iPad Apps for Geosciences

Notes on iPads in general:

Both the original iPad and the iPad 2 come in two versions, one that has only Wi-Fi connectivity and one that has both Wi-Fi and cellular connectivity. The only version to purchase is the Wi-Fi & cellular capable one, which, unfortunately, is the more expensive one. The key reason for this is that this version is the only one with a GPS chip in it. The other reason is that many of the apps used in the geosciences download maps from the Internet and need a connection to work. In the field, or traveling, the cellular connection is invaluable.

iPad 2 has two features that set it apart from the original iPad for use in the field, classroom and lab.

- camera
- ability to mirror screen to data projector or large screen TV/monitor

These two features are missing from the original iPad .

There is no camera of any kind. Some people have hooked up USB web cams using the optional camera connection kit that allows for connecting an SD card or a USB device to the 30-pin dock connector on the iPad. When Apple updated the iOS to 4.x.x part of the update changed the supplied voltage at the dock connector and **some** USB devices that previously worked via the camera connection kit no longer did following updating the iOS. If you wish to upload images from an SD card you need to purchase the **camera connection kit** that provides both a port for an SD card and a USB connection.

On the original iPad the ability to send data out to an external monitor/projector is entirely dependent on the individual app and if the author/programmer put this functionality in the app. Unlike when Steve Jobs introduced the iPad it is not possible to mirror the home screen or apps not configured by the author/programmer for output to an external monitor. Lots of people were very upset when they discovered that in his introduction he was using a customized iPad that had functionality that the iPad you could actually purchase did not. This has been addressed in the iPad2. The iPad2 mirrors everything that is on the screen to an external monitor. To use this function you need to purchase a **dock to VGA** or **dock to HDMI** cable.

The iPad2 comes in three versions, a Wi-Fi only version, which does not contain a GPS chip and two cellular versions, one compatible with AT&T and one with Verizon. Which you choose does matter because they are cellular supplier specific and cannot be switched.

In the US, Verizon appears to have better coverage in more rural areas than AT&T although this is changing on a daily basis. For good functionality you should be connected to a 3G (third generation) cellular network or a high speed Wi-Fi system. In urban areas/airports/major road systems (NYS Thruway, Mass Pike, etc) both AT&T and Verizon have good coverage.

If you intend to travel internationally with your iPad2 another factor comes into play. The Verizon version of the iPad2 does not use a SIMM chip but rather has a hard-wired cellular chip. The AT&T version has a SIMM card and according to an Apple Store representative I spoke with, this SIMM card can be switched at an Apple Store or cellular service in a different country to allow you to use the iPad2 on that countries cellular system. The original iPad only works with the AT&T cellular network so has a SIMM card.

I have not tested this international capability with the iPad, but travels to Egypt, Iceland and South Africa with a SIMM based international cell phone and Vodafone modem outlines the procedure. The cell phone, originally purchased in Iceland has been repurposed in both Egypt and South Africa by simply visiting the Vodafone store in each country, purchasing a cellular plan with a SIMM card, switching the SIMM card in the phone with the new one and activating the service. All of this is done in the Vodafone store in less than 15 minutes and additional minutes can be added to the cellular plan at any time with just a 5-minute stop at a shop. In Egypt we purchased a Vodafone USB cellular modem that plugs directly into a USB port on a Mac or PC and gives you instant access to the Internet over the Egyptian Vodafone cellular network, including deep in the Western Desert. This modem also uses a SIMM card. In Iceland we tried to purchase a SIMM card for the modem at the same time we updated the card for the cell phone. Unlike Egypt, Iceland limits access to the Internet via the cellular network by allowing only Icelandic citizens to purchase SIMM cards for these modems. In this case our connection to the Internet was limited to finding Wi-Fi connections, which are readily available in Reykjavik, but less so in the more rural areas.

AT&T and Verizon (in the US) do offer international plans but they are very expensive.

iPad Apps, not in any particular order of grouping:

There are lots of apps out there with more being added every day. On this list are apps that I have found or been pointed too. I have not fully explored all of them. Apps are updated on an irregular basis and some loose functionality with updates. I take the reviews with a grain of salt. Many of these are free or cost 1-5 dollars so I'm willing to take a chance and explore them for myself. All the names have been tested in the App Store (6/8/11).

GISRoam – allows access to GIS data created in the office on iPad. App is free but requires subscription to access server to transfer data.

Avenza PDF maps- geospatial PDF reader. Extensive downloadable georeferenced maps including all US 2400 7.5 minute topo quads and Canadian NRC topographic maps as well as Cities, National Parks, etc.

MotionX GPS HD and MotionX GPS Drive HD- GPS and map apps. Drive version creates a road navigation route to a given address or location. Lots of functionality and updated on a regular basis.

Tasa Geology- geotimescale enhanced HD-geologic time scale

Quakewatch- real-time updated global earthquake data with maps of location, magnitude and link to USGS data pages

ESRI ArcGIS-ESRI ArcGIS for iPad, not a great deal of functionality

HurricaneHD-hurricane tracker using real time data feeds from NOAA along with weather data, satellite imagery, etc. Stunning graphics

iGeology-British Geologic Map of the British Isles.

iGeoLog-app for drawing geologic (stratigraphic) sections in the field (just found this one, new March 2011)

Earth Observer-Columbia University, lots of data on a global map interface including bathymetry

iSeismograph-uses iPad internal accelerometer to graph x,y,z motions

Coordinates-Hunt Mountain Software-displays GPS location in multiple formats

Geology NY-Integrity Logic- layered maps for multiple states. All data contained in the app, no network connection needed to view data. www.integrity-logic.com

GeolCompass-Tecton Software-strike/dip compass

GeoID-geo compass, stereonet, failure analysis

Lambert-another geo compass with stereonet capability

Strike and Dip- Hunt Mountain Software-strike and dip, location, elevation

Emerald Observatory for iPad-astronomical data, spectacular graphics

Star Walk for iPad-map of the sky, winner of multiple awards.

Moon Globe HD-lunar map

NASA App HD-space imagery

3D Sun&Moon Compass HD-Sun and Moon visualization 3D compass

Google Earth- a must have

Commander Compass – milspec compass – GPS tracker – maps-compass overlies satellite images, maps, etc.

QuakeWarn HD-earthquake notification app

Glossary of Geology-$29.99-AGI Glossary of Geology - expensive but very useful reference

New map apps 6/14/11

You Need A Map & Scenic Map Eastern USA, Central and Western USA- free (You Need A Map) and $10.00/each (Scenic map series). These are large files, almost 2 GB but all the data is downloaded to the iPad, so no network connection needed, works when flying and iPad is in Airplane Mode. Works with GPS and includes topography, hillshades, contours and detailed roads. Purchased versions include better detail than free version.

iPad2 only – need the internal camera:

Theodolite HD- augmented reality, image from camera overlain with GPS coordinates, compass, and inclinometer. Capture can be of image or of screen with image and all associated data

Photosynth-Microsoft-panoramic photo creation

Non Geo Apps but really useful:

GoodReader for iPad-PDF reading software, great interface for downloading PDFs from web/e mail

Converter Plus-convert just about units (including furlong/fortnight)

EMD PTE-periodic table of elements

Wi-Fi finder-finds free or paid Wi-Fi locations and maps them, can save data for use later

Multi-Measures HD- multiple measuring tools, stopwatch, timer, protractor, seismometer, level, ruler, etc

PCalc RPN Calculator-feature rich calculator with lots of options and lists of constants

MyCalculator Pro-graphing calculator

iSurface-converts iPad to whiteboard

World Clock Pro- multi time zone clocks

Sun Seeker-compass with sunrise/sunset data for location

SketchBook Pro for iPad-drawing app of the year-takes getting use to

TouchDraw- allows import of background photo to annotate

FlightTrack-live flight statistics-great for checking on flight status, weather issues, etc.

ForeFlight Mobile HD-designed for pilots, 3 months free then subscription. Tons of data and maps. Data can be downloaded for use while flying. I use this on every airplane flight

External GPS:

Cellular enabled iPads have integrated GPS chip in them that are quite good as long as the iPad can see the satellites (sky). When the iPad is in Airplane Mode, the internal GPS is turned off. You can get around this by turning off the cellular, Wi-Fi and Bluetooth capability individually and leaving Airplane Mode off. This should meet all the requirements of the airlines, but the internal GPS is still functional and can be used with mapping programs if the iPad can see the satellites.

Bad Elf, Inc. makes an external GPS chip that connects to the dock either directly or with an extension cable. This chip is operational when the iPad is in Airplane Mode and works directly with many of the mapping and location aware apps. It does use power from the iPad so the battery life of the iPad is diminished somewhat.

BlueTooth connector to cameras:

BlueSLR has a free app to use in conjunction with a purchased hardware Bluetooth receiver that connects to some digital SLR cameras. The app provides wireless control of the camera and transfers the GPS coordinates of the iPad to the EXIF data of the digital files created by the camera. This summer I will be testing combining the Bad Elf external GPS with the BlueSLR app to wirelessly transfer GPS data to a digital camera from an iPad buried in a pack with the Bad Elf GPS chip in a top pocket or strapped on the exterior of the pack.

Screen shots (screen captures) with iPad:

Both the original iPad and iPad2 can do screen shots of their screens. Press and hold the Home and Sleep/Wake buttons simultaneously then release them. Screen will flash and if volume is on a "shutter" click will be heard.

from iPad PDF manual

Screen capture is saved to **Photos**. **Filterstorm** app can be used to crop out extraneous data from the capture.