

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

Author: Dr. Sergei Antonovich Lemeshevsky  
Lavochkin Association, Russian Federation

Mr. Oleg Grafodatskiy  
NPO Lavochkine, Russian Federation  
Dr. Victor Vorontsov  
Lavochkin Association, Russian Federation  
Mr. Kharun Karchaev  
Lavochkin Association, Russian Federation  
Dr. Sergei Fedorovich Teselkin  
Lavochkin Association, Russian Federation

“TOWARDS VENUS TOGETHER”. THE ISSUES OF POSSIBILITY ELABORATION OF  
INTERNATIONAL PROJECT IMPLEMENTATION ON VENUS PLANET RESEARCH

**Abstract**

Mission “Venera-D”, developed by Lavochkin Association, implies a long-term study of Venus using the scientific equipment of wide range, which will be installed on orbiter and lander and long-living station on Venus surface. The project can serve as a basis for large-scale international missions to Venus, the purpose is to continue fundamental studies of Venus, actively carried out in 1960-80s and early 1990s by Soviet and American space stations.

“VEGA” brilliant Soviet Venus research program was completed in 1986 by study Halley’s comet core. It was one of the most successful projects in Lavochkin history. Since 1994 (the year of completion of Venus mapping program with the Magellan mission, USA) Venus was studied by two spacecraft: the “Venus Express” (ESA, 2005-2014) and “Akatsuki” (JAXA, launch in 2010, start of operation in 2015).

The first developments related to “Venera-D” mission appeared in early 2000s with idea that landing station shall operate on surface of Venus for several hours and possibly days. As prototypes for automatic interplanetary station “Venus-D” experts consider mission “VEGA” stations taking into account the latest developments, unification of design solutions and new technical tools used in-house.

A great interest in participation in “Venera-D” program is being shown by scientists and technicians of space faring states: Europe, USA, China. In framework of joint scientific group activity consisting of Federal Space Agency/Space Research Institute (IKI)/ Lavochkin Association – NASA/U.S Research universities the analysis of the architecture of “Venera-D” mission is performed as well as the review of the options of joint cooperation. It is assumed that Russian lander and orbiter can become the main elements of the mission. As NASA possible contribution, the development of the Venus atmospheric maneuverable platform, VAMP (Venus Atmospheric Maneuverable Platform) is considered. Another option — several small drop-probes made on basis of high-temperature electronics that can operate on Venus surface for several hours. They can be dropped to different areas of the planet where they will study parameters of the atmosphere near the surface. By far the most prolonged operation of the “Venus” station on the surface was up to 2 hours (“VEGA” project). The possibility of inclusion in the mission of freely drifting balloons or small subsatellites is also foreseen.

The Russian Federation and the United States of America have long and rich experience in Venus studies and, for sure it gives confidence in successful implementation of joint program on the “morning star” research.