CRITICAL ITEMS LIST

SSV NOMENCLATURE: Adaptive Payload Carrier Assembly
SSEMBLY PART NO.: SED39819294

REVISION NO: LESC 28151/DST 24191
REVISION: Original
DATE: 3/22/90

EFFECTIVITY: STS-31 and SUBS

FMEA REF	FMEA REV	NAME, QTY & DRAWING NO. REF DESIGNATION	CRIT	FAILURE MODE AND CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
AI	-	Adaptive Payload Carrier (APC) Interface Mechanism QTY (1) DWG C95-186-1 DWG C95-187-1 DWG C95-188-1	2/3R SCREEN A - P B - N/A C - P	A1 - Latch opens during launch or landing - Retention or structural failure of hook spring and trigger spring.	END ITEM Latch mechanism fails in open position after two failures OFF INTERFACE PRR boot connection to APC. PRR loose in Payload Bay (PLB) MISSION Unable to perform HST repair CREW/VEHICLE Potential loss of crew/vehicle due to impact from PRR	A. Design The APC interface mechanism has been designed to withstand launch loads including shock (20g, 11ms(1/2 sec, sawtooth pulse, 3 axes), random vibration at high as 7grms/hz, and lift off and landing static loads (3.9g's 3.0g's, and 6.4g's in the x, y, and z axes respectively. Dynamic magnification of 2 has been included and all static loads are assumed simultaneous (worst case) and are combined with the worst case 3.3 sigma random response load in each axes. An arbitrary handling load of one hundred pounds in any direction at any point was also considered. Using the above load spectrum design safety margins of 1.14 for deformation and 1.40 for failure have been achieved. All springs are corrosion resistant and will be cycled a small fraction of nominal cyclic life in the 20 mission life of the MPR. Fatigue life based upon random response loads with appropriate stress concentration factors has been established using a scatter factor of 4.0 (e.g. 80 mission fatigue life based upon S-N curves). All materials are per table 1 and 2 of MSFC-SPEC-522A to reduce stress corrosion, and are certified for traceability/quality. B. TEST 1. Acceptance test per procedure 380 99.01 at Grumman (7/7/83) before and after all tests. ATP includes functional tests of all operating functions and a general visual inspection. 2. Stiffness test per procedure 380 00 01 at Grumman (7/7/83). Demonstrated zero/zero end play less than .5 inch for a five pound load in any direction and deflection less than 3 inches lateral and 2 inches longitudinal for 1 hundred pound loads. 3. Vibration and shock test per procedure 380-98 01 at Grumman (7/7/83). Demonstrated ability to withstand design levels without structural failure with no significant resonance. Several tenses required the application of loads. 4. APC/MLH ultimate load tests per S1581 0911 at Rockwell (9/83). Loads applied in 14 steps, each comprising 100 of limit load no yield was observed at the ultimate load of 1.4 x limit.

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CRITICAL ITEMS LIST

SSY NOMENCLATURE: Adaptive Payload Carrier Assembly
SSEMBLY PART NO.: SED39119294

REPORT NO: HSC 28151(SC-2429)
REVISION: Original
DATE: 3/22/90

EFFECTIVITY: STS 31 and SUBS

FMEA REF	FMEA REV	NAME, QTY & DRAWING NO. REF DESIGNATION	CRIT	FAILURE MODE AND CAUSE	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
						5. Thermal vacuum test at JSC (7/29/84). Latches were operated at ambient temperature, plus 234°F and -157°F (average lowest achievable chamber temp) at an average vacuum of .00006 torr. C. INSPECTION 1. NAVSEO inspects all production and items at completion of final assembly. 2. Anodic hard coated aluminum parts inspected for compliance to MIL-A 8625 C by DCAS. Certificate of compliance on file at Dimensional Heritage 3. Thermal Control Coating process is controlled by inspections, (post prime, cure, post coating, and cure), and sample testing for coating thickness, coating adhesion, and moisture/volatile absorption. D. FAILURE HISTORY None (per PRACA database) The latches have been successfully utilized on five missions, STS 51, 13, 5AA, 51I, and 61C. E. OPERATIONAL USE 1. Operational effect of failure - none and PRI available. 2. Crew action - None 3. Crew training - None 4. Mission Constraints - None 5. In-flight Checkout - None

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