THE UCL RPIF: A PLANETARY DATA PORTAL FOR THE UK. J.-P. Muller[1,2] and P. M. Grindrod[2,3], [1]Imaging Group, MSSL, Space & Climate Physics, UCL, Holmbury St Mary, RH5 6NT, UK [2]Centre for Planetary Sciences at UCL/Birkbeck, Gower Street, London, WC1E 6BT, UK, [3]Dept. of Earth and Planetary Sciences, Birkbeck College, Malet Street, London, WC1E 7HX, UK,. (j.muller@ucl.ac.uk; p.grindrod@ucl.ac.uk)

Introduction: The Regional Planetary Image Facility (RPIF) at UCL is a NASA facility that provides two fundamental roles: (1) the RPIF houses rare and unique hard-copy and digital planetary data from missions spanning four decades of space exploration, which forms part of the Geology Collection, itself part of UCL Museums and Collections, and (2) the RPIF 3D facility provides hardware and software necessary for accessing, processing and analyzing planetary data for internal and external users. Both of these roles are unique in the UK. The current Director of the RPIF is Prof. Jan-Peter Muller, and Dr. Peter Grindrod is the Data Manager.

Here we provide an overview of current facilities at the UK RPIF, including case studies, guest access and future directions.

RPIF Planetary Collection: The UCL RPIF houses approximately 30,000 objects, including photographs and negatives, slides, videos, maps, CDs, and publications. The extensive photographic collection includes rare images sets, such as a complete set of Magellan Venus C1-MIDR stereo images and F-Map large-scale images, and a large collection of prints and negatives of Mariner 9 and 10, Lunar Orbiter, Viking, Voyager, and Apollo Panoramic Camera images. The hard-copy archives within the RPIF are part of the Geology Collection, which falls under the larger jurisdiction of UCL Museums and Collections. The UCL RPIF was the first RPIF established outside of the US in 1980, and remains the only RPIF in the UK.

In addition to its annual open day, the RPIF welcomes about 500 visitors per year to visit the collection on a pre-booking basis. The RPIF also regularly advises television, print and radio media, and hosts interviews and broadcasts that make use of the collection. Recent examples include BBC News and Sky at Night, The Guardian and New Scientist. The RPIF also organizes, curates and/or contributes towards regular, high-profile public engagement activities.

10 Miles of Mars Exhibition. The UCL RPIF supported and organized a recent exhibition, called 10 Miles of Mars. The tenet of this exhibition was simple – to showcase a beautiful image at an unprecedented scale. Measuring approximately 3 x 40 metres, the image continuously covered the majority of the wall of the North Cloisters at UCL, even wrapping around the columns (Fig. 1). The exhibition was open to the pub-

lic for 60 days in total in Autumn 2013, and was seen by over 1000 people in the first week alone.

Figure 1. The 10 Miles of Mars exhibition after installation in the UCL North Cloisters.

RPIF 3D: Since autumn 2009, the RPIF has provided hardware and software necessary for accessing, processing and analyzing planetary data, a service that is available to both internal and external users [1].

Planetary Data Visualization and Processing Facilities. At present the RPIF 3D houses 1 planetary viusalization and data processing machine and 2 stereo workstations. For data processing we have an iMac and MacPro, running ISIS, ENVI/IDL (+CAT), and Fledermaus. We also have two stereo workstations running BAE SocetSet 5.6 and ArcGIS 10. The RPIF also owns and manages a 16 inch MagicPlanet spherical projection display and a portable 8 x 6 foot Geowall for display of stereo products created using the RPIF 3D at exhibitions and conferences.

Guest users and training. The RPIF 3D is a portal to allow geoscientists in the UK and across the European mainland to process planetary data in general, but in particular produce stereo digital terrain models (DTMs) from HiRISE [2] and CTX data to combine with processed CRISM data. Users wishing to access the guest facilities are required to attend a training course, provided by the facility. The first of these training workshops was run in Summer 2009, with about half of the participants subsequently booking and using the facilities. A further workshop was held during EPSC 2013, and a third one is planned for June 2016 with support from the H2020 EUROPLANETS project. People interested in attending this future workshop should email the Data Manger Peter Grindrod (p.grindrod@ucl.ac.uk) for further information.

Case Studies: To date, the RPIF 3D facilities have been used to produce over 100 HiRISE DTMs, including 32 in support of ExoMars landing site selection

(e.g. Fig. 2), and over 150 CTX stereo DEMs, including 40 in support of ExoMars. Additional examples include DTMs of the possible Beagle 2 site, and numerous sites of potential water or ice activity at different times in Mars' history, which have now resulted in over 10 publications [e.g. 3-7].
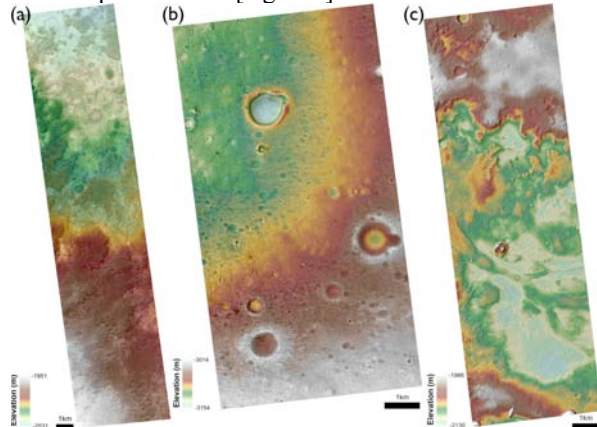

Figure 2. Example HiRISE DTMs produced in support of ExoMars landing site selection for (a) Mawrth Vallis, (b) Oxia Planum, and (c) Aram Dorsum.

Future Directions: The EU through its 7th Framework programme has supported a number of increasingly complex Mars data processing and dissemination research projects. Training for the newly developed tools to analyse and visualize the results of these projects will be offered through the RPIF. These tools include the PRoGIS 1.0 webGIS to display the aerographical location and view fulcra of the rover traverses [8] along with which frames to process into 3D geocoded products in a Mars co-ordinate system (Fig. 3), the PRoViP image processing system to process individual images or groups of rover Pancam or Navcam images or PRoGIS 2.0 [8] to display the thousands of Pancam, Navcam or Mastcam (for MSL) stereo panoramas or derived 3D products processed within the PROViDE project for all 3 NASA rover missions [9]. All of these data are stored locally within the RPIF-3D infrastructure and so can be viewed at much higher speeds than over the internet. It is also possible to set-off new processing jobs as each new PDS release takes place. The most important function within RPIF-3D requiring high-speed access to the large GPU cluster at MSSL which forms the new processing backbone in the RPIF-3D is a geological analysis tool called Pro3D® [10] which employs a GRID-based real-time rendering in 3D using HiRISE DTMs mixed with super-resolution restored 5cm HiRISE derived images [11]. An example of polygonal measurements is shown in Fig.4 demonstrating digitization of MER-B rover from a 5cm super-resolution HiRISE image. The EU-FP7 iMars project (http://www.i-Mars.eu) is currently

processing all CTX and HiRISE stereo-pairs into DTMs and ORIs (OrthoRectified Images) to embed within a webGIS for change detection using automated data mining and citizen science measurements for verification [12,13].
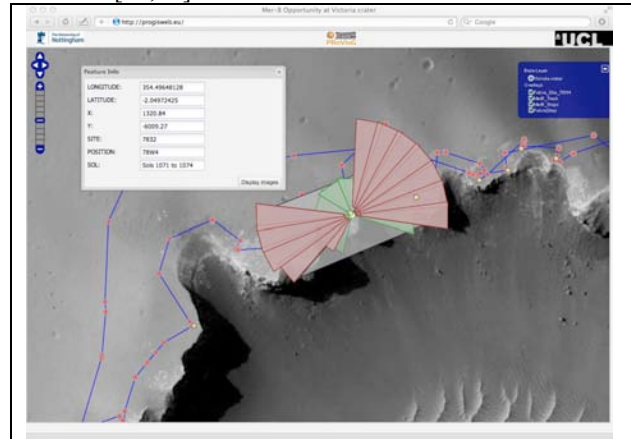

Figure 3. PRoGIS view showing Hazcam, Navcam & Pancam fulcra from a MER-B station at Victoria crater.
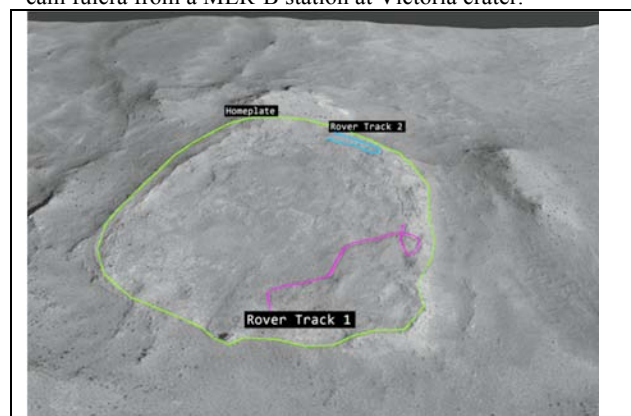

Figure 4. Pro3D® annotations of Homeplate on SRR=5cm

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