

Phobos Geoportal As Geodesy And Cartography Node Of Mexlab Planetary Data Storage. I. Karachevtseva, A. Zubarev, A. Kokhanov, N.Kozlova, E. Matveev, and A. Garov, Moscow State University of Geodesy and Cartography (MIIGAiK), MIIGAiK Extraterrestrial Laboratory (MEXLab) (Gorokhovskiy per., 4, 105064, Moscow, Russia, e-mail: icar2003@mail.ru).

Introduction: In MIIGAiK we are preparing Geodesy and Cartography data for celestial bodies and developing Planetary Data Server [1]. We use modern spatial and web-based technology to store results of various projects including future Russian missions. It is the practical implementation of the previously proposed concept of a thematic node which provides access to data on planetary geodesy and cartography [2]. Using this original idea we have developed a planetary spatial information system [3]. The architecture of the system is based on the client-server principle, where the Geo-portal is the client part which provides access to the science and public community (Fig. 1). We started our work using data from the small body Phobos, motivated by the availability of large volumes of remote sensing data provided by Mars Express [4].

Phobos Geo-portal. Due to small size of Phobos, firstly we used a personal geodatabase within commercial software ArcGIS 10.* (ESRITM) for preliminary data storage and analyses. The set of Mars Express SRC camera and Viking Orbiter images providing base layers for Phobos study [6], in the form of a global DTM (Digital Terrain Model which includes shapes of local features), individual orthoimages and the global orthomosaic.

A number of secondary products (craters, grooves, slope, surface roughness, shaded relief) were generated based on standard tools of ArcGIS. All data sets were referenced on a sphere of radius $R=11.1$ as recommended IAU [7]. The data uploaded into ArcGIS were used for Phobos thematic mapping [8]. Initial data and results of the geo-analyses were uploaded to MexLab database, which has universal structure. A user interface of MexLab database has been developed as Geoportal (<http://carsrv.mexlab.ru/geoportal/>) using Flash technology with further plans to implement Silverlight and HTML5 + JavaScript technology on the client side to allow for larger numbers of simultaneous users. The main feature of the designed Geo-portal is the ability of spatial queries and access to the contents selecting from the list of available data set. Layers can be displayed using four different projections. Users can obtain quantitative and qualitative characteristics of the objects in graphical and tabular forms and can download data. User authorization service is provided data security and access control.

Phobos Data Access. For public users we also have developed easy access to high quality color e-

maps with layers support which use possibilities of presentation not included in typical Geo-portals, such as map diagrams or special projections for 3-axial ellipsoids, for example, the modified Bugaevsky projection, which has been developed for Phobos earlier [8].

The high quality color maps published use the ESRI ArcGIS server <http://www.arcgis.com/apps/OnePane/basicviewer/index.html?appid=b5d1d388c3a6484299586988d0e7a7c6>. The list of maps was published on the MEXLab webpage (<http://mexlab.miiigaik.ru/>).

The MEXLab Planetary spatial information system can integrate various types of data not only for Phobos, but other planets and their satellites, and it can be used for geodesy and cartography support of future missions to celestial bodies. Our technological solutions are open-source, which makes it possible to increase the functionality of the system, for example, using 3D-modeling (Fig.2).

References:

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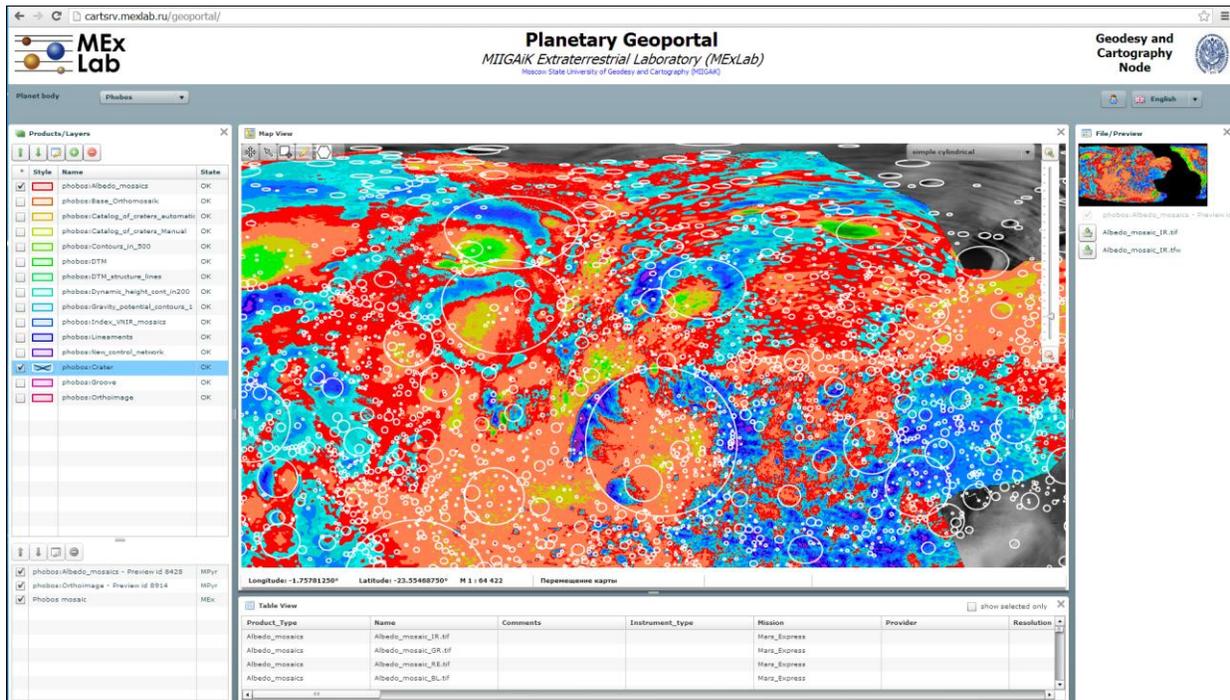


Fig. 1: User interface of the Geodesy and Cartography Node of Planetary data storage; result of a multispectral study based on HRSC color-channel data of Mars Express [5].

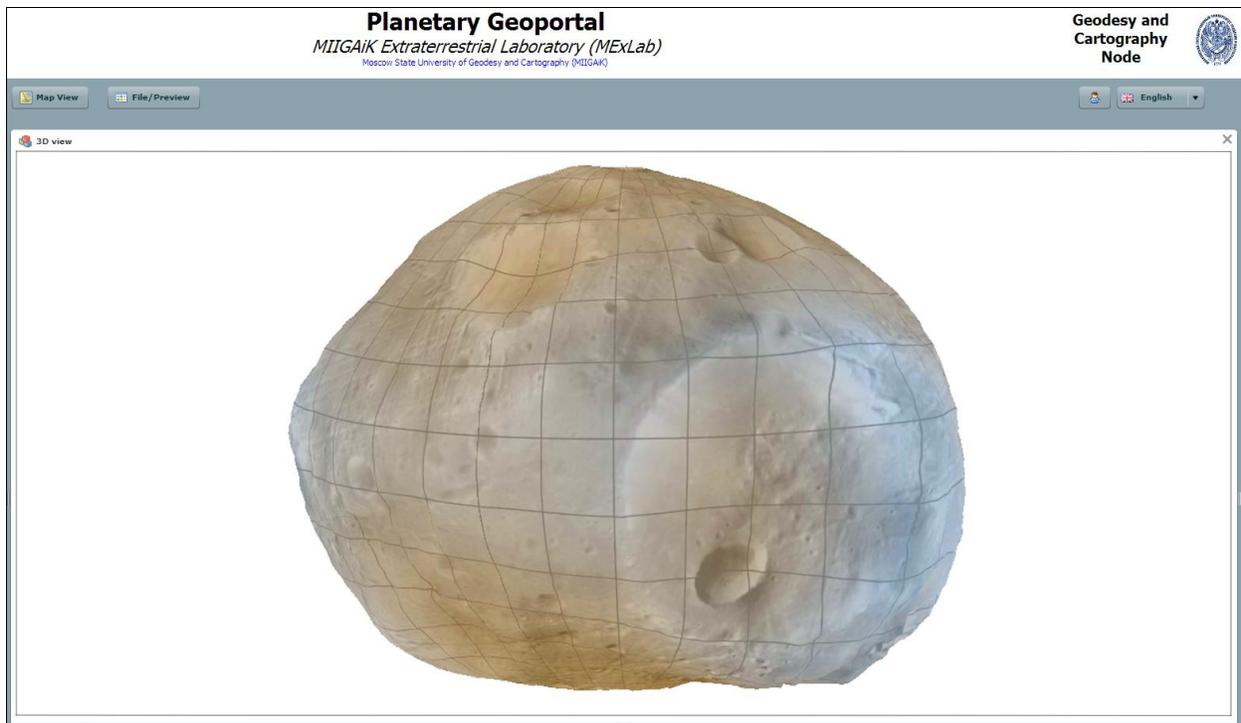


Fig. 2: Creation of 3D user interface for further developing of the MExLab Geo-portal