

probabilities using index-count filtering are larger than those for exponential filtering. For Titan, the results are mixed, further suggesting that Titan reliability has not improved in recent years.

For comparison purposes, the same filtering techniques have been applied to all flight tests shown in the tables of Appendix D, regardless of configuration. The results are presented in Table 3.

Table 3. Predicted Failure Probabilities for All Configurations

Vehicle	Flight Phase	Filter Technique					Sample Failures /Total
		Equal Weight	Index Count	Expon. F = 0.99	Expon. F = 0.98	Expon. F = 0.97	
Atlas	0	0	0	0	0	0	0/7
	0 - 1	0.1053	0.0641	0.0422	0.0273	0.0190	56/532
	0 - 2	0.1711	0.0990	0.0555	0.0311	0.0204	91/532
	0 - 3	0.2086	0.1261	0.0802	0.0559	0.0455	111/532
	0 - 4	0.2143	0.1330	0.0873	0.0627	0.0511	114/532
	0 - 5 *	0.2575	0.1671	0.1150	0.0866	0.0725	137/532
Delta	0	0	0	0	0	0	0/196
	0 - 1	0.0172	0.0164	0.0148	0.0110	0.0077	4/232
	0 - 2	0.0259	0.0232	0.0201	0.0133	0.0085	6/232
	0 - 3	0.0431	0.0279	0.0263	0.0150	0.0089	10/232
	0 - 4	0.0431	0.0279	0.0263	0.0150	0.0089	10/232
	0 - 5 *	0.1078	0.0766	0.0740	0.0536	0.0459	25/232
Titan	0	0.0306	0.0137	0.0187	0.0281	0.0349	3/98
	0 - 1	0.0534	0.0319	0.0351	0.0399	0.0467	18/337
	0 - 2	0.1424	0.0771	0.0719	0.0662	0.0750	48/337
	0 - 3	0.1632	0.0924	0.0830	0.0711	0.0770	55/337
	0 - 4	0.1662	0.0942	0.0840	0.0712	0.0771	56/337
	0 - 5 *	0.1958	0.1369	0.1326	0.1277	0.1346	66/337

* Includes response mode 'NA'

A comparison of Table 2 and Table 3 shows that in most cases, but not all, exponential filtering produces failure probabilities for the representative configuration samples that are smaller than the corresponding probabilities for the all-configuration samples. The fact that most differences between corresponding samples are relatively small attests to the effectiveness of the exponential filter in down-weighting early launch failures. This is not the case for equal weighting of tests, where the predicted failure probabilities based on all configurations are up to 3.6 times as large.

With respect to the weighting of missile and space-vehicle performance data, RTI favors an exponential filter over either the equal-weight or index-count filters. Weighting percentages for the three filters are given in Table 4 for sample sizes of 4 to 1,000. Except for small samples, the percentages produced by equal weighting place too much emphasis on old data, thus failing to account for the learning process and