

Computer Mapping Software & Websites¹

Google Earth Outreach Tutorials (<http://earth.google.com/outreach/tutorials.html>). All the “how-to’s” for using Google Earth, from the basics, to working with GPS data, to coding for advanced users.

Earthpoint. Earthpoint is a private company that converts geographic layers into Google Earth format. They provide two free services that are valuable to forest owners. The first is a public land survey system overlay containing townships, sections and quarter sections. This layer can be helpful when determining property boundaries (see <http://www.earthpoint.us/Townships.aspx>). They also provide an area calculator for Google Earth. The free version of Google Earth doesn't allow you to measure area but by copying and pasting a Google Earth polygon into the Earthpoint website, you can see the area and perimeter of the region. This tool along with directions is found at: <http://www.earthpoint.us/Shapes.aspx>

GEPATH (<http://www.sgrillo.net/googleearth/gepath.htm>). GEPATH is a standalone downloadable freeware program that allows you to load and manipulate Google Earth files (.kml files). You can determine area and perimeter of polygons, create regular grids, perhaps for an inventory grid, and many other more advanced functions. GEPATH also easily transfers data between, Google Earth, and Excel spreadsheets.

DNRGarmin (<http://www.dnr.state.mn.us/mis/gis/tools/arcview/extensions/DNRGarmin/DNRGarmin.html>). This free program developed by the Minnesota Department of Natural Resources allows you to download data from your Garmin GPS into Google Earth or ArcGIS and also to upload data from Google Earth or ArcGIS into your Garmin GPS.

SHP2KLM (<http://www.zonums.com/shp2kml.html>). This stand-alone downloadable program allows you to easily convert shape files (formal GIS system files) into the .kml format so they can be viewed in Google Earth.

Google Earth Topographic Map (<http://www.gelib.com/ng-topo.htm>). Topographic maps can be viewed at different scales as you zoom in. Open up Google Earth. Then open up a browser, go to above web site and click “Download with Google Earth.”, the KML file will load to your temporary places.

USGS Online Mapping A great resource for GIS data (<http://nationalmap.gov>). This website can also be used to produce simple maps utilizing USGS spatial data. Can also download standard USGS topo maps here.

INSIDE Idaho (<http://inside.uidaho.edu>). The official geospatial data clearinghouse for the State of Idaho. INSIDE Idaho serves as a comprehensive geospatial data digital library, providing access to, and a context within which to use, geospatial data and information by, for, and about Idaho.

Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov>). This is a digital version of the Natural Resource Conservation Service soil survey books. This website allows you to produce custom soil reports complete with soils maps and a wealth of data relating to the soil types.

MyLandPlan (<http://mylandplan.org>). A forest management planning resource for forest owners provided by the American Forest Foundation (AFF) (of which the American Tree Farm System is a part).

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County Mapping Programs. Some Idaho counties have mapping data available online. To see one of the better examples, go to Kootenai County's site: <http://www.co.kootenai.id.us/departments/mapping> . The "KCEarth On-Line Mapping Tool" is particularly user-friendly (note, this requires installation of Microsoft Silverlight).

Free, open-source GIS programs. There are many freely available open-source GIS programs available to download. The three listed below are all fairly user-friendly and feature many plug-ins to view, analyze, manipulate, and display geospatial data from a variety of sources:

- Mapwindow: <http://www.mapwindow.org>
- Geographic Resources Analysis Support System (GRASS): <http://grass.fbk.eu>
- QuantumGIS: <http://www.qgis.org>

Links to sites with geospatial content:

- **Geospatial Technology Community of Practice (eXtension)** (http://www.extension.org/geospatial_technology). Provides a wide variety of content on geospatial technology from many different land grant universities. Also has an "Ask an Expert" feature where you can get a question answered within 48 hours.
- **Society of American Foresters Remote Sensing Toolbox** (<http://www.safnet.org/fp/gis.cfm>). This site has a wide variety of articles for varying skill levels regarding geospatial issues. Some of the articles may require SAF membership for access.
- **Inventory and Mapping: A Beginner's Guide to Basic Inventory and Digital Mapping of Nontimber Forest Products on Small Private Forestlands.** (<http://www.ntfpinfo.us/publications/index.html>) A guide to help landowners conduct a basic inventory of their nontimber forest products and digitally map the data using Google earth. Techniques can also be used to inventory and map other forest resources (e.g. wildlife snags).
- **"Mapping Your Land: An Overview for Landowners"** (www.lpsdl.auburn.edu/pdfs/MappingBook_FINAL.pdf). Twenty-page downloadable booklet produced by Auburn University designed for beginners with tutorial information on Google Earth; Web Soil Survey and Geospatial Data Gateway(both from the USAs NRCS); Alabama Historic Aerial Photo Archive from the University of Alabama; and CanVIS from the USDA National Agroforestry Center.

By David Hughell

A major challenge for sustainability certification programs is the quantification of human impacts on biodiversity and natural ecosystems. To address this challenge, the Rainforest Alliance is piloting a Natural Ecosystem Assessment (NEA) methodology, which involves the mapping of natural and semi-natural (e.g., agriculture) land cover pre- and postcertification. This article describes our experience using Android tablet computers in conjunction with OruxMaps software to assist with this land-cover mapping activity in cocoa landscapes in Ghana and Indonesia.

Given recent advances in tablet computers running Google's Android operating system and the proliferation of these devices, we felt that the time was right to test whether these tools could support our field mapping activities. The desired functionality we wanted from our Android tablet computer was:



Rainforest Alliance uses OruxMaps on its Android-based tablet computers for land-cover mapping projects in Ghana (screen) and Indonesia (photo).

- Mapping software that works while not connected to the Internet
- The ability to show display track and location in a map
- Storage of geotagged notes
- The ability to overlay customized data and third-party imagery
- Low cost
- Easy to implement for someone without experience in GIS

In our search for the right tablet mapping software, we looked at several alternatives. Esri's ArcPad would enable us to edit geographic features, but we felt it was too expensive and sophisticated for people without GIS experience. In our assessment of Google Earth, we quickly discov-

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ered that the Android (tablet) version does not have all the functionality of the Windows (laptop) version. Most notable is Google Earth for Android's inability to create waypoints and tracks. In both the Windows and Android versions, the places visited in Google Earth are cached locally on the computer or tablet while online, permitting use of maps while offline. However, the ability to manage this cache is limited, which increases the risk that the cached data will be lost as new data are added.

In Aceh, Indonesia, the desired high-resolution imagery was available through Google Earth, whereas in western Ghana, it was necessary to purchase WorldView imagery to obtain the resolution required for land-cover mapping. We tried to use Google Maps Engine to serve up our WorldView imagery into Google Earth, but were not successful.

OruxMaps

After researching and testing several other Android mapping applications, we selected OruxMaps (www.oruxmaps.com). This public-domain Android application is well documented (in English, Spanish, and French) and is easy to use, versatile, and, most important, meets our requirements as mentioned above.

When you launch OruxMaps, you are given the option to either "Map online" or "Map offline." In the online mode, you have access to 36 online basemap sources, including Google Maps, Google Earth, Microsoft Earth, Microsoft Map, and OpenStreetMap. My favorite feature of OruxMaps is its ability to create maps from these basemaps and store them locally for use in the offline mode. To create a map for offline use, you first launch OruxMap in the Map online mode, select the desired basemap source, and pan/zoom to the area of interest. You then select the Map Creator tool, identify the desired geographic extent, and select the desired zoom levels (from 0 to 20). The map is then downloaded and stored in the mapfiles folder on the tablet and can be copied to other Android tablets. OruxMaps is customizable, and allows maps to be stored and accessed directly on an SD card to save space on the tablet. One limitation is the inability to download maps larger than 500MB.

Once you create a map, you can access it in the offline mode. While working in the offline mode, OruxMaps automatically swaps stored maps as you travel from one map extent to another.

Vector Data and Imagery

The easiest way to display land-cover polygons (e.g., digitized in a GIS from high-resolution imagery) in OruxMaps is to store the vector data in KML/KMZ format on the tablet and then use an Android browser to locate and open this file. When attempting to open the file, you are prompted to select the mapping application to display the data—select OruxMaps from the available options. Initially, we were unable to display polygon data, but this problem was solved after we upgraded to version OruxMaps 4.8. [As of mid-December, version 4.8.61 was available, which reportedly "Solved some bugs with kml files." The previous release, 4.8.60, added "Support for Garmin .img maps (not locked)."]



OruxMaps software running on Android tablet computers helps foresters map cocoa production in Ghana.

We found that the most challenging part of using OruxMaps was the conversion and tiling of satellite imagery. For this we used the third-party program MAPC2MAPC (www.thethorns.org.uk/mapping/). In conjunction with the MAPC2MAPC program, we also had to download and install "FWTools Listgeo.exe" to process geotifs (<http://dl.maptools.org/dl/geotiff/libgeotiff/>). The maximum size of geotifs that the MAPC2MAPC program can handle is around 1 GB, making it necessary to split

.db,.xml" option from the Write Mobile Atlas menu. The subsequent sequence of screens will prompt you to select the tiles to be displayed at each zoom level. Once the image is processed, you can copy the output to the tablet's Oruxmap "mapfiles" folder.

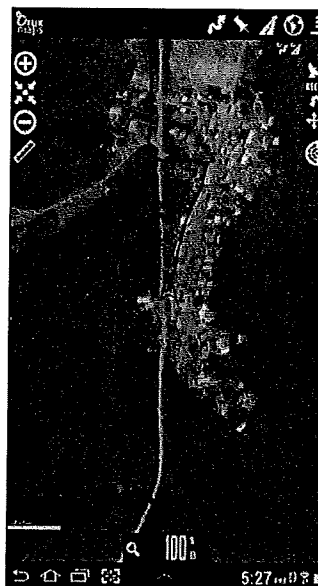
Photo Waypoints

In addition to the standard GPS functionality of showing locations and creating tracks and waypoints, OruxMaps provides the option of creating photo waypoints. We found these extremely useful for creating photos that documented the vegetation cover encountered at specific locations. You can download tracks and waypoints as KML/KMZ files for viewing in Google Earth.

I have described the OruxMaps features that we found most useful for our specific needs, but the app has many more features, such as tools for measuring distances and calculating areas. Remember that, even though this application is available for free, it is always a good practice to recognize the successful efforts of a developer by making a donation.

Applications for tablet computers are advancing quickly, with one application leap-frogging another in its ability to provide useful functionality. Right now, OruxMaps is our preferred application. However, we will be watching carefully to see how the field of tablet mapping applications evolves.

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images larger than 1GB into smaller pieces with a GIS software and then convert separately.

Once the MAPC2MAPC program is launched, you select the Open Calibration option under the Files tab and select the geotif file to be converted. This takes several minutes, after which you are asked to select the projection (e.g., UTM zone) and the datum (e.g., WGS84). To execute the conversion, select the "Orux sqLite

Want More GIS for Foresters?

To read past installments of the *Source's* GIS for Foresters column, visit the "Remote Sensing and GIS" web page in the professionals area of the SAF website at www.safnet.org/fp/GIS.cfm.