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A FEASIBILITY STUDY FOR PROJECT GIGA: USING SATELLITE CONSTELLATIONS TO
 PROVIDE INTERNET TO DISCONNECTED SCHOOLS

Abstract

Internet access has become an often under-appreciated commodity for citizens throughout the developed world. However, in rural and isolated areas where financial and physical barriers prohibit the use of traditional internet infrastructure, access depends on slow, high-latency techniques. Currently, one of the most common methods for internet connectivity in remote areas relies on data transfer through geostationary satellite providers; notably HughesNet and ViaSat. Even still, these companies depend on predetermined orbit planes for their satellites and often do not address the more isolated regions of the planet.

With the decreasing cost of launch services, small satellites have grown in popularity over the last decade. They have quickly expanded their capabilities, from basic technology demonstrations and university projects to more complicated endeavors such as Earth observation and interplanetary missions. Several programs now in development look to employ networks of small satellites, known as constellations, to address the communication sector and help to provide global broadband internet access. Companies like SpaceX, OneWeb, Amazon, Telesat, and various other efforts are now beginning to set up these systems with the intentions of supplying consistent and reliable internet, with performance comparable to traditional providers.

Hoping to utilize this burgeoning satellite internet revolution, UNICEF, in partnership with the International Telecommunication Union, launched Project GIGA in late 2019. With the aim of connecting every school to the internet, Project GIGA plans to bring down educational barriers for over 360 million young people. The lack of access to information increasingly only available online continues to separate underdeveloped nations from those more technologically advanced. Through internet connectivity, Project GIGA looks to promote the United Nations Sustainable Development Goals by supporting digital inclusion in an effort to promote social and economic equality worldwide.

This paper will analyze the growth of interest in the small satellite communications sector and to afford background knowledge on the technological capabilities of current providers. A feasibility study is performed to assess the main actors in the field and their ability to contribute to Project GIGA's ultimate goal of connectivity for every school. Through a multifaceted lens, the paper identifies the benefits and potential obstacles of constellation-based satellite broadband internet. Where necessary, possible solutions and workarounds are explored to allow a coherent assessment on the practicality of Project GIGA's connectivity objective. With this research Project GIGA will have a baseline to begin their outreach and development initiatives.