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Small Launchers: Concepts and Operations (7)

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RELIABLE LAUNCH OPTIONS FOR SMALL SATELLITES IN THE AGE OF INCREASED LUNAR  
EXPECTATIONS

**Abstract**

Space technology company Rocket Lab is the premier dedicated small satellite launch provider in today's commercialized space age. Providing reliable, affordable, and responsive launch services since 2017, Rocket Lab has placed 48 satellites across 11 missions in low Earth orbit for customers including NASA, DARPA, the NRO, and the United States Air Force, as well as commercial small satellite providers.

Historically low launch costs, technology miniaturization in payloads, the commercial potential of space, and changing national security requirements are combining to drive change to operations in space. The ability to deploy new satellites to precise orbits in a matter of hours, not months or years, is now critical to all small satellite operators.

Equipped to launch more than 130 times per year, Rocket Lab's offers small satellite customers unmatched control over their schedule and orbit. Missions from the company's Launch Complex 1 in New Zealand – the only privately-owned and operated orbital launch site in the world – are possible once every 72 hours. Work has begun on the construction of a second launch pad within the Complex to reduce pad turnaround time. Parallel launch campaigns are expected to possible before year-end. On home soil, Rocket Lab's Launch Complex 2 at NASA Wallops, Virginia, can support 12 US government launches per year, with the site's first launch for the US Air Force Space Test Program scheduled for later this year.

In response to increased global focus on lunar scientific and economic development, Rocket Lab now offers an all-inclusive spacecraft build and launch service with its customizable Photon satellite platform. Utilizing Electron's flight-proven Curie propulsion system aboard the vehicle's Kick Stage, Photon is ideally used for technology demonstrations, pathfinding and retiring risk, and infrastructure building to support the return of humans to the Moon. Rocket Lab will utilize Photon and Electron to launch and deploy NASA's Cislunar Autonomous Positioning System Technology Operations and Navigation Experiment (CAPSTONE) to a near rectilinear halo orbit around the Moon in 2021.

Advancements have also been made in the conversion of Electron into a reusable launch vehicle, a development that will further increase launch frequency by eliminating the need to build a new Electron first stage for every mission.

This paper summarizes Rocket Lab's launch successes and technical achievements of the past year and the developments underway to further democratize access to space for small satellites.