

Table of Contents

1. Introduction.....	1
2. Examples Showing Need for Mode 5	3
3. Understanding the Mode-5 Failure Response.....	7
3.1 Effects of Mode-5 Shaping Constants.....	9
3.2 Effects of Shaping Constant on DAMP Results.....	9
4. Methodology for Assessing Failure Probabilities.....	13
4.1 The Parts-Analysis Approach.....	13
4.2 The Empirical Approach.....	15
5. Computation of Failure Probabilities.....	16
5.1 Overall Failure Probability.....	16
5.2 Relative and Absolute Probabilities for Response Modes.....	24
5.3 Relative Probability of Tumble for Response-Modes 3 and 4.....	30
6. Shaping Constants Through Simulation.....	31
6.1 Malfunction Turn Simulations.....	31
6.1.1 Random-Attitude Failures.....	31
6.1.2 Slow-Turn Failures.....	32
6.1.3 Factors Affecting Malfunction-Turn Results	33
6.1.4 Malfunction-Turn Results for Atlas IIAS.....	35
6.2 Shaping Constants for Atlas IIAS	37
6.2.1 Optimum Mode-5 Shaping Constants.....	37
6.2.2 Launch-Area Mode-5 Risks.....	49
6.2.3 Effects of Mode-5 Constants on Ship-Hit Contours	51
6.2.4 Range Distributions of Theoretical and Simulated Impacts.....	58
6.3 Shaping Constants for Delta-GEM	60
6.3.1 Optimum Mode-5 Shaping Constants.....	61
6.3.2 Launch-Area Mode-5 Risks.....	64
6.4 Shaping Constants for Titan IV.....	65
6.5 Shaping Constants for LLV1	69
6.6 Shaping Constants for Other Launch Vehicles.....	72
7. Potential Future Investigations.....	73
8. Summary.....	74