

GeoPDF Map Files

All Regional Digital Maps on One DVD

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Five years ago the National Geospatial-Intelligence Agency (NGA), in conjunction with private industry, began developing a geospatial portable data format (GeoPDF)—a new Adobe® Acrobat® file format. The GeoPDF provides a more efficient way to use and print digital map displays. NGA is preparing to create GeoPDFs for every map it produces so Soldiers can access maps using the free Adobe Reader® and free third-party plug-in (TerraGo Technologies™ MAP2PDF™) for the Adobe Reader. This technology is being used to make file sizes for electronic map displays much smaller than NGA standard map display files.

The United States Army Engineer Research and Development Center's Topographic Engineering Center (ERDC-TEC) is now using this technology to build Unclassified/For Official Use Only digital map displays for regions of the world where the Global War on Terrorism is being fought. The GeoPDF files are very small (most range from two to ten megabytes per map) and are usable on any personal computer with Adobe Reader and the free plug-in software. The digital display on the computer remains crisp and clear as the user zooms in to look at the map in more detail—unlike Compressed ARC Digitized Raster Graphics (CADRG). The GeoPDF maps can also be printed on letter-size paper (not to scale) or printed to scale on a plotter.

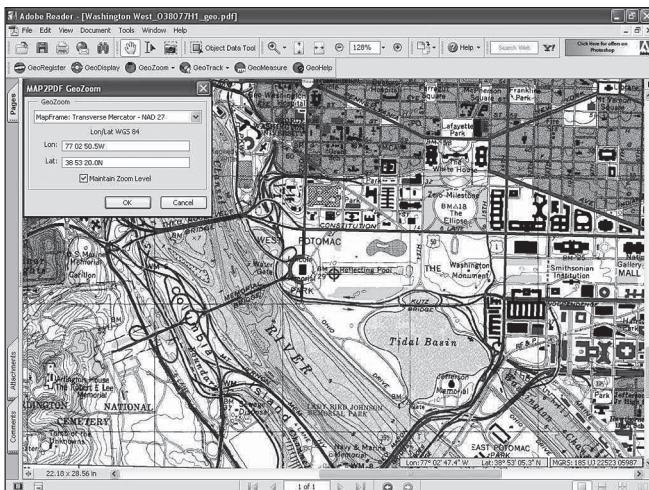


Figure 1. Adobe Acrobat GeoPDF map of Washington, D.C., with the latitude and longitude displayed, as well as the Military Grid Reference System (MGRS) coordinates

All of the NGA standard maps for an entire country can now be loaded on a single digital versatile disc (DVD) using this technology. These products can be ordered from ERDC-TEC by mail or downloaded through ERDC-TEC's public key infrastructure (PKI) Web access, secure Internet protocol router network (SIPRNET), or the Joint Worldwide Intelligence Communications System (JWICS).

Map Display Technology in Battle Command

Digital map displays have been used for several decades to support battle command systems. Standard formats for digital map displays were developed by the Defense Mapping Agency, now part of the NGA. Geospatial software technology enabled Soldiers to use digital map backgrounds which were stored on compact disc (CD) media and hard drives. One map display format, ARC Digitized Raster Graphics (ADRG), provided a clear view of the scanned map in computer displays, but file sizes were so large that few maps could be loaded on a single CD. CADRG was developed as a new file format using compressed ADRG, with some loss in content, to load more map background files on a single CD, thereby using less hard drive space. CADRG files are much smaller than ADRG, but the digital map display becomes blurry as the user

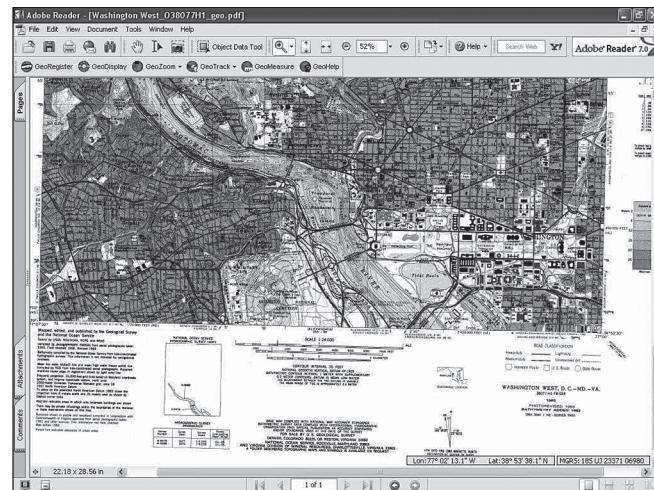


Figure 2. The same map, zoomed out with margin information such as scale, legend, and declination constant

zooms in to see more detail. Some users still require the old ADRG format because of the need for better resolution. Both CADRG and ADRG are the primary map background file formats that are used today in most automated battle command systems.

A few years ago, an NGA leader in St. Louis, Missouri, saw the potential for using Adobe Acrobat to create digital map display files that were more useful and accessible than CADRG, with better resolution when users zoom in for a closer look. GeoPDF technology was developed during this period. The resulting GeoPDF file retains the geocoordinates of the map background, as well as marginal features and legend information. GeoPDF files can be readily printed with a desktop printer or to scale with a plotter.

There are two types of GeoPDF files: raster and vector. Both file types provide a scalable display of the digital map with crisp, clear delineation of roads, rivers, contour lines, and other features. The vector GeoPDF has an added function that enables the layers to be turned on and off as needed to analyze a map display based on the user's needs.

Production and Availability of GeoPDF Files

NGA uses GeoPDF technology for a variety of map display applications, but this new format is still a nonstandard product so it was not mass-produced. The ERDC-TEC Operations Division has collaborated with NGA on the development and use of this technology. ERDC-TEC is presently building digital map displays in GeoPDF for required standard NGA maps in theater. ERDC-TEC now produces a series of DVDs that contain all required NGA maps in various regions.

Copies of these GeoPDF products can be obtained by contacting Ray Caputo at 703-428-6784 or <raymond.g.caputo@erdc.usace.army.mil> or by downloading GeoPDF files from the ERDC-TEC PKI Web site using a common access card (CAC) at <<https://tsunami.tec.army.mil/Products/MapArchive/>>. The files are also available via SIPRNET at <www.tec.army.smil.mil/Products/MapArchive/> and JWICS at <www.tec.army.ic.gov/Products/MapArchive/>. NGA GeoPDF files can be obtained via SIPRNET at <www.nga.smil/products/echart/> and via JWICS at <www.nga.ic.gov/products/echart/>.



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