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DEVICE FOR PASSIVE CUBESATS DEORBITING

Abstract

Currently, CubeSat satellites are becoming an increasingly popular design solution. The development of the payload makes it possible to perform more and more serious tasks for small spacecraft, such as remote sensing of the Earth, conducting astronomical observations, conducting technological and scientific experiments, providing communications, and performing tasks of automatic interplanetary stations. The small dimensions of the CubeSats and, consequently, the small atmospheric drag allow such devices to exist in low orbits for a long time after the end of their service life.

In this work, the students developed a rotary sail device, which provides deorbiting of the nanosatellites in passive mode.

Due to small dimensions, the device can be integrated into CubeSat of any typical size. At the end of the nanosatellite service life the onboard sail can be opened, which makes the deorbiting process much faster due to increased atmospheric drug.

The paper presents the feasibility of this device for nanosatellites weighting up to 12 kg, taking into account the different solar activity, the orientation of the spacecraft, the orbit parameters, as well as the

design of the device corresponding to the CubeSat Design Specification standard. Currently experimental prototype of the sail device has been developed and its operability in simulated space environment is confirmed.

Flight testing of the device is planned in 2020 within the space experiments conducted by Bauman Moscow State Technical University.