

CARTOGRAPHIC SUPPORT OF A NEW LANDING SITE FOR "PHOBOS-GRUNT" MISSION

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At November 2009 the launch of «Phobos-Grunt» spacecraft was postponed on November 2011 because of technical reasons. This delay had some positive consequences too, namely there were obtained new Phobos pictures for its side opposite to Mars. It was selected for the area of choosing the spacecraft landing site position. The new material was appeared thanks the special surveying by ESA spacecraft “Mars Express” changing its orbit extra for this purpose. The main goal of the «Phobos-Grunt» spacecraft mission is the Phobos soil sample delivery to the Earth, and also the larger Mars moon study using a set of scientific equipments installed on the spacecraft board. That is why it is required the spacecraft soft landing at a pre-selected area on the Phobos surface. At this stage of the project two organizations (Lavochkin NPO and IPM RAN) have developed a scenario of flight. Russian comparative planetology scientists (GeoKHI RAN) have pre-selected potential landing areas, and Planetary Cartography Laboratory (MIIGAiK) has become responsible for mission geodesy and cartography support. It means it is responsible in front of solving the following main tasks: calculation of corrections to the coordinates of the landing site and then a variety of cartographic material on Phobos, which should be compiled on the basis of new high resolution images coming from the spacecraft "Phobos-Grunt". DLR scientists using the results of previous surveys created a new network of 665 ground control points and a digital model of Phobos with high accuracy taking into account the revised satellite perturbed motion of Phobos. But the interesting landing area was still not covered by high-resolution images, and Viking spacecraft images was used for this new model in spite of their exterior orientation parameters are known with low accuracy. Summing up, we can to establish a fact that all of the models and their corresponding coordinate systems have a relatively accuracy that does not exceed 100 m. At the same time, the coordinates of the landing point should be determined with a precision not worse than 10 m. Thus, a team of MIIGAiK Planetary Cartography Laboratory has a complicate task: the creation a new coordinate system and the control points network, which should ensure the accuracy of landing at the given point. That is why the modeling on the base of new “Mars Express” pictures gave us a possibility to improve the last control point catalogue and the landing site coordinates too.