

Space Shuttle Launch Probability Analysis: Understanding history so we can predict the future

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Abstract— The Space Shuttle was launched 135 times and nearly half of those launches required 2 or more launch attempts. The Space Shuttle launch countdown historical data of 250 launch attempts provides a wealth of data that is important to analyze for strictly historical purposes as well as for use in predicting future launch vehicle launch countdown performance. This paper provides a statistical analysis of all Space Shuttle launch attempts including the empirical probability of launch on any given attempt and the cumulative probability of launch relative to the planned launch date at the start of the initial launch countdown. This information can be used to facilitate launch probability predictions of future launch vehicles such as NASA's Space Shuttle derived SLS. Understanding the cumulative probability of launch is particularly important for missions to Mars since the launch opportunities are relatively short in duration and one must wait for 2 years before a subsequent attempt can begin.¹

Keywords – *Space Shuttle, Launch Countdown, Launch Probability, Statistics*

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