DEMOCRATIZING ACCESS TO SPACE

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After decades of government-led spaceflight activity, private industry has begun to play a significant role in space access, exploration, and utilization—generating both new sources of funding and new capabilities that improve humanity's ability to fly into outer space and beyond. Buoyed by high profile investments from entrepreneurs and financial institutions, the creation of innovative new products, and by tangible technical accomplishments, commercial space companies are both delivering valuable services to well-established space industry players as well as helping generate and enable new classes of consumers.

While many of these new program are focused on pushing the frontiers of exploration out ever further, others are instead focused on broadening access to existing mission types. This results in a healthy ecosystem where innovation is being applied both to develop new capabilities for traditional space actors and to dramatically increase the number of new actors entering the field.

Sir Richard Branson's Virgin Group is one such new actor. With approximately seventy companies in operation around the globe and with more than a dozen billion-dollar enterprises as part of the group, Virgin brings real business and operational credibility—as well as real capital—to the table. However, Virgin is known a customer service and experience company, rather than a technology company, so its entry into the space transportation and space development industry is rather unprecedented. Nevertheless, Virgin has made a substantial commit to aerospace, creating not just one but three companies each tackling different challenges but addressing the same fundamental goal: the democratization of space.

This talk will touch on the broader theme of commercial entities and the democratization of space, using one of the three Virgin companies as a case study. Virgin Orbit is developing a space transportation service to provide affordable, dedicated rides to orbit for small satellites. In the last few years, satellite manufacturers have turned to smaller satellites to solve traditional challenges by harnessing recent significant advancements in technology such as new generations of microprocessors, power collection, and propulsion. Satellite engineers are creating new ways of packaging instrumentation into smaller and smaller form factors and many companies have already demonstrated these technologies on orbit. But small satellite operators are typically forced to ride as a secondary payload, constrained to the primary payload's launch schedule and orbit, or pay a significant amount more for a dedicated launch. To address this challenge, LauncherOne—Virgin Orbit's small satellite launch vehicle—will soon begin providing frequent, affordable, and dedicated transportation to low-Earth orbit for small payloads.

LauncherOne is a two stage, liquid propulsion (LOX/RP) rocket launched from a Boeing 747-400. By utilizing air-launch, the system is designed to conduct operations from a variety of locations, removing the complexity associated with travel to distant launch sites. LauncherOne will allow customers to select from various launch azimuths and will increase available orbital launch windows. The Boeing aircraft that will carry LauncherOne has already been obtained by Virgin Orbit, completed its structural modifications, and has been delivered to Long Beach airport – where Virgin Orbit's facilities are located. LauncherOne is well into development and testing, and rapidly approaching first launch.

This presentation will cover the rationale behind the creation of Virgin Orbit, the engineering approaches that fuel the LauncherOne program, the technical progress made on the program to date, expected upcoming technical milestones, example use cases highlighting missions currently in operation or development, and the potential impacts of the new small satellite movement on the industry at large.