

Digital Orthophoto Quadrangle (DOQ) FILES

March 15, 2002

DEFINITION – A digital raster (pixel based) image of an aerial photograph in which displacements caused by the camera and the terrain have been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. The digital image is rectified by processing each image pixel (picture element) through equations using ground control points that can be identified from photographs, camera calibration, and orientation parameters, and a digital elevation model (DEM).

USES: DOQs can serve as backdrops for vector data such as Digital Line Graphs (DLGs), Topologically Integrated Referenced Geographic Encoding and Referencing (TIGER) Line files and Soil Survey Geographic Database (SSURGO) files. Because of their consistent coverage of large geographic areas (statewide/ regional coverages, service boundaries, transmission and distribution corridors, floodplains, watersheds, etc.) they are of benefit to the private sector, local governments and regional planning commissions for resource management.



Example DOQ File.

SPECIFICATIONS: The DOQ is either black-and-white (BW), or color infrared (CIR). It represents one U.S. Geological Survey (USGS) 7.5 minute quadrangle. The Digital Orthophoto Quarter Quadrangle, (DOQQ) represents one quarter of the quadrangle. The names are based on that of the 7.5-minute quad, followed by NE, NW, SW, or SE for the DOQQ. The DOQQ's scale is 1:12,000 scale or 1"=1,000' , with 1 meter pixel resolution, and accuracy of +/- 33 feet. The state of Ohio is covered by 3084 DOQQs.

COORDINATE SYSTEM: The standard quadrangle image is based on the Universal Transverse Mercator (UTM) coordinate system based on the North American Datum of 1983 (NAD83). Each image has between 50 and 300 meters of overedge to facilitate matching of adjacent images. See the

documentation available at <http://rockyweb.cr.usgs.gov/nmpstds/doqstds.html> for a discussion of datum and projections used in DOQs.

FORMAT: DOQs are available in three formats, Native, GeoTIFF and MrSID image format. Native format is composed of BIL or BIP files, standing for Band Interleaved by Line, and by Pixel, respectively. Further information on GeoTIFF software specifications can be found at: <http://mcmweb.er.usgs.gov/sdts/geotiff.html>.

MrSID (for Multi-resolution Seamless Image Database) is used because DOQs are quite large - 50 Mb for the BW and 150 Mb for CIR. A DOQ in MrSID image files is less than 2 Mb at a 25:1 compression ratio.

SOFTWARE: Native, GeoTIFF and MrSid formats can be read by ArcView 3.2. Two freeware programs for Windows 95/NT/2000 can read DOQs in Native and GeoTIFF format. These are DLGV32, available at <http://mcmcweb.er.usgs.gov/drc/dlgv32pro/> and MICRODEM, available at <http://www.usna.edu/Users/oceano/pguth/website/microdem.htm>.

MrSID GeoViewer can be downloaded, free of charge from <http://www.lizardtech.com/>.

AVAILABILITY: The availability of DOQs in the United States can be located at: http://mcmcweb.er.usgs.gov/status/doq_stat.html. USGS offers Native and GeoTiff files on CD, DVD, 8mm, as well as through File Transfer Protocol (FTP). To order DOQs online you will need to visit <http://earthexplorer.usgs.gov>. The price for a B/W 3.75-min. is \$7.50 and \$15.00 per file for a CIR. The B/W 7.5-min. is \$15.00 per file. Ordering online includes a \$5.00 handling fee and \$30.00 base charge per order.

Ohio DOQs in MrSID format are available from OGRIP/GIS Support Center. These are available statewide. These files are projected to State Plane coordinates. Only black and white DOQs are compressed with MrSID format. You can obtain these files free of charge from <ftp://ftp.geodata.gis.state.oh.us/geodata/doqq/>

Data files are provided using a specific naming structure that includes: prefix + geodata type + FIPS zone + file extension (i.e., ca201se3402.sid or .sdw). To download the appropriate files for your location in Ohio you will need to read the doq_index.txt and 24k_idx.pdf file. Refer to the 24k_idx.pdf file

and determine the map name within your county. Refer to the table within the doq_index.txt file and locate your county and the map name for the necessary FTP directory and prefix.

REFERENCES: Documentation and sample images can be found at:
<http://www.state.oh.us/das/dcs/gis/doqq/>
<http://mac.usgs.gov/mac/isb/pubs/factsheets/fs05701.html>
<http://www-wmc.wr.usgs.gov/doq/>
<http://mapping.usgs.gov/www/ndop/>
<http://ask.usgs.gov/photos.html>

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