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NEW ROCKET FUEL: ACETAM

Abstract

The improvement of the space transportation systems by increasing their reliability and reducing cost of cargo delivery to orbit is one of the main priorities of the space industry. It can be achieved by applying new, more simple systems, or increasing their power potential at a constant level of design. JSC "NPO Energomash named after academician V.Glushko" has offered for this goal a new rocket fuel - acetam. In 2008-2010 the calculated-analytical and design-project study of oxygen-acetam liquid rocket engines of space application, which allowed to evaluate acetam as a new highly efficient synthetic fuel, was conducted at JSC "NPO Energomash". It is shown by ballistic calculations of FSUE RSC "Keldysh Research Center", confirmed by RSC "Energia", that replacement of oxygen-kerosene engine of upper stage on oxygen-acetam one at the modernized "Soyuz-2.1b" LV will increase the payload to geostationary orbit on 30-40The similarity of the acetam' parameters to kerosene is an important feature, which allows maximum use of experience in developing an oxygen-kerosene rocket engine in terms of materials, design solutions, etc. Currently, the "Acetam" project is realized by the Innovation Center of NPO Energomash - little scientific enterprise created by JSC "NPO Energomash", the main task of which is the development and promotion of innovative projects. Thermophysical and operating properties of acetam allow to receive a number of advantages in comparison with the hydrogen-oxygen upper stages that were considered till recently as maximum chemical rocket engines on the power capabilities. Acetam perfectly fits into the existing industrial infrastructure on many practically important operational, technical and economic performances. In the aggregate with power efficiency, such practical availability is an important advantage of acetam as rocket fuel.