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VERY LARGE DEPLOYABLE ANTENNA ARRAY FOR NANOSATELLITES

Abstract

The number of applications of oneway or twoway communication between devices on Earth and satellites in space are increasing. So does the amount of devices that ensure such communication. Those devices may be related with vessel (AIS) or air traffic (ADSB) tracking systems, mobile beacon tracking systems (ARGOS), rescue systems (SARSAT), or other satellite communication systems. Such and similar applications of satellite communication often have one common problem: as the number of devices on Earth increases, the signals of these devices overlap in time and thus signal reception from space becomes nearly impossible with low gain antennas typical for CubeSats. These problems might be solved by very large antenna array design suggested by authors. The proposed antenna is a monopole array with electronically steerable beam, which can be stowed inside a standard CubeSat structure. Depending on the number of elements, the gain may range from 8 to 15 dBi, i.e. approximately 20 times (by power) more than a gain of conventional CubeSat antenna. As a result, the field of view of the antenna is also reduced, allowing better signal resolution and sensitivity. This means that even very weak signals from local ground targets can be detected by CubeSats. The presentation will outline the conceptual design of a 3U size CubeSat with proposed antenna. The design issues and challenges, associated with such large antenna integration into CubeSat will be presented together with the proposed engineering solutions.