Fundamental Issues in GeoDesign

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Abstract of keynote

GeoDesign, or geospatial design, is a conceptual framework for thinking about plan creation and evaluation. Its axioms are that design and plan quality is increased by informed professional and public deliberation, that all projects have multiple impacts (good and bad), and that proposed changes should be judged within an explicit spatial context.

The latter concept goes directly against the "beaux arts" tradition which favors starting with a blank canvas, and many project-based impact assessment techniques which try to divorce evaluation from location. In contrast, GeoDesign requires spatially precise context because it asserts that public costs and benefits are rarely confined to proposed changes alone, and impacts must thus be judged relative to place. A proposed igloo village in Nome, Alaska is fundamentally different from one in Saudi Arabia, not because of the design proposal, but because of its impacts judged in context.

In order to assure appropriate deliberation, GeoDesign takes from the field of scenario planning two key ideas and supporting processes. The first is the notion of directly addressing uncertainties which are outside of the control of planners but likely to affect results, and of opening participation by exposing both these and substantive design tradeoffs as tangible choices.

The second is the concept of repeated rounds of evaluation against multiple metrics, shown in many planning processes not only to objectively increase plan performance, but also to subjectively increase the kinds of stakeholder engagement and social learning needed to go from plans to successful community-supported implementations. In this regard, one important metric may be the number of substantive design revisions within a process which demonstrably improve measured plan performance. Reduced to its essence, an ideal geodesign process would involve stakeholders in the selection of appropriate evaluation metrics up front, and then reduce the time between "design" and "evaluation" to zero - visualizing selected impacts in real-time during design. The inherent complexity of this formulation is substantial. In order for such a framework to be practically useful, new tools and organizational methods will be needed which facilitate the rapid generation, evaluation and culling of design concepts. Within particular fields and applications, "spatial decision support systems" have been constructed which already have many needed capabilities - albeit requiring complex and expensive desktop software. Given modern distributed
computing techniques, substantially more scalable and accessible methods are now possible. If we recast both "designs" and "evaluations" as interoperable web services, it is possible to imagine formal design evaluation not as a customized and cumbersome process legally mandated for large projects, but rather as a set of tools available on demand. Conceptually, this will require two elements. The first are tools capable of "semantic geosketching" - the ability to design in geographic context and to generate data in standard formats which include not only visual characteristics, but also the functional attributes needed for appropriate evaluative modeling. The second are spatial evaluation models formulated as web services and able to operate on semantic sketches. An example might be a stormwater model capable of assessing impacts on surface water runoff given geosketch information including impervious cover attributes. For general-purpose representations, complex formats such as IFC, CityGML or GreenXML could provide standards for expressing functional design characteristics along with 3d geometry. Within individual applications, much simpler representations, such as "geoRSS" could provide a means of streaming design information. While professional-grade tools might migrate up from the desktop, zero-configuration web applications could perform most of these functions, and be made widely available for public use. Beyond the provision of more formal impact evaluations, more publically-oriented applications might also include substantial mechanisms for organizing discussions and comments. This could be substantially aided by recent innovations in social networking which provide positive social incentives for the feedback deemed most relevant.

It is intended to demonstrate these concepts with a set of examples drawn from various recent projects done in my lab and elsewhere 3D landscape and city models have been understood, applied, and realized as presentational, visual models throughout the last decades.