

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)  
Launch Services, Missions, Operations, and Facilities (2)

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AN ANALYSIS OF THE LAUNCH INDUSTRY'S CAPABILITY TO MEET FUTURE DEMAND

**Abstract**

Historically, payloads to space have trended on the higher end of the spectrum in terms of mass, capability, and cost. However, with the advancement made in recent years in both satellite size and cost there has been an influx of new entrants announcing new applications and business models for in-space applications. New and known companies have announced small satellite operations and have revealed their plans for satellite constellations for a variety of different applications from communications to remote sensing. SpaceX and OneWeb's plans to launch a combined 4648 small sats over the next 15 years may or may not be viable with current and future launch capacity. This paper will discuss whether future launch capabilities have enough capacity to handle the timeline for these companies or whether restricted access to space will bottleneck the satellite community.

In order to provide an accurate analysis of the future launch capacity, this paper will:

1. Conduct an overview on past available launch vehicles, their capabilities, and their manifest.
2. Analyze currently available launch vehicles, their capabilities, and their manifest.
3. Research and project the future capabilities of launch providers and their vehicles, taking into consideration new entrants such as Firefly, Mishaal Aerospace, Exos and others.
4. Analyze future commercial and government plans for satellite launches, the timelines for respective constellations and the capacity of the launch industry to meet these projected demands.

The paper will then compare and contrast these four steps to determine the projected and required future launch capacity. Quantitative analysis and industry research will be conducted on historical launch capabilities, projections, launch requirements for projected satellite constellations (orbit, size, cost restraints) and the supply and demand timelines of launchers and satellites. Consideration will be placed on the cost of launch, the margin of error when projecting future launch operations, and benchmarks to determine the degree to which launch capacity will satisfy or fail to meet future demand.