

**Specialist Meeting on Spatial Concepts in GIS and Design**  
**Santa Barbara, California**

# **Geo-Spatial Design**

*“Creativity is the synapse between two normally  
disassociated matrices of thought.”*

*... Arthur Koestler*

**William R. Miller**  
**Environmental Systems Research Institute**

**December 2008**

## Summary

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**Context for Design**

**Definition and Purpose of Design**

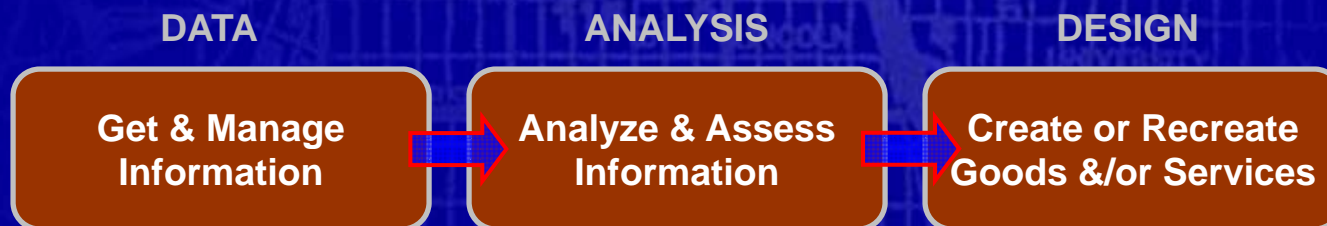
**The Nature of Design: What makes it unique?**

**Geo-Spatial Design**

## Context for Design

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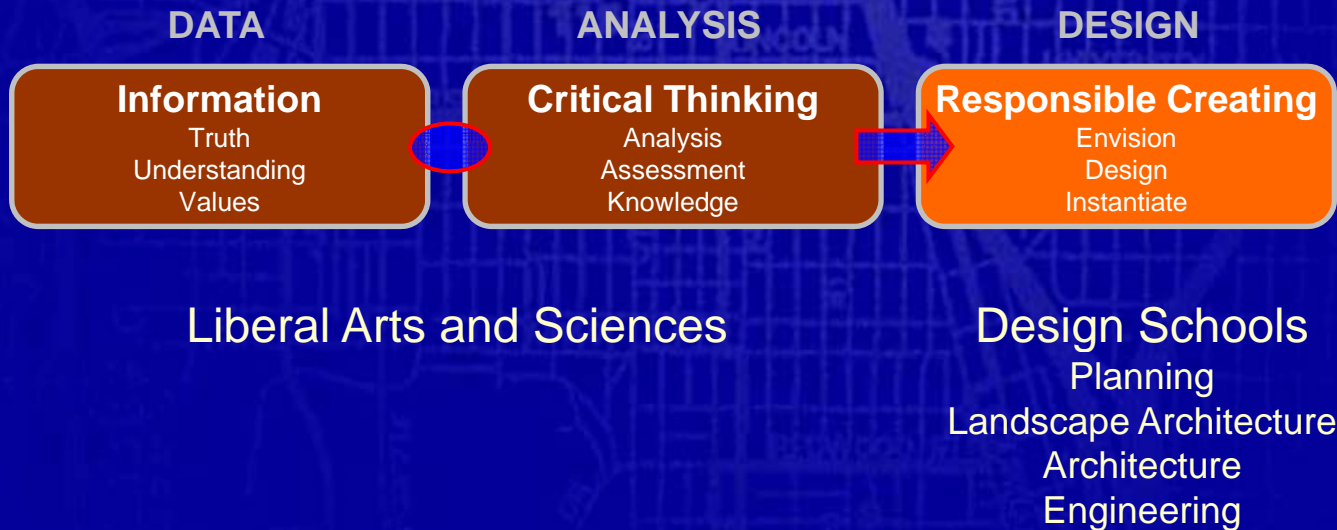
Every organization does three things ...



# Context for Design

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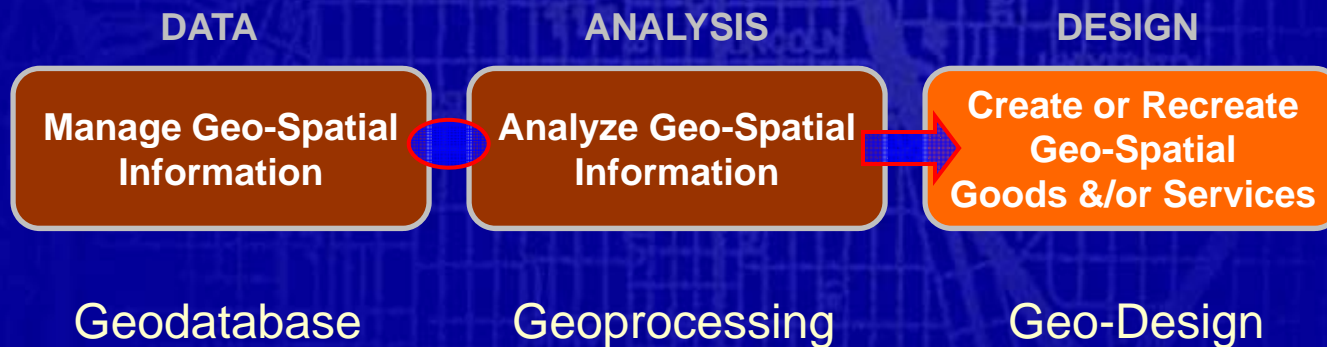
## Expanding our educational system ...



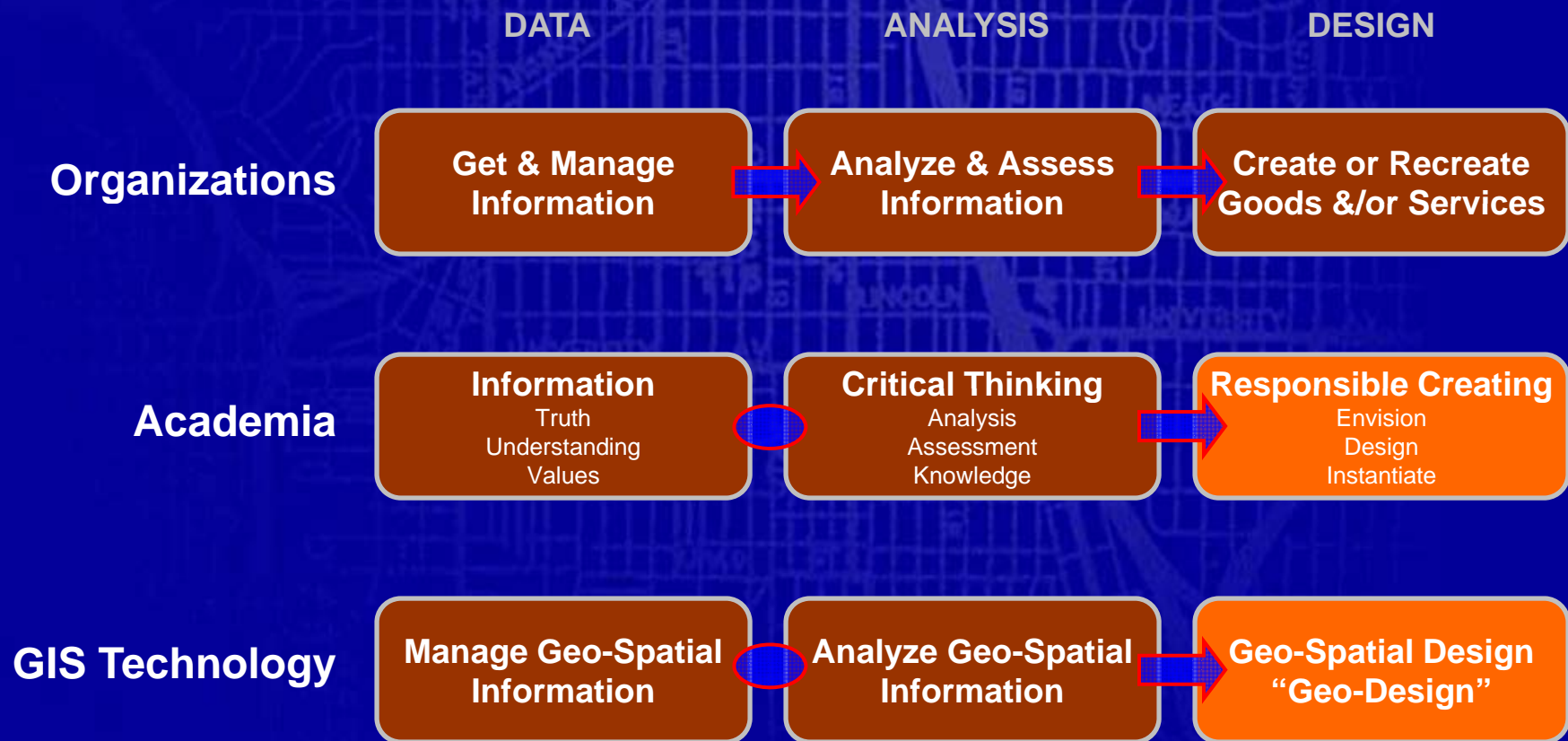
## Context for Design

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Expanding our geo-spatial technology ...



# Context for Design



## The Definition of Design

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***Design is a plan for arranging elements in a such a way as to best accomplish a particular purpose.***

*... Charles Eames*

***Design is the process of originating and developing a plan for a product, structure, system or component with intention.***

*... Wikipedia*

***Design is aesthetic composition.***

*... design student*

## The Definition of Design

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***Design is a bridge between the abstraction of research  
and the tangible requirement of real life.***

*... Glen Lowery*

***Design is applied imagination.***

*... Gavin Heaton*

***Everyone designs who devises courses of action aimed at changing  
existing situations into preferred ones.***

*... Herbert Simon*



## The Definition of Design

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*Design is the thought process comprising the creation of an entity.*

|  
verb  
vs.  
noun

|  
insight  
intuition  
reason  
synthesis

|  
process  
vs.  
product

|  
preceding  
during  
after

|  
imagination  
to  
sensible reality

|  
physical  
temporal  
conceptual  
relational  
complex

## The Purpose of Design

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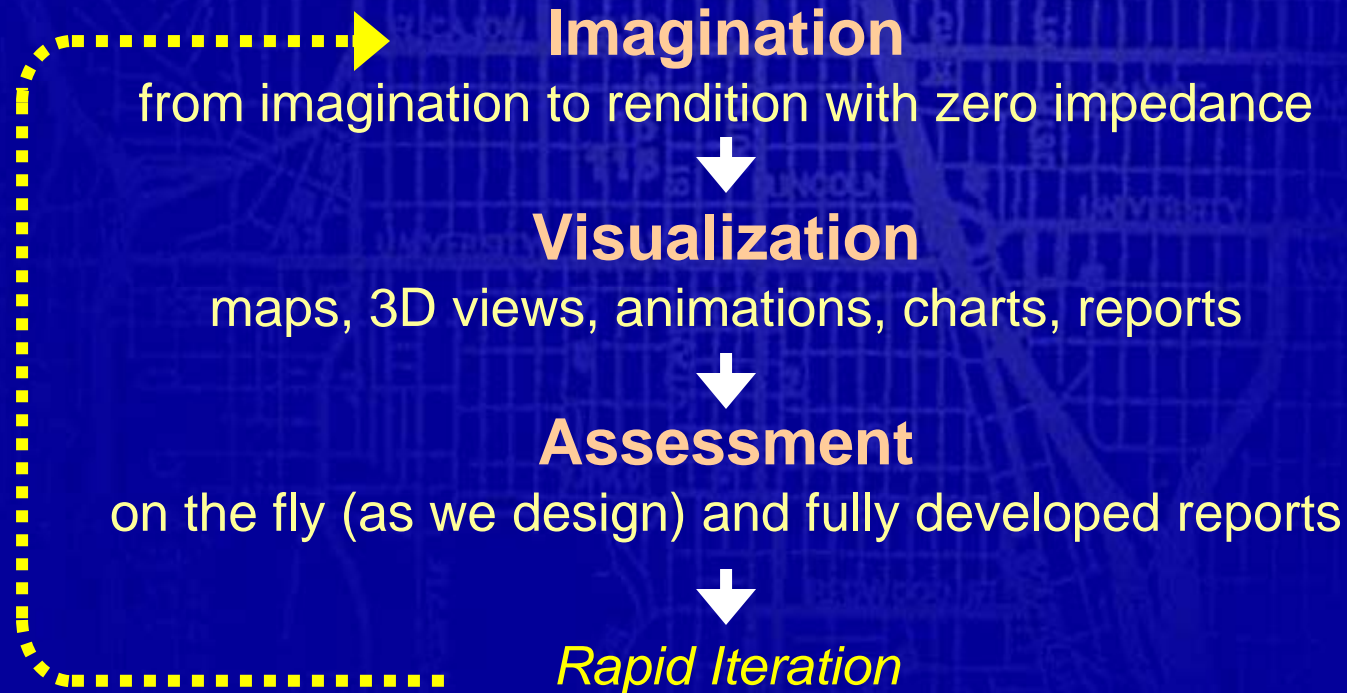
affirm  
enable  
assist  
*as opposed to*  
dictate

*The purpose of design is to facilitate life.*

Who's life?  
Which species?  
extent (in time and space)

- If a design facilitates life ... it is good
- If it inhibits life ... it is bad
- If it does neither ... It is neutral

# What makes design unique?



## The Nature of Design

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# Design Thinking

**Unstructured**

not ungrounded

**Abductive**

vs. inductive and deductive

**Integrative**

lateral / holistic / multidisciplinary

**Empathetic**

users / stake holders / implementers

## The Nature of Design

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### **Collaborative**

#### **Time**

synchronous / asynchronous

#### **Space**

share / distributed

#### **Structure**

design management

## The Definition of Geo-Spatial Design

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verb	insight	process	preceding
vs.	intuition	vs.	during
noun	reason	product	after
	synthesis		

*Geo-spatial design is the thought process comprising the creation of entities in geographic space.*

imagination	physical	3D
to	temporal	geographic
sensible reality	conceptual	space
	relational	
	complex	

# What makes geo-spatial design unique?

## **2D/3D/4D Geo-Reference System**

context / content

## **Attribute Management**

context / content / relationships

## **Topology**

2D / 3D

## **Geo-Spatial Analysis**

2D / 3D / 4D

# The Purpose of Geo-Spatial Design

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affirm  
enable  
assist  
*as opposed to*  
dictate

*The purpose of geo-spatial design is to facilitate life in our geo-scape.*

open  
self organizing  
feedback

?

- If a design facilitates life ... it is good
- If it inhibits life ... it is bad
- If it does neither ... It is neutral



## Geo-Scape

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Moving beyond *landscape* to *geo-scape* ...

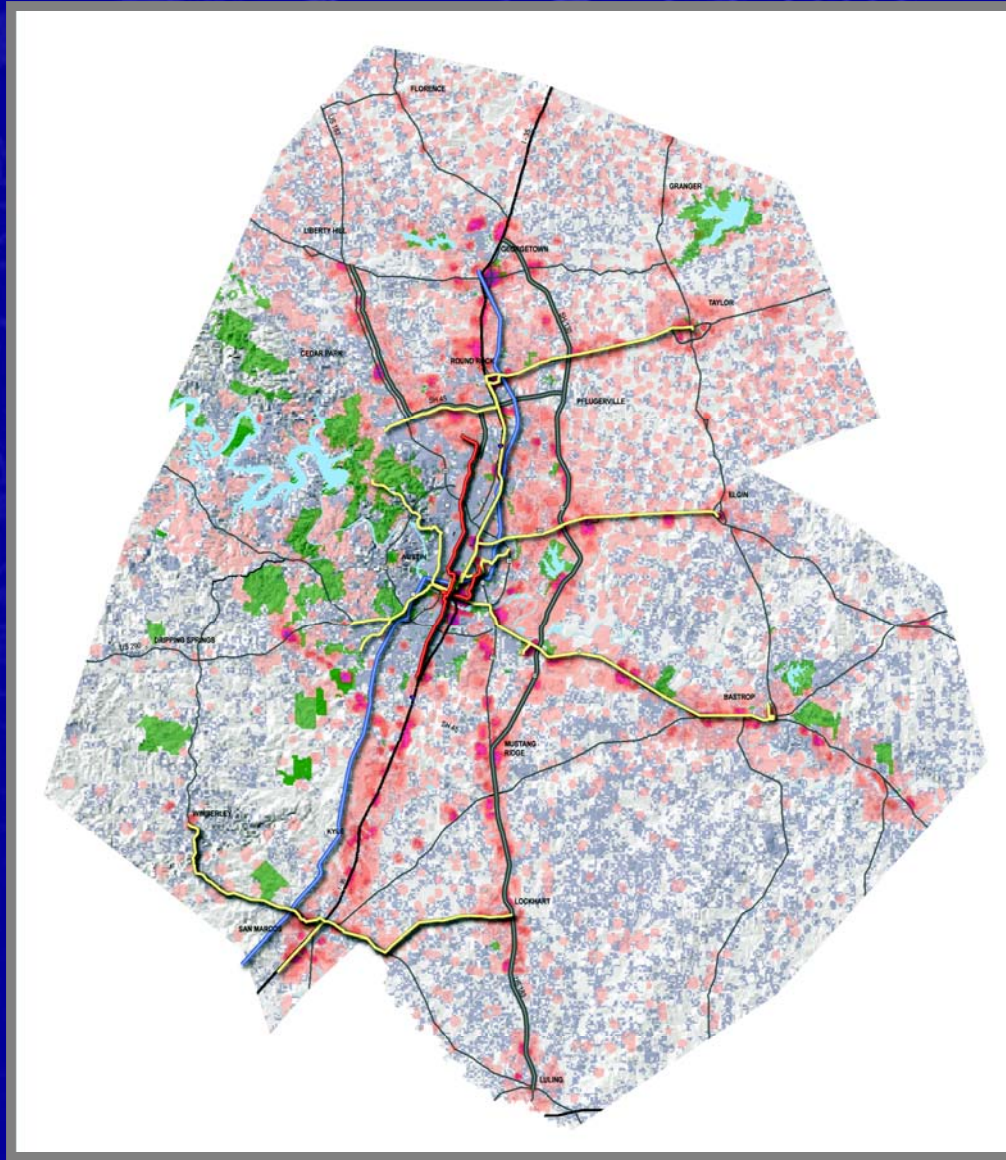
***Geo-scape is the planet's life-zone.***

land + water

below + surface + above

physical + biological + social + economic

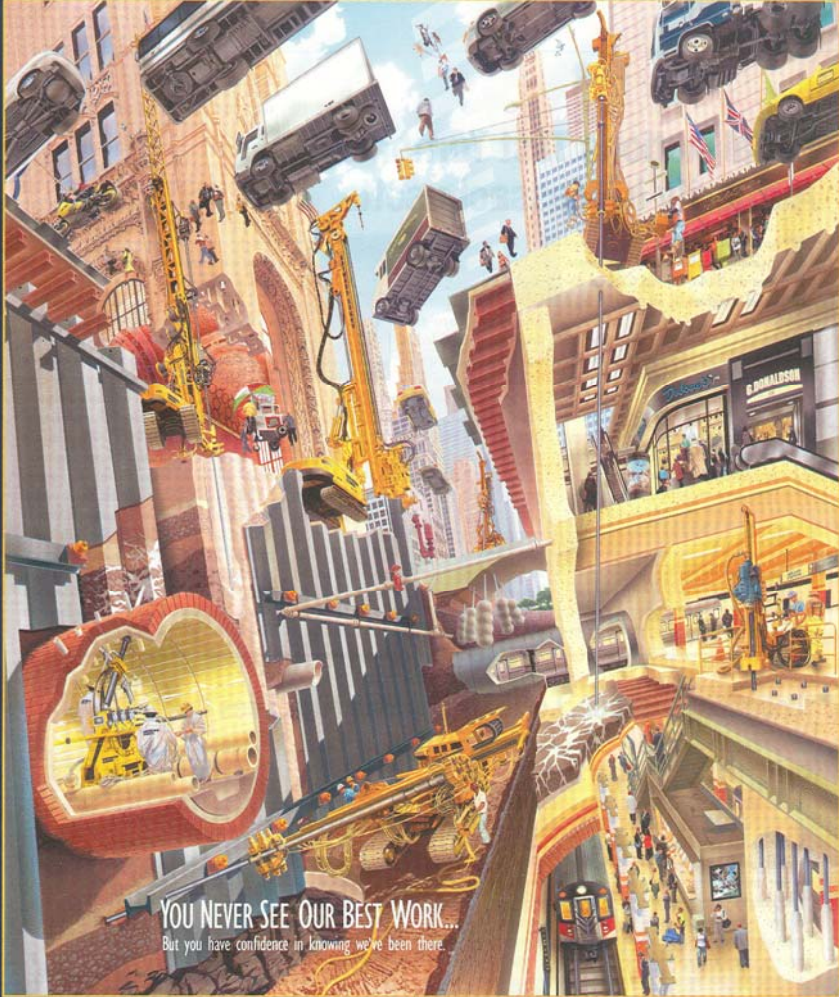
# Regional Geo-Scape



Envision Central Texas



# Urban Geo-Scape



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## Conceptual Framework

### 2D/3D/4D Environment

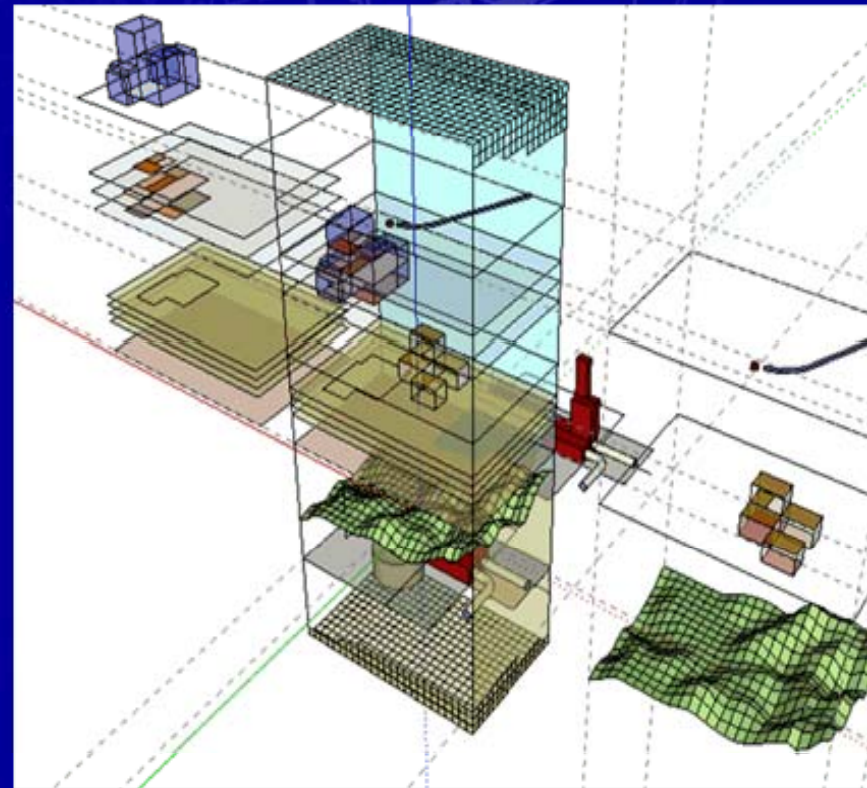
below/on/above the geo-surface

### Geo-Spatial Entities

physical, temporal, conceptual  
relational, complex

### Geo-Spatial Features

layers, surfaces, fields, meshes  
events, agents



# Geo-Design System

## Framework

ontology, workflow, user interface

## Creation Tools

context, content, relationships

## Analysis Tools

assessment, simulation, comparison

## Visualization Tools

drawings, maps, scenes, movies

## Reporting Tools

static, interactive



## Geo-Design

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### Challenge #1

**Develop a comprehensive understanding of geo-design and then work together to translate that understanding into a shared vision.**

## Challenge #2

**Develop an appropriate (design centric) GIS technology and apply that technology to a wide variety of geo-spatial design problems.**



## Geo-Design

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### Challenge #3

**Work together to establish a new profession of geo-design,  
both in practice and academia.**

## Geo-Spatial Design

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**Thank you**

*“The best way to predict the future is to create it.”*

*... Buckminster Fuller*

**William R. Miller**  
**Environmental Systems Research Institute**  
*bill\_miller@esri.com*

# Regional Geo-Scape

