

Phobos Sample Return Project

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Phobos Sample Return mission is under development now by the Russian Space Agency and the Russian Academy of Sciences. The mission main goal is a delivery of a sample of the Phobos surface material to the Earth for laboratory studies. Besides, the spacecraft payload includes scientific instruments for Phobos in situ and the Martian environment studies.

Spacecraft will be launched by the Souz-2b rocket in 2009 and inserted into the Earth-Mars trajectory. The interplanetary cruise will take 10-11 months and the spacecraft will be inserted into the first elliptic orbit around Mars. Then after several orbit transformations a quasi-synchronous orbit closed to the Phobos orbit will be formed. During operation at these orbits the Phobos body will be studied by remote sensing. After several months orbiting at the quasi-synchronous orbits the spacecraft will land at the Phobos surface, implement sampling of the Phobos regolith and a returned rocket with a capsule containing regolith samples will be launched from the Phobos surface and directed towards the Earth. The returned capsule will entry into the Earth atmosphere and land after 11 months of the Mars-Earth flight. Soil samples will be analyzed by specialists of the Vernadsky Institute of Geochemistry and Analytic Chemistry (GEOHI). The mother spacecraft with onboard instruments will continue science measurements at the Phobos surface.

The mission scenario was designed by the Lavochkin Space Association and the Apply Math Institute (AMI). The spacecraft is manufactured now by the Lavochkin Space Association. The payload includes mechanical equipment for sampling from the Phobos surface and a number instruments for in situ and remote sensing of Phobos and Martian environment: panoramic camera, gamma and neutron spectrometers, gas-chromatograph, mass spectrometers, IR spectrometer, seismometer, dust sensor, plasma package. Several instruments: alpha-P-X-spectrometer, Messbauer spectrometer, micro TV-camera and a small device for microsampling mounted at a robotic arm (manipulator). The science instruments are developing by research teams of the Space Research Institute (IKI), the Vernadsky Institute (GEOHI), the Institute of Radio Electronic (IRE), the Apply Math Institute (AMI). Research teams from France, Germany, Italy, Ukraine participate in developing of several science instruments.