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TELECOMMUNICATIONS MISSIONS BASED ON NANOSATELLITES

Abstract

Cubesat's see up to now an exponential growth. Starting as satellites build by students they have now reached a state where they can be used to perform more ambitious task, then just build, launch and enjoy a satellite. Telecommunication missions are very demanding and consequently are not really in the focus of the Cubesat community. However, relative small, low cost satellites in low Earth orbit can be attractive. For example a Nanosatellite with a 10 W transmit power can deliver a 150 Mbit/s data rate to a 80 cm ground antenna in the Ka-band. This is attractive to provide Internet access since the time delay is less than 10 ms for up and downlink. This is much less than the 250 ms for a GEO link. The disadvantage is that one such Nanosatellite cannot deliver a real service. Many more satellites of this type are needed to form a constellation. With e.g. a 1,000 satellites constellation, a global (including both polar regions) Internet access service can be provided. If we assume a non-recurring procurement cost for a single satellite of 500 K\$, an investment for the space segment of 500 M\$ is needed. The total launch mass is around 2,500 kg, allowing one single launch to deploy the whole constellation at once. Besides this attractive mission, several other missions, including interplanetary missions with Nanosatellites will be discussed and analyzed in this paper, with special emphasis on feasibility and technological maturity.