

BUSINESS INNOVATION SYMPOSIUM (E6)

New space at the national, international, and overall industry levels: innovation, entrepreneurship & investment at the macroscopic level of analysis (3)

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NEW KIDS ON THE BLOCK: THE IMPACT OF NEW START-UP SPACE COMPANIES ON THE U.S. SPACE INDUSTRY SUPPLY CHAIN**Abstract**

A grant was awarded to The Tauri Group in 2016 to study how new start-up space companies may have impacted the U.S. space industry supply chain. Specifically, we investigated the hypothesis that new start-up space companies have contributed to the production of less expensive, more capable, and quickly available components for space systems. In addition, we investigated if and how these new start-up space companies are changing the geography of the space industry.

While the U.S. space industry supply chain has experienced some changes in terms of cost, quality, and delivery speed due to the entry of start up space companies during the past decade, our research has revealed more interesting developments. New start-up space companies have restructured markets in a manner that has forced long-established competitors to alter business plans and strategic investments. The entry of SpaceX, with the aim to provide low-cost orbital launch services, has disrupted the launch vehicle manufacturing and services segments of the space industry. The company has inspired United Launch Alliance and Europe's Arianespace to reassess its strategic plans by accelerating introduction of new vehicles that are simpler in construction and feature reusable components. Several other disruptive companies, most in the U.S., have been established during the past ten years to provide launch vehicles for very small satellites and suborbital missions, with some aiming to provide suborbital human spaceflight capability. These new start-up companies have not only added more to the supply chain in terms of increasing the number of manufacturers and consumers, but also expanded it by including the relatively high production rate of very small satellites, the manufacturing of very small orbital launch vehicles, and broadening the innovation base beyond the traditional space industrial centers. These companies have aggressively pursued new processes that address efficiencies, including additive manufacturing. Finally, new start-up space companies are a disruptive force, spurring greater competition within the space industry itself and tapping rapidly growing sectors beyond the space industry like data analytics.