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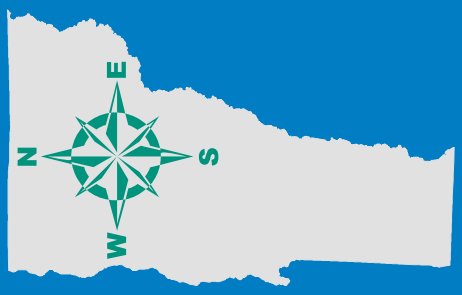
A fresh angle on GIS and mapping news from Vermont…and the rest of the world



VGIS News

Happenings At VCGI

New and Updated Data

VGIS Data Warehouse

NEW

- ImageryPhotos_NAIP, 2008 Color NAIP imagery for Vermont
- ImageryPhotos_VTORTHOS, 2007/2008 VT Black and White Digital Orthophotography (Northern Section of State)
- LandLandcov_NFLLAKELCLU, Lakeshore LCLU for 74 Lakes in the Northern Forest of VT
- UtilityOther_ELCFRANCHISE, Vermont Electric Utility Franchise Areas
- WaterOther_DAMS, Vermont Dam Inventory (VDI)

UPDATED

- TransRoad_LRS2009, VAOT Linear Reference System (2009)
- TransRoad_RDS, VTrans Road centerlines from 1:5000 orthos and GPS
- TransRoad_RDSMAJ1, Major road centerlines extracted from TransRoad_RDS
- TransRoad_RDSMAJ2, Major road centerlines extracted from TransRoad_RDS
- TransRoad_RTLOGPTS2009, VTrans 2009 Route Log intersection and LRS calibration pts

VT Canadian Border Imagery (0.3m color 2008) Now Available!

Steve Sharp, VCGI

VCGI is pleased to announce the availability of some new truecolor imagery along the VT Canadian border. The dataset was developed by 3001, Inc. for the Federal government. The dataset is an extract from a much larger dataset covering the entire US/Canada border coast-to-coast. It extends 10 miles north and 30 miles south of the border. It's a leaf-on truecolor 0.3

meter dataset acquired during the summer of 2008. The dataset includes over 4000 images, each covering a 1500x1500 meter area.

JPEG2000 files are available for download from the VCGI Image Library (~15gig for the entire dataset). If you want to easily "download all", install a browser download manager such as FlashGet (http://www.amazesoft.com/), follow this URL (http://imagelibrary.vcgi.org/IMAGERY/MISC/0_3M/CLR/2008/COMP/) right-click in the white area to the right of the list of files, choose Download Using Flashget and you are done! I would recommend kicking this off overnight because it will take a while.

The data has been left in its native coordinate system (UTM zone 18/19) since a large portion of the dataset extends well into Canada. Check out the metadata for additional details.

The uncompressed (unaltered) GeoTIFFs are available on media only (portable hard drive) for $260.

The data has been added to the VT Interactive Map Viewer as well as the VGIS_Basemap Web Map Service (ArcIMS), which you can stream directly into ArcGIS, ArcExplorer, or any OGC WMS compliant application.

Crowd Sourced Data - Be Very Afraid or Time to Rejoice?

David Brotzman, VCGI

At the October 2009 National States Geographic Information Council (NSGIC) Conference there was a great deal of discussion about "crowd sourced data". Most of the discussion was specifically about crowd sourced geospatial data given the audience, but the discussion can easily be extended to a larger context to include all data. Crowd sourced data is simply data that is supplied to a public repository by the general public. Anyone can provide data to these repositories and the idea is that the public is not only motivated to provide data to these public repositories but, they will provide corrections when incorrect data is posted. So far, those ideas seem to be supported by reality...with some limitations.

There are several of these crowd sourced data repositories and I am sure they will continue to increase in number. Google Earth/Maps may be considered crowd sourced in part since they now accept changes to the data from the public, but Google Earth/Maps appears to be more of a hybrid that uses private sector data, public sector data and crowd sourced data. The best example I know of for pure crowd sourced geospatial data at this time is OpenStreetMap (OpenStreetMap.org). OpenStreetMap appears to be completely fed by public data and money contributions. Data contributions are reviewed and managed by (mostly) volunteers. The volume of data they offer has grown exponentially as people have taken up the cause. I looked at OpenStreetMap a few years ago and the data in there was predominately in Germany. Take a look at it now, especially in a large city like Boston or New York. It's not as complete as Google Earth/Maps but it does show the potential for crowd sourced data if the trend continues.

A few of the many questions for us as geospatial professionals are "What are we, as the geospatial professional community, supposed to make of crowd

News Flashes!

* You can now download the 2004 1:1250 CCMPO/CCRPC truecolor imagery (covering much of Chittenden County) from VCGI's Image Library in compressed format (JPEG2000).

* The Vermont Center for Geographic Information is requesting proposals from qualified companies and individuals to map the location of all terrestrial wireless (voice and data) transceivers that provide service to Vermont, and use this information to generate high-quality radio frequency (RF) propagation coverage maps. A link to the RFP can be found at the front page of VCGI's web site: www.vcgi.org

sourced data". How much crowd sourced data are we comfortable with if it is mixed source? Not every geospatial application requires feature data with 2 inch positional accuracy and 100% field verification. For many of us it would be naive to dismiss a free data source that was being updated every day by thousands of people. But just as surely, crowd sourced data cannot be used without serious considerations as to its completeness and accuracy and the potential for harm. At the NSGIC Conference it was pointed out that traditionally collected data has an agency, company or person that takes responsibility for its quality. True enough, but that doesn't mean that crowd sourced data must be less of a data source because it doesn't and who among us has not seen data from a responsible organization that was unusable. For those of us who deal with spatial data in a broad range of applications there is no simple point of view on this. It's hard to dismiss data that is collected and continually updated for free, BUT you get what you pay for, BUT its good enough for my needs, BUT what do you really know about the data?

For each of us there is a line. We know the quality of the supporting data must meet the quality demands of the application. The organizations that provide this data make clear it is to be used at your own risk. As professionals we intuitively know where we might use data that is being crowd sourced and where to draw the line on its use. But, as crowd sourced data becomes more available, and quality seems to be improving, that line is slowly shifting towards more situations of acceptable use. Also, we can't deny cost plays a part in our calculation as much as we would prefer that it didn't. It was always said that Wikipedia was not as accurate as any of the major encyclopedias. Now some are saying there are more errors per page in Encyclopedia Brittanica than there are in Wikipedia. I have no idea if that is true, but it seems to me that at some point all of these publicly sourced data repositories will reach their point of maximum utility. All I am sure of is that we are not there yet and I am equally sure that crowd sourced data will be seen as more useful than it is today. Where will we be drawing the line then?

Voices From All Sectors

What's In a Name?

Jeff Nugent, Windham Regional Commission

The Mystery Map in the last issue of the VGIS News showed those water features in Vermont with 'creek' in their name. Why are there so few 'creeks' in Vermont, and is there a geographical pattern to where they're located? The word 'river' is fairly universally used throughout the US to describe the larger flowing water features (though there is an exception in Vermont!). The names of smaller flowing water features, however, show a great variation. The vast majority of smaller streams throughout New England have 'brook' in their name. The few creeks in Vermont, by and large, are on the western side, close to New York State. Many people believe the term 'brook' to be a New England one, but I think there's a little more to it than that.

Place names of "streams" (GNIS defined class) that end in the words branch, run, and brook. http://www.flickr.com/photos/pfly/

The Adirondacks of New York State, like Vermont, have many brooks. In fact, nearly all small streams there are brooks, with creeks generally only on the southern and western edge. Outside the Adirondacks, brooks can be found scattered here and there in New York, mostly in areas with hillier topography, but creeks dominate (except for some kills and runs).

Growing up in Western New York, just about every stream was a creek; generally slow, lazy, willow trees or alders along the muddy banks, occasionally broken by a riffle or a sheer waterfall over a limestone ledge. Walking along Bull Creek in Athens, Windham County, VT, I got the feeling I was on a creek back home. Bull Creek, the only creek in Windham County, is also one of the only streams that didn't tumble down off a rocky hillside. And back home the word brook is applied mostly to the few streams that do tumble down the hillsides and through rocky glens.

Interestingly, Vermont's longest river is Otter Creek (and not Otter River). It empties into Lake Champlain in the flatter lands of Addison County, its last several miles generally slow, lazy, with willow trees along its banks. And perhaps more interestingly, several rivers flow into Otter Creek. Using the word 'creek' for large streams—those we might otherwise call a river—is unusual but not rare. For example, many very large streams in the valleys of northwestern Pennsylvania are creeks, fed by little streams that tumble off the hillsides called runs, not brooks. Conversely, some smaller streams are named 'rivers,' most frequently in the mountains. The diminutive Glastenbury River in Bennington County, VT is barely a half-dozen miles long .

So I would agree that usage of the word 'brook' has a strong geographical component, but it also might be used in some locations to describe a stream with certain physical characteristics as well, those rocky streams that cascade downhill. The word 'creek' in some places might be reserved for larger streams or those that flow more slowly. In fact, as used in England, a creek can be a tidal stream.

Now all we have to do is figure out whether it's pronounced kreek or krik. (Some inspiration for the mystery map came from a blog at www.pfly.net which is no longer active. A map from that blog can be found here: http://www.flickr.com/photos/pfly/)

Cool Stuff - And Holiday Gift Suggestions...

Signs that indicate you may be a GeoGeek (aka. GeoNerd): http://blog.gisuser.com/?p=5163

Johnathan Croft of VTrans on VPR's Vermont Edition: http://www.vpr.net/episode/47066/

Tectonic Shifts Altering The Terrain At Google Maps: Google recently upgraded Google Maps with a new land parcel data layer, added a Map error reporting function, has promised map fixes to street errors in 30 days or less and has replaced Tele Atlas as their provider of roadway data. Full article here: http://searchengineland.com/tectonic-shifts-altering-the-terrain-at-google-maps-27783

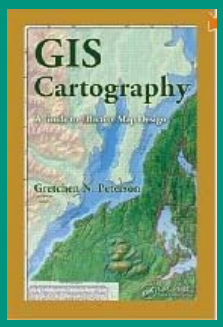
This year's GIS Day Song (Tied Together...to the tune of Come Together by the Beatles): http://www.youtube.com/watch?v=wDVNBDIVUZo

Augmented Reality Goes Mobile : "It was the shake heard 'round the world. On Aug. 27, 2009, überblogger Robert Scoble uncovered a hidden software feature buried within an iPhone application...Once Monocle is activated, users looking through the iPhone camera can see reviews and other information about restaurants, stores, and other businesses in the direction the camera is pointing." - from businessweek.com: http://www.businessweek.com/technology/content/nov2009/tc2009112_434755.htm

Gift Ideas!

- Garmin nuMaps Lifetime update for garmin devices. Map updates for the life of the unit: http://www.garmin.com/garmin/cms/site/us/maps/numaps-lifetime
- Lake Champlain: An Illustrated History: http://www.adirondacklife.com
- Cavallini Decorative File Folders World Map: http://www.thedailyplanner.com/decorative-file-foldersworld-map-p-12511.html
- Some interesting mapping software (National Geographic) http://www.omnimap.com/catalog/digital/topo.htm
- GIS Cartography: A Guide to Effective Map Design: http://www.amazon.com/GIS-Cartography-Guide-Effective-Design/dp/1420082132
- Enlargements from the Vermont orthos of a neighbor or family members property, makes a great gift. I print on high gloss photo paper for a nice product: http://www.threedoggeographics.com
- Hang those maps on the fridge with these serious rare earth magnets: http://www.leevalley.com/wood/page.aspx?c=2&p=42359&cat=1,42363
- All things mapping related: http://www.themapstore.com/
- Custom Map Quilts/Pillows: http://hapticlab.com/
- All handmade things mapping related: http://www.etsy.com/ (then search on map)

Some of The Gift Ideas



"OLD TIMER" LIST

Compiled and edited by Sara Moulton, VTrans

In August this year, as part of a review on the history of GIS in Vermont, lists of items were offered to help determine if you might be an "old timer". For those who aren't old timers, the following explanations are offered.

ITEMS 1 - 10 FROM JOHNATHAN CROFT, VTrans
JC: Here is an inside look into some "old timer" items that circulated on the listserv back in August. Being an old timer, even though I am fairly young, I have experienced the evolution of GIS software, hardware, and the associated growing pains. So here are some of the gems for the old days.

1.) If you know the consequence of non-unique ArcID's.
pcArcInfo and ArcInfo had a bad habit of corrupting your data, if you had non-unique ArcID's. If your attributes were different, but your ArcID was the same, then you ran a BUILD, the records would inherit the field contents of the first record in sequence. If you have many records with non-unique ID's, you were looking at lots of extra work if you didn't have a backup.

2.) Couldn't work one day because you misplaced the INFO 5 1/4" boot disk.
Before pcArcInfo came out with the dBase-integrated version, 3.4d, the underlying relational database management system was INFO. This software was very robust, not necessarily intuitive, and could be used independently from Arc. In the days before sophisticated licensing software, there was the boot disk. This was a diskette that you had to have in the drive for the application to boot up and read key code information before initializing. For versions of pcArcInfo before 3.4d, you needed to have the HENCO INFO diskette, 5 ¼" in the early days. If you lost the disk, you couldn't use your primary GIS software and had to send out the search parties. Heaven forbid you lost the disk entirely…

3.) Needed Steve Bower to help debug your SML.
The early versions of pcArcInfo didn't come along with lots of tools, like the ability to pan or zoom. To do this, Steve Bower of OGIS wrote a series of macros in Simple Macro Language (SML) which is a light version of the Arc Macro Language (AML). These tools greatly improved performance and eliminated a lot of typing to do simple tasks. If you wanted to do something outside of Steve's tool kit, you had to write your tool with SML. Sometimes things didn't work well and you got errors galore. To keep your sanity you could send your macro to Steve, via the U.S. Postal Service as this predated our now ubiquitous email, and he would run the macro and debug it for you. His experience in programming greatly helped novice code writers to create tools to make work more efficient and extend pcArcInfo to do some pretty amazing things at the time.

4.) Had to use a 0 instead of a 00 because the ink kept clogging.
Pen plotters were state of the art for low cost plotters in the late 1980's, and the Calcomp plotter was being used during the pilot project by most of the sites. Other plotter technology existed, including electrostatic plotters, but the cost was prohibitive for most small operations. A pen plotter mixed the world of hand cartography and operations of pens, ink, and media with the sophisticated drawing that a

computer can provide. The "old school", highly mechanical pen plotters needed a lot of attention to keep the ink flowing from the pens. Each pen was comprised of an ink reservoir and a nib, being the drawing end. To keep the nib operational, it needed to be quite clean and free of any dried ink. Ultrasonic cleaners and solvents helped the cleaning process, as well as methodical attention to detail in keeping all the nibs clean. Also, having a good backup stock of pen nibs helped immensely when a pen wouldn't write properly. If you wanted to draw a wide line, you could add a pen to the carousel that has a wider nib; thinner lines would take a finer nib, with sizes ranging from 0 (fine) to 000 (very fine). If a 00 pen would not draw for some reason, you could swap the nib out for a wider one like a 0 to help the ink flow better.

5.) Wished you could load more than 8 pens in the carousel.
Since the pen plotters were more mechanical and significantly limited compared to the ink jet plotters of today, there were somethings that you just couldn't do well. Solid fills could possibly make the paper too wet with ink and create holes in your map, stipple patterns were next to impossible without destroying pens in the process. There were techniques that would allow you to use all 8 pens in the carousel, including several black pens with different sized nibs for different line weights and then several colors, like blue, green, and red. If you wanted other colors, you needed to either blend your inks, or order some.

If you had more than 8 possible line weights or colors, you could create a second plot file, running the first plot, then swapping out the full carousel for the new pens. Then run the second plot on top of the first. The only key consideration is perfect registration of your paper on the plotter. There were some very creative techniques using the Calcomp plotters that seem so limiting now, but were a vast improvement over hand drafting.

6.) Got lightening performance out of a 286 PC.
Times have really changed since the days of 286 machines and the quantum leap in performance by going to a 386. In 1989, the thought of the speed of a Pentium chip was nearly unfathomable. Our machines today have light speed performance in comparison. What will we have in 20 years?

7.) Met Jack when he came to the User Group Meeting in White River.
At the Third Annual Vermont GIS Conference in White River Jct. on March 19, 1992, Jack Dangermond came to Vermont to speak to the GIS users. It was inspiring to have the "Big Kahuna" of ESRI come to our small state and be the keynote.

8.) Know what MAPE does.
MAPE is the shortened command MAPEXTENT. Before the full ability to set an extent by simply running a mouse, you had to type in your map extent with discrete coordinates (xmin ymin xmax ymax) or the extent of a coverage (f:\property\lots, for example). Using shorthand commands saved key strokes and improved performance; ME was also used to simplify the process. Other commands like DRAWENVIRONMENT could be shortened to DRAWE or DE.

9.) Used a digitizer that echoed the curvature of the earth.
The GTCO digitizers that were used by many of the early sites were made of 2 sheets of laminate with a low to medium density fiber board core and limited structural components. Over time, the digitizers would change shape from a nice flat table to an arched sheet with more than a subtle curve. The one that I had the pleasure of using for many years was C-clamped to a sheet of plywood to keep it from creating too much of a bow, but it did have a curve to it. There were Numonics and Calcomp digitizers that had more structure and didn't succumb to the elements like the GTCO digitizers did.

10.) Used TK50's and VT100's.
TK50's were cartridge tapes, somewhat like an 8-track tape for computers. These could store a lot of information for backups and were relatively easy to use. The VT 100 is a graphics terminal, I can't remember if they were gold or green in color, but they were pretty plain monitors. These seem primeval compared to today's LCD flat panel monitors. Users would also have to tell ArcInfo what monitor you were using before getting a graphic window to open in ArcEdit or ArcPlot.

Items 11 - 17 in this list will appear in the next newsletter!

High-Resolution Land Cover for Chittenden County: Generating a Return on Investment from the 2004 Imagery and LiDAR.

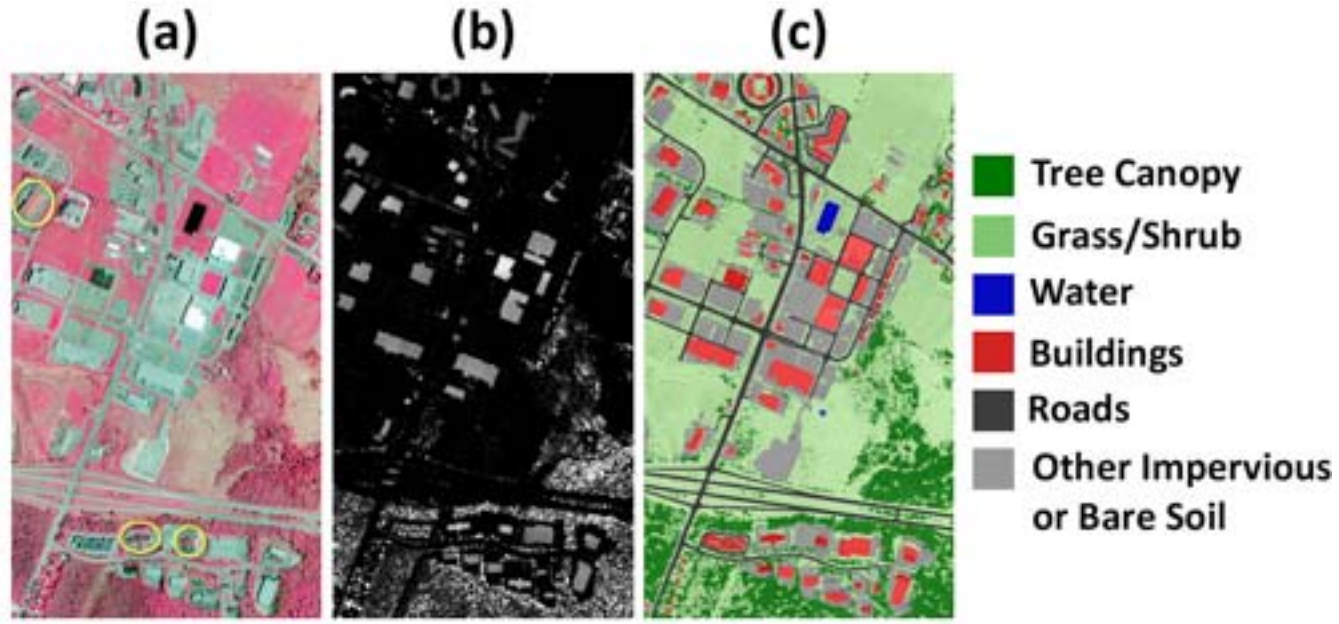
Jarlath O'Neil-Dunne, UVM Spatial Analysis Lab

In 2004 the Chittenden County Metropolitan Planning Organization (CCMPO) and the Chittenden County Regional Planning Commission (CCRPC) worked with several Chittenden County municipalities and the Vermont Mapping Program to acquire high-resolution color infrared orthorectified imagery and light detection and ranging data (LiDAR) for 1044km^2 of the county. With funding from the Northern States Research Cooperative (NSRC) the University of Vermont's Spatial Analysis Laboratory (SAL) set out to generate high resolution land cover from the data.

Most of us in the GIS profession have taken a remote sensing class that exposed us to remote sensing techniques that automate the extraction of land cover from imagery using the digital values of individual pixels. These "pixel-based" techniques, which only take into account the spectral (color) properties of the imagery, tend not to work well on high-resolution data where the majority of the information is spatial and contextual. In the case of the 2004 data, such techniques would have been entirely inappropriate because many trees, shrubs, grasslands, and agricultural fields were devoid of photosynthetically active vegetation, and thus appeared spectrally similar to impervious surfaces.

Of course humans have no problems exploiting high-resolution remotely sensed datasets, even in those cases where two functionally different land cover types appear spectrally similar. This is because the human vision system makes extensive use of context. Unfortunately, even trained imagery analysts work relatively slowly when mapping land cover and for an area this size it would have been cost prohibitive.

We sought to build an automated system that would leverage enterprise computing architecture to ensure efficiency, but also incorporate elements of human cognition to ensure accuracy. Using Cognition Network Language (CNL) we built an expert system capable of automating the extraction of land cover information for six classes: tree canopy, grass/shrubs, water, buildings, roads, and other impervious/ bare soil. The CNL expert system was deployed using Definiens eCognition Server and ran for seven days on eight Xeon 3.2GHz cores, processing over 20 billion pixels of data to yield a land cover dataset with over 5 billion pixels. For comparison, the resulting land cover dataset contains approximately half as many pixels as the 30m National Land Cover Dataset (NLCD) for the entire continental United States.



The figure above shows the imagery (a), the LiDAR normalized digital surface model representing the

height of features relative to the ground (b), and the resulting land cover data (c). An approach centered on human cognition ensured that the buildings highlighted (a) with spectral reflectances similar to vegetation were classified correctly. It also allowed areas that were not permanently impervious/bare soil to be classified correctly as grass/shrub. We found that although no automated approach can ever duplicate the work of a highly trained human imagery analyst, automated techniques can be used to generate a return on investment by extracting land cover information from existing remotely sensed datasets.

The land cover dataset has just completed going through external review and will be available from VCGI in late December.

VSDP News

We Unfolded The Map...And It Was Good

Leslie Pelch, VCGI

The last Roundtable was held in October at the Lake Morey Resort in Fairlee (eastern edge of the state) and was attended by about 65 people. Quite successful given the location and the fact that we just had a Roundtable in July! The Roundtable schedule has now officially changed to October/May, and we will also be considering moving it around to different locations in the state each time - I'm thinking Chittenden County in May. Most presentations have been posted as PDFs, so if you missed the event or couldn't attend all of the sessions you were interested in please visit the web page: www.vcgi.org/vsdp (then click on Events). If you would like to help plan the next Roundtable (we'll start emailing/talking in mid-February), please get in touch (lesliep@vcgi.org or 882-3002).

Caught in the act of having a good time at the last Roundtable!

Mystery Map Contest

Last quarter's Mystery Map showed Creeks in Vermont! Congratulations to Dan Currier and Ashley Andrews at the Central VT RPC for sending in the correct answer. How would you describe the "map' below? Thanks to Tracy McIntyre and Peter Whitney for this holiday gift of humor! Please submit your responses to Leslie at *lesliep@vcgi.org*. The winner, drawn from among the respondents who send in correct answers, will receive his or her choice of data CD or compressed imagery on a thumb drive.

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