

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
Future Space Transportation Systems (4)

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RE-USABLE SPACE-ROCKET SYSTEM. INNOVATIONS ON DEVELOPMENT OF RUSSIAN
MEANS OF ACCESS TO OUTER SPACE.**Abstract**

Khronichev Space Center together with TsNIIMash for recent years have been performing researches on validating the final outlook of re-usable space-rocket system (RSRS). First stage of RSRS looks as a returnable to the launch site re-usable rocket block of high aerodynamic performance. Second stage is a single-use rocket booster. Development of RSRS modifications during pilot works in recent years. Avant-project of RSRS's technical outlook was performed. Main aspect of research was addressed to technical innovations' development focused on fulfillment of requirements for lift up tonnage of RSRS to all range of orbits – from low-earth to geostationary earth orbits and departure trajectories. During the work-out period there was formed a principal structure and outlook of re-usable first stage. A number of modifications of returnable rocket block, first of all from aero-dynamical point of view as well as from the components of rocket fuel. Use of prospective reusable RSRS in comparison with today's single-use LV provides higher values of reliability and safety of the launch itself, lower in about 1.5-2 times unit cost of the payload launching, far higher figures of readiness for use. The main difference of the offered RSRS type is a possibility of rescuing main system's components – launch site buildings and reusable booster in case of malfunction of one engine of first stage whilst performing delivery of payload to the desired orbit. Major requirements to main elements of reusable rocket block have been worked out which provide successful handling of the tasks set hereinbefore.