

46th IAA HISTORY OF ASTRONAUTICS SYMPOSIUM (E4)
Scientific and Technical Histories (2)

Author: Mr. Oleg A. Sokolov
The British Interplanetary Society, United Kingdom, mail@bis-spaceflight.com

THE FIRST PRACTICAL ATTEMPT TO CREATE AN 'AEROSPIKE'-CONCEPT ROCKET ENGINE
IN THE FSU

Abstract

The concept of the so called 'external expansion' of exhausting combustion gases in the nozzle of a rocket engine (which has to be formed as an especially shaped central structure) was drawing the attention of rocket designers due to its unique property of providing the effect of partial self-adjustment of the gas expansion degree to the altitude of flight. However, attempts to realize real rocket engines of this concept not been numerous till the present time. The first of them had been the development and on-ground firing tests of the U.S. Rocketdyne 'Aerospike' experimental rocket engine in the sixties of the past century, subsequently, similar attempts were unknown until the late nineties. Nevertheless, in reality, one similar attempt was undertaken in the former Soviet Union (FSU) in the late seventies. An experimental bi-propellant multi-chamber rocket propulsion unit was developed and built in the Moscow Institute of Thermal Technology (MIT) under the management of the author within the frame of high-efficiency post-boost stage development for a ballistic missile. The capability of this concept to provide a high expansion ration with a very short length of nozzle was the reason for a choice of the concept for this purpose. The following on-ground firing tests of the propulsion unit confirmed its efficiency for the required application. The paper contains the preconditions for the concept choice and a description of the processes of the unit development and testing from the author's reminiscences. The achieved results and the reasons for halting the following development are presented as well.