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OVERCOMING CHALLENGES TO INCREASE LAUNCH FLEXIBILITY FOR SMALLSAT CUSTOMERS

Abstract

As the small satellite and launch vehicle industries grow, the market is yearning for greater flexibility to avoid delays that can have lasting impacts on businesses.

Due to their relationship with launch vehicle providers and satellite developers, rideshare companies are in a unique position to provide increased flexibility around launches. Rideshare providers can operate similarly to an airline, offering customers an opportunity to change launches. However, in order to be successful in this offering, it is critical we consider how the technological elements of integration will impact our ability to do this efficiently.

It will be important to provide mechanical and avionics solutions that can easily adapt between unique launch vehicle and satellite separation/deployment systems, while minimizing mass and cost impacts. Understanding and adapting to most permutation will be the first step in allowing rapid manifest changes. Additionally, we need to minimize the number of loads and analysis cycles necessary prior to launch. Ideally, we will no longer need to provide finite element models of every rideshare spacecraft, attachment, and subsystem to launch vehicles for inclusion in their combined loads assessment.

Further, we need to modify the environment's envelopes and expectations for current and future satellite manufacturers, while also working with launch vehicles to mitigate outlying environmental factors where possible. To date, this has been handled by using NASA's General Environmental Verification Standard, however additional refinement with known launch vehicle designs should allow greater flexibility.

In order to be successful in achieving true flexibility, a paradigm shift in both launch vehicles and small satellite contracting techniques will also be required. The industry will need to stop focusing on specific launch vehicle for getting a payload to space and instead move towards an agnostic perspective on launch vehicles. This will allow us to move most satellites from one vehicle to another without as much effort as currently is required.

Finally, we need to push payload encapsulation as late as possible in the launch campaign to enable manifest changes to take advantage of the flexible architecture.

Satellite customers who no longer worry about missing their launch date due to launch vehicle issues, or their own internal setbacks, will be more likely to succeed on orbit.