MARSWEB: GIS BASED WEB 2.0 MAPPING APPLICATION TO MEASURE IMPACT CRATERS ON THE SURFACE OF MARS. C.A. Vargas[1], J-.P. Muller[2] and J. G. Morley[1], [1]Department of Civil, Environmental and Geomatic Engineering, UCL, London UK (ucescav@ucl.ac.uk ; jmorley@cege.ucl.ac.uk), [2]Mullard Space Science Laboratory, Department of Space and Climate Physics, UCL, Surrey UK (jpm@mssl.ucl.ac.uk).

Abstract: This project is concerned with the development of a web-based mapping application to allow both professional and amateur geologists to participate in a large-scale web-GIS project to map craters on extra-terrestrial bodies, starting with the planet Mars. The context is the dating of the surface of Mars which can be retrieved using crater size frequency distributions (Kim et al., 2005 [1]) or crater 3D shape (Kim & Muller, ISPRS 2008. Web 2.0 is based on sharing information dynamically and interactively over the Internet, and has a huge potential for such community mapping efforts.

This paper describes a GIS-based Web 2.0 mapping application developed at UCL to identify and measure the shape of impact craters of Mars interactively. The system provides a generic framework for users, both professional and amateur, to actively engage in mapping Mars by creating, sharing, aggregating and using crater information in a variety of formats that work in traditional GIS and planetary software.

The system is composed of four components. A Persistent RDBMS part developed using Postgres with PostGIS, a Server component based on a J2EE Multi Layer Architecture Platform, a web client based on OpenLayers, ExtJS, and ExtFlot, AJAX opensource frameworks; and a Web Map Server to deliver the crater information generated by the users.

Taking advantage of OGC standard-oriented architecture, the system is able to access layers from distributed map services [2-4], including cascaded WMS services added by the users allowing them to create new views of the maps by using WMS layer transparency. Users can draw simple impact crater boundaries with minimal manual input or can import previously measured craters from shapefile or text files; they can also indicate characteristics of each crater via the generation of tags. After creating their own crater catalogues, users can share these crater measurements with others in the online community. Finally the system provides two basic crater analysis functionalities: Plot Crater Profiles and Plot Crater Count Size-Frequency Distribution which are based on previous work by G. Michael (Freie Universität Berlin)[5]. Examples of different aspects of the tool are shown in Figure 1.

References:

[1] Kim et al. (2005). Photogrammetric Engineering and Remote Sensing 71(10): 1205-1217

[2] http://webgis.wr.usgs.gov/

[3] http://onmars.jpl.nasa.gov/

[4] http://jmars.asu.edu/

[5] Michael G. et al. (2007), LPSC XXXVIII, #1825.

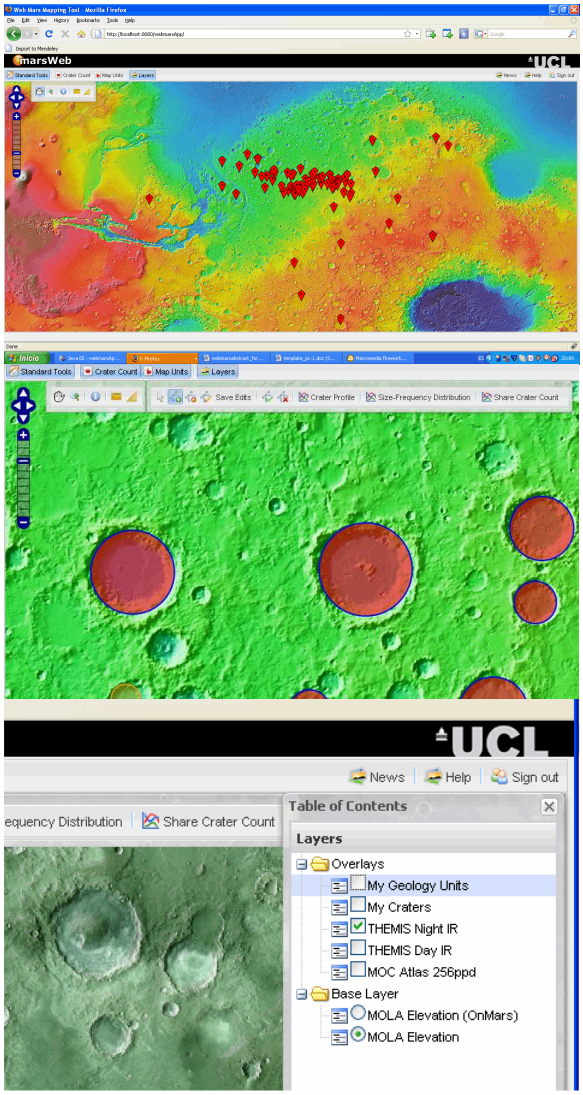

Figure 1. MarsWeb screenshots showing display of pre-existing craters (upper panel) and measured craters (red) superimposed on a hill-shaded and colourised MOLA DTM (using the USGS Flagstaff colour LUT). Other layers can be cascaded such as those from the J-Mars [4] WMS server shown here.