IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advances in Space-based Communication Systems and Services, Part 1 (1)

Author: Mr. Alan Mattos
Agencia Boliviana Espacial, Bolivia, alanm.9119@gmail.com

Mr. Dilhan Clavijo Urrelo
Universidad Catolica Boliviana San Pablo, Bolivia, cris.dclau@gmail.com

RURAL CONNECTIVITY IN DEVELOPING NATIONS: A TECHNICAL COMPARISON OF GEO VHTS AND LEO MEGACONSTELLATIONS

Abstract

The telecommunications industry is transitioning to a new generation of services, the advent of 5G, IoT, cloud computing and others will potentially change the way our societies work and live. Surely, these technologies will arrive first to developed countries and dense cities. As history has taught us, developing countries will most likely be relegated from these technological developments, especially the people living in rural areas of these nations. In order to ensure that new technologies can be deployed on a truly global scale, it is fundamental to find the means to ensure ubiquitous coverage. Satellite communications can provide coverages for entire nations or even continents, however, in the past these systems had limited bandwidth. Nowadays, this situation has changed, satellites can provide several Gbps or even Tbps of throughput. The developments in satellite technology have allowed them to become a viable solution to deliver high throughput and reliable connectivity to rural areas. New generation satellites can be deployed in different orbits, in one hand, there are the LEO satellite constellations, which have generated great interest by different developing Nations due to its capacity to provide high throughput and low latency connectivity at an affordable cost thanks to the economies of scale that can be applied to a global system composed of hundreds or even thousands of satellites. On the other hand, GEO is a more traditional approach and recent developments have allowed to allocate hundreds of Gbps of capacity on a single satellite. In this sense, it is necessary to know which solution is more efficient, in technical and economic terms. The present paper compares a hypothetical VHTS GEO satellite to the LEO constellation deployed by SpaceX (Starlink). In order to define the geographical scope of this study, Bolivia as a developing nation is set to be the study-case to compare the performance of aforementioned technologies.