Implementing a Spatial Decision Support System for Puerto Rico: The Political Process

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Guy Engelen and Elías R. Gutiérrez, Ph.D.

VITO - Flemish Institute for Technological Research
Centre for Integrated Environmental Studies
Boeretang 200, 2400 Mol, Belgium
guy.engelen@vito.be

Graduate School of Planning, UPR
Rio Piedras, Puerto Rico
eliasgutierrez@yahoo.com
Puerto Rico: Some Key Facts

- Puerto Rico is a densely populated Caribbean archipelago that transformed itself in 50 years from a very poor rural to an industrial urbanized society.
- Industrialization was a relatively successful strategy to lift the island from poverty.
- Urbanization and land use has been a planning failure.
Puerto Rico’s Dominant Land Use Pattern
Indicators of Environmental Stress
What is Xplorah

- A state of the arts SDSS tailor-made for the Integrated Assessment of Socio-economic and Environmental Spatial Policies.
- With simulation capabilities that produce future likely land-use patterns consistent with user-defined scenarios developing into the future.
- A tool to support strategic thinking and evaluation of alternative policies under different sets of circumstances.
Objectives and State of the Art

Xplorah was planned to evolve into a SDSS for the Integrated Assessment of Socio-economic and Environmental Spatial Policies:

- Autonomous developments (dynamics) of the system;
- Current and future effects of policies;
- Evaluation of alternative policies.
The Development Process

The GSP commissioned the development of Xplorah to RIKS in 2001 with support from:

- The Office of the President of the University of Puerto Rico; and
- Public Policy Research Center of the Rafael Hernández Colón Foundation (RHCF);

First prototype available March 2002;
Xplorah’s *Building Blocks*

- The core element is the *Constrained Cellular Automata* model of White, Engelen and Uljee, representing the Puerto Rican archipelago at 4 geographical levels:
  - 3 Islands
  - 78 Municipios
  - 100 Transport Zones and
  - 225,000 Cellular Entities of 6.25ha each.

- Demographic and economic systems integrated by means of linked dynamic models that jointly determine land use patterns over time.
Resistance met:

- Development and implementation of the Xplorah SDSS met resistance at the institutional level reflecting:
- The political nature of land use policies.
- The very limited role traditionally played by sophisticated tools for policy making and planning.
Strategy Followed to Gain Support From Potential Users

- Integrate existing models being used in uncoupled and unrelated modes, with new models of special interest:
  - Demographic
  - Input-output
  - Macroeconomic and sector
  - Housing supply / demand
  - Transportation
  - Climate
Major Enhancements Linked to Land Use Make Xplorah Unique

- An age-cohort demographic model;
- Macroeconomic model (39 equations)
  - Final Demand and Housing Forecaster
  - Input-output Matrix (92 sectors);
- A 4 stage transportation model;
- Regional models that distribute national aggregates;
- A Cellular Automata Land Use Model acting at the local level
The User Interface Illustrates Processes at 4 Strongly Coupled Spatial Levels
National Economics & Demographics
The Four Stage Model

Production & Attraction

Distribution & Modal split

Route choice & Allocation

Trip cost & Accessibility

Land use

Jobs & Population

Departures & Arrivals

Trip Matrix

Cost matrix

Road track Intensities

Trip Matrix
The political dimension is incorporated through: *Suitability & Zoning restriction maps (PUT)*
Xplorah: Processes at 44 strongly coupled spatial levels

**National**

1 Nation

22,500 cells (250 m)

78 Municipios

401 Transport zones
Exploring planning options

- Scenarios
- External shocks
- Alternative visions
- Ex-post, ex-ante trends
- Actual and optional policies

National Indicators
- Population, Economic activity, Job indicators

Municipal Indicators
- Population, Economic activity, Job indicators

Transportation Indicators
- Accessibility, Population, Jobs, Traffic indicators

Local Indicators
- Land use, Environmental, Economic, and Social indicators

1990
- Job Potential
- Potential biodiversity
The Political Process

- An Intensive effort to obtain acceptance and public funding necessary for development and implementation was launched from the start…
- After a dozen depositions to House and Senate Committees…
First Major Success

- On February 2003, a Joint Resolution, approved unanimously by the House of Representatives and the Senate, was signed into law by then Governor Sila María Calderón to partially fund and support the development of Xplorah.
The Stumbling Rock

- The House and Senate unanimously voted R.C. de la C. 4666 to extend funding for Xplorah’s development, but;
- Separately, order the Puerto Rico Planning Board (PRPB) to prepare a land use plan (PUT) with no funding!
- Xplorah and the PUT became competing projects!
Then…the Tragedy!

Planning system yanked
Planners left dumbfounded

R.C. de la C. 4666
is Vetoed!

The mystery pocket veto
Now we are confronted with the Mystery of the Great Pocket Veto.

Amidst the hullabaloo of the great election controversy, there occurred very quietly Gov. Calderón's pocket veto of a legislative resolution that would, according to an array of planning and development enthusiasts, revoluc-ionize Puerto Rico's planning, thrusting it into the modern era of advanced technology.

Chief proponent of the change, Elias Gutiérrez, dean of the Graduate School of Planning at the University of Puerto Rico, said the resolution would have appropriated final funding for a computerized model designed for use as an analytical planning tool.

The model, named Xplorah, was devised by UPR in conjunction with the University of Masstricht and the Research Institute for Information Systems (RIKS) in The Netherlands. Betsy Asencio of the Legal Affairs Office said, "It was a good initiative. The money was available, but it was needed for urgent services that were not expected."

The Legislature had been solidly in back of the project, having provided an initial $350,000 to go with $125,000 from UPR, assigned by former president Norman Maldonado.

House Vice President Ferdinand Pérez of the Popular Democratic Party and author of the resolution, said in March that, "This is perhaps the most important thing we've worked with since we arrived at the Legislature, and I believe it's the most important [project] in the hands of the government of Puerto Rico — to restructure its planning system."

Why would something so promising of modernizing Puerto Rico's bureaucratic, disdainfully inefficient planning system be mothballed for lack of $350,000? Calderón does not have to explain reasons for pocket vetoes, but in this instance one is certainly called for.

In any event, the new session of the Legislature opening in January should make a review of this situation a priority.
So... 

...start again!
In the mean time the politics of land use intensified

- The absence and need for an SDSS became clear.
- The technical and political process came to a **boiling point** in 2006 with the publication by the PRPB of a draft of the first land use plan (PUT) ever attempted for the island.
Pandemonium!

- The PUT was found to be based on inaccurate, outdated and incorrect land use maps;
- The PRPB lacked instruments to evaluate alternatives;
- The likely consequences of plan adoption were unknown;
- The team of planners and technicians that had prepared the plan revolted and were dismissed.
PLAN DE USO DE TERRENO
EN EL LIMBO

Despiden al Director
y renuncian los peritos

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A technical problem transformed into a political time bomb.

Need for Xplorah Gains Political Support!
An Updated Land Use Map Become a Political Necessity

The Need for Xplorah Gained Political Support!
Enter the
The Governor’s Advisory Board on Urbanism

“...to plan, Xplorah is needed, and Xplorah requires reliable data...”
“Puerto Rico needs a plan…

…but, how can we plan if you don’t even know what’s on the ground?”
Then, fiscal crisis strikes:

- On May 1st 2006 the government of the Commonwealth of Puerto Rico shuts down for the first time in history after running out of cash to pay the wage bill.
Implementing Xplorah requires production of adequate land use maps at affordable cost

An Unexpected Technological Solution Enters the Arena
Pegasus:
UAV-HALE Remote Sensing Platform
Pegasus is a system, not an aircraft
The Inevitable Result…

Victory!
But, wait…

...Just not yet!
There was a joker in the deck!
Politics again…

- In December 2006 the New Progressive Party (NPP) that controls the Legislature, blocked a $500 million GO bond issue that, among other infrastructure projects, would have funded the implementation of Xplorah.

- The battle was afoot once more!
Finally…

- In December 2007 the contracts were signed and the project’s implementation starting in January 2008 and programmed to extend for 30 months.