USING THE ARTSIMOVICH RAILGUN (RELSOTRON) FOR PAYLOADS DELIVERY FROM THE MOON. M. V. Sazhin[1], M. Safonova[2], V. N. Sementsov[1], P. Hasan[3] and N. Hasan[3], [1]Sternberg Astronomical Institute (SAI), Moscow State University, Russia, [2]Indian Institute of Astrophysics (IIA), Bangalore, India (margarita.safonova@iiap.res.in), [3]Maulana Azad National Urdu University (MANUU), Hyderabad, India.

Long-term plans of the Russian Federation for exploration and utilization of the Moon, Mars, and outer space demand to resolve a large set of problems. One of the major problems concerns the return of the piloted lunar missions and the delivery of lunar minerals and material to Earth. In the present scenario it is timely to initiate the program of scientific exploratory research in the areas of creation and development of new (advanced) technologies, designed to support the space missions aimed at study, exploration and ultimately utilization of the lunar resources.

One of the key problems in the large-scale exploration of the Moon is the high costs involved in delivering the spacecraft to the lunar surface and its return with lunar material to the Earth. We discuss here the unconventional methods of delivering payloads from the Moon to the Earth, namely, the concepts of the space elevator [1, 2] and the electromagnetic accelerator – the Artsimovich railgun (relsotron) [3]. By estimating the energy required to launch a payload into a low lunar orbit (LLO), or to the Lagrange point L_1 of the Earth-Moon system, we have shown that the use of the relsotron to launch payloads from the lunar surface to these locations requires much less energy than the corresponding launches to low-Earth orbit [4].

The lunar relsotron can be built on the Moon using the local material and some necessary equipment from the Earth that needs to be delivered only once. The energy can be sourced using solar batteries on the lunar surface, or even a nuclear power sources delivered from the Earth. In the foreseeable future, a thermonuclear power source can be used, for which the fuel – 3He isotope – is abundantly available on the Moon.

Unlike on Earth where, to reduce the aerothermal heat load on the launched payload, the relsotron was suggested to be build high in the mountains with lengths of at least 1.5 km for a linear design, or with diameter of a few km for a circular design, the length of the linear lunar relsotron for launching to L_1 can be just 157 m.

Therefore, we are confident that the use of the linear Artsimovich relsotron is a promising and cost-effective way of launching payloads from the surface of the Moon into the cislunar space; much more practical and economically feasible than the space elevator, or a conventional chemical rocket technology.

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