Can Regulating Large Satellite Constellations as Monopolies Improve Sustainability Standards While Providing Effective and Equitable Internet Access?

Samuel Rodgers

The following is an excerpt from a longer piece. For full text, please visit https://scholar.colorado.edu/concern/undergraduate_honors_theses/5138jg42t

Abstract

Large satellite constellations (LSC) in Low Earth Orbit (LEO) provide the means to deliver internet to previously underserved populations. The LSC's economic potential combined with a growing demand for internet access has led to multiple companies pledging their own internet LSCs in hopes of capitalizing on this need. This, in addition to growing interest in LEO, risks destabilizing the LEO environment if not regulated properly. The current U.S. Orbital Debris Standard Mitigation Practices (USODSMP) are woefully outdated and only sporadically followed by operators. Furthermore, there are no licensing regulations for other key sustainability requirements, such as propulsion and tracking. Accelerated growth of internet LSCs without proper regulation will lead to an unsafe and unsustainable LEO environment. There needs to be a change in how governments regulate private and public LSCs, in particular those providing internet telecommunications. Internet LSCs are the fastest growing population in LEO, often directly competing for orbits and broadband frequencies.

In this thesis, I investigate whether the U.S. could apply aspects of terrestrial utility infrastructure to better regulate satellite internet. In particular, I question whether the U.S. government could regulate internet LSCs as monopolies. Such regulatory control would allow the U.S. to better enforce and revise sustainability regulations and ensure fair access to internet services. Viewing internet as a utility—as a necessity of modern life to which all citizens deserve access—this thesis proposes the U.S. license a single internet LSC from within its borders. I explored two potential regulatory approaches: one based on the U.S.'s public utility system and one based on European internet infrastructure. I then presented these approaches to five experts in the field of space sustainability and solicited their feedback. From these results, I determined that both of my regulatory approaches are not feasible in their current forms within the U.S.; however, both approaches produce potential partial applications and variations of their initial design that may find traction. This thesis concludes that adopting an interoperability framework in LEO would allow for precise and targeted sustainability, technology, and capacity standards for each orbital corridor, empower regulatory bodies to enforce these standards, and preserve competition among Commercial Satellite Operators (CSOs). Finally, a government internet LSC competing against commercial internet LSCs, akin to terrestrial municipal internet, would demonstrate technological feasibility, satisfy equity requirements, and provide a baseline LSC for CSOs to compete against.