Venera-D – The Future Russian Mission to Venus

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Venus was actively studied by Soviet and US mission in 60-80- th years of the last century. The investigations carried out both from the orbit and *in situ* were highly successful.

After a 15-years break in space research of Venus, the ESA Venus Express mission, launched in 2005, successfully continues its work on orbit around Venus. In 2010 the launch of the Japanese Climate Orbiter (Planeta-C) mission is planned. However, many questions concerning the structure, and evolutions of planet Venus, which are the key questions of comparative planetology, very essential for understanding the evolution of the terrestrial climate, cannot be solved by observations from an orbit.

Now in Russia the new investigation phase of Venus begins: the mission Venera-D is included in the Russian Federal Space Program to be launched in 2016. This mission includes the lander, balloon, and the orbiter.

Scientific goals of the mission include:

- investigation of the structure, chemical composition of the atmosphere, including noble gases abundance and isotopic ratio, structure and chemistry of the clouds;
- study of dynamics of the atmosphere, nature of the superrotation, radiative balance, nature of an enormous greenhouse effect;
- study of structure, mineralogy and geochemistry of the surface, search for seismic and volcanic activity, the lightening, interaction of the atmosphere and the surface;
- investigation of the upper atmosphere, ionosphere, magnetosphere, and the escape rate;
- study of the evolution of the atmosphere and the surface of Venus.

The complex of experiments on the orbiter includes, among the others, several spectrometers in the spectral range from UV to MW, the mapping spectrometers and the

plasma package. On the lander there are instruments to work during the descent, and on the surface: gas-chromatograph, PTW (meteo), nephelometer and the particle sizes spectrometer, optical package, active gamma-spectrometer, TV-complex, which includes panoramic, high resolution and descending cameras.. On the balloon which has to work near the lower boundary of clouds, the devices will be installed to study the lower atmosphere and to get the surface images with high resolution at 1 mkm.

Successful realization of the project Venera-D will allow to solve the important scientific problems of comparative planetology. In particular it will help to understand why do Venus and the Earth (sister-planets), similar in many aspects, being formed at similar conditions in the protoplanet nebula, evolve by such a different way.