Paper ID: 77013
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IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Advances in Space-based Communication Systems and Services, Part 3 (4)

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MINIATURIZED MULTI-SATELLITE RELAY SYSTEM TO OPTIMIZE DELAYED COMMUNICATION

Abstract

At present, there has been immense demand for miniature satellites for discrete missions within the Earth's periphery or interplanetary missions. These satellites execute the same outcome as conventional satellites perform and sometimes even accomplish more such as high spatial and temporal resolution by collecting data from distinct locations and an in-orbit appraisal of bigger satellites by forming constellations or clusters. They are integrated and programmed in such a state-of-the-art that they can gather or transmit maximum data. In the dynamic and uncertain environment of space networking, the functioning of multiple satellites for a varied positions is challenging, directing to delayed transferring of transmission linkages. In addition, delay, noise transmission, and Bit Error Rate (BER) due to interference cause it complicated to get precise data to the ground station for the analyzing phase. In a unified system, some issue arises when the leading satellite fails to operate, thus, the need for a new superior satellite.

The paper gives the solution for the delayed communication in the space and fills the loopholes, assembled in between the functionality of the whole system. The potential way is to reduce the bandwidth and utilize instruments of higher precision. In a conventional satellite, it is formidable to support the two solutions. Hence, a design of a clustered nanosatellite is introduced. It will be the same size as a Rubik's cube, integrated with the instruments in a miniaturized configuration competent of computing boards, sensors, and communication tools along with Ultra high-frequency antenna. These satellites will get projected from their mother spacecraft, which comprises these satellites in bulk, filling the gaps between the interconnected satellite system hence reducing the distance between them i.e., reducing bandwidth automatically. They will be transmitting precise data systematically to the conclusive point without delay. Connectivity between in-situ missions will increase with a decrease in traffic load in the multi-satellite relay system, proposing extensively major functional flexibility and stability and stimulating further relay approaches.