

SPACE PROPULSION SYMPOSIUM (C4)
Propulsion Technology (3)

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SLURRY-PROPELLANT ROCKET PROPULSION. NEW DESIGN SOLUTIONS FOR DISPLACING
GAS-GENERATOR AND RELIABLE MULTISTART**Abstract**

The Slurry Rocket Motors (SluRM) can be widely using at a kind of main propulsion for upper stages of launch vehicles (LV) and spacecraft in precise change of the orbit parameters, in transference from one flight trajectory to another one, in braking for withdrawal of the upper LV's stages or spacecraft from orbit. At the report there are proposals about new technical solutions according to design of the SluRM plant using displacing propellant feeding into combustion chamber which is mobile and autonomous on control, it is assigned for the operation in outer space with multistarting and deep modulation/throttling and thrust vector control. We propose to use following solutions which increase efficiency of the SluRM:

- the gas-displacing system of paste propellant feeding using gas-generator component – alumina hydride; this one generates hydrogen that is heat less than temperature of the propellant ignition; for the hydrogen heating it is using the heat from combustion chamber by extraction its by heat-pipe; multi ignition of the propellant is implementing by electric discharge of capacitor. The device allows in comparison with other systems to simplify the design essentially, to reduce materials consumption, to increase reliability of the SluRM plant in a whole;

- the ring nozzle with mobile central body of plate type upon the nozzle axis; SluRM thrust parameters and thrust vector gas-dynamic control system by blowing into the nozzle supersonic part of combustion chamber gas; thermal protection on the inner walls of the combustion chamber made from solid propellant slow-burning charge. The solution provides reliable and high-economical multistart for the SluRM plant in space conditions, high-economical and fast-operating control of the thrust vector, combustion chamber high capacity for work in multistart and long operational time, improved dimension and mass characteristics of the SluRM plant in a whole.