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Sally K. Ride Papers - STS-51L Mission Operations Manual

Extracted on Oct-22-2021 05:53:44

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the operator has a large amount of digital data to review, it is reasonable to conclude that such small deviations would not be noted in so short a timespan. Most importantly, there is no reason to monitor for thrust differences in this time period because there is no acceptable procedural option that can be safely implemented while the SRB's are thrusting.

The Flight Operations Team published a Summary Report, dated February 18, 1986 (app. G). The report included a summary of the team's postflight analysis efforts, statements from all flight controllers in the Mission Control Center, an impounded data inventory list, and the findings of the Flight Control Team as of the date of the report.

After the STS 51-L accident, the International Business Machines (IBM) primary avionics software system (PASS) flight software team conducted a software audit and data analysis which confirmed that the STS 51-L flight software performed nominally and in accordance with system requirements throughout the actual prelaunch and ascent flight sequences.

The post-STS 51-L accident audits did reveal two discrepancies in the expected values of constants (K-loads) that define the external tank (ET) separation body rate inhibit limits and the fast separation (Fast Sep) liquid hydrogen prevalve close delay timer. These K-load discrepancies had no effect on the STS 51-L accident and will be corrected before the next flight (refer to appendix E of this document).

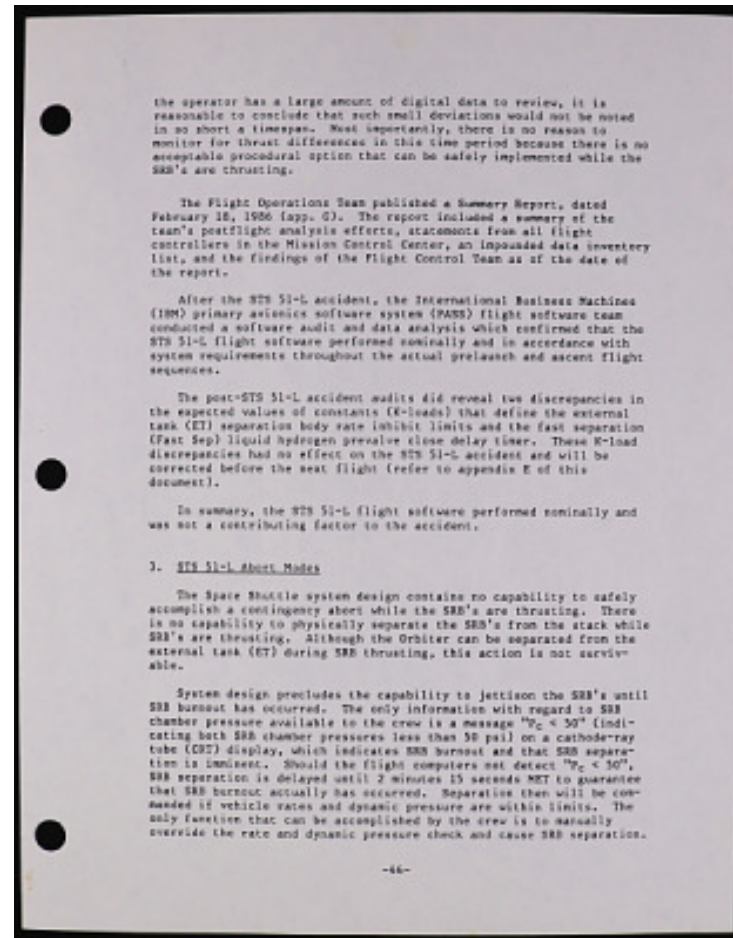
In summary, the STS 51-L flight software performed nominally and was not a contributing factor to the accident.

3. STS 51-L Abort Modes

The Space Shuttle system design contains no capability to safely accomplish a contingency abort while the SRB's are thrusting. There is no capability to physically separate the SRB's from the stack while SRB's are thrusting. Although the Orbiter can be separated from the external tank (ET) during SRB thrusting, this action is not survivable.

System design precludes the capability to jettison the SRB's until SRB burnout has occurred. The only information with regard to SRB chamber pressure available to the crew is a message "Pc < 50" (indicating both SRB chamber pressures less than 50 psi) on a cathode-ray tube (CRT) display, which indicates SRB burnout and that SRB separation is imminent. Should the flight computers not detect "Pc < 50", SRB separation is delayed until 2 minutes 15 seconds MET to guarantee that SRB burnout actually has occurred. Separation then will be commanded if vehicle rates and dynamic pressure are within limits. The only function that can be accomplished by the crew is to manually override the rate and dynamic pressure check and cause SRB separation.

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