

Yuzhnoye SDO Technologies, Proposed for Using in International Programs on Moon Exploration

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Yuzhnoye SDO possesses a lot of technologies and has obtained great experience of development of the space transportation systems, which can be used in international programs on Moon exploration.

1. Liquid-propellant booster made on the basis of the first stage of Zenit LV possesses high specific parameters and is convenient in operation together with high reliability, which has been confirmed in two launches of Energia LV and in more than 50 launches of Zenit LV. Ecologically clean fuel components minimize negative influence on the environment. Because of identity of the booster construction with regular first stage of Zenit LV, it retains the high reliability of the last one and can be developed with the minimum costs and in short terms. It is proposed to use such booster as the first stage in heavy and super heavy launch vehicles. Thanks to the decisions, which are put into its construction, it could be a part of LV for manned launches, and has the real potential for multiple usages.
2. Rocket module (block E) of the soviet lunar vehicle is designed for the astronaut soft landing on the Moon surface and further return to the circumlunar orbit. Block E consists of the major and backup main engines, fuel tanks with support facilities for the entirety and heat conditions of the fuel components, as well as interfaces with lunar vehicle cabin and landing device. High reliability of the Block E is proved by great volume of ground testing and successful testing in space during three launches to the near-earth orbit. Block E even now can be used for Moon landing missions. Besides, it is possible to develop more complete version of this Block E or other modules with close functions, on the base of technological accumulations on this block.
3. Autonomous space tug Krechet is being developed in Yuzhnoye SDO for increasing Dnepr LV possibilities on spacecraft injection to the high-energy orbits. AST Krechet in two-stage configuration can deliver payload to the Moon flight trajectory, circumlunar orbit and lunar libration points. First stage of the tug is solid-propellant, the second one is equipped with multiple ignition liquid-propellant propulsion system and all necessary systems for long operation in space. For increasing the reliability and reduction of costs during AST development previously developed and tested systems, aggregates and technologies are used.