

DIGITAL MAPPING TECHNIQUES 2013

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The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2013)

<http://ngmdb.usgs.gov/info/dmt/>

Semi-Automated Base Map Creation – A Summary

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The Indiana Geological Survey (IGS) creates unique 7.5-minute quadrangle base maps from recently updated data sources for its geologic mapping program. To keep these maps updated with the most current data, we incorporated ideas and automation techniques discussed at the 2012 Digital Mapping Techniques (DMT) presentation, “Making the US Topo – A Process Discussion,” to automate aspects of base map creation with ArcGIS geoprocessing models and Python scripts.

In the past the IGS created custom base maps for geologic maps in conjunction with compiling the final product for publication. Today we build the base maps as soon as we know the boundaries of upcoming STATEMAP deliverables. This new workflow not only allows us to provide up-to-date maps for the geologists to use in the field, but, when the geologists complete their interpretations and modeling, we can quickly overlay the new geologic data onto the base maps. Since this presentation we are creating base maps county wide as we publish our final county map compilations at 1:48,000 scale. Although we have not yet revised our geoprocessing scripts to be able to clip at the county extent, we plan to do so in the near future.

Creating our own custom base maps also allows us to use the most recent GIS data for the state of Indiana. These data include county road centerlines, local resolution hydrography (when available), and 5-ft DEMs (when available), created from the 1.5-meter post spacing LiDAR data. (Currently all of Indiana has LiDAR DEMs available at 5-ft resolution.) Vector data sets are loaded into an ArcGIS geodatabase, which is used as the data library. These data are then clipped and exported with Esri Model Builder and Python scripts to individual ArcGIS geodatabases associated with the 7.5-minute quadrangle we are building. In addition to the vector data, we create contours, both regular and depression, using Python scripts from a statewide mosaic of 5-ft DEMs for the map extent. Once the vector data have been clipped and exported to the new ArcGIS geodatabase, a script then updates all data references in a prebuilt ArcGIS Map document (MXD) to this new ArcGIS geodatabase with pre-styled layers. This MXD is then set to 1:24,000 scale so the user can export the vector data to an Adobe Illustrator (AI) file for final styling and type placement. We also export two raster data sets (grayscale TIFFs)—hillshade and slope—that are created from the 5-ft DEMs. At present, we create these two images manually using the Image Analysis window. In the future we hope to build a script for this step.

The exported AI file is then loaded into a preset AI template containing graphic styles for FGDC cartographic standards and custom IGS styles for our base maps. The cartographer applies styles and adjusts type as needed. The hillshade and slope TIFFs are opened in Adobe Photoshop and merged together with predefined styles and opacity settings to create the background shading for the map. Once the styling and type adjustments are complete and the shading has been placed into the AI file, the cartographer creates the layout file in Adobe

InDesign. The map is now ready for use by the geologists in the field and for incorporating the final geologic unit polygons, labels, contacts, and other mapped data for various projects.

This is a brief summary of the process. We estimate that, from start to finish, we can create a base map in approximately 5 hours and create layouts in approximately 2 to 3 hours. Please refer to the “Semi-Automated Base Map Creation” PowerPoint presentation on the DMT website (http://ngmdb.usgs.gov/Info/dmt/DMT_presentations.html) for detailed information on scripting and for examples of 7.5-minute quadrangles created using this technique. We recently modified our Model Builder and Python scripts, incorporating suggestions from Charlie Frye* of Esri and to clean up commenting and unneeded steps. The IGS will provide, upon request, our Model Builder and Python scripts, which users can modify to fit their needs.

* We also thank Charlie Frye from Esri for pointing out a faster way to tag depression contours when using the “select by location” window.