

Contents.

Document approval.....	iii
Abstract.....	v
Contents.....	vii
List of acronyms and abbreviations.....	ix
1. Introduction.....	1
2. General spacecraft description.....	3
3. Operations highlight summary.....	13
4. Orbit.....	24
4.1. Orbital corrections (Delta-V).....	33
5. Subsystems.....	34
5.1. Power subsystem.....	35
5.1.1. Solar array.....	35
5.1.1.1. Beta restrictions.....	40
5.1.1.2. Solar array EOL characterization.....	40
5.1.2. Batteries.....	41
5.1.2.1. Battery 1 degradation.....	43
5.1.2.2. Battery EOL characterization.....	44
5.1.3. Shadow.....	44
5.2. Command subsystem.....	51
5.2.1. Command decoder anomalies.....	53
5.3. Communications system.....	54
5.3.1. S-Band system.....	54
5.3.1.1. S-Band power amplifier 4 anomaly.....	56
5.3.2. VHF system.....	56
5.3.2.1. Ranging.....	56
5.4. Data Handling subsystem.....	57
5.4.1. DMU anomaly.....	61
5.4.2. DMU radiation monitor.....	65
5.5. Attitude control subsystem.....	72
5.5.1. Inertial Reference Assembly.....	73
5.5.1.1. Gyro failures.....	74

5.5.1.2. Gyro drift rates.....	76
5.5.2. Fine Sun Sensor.....	77
5.5.2.1. FSS anomalies.....	79
5.5.3. Course Analog Sun Sensor.....	80
5.5.4. Spin Mode Sun Sensor.....	80
5.5.5. Panoramic Attitude Sensor.....	80
5.5.5.1. PAS anomalies.....	80
5.5.6. Accelerometer.....	81
5.5.7. Fine Error Sensor.....	81
5.5.7.1. FES geometric calibration.....	84
5.5.7.2. FES 2 reference point shift anomaly.....	85
5.5.7.3. FES 2 star count variations anomaly.....	85
5.5.7.4. Scattered light anomaly.....	85
5.5.7.5. Streak light anomaly.....	87
5.5.8. Reaction Wheel.....	90
5.5.9. Hydrazine Auxiliary Propulsion System.....	90
5.5.9.1. HAPS heater group 1 failure.....	99
5.5.9.2. N ₂ H ₄ venting.....	99
5.5.10. Control Electronics Assembly.....	101
5.6. The Onboard Computer.....	103
5.6.1. OBC Patches.....	110
5.6.2. Three-Gyro System.....	112
5.6.3. Two-Gyro/FSS System.....	113
5.6.4. One-Gyro System.....	114
5.6.5. Attitude recovery procedures.....	118
5.6.6. OBC anomalies.....	119
5.7. Scientific Instrument.....	122
5.7.1. Camera Operating Sequence.....	128
5.7.2. LWP Scan Control Logic anomaly.....	129
5.7.3. LWP flux anomaly.....	129
5.7.4. LWR anomaly.....	129
5.7.5. Microphonics.....	130
5.7.6. LWP Scan Control Logic Anomaly.....	130
5.7.7. SWR failure.....	130
6. Spacecraft Thermal Design.....	131
Appendix A. Earth shadow seasons.....	143
Appendix B. Delta-Vs.....	145
Appendix C. OBC malfunctions.....	147
Source Documents.....	151
List of figures.....	156