SIMLANDSCAPE

A PSS concept with PBGIS and gaming

About achieved and planned R&D
PROGRAM
1. Simlandscape 1 and Simlandscape 2
2. Conceptual framework
3. Simlandscape 1 results
4. Simlandscape 2 ideas
Simlandscape 1 & 2

2000 – 2005  **Simlandscape 1**

A research and design support system for planning based on the scenario method and Parcelbased-GIS

Consortium: Technische Universiteit Eindhoven and Nieuwland Advies. Co-funded by Habiforum

2006 – 2008  **Simlandscape 2**

A PSS concept that turns Pb-GIS into digital lego and participative scenario development into serious gaming

Consortium: Idem + The Dutch Cadastre, Alterra and Nieuwland Automatisering. Co-funded by RGI.
R & D challenge

Simlandscape is part of the kind of R&D that aims at better tools for planning, specifically;

The development of a scenario system - for professional planning - that:

1. is relevant for modern planning and;
2. is consistent with scenario methodological aspects
Additional challenges
Simlandscape 1

To develop and test:

Communicative and participative methods
Multi-thematic scenarios
Scenario performance evaluation

Landscape (LULC) transformation modelling
Hybrid scenario methodology
Integral data-sets

stakeholders
interests/aspects
effectiveness/feasibility

real study areas
draw and calculate
data-mining and conversion

1. Simlandscape 1 & 2
Simlandscape 1 contributions

Conceptual

Property – governance interaction as a basis for spatial scenario research.

R&D

One hybrid, design oriented and quantitative system. Actor-inclusive, modular and area covering.
Possible professional applications

Research
(scenario studies, monitoring development)

Policy exploration and decision-making
(Scenario studies, policy evaluation)

Gaming and simulation
(In education and planprocesses, ‘ex ante‘ evaluation of new policies)
Limitations

External
- Time requirements with quantitative scenario studies
- Required data infrastructure
- Planning tradition

Internal
- Elegancy of software (flexibility, fastness, user friendliness, vividness)
- Role simulation capacities (game integration, number of players, use of agents)


1. Simlandscape 1 & 2
PROGRAM

1. Simlandscape 1 and Simlandscape 2
2. Conceptual framework
   Cadastral transformation model, scenario method, artist impression
3. Simlandscape 1 results
4. Simlandscape 2 ideas
‘The cells of change’

In Simlandscape properties (or cadastral units) are considered as transformation cells.
Transformation model

ALL KINDS OF AGENT INTERACTIONS INFLUENCE DEVELOPMENT

MARKETS  ADMINISTRATION  OTHER USERS  NATURE

CADAstral OWNers AND THEIR PROPERTIES

PROPERTY ‘PARCELS’ ARE THE CELLS OF CHANGE IN LANDSCAPES

CHANGE IN ‘PARCEL’ USE = CHANGE IN LANDSCAPE

Concept; property – governance interaction as a basis for spatial scenario research

2. Conceptual framework
Recognize this planning problem?!

NATURAL PROCESSES

GOVERNMENTS IDEA FOR A PLAN DEVELOPMENT

MARKETS

GOVERNMENT

USERS

THE RESULTING TRANSFORMATION

NO

NOT INTERESTED

2. Conceptual framework
Or vice versa ?!

MARKETS  GOVERNMENT  USERS  NATURAL PROCESSES

NO

DEVELOPERS IDEA FOR DEVELOPMENT OF A PARCEL

THE RESULTING TRANSFORMATION

2. Conceptual framework
Simlandscape is…

a translation of it’s transformation model - the Cadastral Land Use Model - into a (proces)game model and a GIS model
3. FUTURE SCENARIOS

FULL SCENARIO STUDIES HAVE 3 COMPONENTS (VAN DOORN) AND 2 TYPES OF FUTURE SCENARIOS

1. PRESENT SITUATION

2. FUTURE PATHS

2. Conceptual framework

3. FUTURE SCENARIOS

PLAN SCENARIOS
PLANS, RULINGS AND INVESTMENT PROJECTS

REAL SCENARIOS
EXPECTED DEVELOPMENT WITH AND WITHOUT INTERVENTION
Simlandscape Scenarios

2. Conceptual framework
Scenario construction

2. Conceptual framework
PROGRAM
1. Simlandscape 1 and Simlandscape 2
2. Conceptual framework
3. Simlandscape 1 results
   bridging gaps, features, role simulation, cadastral typology, PbGIS as scenariotool
4. Simlandscape 2 ideas
‘Bridging gaps’

Simlandscape intends to bridge the gap between…

- **Planners & stakeholders**
  through a digital maquette as a tool for communication and evaluation of ideas

- **Planning & realisation**
  through feasibility assessment of planscenarios with respect to owner behaviour (parcel transformations)

- **Monitoring data, plandata & scenario data**
  through a normalisation and a (parcel) typology method

3. Simlandscape 1 results
# Simlandscape design and research features

<table>
<thead>
<tr>
<th>Present Situation</th>
<th>Present Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHAT DOES THE PRESENT SITUATION LOOK LIKE</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PlansScenarios</th>
<th>PlansScenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESIGN AND CONSTRUCT; HOW CAN THE FUTURE LOOK LIKE</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>'What-If' Simulation Scenarios</th>
<th>'What-If' Simulation Scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHAT COULD THE AUTONOMOUS DEVELOPMENT LOOK LIKE</td>
<td></td>
</tr>
<tr>
<td>WHAT CAN PLANREALISATION SCENARIOS LOOK LIKE</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analytical Tools</th>
<th>Analytical Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPLY METHODS THAT DESCRIBE SYSTEM BEHAVIOUR, SUCH AS:</td>
<td></td>
</tr>
<tr>
<td>• (GAME)SIMULATION</td>
<td></td>
</tr>
<tr>
<td>• TRENDANALYSIS AND INQUIRIES</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Of Any (Plan)Scenario You Can Determine:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• TO WHAT EXTENT WILL STAKEHOLDER PROGRAMS BE MET</td>
</tr>
<tr>
<td>• WHAT TRANSFORMATION IN LAND USE DO THEY IMPLY</td>
</tr>
</tbody>
</table>

---

3. Simlandscape 1 results
The transformation model was ‘translated’ into a role simulation game “see the future in action”
The role simulation game
(originally created in GMB context for system design)

ROUND 1
EXPLORATION
WHAT AND WHO

- t0-SCENARIO
- OWNER SCENARIO
- SECTORAL VISIONS
- VISIONS CO-USERS
- REFERENDUM

ROUND 2
PARTICIPATIVE PLAN DEVELOPMENT

- COMPETING ALLIANCES OF PLAYERS
- MAKE INTEGRAL PLANS
- IN NEGOTIATIONS WITH STAKEHOLDERS
- PLAN ELECTION

ROUND 3
TRANSFORMATION RESULT

OWNERS MAKE:
- DEVELOPMENT PLANS
- AND APPLY FOR:
- BUILDING PERMITS
- BANKLOANS

IF OK >> ASSEMBLAGE NEW SITUATION
IF NOT >> t0 SITUATION
Cadastral typology plays an important role in Simlandscape (simultaneously ‘enabling framework’ and ‘scenario lego’)

How does Simlandscape 1 handles this in GIS?
What challenges can be illustrated for Simlandscape 2?
Two basic lot typologies are used to describe or construct scenarios.

Functionform = economic function (f.e. hotel or husbandry)
Lay-out form = what does its landscape look like (f.e building, yard or estate)
Lay-out form catalogue
T0 lay-out classification

A present parcel situation in pilot area Lunteren
SSR = 98.3% = 18,5 ha.; TSR = 54.3% = 10,2 ha.

Lay-out form catalogus

- Arable
- Forest Estate
- Field

Lay-out form:
Forest Estate >10 ha.
Use of GIS in Simlandscape

An illustration of Simlandscape GIS features: using real area data

Topo map of study area

Topo map with property lot overlay (transformation cells)

3. Simlandscape 1 results
Present Situation (t0-scenario)

Thematic maps
- Function forms
- Lay-out forms
- Space use forms

Analytical maps
- Non agricultural green
- Wild life suitability

FUNCTIONFORMS
Classification based on economic functions

SPACEUSEFORMS
Combined typology

LAY-OUT FORMS
Classification based on the physical lay-out ratio
Owners scenarios

Profession

Owners who want to develop buildings or green

Respondents

Owners scenarios

Profession Owners who want Owners expect Owners scenarios

Owners expect

Owners scenarios

Profession Owners who want Owners expect Owners scenarios

Owners scenarios

Owners who want to develop buildings or green

Respondents

Owners scenarios

Owners who want to develop buildings or green

Respondents

Owners scenarios

Owners who want to develop buildings or green

Respondents
Planscenarios in two steps

3. Simlandscape 1 results

- planscenario on parcel level for the estate zone
- parcel typologie program
- parcel typologie structure
- function forms
- lay-out forms
- zone level
- parcel level

- recreation & small farm zone
- estate & nature zone
- country house zone
- industrial farm zone
Planscenarios in two steps

3. Simlandscape 1 results

Parcel typologie program

Simlandscape 1 Manual query and classification in GIS (ArcView)

Parcel typologie structure

Zone level

Parcels

Estate & nature zone

Recreation & small farm zone

Industrial farm zone

Country house zone

Parcels on parcel level for the estate zone
Planscenarios in two steps

3. Simlandscape 1 results

Simlandscape 2 - Automation in database querying (SQL) and reclassification
Planimpact scenario ‘using what-if’ simulation

3. Simlandscape 1 results
Portfolio development projects

Section ‘estate-like’ projects

List of specific ‘estate-like’ projects:

- Design
- Lay-out indexation
- Function
- Economic data
- Et cetera

NB Portfolio projects are used in parcellation scenarios
Planimpact scenarios step 1 – land supply

3. Simlandscape 1 results

- t0, functionforms
- ex ante current policy simulation (t5)
- ex ante planscenario Mix + landreconstruction simulation (t5)
- Expected sales & transformations
  - Red = sales >> allocation development projects
PROGRAM

1. Simlandscape 1 and Simlandscape 2
2. Conceptual framework
3. Simlandscape 1 results
4. Simlandscape 2 ideas
   - challenge, PSS concept, game concept, digital lego and maquette
The challenge is to design software that is able to:

- turn PbGIS into digital lego and;
- embed participative scenario development into serious gaming
Simlandscape 2 & PSS

Policy cycle

Planning Support System (PSS)

T0 Information
- Area
- Policy

Tn Development
- Planscenario Constr. + SIM
- What-if
- Role simulation game
- Planprocess (log)

4. Simlandscape 2 ideas
Simlandscape 2 & PSS challenges
Digital lego concept: creating the box and the maquette
Role simulation game

Digital game concept elements

- real plan areas and data
- revolving rounds to implement lessons learned (f.e. with respect to plan scenario feasibility)
- continuous flow of information to players on game events (news, game status, phase results, back-round data)
- continuous open communication between all players
- a dynamic cast of players (new players may enter, coalitions may change)
THANK YOU!
THANK YOU
Simlandscape GIS model offers a laboratory model of your study area to explore the future
Present-to-plan (scenario) transformation analysis

Planscenario Mix, zone level

Compare

(Not) allowed t0-parcel situations according to plan design

Lay-out forms, present situation (t0)

Compare

To be transformed t0-parcels

Planscenario Mix, parcel level
SIMLANDSCAPE

Een gereedschapskist voor het onderzoeken van ruimtelijke scenario’s als hulpmiddel bij planprocessen en gebiedsmonitoring

• Zichtbaar maken van dynamiek
• Haalbaarheidsonderzoek
• Optimalisatie van planscenario’s
• Monitoren van scenario realisatie
• Multi actor en participatief
• Ideeën voor investeringsprojecten gebruiken als bouwstenen voor scenario constructie

EINDE
SIMLANDSCAPE

Making dynamics transparent, feasibility studies, planscenario optimalisation, monitoring scenario realisation, multi actor en participative, using investmentprojects as buildingstones in scenario construction.

DISCUSSION

• Parcels are the most adequat units for regional planning information and scenario tools

• Only hybrid models – a combination of projective MAS LULC and creative - can do the job.

END
With Simlandscape you can simulate and evaluate

- Actor behaviour, instruments, participative planning & the resulting project development and landscape transformations in a .................. role simulation game

- The present and expected and designed land use futures in a......... computermodel
Analysis of portfolio projects

Comparison of projects by their indexes (MILU) on build space (BSI), floor space (FSI), hard space (HIS) and green/soft space (SSI).
SIMLANDSCAPE

A research and design support system for subregional planning based on the scenario method and Parcelbased-GIS
DISCUSSION

1. Parcels are the most adequate units for regional planning information and scenario tools

1. Only hybrid models – a combination of projective MAS LULC and creative - can do the job.
SOME CONTEXT

Good planning is appealing in content and plausible and therefor effective with respect to realization

Planning is appealing when it tells vivid stories about comprehensive and sustainable visions

Planning is plausible and effective when it is based on explorative scenario research that includes knowledge of systems, instruments and investment projects

Both criteria are closely linked to participative and development oriented planning
SIMLANDSCAPE IN A NUTSHELL

Better tools to enable local planning to make good and feasible plans, in an interactive way and pro-active towards realisation, are clearly a challenge for R&D.

Simlandscape is such a tool. It is a design for a hybrid research and design support system for subregional planning, based on the scenario method and Parcel-Based GIS.

It uses the scenario method in combination with a multi-actor transformation model of culture areas which has been translated into a GIS model and a procesmodel for participative planning.

Present situation data are made available for all kinds of users, not only for retrieval and analysis, but also as a model for the development of autonomous scenarios and for the design and evaluation of plan scenarios.
Onderzoeksopdracht

‘Ontwikkel en verken de mogelijkheden van op eigendom gebaseerd scenario gereedschap voor de lokale – op participatie, meervoudige kwaliteit en realisatie gerichte – planningspraktijk’.