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THE S-CURVE CHALLENGE: HOW TO CLOSE THE BUSINESS CASE FOR SPACE

Abstract

The demand for data and connectivity is driving the development of systems with proliferated architectures for timely sensor acquisition and/or data transmission. Industry forecasts predict that thousands of small satellites could be launched in the next 10 years. Approximately 80 However, the Authors posit that this view of the future may not be realised because of the “brakes” imposed by the technical, programmatic and business fundamentals: The “Time To Money” is too long, system development costs are too high, and satellite mission lifetimes are not long enough to allow a return on investment to be achieved in meaningful timescales. The first wave of space industry disruption by SmallSats in the 2000s, and the second phase of disruption catalysed by cubesats in the 2010s revolutionised the industry, by leveraging Commercial Off The Shelf systems and technologies and increasing industrialisation. There is, however, a limit to the cost-effective benefits that can be realised from these innovations. A third wave of ecosystem disruption, that can deliver order-of-magnitude price:performance improvements, is now necessary to enable a new generation of affordable, accessible and responsive space missions. The Authors’ assertions are borne out by the statistics: despite the hype around smallsats, the majority of the value generated by the space industry is still created by the GEO comms market, which took decades to mature and stabilise as the market, technology and demand developed and matured. The first phase of LEO comms systems failed, and in the second wave, OneWeb, SSG, LEOSat and others filed for bankruptcy. During the period 2017-2020, 80+ companies launched their first demo or prototype satellite; most of which have not progressed to a second. Very few have secured to Series B or C funding. Also notable: new startups entering the smallsat market are predominantly cubesat companies. In parallel there has been significant consolidation amongst microsatellite companies that dominated the market in the 2000s: many were unable to sustain innovation and growth without substantial investment, indicative of the challenges of developing a commercially viable microsatellite design. This paper: • Explores these technical, engineering, production, process, programmatic and commercial and environmental challenges and how these are acting as a brake on the implementation of new systems. • Presents and discusses the S-Curve trajectories of typical space programmes • Proposes potential solutions for addressing these barriers to business sustainability.