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ENGINES FOR FIRST SPACE LAUNCH-VEHICLE

Abstract

Space era of mankind began since October 4, 1957. The first artificial Earth satellite was launched in this day. As you know, this launch was carried out by R-7 launch-vehicle, which used RD-107 and RD-108 liquid-propellant rocket engines developed by OKB-456 (now NPO Energomash) under leadership of chief designer V.Glushko. The basic version of these engines for the first and second stages of R-7 rocket was developed in 1954-57. The original design of multi-chamber engine became the basis for subsequent modifications. Over 60 years space launch-vehicles of "Vostok", "Voskhod", "Molnia", "Soyuz" famous family are in active operation and all this time the engines developed by NPO Energomash reliably operate. More than 10 modifications of engines for the first and second stages have been developed over the years for various space missions. Since 2001 new modifications of RD-107 and RD-108 engines - 14D22 and 14D21 engines – are used in composition of "Soyuz" LV. These engines, like the previous ones, are based on the design of their famous predecessors, but they provide increase of engine operation stability and increase of specific impulse of engines, which ensure to increase the payload mass. We continue efforts on further improvement of this family engines. The major work on engine modification and supervision of its serial production, as well as flight operation is performed now in Privolgsky branch of NPO Energomash in Samara. Significant support and assistance in these efforts is provided by specialists of NPO Energomash (Khimki). Serial production of engines for many years carried out at JSC "Motorostroitel" (formerly "Plant named after M.Frunze"), Samara. After some reorganizations this company received new name – JSC "Kuznetsov". The paper outlines history and features of main modifications of engines used in composition of R-7 launch-vehicles family.