

SIMULATION OF THE EVOLUTION OF A DROPLET CLOUD THROWN INTO THE ATMOSPHERE AS A RESULT OF AN EXPLOSION OF A LAUNCH VEHICLE WITH SELF-INFLAMMABLE PROPELLANT COMPONENTS

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The aim of this work is to develop a methodological approach to simulating the evolution of a droplet cloud (DC) formed as a result of an explosion of a launch vehicle with self-inflammable propellant components in the initial portion of the flight trajectory and thrown into the atmosphere with initial motion parameters that correspond to the launch vehicle position at the time of the explosion. The proposed approach, which is based on a phenomenological analogy with the motion of a fuel spray injected in the combustion chamber of a diesel, takes into account the fragmentation and tracing of droplets and the effect of their collisions and possible coalescence on the structure and parameters of the propellant component DC, which undergoes a transformation as it moves. The proposed model of the DC evolution, which is due to droplet interaction in the DC and its structuring in the process of motion, reflects the most important, in terms of the environmental consequences of the explosion, processes in the DC and allows one to estimate its basic kinematic and geometric characteristics required for solving the ballistic problem of the motion of the suspended DC droplets in the atmosphere and their precipitation onto the ground surface.

Keywords: *explosion, droplet cloud, droplet, propellant component, launch vehicle.*

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