

FAILURE MODES EFFECTS ANALYSIS (FMEA) -- NON-CIL HARDWARE
NUMBER:05-1-12200C -X

SUBSYSTEM NAME: GUIDANCE, NAVIGATION, AND CONTROL

REVISION: 0 08/15/01

PART DATA

	PART NAME	PART NUMBER
	VENDOR NAME	VENDOR NUMBER
	:FLT DK AVNS INSTL AREA	
LRU	:DEVICE DRIVER UNIT AEROSPACE AVIONICS INC.	MC454-0154-0001 715305-1

EXTENDED DESCRIPTION OF PART UNDER ANALYSIS:
 DEVICE DRIVER UNIT (DDU) - AFT STATION

REFERENCE DESIGNATORS: 30V73A3

QUANTITY OF LIKE ITEMS: 1
 1 AFT

FUNCTION:
 PROVIDES POWER TO THE AFT ROTATION HAND CONTROL (RHC), AND AFT TRANSLATION
 HAND CONTROL (THC).

REFERENCE DOCUMENTS: MCR 19029 - DEVICE DRIVER UNIT (DDU), REV 2 (11/24/99)

FAILURE MODES EFFECTS ANALYSIS FMEA -- NON-CIL FAILURE MODE

NUMBER: 05-1-12200C- 02

REVISION#: 0 08/15/01

SUBSYSTEM NAME: DISPLAYS & CONTROLS

LRU: DEVICE DRIVER UNIT

ITEM NAME: DEVICE DRIVER UNIT

CRITICALITY OF THIS

FAILURE MODE: 2R3

FUNCTIONAL CRITICALITY/

REQUIRED FAULT TOLERANCE/ACHIEVED FAULT TOLERANCE:2R/1/1

FAILURE MODE:

ERRONEOUS POWER OUTPUT FROM DEVICE DRIVER UNIT (DDU) FLIGHT CONTROL POWER SUPPLIES (A,B,C). ERRONEOUS POWER OUTPUT FROM ONE, TWO, OR THREE POWER SUPPLIES.

MISSION PHASE:

- PL PRE-LAUNCH
- LO LIFT-OFF
- OO ON-ORBIT
- DO DE-ORBIT
- LS LANDING/SAFING

VEHICLE/PAYLOAD/KIT EFFECTIVITY:

- 102 COLUMBIA
 - 103 DISCOVERY
 - 104 ATLANTIS
 - 105 ENDEAVOUR
- APPLIES TO VEHICLES THAT HAVE MEDS AND NEW DDU INSTALLED ONLY

CAUSE:

CONTAMINATION, VIBRATION, SHOCK, PIECE PART FAILURE, TEMPERATURE.

CRITICALITY 1/1 DURING INTACT ABORT ONLY? NO

CRITICALITY 1R2 DURING INTACT ABORT ONLY (AVIONICS ONLY)? NO

REDUNDANCY SCREEN

- A) PASS
- B) PASS
- C) PASS

PASS/FAIL RATIONALE:

A)

B)

C)

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MASTER MEAS. LIST NUMBERS: V73X3021X
V73X3022X
V73X3023X
V73X3052X

CORRECTING ACTION: MANUAL

CORRECTING ACTION DESCRIPTION:

CREWS ARE TRAINED TO COMPENSATE FOR AFT STATION DDU FAILURE USING THE COMMANDER STATION HAND CONTROLLERS. THE PILOT WILL BE AT THE COMMANDER STATION DURING RENDEZVOUS OPERATION TO RECOVER FROM LOSS OF AFT STATION DDU.

REMARKS/RECOMMENDATIONS:

RENDEZVOUS PROCEDURES PROVIDE MANY DECISION POINTS AND THE REDUCTION OF CLOSING VELOCITY AS THE ORBITER APPROACHES THE RENDEZVOUS TARGET WILL PRECLUDE ANY POTENTIAL LOSS OF CREW/VEHICLE.

NOTE: THERE IS NO SINGLE POINT FAILURE THAT CAN CAUSE ERRONEOUS OUTPUT FOR ALL THREE POWER SUPPLY OUTPUTS. IT REQUIRES AT LEAST TWO INTERNAL FAILURES TO CAUSE ERRONEOUS OUTPUT FOR ALL THREE POWER SUPPLY OUTPUTS.

- FAILURE EFFECTS -

(A) SUBSYSTEM:

ERRONEOUS POWER OUTPUT FROM ONE OF THREE DDU FLIGHT CONTROL POWER SUPPLIES AT AFT STATION.

(B) INTERFACING SUBSYSTEM(S):

RM SOFTWARE WILL PROTECT AGAINST ERRONEOUS OUTPUT POWER FOR ONE DDU POWER SUPPLIES FOR THE AFT RHC AND THC BY SWITCHING FROM 3 CHANNEL MID-VALUE SELECT TO 2 CHANNEL AVERAGING FOR THESE CONTROLLERS.

(C) MISSION:

FIRST FAILURE - NO EFFECT.

(D) CREW, VEHICLE, AND ELEMENT(S):

FIRST FAILURE - NO EFFECT

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(E) FUNCTIONAL CRITICALITY EFFECTS:

POSSIBLE LOSS OF MISSION DUE TO INABILITY TO DOCK WITH RENDEZVOUS TARGET (PAYLOAD OR STATION). REQUIRES TWO FAILURES (ERRONEOUS OUTPUT FOR TWO OF THREE DDU POWER SUPPLIES) BEFORE EFFECT OCCURRED.

- TIME FRAME -

TIME FROM FAILURE TO CRITICAL EFFECT: MINUTES

- APPROVALS -

SAFETY ENGINEERING	: T. AI	:/S/ T. AI_____
DDU SSM	: R. D SMITH	:/S/ R. D. SMITH_____
FLIGHT CONTROL SSM	: D. HEIDMANN	:/S/ D. HEIDMANN_____
GN&C/FC ANALYSIS-ORBIT SSM:	R. FRIEND	:/S/ R. FRIEND_____