



Russia's Mobile and Cost-Efficient Satellite Launch Service

OE Watch Commentary: The accompanying excerpted article from *Izvestiya* discusses Russian plans to field a low-cost rocket that can launch small (up to 15kg) satellites into a very Low Earth Orbit (LEO) of 250-300 kilometers. This rocket is based upon the MN-300 meteorological rocket that has been modified to include a second stage booster. This system is very mobile, and can reportedly be moved by truck, air, or rail. The article focuses on the financial benefits of such a system, including the ability to rapidly put a satellite into orbit, without having to “piggy-back” on another (larger) rocket, which is the customary way small satellites are put into orbit. But this system also has military uses. Small reconnaissance and communications satellites may have shorter life spans due their small sizes and close orbits, but the ability to rapidly field small satellites on demand could be extremely valuable in crisis situations when surge capabilities are required. **End OE Watch Commentary (Bartles)**

“Scientists of the Russian Science and Production Association ‘Tayfun’ have found a way to ensure the rapid delivery of satellites into space. They have proposed to create a super-light space launch vehicle based on the MN-300 meteorological rocket.”

Source: Aleksandr Bulanov, “Естественный носитель: в России создают ракету для оперативных запусков Она сможет отправлять на орбиту спутники весом до 15 кг за три часа (A Natural Carrier: A Rocket for Expedited Launches is Being Created in Russia; It Can Send Satellites Into Orbit Weighing up to 15 Kilograms in Three Hours),” *Izvestiya*, 20 February 2019. <https://iz.ru/843088/aleksandr-bulanov/estestvennyi-nositel-v-rossii-sozdaiut-raketu-dlia-operativnykh-zapuskov>

Scientists of the Russian Science and Production Association “Tayfun” have found a way to ensure the rapid delivery of satellites into space. They have proposed to create a super-light space launch vehicle based on the MN-300 meteorological rocket. It is used to send scientific equipment into the upper layers of the atmosphere along a ballistics trajectory. “We plan to replace the scientific equipment located in the payload section of the rocket with a second-stage engine. This will give the carrier the ability to inject a payload weighing up to 15 kilograms into a low, near-earth orbit at an altitude of 250-300 kilometers,” noted Anatoliy Pozin, the manager of NPO “Tayfun’s” Geophysical and Ecological Laboratory for Missile and Space Research. “And the launch platform of the MN-300 rocket and the first stage will remain unchanged, which minimizes expenditures for modernization.”...

*The new version of the rocket will fully retain the positive qualities of the MN-300. Preparation for launch will take a total of about three hours and its transportation can be accomplished in a container installed on an ordinary truck or railroad platform. Water or aircraft transportation versions are also available, *Izvestiya* was told by Yuliya Chikacheva, an engineer on the developers’ staff...*

“Besides the elimination of the economic losses associated with the additional logistics and the lengthy waiting periods for a launch, its high responsiveness will open new possibilities for rapid exchanges of small satellites in the event that they become suddenly disabled,” noted the engineer.

The Cost of the Flight

The main shortcoming of the new rocket is the high cost of delivering 1 kilogram of payload into orbit. It is approximately \$60,000. However, this cost can be offset by individual conditions of the launch. “The cost of inserting a satellite into orbit may fluctuate significantly depending on its characteristics, but most likely it will be about \$20,000 to \$30,000 a kilogram, which is at least half that of the costs cited by the NPO ‘Tayfun’ specialists,” noted Andrey Potapov, Deputy Director of the Space Center of the Skolkovskiy Institute of Science and Technology. “Moreover, the high cost of a new rocket is fully justified by the capability of selecting the altitude of the orbit and the launch time for the goals of the specific space mission.”...

The Scientific Side

*It is assumed that the main payload for the new rocket will be scientific nano- and micro-satellites. The number of their launches has significantly grown in recent years. In the opinion of Anatoliy Kopik, director of marketing for the “Sputniks” Company, small scientific devices (weighing 1-2 kilograms) may be launched to a 300-kilometer low orbit for study of the earth’s lower thermosphere. At the present time this field remains little studied since the use of meteorological rockets can rarely be used there. And it is preferred not to use large and expensive satellites to resolve such tasks, the expert related. refused to comment to *Izvestiya* about NPO “Tayfun’s” new development. The project to create the new rocket may be completed over the course of 3-4 years.*