

PIGWAD: CONTINUING TO OFFER GIS SERVICES TO THE PLANETARY COMMUNITY. T. M. Hare and K. L. Tanaka, U.S. Geological Survey, 2255 N. Gemini Dr., Flagstaff, AZ, 86001; thare@usgs.gov.

Introduction. Planetary Interactive GIS on the Web Analyzable Database, or PIGWAD, has been online for nearly five years. During this period, GIS web technologies have evolved at a furious pace and will continue to do so. For our on-line GIS mapping sites, we will continue to use the technology called ArcIMS, by Environmental Systems Research Institute (ESRI). We have also just implemented a Java front-end called Maplicity, by Telemorphic. This abstract will focus on our current progress, new changes we will implement this year, and ideas for future functionality (see [1] to compare the status of PIGWAD one year ago).

Developing On-Line GIS Technologies. ArcIMS is being used by thousands of facilities because of its ability to adapt to multiple on-line projects and its ability to serve its maps across the Internet in stand-alone GIS packages like ArcExplorer and ArcMap (also by ESRI). ArcIMS also supports Open GIS technologies defined by the Open GIS Consortium (OGC). These products will let us generate on-line services that can be incorporated into any application that supports this open standard. Furthermore, the out-of-the-box ArcIMS solution has been plagued with incompatibilities across some operating systems and Internet browsers. To help overcome these issues and include more functionality, we invested in Maplicity.

Maplicity is completely written in Java and has good cross-platform compatibility. In addition to this benefit, it offers a powerful GIS interface. Unlike most live GIS sites, the characteristics and drawing order of the layers are static. The Maplicity interface allows the user to reorder the layers, label the features, change the legend colors, set the field the legend is based on, and alter the legend type (using equal-interval, quantile, or natural breaks

for color scaling of quantitative data). The user has the ability to draw graphic points, lines, polygons, or text and change their properties and colors. These graphics can then be used to intersect the other vector layers. Image processing and visualization tools are integrated, although, querying the raster pixel value is still not supported. Once the user is happy with the image enhancements, the georeferenced image can be saved locally. The visualization tools made available are stretching, image overlay, swiping, blending, fading, merging, the ability to change the band order, and image morphing.

Current PIGWAD Tasks. Along with our online mapping pages, we will continue to convert published geologic maps into GIS compatible files. Our priority for this task will be to focus on Venus geologic maps. This process mainly involves using the Map Publisher plug-in by Avenza for Adobe Illustrator. This program converts vector features into GIS shapefiles with tabular attributes. Once we feel comfortable and have optimized our procedures using Map Publisher, we will place a tutorial online.

Another goal that has been deemed a priority for the PIGWAD project is to generate a tool to help define planetary projections for the application ArcMap. An ESRI employee created a tool similar to this for ArcView 3.x with input from Brown University and the USGS. This program is widely used, and the same functionality is desired for the ArcMap. Additional new capabilities will be available upon implementing this package. The older ArcView 3.x programs could only project vector files that were in geographic coordinates. ArcMap has the ability to reproject vector

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shapefiles and raster files in different projections into a common projection. While this is extremely powerful, more potential pitfalls have to be addressed.

A new on-line planetary GIS discussion website has been added this year. This site allows researchers to post questions about using GIS software or inquiries about planetary datasets. This was implemented both as a resource for the planetary researcher and as an aid to help us produce a site that can answer many of the common questions new users have with GIS software. Thus far, we have published more than twenty common questions ranging from, "What software packages can use planetary data?" to, "How to convert many of the new martian datasets that have been recently released." Once we or other users have answered the question, the community can then view the posed questions and answers.

Other plans for this year include generating online services for Ganymede and Io. For the planetary bodies we already support, namely Mars, Venus, and the Moon, we will also provide north and south polar stereographic views. Viewing the polar regions in their current on-line projection, simple cylindrical, is clearly problematic.

The Future. As stated before, the development of on-line GIS capabilities is rapidly accelerating. This activity will eventually provide users with tools that are more powerful yet easier to use. We will continue to investigate implementing tools such as database engines that can quickly display and work with extremely large datasets, which obviously is a current and forthcoming need with new planetary data sets. Other tools, like Maplicity Enterprise, enable on-line cooperative digitizing and attribution. We also have the ability with the ArcIMS toolset to employ a metadata-serving site. This allows the user to quickly search a geographic area for digital data from multiple websites. If the data exists in an online map service, the user will have

the ability to instantly start using the data. We therefore will strive to foster collaborations with appropriate sites.

PIGWAD continues to grow with the GIS Internet technologies and will be an exciting and fundamental tool for planetary researchers to use as the functionality continues to increase. We invite community input into how PIGWAD develops to meet the needs of planetary scientists.

[Any use of trade, product, or firm names is for descriptive purposes only and does not constitute endorsement by the U.S. Government.]

References. Hare T. M. and Tanaka K. L. (2002) PIGWAD–OpenGis and Image Technologies for Planetary Data Analysis, *LPSC 33*, Abstract #1365, 2002.

Additional Information. The PIGWAD website can be found at the following address: <http://webgis.wr.usgs.gov>

