. RAFFAELLI 
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM

CRITICALITIES

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<td>POST-EVA:</td>
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: SV778872-11

CAUSES: CONTAMINATION, VIBRATION, CHAFFING

EFFECTS/RATIONALE:
SHORT WILL CAUSE BATTERY DISCHARGE AND WILL RESULT IN MISSION TERMINATION AT PRE-EVA.

REFERENCES:

REPORT DATE 02/25/88 E-31
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 733 

ITEM: VOLUME CONTROL (ITEM 360) 
FAILURE MODE: INTERMITTENT OPERATION 

LEAD ANALYST: G. RAFFAELLI 
SUBSYS LEAD: G. RAFFAELLI 

BREAKDOWN HIERARCHY: 
1) EMU 
2) LSS 
3) DCM 
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CRITICALITIES

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LOCATION:
PART NUMBER: SV767784-1

CAUSES: CORROSION/CONTAMINATION ON WIPER

EFFECTS/RATIONALE:
EGRATED COMMUNICATIONS OPERATION. IF BOTH COMMUNICATIONS SETS ARE FAILED, TERMINATE MISSION.

REFERENCES:

REPORT DATE 02/25/88 

E-32
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM: EMU  
MDAC ID: 734  
HIGHEST CRITICALITY: HDW/FUNC  
FLIGHT: 3/2R

ITEM: COLUMN CONTROL (ITEM 360)  
FAILURE MODE: SHAFT BREAKS

LEAD ANALYST: G. RAFFAELLI  
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU  
2) LSS  
3) DCM

CRITICALITIES
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LOCATION:
PART NUMBER: SV767784-1

CAUSES: IMPACT, EXCESSIVE FORCE APPLIED TO SHAFT

EFFECTS/RATIONALE:
INABILITY TO CHANGE VOLUME. POSSIBLE LOSS OF ONE COMMUNICATIONS SET. TERMINATE MISSION IF BOTH SETS ARE LOST.

REFERENCES:

REPORT DATE 02/25/88  E-33
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU
MDAC ID: 735

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2

ITEM: DISPLAY INTENSITY CONTROL (ITEM 361)
FAILURE MODE: INTERMITTENT OPERATION

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES

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<td>POST-EVA:</td>
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LOCATION:
PART NUMBER: SV767785-1

CAUSES: CONTAMINATION ON CONTACTS

EFFECTS/RATIONALE:
PROBABLE DISPLAY LOSS. TERMINATE MISSION.

REFERENCES:

REPORT DATE 02/25/88 E-34
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [Blank]
SUBSYSTEM: EMU
MDAC ID: 736
HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/3

ITEM: DISPLAY INTENSITY CONTROL (ITEM 361)
FAILURE MODE: BROKEN SHAFT

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 3/3
POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: SV767785-1

CAUSES: IMPACT, EXCESSIVE FORCE

EFFECTS/RATIONALE:
INABILITY TO VERY DISPLAY INTENSITY. IF ENVIRONMENT IS BRIGHT, DISPLAY MAY REQUIRE SHADING.

REFERENCES:

REPORT DATE 02/25/88 E-35
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 737

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2

ITEM: CAUTION AND WARNING SWITCH (ITEM 368)
FAILURE MODE: SWITCH FAILS IN CENTER (OFF) POSITION

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/2
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV767792-2

CAUSES: BEARING BINDS, CAM BINDS, CORROSION

EFFECTS/RATIONALE:
INABILITY TO EMPLOY PROGRAM OR STATUS FUNCTION. THIS WILL RESULT IN MISSION TERMINATION.

REFERENCES:

REPORT DATE 02/25/88 E-36
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 738 

HIGHEST CRITICALITY HDW/FUNC 
FLIGHT: 3/3 

ITEM: SUIT PRESSURE GAGE (ITEM 311) 
FAILURE MODE: LIGHT FAILS OFF 

LEAD ANALYST: G. RAFFAELLI  
SUBSYS LEAD: G. RAFFAELLI 

BREAKDOWN HIERARCHY: 
1) EMU 
2) LSS 
3) DCM 
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CRITICALITIES 

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LOCATION: 
PART NUMBER: SV767706-3 

CAUSES: OPEN CIRCUIT, VIBRATION 

EFFECTS/RATIONALE: 
NO MISSION IMPACT. CREWPERSON CAN EMPLOY AVAILABLE LIGHTING OR C&W DISPLAY. 

REFERENCES: 

REPORT DATE 02/25/88 E-37
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 739

ITEM: DCM TMG (ITEM 384)
FAILURE MODE: PARTIALLY EXPOSES DCM

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES

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<td>POST-EVA:</td>
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LOCATION:
PART NUMBER: SV771987-11

CAUSES: SEAM SEPARATION, THREAD/CORD SEVERS OR COMES UNDONE

EFFECTS/RATIONALE:
LOCAL "COLD/HOT" SPOTS ON DCM ARE REMOTE FROM CREwperson AND HIGH PRESSURE OXYGEN. ELECTRONICS SHOULD NOT BE AFFECTED DUE TO HEAT DISTRIBUTION. NO IMPACT.

REFERENCES:

REPORT DATE 02/25/88 E-38
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM: EMU  
MDAC ID: 742  

HIGHEST CRITICALITY HDW/FUNC  
FLIGHT: 3/3  

ITEM: SHEATH ASSEMBLY (ITEM 428)  
FAILURE MODE: CLOTH TORN  

LEAD ANALYST: G. RAFFAELLI  
SUBSYS LEAD: G. RAFFAELLI  

BREAKDOWN HIERARCHY:  
1) EMU  
2) SCU  
3)  
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CRITICALITIES  

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LOCATION:  
PART NUMBER: SV771749-3  

CAUSES: DEFECTIVE MATERIAL, ABRASION, SEAM SEPARATES  

EFFECTS/RATIONALE:  
NO IMPACTS SINCE SCU IS NOT IN A SEvere THERMAL ENVIRONMENT.  

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM:  EMU
MDAC ID:  743

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<td>FAILURE MODE:</td>
<td>ADAPTER DETACHES FROM WALL</td>
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LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
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<td>POST-EVA:</td>
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LOCATION:
PART NUMBER:  SV767680-03

CAUSES:  MOUNTING BRACKET FRACTURES

EFFECTS/RATIONALE:
LOSS OF ANY ONE BRACKET WOULD RESULT IN AAP DETACHING. MISSION TERMINATION. FAILURE MODE WILL MOST LIKELY OCCUR DURING ASCENT.

REFERENCES:

REPORT DATE 02/25/88  E-40
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 

SUBSYSTEM: EMU  HIGHEST CRITICALITY HDW/FUNC
MDAC ID: 744  FLIGHT: 2/2

ITEM: AIRLOCK ADAPTER PLATE (ITEM 470)
FAILURE MODE: EMU DETACHES FROM AAP

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
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CRITICALITIES

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<td>G. RAFFAELLI</td>
<td>G. RAFFAELLI</td>
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LOCATION:
PART NUMBER: SV767680-03

CAUSES: LATCH MECHANISM FAILS OPEN/FRACTURES, PIN FRACTURES

EFFECTS/RATIONALE:
LOSS OF ONE OF TWO PIN-LATCH MECHANISMS OR ONE OF TWO PIN INSERT MECHANISMS CAN RESULT IN DETACHMENT DURING ASCENT LOADS. MISSION TERMINATION.

REFERENCES:

REPORT DATE 02/25/88  E-41
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM:  EMU
MDAC ID:  745

HIGHEST CRITICALITY   HDW/FUNC
FLIGHT:  2/2

ITEM:  AIRLOCK ADAPTER PLATE (ITEM 470)
FAILURE MODE:  SCU DETACHES

LEAD ANALYST:  G. RAFFAELLI
SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
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LOCATION:
PART NUMBER:  SV767680-03

CAUSES:  SCU LATCH FAILS OPEN/FRACTURES

EFFECTS/RATIONALE:
SCU DETACHMENT CAN RESULT IN DAMAGE TO SCU, AIRLOCK, AND EMU DURING ASCENT. MISSION TERMINATION.

REFERENCES:

REPORT DATE 02/25/88  E-42
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [Blank]
SUBSYSTEM: EMU
MDAC ID: 746

HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 2/1R

ITEM: CONTAMINATE CONTROL CARTRIDGE (ITEM 480)
FAILURE MODE: FAILS TO REMOVE CO2

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
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CRITICALITIES

FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV792600-00

CAUSES: CHANNELING, EARLY LIFE LIMIT REACHED, MOISTURE PENETRATION

EFFECTS/RATIONALE:
LOSS OF CO2 REMOVAL CAPABILITY WILL RESULT IN MISSION TERMINATION. IF CONCURRENT CO2 SENSOR FAILURE ALSO OCCURS, CREWPERSON CAN BE LOST.

REFERENCES:

REPORT DATE 02/25/88
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 748

HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 2/1R

ITEM: CONTAMINANT CONTROL CARTRIDGE (ITEM 480)
FAILURE MODE: OVERHEATING/HYDROGEN GENERATION

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
4) 
5) 
6) 
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8) 
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CRITICALITIES

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LOCATION:
PART NUMBER: SV792600-00

CAUSES: WATER IN LiOH

EFFECTS/RATIONALE:
DEGRADED CO2 REMOVAL CAPABILITY WILL RESULT IN MISSION TERMINATION. IF COUPLED WITH A CO2 SENSOR FAILURE CREWPERSON CAN BE LOST.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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SUBSYSTEM: EMU
MDAC ID: 749

ITEM: COMMON MULTIPLE CONNECTOR
FAILURE MODE: OPEN IN BATT SENSE LINE

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SCU
3) 
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5) 
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CRITICALITIES

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LOCATION:
PART NUMBER: SV771763-3

CAUSES: VIBRATION, WIRE SEVERS

EFFECTS/RATIONALE:
LOSS OF SENSE SIGNAL WILL RESULT IN INABILITY TO RECHARGE BATTERY. MISSION TERMINATION CAN RESULT.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [blank]
SUBSYSTEM: EMU
MDAC ID: 750

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2

ITEM: COMMON MULTIPLE CONNECTOR
FAILURE MODE: SHORT IN BATT SENSE LINE

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SCU
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CRITICALITIES

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LOCATION:
PART NUMBER: SV771763-3

CAUSES: VIBRATION, CONTAMINATION

EFFECTS/RATIONALE:
SHORT WILL CAUSE BATTERY DISCHARGE DURING IV OPERATION. NOT APPLICABLE TO EVA.

REFERENCES:

REPORT DATE 02/25/88 E-46
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 751

HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 1/1

ITEM: FAN/SEPARATOR/PUMP/MOTOR ASSEMBLY
FAILURE MODE: 02 LEAKAGE TO ELECTRONICS/ROTOR

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
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CRITICALITIES

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LOCATION:
PART NUMBER: SV787994-8

CAUSES: SEAL FAILURE-GALLED, AGE, WEAR

EFFECTS/RATIONALE:
02 LEAKAGE INTO ELECTRONICS CAN RESULT IN AN OXYGEN FIRE AND CREWPERSON LOSS.

REFERENCES:

REPORT DATE 02/25/88 E-47
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                                  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU                        FLIGHT: 3/2R
MDAC ID: 752

ITEM: PRESSURE SUIT SENSOR
FAILURE MODE: FAILS STUCK AT NOMINAL PRESSURE VALUE

LEAD ANALYST: G. RAFFAELLI           SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/2R
EVA: 3/2R
POST-EVA: 3/2R


LOCATION:
PART NUMBER:  SV767788-2

CAUSES: INTERNAL LINKAGE FAILURE, WIPER STICKS

EFFECTS/RATIONALE:
IF ONLY ONE FAILURE, NO IMPACTS WOULD RESULT. HOWEVER, IF
COMBINED WITH A PLSS REGULATOR FAILURE OR A LEAK THE SOP WOULD
NECESSARILY BE USED AND MISSION TERMINATION WOULD RESULT.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                      HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM:  EMU           FLIGHT:  2/1R
MDAC ID:  753

ITEM:                   FAILURE MODE:
SHEAR PLATE ASSEMBLY   CAM DETACHES

LEAD ANALYST: G. RAFFAElli      SUBSYS LEAD: G. RAFFAElli

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
4) 
5) 
6) 
7) 
8) SHEAR PLATE ASSEMBLY
9) CAM DETACHES

CRITICALITIES
FLIGHT PHASE  HDW/FUNC
PRE-EVA:  2/2
EVA:  2/1R
POST-EVA:  2/2


LOCATION:
PART NUMBER:  SV778540-26

CAUSES:  IMPACT, MATERIAL DEFECT/FATIGUE, JOINT FRACTURES

EFFECTS/RATIONALE:
FREE MOVEMENT OF THE REGULATOR ASSEMBLY ACTUATION MECHANISM CAN RESULT IN MOVEMENT OUT OF THE EVA POSITION. WERE THIS TO OCCUR WITH FAILURES OF REDUNDANT PRESSURE MAINTENANCE FUNCTIONS (E.G., A LEAK) THE PLSS AND SOP MAY NOT BE AVAILABLE AND CREWPERSON COULD BE LOST.

REFERENCES:

REPORT DATE 02/25/88  E-49
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU
MDAC ID: 754

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R

ITEM: SHEAR PLATE ASSEMBLY
FAILURE MODE: MOUNTING SCREW FRACTURES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/2R
EVA: 3/1R
POST-EVA: 3/2R


LOCATION:
PART NUMBER: SV778540-26

CAUSES: IMPACT, MATERIAL DEFECT/FATIGUE

EFFECTS/RATIONALE:
THE IOA RECOGNIZES THAT 10 MOUNTING SCREWS EXIST AND SEVEN ARE REQUIRED TO MAINTAIN INTEGRITY. THEREFORE 3 SCREW MUST BE LOST BEFORE THE SYSTEM AND CREWPERSON COULD BE LOST.

REFERENCES:

REPORT DATE 02/25/88 E-50
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 755

HIGHEST CRITICALITY HDW/FUNC FLIGHT: 2/1R

ITEM: SUBLIMATOR (ITEM 140)
FAILURE MODE: REDUCED AIR STREAM HEAT REMOVAL

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV783850-14

CAUSES: CONTAMINANT DEPOSITION ON HEAT EXCHANGER WALLS

EFFECTS/RATIONALE:
LOSS OF HEAT EXCHANGER EFFICIENCY CAN RESULT IN WARMER VENT FLOW THAN DESIRED. THIS IN TURN DEGRADES THE HUMIDITY CONTROL FUNCTION AND CAN LEAD TO FOGGING OF THE HELMET AREA AND SOP OPERATION. MISSION TERMINATION CAN RESULT. IF THE SOP WERE ALSO FAILED, CREWPERSON CAN BE LOST FROM DISORIENTATION DUE TO HELMET FOGGING.

REFERENCES:

REPORT DATE 02/25/88 E-51
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM:  EMU  FLIGHT:  2/1R
MDAC ID:  756

ITEM:  SUBLIMATOR (ITEM 140)
FAILURE MODE:  POROUS PLATE SPATIAL RELATION TO SUBLIMATOR
CHANGES

LEAD ANALYST:  G. RAFFAELLI  SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
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LOCATION:
PART NUMBER:  SV783850-14

CAUSES:  IMPACT ON POROUS PLATE MOUNTING EDGE

EFFECTS/RATIONALE:
DECREASED EFFICIENCY CAN LEAD TO LOSS/DEGRADATION OF HUMIDITY
CONTROL AND COOLING FUNCTIONS. MISSION TERMINATION WILL RESULT
AS WILL SOP OPERATIONS. WERE THE SOP ALSO FAILED, THE CREWPERSON
WOULD BE LOST.

REFERENCES:

REPORT DATE 02/25/88  E-52
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 757

HIGHEST CRITICALITY HDW/FUNC

MDAC ID: 757
FLIGHT: 2/1R

ITEM: CAUTION AND WARNING ELECTRONICS (ITEM 150)
FAILURE MODE: 5.6V POWER SUPPLY FAILS OFF

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) C&W
3)
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV785970-5

CAUSES: OPEN AT 5.6V INPUT

EFFECTS/RATIONALE:
LOSS OF 5V NON-VOLATILE RAM POWER AND 5V DIGITAL POWER SUED BY NUMEROUS C&W COMPONENTS THEREBY CAUSING OVERALL C&W LOSS. MISSION TERMINATION SHOULD RESULT. ADDITIONALLY, WERE A SIMULTANEOUS CCC FAILURE TO OCCUR, THE CREwperson COULD BE LOST.

REFERENCES:

REPORT DATE 02/25/88 E-53
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 758

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: CAUTION AND WARNING ELECTRONICS (ITEM 150)
FAILURE MODE: TIMELINE MEMORY FAILS AT X=1

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) C&W
3) 
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CRITICALITIES

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LOCATION:
PART NUMBER: SV785970-5

CAUSES: INTERNAL MEMORY ADDRESS LATCH FAILS CLOSED

EFFECTS/RATIONALE:
LOSS OF NUMEROUS EVA CAUTION AND WARNING MONITORING FUNCTIONS (INCLUDING CO2 LEVELS). MISSION TERMINATION. WERE THE CCC TO ALSO FAIL, THE CREWPERSON COULD BE LOST.

REFERENCES:

REPORT DATE 02/25/88 E-54
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM:  EMU  
MDAC ID:  759

ITEM:  DCM
FAILURE MODE:  SCREW BRACKET DISATTACHES

LEAD ANALYST:  G. RAFFAELLI  
SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU  
2)  LSS  
3)  DCM  
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CRITICALITIES

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               B [ F ]  
               C [ F ]

LOCATION:
PART NUMBER:

CAUSES: IMPACT, STRIPPED SCREW, MATERIAL DEFECT/FATIGUE

EFFECTS/RATIONALE:
NO IMPACT FOR FAILURE OF SINGLE SCREW/BRACKET; HOWEVER, IF ALL
WERE TO FAIL THE DCM COULD DETACH FROM THE HUT AND CAUSE LOSS OF
CREWPERSON DUE TO GROSS EXTERNAL OXYGEN LEAKAGE.

REFERENCES:

REPORT DATE 02/25/88  E-55
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:     SUBSYSTEM: EMU
MDAC ID:  760

ITEM:     DCM ELECTRONICS (ITEM 350)
FAILURE MODE: SHORT INPUT TO OUTPUT IN PRIMARY EVC CURRENT LIMITER

LEAD ANALYST: G. RAFFAELLI     SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM

CRITICALITIES

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LOCATION:
PART NUMBER: SV792291

CAUSES: CONTAMINATION, VIBRATION

EFFECTS/RATIONALE:
LOSS OF CURRENT LIMITER FUNCTION. NO INPACT UNLESS SUBSEQUENT FAILURE IN DOWNSTREAM ELECTRONICS (I.E., A SHORT) RESULTS IN EXCESSIVE CURRENT DRAW UPON THE BATTERY. THIS CAN RESULT IN A SHORTENED MISSION OR LOSS OF BATTERY POWER. IF BATTERY POWER IS LOST THE SOP WOULD BE EMPLOYED TO RETURN TO VEHICLE. THEREFORE, LOSS OF LIFE CAN RESULT IF THE SOP WERE ALSO FAILED.

REFERENCES:

REPORT DATE 02/25/88    E-56
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:          HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM:  EMU  FLIGHT:  3/1R
MDAC ID:  761

ITEM:  DCM ELECTRONICS (ITEM 350)
FAILURE MODE:  INPUT TO OUTPUT SHORT IN FEEDWATER VALVE CURRENT LIMITER

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  LSS
3)  DCM
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LOCATION:
PART NUMBER:  SV792291

CAUSES:  CONTAMINATION, VIBRATION

EFFECTS/RATIONALE:
LOSS OF CURRENT LIMITER FUNCTION. NO IMPACT UNLESS SUBSEQUENT FAILURE IN DOWNSTREAM ELECTRONICS (I.E., A SHORT) CAUSES EXCESSIVE CURRENT DRAW UPON THE BATTERY. THIS CAN RESULT IN A SHORTENED MISSION OR LOSS OF BATTERY POWER. IF BATTERY POWER IS LOST, THE SOP IS REQUIRED FOR RETURN TO VEHICLE; HOWEVER, IF THE SOP WERE ALSO FAILED, THE CREWPERSON COULD BE LOST.

REFERENCES:

REPORT DATE 02/25/88  E-57
INDEPENDENT ORBITER ASSESSMENT  
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 762 

HIGHEST CRITICALITY  HDW/FUNC
FLIGHT: 3/1R

ITEM: DCM ELECTRONICS (ITEM 350) 
FAILURE MODE: BATTERY POWER "ON" DISCRETE FAILS OFF 

LEAD ANALYST: G. RAFFAELLI  
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY: 
1) EMU  
2) LSS  
3) DCM  
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LOCATION: 
PART NUMBER: SV792291

CAUSES: ELECTRICAL OPEN, VIBRATION

EFFECTS/RATIONALE: 
LOSS OF CONSUMMABLES MANAGEMENT AND MONITORING FUNCTION BY CWS. 
WERE A SECOND FAILURE TO RESULT (I.E., AN OXYGEN LEAK), THE 
CREWPERSON MAY BE REQUIRED TO EMPLOY THE SOP TO RETURN TO 
VEHICLE. IF THE SOP WERE ALSO FAILED THE CREWPERSON COULD BE 
LOST.

REFERENCES:

REPORT DATE 02/25/88  E-58
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:              HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU                  FLIGHT: 3/3
MDAC ID: 763

ITEM: DCM ELECTRONICS (ITEM 350)
FAILURE MODE: BATTERY POWER "ON" DISCRETE FAILS ON

LEAD ANALYST: G. RAFFAElli    SUBSYS LEAD: G. RAFFAElli

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: SV792291

CAUSES: LIMITED SHORT, CONTAMINATION

EFFECTS/RATIONALE:
ERRONEOUS MESSAGE DURING IV OPERATIONS; OTHERWISE, NO IVA OR EVA IMPACTS.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                     HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU
MDAC ID: 764

ITEM: DCM ELECTRONICS (ITEM 350)
FAILURE MODE: FEEDWATER VALVE SWITCH DISCRETE FAILS OFF

LEAD ANALYST: G. RAFFAELLI        SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM

CRITICALITIES

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REDUNDANCY SCREENS:   A [ ]   B [ ]   C [ ]

LOCATION:        SV792291

PART NUMBER:    SV792291

CAUSES:        ELECTRICAL OPEN, CONTAMINATION

EFFECTS/RATIONALE:
ERRONEOUS MESSAGE DISPLAYED AND LOSS OF CWS SUBLIMATOR PRESSURE MONITORING FOR LIMIT VIOLATIONS. SUBLIMATOR PRESSURE READOUT REMAINS AVAILABLE. NO MISSION OR CREWPERSON IMPACTS.

REFERENCES:

REPORT DATE 02/25/88    E-60
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EMU
MDAC ID: 765
FLIGHT: 3/3

ITEM: DCM ELECTRONICS (ITEM 350)
FAILURE MODE: FEEDWATER VALVE SWITCH DISCRETE FAILS ON

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM

CRITICALITIES
FLIGHT PHASE  HDW/FUNC
PRE-EVA: 3/3
EVA: 3/3
POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER: SV792291

CAUSES: LIMITED SHORT, CONTAMINATION

EFFECTS/RATIONALE:
ERRONEOUS MESSAGE DURING IVA OPERATIONS; OTHERWISE, NO IMPACTS.

REFERENCES:

REPORT DATE 02/25/88 E-61
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 766

HIGHEST CRITICALITY HDW/FUNC FLIGHT: 2/1R

ITEM: DCM ELECTRONICS (ITEM 350)
FAILRE MODE: FAN/PUMP SWITCH DISCRETE FAILS OFF

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES

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<td>POST-EVA:</td>
<td>2/2</td>
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LOCATION: 
PART NUMBER: SV792291

CAUSES: ELECTRICAL OPEN, VIBRATION

EFFECTS/RATIONALE:
LOSS OF THIS DISCRETE CAUSES ERRONEOUS FAN STATUS MESSAGE AND LOSS OF CWS VENT FLOW MONITORING. WERE VENT FLOW ALSO FAILED SUCH THAT AN INEFFICIENT ORAL/NASAL FLUSH TO OCCUR, THE CREWPERSON COULD BE SUBJECT TO HIGH CO2 LEVELS THAT CAN RESULT IN DISORIENTATION AND LOSS OF LIFE.

REFERENCES:

REPORT DATE 02/25/88 E-62
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                      HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU
MDAC ID: 767

ITEM: DCM ELECTRONICS (ITEM 350)
FAILURE MODE: FAN/PUMP SWITCH DISCRETE FAILS ON

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER: SV792291

CAUSES: SHORT, CONTAMINATION

EFFECTS/RATIONALE:
ERRONEOUS MESSAGE GENERATION WHEN FAN IS ACTUALLY OFF. NO IMPACTS ON MISSION OR CREWPERSON.

REFERENCES:

REPORT DATE 02/25/88  E-63
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:        HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM:   EMU
MDAC ID:     768              FLIGHT: 3/3

ITEM:       DCM ELECTRONICS (ITEM 350)
FAILURE MODE: VEHICLE VOLTAGE DISCRETE FAILS OFF

LEAD ANALYST: G. RAFFAELLI      SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: SV792291

CAUSES: ELECTRICAL OPEN, CONTAMINATION

EFFECTS/RATIONALE:
ERRONEOUS MESSAGE GENERATION DURING IVA; OTHERWISE, NO OTHER IMPACTS.

REFERENCES:

REPORT DATE 02/25/88 E-64
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM:  EMU
MDAC ID:  769

HIGHEST CRITICALITY  HDW/FUNC

FLIGHT:  3/1R

ITEM:  DCM ELECTRONICS (ITEM 350)
FAILRE MODE:  VEHICLE VOLTAGE DISCRETE FAILS ON

LEAD ANALYST:  G. RAFFAELLI  SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  LSS
3)  DCM
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CRITICALITIES

FLIGHT PHASE  HDW/FUNC
PRE-EVA:  3/2R
EVA:  3/1R
POST-EVA:  3/2R


LOCATION:
PART NUMBER:  SV792291

CAUSES:  SHORT, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF CWS MONITORING FOR HIGH AXYGEN USE RATE AND H2O OFF STATUS DURING EVA. SHOULD AN OXYGEN ALSO OCCUR DURING EVA THE CREWPERSON WOULD NOT BE ALERTED (EXCEPT BY THE CONSUMMABLES MANAGEMENT FUNCTION WHICH WOULD INDICATE ONLY 30 MINUTES OXYGEN LEFT; HOWEVER, THIS TIME COULD BE ERRONEOUS DUE TO THE MANNER OF THE CWS CALCULATION). THIS CAN RESULT IN SOP USAGE WHICH IF ALSO FAILED CAN RESULT IN LOSS OF LIFE.

REFERENCES:

REPORT DATE 02/25/88  E-65
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU
MDAC ID: 770

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/IR

ITEM: DCM ELECTRONICS (ITEM 350)
FAILURE MODE: SHORT INPUT TO OUTPUT IN CLIV CURRENT LIMITER

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
4)...
5)...
6)...
7)...
8)...
9)

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/2R
EVA: 3/1R
POST-EVA: 3/2R


LOCATION:
PART NUMBER: SV792291

CAUSES: CONTAMINATION, VIBRATION

EFFECTS/RATIONALE:
LOSS OF CURRENT LIMITER FUNCTION RESULTS IN POSSIBLE LOSS OF ALL
POWER SHOULD A SUBSEQUENT DOWNSTREAM SHORT OCCUR. IF THE SOP IS
ALSO FAILED WITH LOSS OF POWER, THE CREWPERSION COULD BE LOST.

REFERENCES:

REPORT DATE 02/25/88 E-66
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM:  EMU  
MDAC ID:  771

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT:  2/1R

ITEM:  DCM ELECTRONICS (ITEM 350)
FAILURE MODE:  DC/DC CURRENT LIMITER FAILS OPEN

LEAD ANALYST:  G. RAFFAELLI  
SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  LSS
3)  DCM
4)  
5)  
6)  
7)  
8)  
9)  

CRITICALITIES
FLIGHT PHASE  HDW/FUNC
PRE-EVA:  2/2
EVA:  2/1R
POST-EVA:  2/2


LOCATION:
PART NUMBER:  SV792291

CAUSES:  VIBRATION, THERMAL CYCLING

EFFECTS/RATIONALE:
LOSS OF DC/DC CONVERTER SUPPORTED ELECTRONICS - CWS, SENSORS, AND RTDS. MISSION TERMINATION. WERE A CO2 CONTROL FUNCTION FAILURE TO ALSO OCCUR, THE CREWPERSON COULD BECOME DISORIENTED AND UNABLE TO REACT PROPERLY, THEREBY CAUSED LOSS OF LIFE.

REFERENCES:

REPORT DATE 02/25/88  E-67
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 772

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/1R

ITEM: DCM ELECTRONICS (ITEM 350)
FAILURE MODE: SHORT INPUT TO OUTPUT FOR DC/DC CONVERTER CURRENT LIMITER

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES

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LOCATION:
PART NUMBER: SV792291

CAUSES: CONTAMINATION, VIBRATION

EFFECTS/RATIONALE:
LOSS OF CURRENT LIMITER FUNCTION. IF ACCOMPANIED BY A DOWNSTREAM SHORT THE BATTERY COULD BE SIGNIFICANTLY DRAWN DOWN SUCH THAT PLSS FUNCTIONS COULD NOT BE SATISFIED AND THE SOP REQUIRED. AN ADDITIONAL SOP FAILURE COULD THEN RESULT IN LOSS OF LIFE.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                      HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM:  EMU            FLIGHT:  2/1R
MDAC ID:  773

ITEM:  DCM ELECTRONICS (ITEM 350)
FAILURE MODE:  NEGATIVE CURRENT RETURN LINE FAILS OPEN

LEAD ANALYST:  G. RAFFAELLI  SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  LSS
3)  DCM
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CRITICALITIES
FLIGHT PHASE  HDW/FUNC
PRE-EVA:  2/2
EVA:  2/1R
POST-EVA:  2/2


LOCATION:
PART NUMBER:  SV792291

CAUSES:  VIBRATION, IMPACT

EFFECTS/RATIONALE:
LOSS OF CIRCUIT AND, THEREFORE, ALL EMU POWER. MISSION TERMINATION. IF THE SOP WERE ALSO FAILED, THE CREWPERSON WOULD BE LOST.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 774

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3

ITEM: DCM ELECTRONICS (ITEM 350)
FAILURE MODE: MOTOR TACH SIGNAL OPEN/SHORT

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES

FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 3/3
POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: SV792291

CAUSES: VIBRATION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF MOTOR TACHAMETER SENSING. NO IMPACTS TO MISSION OR CREWPERSON.

REFERENCES:

REPORT DATE 02/25/88 E-70
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                    HIGHEST CRITICALITY    HDW/FUNC
SUBSYSTEM: EMU            FLIGHT:       /
MDAC ID: 775

ITEM: DCM ELECTRONICS (ITEM 350)
FAILURE MODE: TEMPORARY DROP IN DC/DC CONVERTER VOLTAGES

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
4)
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CRITICALITIES

FLIGHT PHASE    HDW/FUNC
PRE-EVA:       /
EVA:           /
POST-EVA:      /

REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER: SV792291

CAUSES:

EFFECTS/RATIONALE:
NOT A FAILURE - THIS IS AN ANOMALY.

REFERENCES:

REPORT DATE 02/25/88 E-71
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [Redacted]
SUBSYSTEM: EMU
MDAC ID: 776

HIGHEST CRITICALITY  HDW/FUNC

FLIGHT:

ITEM: DCM ELECTRONICS (ITEM 350)
FAILURE MODE: RADIATED EMISSIONS HIGH

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES
FLIGHT PHASE  HDW/FUNC
PRE-EVA:  /
EVA:  /
POST-EVA:  /

REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER: SV792291

CAUSES:

EFFECTS/RATIONALE:
SHOULD BE COVERED AS A HAZARD ANALYSIS.

REFERENCES:

REPORT DATE 02/25/88  E-72
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU  
MDAC ID: 777  

HIGHEST CRITICALITY HDW/FUNC  
FLIGHT: 3/1R

ITEM: DCM ELECTRONICS (ITEM 350)  
FAILURE MODE: SHORT INPUT TO OUTPUT OF SECONDARY EVC CURRENT LIMITER

LEAD ANALYST: G. RAFFAELLI  
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU  
2) LSS  
3) DCM  
4)  
5)  
6)  
7)  
8)  
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CRITICALITIES

FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/2R
EVA: 3/1R
POST-EVA: 3/2R


LOCATION:
PART NUMBER: SV792291

CAUSES: CONTAMINATION, VIBRATION

EFFECTS/RATIONALE:
LOSS OF CURRENT LIMITER FUNCTION CAN RESULT IN COMPLETE EMU POWER LOSS IF ACCOMPANIED BY DOWNSTREAM SHORT. POSSIBLE CREWPERSON LOSS IF SOP ALSO FAILS IN THIS SCENARIO.

REFERENCES:

REPORT DATE 02/25/88  E-73
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 778

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 2/1R

ITEM: DCM ELECTRONICS (ITEM 350)
FAILURE MODE: ALL SECONDARY VOLTAGES DRIFT HIGH

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
4) 
5) 
6) 
7) 
8) 
9) 

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV792291

CAUSES: ELECTRONIC FAILURE IN FEEDBACK GENERATOR OR MODULATOR

EFFECTS/RATIONALE:
HIGH VOLTAGE SUPPLIED TO "LOW VOLTAGE" ELECTRONICS CAN RESULT IN FAILURE OF THESE ITEMS. IF A SUBSEQUENT FAILURE OF CO2 CONTROL FUNCTION OCCURS, THE CREWPERSON COULD BECOME DISORIENTED AND POSSIBLY LOST.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [ ]
SUBSYSTEM: EMU
MDAC ID: 779

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: DCM ELECTRONICS (ITEM 350)
FAILURE MODE: LCD MICROPROCESSOR FAILURE

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV792291

CAUSES: ELECTRICAL OPEN/SHORT, VIBRATION, CONTAMINATION

EFFECTS/RATIONALE:
LOSS OF LCD DISPLAY WILL RESULT IN MISSION TERMINATION. THIS WILL HAVE NO EFFECT ON THE TONES AND ACTUAL MONITORING OF VALUES BY THE CWS; HOWEVER, IF A CONCURRENT CO2 CONTROL FAILURE OR LOW VENT FLOW FAILURE WERE TO OCCUR, THE CREWPERSON WOULD BE ALERTED BUT NOT INFORMED OF THE PROPER CORRECTIVE ACTION. THEREFORE, THE CREWMEMBER CAN BE SUBJECTED TO HIGH CO2 AND DISORIENTATION PRIOR TO RETURN TO VEHICLE. DISORIENTATION CAN RESULT IN LOSS OF CREWPERSON.

REFERENCES:

REPORT DATE 02/25/88 E-75
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU MDAC ID: 780
ITEM: DISPLAY (ITEM 351) FAILURE MODE: DISPLAY FAILS ON
LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES

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<td>POST-EVA:</td>
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LOCATION:
PART NUMBER:  SV 792526-1

CAUSES: ELECTRICAL OPEN, CLOCK FAILURE

EFFECTS/RATIONALE:
DISPLAY OUTPUT WILL NOT CHANGE OR BLANK. THIS IS THE SAME "EFFECT" AS LOSS OF DISPLAY. IF A CONCURRENT CO2 CONTROL FAILURE WERE TO ALSO OCCUR, THE CREWPERSON WOULD NOT BE ALERTED TO THE PROPER CORRECTIVE ACTION ALTHOUGH THE TONE WILL OCCUR. THIS CAN RESULT IN CREWPERSON DISORIENTATION AND LOSS.

REFERENCES:

REPORT DATE 02/25/88      E-76
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 781 

HIGHEST CRITICALITY HDW/FUNC 
FLIGHT: 3/3 

ITEM: DISPLAY (ITEM 351) 
FAILURE MODE: BACKLIGHTING FAILS ON 

LEAD ANALYST: G. RAFFAELLI 
SUBSYS LEAD: G. RAFFAELLI 

BREAKDOWN HIERARCHY: 
1) EMU 
2) LSS 
3) DCM 
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CRITICALITIES 

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<td>POST-EVA:</td>
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: 
PART NUMBER: SV 792526-1 

CAUSES: SHORT, VIBRATION 

EFFECTS/RATIONALE: 
NO IMPACT. (POWER USAGE IS INSIGNIFICANT).

REFERENCES: 

REPORT DATE 02/25/88 E-77
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: ___________________________ HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU
MDAC ID: 782

ITEM: DISPLAY (ITEM 351) FLIGHT: 3/3
FAILURE MODE: BACKLIGHTING FAILS OFF

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) DCM
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 3/3
POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: SV 792526-1

CAUSES: ELECTRICAL OPEN, VIBRATION

EFFECTS/RATIONALE:
THIS WILL NOT INHIBIT USE OF THE DISPLAY; THEREFORE, NO IMPACT.

REFERENCES:

REPORT DATE 02/25/88 E-78
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM: EMU  
MDAC ID: 783

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: EEH  
FAILURE MODE: LEAKAGE AT HUT FEEDTHROUGH

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU  
2) LSS  

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2  
EVA: 2/1R  
POST-EVA: 2/2


LOCATION:  
PART NUMBER:  
CAUSES: SEAL FAILURE

EFFECTS/RATIONALE:
LOSS OF OXYGEN SUPPLY REQUIRES SOP USAGE TO RETURN TO VEHICLE.
POSSIBLE CREWPERSON LOSS IF SOP ALSO FAILS.

REFERENCES:

REPORT DATE 02/25/88 E-79
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM:  EMU  
MDAC ID:  784  

ITEM:  PLSS  
FAILURE MODE:  LOWER BRACKET FRACTURED  

LEAD ANALYST:  G. RAFFAELLI  
SUBSYS LEAD:  G. RAFFAELLI  

BREAKDOWN HIERARCHY:  
1)  EMU  
2)  LSS  
3)  PLSS  

CRITICALITIES  
FLIGHT PHASE  HDW/FUNC  
PRE-EVA:  2/2  
EVA:  2/1R  
POST-EVA:  2/2  


LOCATION:  
PART NUMBER:  SV 789200  

CAUSES:  IMPACT, MATERIAL FATIGUE/DEFECT  

EFFECTS/RATIONALE:  
LOSS OF LOWER BRACKET (ONE OF TWO) CAN RESULT IN SEPARATION OF HUT AND PLSS IF SECOND BRACKET ALSO LOST. IF SECOND BRACKET IS ALSO LOST AND SEPARATION WERE TO OCCUR EVA, CREWPERSON WOULD BE LOST. 

REFERENCES:  

REPORT DATE 02/25/88  E-80
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU  
MDAC ID: 785  

HIGHEST CRITICALITY HDW/FUNC FLIGHT: 2/1R

ITEM: PLSS  
FAILURE MODE: H2O MAKEUP TUBE-EXTERNAL LEAKAGE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU  
2) LSS  
3) PLSS
4)  
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: SV 789200

CAUSES: IMPACT, SEAL FAILURE

EFFECTS/RATIONALE:
LOSS OF FEEDWATER SUPPLY CAN RESULT IN LOSS OF HUMIDITY CONTROL. IF SOP ALSO LOST, CREWPERSON WILL BE LOST DUE TO NO DEFOG CAPABILITY FOR HELMET.

REFERENCES:  

REPORT DATE 02/25/88 E-81
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                    HIGHEST CRITICALITY   HDW/FUNC
SUBSYSTEM:  EMU            FLIGHT:  2/1R
MDAC ID:  786

ITEM:  PLSS
FAILURE MODE:  O2 PRESSURE RELIEF TUBE - EXTERNAL LEAKAGE

LEAD ANALYST:  G. RAFFAELLI  SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  LSS
3)  PLSS
4)
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CRITICALITIES

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LOCATION:
PART NUMBER:  SV 789200

CAUSES:  IMPACT, SEAL FAILURE

EFFECTS/RATIONALE:
LOSS OF PRIMARY OXYGEN SUPPLY RESULTS IN SOP USAGE. IF SOP IS FAILED, THE CREWPERSON WOULD BE LOST.

REFERENCES:

REPORT DATE 02/25/88  E-82
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 787

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: PLSS
FAILURE MODE: EMU/MMU LATCH DISCONNECTS

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) LSS
3) PLSS
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LOCATION:
PART NUMBER: SV789200

CAUSES: IMPACT, MATERIAL DEFECT/FATIGUE, SCREW(S) SHEAR, CONTAMINATION

EFFECTS/RATIONALE:
FAILURE OF THE LATCH OF SECURE THE EMU TO THE MMU WILL RESULT IN DEPENDENCY UPON THE RETENTION BELT (OTHER LATCH ALONE IS INSUFFICIENT). IF THE RETENTION BELT WERE TO FAIL DURING EMU-MMU OPERATIONS, THE CREWPERSON COULD BE LOST DUE TO SEPARATION FROM THE MMU.

REFERENCES:

REPORT DATE 02/25/88 E-83
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  SUBSYSTEM: EMU  HIGHEST CRITICALITY  HDW/FUNC
MDAC ID: 801  FLIGHT: 3/3

ITEM: NECK RING AND VENT SEAL ASSEMBLY
FAILURE MODE: INTERNAL LEAKAGE OF HELMET INLET DUCT

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HUT
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CRITICALITIES

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LOCATION:
PART NUMBER: A/L 9357-10/9713-03

CAUSES: SEAL WEAR OR DETERIORATION, CONTAMINATION ON SEAL

EFFECTS/RATIONALE:
MINIMAL LOSS OF VENT FLOW TO HELMET SHOULD NOT HAVE MISSION OR CREW IMPACT. CAN RESULT IN MINOR LOSS OF SOP OXYGEN DURING SOP CHECK BUT SHOULD ALSO NOT BE A SIGNIFICANT QUANTITY TO HAVE NEGATIVE IMPACTS.

REFERENCES:

REPORT DATE 02/25/88  E-84
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 802

HIGHEST CRITICALITY HDW/FUNC 
FLIGHT: 2/2

ITEM: NECK RING AND VENT SEAL ASSEMBLY
FAILURE MODE: INTERNAL LOOP TAPE CLIP ATTACHMENT SCREW LOOSE OR MISSING

LEAD ANALYST: G. RAFFAELLI 
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU 
2) SSA
3) HUT
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/2
POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: A/L 9357-10/9713-03

CAUSES: SCREW DEFECTIVE, INEFFECTIVE THREADLOCK, CORROSION, VIBRATION

EFFECTS/RATIONALE:
NO EFFECT ON THE BRACKET; HOWEVER, A LOOSE SCREW WITH THE SSA (DURING AN EVA) CAN RESULT IN CREWPERSON DISCOMFORT, ABRATION OF WATER LINES ON THE LCVG (SUCH THAT A LEAK CAN OCCUR), OR SUIT BLADDER ABRASION. SUCH AN EFFECT CAN RESULT IN MISSION TERMINATION. ALSO IF ALL THE SCREWS FAILED, BRACKET LOSS OF FUNCTION SHOULD HAVE NO MORE SEVERE AN EFFECT THAN THE LOOSE SCREW.

REFERENCES:

REPORT DATE 02/25/88 E-85
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:       HIGHEST CRITICALITY   HDW/FUNC
SUBSYSTEM:  EMU
MDAC ID:    803

ITEM:       NECK RING AND VENT SEAL ASSEMBLY
FAILURE MODE: EXTERNAL LOOP TAPE BRACKET ATTACHING SCREW LOOSE OR MISSING

LEAD ANALYST: G. RAFFAELLI   SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HUT
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LOCATION:
PART NUMBER: A/L 9357-10/9713-03

CAUSES: DEFECTIVE SCREW, INEFFECTIVE THREADLOCK, CORROSION, VIBRATION

EFFECTS/RATIONALE:
LOSS OF ONE SCREW SHOULD HAVE NO EFFECT ON BRACKET; HOWEVER, LOSS OF ALL SCREWS AND THEREFORE BRACKET FUNCTION CAN RESULT IN UNRESTRAINED TMG GARMENT WHICH IN TURN CAN CAUSE POSSIBLE "HOT" OR "COLD" SPOTS. MISSION TERMINATION WOULD THEN RESULT.

REFERENCES:

REPORT DATE 02/25/88   E-86
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [Date]
SUBSYSTEM: EMU
MDAC ID: 804

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: WATER LINE AND VENT TUBE ASSEMBLY
FAILURE MODE: REDUCED VENT FLOW

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HUT
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: 0102-82437-18

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:
PARTIAL BLOCKAGE OF VENT TUBE REDUCES FLOW. MISSION TERMINATION RESULTS. IF SIGNIFICANT FLOW REDUCTION OCCURS AND THE SOP IS ALSO FAILED, CREWMEMBER LOSS CAN ALSO OCCUR.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 805

HIGHEST CRITICALITY HDW/FUNC

ITEM: BODY SEAL CLOSURE (HUT HALF)
FAILURE MODE: TMG LOOP TAPE LOOSE OR BROKEN

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HUT

CRITICALITIES

FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 2/2
POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: A/L 9786-05

CAUSES: MATERIALS DEFECT

EFFECTS/RATIONALE:
LOCAL HOT OR COLD SOPTS CAN RESULT. DEPENDENT UPON THE ENVIRONMENT, THIS CAN PRESENT THE CREWPERSON WITH SIGNIFICANT DISCOMFORT OVER TIME; THEREFORE, MISSION TERMINATION CAN RESULT.

REFERENCES:

REPORT DATE 02/25/88 E-88
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:       HIGHEST CRITICALITY   HDW/FUNC
SUBSYSTEM:  EMU
MDAC ID:    806

ITEM:       MDAC ID: 806
FAILURE MODE: BODY SEAL CLOSURE
MINI WORK STATION WILL NOT ENGAGE

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HUT

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: A/L 9786-05

CAUSES: CONTAMINATION IN MORENTS

EFFECTS/RATIONALE:
INABILITY TO EMPLOY MINI WORK STATION MAY RESULT IN MISSION TERMINATION.

REFERENCES:

REPORT DATE 02/25/88 E-89
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM:  EMU                  FLIGHT:  3/3
MDAC ID:    807

ITEM:      HELMET ASSEMBLY
FAILURE MODE: VALSALVA DEVICE DISCONNECTS

LEAD ANALYST: G. RAFFAELLI    SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  SSA
3)  HELMET
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER: A/L 9672-01

CAUSES: DEFECTIVE ADHESIVE, IMPACT BY CREWPERSON

EFFECTS/RATIONALE:
NO EFFECTS EXCEPT FOR POSSIBLE CREW DISCOMFORT.

REFERENCES:

REPORT DATE 02/25/88  E-90
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU
MDAC ID: 808

HIGHEST CRITICALITY HDW/FUNC FLIGHT: 2/2

ITEM: HELMET ASSEMBLY
FAILURE MODE: HELMET FOGGING (NOT DUE TO SYSTEM FAILURE)

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HELMET

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 2/2
POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: A/L 9672-01

CAUSES: IMPROPER APPLICATION OF ANTI FOG FILM

EFFECTS/RATIONALE:
FOGGING CAN IMPAIR VISION AND PERFORMANCE OF EVA TASKS. TERMINATE MISSION.

REFERENCES:

REPORT DATE 02/25/88 E-91
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU MDAC ID: 809

HIGHEST CRITICALITY HDW/FUNC FLIGHT: 2/1R

ITEM: HELMET ASSEMBLY
FAILURE MODE: VENT PAD DE-BONDS FROM HELMET

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HELMET
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<td>POST-EVA:</td>
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LOCATION:
PART NUMBER: A/L 9672-01

CAUSES: OLD OR DEFECTIVE BONDING AGENT

EFFECTS/RATIONALE:
DEGRADATION OF ORAL-NASAL FLUSH CAN RESULT IN HELMET FOGGING AND CO2 BUILDUP. USE OF HELMET CPV AND/OR DCM PURGE VALVE AND SOP MAY BE REQUIRED, BUT IF THESE TOO ARE FAILED, CREWPERSON CAN BE LOST.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

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<td>ITEM:</td>
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<td>FAILURE MODE: SHELL CRACKED</td>
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<td>LEAD ANALYST: G. RAFFAELLI</td>
<td>SUBSYS LEAD: G. RAFFAELLI</td>
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BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HELMET
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: A/L 9813-12

CAUSES: DEFECTIVE MATERIAL, IMPACT

EFFECTS/RATIONALE:
EVVA VISOR MOVEMENT CAN BE IMPAIRED AS COULD THE CAPABILITY TO MOUNT THE LIGHTS. THIS CAN RESULT IN MISSION TERMINATION.

REFERENCES:

REPORT DATE 02/25/88 E-93
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                      HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU            FLIGHT: 3/2R
MDAC ID: 811

ITEM: EVVA
FAILURE MODE: CRACKED/FRACTURED EYE SHADES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HELMET

CRITICALITIES

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LOCATION:
PART NUMBER: A/L 9813-12

CAUSES: IMPACT, MATERIAL DEFECT

EFFECTS/RATIONALE:
NONE UNLESS VISORS ARE ALSO FAILED THEN MISSION WOULD BE TERMINATED.

REFERENCES:

REPORT DATE 02/25/88 E-94
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM: EMU  
MDAC ID: 812  

HIGHEST CRITICALITY HDW/FUNC  
FLIGHT: 3/2R  

ITEM: EVVA  
FAILURE MODE: BRACKET LOOSE FOR LIGHTS OR BATTERY  

LEAD ANALYST: G. RAFFAELLI  
SUBSYS LEAD: G. RAFFAELLI  

BREAKDOWN HIERARCHY:  
1)  
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CRITICALITIES  
FLIGHT PHASE HDW/FUNC  
PRE-EVA: 3/3  
EVA: 3/2R  
POST-EVA: 3/2R  


LOCATION:  
PART NUMBER: A/L 9813-12  

CAUSES: IMPACT, DEFECTIVE THREADLOCK, SCREW FRACTURES, VIBRATION  

EFFECTS/RATIONALE:  
LOSS OF ONE OF THREE BRACKETS SHOULD NOT RESULT IN IMPACT; HOWEVER, LOSS OF ONE MORE CAN RESULT IN MISSION TERMINATION.  

REFERENCES:  

REPORT DATE 02/25/88 E-95
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [Blank]
SUBSYSTEM: EMU
MDAC ID: 813

ITEM: UPPER/LOWER ARM RESTRAINT AND BLADDER ASSEMBLY
FAILURE MODE: TMG LOOSE

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) ARM ASSEMBLY

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2

PRE-EVA: 3/3
EVA: 2/2
POST-EVA: 3/3

LOCATION:
PART NUMBER: 0103-82318-22/0103-82351-16

CAUSES: LOOP TAPE DEFECTIVE/TORN, VELCRO DEFECTIVE, THREAD/CORD BREAKS

EFFECTS/RATIONALE:
PROBABLE LOCALIZED HOT OR COLD SPOTS CAN RESULT ARM ASSEMBLY. IF ENVIRONMENT IS SEVERE, THESE SPOTS CAN RESULT IN CREWPERSON DISCOMFORT SUFFICIENT ENOUGH FOR MISSION IMPACT OR TERMINATION.

REFERENCES:

REPORT DATE 02/25/88 E-96
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                      HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EMU             FLIGHT:  2/1R
MDAC ID: 814

ITEM:                      FAILURE MODE: Axial restraint seam separation or sizing insert moves
UPPER ARM RESTRAINT AND BLADDER ASSEMBLY

LEAD ANALYST: G. RAFFAEIIL
SUBSYS LEAD: G. RAFFAEIIL

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) ARM ASSEMBLY
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LOCATION:
PART NUMBER: 0103-82318-22

CAUSES: Fabric defect, defective thread or cord

EFFECTS/RATIONALE:
BLADDER IS STILL UNDER TMG AND CAN ACCEPT OPERATING SUIT PRESSURES BUT IS SUBJECT TO ABRASION AND WEAR. IF BLADDER WERE TO ALSO FAIL, CREWPERSON LOSS CAN RESULT.

REFERENCES:

REPORT DATE 02/25/88 E-97
**INDEPENDENT ORBITER ASSESSMENT**  
**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

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**ITEM:** SCYE BEARING ASSEMBLY  
**FAILURE MODE:** RESTRAINT BRACKET SCREW LOOSE

**LEAD ANALYST:** G. RAFFAELLI  
**SUBSYS LEAD:** G. RAFFAELLI

**BREAKDOWN HIERARCHY:**
1) EMU  
2) SSA  
3) ARM ASSEMBLY  
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**REDUNDANCY SCREENS:**  
A [ 2 ]  
B [ F ]  
C [ P ]

**LOCATION:**  
**PART NUMBER:** A/L 9782-04

**CAUSES:** IMPACT, VIBRATION, DEFECTIVE THREADLOCK OR SCREW

**EFFECTS/RATIONALE:**  
NO IMPACT FOR LOSS OF 1 OF 4 SCREWS. BUT IF ONE MORE IS LOST ASSEMBLY COULD SEPARATE AND CREWMEMBER COULD BE LOST.

**REFERENCES:**
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM:  EMU
MDAC ID:   816

HIGHEST CRITICALITY HDW/FUNC
FLIGHT:  2/1R

ITEM:      ARM BEARING ASSEMBLY
FAILURE MODE:  LOWER PRIMARY RESTRAINT BRACKET BROKEN/FAILED

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  SSA
3)  ARM ASSEMBLY
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LOCATION:
PART NUMBER:  A/L 9657-06

CAUSES:  MATERIAL DEFECT, IMPACT, KEEPER SCREW BACKED OUT, DEFECTIVE THREADLOCK

EFFECTS/RATIONALE:
LOSS OF PRIMARY AXIAL LOAD RESTRAINT INTEGRITY. IF COMBINED WITH LOSS OF SECONDARY RESTRAINT OR COMPLETE LOSS OF ATTACHMENT SCREWS, CREWMEMBER COULD BE LOST.

REFERENCES:

REPORT DATE 02/25/88  E-99
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                      HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM:  EMU                FLIGHT:  2/1R
MDAC ID:  817

ITEM:  WRIST DISCONNECT
FAILURE MODE:  PRIMARY RESTRAINT BRACKET BROKEN

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  SSA
3)  ARM ASSEMBLY
4)
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CRITICALITIES
FLIGHT PHASE  HDW/FUNC
PRE-EVA:  2/2
EVA:  2/1R
POST-EVA:  2/2


LOCATION:
PART NUMBER:  A/L 9813-02, A/L 9814-02

CAUSES:  MATERIAL DEFECT, IMPACT

EFFECTS/RATIONALE:
NO IMMEDIATE IMPACT DUE TO BLADDER FABRIC BEING SECONDARY
RESTRAINT; HOWEVER, FAILURE OF SECONDARY RESTRAINT CAN RESULT IN
GROSS OXYGEN LOSS AND LOSS OF CREWPERSON.

REFERENCES:

REPORT DATE 02/25/88  E-100
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM: EMU  
MDAC ID: 818  

HIGHEST CRITICALITY  HDW/FUNC

FLIGHT: 2/1R

ITEM: WRIST DISCONNECT
FAILURE MODE: PRIMARY RESTRAINT BRACKET LOOSE

LEAD ANALYST: G. RAFFAELLI  
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) ARM ASSEMBLY
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CRITICALITIES

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LOCATION:
PART NUMBER: A/L 9813-02, A/L 9814-02

CAUSES: SCREW FRACTURES OR BACKS OUT, VIBRATION, DEFECTIVE THREADLOCK

EFFECTS/RATIONALE:
LOOSE BRACKET HAS NO IMPACT UNLESS REMAINING SCREWS AND SECONDARY RESTRAINT ALSO LOST THEREBY CAUSING GROSS LOSS OF PRESSURE AND CREWPERSON LOSS.

REFERENCES:

REPORT DATE 02/25/88  E-101
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: EMU
MDAC ID: 819

ITEM: RESTRAINT MODIFIED
FAILURE MODE: CREWPERSON NERVE COMPRESSION

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: 0106-85894-11/12

CAUSES: POOR SIZING

EFFECTS/RATIONALE:
CREW DISCOMFORT CAN RESULT BUT THIS FAILURE CAN ONLY RESULT FROM PROCEDURAL OR GROUND OPERATION/PROCESSING ERRORS. THEREFORE, THIS IS MORE SUITED TO A HAZARD ANALYSIS OR AN ANALYSIS OF GSE OPERATIONS.

REFERENCES:

REPORT DATE 02/25/88 E-102
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 820

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 2/2

ITEM: RESTRAINT MODIFIED
FAILURE MODE: TMG ATTACHMENT FAILURE

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) GLOVE ASSEMBLY
4) 
5) 
6) 
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 2/2
POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: 0106-85894-11/12

CAUSES: DEFECTIVE LOOP TAPE, DEFECTIVE CORD, WEAR ON LOOP TAPE OR CORD

EFFECTS/RATIONALE:
POSSIBLE LOCALIZED HOT/COLD SPOTS WHICH, DEPENDENT UPON THE ENVIRONMENT, CAN RESULT IN VARYING LEVELS OF CREWPERSON DISCOMFORT. IF ENVIRONMENT IS SEVERE AND CREWPERSON DISCOMFORT SIGNIFICANT, MISSION CAN BE TERMINATED.

REFERENCES:

REPORT DATE 02/25/88 E-103
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  SUBSYSTEM: EMU  HIGHEST CRITICALITY  
MDAC ID: 821   HDW/FUNC  FLIGHT: 3/2R

ITEM: BLADDER ASSEMBLY  FAILURE MODE: FLOCK DELAMINATES FROM BLADDER

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) GLOVE ASSEMBLY
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CRITICALITIES

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LOCATION:  PART NUMBER: 0106-87543-01/02

CAUSES: DEFECTIVE ADHESIVE, WEAR

EFFECTS/RATIONALE:
FLOCK CAN ENTER THE VENT SYSTEM. IF SIGNIFICANT FLOCK AMOUNT CAN TRANSLATE TO AND CONSTRICT FLOW TO THE CCC, THE CREWPERSON WOULD HAVE TO EMPLOY THE SOP AND TERMINATE THE MISSION.

REFERENCES:

REPORT DATE 02/25/88  E-104
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                     HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU
MDAC ID: 822
FLIGHT: 2/1R

ITEM: Wrist Disconnect (Glove Side)
FAILRE MODE: Restraint Bracket Broken or Loose

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) Glove Assembly
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CRITICALITIES

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LOCATION:
PART NUMBER: A/L 9924-01

CAUSES: IMPACT, VIBRATION, SCREW FRACTURE, DEFECTIVE THREADLOCK

EFFECTS/RATIONALE:
NONE FOR FIRST FAILURE; HOWEVER, IF REMAINING BRACKET SCREWS FAIL OR LOSS OF SECONDARY RESTRAINT ALSO OCCURS CREWPERSON CAN BE LOST.

REFERENCES:

REPORT DATE 02/25/88 E-105
### INDEPENDENT ORBITER ASSESSMENT

**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

**DATE:**

**SUBSYSTEM:** EMU

**MDAC ID:** 823

**ITEM:** WRIST DISCONNECT (GLOVE SIDE)

**FAILURE MODE:** TETHER SEVERS OR DISATTACHES

**LEAD ANALYST:** G. RAFFAELLI

**SUBSYS LEAD:** G. RAFFAELLI

**BREAKDOWN HIERARCHY:**

1) EMU
2) SSA
3) GLOVE ASSEMBLY
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**CRITICALITIES**

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**LOCATION:**

**PART NUMBER:** A/L 9924-01

**CAUSES:** MATERIAL DEFECT, ABRASION, BRACKET FRACTURES

**EFFECTS/RATIONALE:**

THE TETHER FAILURE HAS NO CREWPERSON IMPACT BUT CAN RESULT IN MISSION TERMINATION IF ITEM(S) TETHERED ARE ESSENTIAL TO THE MISSION.

**REFERENCES:**

REPORT DATE 02/25/88 E-106
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 824
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: WAIST RESTRAINT AND BLADDER
FAILURE MODE: HOLE OR SEPARATION IN RESTRAINT FABRIC

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) IIA
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: 0104-82347-107/0104-84811-05

CAUSES: DEFECTIVE MATERIAL OR THREAD, SEAM SEPARATION

EFFECTS/RATIONALE:
BLADDER FABRIC ASSUMES LOAD; HOWEVER, IF BLADDER FAILS CREWPERSON CAN BE LOST.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:             HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM:  EMU             FLIGHT:  2/2
MDAC ID:  825

ITEM: WAIST RESTRAINT AND BLADDER
FAILURE MODE: AXIAL RESTRAINT DISATTACHES FROM CLOTH

LEAD ANALYST: G. RAFFAELLI           SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  SSA
3)  LTA
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CRITICALITIES

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER:  0104-82347-107/0104-84811-05

CAUSES: THREAD BREAKS OR DEFECTIVE, FABRIC DEFECTIVE

EFFECTS/RATIONALE:
LOSS OF AXIAL RESTRAINT CAUSES THE WAIST SECTION TO DISFORM AND RESULTS IN THE CREWPERSON HAVING TO PROVIDE SIGNIFICANT EXERTION TO OVERCOME THE DISFORMATION OF THE WAIST AREA. MISSION IMPACT AND TERMINATION CAN RESULT.

REFERENCES:

REPORT DATE 02/25/88     E-108
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:            HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM:       EMU
MDAC ID:         826

ITEM:            WAIST RESTRAINT AND BLADDER
FAILURE MODE:    TMG LOOSE

LEAD ANALYST: G. RAFFAELLI    SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA

CRITICALITIES

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REDUNDANCY SCREENS:  A [   ]  B [   ]  C [   ]

LOCATION:
PART NUMBER:  0104-82347-107/0104-84811-05

CAUSES:  DEFECTIVE/WORN THREAD, DEFECTIVE FABRIC

EFFECTS/RATIONALE:
PROBABLE LOCAL "HOT/COLD" SPOTS WHICH CAN CAUSE CREWPERSON DISCOMFORT. IF ENVIRONMENT IS SEVERE AND CREWPERSON DISCOMFORT SIGNIFICANT, MISSION WOULD BE TERMINATED.

REFERENCES:

REPORT DATE 02/25/88 E-109
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 827

ITEM: WAIST BEARING
FAILURE MODE: TETHER BRACKET LOOSE

LEAD ANALYST: G. RAFFAELLI

SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: A/L 9698-08

CAUSES: FRACTURED OR LOOSE SCREW, DEFECTIVE THREADLOCK

EFFECTS/RATIONALE:
LOSS OF 1 OF 4 SCREWS RESULTS IN LOOSE TETHER BRACKET WITH NO IMMEDIATE IMPACT. HOWEVER, LOSS OF ONE MORE SCREW CAN RESULT IN LOSS OF BRACKET AND CREWPERSON BEING UNRESTRAINED TO ORBITER. POSSIBLE LOSS OF CREWPERSON.

REFERENCES:

REPORT DATE 02/25/88 E-110
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 828

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: LOWER TORSO RESTRAINT/BLADDER ASSEMBLY
FAILURE MODE: HOLE OR SEPARATION IN RESTRAINT

LEAD ANALYST: G. RAFFAELLI 
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU 
2) SSA 
3) LTA 
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CRITICALITIES

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LOCATION:
PART NUMBER: 0104-82335-22

CAUSES: FABRIC/THREAD DEFECTIVE, WEAR OR TEAR, SEAM SEPARATION

EFFECTS/RATIONALE:
BLADDER UNPROTECTED BY RESTRAINT MATERIAL WILL ASSUME SUIT LOADS; HOWEVER, IF BLADDER ALSO FAILS, CREWPERSON CAN BE LOST.

REFERENCES:

REPORT DATE 02/25/88 
E-111
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU
MDAC ID: 829 HIGHEST CRITICALITY HDW/FUNC

ITEM: LOWER TORSO RESTRAINT/BLADDER ASSEMBLY
FAILURE MODE: TMG SEPARATION FROM ASSEMBLY

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 2/2
POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: 0104-82335-22

CAUSES: DEFECTIVE/TORN LOOP TAPE, MATERIAL DEFECT

EFFECTS/RATIONALE:
LOCAL "HOT/COLD" SPOTS CAN CAUSE CREWPERSON DISCOMFORT. IF THE ENVIRONMENT IS SEVERE ENOUGH, CREWPERSON DISCOMFORT CAN BE SIGNIFICANT AND RESULT IN MISSION TERMINATION.

REFERENCES:

REPORT DATE 02/25/88 E-112
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [Blank]
SUBSYSTEM: EMU
MDAC ID: 830

HIGHEST CRITICALITY HDW/FUNC

ITEM: GOODS DISCONNECT
FAILURE MODE: LOSS OF AXIAL RESTRAINT (PRIMARY OR SECONDARY)

LEAD ANALYST: G. RAFFAElli SUBSYS LEAD: G. RAFFAElli

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: A/L 9752-01

CAUSES: DEFECTIVE MATERIAL, SCREW BACKS OUT, INEFFECTIVE THREADLOCK

EFFECTS/RATIONALE:
SUIT LOADS WILL BE ASSUMED BY REMAINING RESTRAINT WHICH, IF ALSO FAILED, CAN RESULT IN CREWPERSON LOSS DUE TO INABILITY OF SUIT TO WITHSTAND LOADS AT BOOT.

REFERENCES:

REPORT DATE 02/25/88 E-113
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 831

ITEM: PRESSURE BOOT ASSEMBLY
FAILURE MODE: HEEL-TOP RETAINING SCREW LOOSE

LEAD ANALYST: G. RAFFAELLI

SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
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CRITICALITIES

FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/2
POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: 0104-82403-29/30

CAUSES: DEFECTIVE THREADLOCK, VIBRATION, SCREW FRACTURED/STRIPPED

EFFECTS/RATIONALE:
MAY CAUSE DIFFICULTY IN USING FOOT RESTRAINT NECESSARY FOR MISSION SUCCESS. TERMINATE MISSION.

REFERENCES:

REPORT DATE 02/25/88 E-114
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                      HIGHEST CRITICALITY   HDW/FUNC
SUBSYSTEM:  EMU            FLIGHT:               2/2
MDAC ID:  832

ITEM: PRESSURE BOOT ASSEMBLY
FAILURE MODE: RUBBER SOLE ABRADED

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  SSA
3)  LTA
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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER:  0104-82403-29/30

CAUSES: WEAR, DEFECTIVE MATERIAL

EFFECTS/RATIONALE:
POSSIBLE LOCAL "HOT/COLD" SPOTS ON SOLE OF BOOT ASSEMBLY. MAY ALSO CREATE DIFFICULTY IN USING FOOT RESTRAINT(S). IF CREW DISCOMFORT IS SIGNIFICANT OR UNABLE TO EMPLOY FOOT RESTRAINT, TERMINATE MISSION.

REFERENCES:

REPORT DATE 02/25/88    E-115
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [Blank]
SUBSYSTEM: EMU
MDAC ID: 833

ITEM: PRESSURE BOOT ASSEMBLY
FAILURE MODE: HOLE OR TEAR IN RESTRAINT FABRIC

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA

CRITICALITIES

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LOCATION:
PART NUMBER: 0104-82403-29/30

CAUSES: DEFECTIVE MATERIAL, DEFECTIVE/TORN THREAD/CORD

EFFECTS/RATIONALE:
BLADDER WOULD BE SUBJECT TO LOADS AND WEAR DUE TO LOSS OF COVERING RESTRAINT FABRIC. IF BLADDER ALSO FAILS, CREWPERSON CAN BE LOST.

REFERENCES:

REPORT DATE 02/25/88 E-116
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 834

ITEM: PRESSURE BOOT ASSEMBLY
FAILURE MODE: TMG DISATTACHES

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/2
POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: 0104-82403-29/30

CAUSES: LOOP TAPE DEFECTIVE/TORN

EFFECTS/RATIONALE:
PROBABLE LOCAL "HOT/COLD" SPOTS CAN CAUSE CREWPERSON DISCOMFORT. ALSO, LOOSE TMG CAN CAUSE DIFFICULTY IN USING FOOT RESTRAINTS. IF DISCOMFORT IS SIGNIFICANT OR FOOT RESTRAINTS CANNOT BE USED, TERMINATE MISSION.

REFERENCES:

REPORT DATE 02/25/88 E-117
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 835

ITEM: BOOT SIZING INSERT
FAILURE MODE: FOAM SEPARATES FROM INSERT

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: 0104-82664-17/18

CAUSES: DEFECTIVE VELCRO

EFFECTS/RATIONALE:
NO MISSION OR CREWPERSON IMPACTS. CAN MAKE DONNING MORE DIFFICULT.

REFERENCES:

REPORT DATE 02/25/88 E-118
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                      HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EMU
MDAC ID: 836              FLIGHT: 3/3

ITEM: RESTRAINT ASSEMBLY
FAILURE MODE: VENT TUNNEL DETACHES

LEAD ANALYST: G. RAFFAELLI   SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LCVG
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER: 0107-82968-07

CAUSES: THREAD TEARS OR DEFECTIVE

EFFECTS/RATIONALE:
CAN PROVIDE MINIMAL CREW DISCOMFORT BUT WHEN CONNECTED AND SUIT IS DONNED NO IMPACTS ARE ENVISIONED.

REFERENCES:

REPORT DATE 02/25/88   E-119
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM:  EMU  
MDAC ID:  837

HIGHEST CRITICALITY  HDW/FUNC

ITEM:  VENT MANIFOLD AND DUCTS  
FAILURE MODE:  THRUMB LOOP BROKEN

LEAD ANALYST:  G. RAFFAELLI  
SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  SSA
3)  LCVG
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CRITICALITIES

FLIGHT PHASE  HDW/FUNC
PRE-EVA:  3/3
EVA:  3/3
POST-EVA:  3/3

REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER:  0107-811060-08/82568-09/81057-19/20

CAUSES:  MATERIAL DEFECT OR TEAR

EFFECTS/RATIONALE:
INCREASES DONNING DIFFICULTY, OTHERWISE NO IMPACT.

REFERENCES:

REPORT DATE 02/25/88  E-120
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 838

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3

ITEM: VENT MANIFOLD AND DUCTS
FAILURE MODE: BOOT ATTACHMENT LOOSE

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LCVG

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 3/3
POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: 0107-811060-08/82568-09/81057-19/20

CAUSES: MATERIAL DEFECT OR TORN

EFFECTS/RATIONALE:
BOOT BECOMES loose and may be difficult donning or doffing, otherwise no impacts.

REFERENCES:

REPORT DATE 02/25/88 E-121
**INDEPENDENT ORBITER ASSESSMENT**
**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

**DATE:**
**SUBSYSTEM:** EMU
**MDAC ID:** 839

**HIGHEST CRITICALITY**
**HDW/FUNC**
**FLIGHT:** 3/3

**ITEM:** MULTIPLE CONNECTOR (LCVG HALF)
**FAILURE MODE:** OXYGEN LEAKAGE IN VENT LOOP

**LEAD ANALYST:** G. RAFFAELLI
**SUBSYS LEAD:** G. RAFFAELLI

**BREAKDOWN HIERARCHY:**
1) EMU
2) SSA
3) LCVG
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**REDUNDANCY SCREENS:** A [] B [] C []

**LOCATION:**
**PART NUMBER:** A/L 9693-03/9697-04

**CAUSES:** SEAL CUT OR DEFECTIVE, LOOSE HOSE CLAMP

**EFFECTS/RATIONALE:**
LEAKAGE OF SUIT ATMOSPHERE INTO VENT LOOP AT CONNECTOR MAY RESULT IN MINIMAL DEGRADATION OF VENT LOOP FLOW THROUGHOUT THE LCVG BUT WITHOUT A SIGNIFICANT FAILURE (I.E., DISCONNECTION) THE LEAK SHOULD NOT RESULT IN A MISSION OR CREWMEMBER IMPACT.

**REFERENCES:**

REPORT DATE 02/25/88 E-122
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 840

HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 3/2R

ITEM: CCA
FAILURE MODE: EARPHONES LOOSE

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
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LOCATION:
PART NUMBER: 0101-80001-02

CAUSES: DEFECTIVE/BROKEN THREAD, FASTENER FAILS OPEN

EFFECTS/RATIONALE:
ONE LOOSE EARPHONE WILL NOT RESULT IN AN IMPACT; HOWEVER, IF BOTH ARE LOOSE, MISSION TERMINATION RESULTS.

REFERENCES:

REPORT DATE 02/25/88 E-123
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM: EMU         FLIGHT: 3/3
MDAC ID: 841

ITEM: CCA
FAILURE MODE: SNAP FAILS CLOSED

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) SSA
2) CCA

CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER: 0101-80001-02

CAUSES: SNAP WORN OR BENT

EFFECTS/RATIONALE:
DIFFICULTY IN DOFFING CAN RESULT BUT, OTHERWISE, NO IMPACTS TO MISSION OR CREWPERSON SAFETY.

REFERENCES:

REPORT DATE 02/25/88   E-124
**INDEPENDENT ORBITER ASSESSMENT**  
**ORBITER SUBSYSTEM ANALYSIS WORKSHEET**

**DATE:**  
**SUBSYSTEM:** EMU  
**MDAC ID:** 842

**HIGHEST CRITICALITY**  
**HDW/FUNC**

**FLIGHT:** 3/2R

**ITEM:** CCA  
**FAILURE MODE:** MICROPHONE BOOM SHIFTS OUT OF RANGE

**LEAD ANALYST:** G. RAFFAELLI  
**SUBSYS LEAD:** G. RAFFAELLI

**BREAKDOWN HIERARCHY:**  
1) EMU  
2) SSA  
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**CRITICALITIES**

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**REDUNDANCY SCREENS:**  

**LOCATION:**
**PART NUMBER:** 0101-80001-02

**CAUSES:** DEFECTIVE OR WORN FASTENER, IMPACT

**EFFECTS/RATIONALE:**
LOSS OF ONE MICROPHONE PRESENTS NO IMPACTS DUE TO AVAILABILITY OF SECOND MICROPHONE. IF BOTH ARE LOST, TERMINATE MISSION.

**REFERENCES:**
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU
MDAC ID: 843

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3

ITEM: HARD TORSO SHELL
FAILURE MODE: 02 LINE LEAKAGE TO SSA

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HUT
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LOCATION:
PART NUMBER: SV772375-21

CAUSES: TUBE PUNCTURED

EFFECTS/RATIONALE:
02 LEAKAGE TO SSA WILL NOT SUBSTANTIALLY REDUCE FLOW TO HELMET; THEREFORE, NO MISSION OR CREWPERSON IMPACTS.

REFERENCES:

REPORT DATE 02/25/88 E-126
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:          HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU               FLIGHT: 2/1R
MDAC ID: 844

ITEM: HARD TORSO SHELL
FAILURE MODE: H2O LEAKAGE INTO SSA

LEAD ANALYST: G. RAFFAELLI    SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HUT
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CRITICALITIES

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LOCATION:
PART NUMBER: SV772375-21

CAUSES: SEAL FAILURE, TUBE PUNCTURE

EFFECTS/RATIONALE:
GRADUAL LOSS OF H2O SUPPLY AND THEREFORE COOLING CAPABILITY.
FREE WATER IN SUIT CAN GET INTO VENT LOOP AND CAUSE FAILURE OF CCC. MISSION TERMINATION. IF SOP ALSO LOST OR PURGE VALVES BLOCKED BY ICE, CREWPERSON CAN BE LOST.

REFERENCES:

REPORT DATE 02/25/88 E-127
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:               HIGHEST CRITICALITY     HDW/FUNC
SUBSYSTEM: EMU
MDAC ID: 845

FLIGHT: 2/1R

ITEM: HARD TORSO SHELL
FAILURE MODE: VENT RETURN FLOW PARTIALLY OR TOTALLY BLOCKED

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HUT
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CRITICALITIES

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LOCATION:
PART NUMBER: SV772375-21

CAUSES: CONTAMINATION, HAIR, FLOCK, LINT

EFFECTS/RATIONALE:
LOW VENT FLOW WILL REQUIRE MISSION TERMINATION AND POSSIBLE SOP
USAGE. IF SOP ALSO FAILS, CREWPERSON CAN BE LOST.

REFERENCES:

REPORT DATE 02/25/88 E-128
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:          SUBSYSTEM: EMU          MDAC ID: 846
               ITEM: HARD TORSO SHELL
HIGHEST CRITICALITY  HDW/FUNC
FLIGHT:  1/1
FAILURE MODE: GIMBAL PIVOT SOCKET FAILURE

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  SSA
3)  HUT

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER: SV772375-21

CAUSES: MATERIAL DEFECT, DEFECTIVE BOND, IMPACT

EFFECTS/RATIONALE:
BELLOWS CAN SEPARATE FROM HUT WITH GIMBAL PIVOT SOCKET FAILURE AND CAUSE UNCONTROLLABLE DEPRESSURIZATION. LOSS OF CREWPERSON.

REFERENCES:

REPORT DATE 02/25/88  E-129
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 847

HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 3/3

ITEM: HARD TORSO SHELL
FAILURE MODE: EEH BRACKET LOOSE

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HUT
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 3/3
POST-EVA: 3/3


LOCATION:
PART NUMBER: SV772375-21

CAUSES: DEFECTIVE BOND, IMPACT

EFFECTS/RATIONALE:
POSSIBLE DISCOMFORT DURING DONNING/DOFFING. NO MISSION OR CREWPERSON IMPACTS.

REFERENCES:

REPORT DATE 02/25/88 E-130
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM:  EMU  
MDAC ID:  848  

HIGHEST CRITICALITY  HDW/FUNC
FLIGHT:  2/2

ITEM:  HUT ASSEMBLY
FAILURE MODE:  IDB DETACHES OR FOOD BAR DETACHES

LEAD ANALYST:  G. RAFFAELLI  
SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  SSA
3)  HUT
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CRITICALITIES
FLIGHT PHASE  HDW/FUNC
PRE-EVA:  3/3
EVA:  2/2
POST-EVA:  2/2


LOCATION:
PART NUMBER:  0102-80002-105

CAUSES:  VELCRO ADHESIVE DEFECTIVE

EFFECTS/RATIONALE:
A DISLODGED IDB OR FOOD BAR CAN POSITION ITSELF IN MANNER WHICH
CAUSES THE CREWPERSON DISCOMFORT OR WHICH INHIBITS OPTIMUM
CREWPERSON PERFORMANCE. MISSION TERMINATION CAN RESULT.

REFERENCES:

REPORT DATE 02/25/88  E-131
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [ ]
SUBSYSTEM: EMU
MDAC ID: 849

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 1/1

ITEM: HUT ASSEMBLY
FAILURE MODE: BROKEN GIMBAL TRAVEL STOP STRAP

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HUT
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 1/1
POST-EVA: 2/2


LOCATION:
PART NUMBER: 0102-80002-105

CAUSES: DEFECTIVE MATERIAL, ABRASION, CLAMP SCREWS MISSING

EFFECTS/RATIONALE:
STRAP FAILURE WILL CAUSE UNNECESSARY LOADING OF BELLOWS AT TRAVEL EXTREMES. AXIAL PEELING OF BELLOWS CAN RESULT IN GROSS DEPRESSURIZATION. CREWPERSON LOSS.

REFERENCES:

REPORT DATE 02/25/88 E-132
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 851

HIGHEST CRITICALITY HDW/FUNC 
FLIGHT: 2/2

ITEM: HUT TMG
FAILURE MODE: LOOSE OR HAS HOLE

LEAD ANALYST: G. RAFFAELLI 
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
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LOCATION:
PART NUMBER: 0102-82782-32

CAUSES: DEFECTIVE MATERIAL OR LOOP TAPE, SEAM SEPARATION, TEAR

EFFECTS/RATIONALE:
LOCAL "HOT/COLD" SPOTS CAN POSSIBLY CAUSE SIGNIFICANT CREWPERSON DISCOMFORT. POSSIBLE MISSION TERMINATION.

REFERENCES:

REPORT DATE 02/25/88 E-133
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:              HIGHEST CRITICALITY
SUBSYSTEM:  EMU     HDW/FUNC
MDAC ID:  852

ITEM:  ARM TMG
FAILURE MODE:  LOOSE OR HAS HOLE IN IT

LEAD ANALYST:  G. RAFFAELLI      SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:

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LOCATION:
PART NUMBER:  0103-82405-10/0103-82406-07

CAUSES:  MATERIAL/LOOP TAPE DEFECT, SEAM SEPARATION

EFFECTS/RATIONALE:
LOCAL "HOT/COLD" SPOTS CAN CAUSE CREWPERSON DISCOMFORT. IF
SIGNIFICANT DISCOMFORT RESULTS, CREWPERSON MAY TERMINATE MISSION.

REFERENCES:

REPORT DATE 02/25/88   E-134
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM:  EMU  FLIGHT:  3/2R
MDAC ID:  853

ITEM:  DOFFING LEVER SUBASSEMBLY
FAILURE MODE:  TORSION SPRING BREAKS

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA:  3/3
EVA:  /NA
POST-EVA:  3/3


LOCATION:
PART NUMBER:  A/L 23869

CAUSES: MATERIAL DEFECT, CORROSION

EFFECTS/RATIONALE:
LOSS OF LEVERAGE IN UNLATCHING BODY SEAL CLOSURE. THIS IS AN
OPTIONAL ITEM AND ITS FAILURE WOULD BE AN IMPACT ONLY IF THE BODY
SEAL CLOSURE WERE DIFFICULT IN OPERATION. IF BOTH WERE FAILED
MISSION TERMINATION WOULD RESULT.

REFERENCES:

REPORT DATE 02/25/88  E-135
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 854

ITEM: DONNING AID HANDLES
FAILURE MODE: LATCH FAILS OPEN

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: /NA
EVA: /NA
POST-EVA: 3/3


LOCATION:
PART NUMBER: A/L 9857/9858

CAUSES: MATERIAL DEFECT/DEFORMATION

EFFECTS/RATIONALE:
INADVERTENT RELEASE OF HANDLES FROM BRACKET INCREASES DONNING DIFFICULTY ONLY.

REFERENCES:

REPORT DATE 02/25/88 E-136
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU FLIGHT: 3/3
MDAC ID: 855

ITEM: DONNING AID HANDLES
FAILURE MODE: HANDLES WILL NOT INSTALL

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
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LOCATION:
PART NUMBER: A/L 9857/9858

CAUSES: MATERIAL DEFORMATION, IMPACT, CONTAMINATION

EFFECTS/RATIONALE:
DONNING DIFFICULTY IS INCREASED. NO OTHER IMPACTS.

REFERENCES:

REPORT DATE 02/25/88 E-137
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU MDAC ID: 856

ITEM: WAIST/BRIEF/LTA/BOOT TMG FAILURE MODE: LOOSE OR HAS HOLE

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
4)
5)
6)
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8)
9)

CRITICALITIES

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<th>FLIGHT PHASE</th>
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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER:

CAUSES: DEFECTIVE MATERIAL/THREAD, SEAM SEPARATION, TEAR

EFFECTS/RATIONALE:
LOCAL "HOT/COLD" SPOTS CAN CAUSE CREWPERSON DISCOMFORT. IF DISCOMFORT IS SIGNIFICANT, MISSION WOULD BE TERMINATED.

REFERENCES:

REPORT DATE 02/25/88 E-138
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  SUBSYSTEM:  EMU
MDAC ID:  857  HIGHEST CRITICALITY  HDW/FUNC
                FLIGHT:  3/3

ITEM:  COMFORT GLOVE
FAILURE MODE:  DAMAGED

LEAD ANALYST:  G. RAFFAELLI  SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  SSA
3)  GLOVE ASSEMBLY
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CRITICALITIES

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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER:  0106-84906-03/04

CAUSES:  TEAR, SEAM SEPARATION

EFFECTS/RATIONALE:
THIS IS A CREW OPTION ITEM AND ITS FAILURE WILL HAVE NO IMPACTS.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: ____________________________  HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM:  EMU
MDAC ID: 858

ITEM:  GLOVE TMG
FAILURE MODE:  HOLE OR SEPARATION IN TMG

LEAD ANALYST:  G. RAFFAELLI  SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) GLOVE ASSEMBLY
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CRITICALITIES

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LOCATION:
PART NUMBER:  0106-88074-01/02

CAUSES:  WEAR, MATERIAL/THREAD DEFECT, TEAR, DEFECTIVE VELCRO

EFFECTS/RATIONALE:
LOCAL "HOT/COLD" SPOTS WHICH CAN CAUSE CREWPERSON DISCOMFORT. IF DISCOMFORT IS SIGNIFICANT, MISSION TERMINATION CAN RESULT.

REFERENCES:

REPORT DATE 02/25/88  E-140
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                      HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM:  EMU
MDAC ID:  859
ITEM:  GLOVE TMG
FAILURE MODE:  TMG DETACHES FROM RESTRAINT
LEAD ANALYST: G. RAFFAELLI    SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  SSA
3)  GLOVE ASSEMBLY
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CRITICALITIES
FLIGHT PHASE    HDW/FUNC
PRE-EVA:  3/3
EVA:  3/3
POST-EVA:  3/3


LOCATION:
PART NUMBER:  0106-88074-01/02

CAUSES:  DEFECTIVE MATERIAL/LOOPTAPE/THREAD

EFFECTS/RATIONALE:
THIS WILL ONLY RESULT IN SOME EXCESS TMG MOVEMENT WHICH SHOULD NOT REDUCE GLOVE FUNCTION OR IMPACT SAFETY.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU
MDAC ID: 860
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3

ITEM: GLOVE TMG
FAILURE MODE: FINGER TIPS LOOSE OR ABRADED

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) GLOVE ASSEMBLY
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CRITICALITIES

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LOCATION:
PART NUMBER: 0106-88074-01/02

CAUSES: CONTACT WITH SHARP OBJECT, DEFECTIVE MATERIAL/BOND

EFFECTS/RATIONALE:
THIS FAILURE MAY SLIGHTLY INCREASE DIFFICULTY OF EVA ACTIVITIES WHICH EMPLOY "FINGER-TIP" ACTIVITIES (I.E., SWITCH MOVEMENTS) BUT SHOULD NOT IMPACT MISSION OR SAFETY.

REFERENCES:

REPORT DATE 02/25/88 E-142
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:                  HIGHEST CRITICALITY  MDAC ID: 861
SUBSYSTEM: EMU         HDW/FUNC FLIGHT: 3/3
ITEM: RESTRAINT ASSEMBLY
FAILURE MODE: BIO-POCKET/POSIMETER DETACHES

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LCVG
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER: 0107-82968-07

CAUSES: MATERIAL/THREAD DEFECT/TEAR

EFFECTS/RATIONALE:
THE LOCATION OF THESE ITEMS SHOULD INHIBIT THEIR TRANSLATION TO OTHER AREAS IN SSA. NO IMPACT IS DETECTED.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM: EMU  
MDAC ID: 862  

HIGHEST CRITICALITY:  
HDW/FUNC  
FLIGHT: 2/2  

ITEM: RESTRAINT ASSEMBLY  
FAILURE MODE: H2O FLOW RESTRICTED  

LEAD ANALYST: G. RAFFAELLI  
SUBSYS LEAD: G. RAFFAELLI  

BREAKDOWN HIERARCHY:  
1) EMU  
2) SSA  
3) LCVG  
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CRITICALITIES  
FLIGHT PHASE:  
HDW/FUNC:  
PRE-EVA: 2/2  
EVA: 2/2  
POST-EVA: 2/2  


LOCATION:  
PART NUMBER: 0107-82968  

CAUSES: IMPACT CAUSES KINK IN LINE; MATERIAL DEFECT  

EFFECTS/RATIONALE:  
PROBABLE DEGRADATION IN COOLING CAPABILITY. TERMINATE MISSION.  

REFERENCES:  

REPORT DATE 02/25/88  E-144
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [Blank]
SUBSYSTEM: EMU
MDAC ID: 863

ITEM: EVVA TMG
FAILURE MODE: HOLE OR SEPARATION IN MATERIAL

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HELMET

CRITICALITIES

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LOCATION:
PART NUMBER: 0108-84032-01

CAUSES: MATERIAL/THREAD DEFECT, SEAM SEPARATION

EFFECTS/RATIONALE:
LOCAL "HOT/COLD" SPOTS SHOULD NOT CAUSE SIGNIFICANT CREW DISCOMFORT; THEREFORE, NO IMPACTS.

REFERENCES:

REPORT DATE 02/25/88 E-145
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:          HIGHEST CRITICALITY   HDW/FUNC
SUBSYSTEM:  EMU                         FLIGHT: 2/2
MDAC ID:  864

ITEM: MITTEN ASSEMBLY
FAILURE MODE: INSULATION TORN OR SEPARATED

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) GLOVE ASSEMBLY
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CRITICALITIES
FLIGHT PHASE   HDW/FUNC
PRE-EVA: 3/3
EVA: 2/2
POST-EVA: 3/3


LOCATION:
PART NUMBER:

CAUSES: THREAD/MATERIAL DEFECT/TEAR

EFFECTS/RATIONALE:
LOCAL HOT SPOT CAN CAUSE DISCOMFORT. ASSUMING REQUIRED FOR MISSION SUCCESS IF UNABLE TO EMPLOY MISSION, MISSION TERMINATION RESULTS.

REFERENCES:

REPORT DATE 02/25/88 E-146
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 865

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: ARM BEARING ASSEMBLY
FAILURE MODE: LOWER PRIMARY RESTRAINT BRACKET BROKEN/FAILED

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) ARM ASSEMBLY
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: A/L 9657-06

CAUSES: MATERIAL DEFECT, IMPACT, KEEPER SCREW BACKED OUT, DEFECTIVE THREADLOCK

EFFECTS/RATIONALE:
LOSS OF PRIMARY AXIAL LOAD RESTRAINT INTEGRITY. IF COMBINED WITH LOSS OF SECONDARY RERAINT OR COMPLETE LOSS OF ATTACHMENT SCREWS, CREWMEMBER COULD BE LOST.

REFERENCES:

REPORT DATE 02/25/88 E-147
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:       MDAC ID:  866
SUBSYSTEM:  EMU
HIGHEST CRITICALITY   FLIGHT:
HDW/FUNC            2/1R

ITEM:  LOWER ARM RESTRAINT AND BLADDER ASSEMBLY
FAILURE MODE:  AXIAL RESTRAINT SEAM SEPARATION OR SIZING INSERT MOVES

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) ARM ASSEMBLY

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA:  2/2
EVA:  2/1R
POST-EVA:  2/2


LOCATION:
PART NUMBER:  0103-82351-16

CAUSES:  FABRIC DEFECT, DEFECTIVE THREAD OR CORD

EFFECTS/RATIONALE:
BLADDER IS STILL UNDER TMG AND CAN ACCEPT OPERATING SUIT PRESSURES BUT IS SUBJECT TO ABRASION AND WEAR. IF BLADDER WERE TO ALSO FAIL, CREWPERSON LOSS CAN RESULT.

REFERENCES:

REPORT DATE 02/25/88   E-148
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [Blank]
SUBSYSTEM: EMU
MDAC ID: 867

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: BOOT DISCONNECT
FAILURE MODE: LOSS OF AXIAL RESTRAINT (PRIMARY OR SECONDARY)

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
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CRITICALITIES

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LOCATION:
PART NUMBER: A/L 9752-01

CAUSES: DEFECTIVE MATERIAL, SCREW BACKS OUT, INEFFECTIVE THREADLOCK

EFFECTS/RATIONALE:
SUIT LOADS WILL BE ASSUMED BY REMAINING RESTRAINT WHICH, IF ALSO FAILED, CAN RESULT IN CREWPERSON LOSS DUE TO INABILITY TO SUIT TO WITHSTAND LOADS AT BOOT.

REFERENCES:

REPORT DATE 02/25/88 E-149
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 868

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3

ITEM: CCA
FAILURE MODE: LOSS OF ATTACHMENT EAR SEAL

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSSA
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 3/3
POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:

PART NUMBER:

CAUSES: MATERIAL DEFECT, WEAR

EFFECTS/RATIONALE:
CREWPERSOON DOES NOT LOSE EAR COMMUNICATIONS BUT DOES GET INCREASED NOISE. NO IMPACTS.

REFERENCES:

REPORT DATE 02/25/88 E-150
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [blank]
SUBSYSTEM: EMU
MDAC ID: 869
MDAC ID:
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 3/3

ITEM: CCA
FAILURE MODE: LOSS OF ABSORPTION ATTACHMENT

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 3/3
POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION: [blank]

PART NUMBER: [blank]

CAUSES: MATERIAL DEFECT, WEAR

EFFECTS/RATIONALE:
NO IMPACTS TO COMMUNICATION CAPABILITY, MISSION OR CREWPERSON.

REFERENCES: [blank]

REPORT DATE 02/25/88 E-151
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM:  EMU  
MDAC ID:  870  

HIGHEST CRITICALITY HDW/FUNC  
FLIGHT:  2/2

ITEM:  CCA  
FAILURE MODE:  CHIN STRAP FAILS OPEN

LEAD ANALYST:  G. RAFFAELLI  
SUBSYS LEAD:  G. RAFFAELLI

BREAKDOWN HIERARCHY:
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REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER:

CAUSES:  MATERIAL DEFECT/WEAR, MECHANICAL FAILURE OF SNAP

EFFECTS/RATIONALE:
THIS CAN RESULT IN THE ENTIRE CCA SHIFTING SUCH THAT COMMUNICATIONS IN EITHER DIRECTION IS IMPACTED.

REFERENCES:

REPORT DATE 02/25/88  E-152
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU HIGHEST CRITICALITY HDW/FUNC
MDAC ID: 871 FLIGHT: 1/1

ITEM: SCYE BEARING ASSEMBLY
FAILURE MODE: SEPARATION OF BEARING RACES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) ARM ASSEMBLY

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: A/L 9782-04
CAUSES: MATERIAL FATIGUE, IMPACT, MATERIAL DEFECT/FRACTURE
EFFECTS/RATIONALE:
SEPARATION OF ARM FROM SSA CAN RESULT WITH UNCONTROLLABLE EMU DEPRESSURIZATION. LOSS OF LIFE.

REFERENCES:

REPORT DATE 02/25/88 E-153
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU
MDAC ID: 872

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: SCYE BEARING ASSEMBLY
FAILURE MODE: LOSS OF PRIMARY AXIAL RESTRAINT BRACKET SWIVEL

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) ARM ASSEMBLY
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CRITICALITIES

FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER:

CAUSES: MATERIAL FATIGUE/WEAR

EFFECTS/RATIONALE:
PRIMARY LOAD BEARING CAPABILITY WOULD BE LOST. MISSION TERMINATION RESULTS. IF SECONDARY FUNCTION ALSO LOST, ARM SEPARATION WOULD RESULT IN LOSS OF CREWPERSON.

REFERENCES:

REPORT DATE 02/25/88 E-154
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU 
MDAC ID: 873 

HIGHEST CRITICALITY HDW/FUNC 
FLIGHT: 2/1R 

ITEM: BODY SEAL CLOSURE (LTA SIDE) 
FAILURE MODE: LOSS OF PRIMARY AXIAL RESTRAINT BRACKET 

LEAD ANALYST: G. RAFFAELLI 
SUBSYS LEAD: G. RAFFAELLI 

BREAKDOWN HIERARCHY: 
1) EMU 
2) SSA 
3) LTA 

CRITICALITIES 

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LOCATION: 
PART NUMBER: A/L 9787-05 

CAUSES: LOOSE OR MISSING SCREWS, MATERIAL DEFECT/FATIGUE, IMPACT 

EFFECTS/RATIONALE: 
LOSS OF PRIMARY RESTRAINT LOAD BEARING CAPABILITY WILL RESULT IN MISSION TERMINATION. IF THE REDUNDANT RESTRAINT ALSO FAILS, THE CREWPERSON WILL BE LOST. 

REFERENCES: 

REPORT DATE 02/25/88 E-155
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:          HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU
MDAC ID: 874

ITEM:           HIGHEST CRITICALITY HDW/FUNC
FAILURE MODE: UPPER PRIMARY EXIAL RESTRAINT BRACKET FAILS
FLIGHT: 2/1R

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:
PART NUMBER: A/L 9698-08

CAUSES: LOOSE OR MISSING SCREWS, MATERIAL DEFECT/FATIGUE,
IMPACT, INEFFECTIVE THREADLOCK

EFFECTS/RATIONALE:
LOSS OF PRIMARY LOAD BEARING CAPABILITY SHOULD RESULT IN MISSION
TERMINATION. IF SECONDARY RESTRAINT ALSO FAILS, GROSS LOSS OF
STRUCTURAL INTEGRITY WILL RESULT IN CREWPERSON LOSS.

REFERENCES:

REPORT DATE 02/25/88 E-156
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM: EMU  
MDAC ID: 875

HIGHEST CRITICALITY HDW/FUNC  
FLIGHT: 2/1R

ITEM: WAIST BEARING
FAILURE MODE: LOSS OF BALL BEARING RETAINER SCREW

LEAD ANALYST: G. RAFFAElli  
SUBSYS LEAD: G. RAFFAElli

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION:  
PART NUMBER: A/L 9698-08

CAUSES: STRIPPED/FRACTURED SCREW, MATERIAL DEFECT/FATIGUE

EFFECTS/RATIONALE:
LOSS OF ONE SCREW WILL NOT IMPACT CREWPERSON BUT LOSS OF SECOND SCREW CAN RESULT IN LOSS OF BALL BEARING RETAINER AND THE SSA PRESSURE INTEGRITY, THEREBY CAUSING LOSS OF LIFE.

REFERENCES:

REPORT DATE 02/25/88  E-157
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 876

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: WAIST BEARING
FAILURE MODE: LOSS OF LOWER PRIMARY AXIAL RESTRAINT BRACKET

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
4)
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8)
9)

CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION: 
PART NUMBER: A/L 9698-08

CAUSES: MATERIAL DEFECT/FATIGUE, IMPACT

EFFECTS/RATIONALE:
LOSS OF PRIMARY LOAD BEARING CAPABILITY WILL CAUSE SECONDARY RESTRAINT TO SUSTAIN LOADS; HOWEVER, IF THE SECONDARY WERE ALSO LOST, THE CREWPERSON COULD BE LOST WHEN SSA PRESSURE INTEGRITY FAILS.

REFERENCES:

REPORT DATE 02/25/88 E-158
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:          HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM:    EMU
MDAC ID:      877
FLIGHT:       2/1R

ITEM:         WAIST BEARING
FAILURE MODE: LOSS OF PRIMARY AXIAL RESTRAINT BRACKET, FRONT

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
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LOCATION:
PART NUMBER: A/L 9698-08

CAUSES: MATERIAL DEFECT/FATIGUE, SCRE FRACTURE, DEFECTIVE THREADLOCK

EFFECTS/RATIONALE:
LOSS OF PRIMARY AXIAL LOAD BEARING CAPABILITY WILL CAUSE SECONDARY RESTRAINT TO SUSTAIN LOADS. LOSS OF SECONDARY RESTRAINT CONCURRENT WITH THE PRIMARY RESULTS IN GROSS LOSS OF PRESSURE INTEGRITY AND CREWPERSON LOSS OF LIFE.

REFERENCES:

REPORT DATE 02/25/88  E-159
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [ ] HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU
MDAC ID: 878

FLIGHT: 2/1R

ITEM: WAIST BEARING
FAILURE MODE: LOSS OF PRIMARY AXIAL RESTRAINT BRACKET REAR PIN

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
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LOCATION:
PART NUMBER: A/L 9698-08

CAUSES: MATERIAL DEFECT/FATIGUE, IMPACT/FRACTURE

EFFECTS/RATIONALE:
FAILURE OF THE PIN WILL CAUSE EFFECTIVE LOSS OF THE PRIMARY AXIAL RESTRAINT AND RESULT IN THE SECONDARY RESTRAINT BEING REQUIRED TO SUSTAIN SUIT LOADS. IF THE SECONDARY RESTRAINT BRACKET TO ALSO FAIL, THE CREWPERSON WOULD BE LOST.

REFERENCES:

REPORT DATE 02/25/88 E-160
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 879

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: WAIST BEARING
FAILURE MODE: LOSS OF REAR RESTRAINT BRACKET SCREW

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
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LOCATION:
PART NUMBER: A/L 9698-08

CAUSES: MATERIAL DEFECT/FATIGUE, IMPACT/FRACTURE, SCREW STRIPPED/BACKS OUT

EFFECTS/RATIONALE:
LOSS OF PIN SET SCREW WILL RESULT IN LOSS OF PRIMARY RESTRAINT BUT SECONDARY RESTRAINT STILL HELD BY BRACKET. HOWEVER, IF THE BRACKET ITSELF LOST TWO SIDE SCREWS, BOTH RESTRAINT COULD BE LOST AS COULD THE CREWPERSON.

REFERENCES:

REPORT DATE 02/25/88 E-161
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:           HIGHEST CRITICALITY  HDW/FUNC
SUBSYSTEM:  EMU       FLIGHT:  1/1
MDAC ID:  880

ITEM: WAIST BEARING
FAILURE MODE: TETHER BRACKET FRACTURES/YIELDS

LEAD ANALYST: G. RAFFAELLI    SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
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LOCATION:
PART NUMBER:  A/L 9698-08

CAUSES: MATERIAL DEFECT/FATIGUE, IMPACT

EFFECTS/RATIONALE:
A FAILURE OF THE TETHER BRACKET TO MAINTAIN THE CONNECTION OF THE EVA CREWPERSON TO THE SHUTTLE CAN RESULT IN UNCONTROLLED CREWPERSON SEPARATION AND LOSS OF LIFE.

REFERENCES:

REPORT DATE 02/25/88    E-162
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:  
SUBSYSTEM: EMU
MDAC ID: 881

HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/1R

ITEM: LOWER TORSO RESTRAINT BLADDER ASSEMBLY
FAILURE MODE: LOSS OF HIP JOINT RING

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  SSA
3)  LTA
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LOCATION:
PART NUMBER: 0104-82335-22

CAUSES: IMPACT, DEFECTIVE MATERIAL, FATIGUE

EFFECTS/RATIONALE:
A FAILURE OF THE HIP JOINT RING WILL RESULT IN PARTIAL TO TOTAL LOSS OF THE PRIMARY AXIAL RESTRAINT FOR THE HIP AREA WITH LOAD DEPENDENCE TRANSFERRED TO THE SECONDARY RESTRAINT. IF THE SECONDARY RESTRAINT WERE ALSO LOST, SUIT LOADS COULD RESULT IN GROSS FAILURE OF SUIT PRESSURE INTEGRITY AND CREWPERSON LOSS.

REFERENCES:

REPORT DATE 02/25/88  E-163
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 882

HIGHEST CRITICALITY
HDW/FUNC
FLIGHT: 2/1R

ITEM: LOWER TORSO RESTRAINT BLADDER ASSEMBLY
FAILURE MODE: CROTCH BUCKLE YIELDS/FRACTURES

LEAD ANALYST: G. RAFFAELLI 
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 2/2
EVA: 2/1R
POST-EVA: 2/2


LOCATION: 
PART NUMBER: 0104-82335-22

CAUSES: MATERIAL DEFECT/FATIGUE, IMPACT

EFFECTS/RATIONALE:
LOSS OF PRIMARY LOAD RESTRAINT FOR CROTCH AREA TRANSFERS LOADS TO SECONDARY RESTRAINT. IF SECONDARY RESTRAINT ALSO FAILS, CREWPERSON CAN BE LOST.

REFERENCES: 

REPORT DATE 02/25/88 E-164
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: __________ HIGHEST CRITICALITY HDW/FUNC
SUBSYSTEM: EMU
MDAC ID: 883 FLIGHT: 3/3

ITEM: LOWER TORSO RESTRAINT BLADDER ASSEMBLY
FAILURE MODE: WEBBING DETACHES FROM KEEPER RING

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: 0104-82335-22

CAUSES: FABRIC TORN/WORN, THREAD BREAKS

EFFECTS/RATIONALE:
IF THE WEBBING DETACHES FROM THE KEEPER RING, MINOR DEFORMATION OF THE LTA CAN RESULT. BECAUSE THE DEFORMATION WOULD BE MINOR, MOBILITY SHOULD NOT BE SEVERELY RESTRICTED NOR SHOULD CREWPERSON DISCOMFORT BE A FACTOR. NO IMPACTS.

REFERENCES:

REPORT DATE 02/25/88 E-165
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM:  EMU  
MDAC ID:  884  

HIGHEST CRITICALITY  HDW/FUNC
FLIGHT:  3/3

ITEM:  WAIST/BRIEF/LTA/BOOT TMG
FAILURE MODE:  SCISSOR POCKET LOOSE/TORN

LEAD ANALYST: G. RAFFAELLI  
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1)  EMU
2)  SSA
3)  LTA
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CRITICALITIES
FLIGHT PHASE  HDW/FUNC
PRE-EVA:  3/3
EVA:  3/3
POST-EVA:  3/3

REDUNDANCY SCREENS:  A [ ]  B [ ]  C [ ]

LOCATION:
PART NUMBER:

CAUSES:  THREAD DEFECTIVE/TORN, MATERIAL DEFECT/WEAR/TEAR

EFFECTS/RATIONALE:
INABILITY TO USE POCKET FOR RETENTION OF EVA SCISSORS SHOULD NOT IMPACT MISSION OR CREWPERSON.

REFERENCES:

REPORT DATE 02/25/88  E-166
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU
MDAC ID: 885

ITEM: DONNING AID HANDLES
FAILURE MODE: FAIL ENGAGED TO LTA

LEAD ANALYST: G. RAFFAELLI  SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LTA
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: A/L 9857/9858

CAUSES: IMPACT, MATERIAL DEFECT/FATIGUE, CONTAMINATION

EFFECTS/RATIONALE:
THE MISSION AND THE CREWPERSON WILL NOT BE IMPACTED DUE TO THE PRESENCE OF DONNING AID HANDLES.

REFERENCES:

REPORT DATE 02/25/88 E-167
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU MDAC ID: 886

ITEM: HELMET ASSEMBLY HIGHEST CRITICALITY HDW/FUNC
FAILURE MODE: FRESNEL LENS DETACHES FLIGHT: 2/2

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HELMET

CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: A/L 9672-01

CAUSES: MATERIAL DEFECTIVE, IMPACT

EFFECTS/RATIONALE:
DIFFICULTY IN READING DCM DISPLAY AND CONTROLS. POSSIBLE IRRITATION TO CREWPERSON DUE TO "FREE" LENS IN HELMET. MISSION TERMINATION.

REFERENCES:

REPORT DATE 02/25/88 E-168
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: SUBSYSTEM: EMU MDAC ID: 887

ITEM: RESTRAINT MODIFIED
FAILURE MODE: GIMBAL RING FRACTURES/YIELDS

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) GLOVE ASSEMBLY
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: 0106-85894-11/12

CAUSES: IMPACT, MATERIAL DEFECT/FATIGUE

EFFECTS/RATIONALE:
THE GIMBAL RING IS CRITICAL TO SUSTAINING GLOVE LOADS. IF LOST, THE PRESSURE INTEGRITY OF THE GLOVE ASSEMBLY WILL ALSO BE LOST IN AN UNCONTROLLABLE MANNER RESULTING IN LOSS OF LIFE.

REFERENCES:

REPORT DATE 02/25/88 E-169
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU  
MDAC ID: 888

HIGHEST CRITICALITY  HDW/FUNC
FLIGHT: 2/2

ITEM: RESTRAINT ASSEMBLY
FAILURE MODE: ZIPPER DETACHES

LEAD ANALYST: G. RAFFAELLI SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) LCVG

CRITICALITIES
FLIGHT PHASE  HDW/FUNC
PRE-EVA: 2/2
EVA: 2/2
POST-EVA: 2/2

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:  
PART NUMBER: 0107-82968-07

CAUSES: FABRIC DEFECT/WEAR, MECHANICAL SEPARATION

EFFECTS/RATIONALE:
A DETACHED ZIPPER CAN RESULT IN POOR LCVG FIT AND THEREFORE DEGRADED COOLING. MISSION TERMINATION WILL RESULT.

REFERENCES:

REPORT DATE 02/25/88 E-170
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: [fill in]

SUBSYSTEM: EMU
MDAC ID: 889

ITEM: EXTRAVEHICULAR VISOR ASSEMBLY
FAILURE MODE: CRACKED/SCRATCHED PROTECTIVE VISOR

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HELMET
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: A/L 9813-12

CAUSES: IMPACT

EFFECTS/RATIONALE:
REDUCED OR IMPAIRED VISION WILL RESULT IN MISSION TERMINATION.

REFERENCES:
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE:
SUBSYSTEM: EMU
MDAC ID: 890

ITEM:
FAILURE MODE:

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
1) EMU
2) SSA
3) HELMET
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CRITICALITIES

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REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: A/L 9813-12

CAUSES: IMPACT, THERMAL STRESS

EFFECTS/RATIONALE:
INABILITY TO EMPLOY EYESHADES DURING A MISSION WHICH REQUIRES THEM CAN RESULT IN SIGNIFICANTLY IMPAIRED VISION AND MISSION IMPACTS.

REFERENCES:

REPORT DATE 02/25/88 E-172
INDEPENDENT ORBITER ASSESSMENT
ORBITER SUBSYSTEM ANALYSIS WORKSHEET

DATE: 
SUBSYSTEM: EMU
MDAC ID: 891
HIGHEST CRITICALITY HDW/FUNC
FLIGHT: 2/2

ITEM: EXTRAVEHICULAR VISOR ASSEMBLY
FAILURE MODE: TENSION BAND BREAKS/YIELDS

LEAD ANALYST: G. RAFFAELLI
SUBSYS LEAD: G. RAFFAELLI

BREAKDOWN HIERARCHY:
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CRITICALITIES
FLIGHT PHASE HDW/FUNC
PRE-EVA: 3/3
EVA: 2/2
POST-EVA: 3/3

REDUNDANCY SCREENS: A [ ] B [ ] C [ ]

LOCATION:
PART NUMBER: A/L 9813-12

CAUSES: MATERIAL DEFECT/FATIGUE, IMPACT

EFFECTS/RATIONALE:
A FAILURE CAN HAVE ONE OF TWO CONSEQUENCES: 1) A LOOSE EVVA NOT HELD IN POSITION, OR 2) STICKS THE EVVA IN ONE POSITION. THE LATTER CONSEQUENCE IS THE MOST CRITICAL IN THAT MISSION TERMINATION CAN RESULT IF THE EVVA CANNOT BE EMPLOYED.

REFERENCES:

REPORT DATE 02/25/88 E-173
APPENDIX F

NASA FMEA TO IOA WORKSHEET CROSS REFERENCE/RECOMMENDATIONS

This section provides a cross reference between the NASA FMEA and corresponding IOA analysis worksheet(s) included in Appendix E. The Appendix F identifies: NASA FMEA Number, IOA Assessment Number, NASA criticality and redundancy screen data, and IOA recommendations.

Appendix F Legend

Code Definition

Blank       The IOA and the NASA are in agreement.
1           The IOA recommends inclusion of this failure mode into the NASA FMEA.
2           The IOA recommends inclusion of this failure mode into the NASA CIL.
3           The IOA recommends deletion of the failure mode from the IOA analysis.
4           The IOA recommends incorporation of the identified failure mode as a "cause" into a specific NASA FMEA.
5           The IOA recommends downgrading the NASA FMEA criticality.
6           The IOA recommends upgrading the NASA FMEA criticality.
7           The IOA recommends upgrading the NASA FMEA criticality and adding the failure mode to the CIL.
8           The IOA recommends removal of the NASA failure mode from the CIL.
9           The IOA agrees with the NASA analysis.
10          The IOA recommends a change to a screen.
11          The IOA recommends the failure mode be removed from the NASA FMEA. Analysis of this event is more applicable to a hazard analysis.
12          The IOA recommends the NASA failure mode effects to be modified.
13          The EVC should be covered by the communications and tracking reports by the IOA.
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