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INCREASE OF EFFICIENCY OF METEOROLOGICAL ROCKETS AT APPLICATION OF HYBRID  
MOTORS**Abstract**

This paper presents studies of a sound rocket design optimization with a fuel mass of 500-600 kg. The comparative assessment of the use of solid rocket motor (SRM) and hybrid rocket motor (HRM) was carried out. Main attention is given to HRM's design and its performances improvement. The report consists of three parts. In the first part various combinations of oxidizer (O<sub>2</sub>, N<sub>2</sub>O) and fuel (paraffin, HTPB + Aluminum) are considered, on the basis of which the optimum energy characteristics of HRMs are determined. The refined technique of HRM's internal ballistic calculations is discussed in the second part. The features of the combustion process and solid fuel grain geometry selection were considered. This technique takes into account the dependence of the solid fuel rate of gasification on the combustion gas stream density. According to obtained calculated data the optimal design of solid fuel grain was determined. The results of the research will assist to improve mass and geometrical parameters of HRM. The characteristics of HRM and SRM are compared in the third part. Presented data show that the ballistic efficiency of HRM is not inferior to SRM, and with a glance of its obvious advantages, such as lower cost and environmental safety, HRMs have a good perspectives for sound rocket applications.