PDS ANALYST’S NOTEBOOK FOR MSL AND MER: INTERFACE UPDATE AND IMAGE DRAWING TOOLS. T. C. Stein1, R. E. Arvidson2, and F. Zhou3, 1Washington University in St. Louis, 1 Brookings Drive, CB 1169, St. Louis, MO 63130, tstein@wustl.edu, 2arvidson@wustl.edu, 3chow@wunder.wustl.edu.

Introduction: The PDS Analyst’s Notebooks (AN) [1] for Mars Science Laboratory (MSL) [2] and Mars Exploration Rover (MER) [3] provide integrated access to peer-reviewed, released data provided by the instrument teams, supported by documentation describing data format, content, and calibration and providing insight into why and how particular observations were made.

Data, documentation, and support files are incorporated on a daily basis into the science team’s version of the Notebook. This approach assists with data validation and builds on strong collaboration between data producers and PDS archivists that begins soon after mission selection with creation of the project data management and archive plans. The public version of the MSL and MER AN (http://an.rsl.wustl.edu) is comprised of peer-reviewed, released data and is updated coincident with PDS data releases as defined in mission archive plans. All data and documents have been ITAR cleared.

Observation planning and targeting information is extracted from mission science plans, including instrument settings and observation parameters. Source commands are linked with resulting data products, albeit with limits due to the absence of round trip data tracking.

In this paper, we focus on the updated user interface and Notebook organization as well as the addition of image drawing tools as a value-added component.

Interface Update: The Analyst’s Notebook has always been available as a set of web-accessible pages divided into main sections: mission, sol, search, map, resources, user settings/cart, and help. Prior to the latest update, each section was a separate web page, and switching between sections resulted in loss of current selections.

With the updated interface, the Notebook is transformed into a single-page web application (Fig. 1). While still accessed via a web browser, the Notebook operates as an application. Now the user may switch between sections without losing their selections. For example, a user might open a product detail page from Sol section. The product remains open when the user switches to traverse map or any other section.

Shifting from a set of web pages to a web application is straightforward conceptually, but the implementation is more challenging. The Notebook application is a combination of client-side and server-side code using both off the shelf components and custom code. The Progress Telerik DevCraft framework was selected as the basis for layout and windowing tasks, saving two...
developer FTEs. In-house efforts were devoted to developing the image analysis tools in the Image Viewer. Code reuse from the previous version’s individual web pages also saved resources.

Other development challenges in converting the AN to a web application included managing communications between Notebook components, optimizing page load speed, and providing visual feedback to the user for longer-running tasks.

**Image Drawing Tools:** The Notebook assists users with image analysis via the included Image Viewer. (The Image Viewer is accessed from an image product detail page by choosing Product views > Image viewer from the menu bar.)

Measurement tools provide location and distance measurements for images with stereo coverage from the Hazcam, Navcam, and Pancam instruments. In addition, elevation profiles may be created [6]. Data values are obtained from paired visible and XYZ archive data products generated by science teams.

Basic functions of the updated image viewer (pan, zoom, cursor pixel location) are available for all images. New drawing tools allow the user to add shapes and text to any image, regardless of stereo coverage (Fig. 2). Supported shapes are lines, arrows, rectangles, ellipses, polygons, and polylines. Text may also be added to images.

Drawing objects may be repositioned, resized, and deleted. Shape settings include fill color and opacity; line color, width, and style; label size and color.

All annotations are saved for later use and both measurement data and annotated images may be downloaded.

**Future Development:** A number of Notebook functions are based on previous user suggestions, and feedback continues to be sought. (User feedback should be submitted to an@wunder.wustl.edu or by using the online form.) Work continues to incorporate additional features, including user tutorials and data transformation.

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**References:**

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Fig. 2. MSL Hazcam sol 999 image FLB_486175319RAD LF0481570FHAZ00323M1 showing drawing objects, distance measurement, and elevation profile.