WorldWide Telescope Mars

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The NASA-Microsoft WorldWide Telescope (WWT) Mars project develops software that makes it easier for scientists and engineers to publish and access planetary geospatial data via the Internet. This includes both educational/outreach content aimed at the general public, as well as technical data aimed at the scientific community.

Microsoft's WorldWide Telescope

Microsoft's WorldWide Telescope application is available as both a stand-alone client for Windows systems and on other systems via browser (with the Silverlight plug-in). Originally implemented as a 'whole universe browser', WWT allows virtual exploration of not only the solar system, but also our galaxy and local cluster. Geo-browser functionality was added later. It was this functionality that Microsoft wanted to exploit by enhancing the model of Mars in WWT.

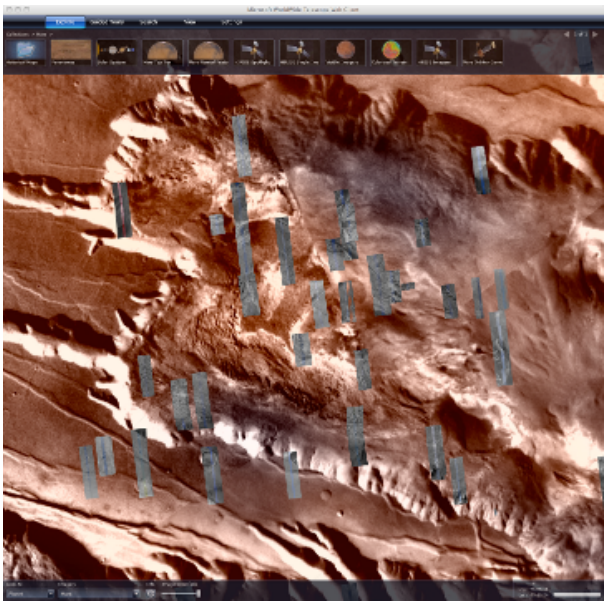

Figure 1: WWT Client

Images in WWT use the Tessellated Octahedral Adaptive Subdivision Transform (TOAST) projection, which models the planets surface as a hierarchical triangular mesh, producing a global image mosaic that is no more distorted at the poles than at the equator. This is a major advantage over digital globes that use cylindrical projections which badly distort images at high latitudes, making it inconvenient to view polar regions.

Another useful feature of the WWT client is its inclusion of a user-friendly authoring environment which allows users to create animated tours of the surface, to which captions, image overlays, and voice narration may be added. This feature has great potential benefits for education and public outreach.

WWT | Mars Implementation

To produce a Martian globe, we built an infrastructure and set of procedures for processing, storing, and serving NASA planetary data in a format the WWT client can display. We created a tool chain for building quadtree-based multi-resolution image mosaics from sets of high-resolution orbital imagery. We developed a Plate File software component for storing image tiles on a large distributed file system, optimized for retrieval speed. We also created software to manage the dispatch of processing jobs to a large cluster of independent processing nodes.

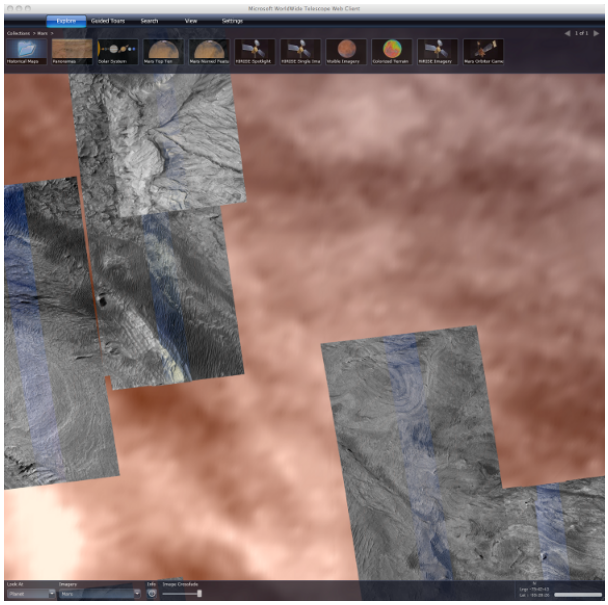

Figure 2: Zooming into a region of HiRISE images.

Using these tools and NASAs Nebula Cloud Computing Platform, we built global image mosaics from the

complete PDS archives of two Martian orbital imaging instruments: HiRISE and MOC Narrow Angle. Both global mosaics are available for viewing through the WWT client. It is important to note that we didn't just pick and choose a subset of these large data sets, but used all images available in the PDS at the time. This means that the HiRISE layer is essentially a 14 Terrabyte global image mosaic of full-resolution HiRISE images that you can browse and explore at will via the WWT client.

Meta-data for the images in view is also available, providing users information about the individual images and links to the corresponding PDS products.

We also used the tour creation facility to produce two tours narrated by Carol Stoker and Jim Garvin. These and many other tours of Mars are available to anyone via the WWT client interface.

Summary

Large mosaics of planetary imagery that can be easily displayed and navigated are a tremendous exploratory tool for both scientists and the public. Users can easily browse from one area to another, but also delve down to the meter-scale resolution that these data sets provide.