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USE OF PIEZO-MOTOR TECHNOLOGY IN NOVASEP, A SEPARATION MECHANISM FOR NANO AND MICRO SATELLITES

Abstract

NovaSep is a piezo motor technology based separation mechanism for satellites of 10-50 KG class, currently under development by NovaNano. It is designed to be in the future an off the shelf product having solely mechanical interface with the satellite and standard Spacewire or logical command interface with the launcher. Two versions are at present under development: one completely energy autonomous and one dependent on power provided by the launch vehicle.

The novelty of NovaSep is that due to the use of piezo motor it is a completely explosive-free mechanism. The advantages of the use of piezo motor technology are numerous. It renders the mechanism light because it allows to eliminate the motor reductor from the system design. Secondly, due to its physical characteristics it allows to self maintain its position without the use of energy or additional mechanisms. Such approach renders the separation mechanism design simple and less risky. Finally piezo motor based mechanisms tend to be more shock and vibration resistant than those based on traditional motors.

NovaNano has carried out in 2012 with the funding from the European Space Agency a feasibility study on the use of specific piezo motor technology in space. The study comprised the tests in the vacuum environment, which allowed to characterize and realize the proof of concept of the selected motor technology for the separation mechanism application. Moreover the tests allow to infer that the chosen technology is suitable for other mechanism based applications in space requiring rotation, translation and adjustment movements.