



Editorial

Welcome to the second issue of the Caribbean Geographic Information Systems technology, CariGIST, the quarterly newsletter of the Association of Caribbean Electric Utilities, produced by the CARILEC GIS Task Force.

In 2003 the CARILEC Board mandated the Secretariat to establish a Task Force to oversee and facilitate the development and use of GIS Technologies among member utilities. The Task Force itself was set up following a two-day GIS workshop held in Dominica in November 2003. Its members meet on a quarterly basis and include representatives from the utilities of APUA (Antigua), Barbados (BLPC), Dominica (DOMLEC), Grenada (GRENLEC), St. Lucia (LUCELEC), Nevis (NEVLEC), and St. Vincent (VINLEC).

With the support of the CARILEC Secretariat, the objectives of the Task Force are to:

- Establish guidelines for the development of GIS within member utilities;
- Monitor improvements in GIS technology and advise members on appropriate adoption practices.
- Report on best practices and identify pitfalls in the implementation of GIS.
- Develop cartographic / mapping standards to be used by member utilities.
- Evaluate GIS training programmes and suggest improvements as necessary.
- Guide the development of GIS databases across member utilities.

This issue of CariGIST contains a summary of the responses to a GIS Survey initiated by the CARILEC GIS Task Force. On behalf of CARILEC, I wish to thank those utilities (from Antigua, Aruba, Barbados, Belize, Bermuda, British Virgin Islands, Cayman Islands, Curacao, Dominica, Grenada, Guyana, Jamaica, Nevis, St Kitts, St Lucia, and St. Vincent) that responded to the circulated survey questionnaire, for their taking the time out to provide their very useful feedback.

This issue also contains a very informative and interesting article by Dr. Vaughn Lewis, VINLEC, on the approach VINLEC (St. Vincent) has adopted to GIS Implementation. Included as well are two reviews, by yours truly, of recent major Conferences. The first was this year's (April 25-28, 2004, Seattle, Washington) Conference of the Geospatial Information and Technology Association (GITA). Personally I have found that the annual GITA Conference is perhaps **the** best conference for electric utility personnel to attend, it is always highly organized, educational and informative.

The second Conference reviewed by yours truly is the Planning Conference held in Trinidad (May 18-19, 2004) of the recently formed Meso-American and Caribbean Geospatial Alliance (MACGA). This Alliance holds the promise of being of great strategic importance to the region in the future.

Re conferences, a major upcoming event, which will be well worth attending, is the second URISA Caribbean GIS Conference. The first was held in Montego Bay, Jamaica, in September 2001; this second one is being held in Barbados, September 13-16, 2001. For further details and information please check the website <http://www.urisa.org>.

In closing, I wish to thank the producer of this newsletter Mr. Terry Inniss, Computer Mapping Programmer, The Barbados Light & Power Co. Ltd., and the other members of the Task Force and the CARILEC executive for their invaluable input towards the planning and production of this newsletter.

That's the **GIST** of things for now.

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CARILEC UTILITIES GIS SURVEY RESULTS

General: A GIS Survey Questionnaire, developed by the CARILEC GIS Task Force, was circulated to the GIS focal point contact personnel of various utilities during the first half of 2004. Sixteen utilities responded to the GIS survey; of those responding, three are without a GIS (Belize, Curacao, Guyana), another three (Nevis, St. Kitts, St. Vincent) are in the process or planning stages of implementing a GIS, but most (10/16) have implemented one; concerning these (10), the following is a synopsis of the results:

Pilot Projects: Most utilities (6/10) included a Pilot Project phase in their GIS implementation (i.e. the utilities of Antigua, Barbados, Bermuda, Dominica, Jamaica, and St. Lucia).

Software: of those utilities that have implemented a GIS, most (6/10) are currently using ESRI software, but others are using (solely or in conjunction with ESRI software): Integraph Geomedia, ILWIS, Milsoft, GE Smallworld, and AutoCAD.

Data input: Generally by digitizing from 1:2500 scale maps, but some utilities have used many different scale maps.

Data output: Nearly all the utilities indicated that they employ different kinds of outputs: digital files plus monochrome and/or colour hard copy plots.

Data access: generally via Point and click technology; maps are typically queried by pole numbers, postal address, customer #, coordinates, and land parcel ID.

Data sharing: 6/10 have shared data from their GIS with other organisations.

Human Resources: The typical (and average) number of persons on a GIS team is three. This figure appears to be independent of the size (number of employees) of a utility - which, for those with a GIS, varies from 110 employees (Antigua) to 1500 employees (Jamaica). Aruba has the largest GIS team (7 out of 170 employees).

Accuracy expected/required from the GIS: Answers varied between 0.1 m (2 utilities, Dominica and Grenada), 1m (7 utilities), and 10 m (Barbados).

Satellite imagery is used by Antigua, Barbados, Dominica, and Jamaica.

Polenumbers are in use in 6 of the 10 utilities with a GIS (Aruba, Barbados, Bermuda, Cayman Islands, Dominica, and Grenada) while the others (Antigua, BVI, Jamaica, St Lucia,) plan to use them in the future.

Global Positioning System (GPS) is in use in the GIS systems in Antigua, Cayman Islands, Dominica, Grenada, and Jamaica; it was also used in the GIS pilot project this year in St. Vincent.

Uses of the GIS listed included: estimating system; pole inspection programme; trouble calls center; customer service queries; Engineering & Planning, Design, Outage planning; Joint use reporting; Damage assessment, safety violations; circuit asset reports; customer reports; staking (line design); T&D line crews; meter reading and new service locations; switching purposes; for information purposes for contractors; asset identification; distribution and network analysis; work order and service order applications.

Obstacles listed included: limited human resources, the lack of skilled personnel in GIS technology, funding; keeping up with the fast pace of technology changes which quickly renders out of date or obsolete any system that is developed; training requirements; over-dependence on outside (vendor) support; internal resistance to change - unwillingness to change current business practices and the reluctance to work with newly introduced technology; inadequate data acquisition and inadequate data maintenance procedures, sometimes data for line crews are not brought back in after construction and maintenance of lines; getting senior management to understand and buy into the technology.

General Comments: The survey showed that in general a significant amount of work is being put into GIS technology among the CARILEC utilities. Although there is no single "perfect" GIS, the survey showed clearly how different utilities have different strengths in different GIS software packages and practices. For example, The Barbados Light & Power Co. Ltd. (which has the oldest GIS, stemming from a 1989 pilot project) is perhaps the most versatile in its map querying capabilities; the GIS of the Cayman Islands reportedly features more data sharing with other organizations than any other (it interfaces with the Government Land Registry, Cable & Wireless and the island's Water Authority); Grenada's (GRENLEC's) GIS appears to have more interfaces to other (internal) systems than any other; Antigua (APUA) & Dominica (DOMLEC) have expertise (and are the only utilities) incorporating digital camera photography in a GIS, etc. The survey therefore highlighted the value and possibilities inherent in CARILEC's member utilities pooling resources and expertise, and sharing their GIS skills and experiences, as has begun to happen, for the common good of all.



VINLEC's Approach to GIS Implementation

By Dr. Vaughn Lewis (VINLEC)

A Modern Geographic Information System (GIS) can greatly enhance the operational efficiency of most electricity utilities if properly implemented, maintained and used. However, there are examples of failed GIS projects, most of these originating from poor implementation of the technology. This article briefly describes VINLEC's attempt to successfully implement a GIS.

The implementation process is guided by a Steering Committee consisting of the Heads of the Planning, Transmission & Distribution, Customer Services and Information Systems Departments as well as other key engineers in the Planning and T&D Departments. **Figure 1** illustrates the main stages of implementation of VINLEC's GIS

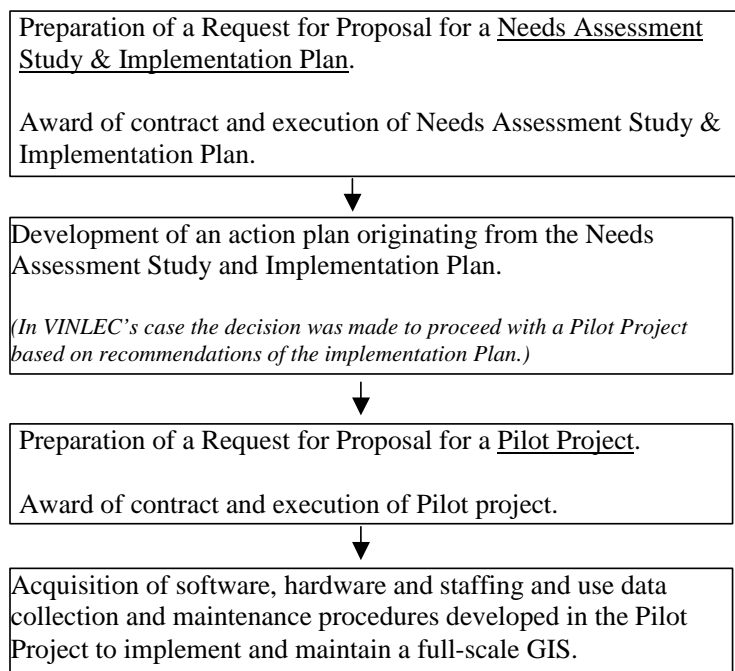


Fig1. Diagrammatic representation of GIS implementation at VINLEC

The Steering Committee determined that it was necessary to conduct a Needs Assessment Study & Implementation Plan to identify and document how GIS can benefit VINLEC and provide a guide on the way forward. A consultant was contracted to assist with this task. The consultants developed a questionnaire, which was distributed to all departments within VINLEC and used to assess:

- the roles and functions of each department in VINLEC,
- the procedures for executing work,
- how GIS can assist VINLEC in executing work
- the current staffing structure,
- the tools used to execute the work
- the types of information/data systems that are used within VINLEC
- the availability of useful maps from external agencies

The completed questionnaires were returned to the Consultants for preliminary assessment after which the Consultants visited VINLEC to compare the accuracy of the completed questionnaires to working reality.

A final document was presented, following a review of a draft document and comments by VINLEC's staff, which identified various ways that VINLEC can benefit from the implementation of GIS technology.

This document also presented a preliminary implementation plan, budget and an implementation schedule.

Ideally it is recommended that a thorough financial analysis of the benefits of any project be conducted before it is implemented. This analysis may be done following or during a Needs Assessment Study. Though important, this step was missed mainly because of the urgent focus on replacing a failing manual mapping system and research into the benefits experienced by other electricity utilities following the implementation of GIS.

Based on the preliminary findings of the Needs Assessment Study, a decision was made to implement a Pilot Project to test and fine tune the recommendations. The Pilot Project was designed to be fairly extensive whereby the end product will be to demonstrate the functionality of a working GIS system. The Pilot Project was used to:

- Identify the most appropriate method of acquiring base maps required for the digitisation process.
- Develop and demonstrate a suitable pole numbering system.
- Finalise the selection of all hardware necessary for data collection.
- Finalise the selection of software necessary for data collection and GIS operation.
- Develop and demonstrate detailed procedures for collecting data of VINLEC's T&D field equipment and customers.
- Demonstrate integration with VINLEC's Customer Information System
- Develop suitable GIS database.
- Identify and demonstrate approaches to access GIS data across the company.
- Make final recommendation on staffing levels and training required to successfully implement a GIS at VINLEC

A project team was formed to work along with the Consultant to digitise a small area and ensure that other aspects of the pilot project were properly implemented. Currently, the pilot project is approximately 60% completed. A data collection device has been identified and tested, different data collection procedures have been tested, all poles have been numbered and digitised, and all customer meters have been digitised. Software for data collection and the main GIS software have been identified. Training in the use of the software is ongoing. Outstanding work includes conclusion of training, demonstration of functional GIS system and submission of final recommendations and work procedures.

VINLEC is hopeful that this approach to GIS implementation is sufficiently methodical to ensure the successful implementation of its GIS.

The 2004 GITA Conference.....A Review By Dr. Philip Corbin

The 27th Annual Conference & Exhibition of the Geospatial Information & Technology Association (GITA) was held in Seattle, Washington from April 25-28, 2004 at the Washington State Convention & Trade Center. Its theme: Information, Strategy, Vision...Building performance for a New Age. The conference included 14 tracks (topics), and about 800 attendees from 250 user organizations, 150 vendors, 200 speakers, 100 papers, and vendor exhibits over an area of 80,000 square feet.



DOMLEC's Ian Sorhaindo, Terry Inniss from Barbados Light & Power, yours truly and DOMLEC's Mark Riddle (as shown from left to right in the above photo) were among the attendees. In fact, both Terry and Ian were featured in on-site interviews published in the conference newsletters (For these interviews, check the [Issue 1](#) link page 1 and [Issue 2](#) link page 4) at <http://www.gita.org/events/annual/27/intro.html>

During both the pre-conference seminars (April 25-26) and main conference (April 26-28) presentations, keeping up with the large number of acronyms which abounded was an exercise in itself. The following ones currently in vogue are worth learning: **GIS** (Geographic Information System); **GPS** (Global Positioning System); **SCADA** (Supervisory Control And Data Acquisition); **OMS** (Outage Management System); **DMS** (Distribution Management System); **DA** (Distribution Automation); **AMR** (Automated Meter Reading); **CIM** (Common Integration Model or Common Information Model), **EAI** (Enterprise Application Integration); **ERP** (Enterprise Resource Planning); **CRM** (Customer Relationship Management); **GML** (Generalized Markup Language); **XML** (Extensible Markup Language); **SOAP** (Simple Object Access Protocol or Service Oriented Architecture Protocol); **WSDL** (Web Services Definition Language); **SVG** (Scaleable Vector Graphics); **LPS** (Local Positions Systems), and **RFID** (Radio Frequency Identification).

The best attended, highly interesting talk, re **Technology Trends in the Spatial Industry**, was by Peter Batty, CTO, Ten Sails, Greenwood Village, Colorado, who predicted that in the next 10 years, Web services, wireless technologies, and sentient computing would most affect the utilities and geospatial industries, with self-updating geodatabases coming into being. (see the bottom half of the previously mentioned [Issue 1](#) link). He suggested that in the future RFID tags, ultra-wideband, LPS, GPS, sentient computing and other technologies will eliminate the need for field crews to record and enter positions and attributes of outdoor facilities placed, since these facilities will automatically and wirelessly self-update the corporate database.

Another interesting presentation was by Robert Wright, Manager, Delivery Systems Maintenance, Dominion, a US-based electric utility serving 5 million customers over 9 States. This utility exports its GIS maps to the Internet and updates them every 10 minutes with information on how many customers are out of supply and roughly where these customers are located. See http://www.dom.com/news/outage_map.jsp. Mr. Wright stated that during hurricane Isabella last year, these outage maps proved popular and of value to the media. Here in the Caribbean, we should give thought to establishing similar online maps.

Some key points made in **The Human Factor** track re the Change Management needed to facilitate the introduction of GIS systems were: pinpoint and work with the key persons resistant to change; don't throw users "in the deep end" but teach them to swim; measure software usage; deliver technology to users in manageable chunks; and adopt a "train the trainer" approach, training users in-house as much as possible.

On a personal note, the conference confirmed to Terry and me that we should push ahead with our web-based GIS technology at The Barbados Light & Power Co. Ltd. In particular, we now plan to pursue an upgrade of our system using SVG, XML, and WSDL. In doing so, we will be able to create maps on the fly, and bypass our present AutoCAD-based process for refreshing the GIS data. Users will be able to window an area of the country, run a database query for all map elements which fall into that window, automatically generate an SVG document from the resulting data to dynamically create a map, and thereafter employ redlining to place text & symbols on our browser-viewed maps as desired.

In summary, the GITA conference was a valuable learning experience and imparted a new vision for where we all could be with GIS. It is to be hoped that there will be many more CARILEC attendees in the future at such conferences.



Report on the MACGA Planning Meeting, May 27-28, Trinidad & Tobago *By Dr. Philip Corbin*

The Meso-American and Caribbean Geospatial Alliance (MACGA), formed in 2003, is a project implemented by the U.S. Geological Survey (USGS) EROS Data Center (EDC) in cooperation with several partner organizations. MACGA strives to facilitate the development of spatial data, to promote efficient data management, to support data access and dissemination, and to encourage the development of geospatial applications in the regions of Meso-America and the Caribbean. For background information on MACGA and its recent activities please check: <http://edcintl.cr.usgs.gov/macga/proposal.html>; <http://edcintl.cr.usgs.gov/macga/index.php>; http://edcintl.cr.usgs.gov/macga/ministerial_wkshp/MACGA%20Flyer%20lt.doc; <http://hasp.axesnet.com/contenido/documentos/MACGA-report.pdf>; http://edcintl.cr.usgs.gov/macga/misc/Objectives_Deliverables.doc

A two-week MACGA training workshop was held at the Trinidad & Tobago Campus of the University of the West Indies (UWI) on May 17-28, 2004; at its close, datasets valued at US \$20 million were distributed to 30 participants from 16 countries, who were gathered from various key government agencies in the region. There was also a two-day MACGA planning meeting (May 27-28, 2004) at the same venue; 32 participants from various institutions attended. The chairman was UWI's Dr. Jacob Opadeyi, Coordinator, Centre for Geospatial Studies, UWI. The objectives were: (1) To reach a regional consensus on regional geospatial issues and prioritize regional needs to support the use of geospatial information and its application for development planning; (2) To reach consensus on the way forward with respect to geospatial information in the region; and (3) To support cooperation, integration, and development activities in the following specific focal areas: (a) Disaster mitigation and response, and (b) Land planning, land cover and conservation planning, and sustainable development.

Personal highlights included: (1) Distributing the inaugural issue of CariGIS to the MACGA attendees; Meeting Kate Lance, editor of an excellent free online MACGA-backed GIS newsletter Spatial Data Infrastructure – Latin America and the Caribbean (SDI-LAC) - registration for this newsletter is at <http://fgdc3.er.usgs.gov/Registration/>; (2) meeting Larry L. Tieszen, prime mover behind MACGA; from International Programmes USGS, EROS Data Center; (3) meeting Mr. Hidetomi Oi, senior advisor of the Japanese International Cooperation Agency (JICA), established in 1974 as a governmental organization responsible for the technical aspect of Japan's Official Development Assistance (ODA) program - JICA is working closely with the Caribbean Disaster Emergency Response Agency (CDERA) re the transfer of GIS technology for disaster emergency mitigation and research; (4) liaising with Elizabeth Riley, Programme Manager, Mitigation and research, CDERA; (5) liaising with Cecille Blake, National GIS coordinator

Ministry of Lands and the Environment, Jamaica; (6) participating in several interesting discussions from papers presented and also in breakout sessions on day 2 of the conference.

Some recommendations coming out of the planning meeting were: There is a continuing and urgent need for greater attention to disaster management in the Caribbean; A basic list of core data should be available in standard formats and appropriately georeferenced in each country (including: Elevation/contour; land use; hydrology; soils; geology; vegetation; bathymetry; infrastructure including roads and buildings; critical facilities e.g. shelters); Metadata are generally not available and need to be developed and accessed through standard clearinghouse mechanisms; CDERA and PDC (Pacific Disaster Center) agreed to compile a standard list of core data, appropriate standards and attributes, and temporal maintenance and updating that is required; There is a common need for greater national capacity and sustainability; Common geospatial standards need to be promoted - this may be facilitated by CDERA forums and the availability of technical expertise; Building and nurturing national capacity is required for all geospatial activities including those related to disasters, land cover, land planning, and environmental issues; Attention needs to be placed on habitat fragmentation, conservation planning, and rapid urban development; A regional and systematic approach should be developed to secure updated base data including remotely sensed imagery for land planning and early warning; A similar regional approach is needed for continued training and networking; The SDI newsletter should be supported and continued; A network of technical experts should be facilitated in the context of a regional GIS policy; Use MACGA funds to support the development of National Spatial Data Infrastructures; Mechanisms to create national political support for new and advancing technologies need to be created, perhaps a function that could be implemented through CARICOM; Countries that have made substantial advances need to be held as models, e.g., Jamaica, British Virgin Islands, and Guyana; Encourage the banks and donor agencies to require that project data be made available and follow accepted standards; Consider support for regional facilities or centers with multi-national responsibilities for various thematic sectors, e.g., satellite reception and applications, disaster management; Utilize the URISA meetings in Barbados for further integration and coordination; Continue MACGA collaboration to fully implement national Internet Mapping Services (IMS) systems and a regional multi-viewer; A Working Group consisting of Jacob Opadeyi, Elizabeth Riley, Andrew Bishop, and Cecile Blake was formed to develop an institutional framework for developing opportunities and resolving geospatial data issues among the Caribbean countries.

Further information, including the list of attendees and agendas for both for the training workshop and the planning meeting, as well as the proceedings of the latter, is online at: <http://edcintl.cr.usgs.gov/macga/caribbean.php>