spacecraft into a lunar orbit. Possible cause was malfunction of the coast-control system after third-stage spinup and separation.

59. Intelsat III A, 18 Sep 68, Response Mode 5, Flight Phase 1: Due to loss of rate gyro, undamped pitch oscillations began at 20 seconds. Vehicle began a series of violent maneuvers at 59 seconds. During the 13-second period while these maneuvers continued, the vehicle pitched down some 270°, then up 210°, and then made a large yaw to the left. At 72 seconds the vehicle regained control and flew stably in a down and leftward direction until 100 seconds. At this time, with the main engine against the pitch and yaw stops, the destabilizing aerodynamic forces became so large that quasi-control could no longer be maintained. The first stage broke up at 103 seconds. The second stage was destroyed by the RSO at 110.6 seconds. Major pieces impacted about 12 miles downrange and 2 miles left of the flight line.

71. Intelsat III E, 26 July 69, Response Mode NA, Flight Phase 3 and 5: Unknown but anomalous third-stage performance inserted payload into an erroneous orbit. Apogee was some 17,000 miles too low and orbital inclination was 1.5° above planned 28.8°

73. Pioneer E, 27 Aug 69, Response Mode 5, Flight Phase 1: First-stage hydraulics system failed a few seconds before burnout (MECO). The vehicle pitched down, yawed left, rolled counterclockwise driving all gyros off limits, and then tumbled. Second-stage separation and ignition occurred while the vehicle was out of control. After about 20 seconds, the second stage regained control in a yaw-right, pitch-up attitude. The vehicle flew stably in this attitude for about 240 seconds until destroyed by the safety officer at T+484 seconds.

78. Intelsat III G, 22 Apr 70, Response Mode NA, Flight Phase 1 and 5: The flight was considered a success, although low first-stage velocity resulted in a propellant-depletion shutdown of the second stage. As a result, the actual apogee was some 2,220 miles below the planned value of 195,400 miles, and well outside three-sigma limits.

85. OSO-H, 29 Sep 71, Response Mode NA, Flight Phase 2 and 5: Stage-2 hydraulic-system failure caused faulty control during second-stage burn. Spacecraft injected initially into an elliptical orbit, but was later maneuvered into a more satisfactory orbit although perigee was still about 93 miles below the planned value.

86. ITOS-B (WTR), 21 Oct 71, Response Mode 4, Flight Phase 2: Contamination in the oxygen vent valve apparently prevented its proper operation throughout flight. This led to bulkhead rupture during second-stage burn and loss of vehicle control.