

CRITICAL ITEMS LIST

SYSTEM: MECHANICAL ARM SUBSYSTEM
 ASS'Y P/N: 51140E1470-1E-3 SHEET: 1

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HOWR / FUNC. 1/1 CRITICALITY	RATIONALE FOR ACCEPTANCE SCREENS: N/A
3940	3	BACKUP RELEASE MECHANISM QTY-1 P/N 51140E1472	<p>MODE: LOSS OF CAPTURE AND ALL RELEASE CAPABILITY.</p> <p>CAUSE(S): (1) BEARING SEIZURE (2) BLOOMING SPRING MOTOR. (3) GEARS SEIZED. (4) MECHANICAL FAILURE</p>	<p>LOSS OF ABILITY TO CAPTURE OR RELEASE PAYLOAD IN PRIME MODE. BACKUP RELEASE WILL NOT OPERATE. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ.</p> <p>WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/ RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING ----- N/A</p>	<p>DESIGN FEATURES -----</p> <p>THE BEARINGS ARE PROCURED BY SPAR AND MEET, OR EXCEED THE REQUIREMENTS OF SPECIFICATION SPAR-SG.393.</p> <p>THE BEARING ANALYSIS USES ULTIMATE LOADS TO DETERMINE THE MARGINS OF SAFETY OF THE LUBRICANT. THE FACTOR BETWEEN WORKING LOADS AND ULTIMATE IS 1.4. THE LUBRICANT FAILURE STRESSES ARE LOWER THAN THE BRTNELLING STRESS. LIFE FOR ALL BEARINGS IS GREATER THAN 400 MISSIONS BASED UPON THE ABOVE CRITERIA.</p> <p>THE ALLOWABLE CONTACT STRESS FOR THE LUBRICANT IS ABOUT 1/5TH THE ALLOWABLE CONTACT STRESS FOR THE BEARING, THEREFORE THE LUBRICANT PROPERTIES DICTATE THE DESIGN. THE BEARINGS AS A RESULT ARE LIGHTLY LOADED AND SURFACE FATIGUE IN THE BEARING MATERIAL IS NOT A VIABLE FAILURE MODE.</p> <p>THE SOLID FILM LUBRICANT SYSTEM USED IS LUBECO 905. THIS COMPRISES A SPRAY AND CURE (400 DEGREES F) APPLICATION OF MOLYBDENUM DISULPHIDE, IN AN IN ORGANIC BINDER APPLIED PER PPS:28:11 AND 28:13. BURNISHING AND RUN IN PER SPAR PPS 28:14. THE LUBRICATED BEARING IS TORQUE TRACED TO ENSURE ACCEPTABILITY PER SPAR PPS:28:14.</p> <p>THE GREASE LUBRICANT USED IS BRAYCOTE 601 (FORMERLY 3L-38RP) WHICH HAS A PERFLUORINATED POLYETHER OIL BASE WHICH IS VERY STABLE UNDER VACUUM ENVIRONMENT.</p> <p>THE GREASE IS APPLIED IN PRECISE QUANTITY TO EACH BEARING.</p> <p>THE LIFE OF THE BEARING LUBRICATION HAS BEEN ANALYZED USING ULTIMATE LOADS TO EVALUATE HERTZIAN STRESSES. ULTIMATE LOAD = 1.4 X WORKING LOAD. THE LUBRICANT ON ALL BEARINGS IS GOOD FOR OVER 400 MISSIONS USING THE ULTIMATE LOADS.</p> <p>THE DRIVE BEARINGS IN THE SPRING RETURN MECHANISM ARE PERMANENTLY LUBRICATED WITH DRY FILM LUBRICANT AND ARE SHIELDED TO CERTAIN EXTENT BY THE THERMAL COVER AND THE GEARS THEY SUPPORT THUS PROVIDING A TORTUROUS PATH FOR THE INGRESS OF ANY FOREIGN DEBRIS INTO THE BEARING.</p> <p>THE ROLLER GUIDE BEARINGS IN TURN ARE SHIELDED AND PERMANENTLY LUBRICATED WITH BRAYCOTE GREASE VIRTUALLY ELIMINATING THE PROBABILITY OF THESE BEARINGS SEIZING.</p> <p>ROLLER GUIDE BEARINGS ARE PROVIDED ON THE PERIMETER OF THE SUPPLY AND TAKE UP SPOOLS TO CONTAIN THE MOTION OF THE SPRING WHILE IT IS IN OPERATION AND DOES NOT ALLOW IT TO EXPAND BEYOND THE LIMITS DEFINED BY THE ROLLER GUIDES. THE INSIDE RUNNING SURFACES OF THE SUPPLY AND TAKE UP SPOOLS ARE ALSO LUBRICATED WITH DRY FILM LUBRICANT TO ENSURE THE SMOOTH TRANSFER OF THE SPRING FROM ONE SPOOL TO ANOTHER. UNDER THESE CONDITIONS BLOOMING OF THE NEGATOR SPRING WHILE IN OPERATION IS VIRTUALLY ELIMINATED.</p> <p>ALL SRMS GEARS ARE DESIGNATED IN ACCORDANCE WITH AGMA STANDARDS TO GIVE A MINIMUM OF INFINITE LIFE. THE DEFINITION OF INFINITE LIFE IS THE CONDITION WHERE 10**7 MESH CYCLES OR</p>	

PREPARED BY: MFVG SUPERCEDING DATE: 12 OCT 89 APPROVED BY: _____ DATE: 24 JUL 91 CIL REV: 3

CRITICAL ITEMS LIST

PROJECT: SRMS
ASS'Y NOMENCLATURE: END EFFECTOR

SYSTEM: MECHANICAL ARM SUBSYSTEM
ASS'Y P/N: 51140E1470-1A-3

SHEET: 2

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HDWR / FUNC. 1/1 CRITICALITY RATIONALE FOR ACCEPTANCE SCREENS: N/A
3940	3	BACKUP RELEASE MECHANISM QTY-1 P/N 51140E1472	<p>MODE: LOSS OF CAPTURE AND ALL RELEASE CAPABILITY.</p> <p>CAUSE(S): (1) BEARING SEIZURE (2) BLOOMING SPRING MOTOR. (3) GEARS SEIZED. (4) MECHANICAL FAILURE</p>	<p>LOSS OF ABILITY TO CAPTURE OR RELEASE PAYLOAD IN PRIME MODE. BACKUP RELEASE WILL NOT OPERATE. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ.</p> <p>WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING ----- N/A</p>	<p>MORE AT THE APPLIED LOAD WILL NOT RESULT IN TOOTH FAILURE.</p> <p>FOR THIS (THESE) GEAR (S) THE CALCULATED LIFE WAS NOT BASED OR CONTROLLED BY CONSIDERATIONS OF STRESS, BUT INSTEAD WERE SIZED TO SATISFY SPECIAL CONSTRAINTS. CONSEQUENTLY, THE MESH IS WELL WITHIN THE DEFINITION OF INFINITE LIFE AND THE FAILURE MODE STATED IN THE FMEA IS REMOTE.</p> <p>THE APPLIED LOADS DERIVED FOR THIS (THESE) GEAR (S) WERE CATERED TO IN THE SIZING OF THE GEAR MESH. THE MATERIAL ALLOWABLES WERE DERATED BY SPAR AS CONSISTENT FOR FINE PITCH GEARING APPLIED TO POWER TRANSMISSIONS. THE RESULTING MESH DESIGN WAS CHECKED AGAINST THE INFINITE LIFE CRITERIA.</p> <p>THE GEARS ON THE SPRING RETURN MECHANISM ARE PERMANENTLY LUBRICATED WITH DRY FILM LUBRICANT WHICH HAS BEEN DEMONSTRATED TO HAVE A MISSION LIFE OF 424 MISSIONS. IT SHOULD ALSO BE NOTED THAT THE GEARS ARE PARTIALLY SHIELDED BY THE SPRING RETURN MECHANISM THERMAL COVER PROVIDING A TORTUOUS PATH FOR DEBRIS TO COME INTO CONTACT WITH THE GEAR MESHES.</p> <p>MATERIALS SELECTION AND USAGE CONFORMS TO SPAR-SG.368 WHICH IS EQUIVALENT TO THE NASA MATERIALS USAGE REQUIREMENTS.</p> <p>THE STRUCTURAL ANALYSIS CONDUCTED ON THE END EFFECTOR, PER SPAR-TM.1531, CONFIRMED A POSITIVE MARGIN OF SAFETY FOR ALL END EFFECTOR PARTS AND GEARS. THE MARGIN OF SAFETY FOR ULTIMATE STRENGTH N(UTS) INCORPORATES A FACTOR OF SAFETY OF 1.4 AGAINST LIMIT LOAD, AS SPECIFIED IN SPAR-SG. 392.</p> <p>A NEGATIVE MARGIN DOES NOT NECESSARILY IMPLY BREAKAGE OF THE PART, RATHER IT INDICATES THAT A LIMITING STRESS LEVEL, ESTABLISHED BY THE FACTOR OF SAFETY, HAS BEEN EXCEEDED.</p> <p>THE MARGIN OF SAFETY FOR YIELD STRENGTH S(YIELD) EMPLOYS A FACTOR OF SAFETY OF 1.0 AGAINST LIMIT LOAD, AS SPECIFIED IN SPAR-SG.392. TABLE 14 LISTS MARGINS OF SAFETY FOR SRMS STRUCTURAL COMPONENTS.</p> <p>A FATIGUE ANALYSIS WHICH SHOWS INDEFINITE LIFE HAS BEEN PERFORMED ON THE GEARS AND MECHANICAL FASTENERS AND A FRACTURE ANALYSIS WHICH SHOWS LIVES GREATER THAN 424 MISSIONS HAS BEEN DEMONSTRATED ON STRUCTURAL COMPONENTS WITHIN THE END EFFECTOR.</p>

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DATE: 24 JUL 91

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CRITICAL ITEMS LIST

PROJECT: SRMS
 ASS'Y NOMENCLATURE: END EFFECTOR

ITEM: MECHANICAL ARM SUBSYSTEM
 ASS'Y P/N: 51140E1470-1A-3

SHEET: 3

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HDMR / FUNC. 1/1	RATIONALE FOR ACCEPTANCE CRITICALITY SCREENS: N/A
3940	3	BACKUP RELEASE MECHANISM QTY-1 P/N 51140E1472	MODE: LOSS OF CAPTURE AND ALL RELEASE CAPABILITY. CAUSE(S): (1) BEARING SEIZURE (2) BLOOMING SPRING MOTOR. (3) GEARS SEIZED. (4) MECHANICAL FAILURE	LOSS OF ABILITY TO CAPTURE OR RELEASE PAYLOAD IN PRIME MODE. BACKUP RELEASE WILL NOT OPERATE. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ. WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING ----- N/A		ACCEPTANCE TESTS ----- THE EE ASSEMBLY IS TESTED TO THE FOLLOWING ACCEPTANCE ENVIRONMENTS: O VIBRATION: LEVEL AND DURATION - REFERENCE TABLE 7 O THERMAL VACUUM: +70 DEGREES C TO -25 DEGREES C (1 1/2 CYCLES) 1 X 10 ⁻⁶ TORR THE EE ASSEMBLY IS FURTHER TESTED IN THE IM THE RMS SYSTEM TEST (TP510 RMS STRONGBACK AND TP552 FLAT FLOOR TESTS) WHICH VERIFIES THE ABSENCE OF THE FAILURE MODE. QUALIFICATION TESTS ----- THE EE ASSEMBLY QUALIFICATION TESTING CONSISTED OF THE FOLLOWING ENVIRONMENTS: O VIBRATION: LEVEL AND DURATION - REFERENCE TABLE 7 O SHOCK: 20G/11 MS - 3 AXES (6 DIRECTIONS) O THERMAL VACUUM: +81 DEGREES C TO -36 DEGREES C (6 CYCLES) 1 X 10 ⁻⁶ TORR O HUMIDITY: 95% RH (65 DEGREES C MAINTAINED FOR 6 HRS) (65 DEGREES C TO 30 DEGREES C IN 16 HRS) 10 CYCLES 240 HRS. O EMC: MIL-STD-461A AS MODIFIED BY SL-E-0002 (TEST CE01, CE03, CS01, CS02, CS06, RE02 (N/B)) O STRUCTURAL STIFFNESS AND LOAD TEST FLIGHT CHECKOUT ----- PDRS OPS CHECKLIST (ALL VEHICLES) JSC 16987

PREPARED BY: NFWG

SUPERSEDING DATE: 12 OCT 89

DATE: 26 JUL 91

CIL REV: 3

CRITICAL ITEMS LIST

PROJECT: SRMS
ASS'Y NOMENCLATURE: END EFFECTOR

SYSTEM: MECHANICAL ARM SUBSYSTEM
ASS'Y P/N: 51140E1470-18-3

SHEET: 4

FMEA REF.	FMEA REV.	NAME, QTY. & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HOWR / FUNC. 1/1 CRITICALITY	RATIONALE FOR ACCEPTANCE SCREENS: N/A
3940	3	BACKUP RELEASE MECHANISM QTY-1 P/N 51140E1472	<p>MODE: LOSS OF CAPTURE AND ALL RELEASE CAPABILITY.</p> <p>CAUSE(S): (1) BEARING SEIZURE (2) BLOOMING SPRING MOTOR. (3) GEARS SEIZED. (4) MECHANICAL FAILURE</p>	<p>LOSS OF ABILITY TO CAPTURE OR RELEASE PAYLOAD IN PRIME MODE. BACKUP RELEASE WILL NOT OPERATE. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ.</p> <p>WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING ----- N/A</p>	QA/INSPECTIONS	<p>UNITS ARE MANUFACTURED UNDER DOCUMENTED QUALITY CONTROLS. THESE CONTROLS ARE EXERCISED THROUGHOUT DESIGN PROCUREMENT, PLANNING, RECEIVING, PROCESSING, FABRICATION, ASSEMBLY, TESTING AND SHIPPING OF THE UNITS. MANDATORY INSPECTION POINTS ARE EMPLOYED AT VARIOUS STAGES OF FABRICATION ASSEMBLY AND TEST. GOVERNMENT SOURCE INSPECTION IS INVOKED AT VARIOUS CONTROL LEVELS.</p> <p>RECEIVING INSPECTION VERIFIES THAT THE HARDWARE RECEIVED IS AS IDENTIFIED IN THE PROCUREMENT DOCUMENTS, THAT NO DAMAGE HAS OCCURRED DURING SHIPMENT, AND THAT APPROPRIATE DATA HAS BEEN RECEIVED WHICH PROVIDES ADEQUATE TRACEABILITY INFORMATION AND IDENTIFIES ACCEPTABLE PARTS.</p> <p>INSPECTION VERIFIES THAT KITTED PARTS ARE CORRECT PRIOR TO ASSEMBLY AND TRACEABILITY INFORMATION RECORDED.</p> <p>INSPECTION TO DRAWING IS CONDUCTED THROUGHOUT THE ASSEMBLY PROCESS, INCLUDING INSPECTION OF LOCKING, WITNESSING OF TORQUING AND APPLICATION OF TORQUE STRIPING.</p> <p>BEARINGS RECEIVE DIMENSIONAL INSPECTION AT THE SUPPLIER AND VERIFICATION BY SPAR RECEIVING INSPECTION. PRE-ASSEMBLY INSPECTION VERIFIES CIRCULARITY OF BALL TRACKS AND INNER/OUTER RACE DIAMETERS. AFTER ASSEMBLY PRIOR TO LUBRICATION, RADIAL CLEARANCE MEASUREMENTS ARE TAKEN. FOLLOWING LUBRICATION, RUN-IN/BURNISHING AND CLEANING OF DRY LUBE BEARINGS, SPECIALIZED BEARING INSPECTION EQUIPMENT AT SPAR IS USED TO VERIFY QUALITY AND STICTION LEVELS THROUGH STRIP CHART RECORDING OF TORQUE TRACES. BEARINGS ARE THEN RETURNED TO THE SUPPLIER FOR FINAL RADIAL CLEARANCE MEASUREMENTS. GOVERNMENT SOURCE INSPECTION IS INVOKED ON ALL BEARING PROCUREMENTS.</p> <p>GEAR INSPECTION, BEFORE GEAR LUBRICATION AND RUN-IN A COMPOSITE ERROR GEAR CHECKER IS USED TO VERIFY THAT INVOLUTE FORM, PITCH CIRCLE CONCENTRICITY AND PITCH DIAMETER ARE TO DRAWING REQUIREMENTS. THIS INSPECTION ALSO INCLUDES TEXTURE EVALUATION. AFTER LUBRICATION, GEARS ARE VISUALLY INSPECTED TO CONFIRM APPROPRIATE LUBRICANT APPLICATION AND GEARS ARE THEN RUN-IN, CLEANED AND VISUALLY INSPECTED.</p> <p>FOLLOWING HEAT TREATMENT, STEEL PARTS (E.G. GEARS) ARE SUBJECTED TO A MAGNETIC PARTICLE INSPECTION FOR CRACKS OR IN THE CASE OF ALUMINUM PARTS (E.G. HOUSINGS) ARE DYE PENETRANT INSPECTED USING GROUP V PENETRANTS. WELDING OF GEARS OR HOUSINGS IS SUBJECTED TO DYE PENETRANT (GROUP V) AND RADIOGRAPHIC INSPECTION ON COMPLETION OF STRESS RELIEF TO CHECK FOR CRACKS. QUALIFICATION WELDING TEST SAMPLES FOR STRUCTURAL WELDS ARE SUBJECTED TO DESTRUCTIVE TESTING WHERE POSSIBLE (TENSILE AND BENDING) AS WELL AS METALLAGRAPHIC ANALYSIS TO ENSURE DEFECT FREE WELDS.</p> <p>THE SPRING RETURN MECHANISM IS INSPECTED AND MANUALLY OPERATED IN ACCORDANCE WITH THE REQUIREMENTS OF SPAR-TH.1657 TO VERIFY CORRECT OPERATION OF MECHANISM. AFTER INTEGRATION TO THE END</p>

PREPARED BY:

MFVG

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CRITICAL ITEMS LIST

PROJECT: SRMS
ASS'Y NOMENCLATURE: END EFFECTOR

SYSTEM: MECHANICAL ARM SUBSYSTEM
ASS'Y P/N: 51140E1470-18-3 SHEET: 5

FMEA REF.	FMEA REV.	NAME, QTY. & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HWDR / FUNC. 1/1 CRITICALITY RATIONALE FOR ACCEPTANCE SCREENS: N/A
3940	3	BACKUP RELEASE MECHANISM QTY-1 P/W 51140E1472	<p>MODE: LOSS OF CAPTURE AND ALL RELEASE CAPABILITY.</p> <p>CAUSE(S): (1) BEARING SEIZURE (2) BLOOMING SPRING MOTOR. (3) GEARS SEIZED. (4) MECHANICAL FAILURE</p>	<p>LOSS OF ABILITY TO CAPTURE OR RELEASE PAYLOAD IN PRIME MODE. BACKUP RELEASE WILL NOT OPERATE. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ.</p> <p>WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/ RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING ----- N/A</p>	<p>EFFECTOR ASSEMBLY, PRIOR TO ACCEPTANCE TESTING THE MECHANISM IS FUNCTIONALLY TESTED TO THE REQUIREMENTS OF SPAR-TM.1727.</p> <p>PRE-ACCEPTANCE TEST INSPECTION, WHICH INCLUDES AN AUDIT OF LOWER TIER INSPECTION COMPLETION, AS BUILT CONFIGURATION VERIFICATION TO AS DESIGN ETC., (MANDATORY INSPECTION POINT).</p> <p>A TEST READINESS REVIEW (TRR) WHICH INCLUDES VERIFICATION OF TEST PERSONNEL, TEST DOCUMENTS, TEST EQUIPMENT CALIBRATION/ VALIDATION STATUS AND HARDWARE CONFIGURATION IS CONVENED BY QUALITY ASSURANCE IN CONJUNCTION WITH ENGINEERING, RELIABILITY, CONFIGURATION CONTROL, SUPPLIER AS APPLICABLE, AND THE GOVERNMENT REPRESENTATIVE, PRIOR TO THE START OF ANY FORMAL TESTING (ACCEPTANCE OR QUALIFICATION).</p> <p>ACCEPTANCE TESTING (ATP) INCLUDES, AMBIENT, VIBRATION AND THERMAL-VAC TESTING, (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT)</p> <p>SRMS SYSTEMS INTEGRATION, THE INTEGRATION OF MECHANICAL ARM SUBASSEMBLIES AND THE FLIGHT CABIN EQUIPMENT TO FORM THE SRMS. INSPECTIONS ARE PERFORMED AT EACH PHASE OF INTEGRATION WHICH INCLUDES GROUNDING CHECKS, THRU WIRING CHECKS, WIRING ROUTING, INTERFACE CONNECTORS FOR BENT OR PUSH BACK CONTACTS ETC.</p> <p>SRMS SYSTEMS TESTING - STRONGBACK AND FLAT FLOOR AMBIENT PERFORMANCE TEST. (SPAR/GOVERNMENT REP. - MANDATORY INSPECTION POINT)</p>

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SYSTEM: MECHANICAL ARM SUBSYSTEM
ASS'Y P/N: 51140E1470-1E-3

SHEET: 6

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	MDMR / FUNC. 1/1 CRITICALITY	RATIONALE FOR ACCEPTANCE SCREENS: N/A
3940	3	BACKUP RELEASE MECHANISM QTY-1 P/N 51140E1472	<p>MODE: LOSS OF CAPTURE AND ALL RELEASE CAPABILITY.</p> <p>CAUSE(S): (1) BEARING SEIZURE (2) BLOOMING SPRING MOTOR. (3) GEARS SEIZED. (4) MECHANICAL FAILURE</p>	<p>LOSS OF ABILITY TO CAPTURE OR RELEASE PAYLOAD IN PRIME MODE. BACKUP RELEASE WILL NOT OPERATE. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ.</p> <p>WORST CASE ----- UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/ RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED.</p> <p>REDUNDANT PATHS REMAINING ----- N/A</p>		<p>FAILURE HISTORY ----- THERE HAVE BEEN NO FAILURES ASSOCIATED WITH THIS FAILURE MODE ON THE SRMS PROGRAM.</p>

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SHEET: 7

FMEA REF.	FMEA REV.	NAME, QTY, & DRAWING REF. DESIGNATION	FAILURE MODE AND CAUSE	FAILURE EFFECT ON END ITEM	HOWR / FUNC. / CRITICALITY RATIONALE FOR ACCEPTANCE SCREENS: N/A
3940	3	BACKUP RELEASE MECHANISM QTY-1 P/M 51140E1472	MODE: LOSS OF CAPTURE AND ALL RELEASE CAPABILITY. CAUSE(S): (1) BEARING SEIZURE (2) BLOOMING SPRING MOTOR. (3) GEARS SEIZED. (4) MECHANICAL FAILURE	LOSS OF ABILITY TO CAPTURE OR RELEASE PAYLOAD IN PRIME MODE. BACKUP RELEASE WILL NOT OPERATE. ARM WILL STAY LIMP DURING AUTO CAPTURE SEQ. WORST CASE UNEXPECTED PAYLOAD MOTION. INCOMPLETE CAPTURE/ RELEASE SEQUENCE. UNABLE TO RELEASE PAYLOAD. CREW ACTION REQUIRED. REDUNDANT PATHS REMAINING ----- N/A	OPERATIONAL EFFECTS ----- EE DOES NOT OPERATE NOMINALLY WHEN COMMANDED. ARM REMAINS LIMP UNTIL EE MODE SW. IS TURNED OFF DURING CAPTURE SEQ. CANNOT RELEASE PAYLOAD IN ANY MODE. EVA RELEASE OF GRAPPLE FIXTURE IS A DESIGN FEATURE, IF THIS IS NOT POSSIBLE PAYLOAD MUST BE JETTISONED WITH ARM. CREW ACTION ----- EVA RELEASE OF PAYLOAD. IF EVA NOT POSSIBLE THEN THE ARM/PAYLOAD COMBINATION MUST BE JETTISONED. CREW TRAINING ----- CREW WILL BE TRAINED TO RECOGNIZE OFF NOMINAL EE OPERATIONS. MISSION CONSTRAINT ----- WHEN CAPTURING A FREE FLYING PAYLOAD. THE EE MUST BE FAR ENOUGH AWAY FROM STRUCTURE TO PROHIBIT CONTACT REGARDLESS OF PAYLOAD ROTATIONS. EE MODE SWITCH SET TO OFF POSITION IMMEDIATELY AFTER SPEC DRIVE TIME HAS ELAPSED. OMRSD OFFLINE ----- PERFORM MANUAL CAPTURE AND BACKUP RELEASE. VERIFY TIME FOR SHARES TO FULLY OPEN. OMRSD ONLINE INSTALLATION ----- NONE OMRSD ONLINE TURNAROUND ----- PERFORM MANUAL CAPTURE AND BACKUP RELEASE. VERIFY TIME FOR SHARES TO FULLY OPEN.

PREPARED BY:

MFVG

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