

SPACE EXPLORATION SYMPOSIUM (A3)  
Space Exploration Overview (1)

Author: Dr. Viktor A. Vorontsov  
Lavochkin Association, Russian Federation, vorontsov@laspace.ru

Prof. Victor V. Khartov  
Lavochkin Association, Russian Federation, npol@laspace.ru

Dr. Konstantin M. Pichkhadze  
Lavochkin Association, Russian Federation, pichkhadze@laspace.ru

Mr. Maxim Martynov  
Lavochkin Association, Russian Federation, maxim.martynov@laspace.ru

Mr. Alexander V. Lukiyanchikov  
Lavochkin Association, Russian Federation, kotl@laspace.ru

UNIFIED PLATFORMS FOR FUNDAMENTAL SPACE RESEARCH

**Abstract**

The next-generation space platforms “Flagman”, Unified Transfer Module with Electrojet Propulsion System, “Navigator” and “Karat” are developed by Lavochkin Association, the enterprise of Federal Space Agency. They are intended for automated spacecraft injection into various Earth orbits and for flights to the Solar system planets and bodies.

The “Flagman” multipurpose space transfer module has been developed subject to relevance of high-efficient transfer space vehicle designing for application in priority scientific missions of the Russian Federal Space Program and promotion of space engineering in the commercial services market.

Due to specific features of used control system there is a possibility of ground control during all flight phases and that significantly increases the safety of task performance. Modular approach enables optimization for the required payload mass and type of transfer operation. Currently “Flagman” is considered to be used for flights to the Moon, Mars, Venus and Jupiter.

The unified transfer module, based on sun electrojet propulsion system, is a new type of interorbital transfer vehicle with improved energy characteristics, designed for target payload delivery to high-energy Earth orbits, fly-off and interplanetary trajectories and also for support of a spacecraft long operation.

The “Navigator” base module is developed as unified module for spacecraft operating in low circular, elliptical, high elliptical, geostationary Earth orbits. Currently the “Navigator” module is used in development of the following spacecraft: “Spektr-R”, “Spektr-UV”, “Spektr-RG” and “Electro”. The “Spektr-R” SC is the International orbital astrophysical observatory of the “Radioastron” project.

While the designing of “Karat” unified platform, Lavochkin Association based on the experience of development, manufacturing and operation of the scientific SC, including small SC. The platform was designed to be used for wide range of objectives and to be capable of small SC injection by different types of launch vehicles both as a main payload and as a piggyback payload.

Attraction of small SC for scientific experiments resulted in increase of proposals quantity (at present more than 20) for implementation of space studies in the field of fundamental science, as well as meteorological and ecological observations.