Interaction between high-enthalpy rocket exhaust streams and dropping liquid

Merkulov E S\textsuperscript{1,\textcopyright} and Kudimov N F\textsuperscript{2}

\textsuperscript{1} Open Joint Stock Company “Academician Makeyev State Rocket Centre”, Turgoyakskoye Shosse 1, Miass, Chelyabinsk Region 456300, Russia
\textsuperscript{2} Central Scientific Research Institute of Machine Building, Pionerskaya Street 4, Korolev, Moscow Region 141070, Russia
\textcopyright mes1@yandex.ru

When launching modern heavy- and middle-lift launch vehicles intra-stream water supply and water-screen systems are often used to decrease force, thermal and acoustic loads to the launch vehicles structural elements. The water flow in such systems is comparable to the mass flow of gases from engine nozzles.

In this paper the interaction between exhaust streams of a space rocket and dropping liquid is studied with high-performance computer simulation.

The results of computations for interaction between a nonstationary exhaust stream generated when starting a propulsion system and a droplet phase are given, the influence of a droplet phase on the structure of a stationary anisobaric stream is evaluated.