

SRB CRITICAL ITEMS LIST

SUBSYSTEM: ELECTRICAL AND INSTRUMENTATION

ITEM NAME: Rate Gyro Assemblies 1 (LSRB), 2 (RSRB), 3 (LSRB), and 4 (RSRB)

PART NO.: MC493-0015-0105
MC493-0015-0106 (Alt)

FM CODE: A04

ITEM CODE: 50-03-02,
50-03-03

REVISION: Basic

CRITICALITY CATEGORY: 1R

REACTION TIME: Immediate

NO. REQUIRED: 2 in each SRB

DATE: March 1, 2002

CRITICAL PHASES: Boost

SUPERCEDES: March 1, 1995

FMEA PAGE NO.: D-196

ANALYST: C. Webster/S. Finnegan

SHEET 1 OF 3

APPROVED: S. Parvathaneni

CN 044

FAILURE MODE AND CAUSES: Erroneous pitch output or yaw output or both, high or low, for two of four RGAs caused by:

- o Electrical failure of any of the following:
 - Chassis mounted power supply components
 - RFI filter
 - Wheel supply/power supply module
 - Pitch or yaw gyro
 - Pitch or yaw servo/BITE module
 - SMRD module
- o Mechanical failure of pitch or yaw gyro

FAILURE EFFECT SUMMARY: Loss of correct vehicle rate detection resulting in loss of mission, vehicle and crew caused by flight instability. Two success paths remain after the first failure. Operation is not affected until three paths are lost, except that two hardover failures within 10 seconds, one hardover and one softover failure within 10 seconds or two softover failures within 10 seconds, of same polarity, are considered critical.

REDUNDANCY SCREENS AND MEASUREMENTS:

- 1) Pass - SMRD measurements B79X1(2)845X, B79X1(2)846X, B79X1(2)848X, B79X1(2)849X. Rate measurements B79R1(2)410C, B79R1(2)411C, B79R1(2)412C, B79R1(2)413C.
- 2) Pass - SMRD measurements B79X1(2)845X, B79X1(2)846X, B79X1(2)848X, B79X1(2)849X. Rate measurements V95R4260C through V95R4263C, V95R4270C through V95R4273C.
- 3) Pass - No credible causes.

RATIONALE FOR RETENTION:

A. Design per Appendix F, Section# 1 and 2.

B. TESTING

1) VENDOR RELATED per Appendix F, Section 3,

2) KSC RELATED (GFE Item)

3) SYSTEM FUNCTIONAL/FAILURE MODE UNIQUE:

RGA ACO power-on, SMRD and rate gyro null and torque test are verified per 10REQ-0021, para. 1.2.2.19.1, and 1.2.2.19.3 (All Causes)

An All Systems Up test is performed on the forward assembly and RGAs per 10REQ-0021, para. 1.2.3 and 1.2.3.1.4. Power circuit isolation from ground is verified per 10REQ-0021, para. 1.2.1.2.3. (All Causes)

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SPC conducts rate gyro power-on SMRD and null test per OMRSD File II, Volume I Requirement Number S00000.640.

SPC conducts RGA positive and negative torque and rate gyro polarity test per OMRSD File II, Vol. I Requirement Numbers S00000.643 and .645.

SRB rate gyro power activation and RGA torque testing is performed during launch countdown per OMRSD File II, Vol. I Requirement Numbers S00FF0.215 and .230.

The above referenced OMRSD testing is performed every flight.

C. INSPECTION

- 1) VENDOR RELATED per Appendix F, Section # 4.
- 2) KSC RELATED per Appendix F, Section # 5.

D. FAILURE HISTORY

Failure Histories may be obtained from the PRACA database.

E. OPERATIONAL USE

Not applicable to this failure mode.

F. WAIVERS/DARS

None