

Commentary

Just another private – public partnership? Possible constraints on scientific information in virtual map browsers

Most academics working with GIS are inclined to hold that Google Earth, Virtual Earth, and similar specialized web browsers for viewing and querying earth imagery and georeferenced data (aka virtual globes or virtual earth browsers), are one of the greatest boons for GIS since the digitizing tablet. Finally any Jane or Joe can experience the visualization and analysis capabilities of GIS that have remained the purview of specialists for years. Finally analysts have an application for producing ‘sexy’ images to communicate ‘scientifically’ and ‘rationally’. Sure, problems remain for interfacing this rich analytics with consumer-friendly browser environments, but we finally have a possible ‘killer app’ that could well make GIS a household word. This unparalleled ability rests on the integration of the underlying earth imagery and the ability to visualize virtually any dereferenced data in this homogenized environment. Industry, government, and academics are rapt in their praise.

Recently, for example, J Luke Blair, a geologist at the US Geological Survey office in Menlo Park, California, encapsulated the potential in an interview with an area newspaper. For Blair, Google Earth means the potential to communicate data in an interesting “and effective” manner, “You can essentially make your own map—see where you live in context of the geology of the Bay Area” (Lyons, 2006). The article goes on to discuss the appeal of Google Earth for the over 100 million people who have downloaded the software as well as the broadening availability of software (including similar applications from Microsoft and NASA). Examples ranging from work at the Jane Goodall Institute on rainforest conservation to the NOAA Coral Reef Watch suggest that the appeal has been particularly strong in the scientific community and that there is more potential still to be realised.

With this appeal, what is the price to be paid for this ability, which goes hand-in-hand with corporate access to data and corporate control of the specifications for adding data in the browser? As Michael Wegener and Ian Masser (1996) wrote in their article “Brave new GIS worlds” about a possible scenario for the future of geoinformation that involved increasing control of information by corporations, the price paid for the sugared pill may be beyond our wildest imagination. Academics may forever lose the possibility to access and publish data without corporate consent. What Faustian bargain do we enter into when we use these amazing possibilities offered by virtual earth software?

In most places GIS users have been part of similar relationships with government data providers, who charge significant amounts for the access and use of data. It bears mentioning that even the mythologized access to public domain data in the United States is often limited by state, tribal, regional, and local governments. Only data collected by civilian federal government agencies can be considered public domain, and even then there are restrictions. Data collected by the military, which includes the Army Corps of Engineers—the government agency responsible for commercial waterways in the US and many, if not all, navigable waterways—are excluded. Every state has its own ‘open-record’ laws which determine which data are available and what state and local governments may charge or request for the provision of their data. For example, in Kentucky the laws allow governments to charge for cost recovery, and this

has made data prohibitively expensive. Access to GIS data is already quite restrictive and there is a growing significance of corporations dedicated to supporting commercially lucrative virtual map browsers.

The simple fact is that Google Earth and other similar applications are licensed software products using licensed data (apart from NASA's *World Wind*, which finds itself in a complex limbo between free public domain US government data and other copyrighted data). Copyright laws are one basis for enforcing restrictions on data use and reuse. For example, Google Earth includes copyrights on much of its data, which means it may be using some public domain GIS data, but also using commercial copyrighted data. This is certainly true for Google Earth, as I found when working on a book recently that includes images taken from applications of this software. Google are very careful about their brand and lay out some clear conditions for people wishing to use images made with their software products. Google Earth users, for example, need to become familiar with both the *Guidelines for Third Party Use of Google Brand Features* (Google Permissions, 2007) and the Google Brand Features Terms and Conditions. They stipulate that any (yes, any) publication of images from Google Earth requires their permission. In Google's case the use of a screen shot showing Google Earth can only be used if the trademarks and copyrights are clearly legible, and all artwork that will appear has to be approved by Google. The guidelines are lengthy and include a variety of stipulations; for example, if you use a Google logo on a web page, a minimum of twenty-five pixels has to separate it from other graphic or textual elements.

Generally we need to remember that, except for the use of these software applications and GIS data for personal use or within fair-use provisions, any use requires the permission of the software provider and possibly the data provider. As another example of how limitations on the use of GIS data may develop, I consider the newly announced GeoCommons Terms of Service in their clarity worth noting and reflecting on. "Unless you have permission from the owner of the Third Party Content, you agree to only display the Third Party Content on your personal computer solely for your personal or business use. You acknowledge and agree that you have no right to download, cache, reproduce, modify, display (except as set forth in this paragraph), edit, alter or enhance any of the Third Party Content in any manner unless you have permission from the owner of the Third Party Content" (FortiusOne, 2007). How many GIS data will require similar terms of service in the future? Will contracts for data use and reuse become the norm rather than the exception? Already common in most countries when working with government data protected by copyright, the increasing privatization of data by corporations can only mean more restrictions and more contracts.

Truths and fictions of geoinformation

Related to the copyright issue is the ambiguity of corporate data used in these browsers—caveat emptor is the key phrase to remember. We believe this to be a veridical representation, but a variety of examples highlight that corporate interests may lead to the replacement of accurate data with inaccurate data in order to protect business activities. Additionally, courts have sometimes ordered the withdrawal or change of data to protect commercial interests. Not only can the data be sometimes ambiguous, they can be simply wrong. This may be due to government censorship, with no information about the alterations. Worse yet, the alterations may be made only to support business interests.

Recent examples have shown that Google exercises an extraordinary control over the images it displays, and alters them. Vint Cerf, codeveloper of TCP/IP protocols and the basic Internet architecture, and now Chief Internet evangelist for Google,

is quoted in a Press Trust of India article as saying “our policy is when we have an issue ... arising from national authorities ... we take it (imageries) away. We do understand that problem” (http://www.ogleearth.com/2007/02/did_vint_cerf_j.html). From a business point of view this approach is comprehensible, but the moral issues and limitations for GIS analysis are considerable. Underlying these issues is the problem that Google fails to inform users when images have been removed or edited at the request of a government. This became obvious to users of Google Earth who were using it to follow events in Basra, Iraq. Newer imagery had shown damage and destruction of buildings and areas of Basra. Suddenly the imagery was surgically removed for Basra only and replaced with images from before the invasion. In another case a court ordered that Greenpeace withdraw an image that showed where in France a commercial company had genetically engineered maize fields, countervailing an EU law that public registers giving the location of GE fields be maintained (<http://www.greenpeace.org/international/news/crop-circle-270706#>). What we see using virtual map browsers may have little to do with what we would actually find on the ground.

Besides these immediate concerns, we should also question how to share material from Google Earth or other virtual earth browsers. Clearly, added data can be shared through a KML file (the encoding format of the data and related graphical characteristics used for data added to Google Earth). Google has proposed making KML an OGC (Open Geospatial Consortium) specification that will make the specification more stable as an industry endorsed standard.

What is lost?

The virtual map application genre is certainly a great boon for the GIS industry and also for academics working on GIS. Access to data is greatly enhanced by these products and the open support for mashups has created a new and exceedingly dynamic industry. However, as cases of replacing new data with old data from Basra and other places show, Google is quite willing to exercise control over data access that has never been freely communicated. Instead of public domain we run the risk, in trusting commercial companies, of developing public delusion over what is happening in the world. This is quite disconcerting and I believe we need to question the data we rely on no matter what the source, how much is paid or what we intend to do with them. People have been quite culpable when it comes to maps and it seems to follow that freely accessible data will enhance our society's willingness to believe imagery over experience.

We also need to consider the changing political economy of GIS data. Wegener and Masser's (1996) prescient piece that posits corporate control of access to GIS data through corporations—both private and semiprivate—is a dark Orwellian vision of the future. However, the world of GIS data has turned out to be far more complex. Intellectual property rights and copyright are the legal frameworks for contracts and court enforcement of memorandums of understanding that stipulate possible uses, regulate reuse, and define acknowledgements. We have geoinformation now; GIS data is rapidly drying up as copyright-based contracts stifle the creation of new GIS data. Geoinformation can be used for all types of GIS applications, but only within the legal constraints of a contract. Corporations involved in developing GIS data and web-based applications remain coy in articulating rights and responsibilities—instead relying on individual contracts that protect their economic interests first and foremost and which can also be more readily altered for changing legal frameworks.

The growing corporate control of GIS data gives causes for more scrutiny of the information we rely on in virtual earth browsers, both in political conflict zones and in more quotidian cases. The first is that the commercial providers of virtual map

browsers have yet to provide thorough metadata or document the redigitizing of images. The second is that these companies seem to be most willing to alter images without scruple or a moral drive to inform its users of the changes. There should be no doubt that these software environments offer rich and broad possibilities; however, we should not let ourselves be blinded by the potential and end up losing sight of the societal values that remain intrinsic to democratic uses of geoinformation. The ability to visualize and hypothesize in three dimensions is an allure with great promise. Pursuing it blindly risks entering into a Faustian bargain expedited with privatized corporate data, which may place scientific endeavours under great restrictions, and, in the end, may replace scientific fact with corporate and government fictions and undermine the creditability of science.

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