

# 3D PLANETARY GEOPORTAL AS ONLINE LABORATORY FOR GEO-COLLABORATION OF SCIENTIFIC COMMUNITY

A.S. Garov\*, I.P. Karachevtseva, E.V. Matveev, A.E. Zubarev, V.D. Patratiy

Moscow State University of Geodesy and Cartography (MIIGAİK),  
MIIGAİK Extraterrestrial Laboratory (MExLab), Russia  
i\_karachevtseva@miigaik.ru

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## ABSTRACT:

We are developing 3D Planetary Geoportal as 3D-web GIS, which provides the information support of planetary research using the collection, storage, processing, analysis, interpretation, and access to remotely sensed data of celestial bodies of the Solar system and the results of their thematic processing. Based on previous version of Geoportal (<http://cartsrv.mexlab.ru/geoportal>) an innovative approaches to the representation of planetary data, including cross platform capability, the combination of 2D- and three-dimensional modelling techniques, Web-GIS, as well as special tasks of navigation and spatial localization of planetary objects a new software architecture has been developed.

## 1. 3D PLANETARY GIS

An innovative information system for tasks of planetary research based on a new software architecture that will have the following main features:

1. The system will provide hi-res remotely sensed data of celestial bodies as well as various digital products (digital models of different resolution and coverage, global orthomosaics and individual hi-res orthoimages of surfaces of celestial bodies, catalogs of reference points, catalogs of small craters and other topographic objects, morphometric catalogs, geomorphological maps, etc.). These products will be available at both global (planetary) scale and a detailed level.
2. A common and specialized user interfaces based on modern geospatial technologies including 2D and 3D Web-GIS and cartographic visualization will be available.
3. Data from SPICE navigation database will be used for the representation of 1) the location of natural and artificial satellites and modelling of their orbit; 2) the Sun position and the modelling of lighting conditions;
4. Context search for related data (such as data products, articles, news etc.), using external data sources will be implemented in the system
5. Teleconferencing mode for communication of the scientific community and educational purposes (online lectures and presentations) will be provided.

## 2. A NEW SOFTWARE ARCHITECTURE

-New geoportal will be implemented as a cross-platform solution with shared codebase – with web application being just one of platforms supported.

- We will use a single compact messaging protocol between the modules within a single process and via the network without the use of middleware.

- We will use the modular approach with ability to easily transfer modules between the server and the client via just reconfiguration to achieve optimal performance.

- We will limit the use of HTTP, XHR in favour of duplex protocols such as WS/WSS and WebRTC.
- Backwards compatibility mode with OGC protocols (WFS, WMS) will be available via special compatibility module.
- We will provide scripting API - support for running external scripts and animation. It will be possible to transmit a static (set of layers/position of the observer) and dynamic (position script/animation) context through URL.
- Teleconference regime (including video/audio broadcasting) will be implemented as remote scripting via WebRTC protocol providing context synchronization.



Figure 1. 3D-web GIS in a teleconference regime can be used for geo-collaboration and scientific discussion in spatial context of Lunar data

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\* Corresponding author