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INVESTIGATION OF C-BAND ANTENNA FOR NANOSATELLITE CONSTELLATIONS BASED ON INTER-SATELLITE LINK CALCULATIONS

Abstract

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Works on nanosatellites have gained momentum recently .Especially those that consider nanosatellite constellations as a platform for the development and demonstration of new space technologies. That could be beneficial for university students, scientists , researchers and industry. Nanosatellites as a network in space involving formation of flying platforms by means of inter-satellite link (ISL).Through this link nanosatellites should be continuous connectivity in real time enabling control and information processing with two way connection. To ensure that, antenna is a key aspect. The proposed paper aims to investigate an antenna with low profile and low power consumption that can be easy integrated on nanosatellites. Taking in to consideration constraints of platform, communication link and mission aspects. Hence, trade of between miniaturization and functionality is essential. To realize that, an inset-fed microstrip antenna operating in the C-band is developed. The required antenna gain was derived for preserved inter-satellite distance. Taking into account the orbital temperature variation effect on link budget calculations. The antenna has been designed and simulated at resonant frequency of 5.8 GHz using Ansoft high frequency structure simulator (HFSS) software. An efficient inter-satellite communication is expected during mission life. Further investigations could be addressed to develop microstrip antenna array with beam steering capability for future nanosatellites missions.