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## THE SMALL LAUNCH VEHICLE SURVEY - A 2022 UPDATE (A REGULAR CADENCE?)

**Abstract**

While many, including this author, have publically stated that the number of small launch vehicles under development is not sustainable, investor money continues to flow into this market segment. New announcements of multi million funding rounds are occurring several times a year. Even the challenges posed by the worldwide COVID pandemic, have not slowed down this trend. In 2015 we first presented this survey, and we identified twenty small launch vehicles under development. By the end of 2021, ten new vehicles in this class were operational, 41 were identified under development, and a 50 more were potential new entrants. Many of these showed up in this annual survey for the first time in 2021. While initially, development was spurred by renewed government investment in space, such as what we see in the U.K., segment growth has continued even when promise of government investment is not present. In this paper we present an overview of the small launch vehicles under development today. When available, we compare their capabilities, stated mission goals, cost and funding sources, and their publicized testing progress. We also review a number of entrants that have dropped out since we first started this report. Since the paper was last presented more systems have become operational, and several have reach a steady cadence of launches.

In order to present the most unbiased, and neutral data to our audience, we purposely avoid making any judgements on vehicle maturity or business case realism. However, with over 163 vehicles tracked in our research, a number of specific trends in performance, cost, and technologies can be identified. Finally, we attempt to answer the question of the validity of small vehicle development, when established players such as SpaceX and ULA believe that the continued growth area is for larger, not smaller vehicles. With several systems launching on a regular basis and directly competing against rational ride-shares, it becomes possible to draw some initial conclusions on the reliability of the new systems as well as the potential demand for small satellite launch services.