

SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)  
Small Launchers: Concepts and Operations (7)

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RUSSIAN CARRIER ROCKET OF SUPERLIGHT CLASS FOR CHEEP ACCESS TO ORBIT:  
PRINCIPLES DESIGN AND POSSIBLE CREATION BASED ON EXISTING ACHIEVEMENTS

**Abstract**

Accomplished a review of currently existing carrier rockets of superlight class (CRSLC) and a comparison of their cost-effectiveness for orbiting of 1 kg of payload. Analyzed the influence of the main technical and operational parameters of CRSLC on the cost of the launch. The possibility of reducing the cost of launching satellites for low mass to 1000-1200 kg can be achieved through: the use of a reusable first stage; to reduce operating costs through the adaptation of new technology of preparation for launch with replacing of training cycle in the acceptance tests at the manufactory, which produce CRSLC; the use of existing rocket stages and sub-systems; transportation of CRSLC by aircraft directly to the launch pad; using manufactory tester team for the three-days start cycle. The possibility of adapting of CRSLC land-based application for the program "Air Launch" with utilization of aircraft An-124-100 "Ruslan" . It can give a significant increase in the efficiency of use, including by expanding the scope of services. Discussed new ways of landing CRSLC with the carrier aircraft. An example of design and appearance of CRSLC and estimated indicator "cost - effectiveness" with reusable first stage and aviation transportation of CRSLC from manufactory to the launch site. The results of research on the aerospace parachute systems for reusable first stage are demonstrated.