

crossed over the flight line and continued toward the right destruct line. Shortly thereafter the missile apparently pitched up violently and the IIP began moving back toward the beach. The missile was destructed at about 45 seconds when the altitude was about 14,000 feet and the downrange distance about 9 miles. Major pieces impacted less than a mile offshore, indicating uprange movement of the impact point during the last part of thrusting flight.

- (6) Delta Intelsat III, 18 Sep 68. Due to loss of rate gyro, undamped pitch oscillations began at 20 seconds. A series of violent maneuvers followed 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.
- (7) Delta Pioneer E, 27 Aug 69. First-stage hydraulics system failed a few seconds before first-stage 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. It flew stably in this attitude for about 240 seconds until destroyed by the safety officer at T+484 seconds.
- (8) Atlas 68E, 8 Dec 80. Flight appeared normal until 102.7 seconds when the lube oil pressure on the B2 booster engine suddenly dropped. At 120.1 seconds, the engine shut down, followed 385 msec later by guidance shutdown of the B1 engine. The asymmetric thrust during shutdown caused yaw and roll rates that the flight control system could not correct. As a result, attitude control was lost and the thrusting sustainer pivoted the missile to a retrofire attitude before the vehicle could be stabilized. After the booster package was jettisoned, the missile was stabilized and decelerating in the retrofire mode by 148 seconds. The sustainer continued thrusting in this attitude until 282.9 seconds when reentry heating apparently caused sustainer shutdown and vehicle breakup.