

SPACE PROPULSION SYMPOSIUM (C4)

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Author: Mr. Oleg Aleksandrov
United States, oleg@aviastar.us

LINEAR REACTIVE ENGINE WITH ACTIVE CONTROL OF A CRITICAL SECTION AND WITH A
MULTI-TIERED ARRANGEMENT OF COMBUSTION CHAMBERS

Abstract

The invention relates to the aerospace industry, and specifically to propulsion systems of aerospace aircraft. A linear reactive engine is known, for example the US Aerospike, which constitutes a multiplicity of local combustion chambers distributed in a single row along the base of a ramp in the form of a prism with a trapezoidal cross section, said ramp serving as a central body. Working fluid emanating from local nozzles of local chambers is restricted at one end by the ramp and at the other end by atmospheric pressure in a rocket-launch or aircraft-cruising part. A shortcoming of such an engine is that local engines are distributed in a single row over the ramp with separate combustion chambers having rigidly fixed critical sections and inadequately distribute the load to the tail part of the aircraft, and, furthermore, in the event of dangerous gas pressure conditions in a combustion chamber, the rigid local critical section will not be capable of damping blasts of gas, and this may result in the destruction of one local engine and of the remaining engines in the series, and also said engine does not permit control of the critical section. Furthermore, the internal space in the ramp is hardly used for the payload weight and only contains turbopump units.