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SOUNDING ROCKET VIBRATION MECHANICAL FILTER AND AMPLIFIER

Abstract

Measuring accelerations and vibrations of a sounding rocket provides both information for engineers on the launcher vehicle performance as well as environment description for future payload designers. Typically, information on the level of vibration and eigenfrequencies are required to properly design a payload. This paper presents a design of a novel mechanical filter and amplifier for mechanical vibrations. Its key feature is the possibility to tune to a specific frequency so that it acts as a bandpass filter. Its application enables widening the sensing range of a vibration sensor, such as an accelerometer, a strain gauge or a contactless sensor. The device has been successfully validated on a small sounding rocket and provided detailed description of the rocket's dynamic behaviour. Conclusions from the flight campaign as well as possibilities for other applications are discussed. Application of the sensor can result in better insight into the launch vehicle dynamics, thus resulting in the improvement of overall sounding rocket performance.