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Cartography and Information Systems for the Luna-Glob Landing Sites

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1. Introduction

We provide cartography and information system support to the LUNA-GLOB mission and assess candidate landing sites [1] on the basis of different available remote sensing data sets. The main goal of our work is to identify science opportunities in the sub-polar areas and to detect possible hazards for any landing spacecraft.

2. Sources

For mapping, we used images and Digital Elevation Models (DEM) of the area obtained by LRO: WAC orthoimages and the DEM "GLD 100" [4, 6], LOLA topographic profiles [7], LOLA gridded data products [8], LOLA-based DEMs with spatial resolution 30 m per pixel (LDEM_1024 [9]), available NAC images [10], images from MRF LRO [11]. We also use images and DEM data from SELENE (Kaguya) [12].

3. Mapping results

For the general area of interest, we have compiled a geodatabase containing vector data, images and DEMs with different resolutions (Fig. 1a,b). Using GIS techniques for characterization of the surface, we created several types of thematic maps [3]. Using ISIS software we created about 100 LRO NAC orthoimages on the base of the LDEM that cover the area of target ellipses of candidate landing sites (Fig. 2).

4. Future works

In the next step, we will create a catalog of craters containing crater locations, diameters (> 20 m) and depths (Fig. 3). This catalog will allow us to calculate statistical parameters including crater cumulative size distribution and spatial density maps. Crater statistics based on GIS-tools and high resolution DEMs has previously been successfully tested for the Lunokhod-1 area [2]. We expect that high-resolution stereo images from the LRO NAC will become available soon, from which we will create new DEMs with much improved spatial resolution [5]. The infrared images from MRF LRO will be used for calculating of boulder distributions in the landing site areas.

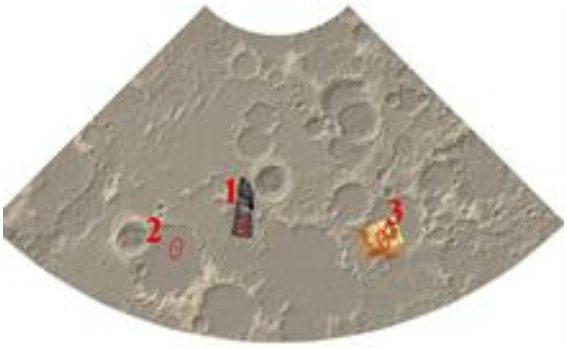

Figure 1a. General sub-polar landing area for LUNA-GLOB with 3 proposed candidate landing sites. (background – color shaded relief from "GLD100")

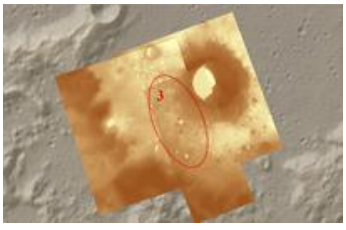

Figure 1b. Kaguya stereo DTMs for Target ellipse 3

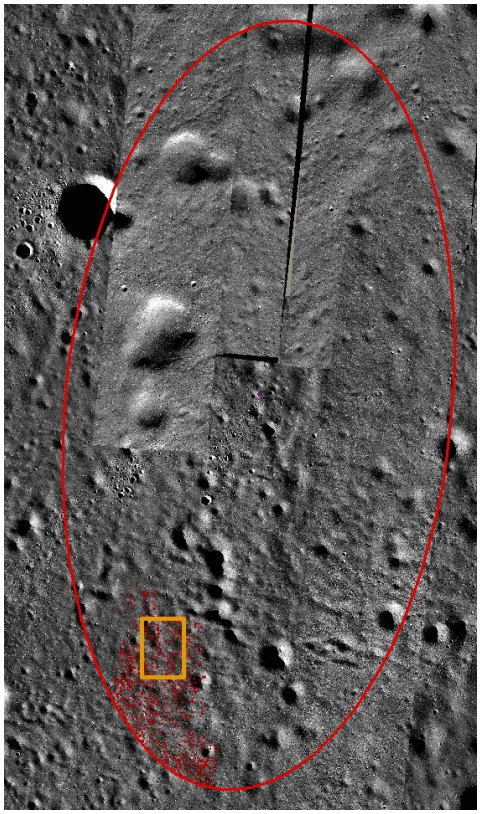

Figure 2a: LRO NAC orthomosaic for Target ellipse 1 and selected area with digitized craters

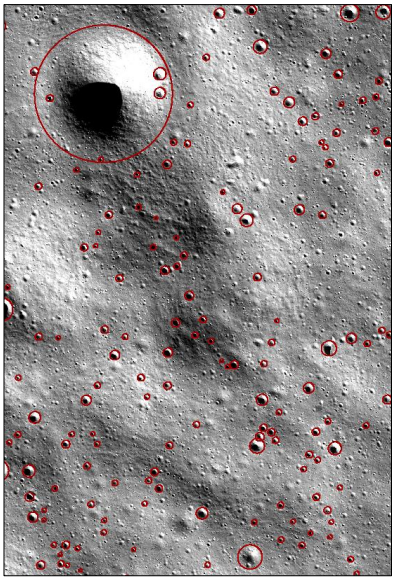

Figure 2b: High resolution LRO NAC image with digitized craters within Target ellipse 1

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References

[1] Basilevsky A. T. et al. (2011) 2M-S3, IKI, P. 70

[2] Gusakova et al. (2012) LPSC Abstracts, 1750

[3] Kokhanov et al. (2012) LPSC Abstracts, 1756

[4] Scholten et al., (2012) GLD100, J. Geophys. Res., in press.

[5] Zubarev A. E. et. al. (2012), Lunokhod-1 Panoramic Images and Stereo Topography, this Issuies.

[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

[11]http://ode.rsl.wustl.edu/moon/DataSetExplorer.aspx?target=mars&instrumenthost=LRO&instrumentid=MRFLRO

[12] https://www.soac.selene.isas.jaxa.jp/archive/index.html.en