A Workshop in Digital GeoDesign Synthesis

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The promise of geodesign when used in a digital environment differs from traditional design done digitally in the way it can be implemented. Traditionally, digital design involves the direct allocation of land uses to build a plan or the application of spatial optimization models. The workflow is based on drawing and digitization of plan objects which constitute a design in a serial fashion, and once these are drawn they are then evaluated for performance. What makes geodesign fundamentally different from a traditional design process is the workflow, the process of creating a design. Geodesign is normally a collaborative enterprise, in which computers respond to changes in design as the various stakeholders are building it. The ability to create a design collaboratively and rapidly measure its impacts as the team proceeds, fast iteration in rapid design cycles through several improving versions of a design, and the use of a digital platform for collaboration and communication form the basis of the geodesign workflow. These are significant ways in which geodesign workflow differs significantly from a traditional one.

Another important difference is the emphasis in geodesign on "systems thinking". Carl STEINITZ, Professor Emeritus of Landscape Architecture and Planning at Harvard University, developed some early and fundamental ideas about the geodesign workflow. STEINITZ developed a model of landscape change that enables design and assessment of alternative futures. The framework takes a multi-system approach to problems that is novel both from a design and from an analysis point of view. The "Steinitz Framework" has been put in practice for a number of years on large landscape change problems and in the form of intense two or three day workshops where participants from diverse academic and professional backgrounds and levels of experience come together and go through the process to build a design iteratively in a compressed timeframe.

In 2014-15 the framework was transformed by Hrishi Ballal into software that enables a digital geodesign workflow. The digital workflow is an open system where the participants bring their data and ideas into the tool and after going through the various stages of the framework are able to collaborate and build plans to address the challenges the region faces. The tool is an open system and supports most commonly available geospatial file formats such as Shapefile, KML, WKT, GeoJSON etc. and data can be exported out in a Shapefile format. The system is fundamentally a designing aid that interacts with commonly available GIS data and other models and helps the users in building the design. The design data can be exported for use in advanced 3D visualizations etc.

The software includes a project setup step where the initial requirements are built into the project. The tool enables participants to create diagrams and select a number them to build final designs by enabling digital synthesis. Diagrams can be built by sketching, importing existing feature data or linking to dynamic models. In addition the tool provides a platform for collaboration during design creation and also helps in analyzing the created designs. The versioning system implemented enables the users to quickly iterate on the design until

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they are satisfied with its performance. The tool enables multiple ways of collaboration: open mode, team mode and completion among others and also supports multiple ways to design. The tool is novel in a way that it enables near real-time analysis of designs over multiple systems. The tool extends the existing work done in planning support systems and it can accommodate any model from any discipline as long as the model can output a map with three to five colors. The tool also specifies the use of color and graphic conventions, which enforce a shared language of communication and enables broad collaboration among experts from diverse disciplines and non-experts.

Table 1: GeoDesign Change

1. Geodesign "problems" are complex with at least ten systems. 2. Each system has Representation-data, Process and Evaluation models. 3. There are many ways to Change and improve each system. These are policies and projects. Assume ten ways: e.g. 10 systems X 10 = 100 ways. Each is a diagram. Some are partial solutions. Some are GIS-derived. Some are rule based and "smart". 4. Change towards a design is a relational synthesis in space and time of SETS of system changes.	5. Each Change "move" has Impacts across ALL systems. These are quantities and qualities, and can be expressed as graphs, maps and time-lines. 6. There are many ways of synthesis —of making a design. Some are more effective than others, depending.... 7. All Changes feed back, To Representation, Process and Evaluation models. 8. There Change-Variations, based on design revisions, 9. and Change-Alternatives based on diverse decision models, alternative scenarios, sensitivity assessments, etc. There may be six +- of each in any geodesign study.	10. These must be compared, and (usually) one must be selected and proposed for action. 11. Implementation in the future changes the Representation-data. 12. Synthesis in geodesign is not a linear process, The methods and models do NOT "scale", but they must interact across the "problem", geography, size, scale and culture. Carl Steinitz notes for Hrishi Ballal CASA/Bartlett/UCL 2013-14

The tool used in the workshop will be available free to use with support manuals and video tutorials at www.geodesignhub.com, and with options to have paid professional support.

This one-day workshop at DLA2015 will apply the "Steinitz Framework for Geodesign" and the related software package designed by Hrishi BALLAL to the design for rebuilding Soma City Japan, the nearest city to the post-tsunami, post-nuclear disaster at Fukushima. It will use data and models provided by Japanese colleagues in a prior workshop. The workshop will be led by Carl STEINITZ and Hrishi BALLAL.

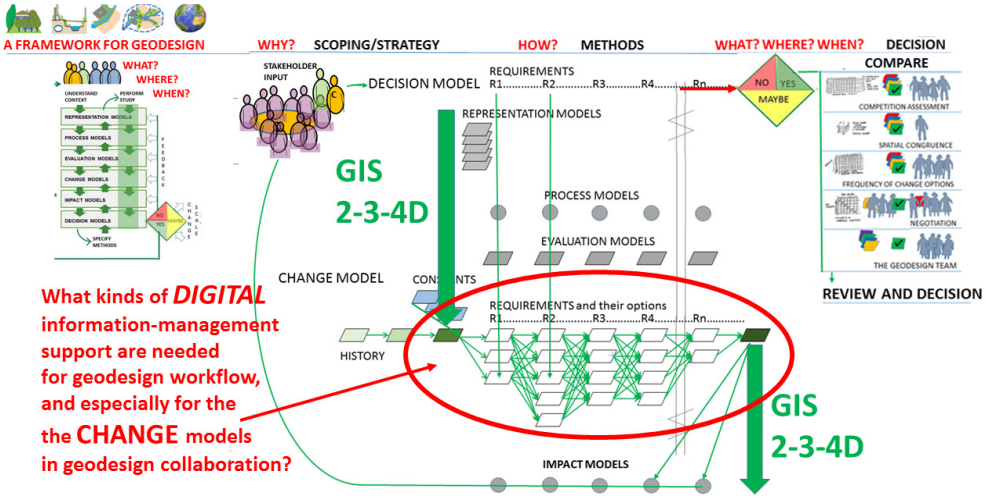

Fig. 1: What? Where? When?

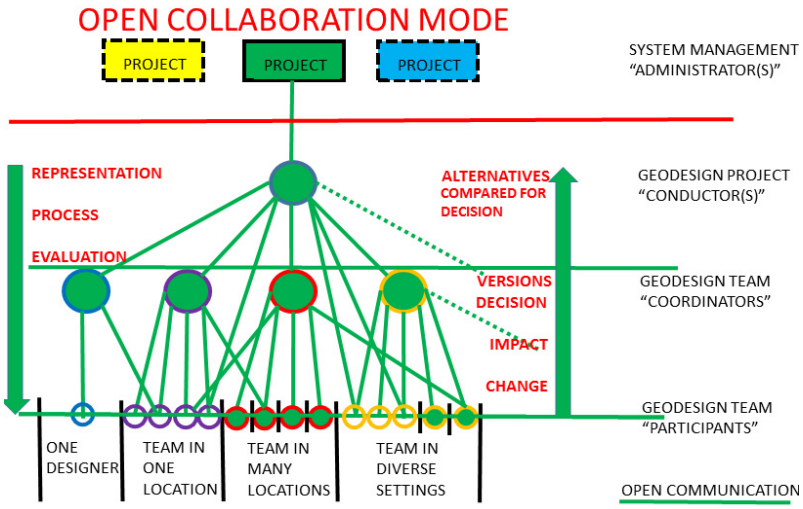

Fig. 2: A GeoDesign Workflow for Change Models

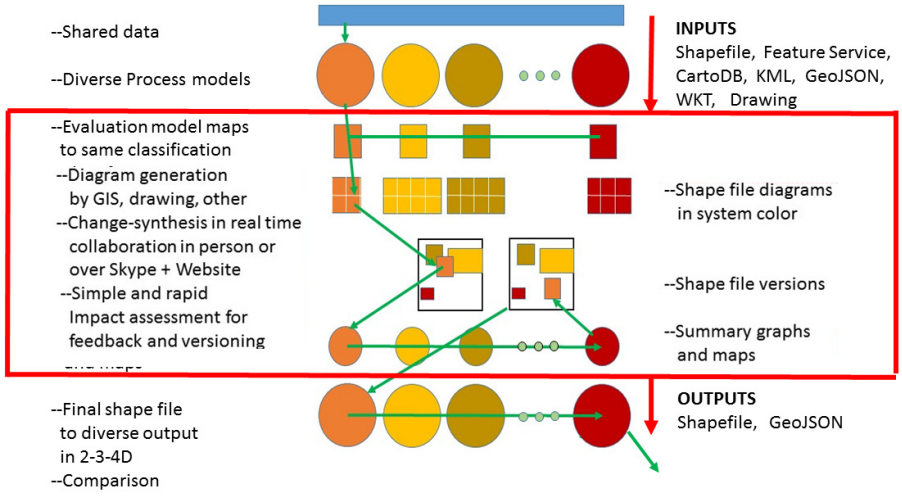

Fig. 3: A GeoDesign Workflow for Change Models

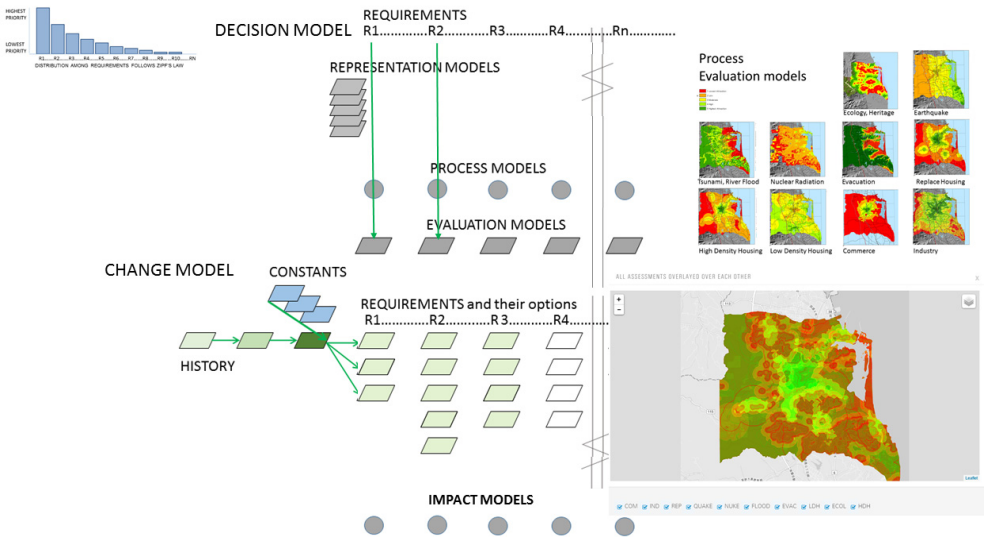

Fig. 4: Assess Evaluation Models

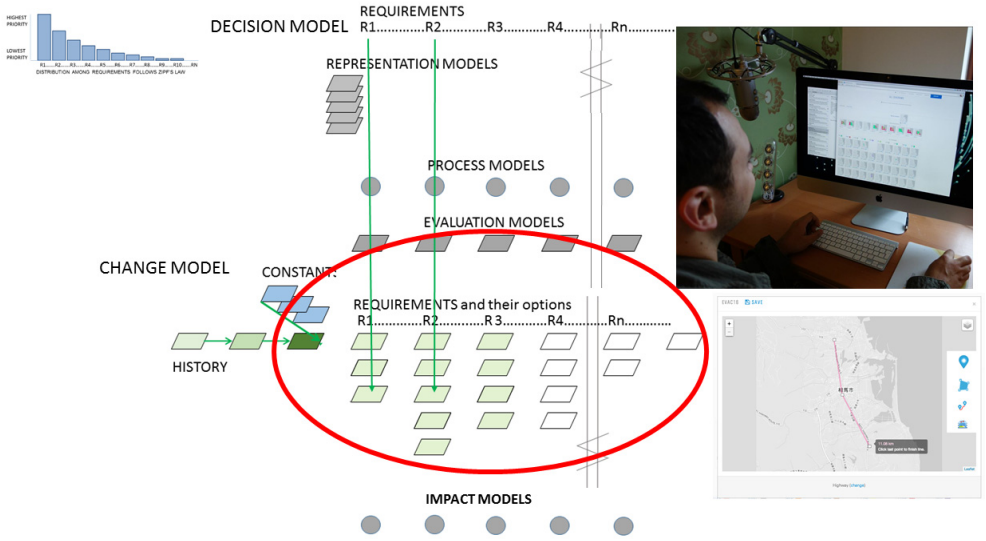

Fig. 5: Generate Policy and Project Diagrams

Fig. 6: Grid of Policy and Project Diagrams

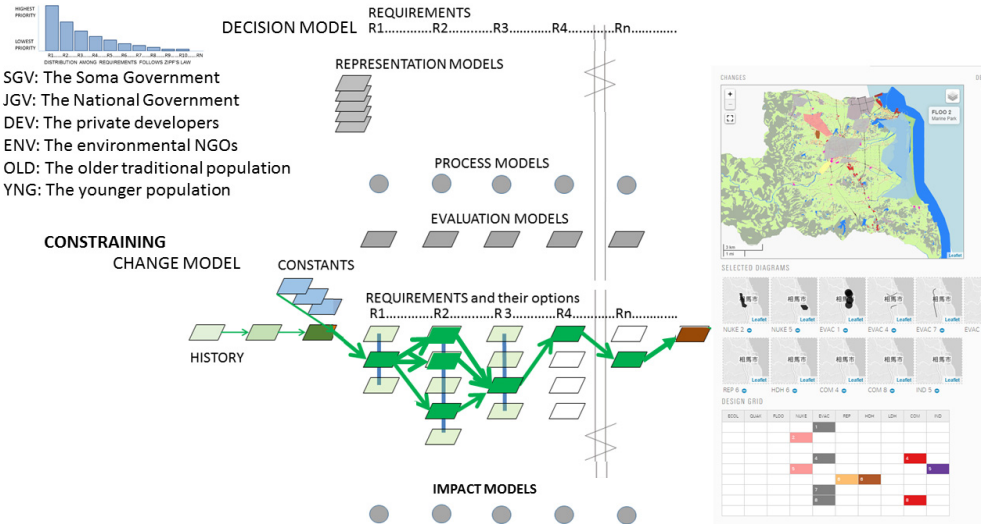

Fig. 7: Select Diagrams to make the Design

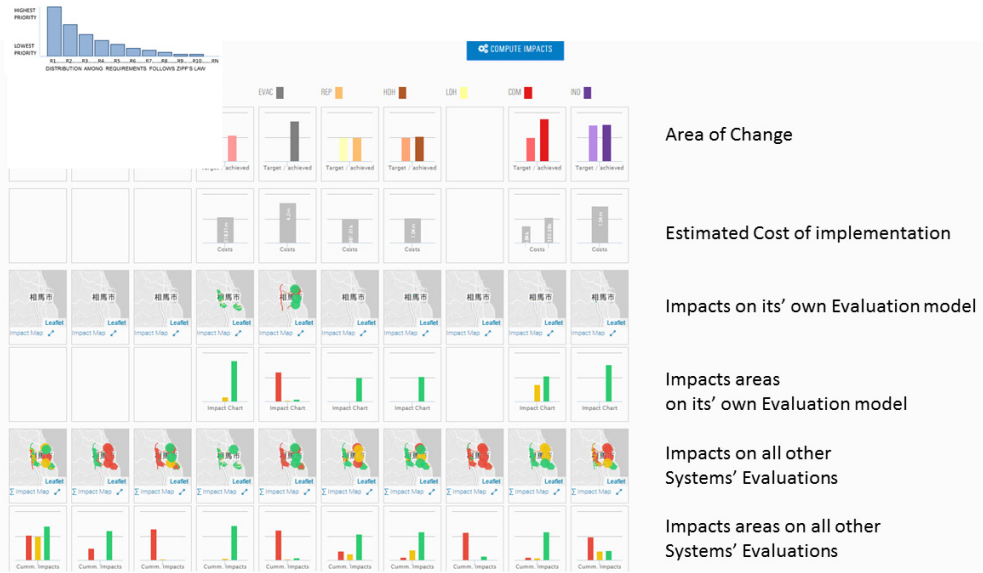

Fig. 8: Assess the Impacts of the Design at any Stage

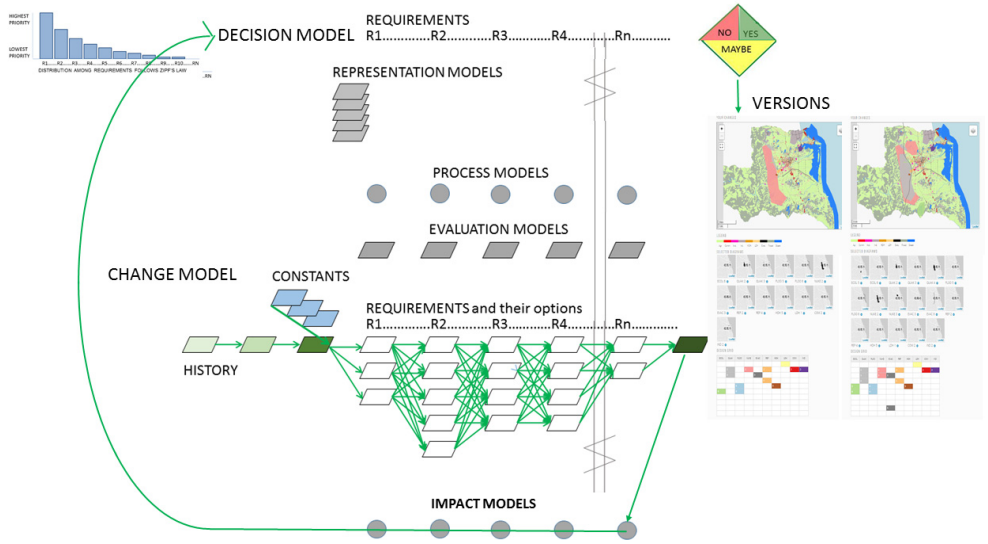

Fig. 9: Assess and Compare Versions

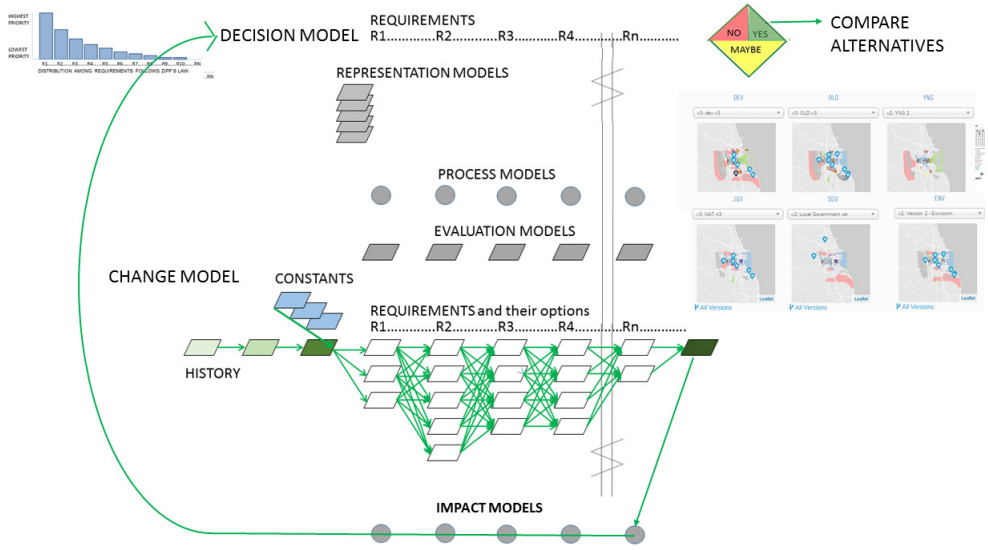

Fig. 10: Assess and Compare Alternatives

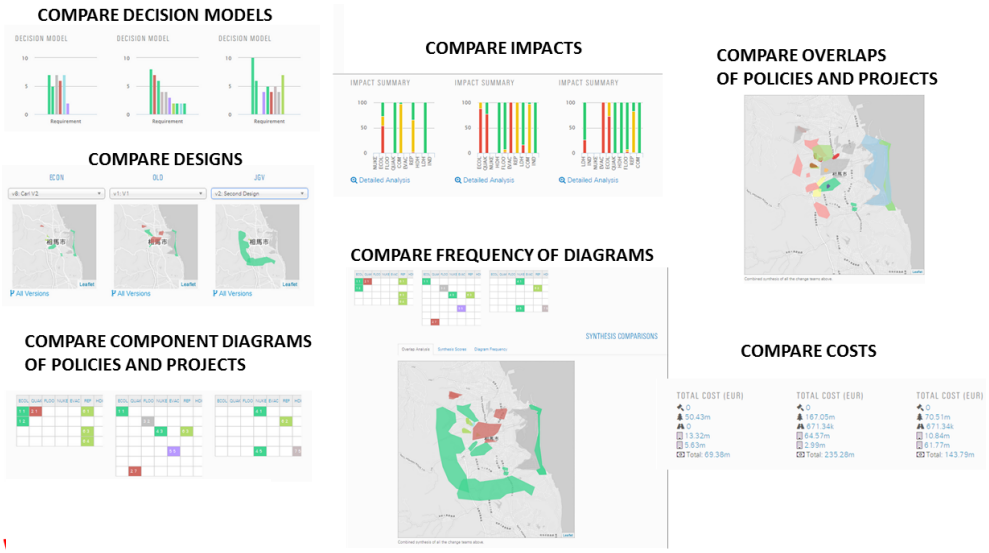

Fig. 11: Ways of Comparison

References

STEINITZ, C. (2013), Beginnings of Geodesign: A Personal Perspective. ArcNews, 35 (2), 4-7.

STEINITZ, C. (2013), Getting Started: Teaching in a Collaborative Multidisciplinary Framework. Landscape Architecture/China, Special Issue on Digital Technology and Landscape Architecture, 16-24 (in English and Chinese).

STEINITZ, C. (2012), A Framework for Geodesign. Esri Press, Redlands, CA.

STEINITZ, C. (2014), Geodesign with Little Time and Small Data. In: WISSEN HAYEK, U., FRICKER, P. & BUHMANN, E. (Eds.), Digital Landscape Architecture 2014. Wichmann Berlin/Offenbach, 2-15.

STEINITZ, C. (2014), Which Way of Designing? In: LEE, D., DIAS, E. & SCHOLTEN, H. (Eds.), Geodesign by Integrating Design and Geospatial Sciences. Springer, 11-43.