FOR FEEDBACK EMAIL US AT GIS@CARILEC.ORG VOL. 2005 NO.2

EDITORIAL

Welcome to another issue of Caribbean Geographic Information Systems technology, Cari**GIS**t. This newsletter is a product of the **CARILEC GIS Task Force** - a body established by the Association of Caribbean Electric Utilities (**CARILEC**) to oversee and facilitate the development and use of GIS Technologies among CARILEC's member utilities. The Task Force includes representatives from the utilities of Antigua (**APUA**), Barbados (**BLPC**), Dominica (**DOMLEC**), Grenada (**GRENLEC**), Jamacia (**JPSCo**), St. Lucia (**LUCELEC**), Nevis (**NEVLEC**), and St. Vincent (**VINLEC**), and works closely with **CARILEC.** Earlier issues of this newsletter are on the CARILEC website at http://www.carilec.com/gis/gis/.

With the support of the **CARILEC** Secretariat, the objectives of the Task Force include: establish guidelines for the development of GIS within member utilities; monitoring improvements in GIS technology and advising members on appropriate adoption practices; reporting on best practices and identifying pitfalls in the implementation of GIS; develop cartographic / mapping standards to be used by member utilities; evaluating GIS training programmes and suggesting improvements as necessary; guiding the development of GIS databases across member utilities.

This issue of Cari**GIS**t focuses on the use of web technology in the GIS arena. It includes an article by the producer of this newsletter, Mr. Terry Inniss, Computer Mapping Programmer, The Barbados Light & Power Co. Ltd., on **GIS Web Applications on the Internet**, namely **World Wind** by NASA (released 2004) and **Google Earth** (beta version released 2005) which feature integration between satellite imagery and GIS technology on the global scale. The Canadian GIS Consulting Company Barkley Technologies Inc. has also submitted an interesting paper answering the question "**Why do we need Web-based GIS?**" There is also an update on the GIS project in St. Vincent by Dr. Vaughn Lewis, where the pilot project phase has just been completed and the main phase of the project is about to commence.

As always, I wish to thank the other members of the Task Force and the **CARILEC** executive for their invaluable support. Let's keep the **GIS** meter ticking over and re**GIS**tering, colleagues!

That's the **GIS**t of things for now.

Dr. Philip Corbin
Computer Engineering Analyst, The Barbados Light & Power Co. Ltd.
Chairman, GIS Task Force

What's in this Issue

GIS Web Applications on the Internet

By Terry Inniss (B.L & P)

The sharing of GIS information has reached the ultimate. Sharing that information is now being done on the Internet using high quality satellite imagery. It is now quite easy to sit in a living room in any part of the world and virtually fly to any other part of the world by a mouse click or a search utility. Two applications have tantalized our GIS appetite, these are NASA World Wind (http://worldwind.arc.nasa.gov/index.html) and Google Earth (http://earth.google.com).

NASA World Wind

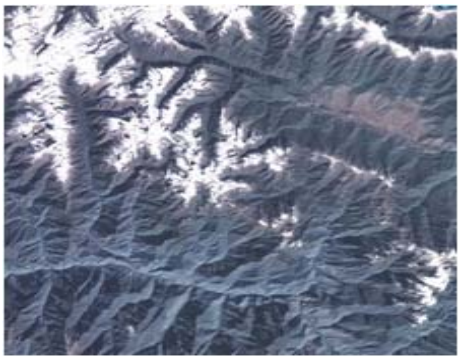
This web application is a fully 3D interactive globe and was developed at NASA Ames Research Center. It has many features including a 3D engine, Blue Marble, Land Sat 7, Shuttle Radar Topography Mission (SRTM) data, Globe, country & State borders, place names, visual tools and landmark set.

World Wind allows any user to zoom from satellite altitude into any place on Earth, leveraging high resolution LandSat imagery and SRTM elevation data to experience Earth in visually rich 3D, just as if they were really there. Particular focus was put into the ease of usability so people of all ages can enjoy World Wind. All one needs to control World Wind is a two-button mouse. Additional guides and features can be accessed though a simplified menu. Navigation is automated with single clicks of a mouse as well as the ability to type in any location and automatically zoom into it.

Highlighted here two features of World Wind - Blue Marble and Land Sat 7.

Blue Marble

World Wind has a full copy of the Blue Marble, a spectacular true-colour image of the entire Earth as seen on NASA's Earth Observatory. The Blue Marble, put together from data of a variety of satellites such as MODIS and Terra, can be seen at 1km per pixel resolution.



Land Sat 7

Land Sat 7 is a collection of images from 1999-2003 at 15m per pixel resolution. It also includes other colour bands such as the infrared spectrum. Users are able to browse these different sets as they become available and World Wind automatically inherits the changes and updates. LandSat 7's resolution makes it possible to see your own city, neighborhood, or landmarks in your vicinity. Seeing the whole globe like this puts the world in context with scientifically accurate data. The complete LandSat 7 data set is too large to fit on a single machine so World Wind only downloads what you see and stores a compressed copy on your computer for later viewing.

Although the product documentation states that it was designed for the normal user, World Wind seems to be tailored more for scientists. The other drawback is that it fully occupies the resources of the client computer.

For further information on NASA World Wind just visit http://worldwind.arc.nasa.gov/index.html

Google Earth

The other application that can be used free of cost is Google Earth. There are three (3) flavours of Google Earth highlighted here – Standard Google Earth (which is free), Google Earth Plus for US20 subscription-based annual fee and Google Earth Pro for US400 annual fee.

Google Earth (core product) has the following features: Free for personal use, Sophisticated streaming technology delivers

the data to you as you need it, imagery and 3D data depict the entire earth with terabytes of aerial and satellite imagery depicting cities around the world in high-resolution detail. The local search lets you search for restaurants, hotels, and even driving directions. Results are shown in your 3D earth view. It is also easy to layer multiple searches, save results to folders, and share with others. Layers show parks, schools, hospitals, airports, shopping, and more. KML – data exchange format lets you share useful annotations and view thousands of data points created by Google Earth users. KML, or Keyhole Markup Language, is an XML grammar and file format for modeling and storing geographic features such as points, lines, images and polygons for display in the Google Earth Client.

Google Earth can be used for planning a trip, getting driving directions, finding a house or apartment, finding a local business and exploring the world.

Google Earth Plus (beta) has GPS device support, the ability to import spreadsheets, drawing tools and better printing. Imports GPS data, tracks and waypoints from select GPS devices (Magellan and Garmin devices only). It also supports higher resolution printing (greater than screen resolution). Customer support is provided via email. There are draw/sketch tools for annotations and a data importer that reads address points from .csv files.

Google Earth Pro (beta) is the ultimate research, presentation and collaboration tool for location information, making location research and presentation easy. Type in an address and watch Google Earth fly you in from space, overlay roads, businesses, schools, and retail onto real 3D satellite images. You can even import site plans, property lists or client sites. Share the view with your client or colleague with one click. Export a movie of a flight around a city. Even export high-quality images to documents or the web.

For further information on the Google developed tool check: http://earth.google.com.

BARKLEY TECHNOLOGIES INC.
UTILITY CONSULTANTS

42 KING CRESCENT
HUNTSVILLE, ONT.
P1H 1X6
OFFICE (705)789-7824
FAX (705)789-9397

WHY WE NEED A WEB-BASED GIS

Traditional desktop solutions for the most-part do not have the ability to deliver GIS solutions online through a flexible and friendly user interface. GIS systems typically have unique functionality and data formats that cannot be shared with common desktop software systems. This has limited the ability of GIS specialists to share the wealth of information they currently maintain. This information needs to be distributed to the hands of individuals who require this information to perform their everyday tasks. The continuous review of GIS by each individual within the organization provides an indirect means of ensuring data accuracy is current.

So why web-based GIS?

Management Perspective

Combined geographic information access and distribution.

Former data distribution methods included paper maps and hardcopy documents. Multiple maps and records had to be cross-referenced to derive meaningful information to make day-to-day decisions. The combination of geographic information and attribute data into one continuous mapping system delivered online to all individuals within the organization ensures that everyone is utilizing the most current information when making business decisions. The delivery of GIS over the internet allows all users access to view and query the information previously stored on the desktop of a GIS specialist.

Decentralization of geographic information management.

Although the initial creation of a GIS may involve GPS, satellite imagery, and or 'heads-up' digitizing of features into the GIS, the largest task is the continuous maintenance of the datasets. Allowing access to all members within an organization allows each individual that performs changes in the field to report their efforts and in-turn see the changes reflected in the data. The integration of GIS to other corporate applications (work management, outage management, SCADA, …) provides the mechanism to maintain the geospatial data as well as provide a double-check as to the accuracy of the other systems.

User Perspective

The ability to process and manipulate GIS data with the increasing size and variety of geospatial data.

Existing systems involved the comparison of hard copy maps to either hardcopy or digital tabular data. Analysis and review of information took a considerable amount of time. This time is exponentially reduced with the integration of GIS to other data management systems. The introduction of this system through the internet provides non-GIS users a common interface to access and analyze geospatial and tabular data quickly.

Customizeable modules for specific GIS applications.

Although each division of the corporation shares common needs for information with other departments, they do have specific needs and requirements within each group. Distributed GIS allows the same information to be displayed differently to accommodate the business needs of each department. This same customization allows for additional customization with respect to application integration. For instance the planning department may have a need to view the information from the outage management system to assist with their planning decisions, but will need read and write access when designing an extension.

Demand for location-based data from the corporation and general public.

Tabular data is crucial in making business decisions. The addition of geospatial data allows business managers the opportunity to review the tabular information in a geographic profile (ie. what is the relationship between these outages with respect to the surrounding terrain).

Implementation Perspective

Issue 1: Internet delivery of geospatial and tabular data.

Traditional means of online map delivery was the result of hard-coding static images and tabular data into a web-page. The dynamic manner of geospatial data requires continuous updates to the website to ensure information is current. The implementation of a web-based GIS allows for both the vector and tabular data to be refreshed dynamically and read from the most current database. The conversion from a static data delivery system to a web-based GIS will reduce the time associated with web development for data distribution.

Issue 2: Data interoperability issues.

Existing online map delivery often involved time consuming data conversions of geospatial data when incorporating data from different systems (ie. CAD, ESRI, Intergraph, …) The open nature of GIS allows various data formats to be read and published in a common open-source format such as SVG, XML or displayed through an applet that delivers the information via an image service.

Barkley Technologies Inc. Web-based GIS solution:

The web-based GIS application supports vector based object data and raster image data. While raster data are displayed as GIF or JPEG files, the vector data and all text objects are converted into the SVG format. SVG graphics have the advantage to be infinitely zoomable without loosing cartographic quality. Beside this, the file size is quite smaller and loads much faster in a web browser.

The web-based application also supports attribute data. This data is stored in either an XML data structure or can reside in a common database system. The data can be displayed on different ways: with mouse-over effects, identifying features on the map and even as the whole attribute table. Like in desktop GIS software, there exists a link between the attribute and the geometry, so flashing of individual shapes is possible. This application comes with a query engine – allowing users to search for features using specific criteria.

This HTML solution is for Microsoft Internet Explorer and has more options (like Attribute Table, Query Builder). The zooming and panning runs faster, as well as the display of the object information than most web-based GIS

solutions. The layout of the website is defined with stylesheets, so it is very easy for you to change the layout for your own purposes.

Open architecture XML database technology will provide us the ability to integrate additional data management programs (work management, outage management, …) to the web-based GIS software.

XML and SVG are platform independent, non-proprietary formats. Although we recommend Internet Explorer (to maximize on the performance) this solution can be used with other internet browsers (Netscape, Mozilla, …).

Features:

- Export of vector based data in the SVG format
- Support of image data
- Support of "Annotation Coverages" of ArcInfo, Textlayer of CAD data as well as support of "DatabaseThemes"
- Turn on and off individual themes in the MapView
- Finding features by building a query expression
- Generate reports object information and attribute tables
- Mapscale dependent view of themes
- View MapView in an individual scale
- Hot-Links for E-Mail and other URL-addresses (internal and external links)
- Scale bar and overview map
- Measurement tools and coordinate read-out
- No additional Software on web server needed

VINLEC COMPLETES GIS PILOT PROJECT

By Dr Vaughn Lewis (VINLEC)

VINLEC in association with its consultants GeoCaribe Inc. completed its Pilot Project during February 2005, and is now preparing to move forward with the implementation of a full-scale GIS. Overall the primary objectives of the Pilot project were achieved though there were difficulties along the way. The following are considered as the achievements of the Pilot Project:

- Determination of procedures for collecting T&D network and customer data.
- Determination of procedures for labeling all poles
- Development of detailed budget for full scale project implementation
- Identification of staffing requirements for full GIS implementation
- Identification of the suitable hardware for data collection
- Identification of relevant background mapping information and the means to acquire this information
- Training programmes that introduced a wider cross-section of VINLEC staff to GIS technology
- Identification of computer hardware required at base
- Identification of software to be used
- Identification of suitable pole numbering systems
- Demonstration of actual GIS over the project area.

The main difficulty encountered during the execution of the pilot project was tardiness. The factors contributing to the tardy implementation included technical glitches with the data collection software and hardware, change in data collection methodology and scheduling difficulties with the consultant.

VINLEC is about to proceed with its GIS implementation and hopes to begin the full project on October 3rd 2005.