



## **GIS Toolsets for Planetary Geomorphology and Landing-Site Analysis**

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Modern Geographic Information Systems (GIS) allow expert and lay users alike to load and position geographic data and perform simple to highly complex surface analyses. For many applications dedicated and ready-to-use GIS tools are available in standard software systems while other applications require the modular combination of available basic tools to answer more specific questions.

This also applies to analyses in modern planetary geomorphology where many of such (basic) tools can be used to build complex analysis tools, e.g. in image- and terrain model analysis. Apart from the simple application of sets of different tools, many complex tasks require a more sophisticated design for storing and accessing data using databases (e.g. ArcHydro for hydrological data analysis).

In planetary sciences, complex database-driven models are often required to efficiently analyse potential landings sites or store rover data, but also geologic mapping data can be efficiently stored and accessed using database models rather than stand-alone shapefiles. For landings-site analyses, relief and surface roughness estimates are two common concepts that are of particular interest and for both, a number of different definitions co-exist.

We here present an advanced toolset for the analysis of image and terrain-model data with an emphasis on extraction of landing site characteristics using established criteria. We provide working examples and particularly focus on the concepts of terrain roughness as it is interpreted in geomorphology and engineering studies.