Cartography Support and Assessment of Candidate Landing Sites for the LUNA-GLOB Mission. A. Kokhanov[1], I. Karachevtseva[1], J. Oberst[1,2,3], Ph. Gläser[2], M. Wählisch[3], and M. S. Robinson[4]. [1]State University of Geodesy and Cartography (MIIGAiK), Gorokhovskiy per., 4, 105064, Moscow, Russia; [2]Technical University of Berlin, Berlin, Germany; [3]German Aerospace Center (DLR), Berlin, Germany; [4]Arizona State University, Arizona, USA.

Introduction: The Russian LUNA-GLOB mission, scheduled for launch in 2015, is to explore the Lunar subpolar areas. Research program was proposed by scientific team from the Russian Space Research Institute of RAS [1, 2, 3]. The general landing area for lander and rover, as well as 3 specific coordinates of landing sites have recently been proposed [4]. Our team is providing cartographic support to the mission and assessments of these candidate landing site on the basis of different types of data.

Sources: For mapping, we used images and Digital Elevation Model (DEM) of the area obtained by LRO: the WAC orthoimages and DEM "GLD 100" [5, 6], LOLA track profiles [7], LOLA gridded data products [8] – DEM with spatial resolution 30 m per pixel, named as LDEM_1024 [9] and available NAC images in the subpolar area [10].

Mapping Results: For the area of interest, we have compiled a geodatabase (*Fig. 1*) containing vector data, orthoimages and DEM with different resolutions. Using GIS techniques we carried out a various manipulations and cross-analyses of the spatial data. For characterization of the surface, we created some examples of maps: slope, roughness and hill-shaded relief in various scales. Slopes were classified in some groups to identify sites that would be safest for landing. The surface roughness was calculated using 5 methods (*Fig. 3, one example*). Hill-shaded maps were generated using two sets of illumination vectors 90° apart for unbiased studies of relief forms (*Fig. 4, one example*). Using data from LOLA tracks we generated DEM that matched the resolution of the "GLD 100". Comparison of topographic profiles from both data sets show general agreement along tracks, but across-track topography requires interpolation and has low accuracy, so for characterization landing site entire area we need to use DEM from stereo images (*Fig. 2*).

Future works: In the next step of research of the landing site area we will create new DEM with high resolution based on LRO NAC stereo images. Unfortunately, while numbers of single NAC images are available in the targeted subpolar areas (*Fig. 1*), stereo coverage is currently limited. The acquisition of stereo images in the areas is far from standard, owing to limited spacings of orbital tracks (which require specific spacecraft re-orientation maneuvers for stereo viewing) and the illumination conditions under shallow sun angles. The surveying of such stereo images are currently in the planning.

References: [1] Zelenyi L. M. (2011) *The Book of Abstracts of the 2-nd Moscow Solar System Symposium (2M-S[3]), Space Research Institute (IKI)*, P. 19. [2] Tretyakov V.I. (2011) *2M-S[3], IKI*, P. 116. [3] Petrukovich A.A. et al. (2011) *2M-S[3], IKI*, P. 115. [4] Basilevsky A. T. et al. (2011) *2M-S[3], IKI*, P. 70 [5] Scholten F. et al. (2011) *EPSC Abstracts Vol. 6, 1272-1*.
[6]*http://wms.lroc.asu.edu/lroc/global_product/100_mpp_DEM*
[7]*http://ode.rsl.wustl.edu/moon/indexProductSearch.aspx*
[8]*http://pds-geosciences.wustl.edu/lro/lro-l-lola-3-rdr-v1/lrolol_1xxx/data/lola_gdr/*
[9]*http://imbrium.mit.edu/document/archsis.pdf*
[10]*http://ode.rsl.wustl.edu/moon/indextools.aspx*

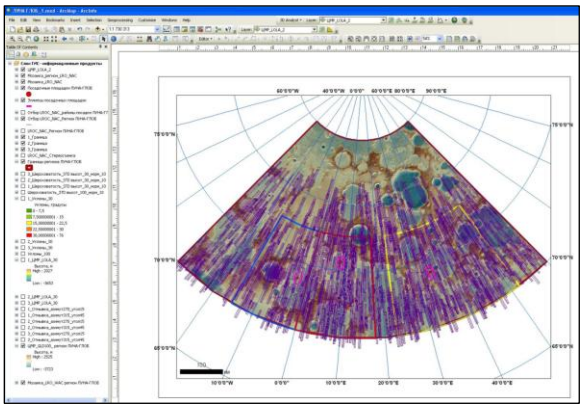

Figure 1. General sub-polar landing area for LUNA-GLOB, 3 proposed candidate landing sites and footprints of available LRO NAC images (background – color shaded relief from "GLD100")

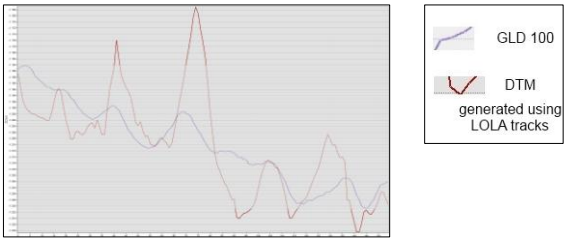

Figure 2. Profiles of the Target Ellipse 2 surface from "GLD 100" and DEM, created with using LOLA track data. Direction of profile line is to perpendicular track.

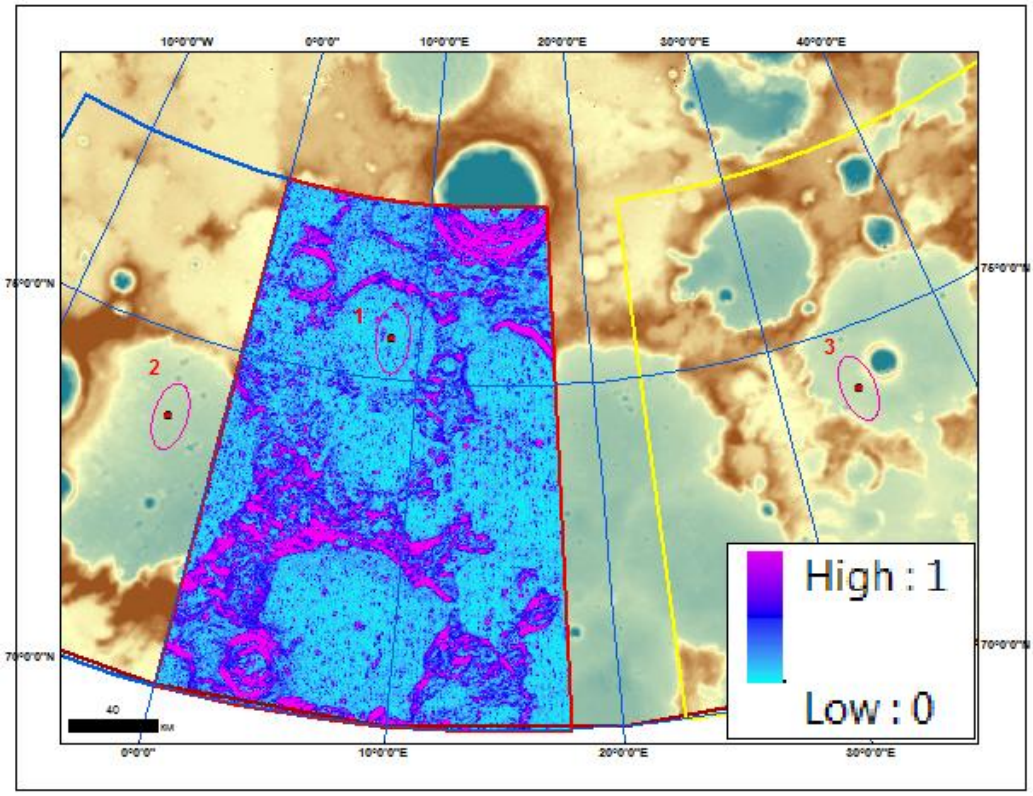

Figure3. Regional map of roughness, here using the standard deviation of elevations (background – color relief from "GLD100")

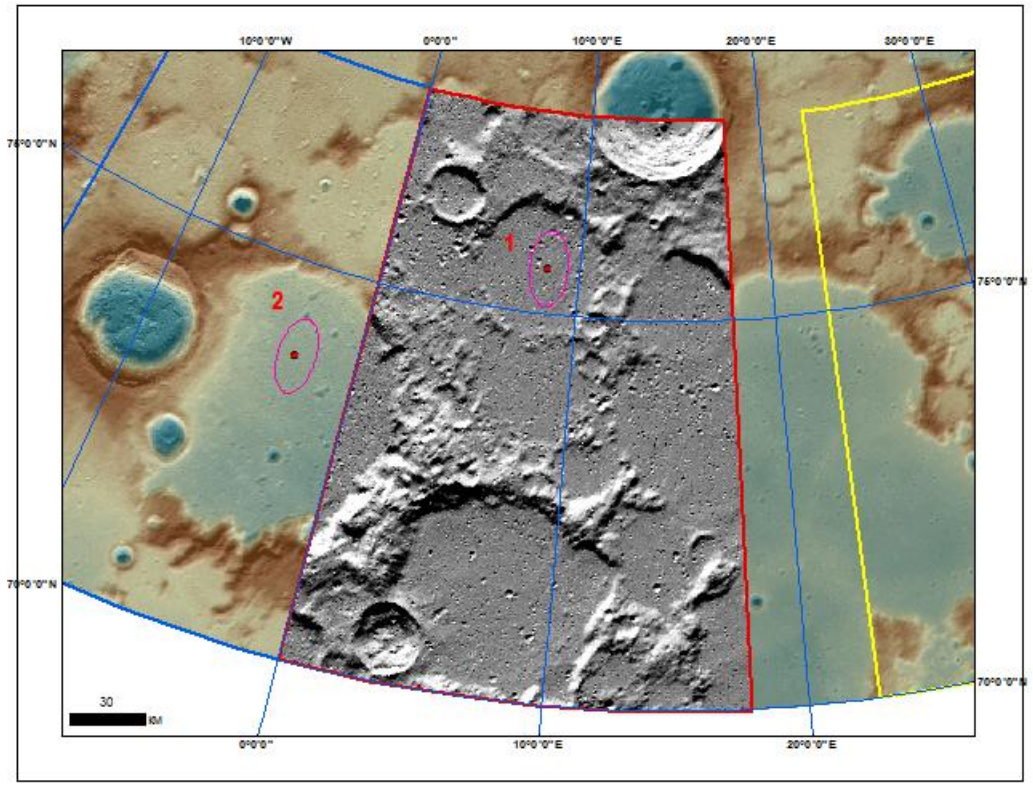

Figure 4. Hill-shaded relief map. Azimuth 315°, solar elevation angle 45° (background – color shaded relief from "GLD100")