Systems & Systematic Design

Tracing the Evolution of Design Methodology at the Institute of Design 1965 - 2010

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3rd Annual **IIT Archives Lecture**
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Post-WWII Design Education
The Available Models

An Analysis by Jay Doblin

- *Beaux Arts*
  The traditional art school model
- *Purism*
  A top-down model directly transmitting ideals
- *Experimentalism*
  A bottom-up model resynthesizing individual exploration and experience
- *Commercialism*
  The uniquely American market-oriented skills training model

1945 - 1955

Background

Post-WWII European Design Education
A German "new Bauhaus"

HfG Hochschule für Gestaltung Ulm

- *Bauhaus successor school in Ulm.*
  Key founders: Max Bill, Inge Scholl and Otl Aicher
  "Design problems of the industrial society of the future"
- *Faculty and student statistics:*

Staff Instructors:	21
Workshop Leaders and Technical Instructors:	10
Guest Instructors:	216
Visiting Lecturers:	12+
Total Student Enrollment:	640

1953 - 1968

Background

Post WW-II European Design Education

A German "new Bauhaus"

HfG Hochschule für Gestaltung Ulm

- *Illustrious faculty,* including:

Max Bill	Konrad Wachsmann
Josef Albers	Herbert Ohl
Johannes Itten	Horst Rittel
Walter Peterhans	Bruce Archer
Tomàs Maldonado	Gui Bonsiepe
Otl Aicher	Herbert Lindinger
Frei Otto	Karl Gerstner
Hans Gugelot	Abraham Moles

- *Search for a new educational balance*

Craft *vs* Technology	Science *vs* Design
Theory *vs* Practice	Art *vs* Science

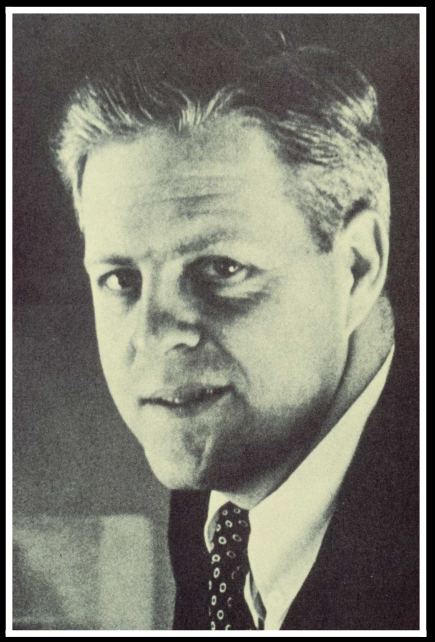
Tomàs Maldonado

1953 - 1968

Design Education – IIT Institute of Design

Altering Course

Contributing Influences



- *ICSID Vice Presidency 1960-61*
  International Council of Societies of Industrial Design
- *Review of 23 schools 1963*
  Federal Republic of Germany
- *Presidency IDEA 1963-64*
  Industrial Designers Education Association (USA)

Information-based Design

Design based on research, systematic methods and the information obtained with them

1955 - 1965

Design Education – IIT Institute of Design
Design Methods

A New Course in the Application of Design Methods

- *Alexander's Method*
  Architect Christopher Alexander (Harvard, UC Berkeley):
  design problems as graphs
- *Systems Engineering Projects*
  Mechanical Engineer Dwight Baumann (and others at MIT):
  cross-discipline teams and project-oriented teaching
- *Computer Software*
  Alexander and Marvin Manheim (MIT):
  HIDECS2 and HIDECS3 computer programs

1965 - 66

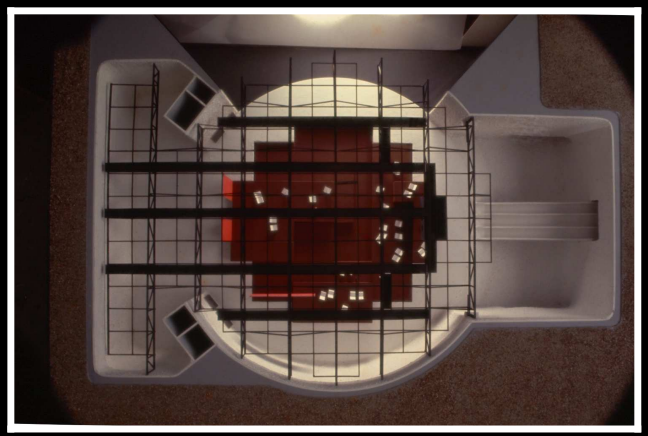
Governmental / Institutional
1 Theater, 3 Transportation Systems

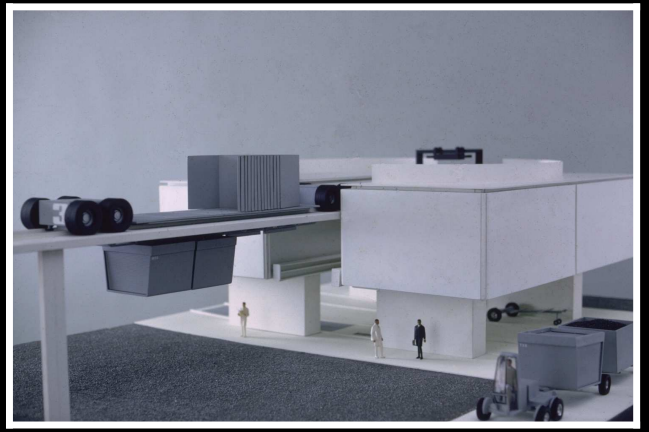
Laboratory for the Performing Arts

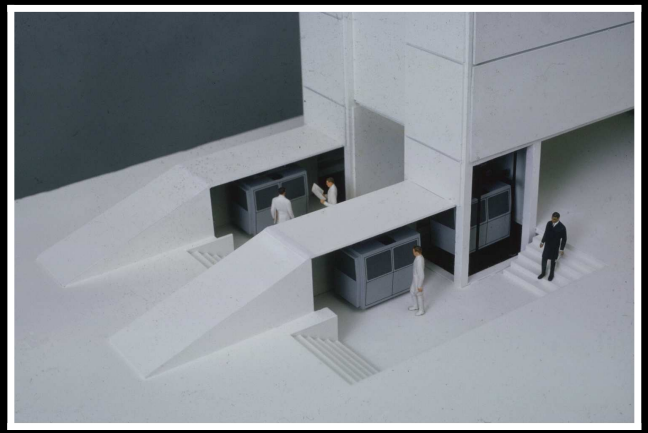
Commodity Transportation System

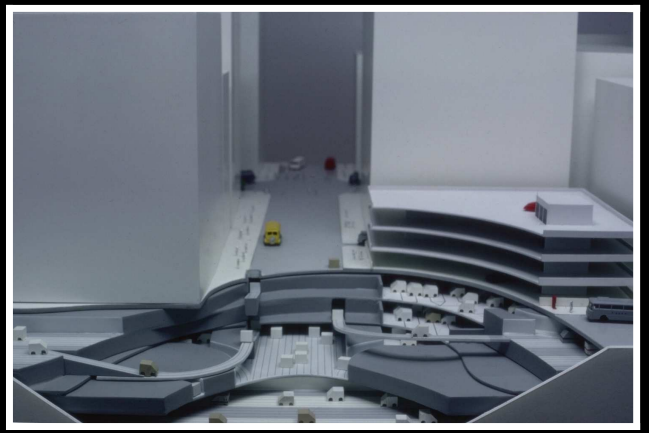
Personal Transportation System

Regional Transportation System









- Alexander's method (augmented)
- Hierarchical condensation algorithm
- VTCON2 computer program

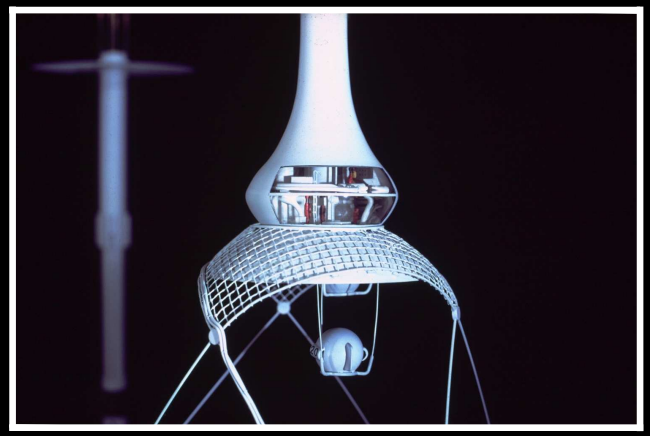
Spring 1967

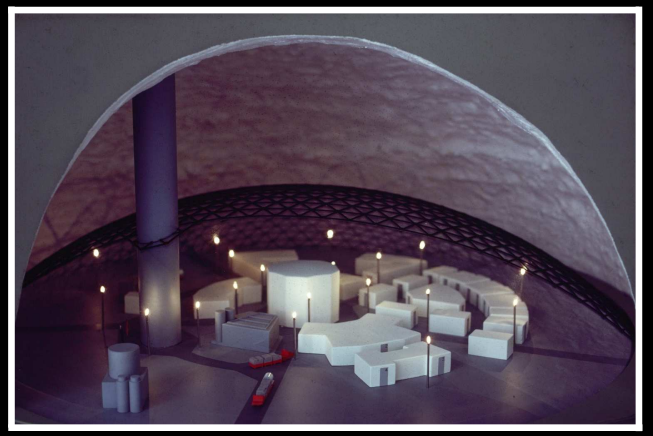
Project

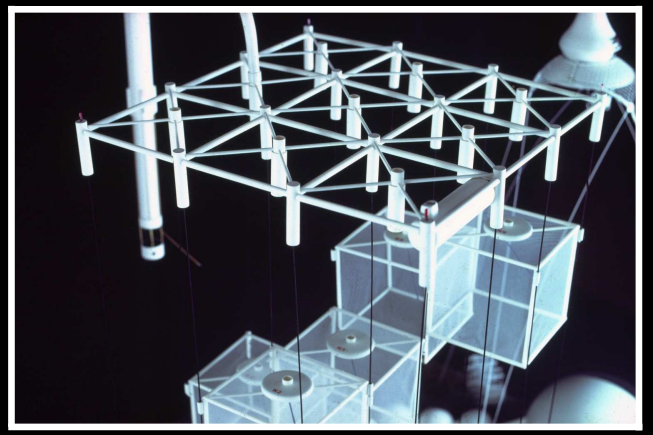
Industrial
Ocean Resources Development System

Hydrospace

- *Selected schools competition*
  ARMCO Steel
- *Journal article*
  Marine Technology Society Journal







- Observations, Force-tendency statements
- Design Implications
- Decomposition algorithm
- VTCON3 computer program

Fall 1968

Event

Design Education – IIT Institute of Design
Undergraduate Curricular Changes

Course Types to Improve Access to New Subjects

- *Theory Courses*
  Lecture courses on design theory and methods:
  2 credits
- *Minor Application Courses*
  One-afternoon workshop courses on specialized design topics:
  3 credits
- *Major Application Courses*
  Two-afternoon workshop courses on primary design topics:
  4 credits
- *Senior Thesis*
  Summary complete project with written component:
  4 credits

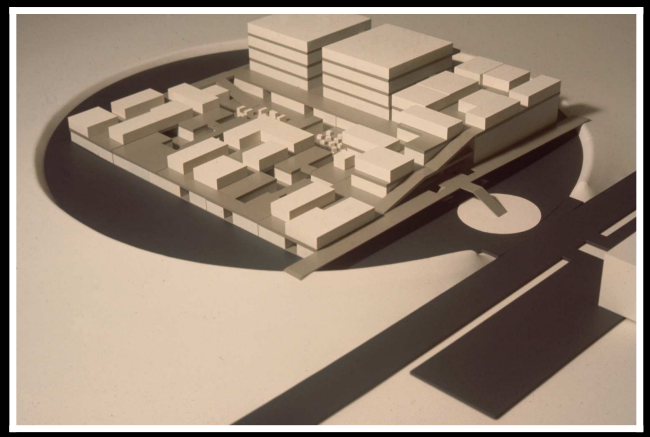
Fall 1968

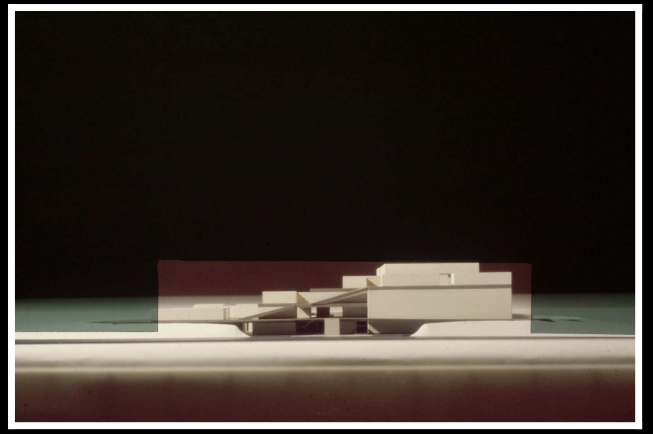
Project

Institutional
Design Education Facility

IIT Institute of Design

- *Funded Grant*
  ESSO Foundation





- Problem Element document format
- Interaction measure
- RELATN computer program
- Diagramming following conceptual synthesis
- Cycled planning process

Summer 1969

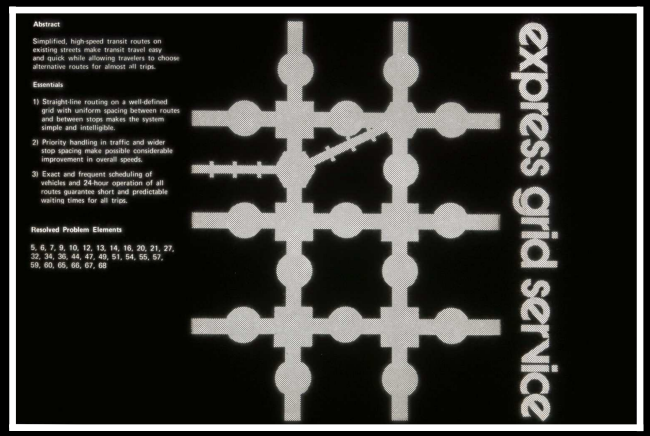
Project

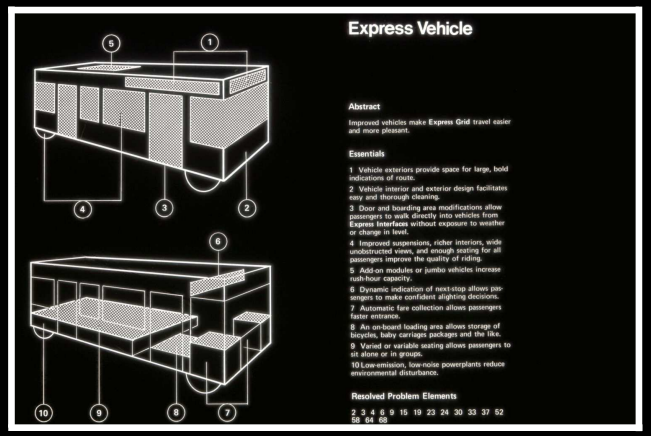
Governmental
Surface Transportation System for Chicago

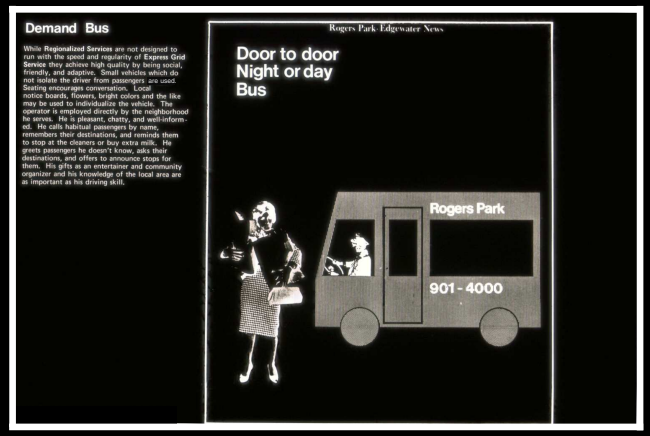
Getting Around

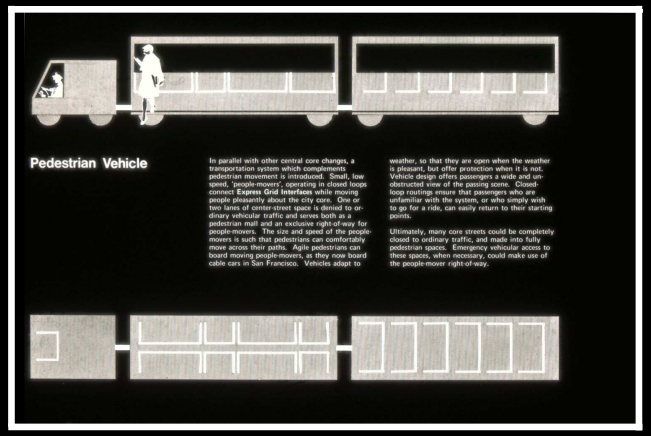
- *Multi-discipline* "Urban Systems Project"
- *Demonstration Project* Grid cities

- Integration of design / non-design disciplines
- Planning course / communication course handoff
- Multi-media communication









Spring/Summer/Fall 1970

Event

Design Education – IIT Institute of Design
Product Design Curricular Refinements

Graduated Development of Complexity

- *Products*
  5th semester major course:
  products as artifacts with emphasis on form and functionality
- *Environments*
  6th semester major course:
  products in environments with emphasis on human factors
- *Systems*
  7th semester major course:
  products in systems with emphasis on systematic design

Fall 1972

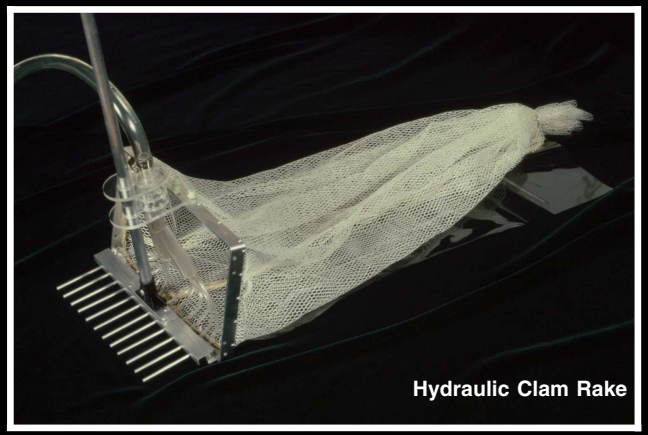
Project

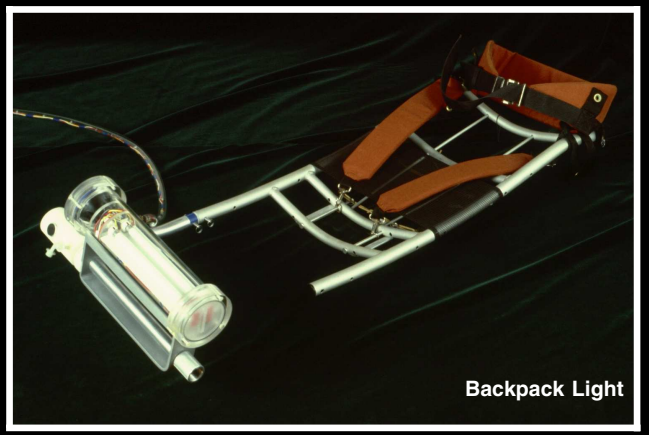
Governmental / Institutional
Ocean Surveying/Monitoring/Collecting System

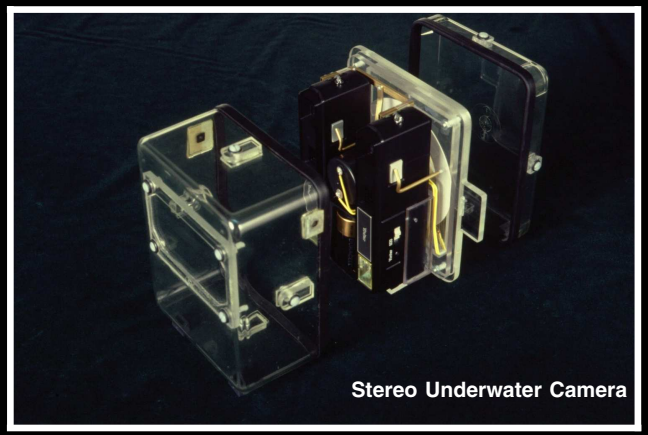
Living Sea Project

- *Design for Home Production*
  Self-Produced Research Tools

- "Structured Planning"
- Constraints, Objectives, Directives
- Functions, Function Structure
- Action Analysis
- Design Factors


Hydraulic Clam Rake


Backpack Light


Stereo Underwater Camera


Marathon, Florida

Fall 1977 / Spring 1978

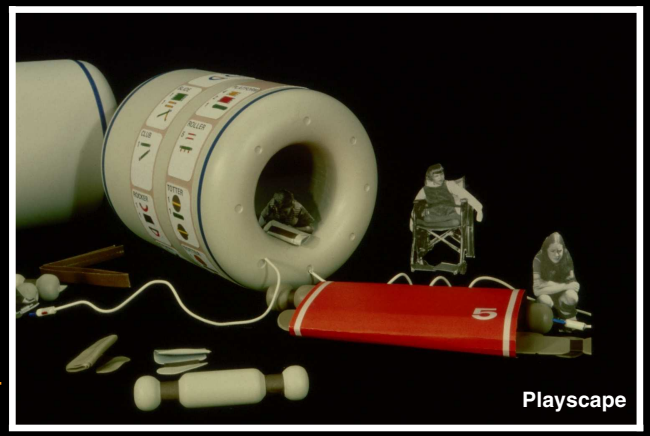
Institutional / Commercial
K-5 Educational Support Systems

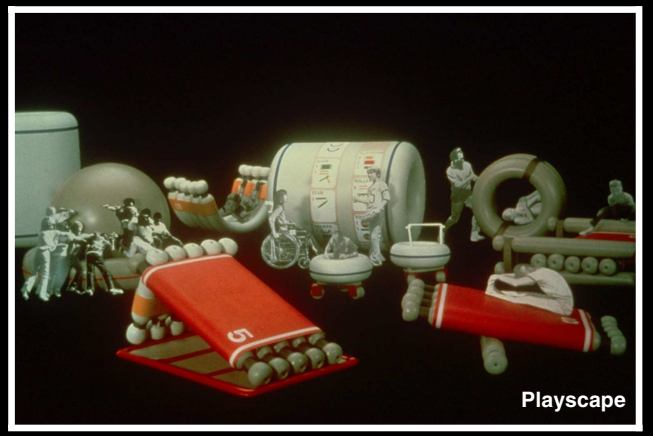
Sensory Workshop

- ***1st Prize*** *Education Category*
  ICSID 1st International Student Competition

Playscape

- ***3rd Prize***
  International Rehabilitation Engineering Design Competition





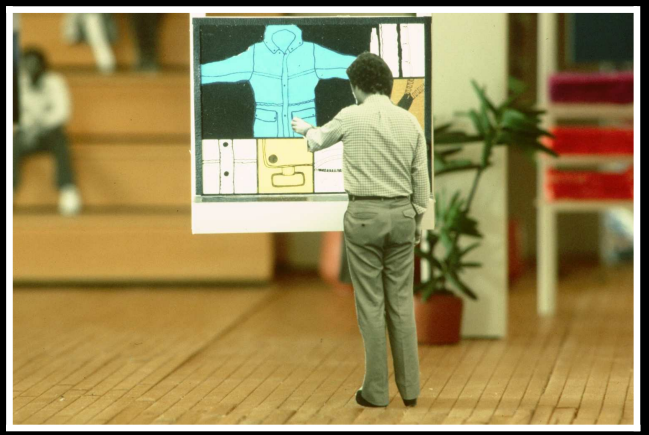
Spring 1979

Project

Commercial
Sports Store Customer Service System

Kinetics

- ***2nd Prize***
  Walker Group Interior Design Competition, New York



- CHART1 computer program

Fall 1981

Project

Commercial
Multi-climate, Multi-culture Housing System

House of the Future

- *Grand Prize*
  1st International Osaka Design Competition

- *Book*
  House of the Future

- INFORM computer program
- Report format

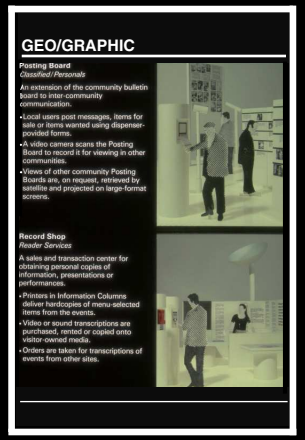
Fall 1982

Project

Governmental / Institutional
World's Fair Social Interaction System

Geo/Graphic

- ***Demonstration Project***
  Alternative Model for a Chicago Bid



• Planning team handoff to designing team

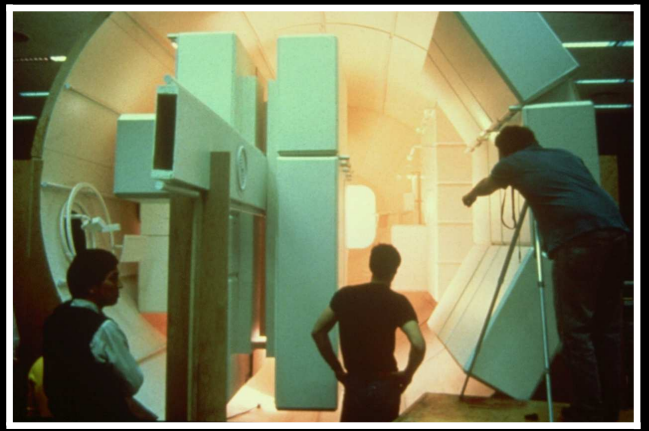
Fall 1984 / Spring 1985

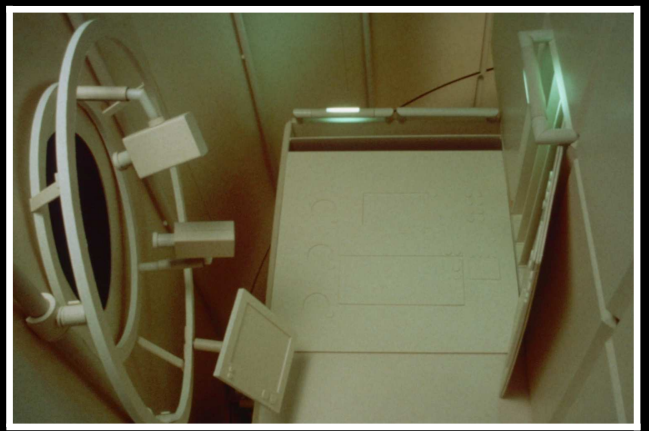
Project

Institutional
Habitat Utilities and Logistics System

Space Station

- *Commissioned project*
  NASA / Johnson Engineering Company





- Defining Statement forms
- Abstraction ladder synthesis

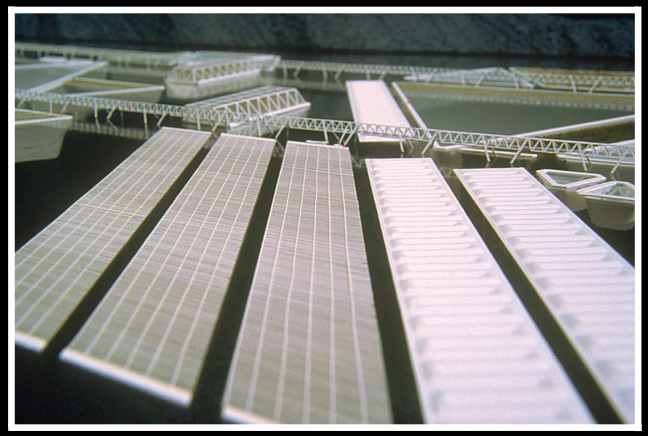
Fall 1985

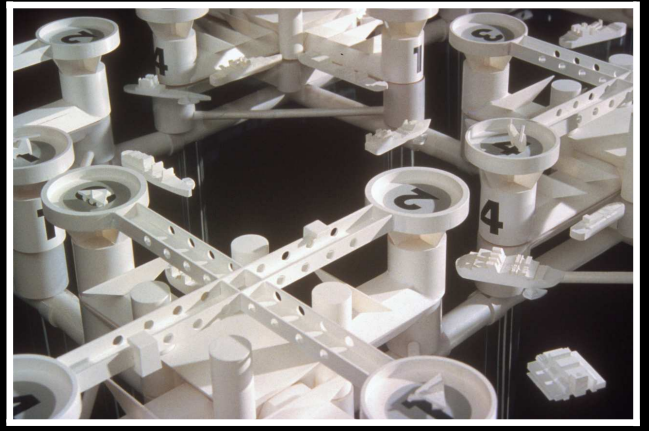
Projects

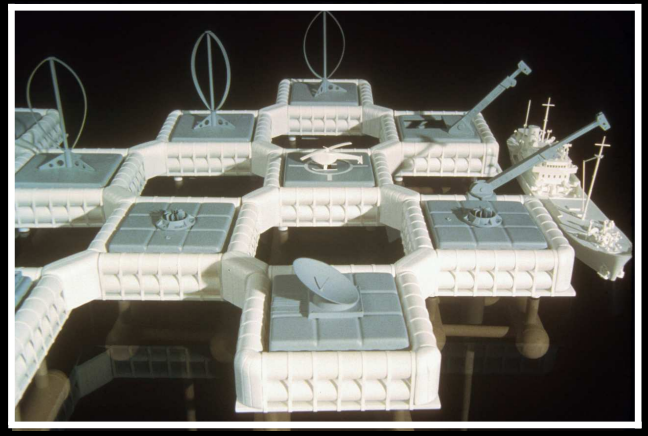
Institutional / Industrial
Ocean-deployed Resource Extension Systems

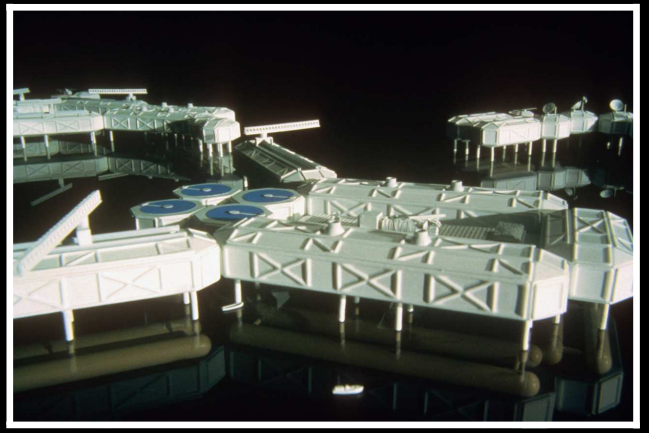
Aquatecture

- *Grand Prize*
  3rd International Osaka Design Competition
- *Selected Concept*
  ID International Design Review









- Multiple project integration

- *www.id.iit.edu/620/*

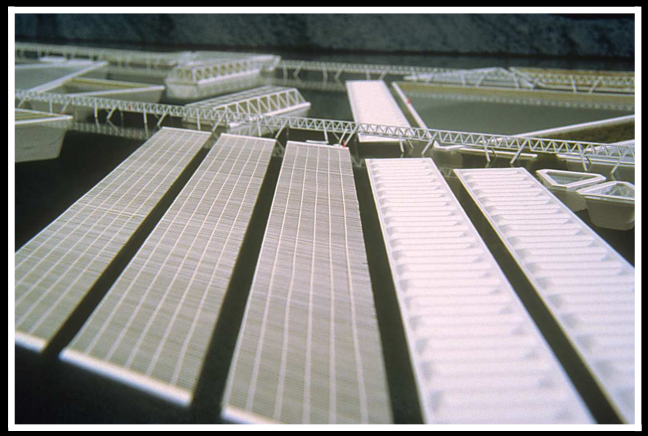
Fall 1986

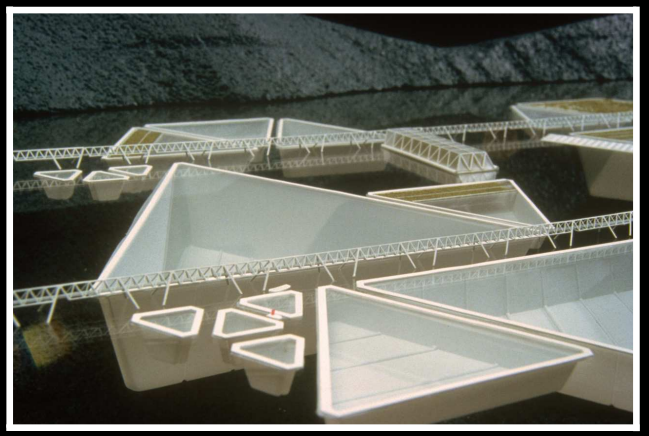
Projects

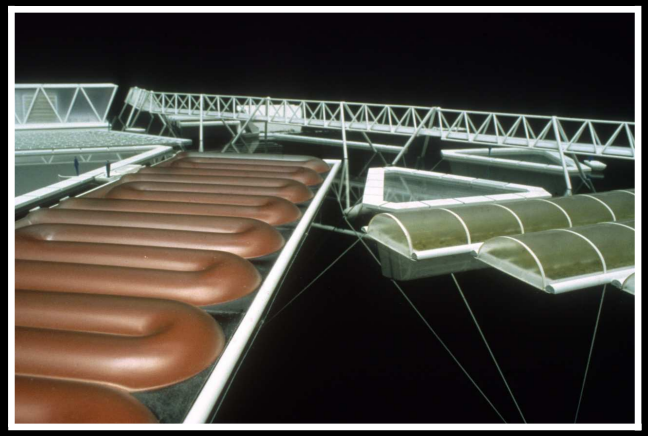
Institutional / Industrial
Ocean-deployed Resource Extension Systems

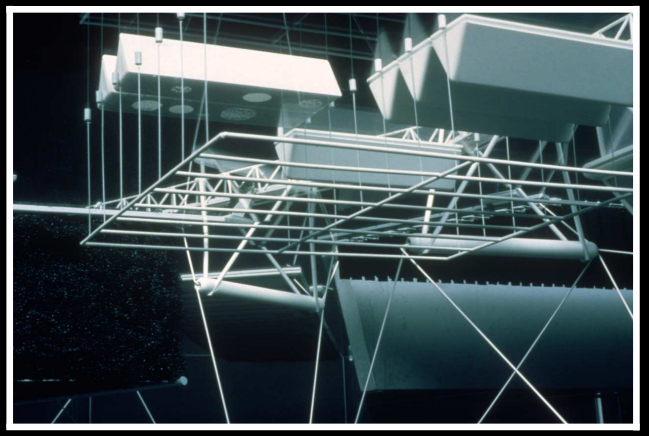
Aquatecture
Floating Fields

- *Grand Prize*
  3rd International Osaka Design Competition
- *Selected Concept*
  ID International Design Review









- Multiple project integration

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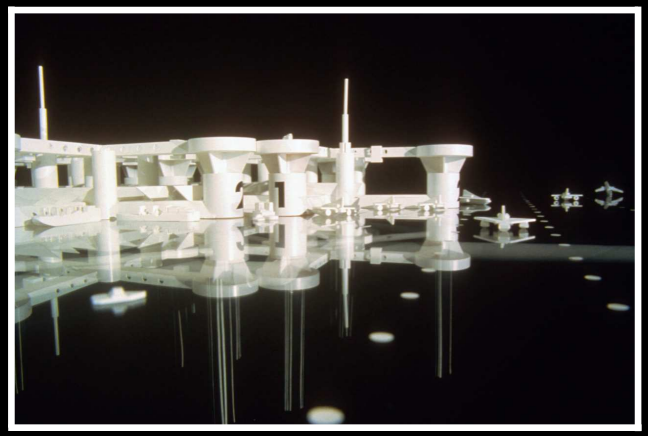
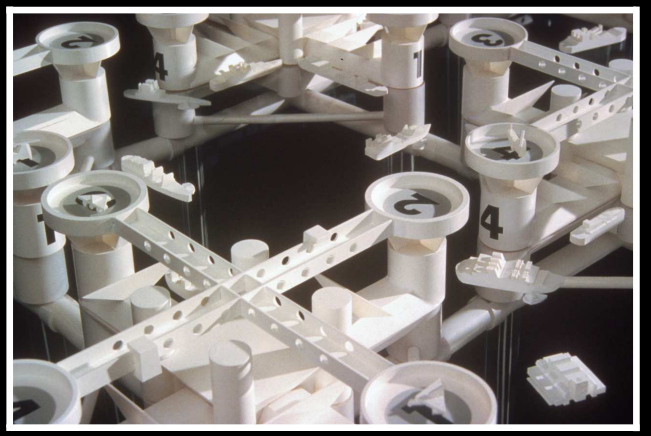
Fall 1986

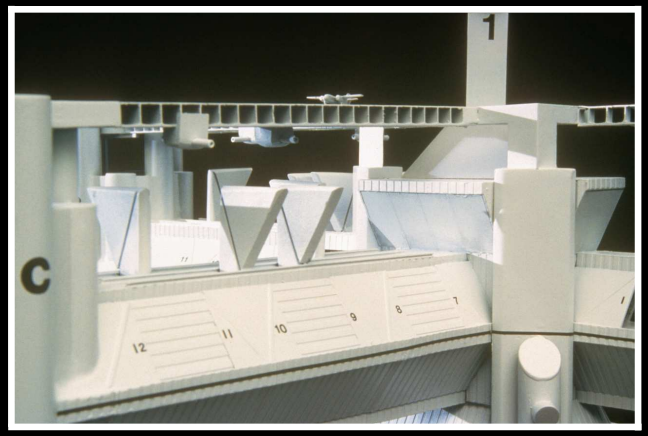
Institutional / Industrial
Ocean-deployed Resource Extension Systems

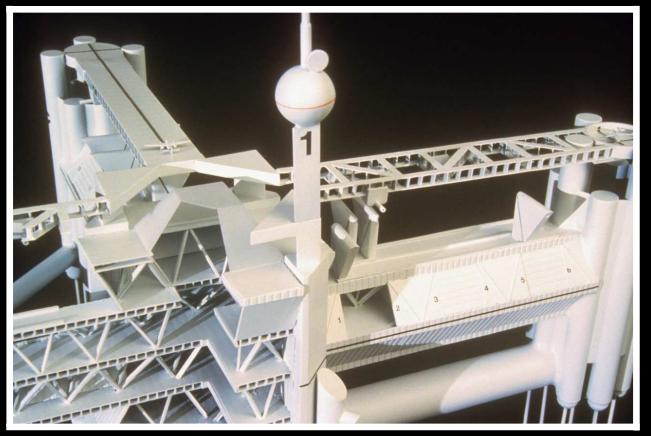
Aquatecture
Crossroads
in the Sea

- *Grand Prize*
  3rd International Osaka Design Competition
- *Selected Concept*
  ID International Design Review









- Multiple project integration

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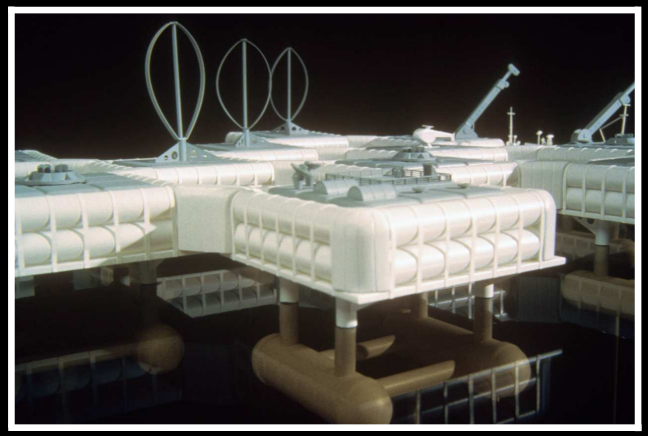
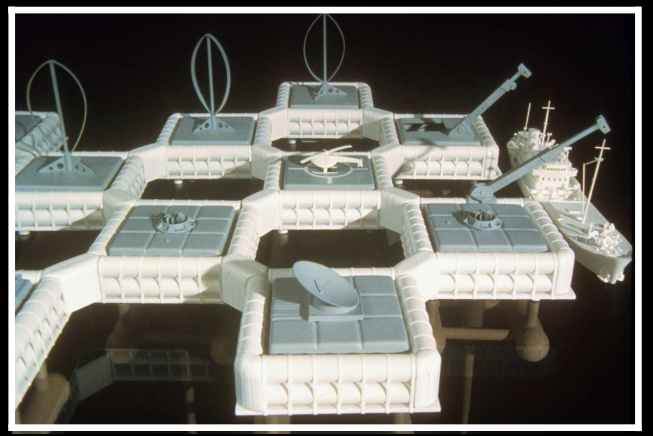
Fall 1986

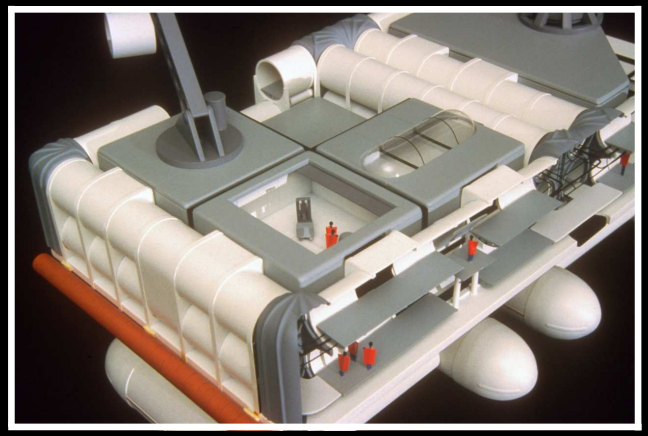
Institutional / Industrial
Ocean-deployed Resource Extension Systems

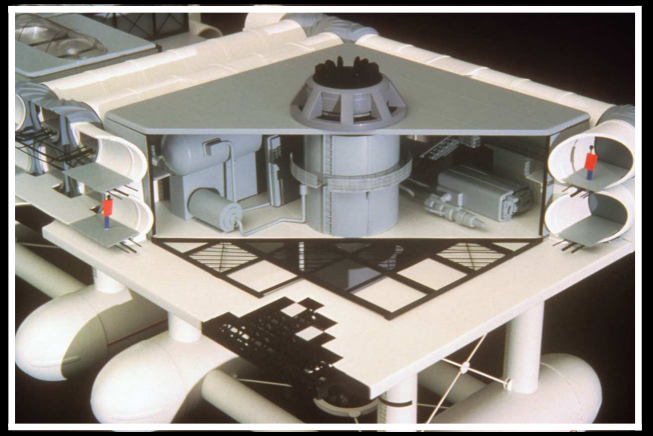
Aquatecture
Patterned Energy

- *Grand Prize*
  3rd International Osaka Design Competition
- *Selected Concept*
  ID International Design Review









- Multiple project integration

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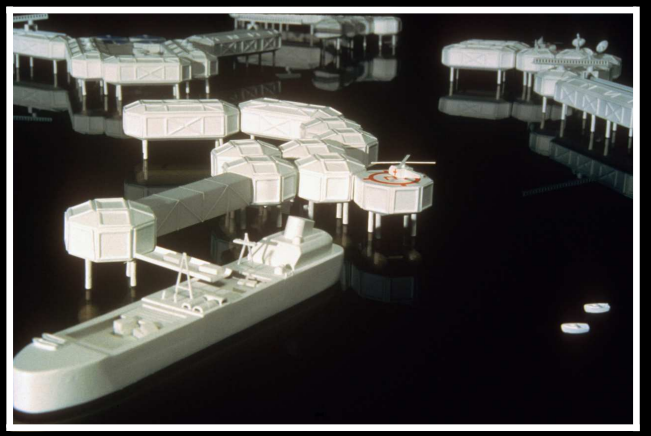
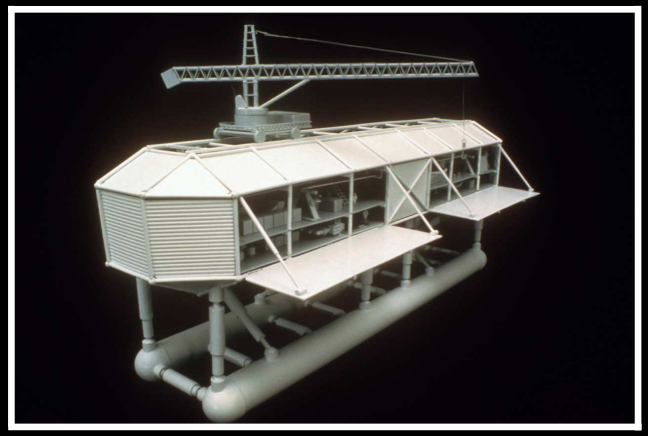
Fall 1986

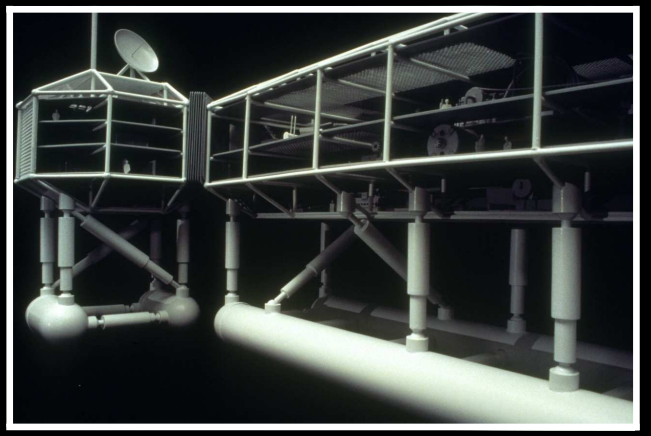
Institutional / Industrial
Ocean-deployed Resource Extension Systems

Aquatecture
Mobile Offshore Industry

- *Grand Prize*
  3rd International Osaka Design Competition
- *Selected Concept*
  ID International Design Review







- Multiple project integration

- *www.id.iit.edu/620/*

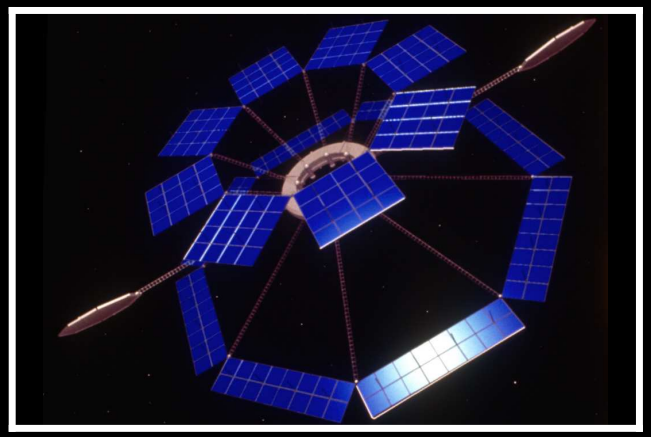
Fall 1986

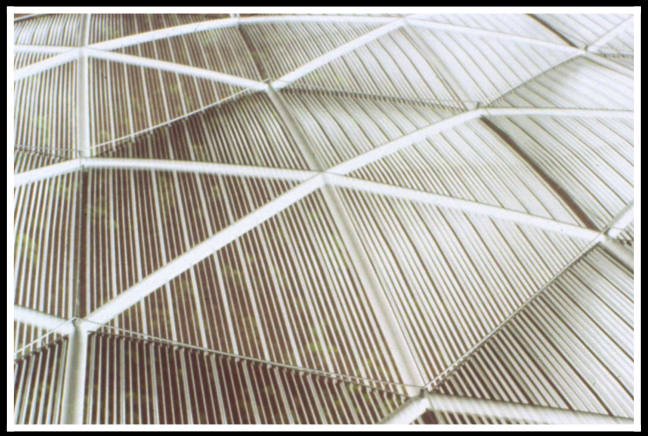
Project

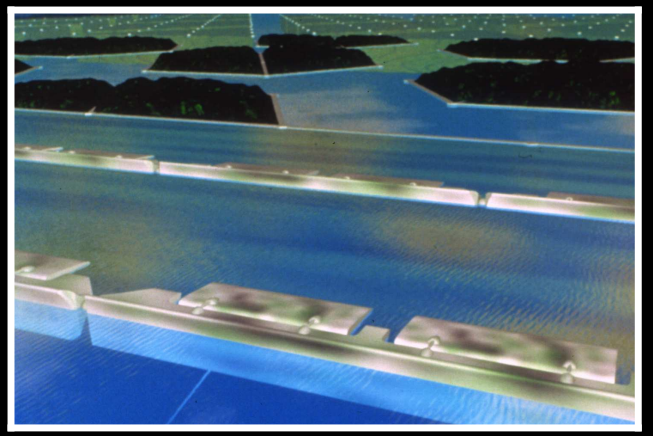
Governmental / Industrial
Climate Change Mitigation Systems

Project Phoenix

- *Grand Winner*
  Environmental Technology
  "1991 Year's Greatest Achievements in Science and Technology"
  Popular Science
- *Selected Concept*
  ID International Design Review







• Computer-graphic conceptual prototypes

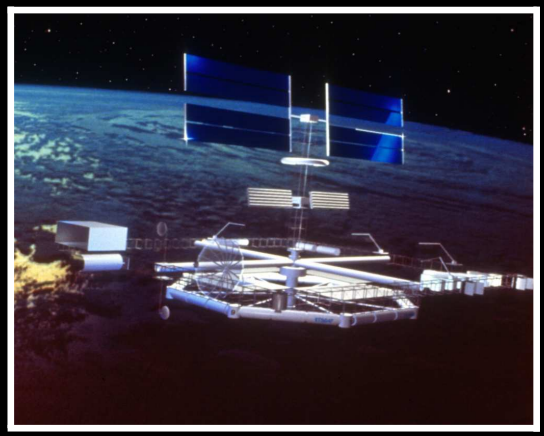
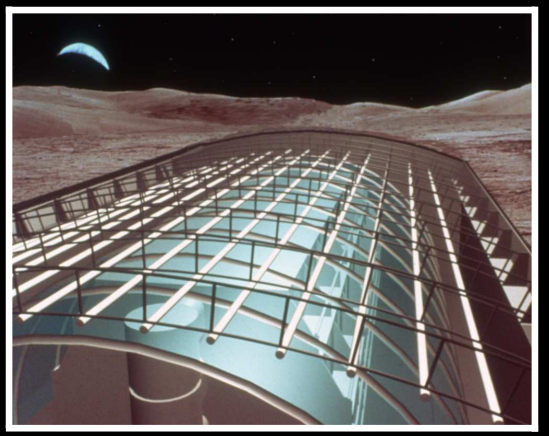
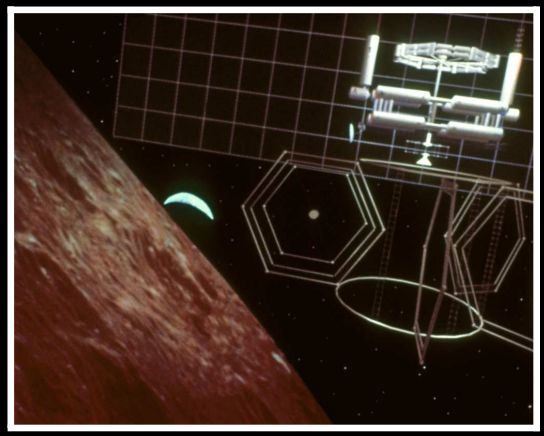
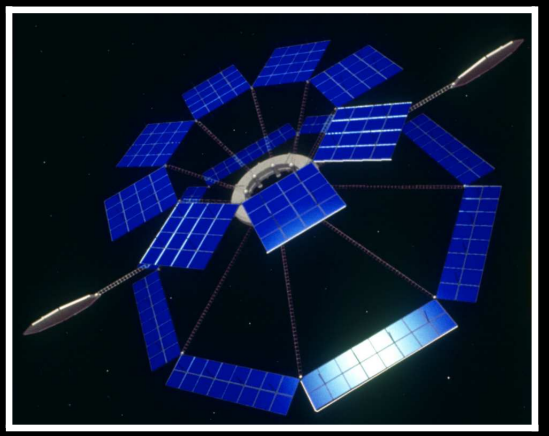
• *www.id.iit.edu/619/*

Fall 1988

Governmental / Industrial
Climate Change Mitigation Systems

Project Phoenix
Fire Replaced

- *Grand Winner*
  Environmental
  Technology
  "1991 Year's Greatest Achievements in Science and Technology" **Popular Science**
- *Selected Concept*
  ID International Design Review

- Computer-graphic conceptual prototypes

- *www.id.iit.edu/619/*

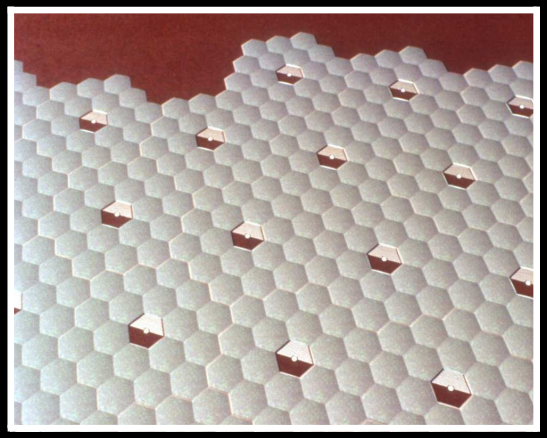
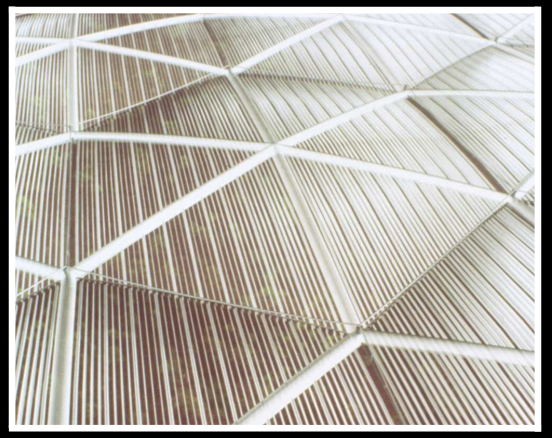
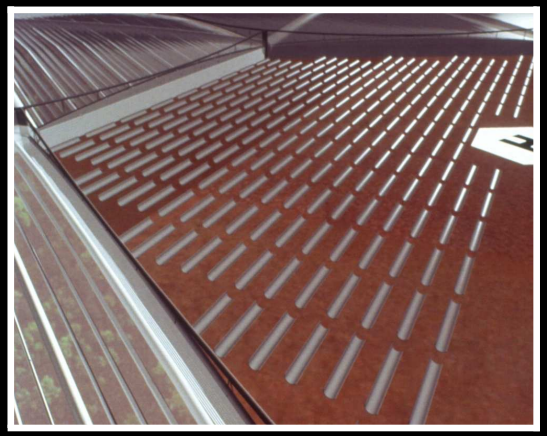
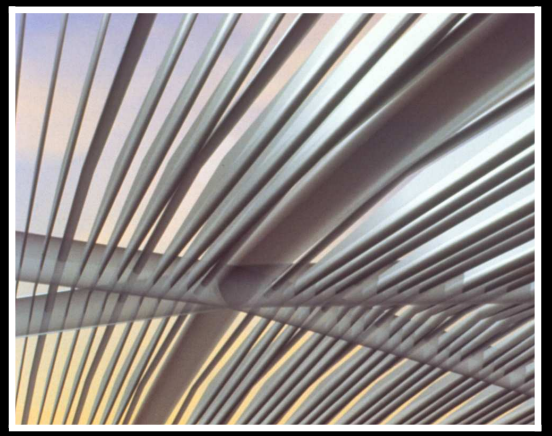
Fall 1988

Governmental / Industrial
Climate Change Mitigation Systems

Project Phoenix
Fire Reversed
Desert Regreening

- *Grand Winner*
  Environmental Technology
  "1991 Year's Greatest Achievements in Science and Technology" **Popular Science**
- *Selected Concept*
  ID International Design Review

- Computer-graphic conceptual prototypes

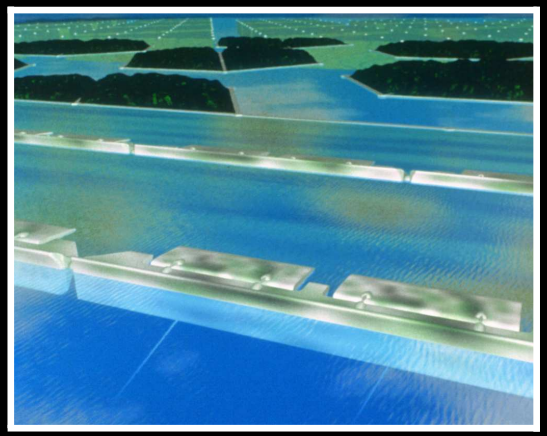
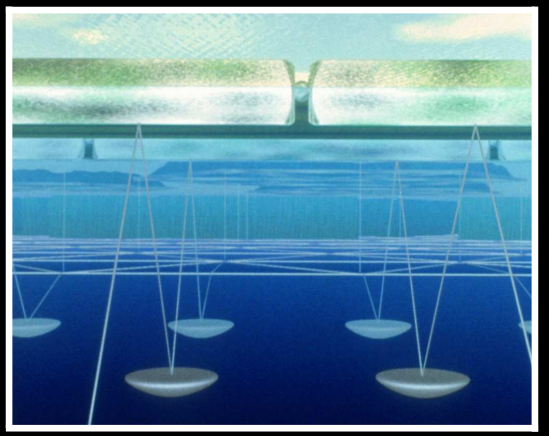
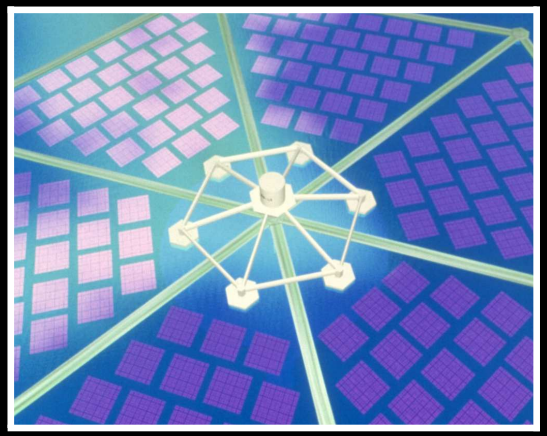
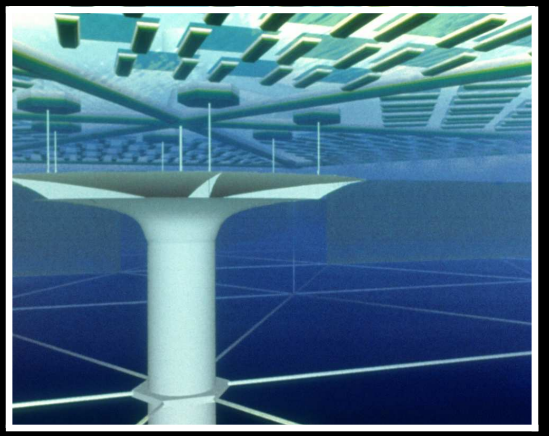
- *www.id.iit.edu/619/*

Fall 1988

Governmental / Industrial
Climate Change Mitigation Systems

Project Phoenix
Fire Reversed
Floating Wetlands

- *Grand Winner*
  Environmental
  Technology
  "1991 Year's Greatest Achievements in Science and Technology" **Popular Science**
- *Selected Concept*
  ID International Design Review

- Computer-graphic conceptual prototypes

- *www.id.iit.edu/619/*

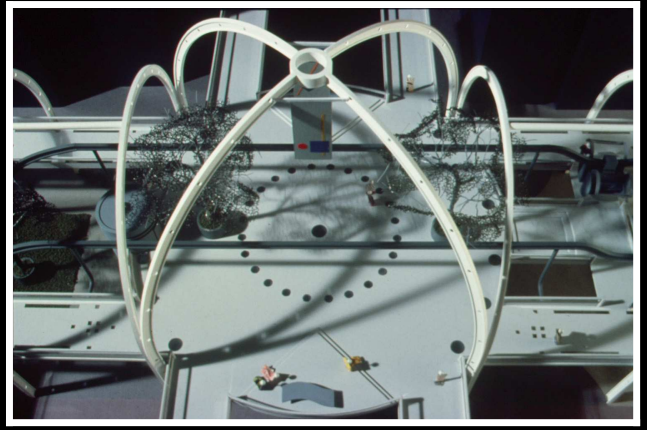
Fall 1988

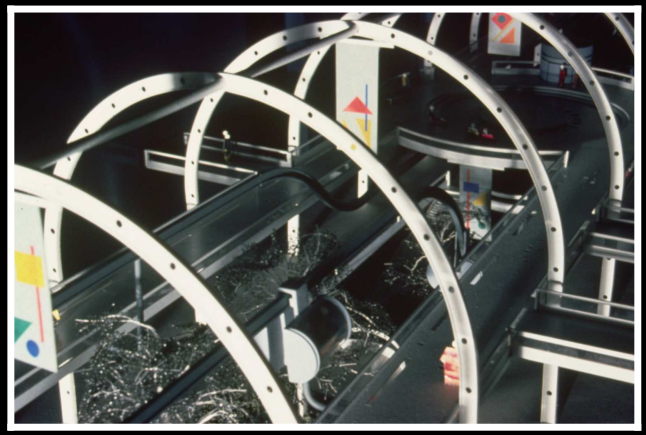
Project

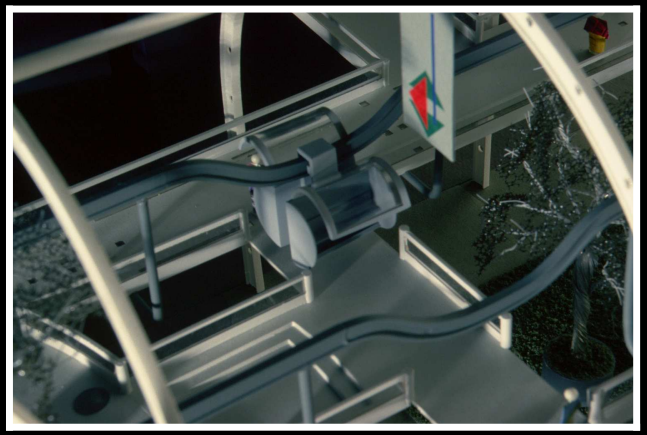
Governmental / Commercial
Urban Environmental Integration System

Galleria Chicago

- *Demonstration Project*
  State Street Mall
  Chicago







Fall 1988

Project

Commercial
K-12 Educational Support System

Kore Computer

- *Demonstration project*
  Apple Computer
- *Book Chapter*
  Design for Integrity

- Means/Ends Analysis
- Ends/Means Synthesis

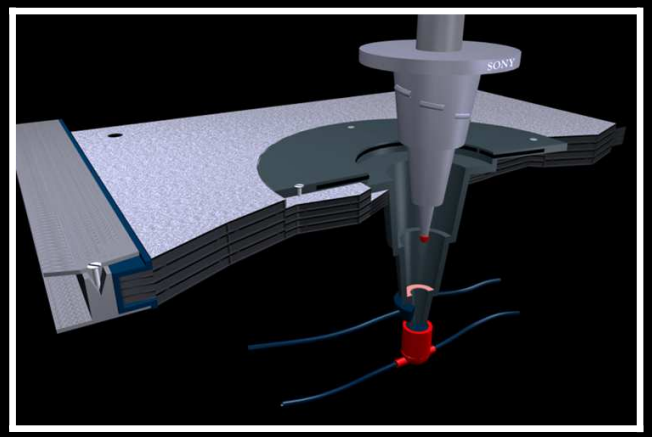
Fall 1990

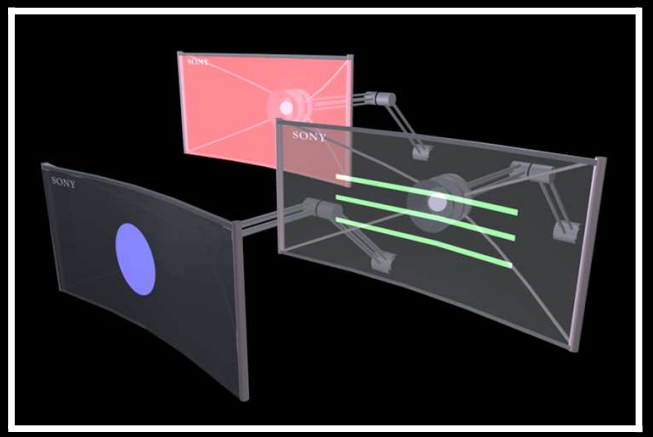
Project

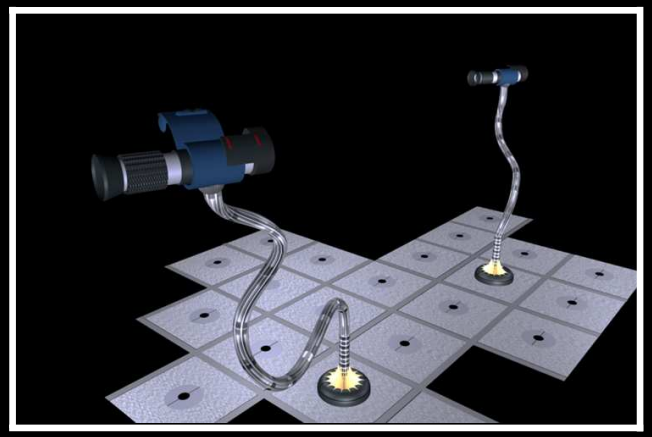
Industrial / Commercial
Telecommunication Production System

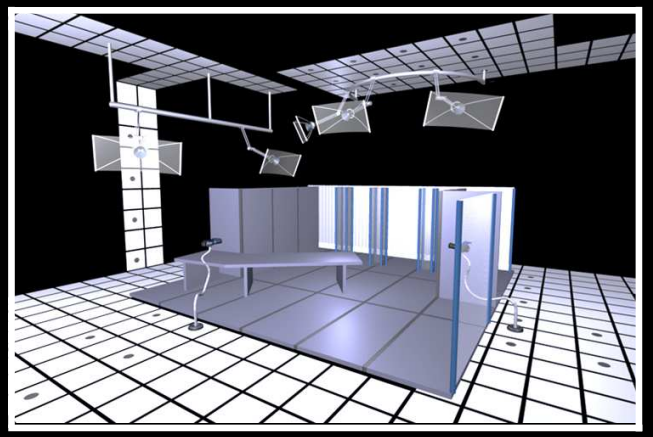
TV Command

- *Demonstration project*
  Sony
- *Book Chapter*
  Design for Integrity









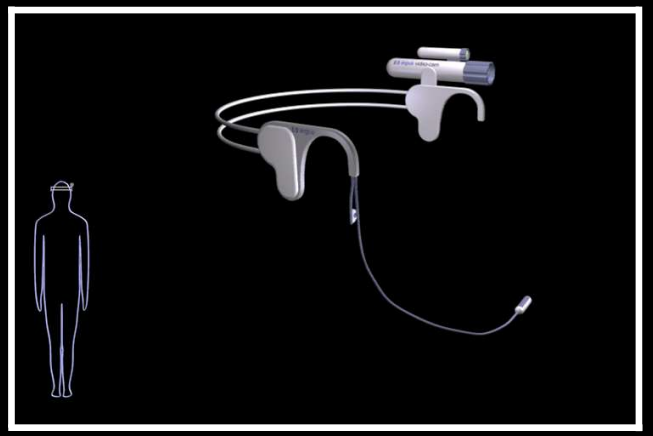
Fall 1991

Project

Industrial / Institutional
Distributed Health Care System

Argus

- *Demonstration project*
  Hewlett Packard
- *Book Chapter*
  Design for Integrity



Fall 1991

Event

Design Education – IIT Institute of Design
Curricular Revisions

Commitment to Research

- *Research and Teaching PhD Degree*
  First U.S. PhD in design

- *Terminal Professional MDes Degree*
  Two year program terminating in a demonstration project

- *Theory Courses and Workshops*
  Eight-week, 1½-credit theory courses;
  Sixteen-week, 2 or 4-credit workshop courses

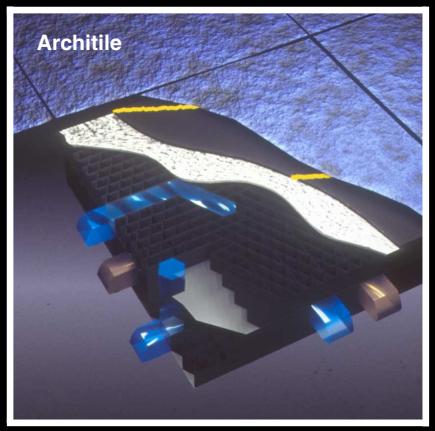
Fall 1991

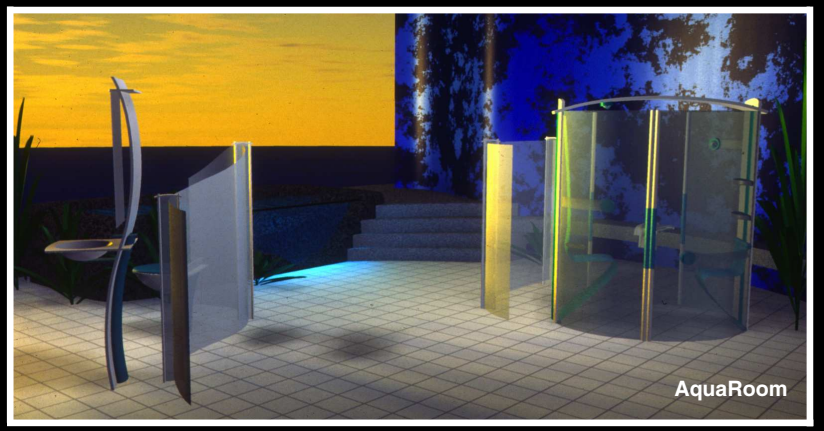
Project

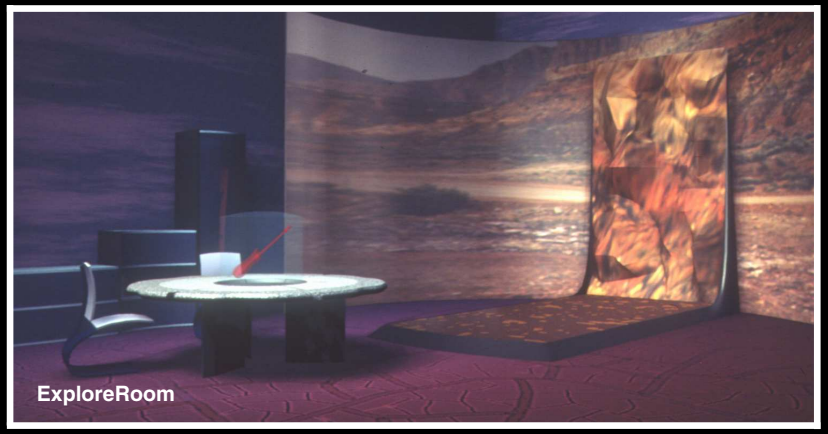
Commercial
Future of Plastics in Home Systems

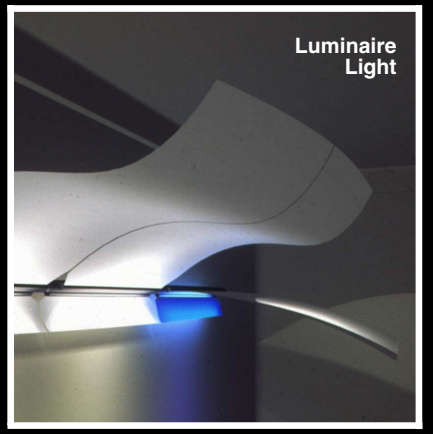
Nanoplastics

- *Finalist*
  3rd International Forma Finlandia Competition









- Future projections for society based on science projections

- *www.id.iit.edu/618/*

Fall 1992

Project

Commercial
Lighter-than-Air Transport System

Aerotecture

- *Bronze Prize*
  6th International
  Osaka Design
  Competition

- *www.id.iit.edu/397/*

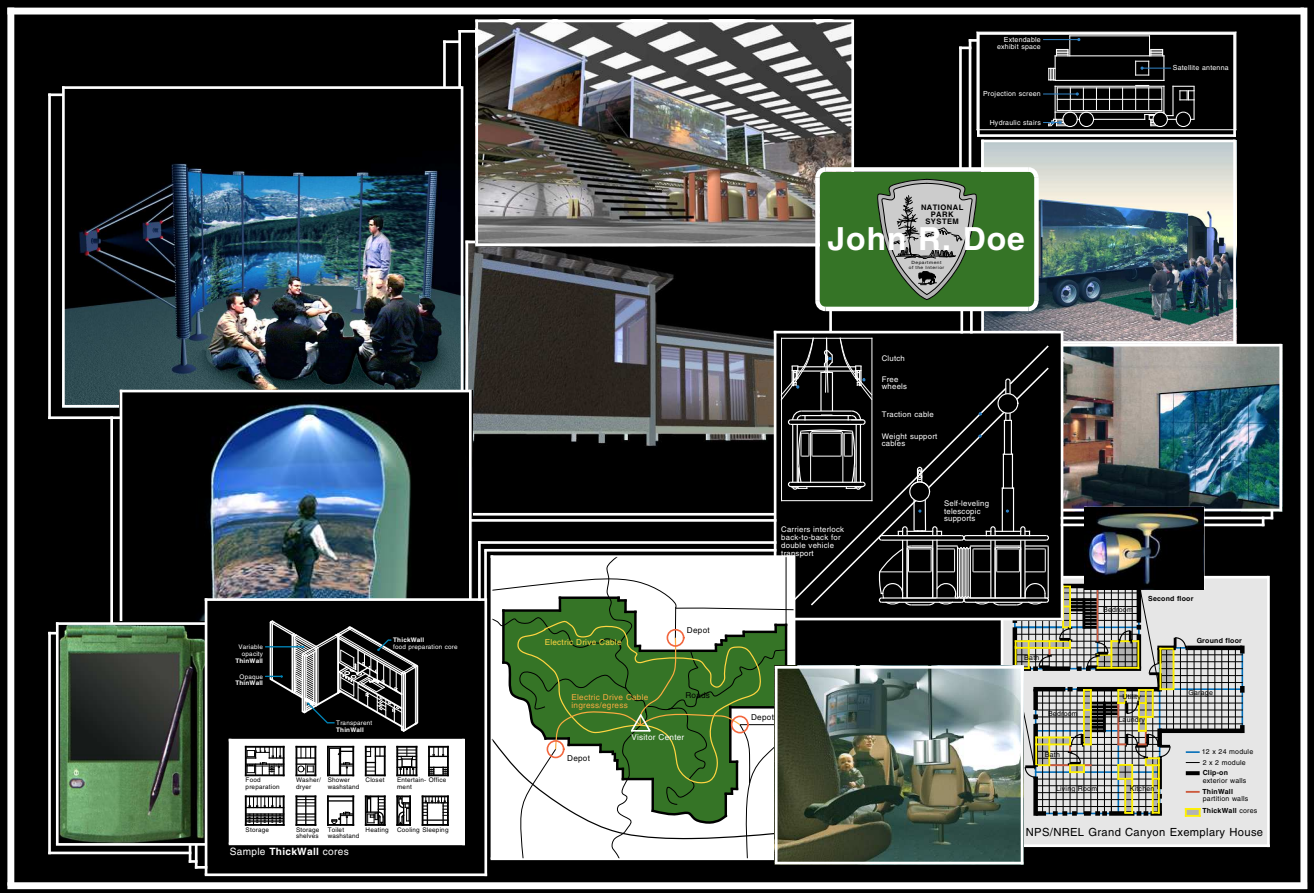
Fall 1992

Project

Governmental
National Parks Conservation System

National Parks System

- *Commissioned Project*
  National Parks Foundation



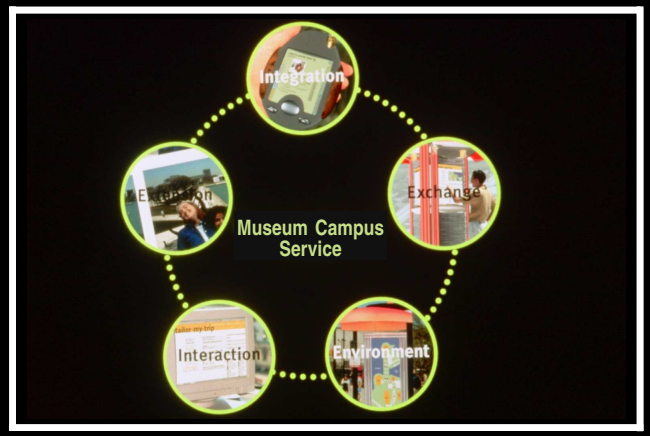
Fall 1994

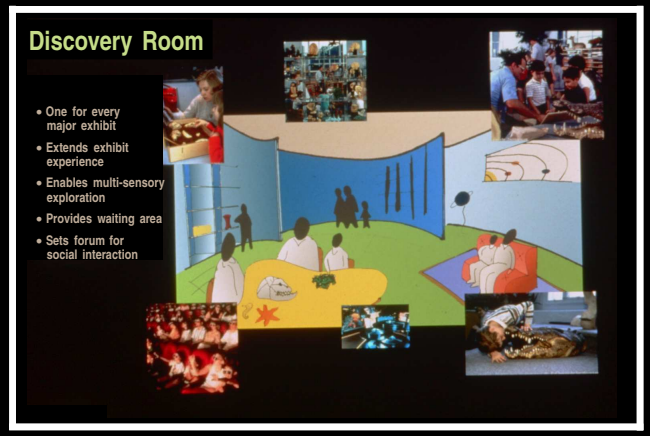
Project

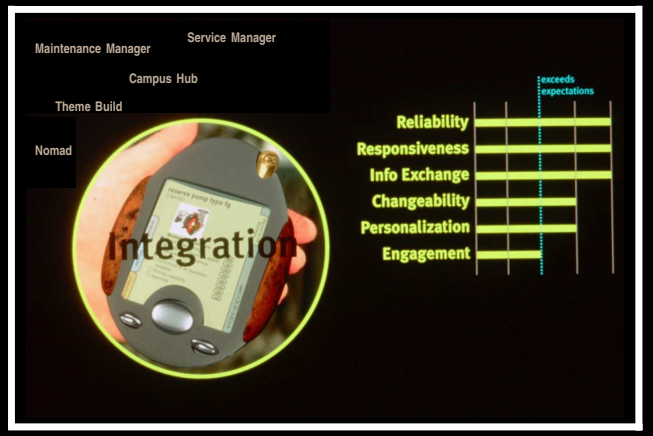
Institutional
Inter/Intra Institutional Service Systems

Chicago Museum Campus

- *Demonstration Project*
  Field Museum
  Shedd Aquarium
  Adler Planetarium







- Formatted System Elements
- Solution Element and System Element Properties and Features
- System Element interaction

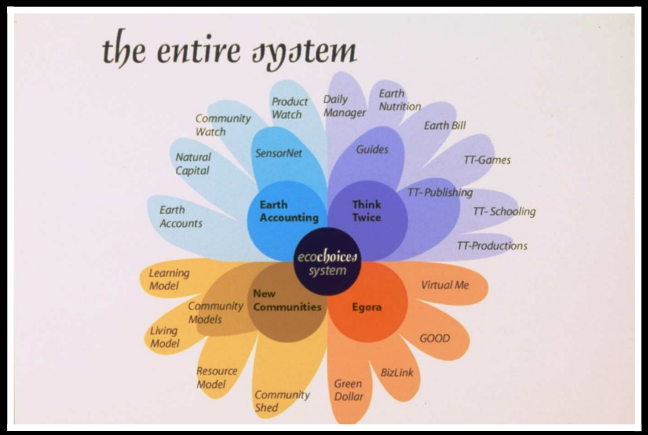
Spring 1999

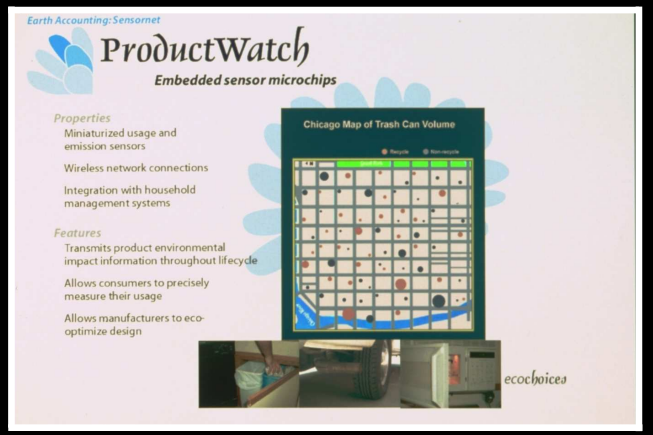
Project

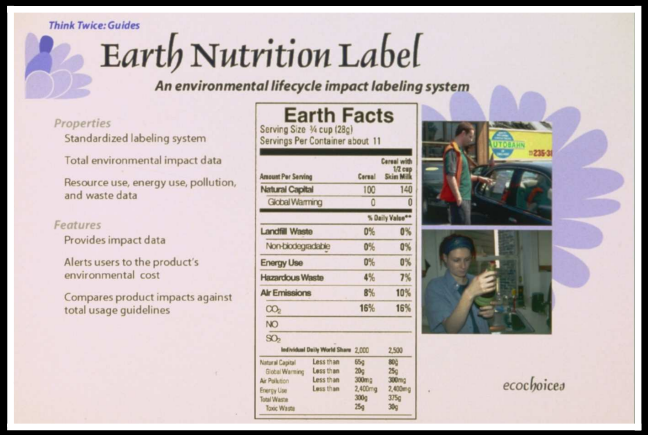
Governmental
Environmental Awareness and Action System

Eco-Choices

- *Demonstration Project*
  Environmental Stewardship Organizations







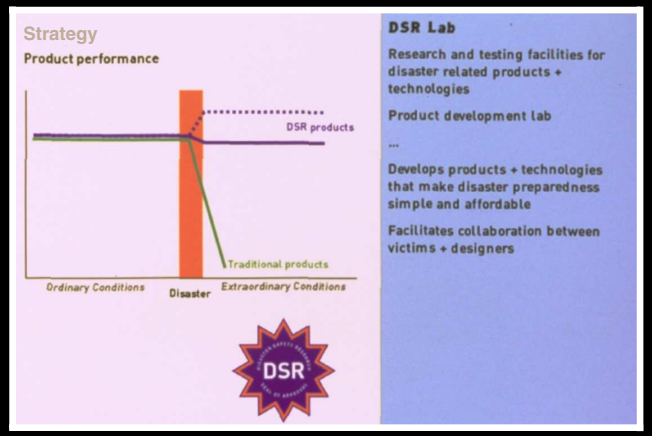
Spring 2000

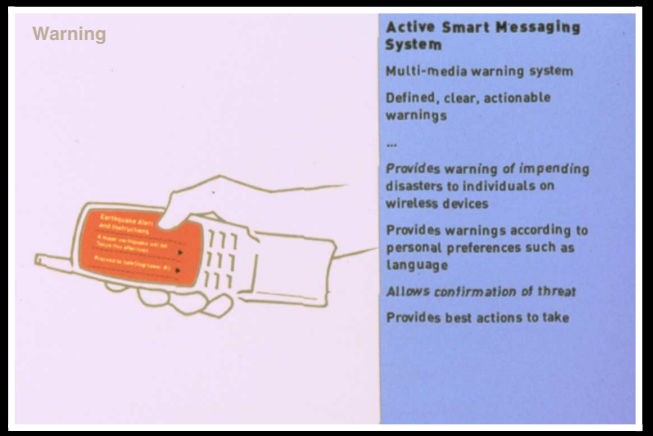
Project

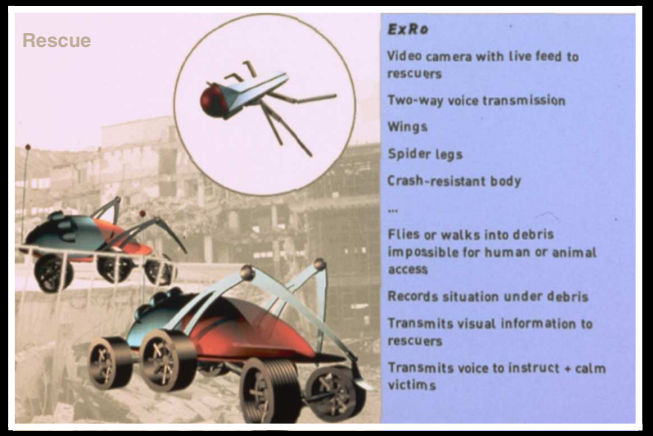
Governmental
Disaster Preparation/Response/Recovery Systems

Safe Earth

- *Demonstration Project*
  Disaster Management Agencies







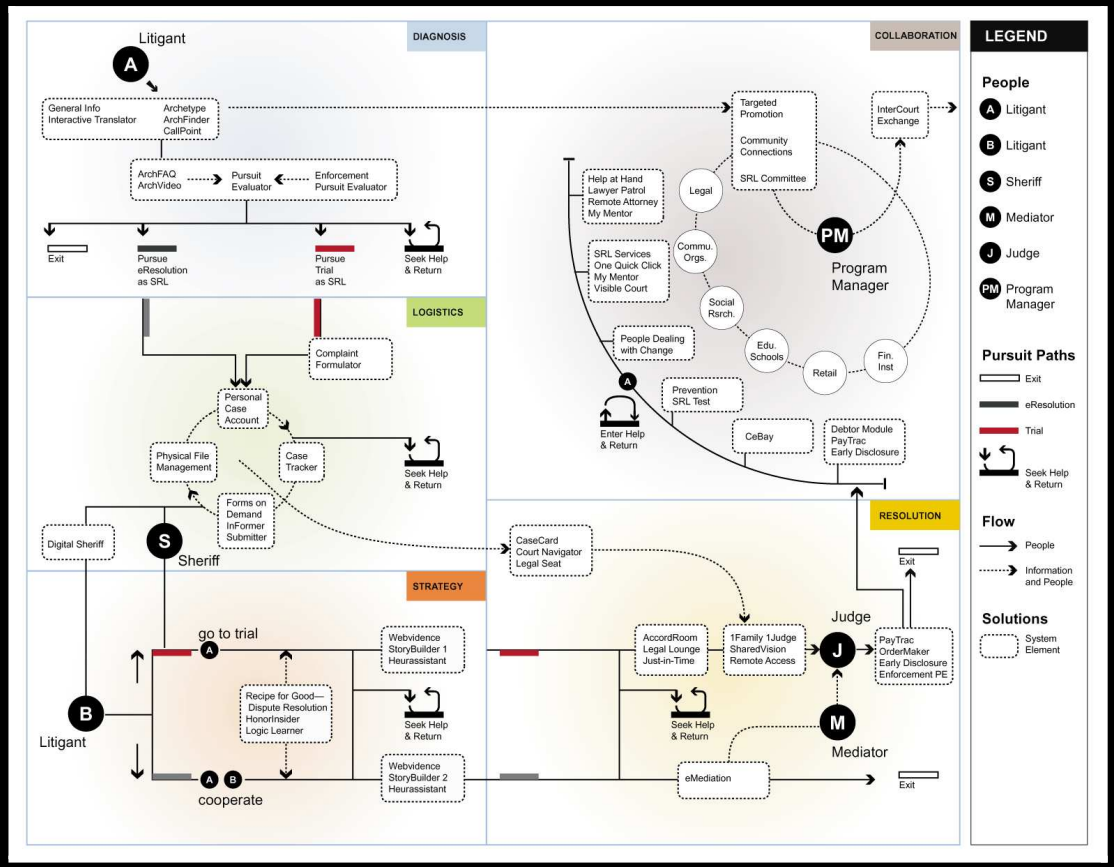
Spring 2000

Project

Governmental
State Courts Information Services System

Access to Justice

- *Commissioned Project*
  National Center for State Courts
- *Book*
  Access to Justice. Meeting the Needs of Self-Represented Litigants



- Shared authority for direction
- Integration of disciplines

- *www.id.iit.edu/727/*

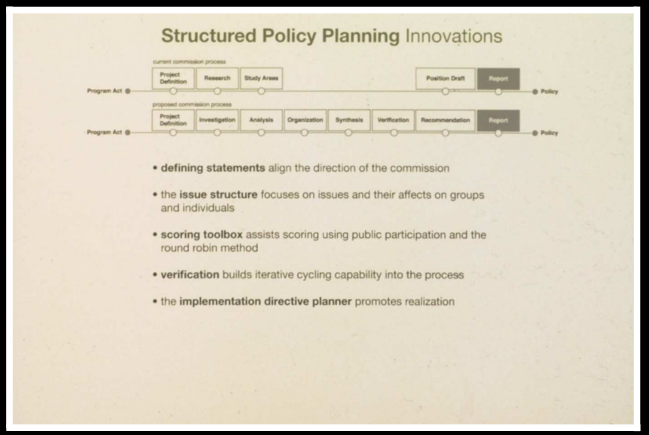
Spring 2001

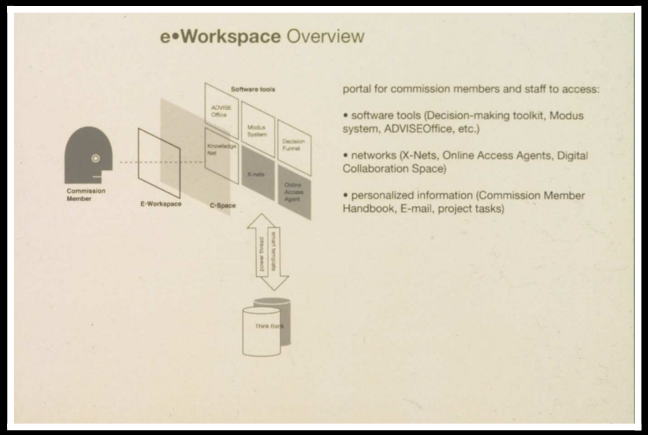
Project

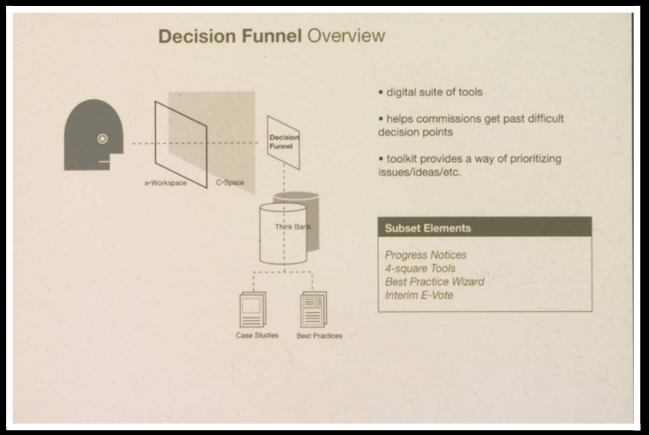
Governmental
Advisory Recommendation Planning System

Planning for Innovation

- *Demonstration Project*
  Governmental Commissions







• Planning the design of a planning system

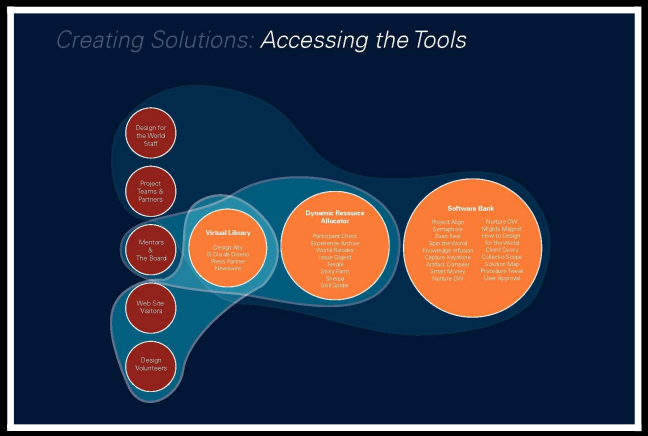
Spring 2002

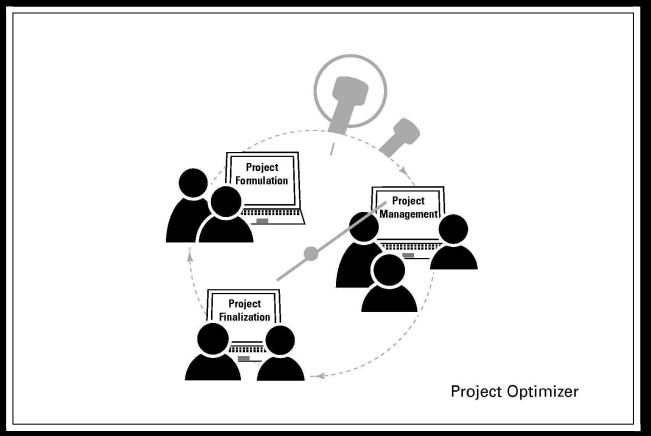
Project

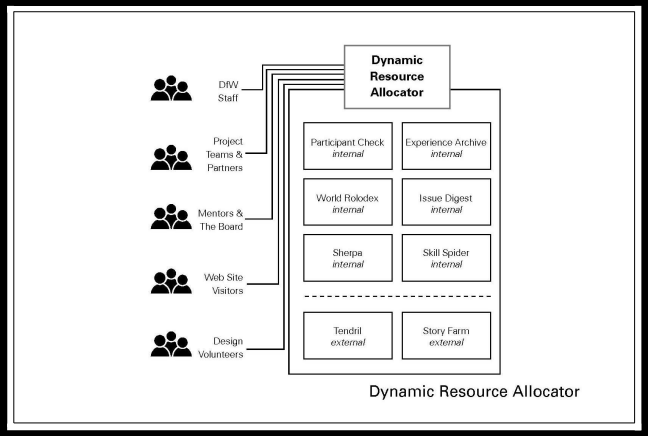
NGO Institutional
Process Evaluation Systems

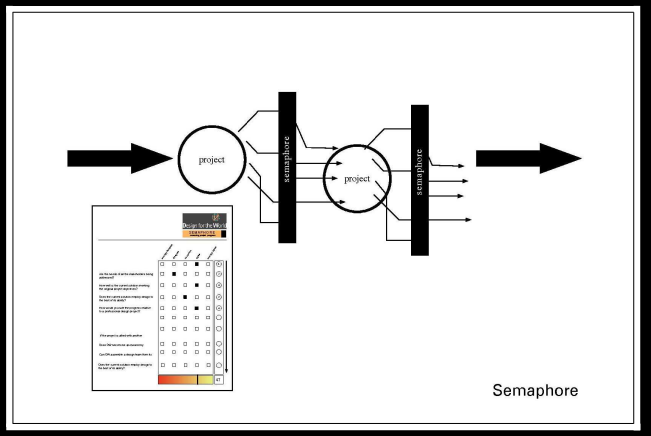
Design for the World

- *Commissioned Project*
  Design for the World
- *Special Commendation*
  ICSID Design for the World, Barcelona









- System evaluation techniques

Spring 2003

Project

Institutional
International Design Institute for Chicago

IDI/C

- *Demonstration Project*
  - IIT
  - Chicago
  - The international design community

Fall 1990 / Spring 2003

Project

Institutional
International Design Institute for Chicago

IDI/C

- *Demonstration Project*
  - IIT
  - Chicago
  - The international design community

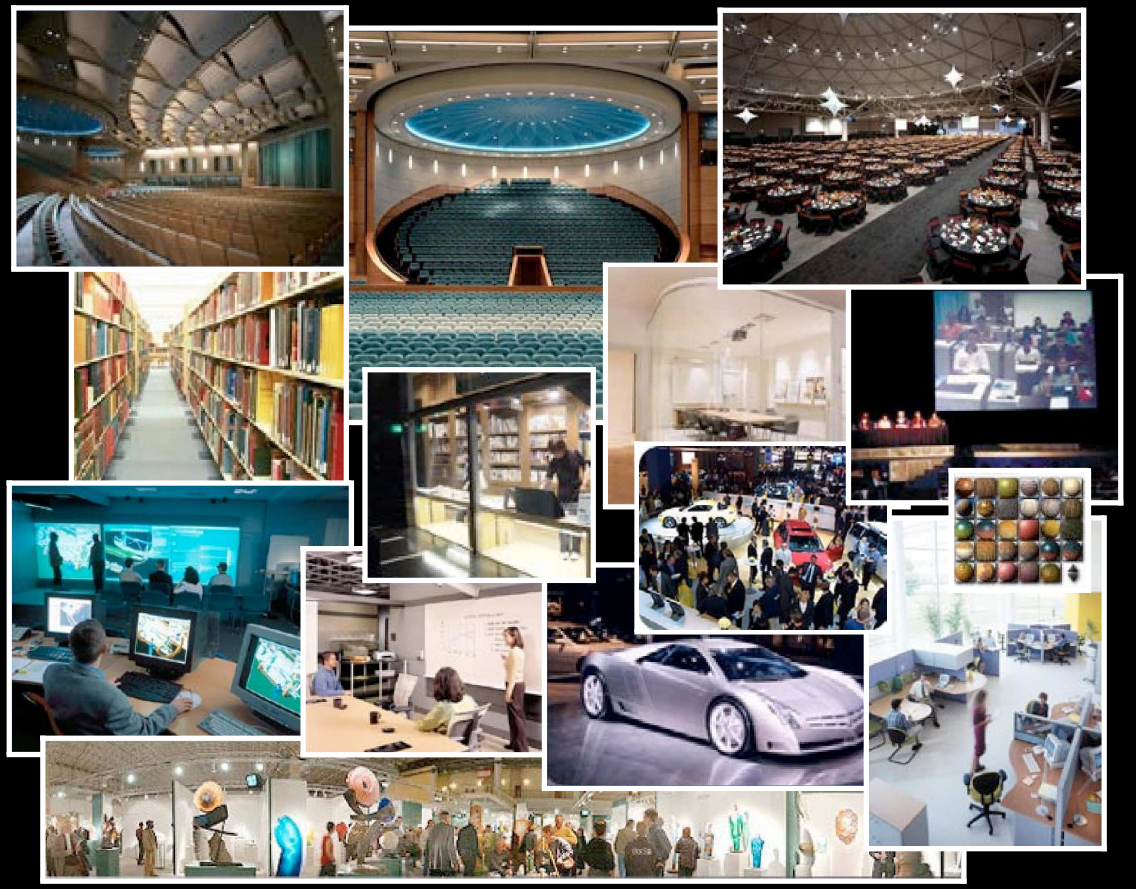
Fall 1990 / Spring 2003

Project

Institutional
International Design Institute for Chicago

IDI/C

- *Demonstration Project*
  - IIT
  - Chicago
  - The international design community



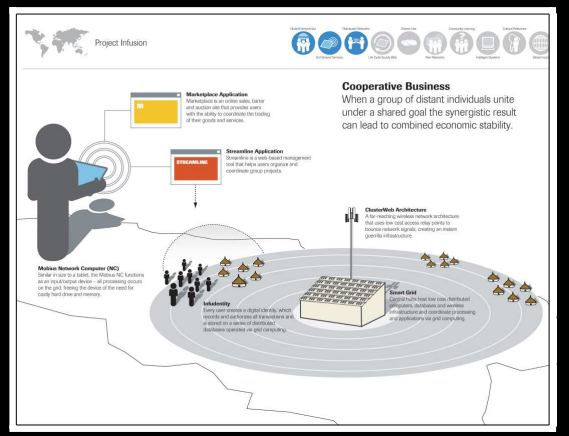
Fall 1990 / Spring 2003

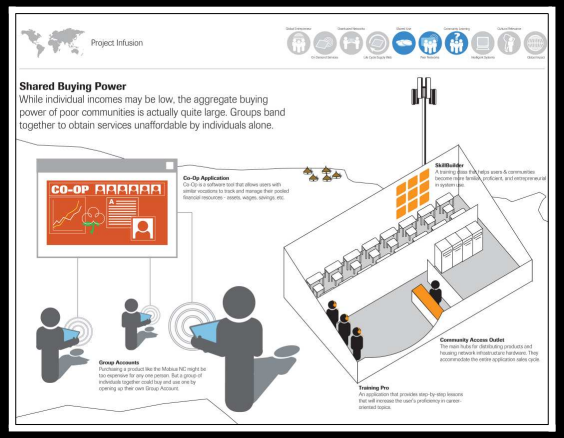
Project

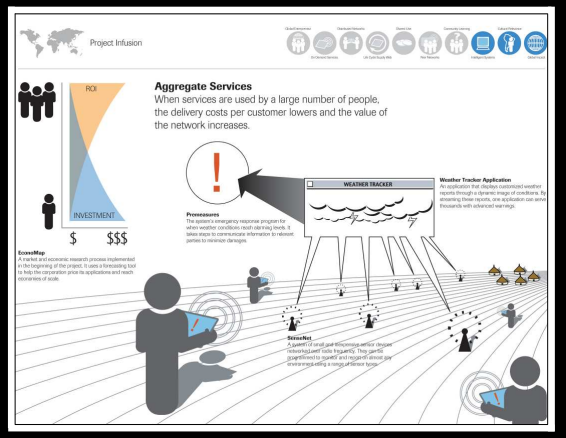
Commercial
Cloud Network Computing System

Project Infusion

- *Finalist:* Work category
  1st International
  INDEX Awards
  Copenhagen







- *www.id.iit.edu/614/*

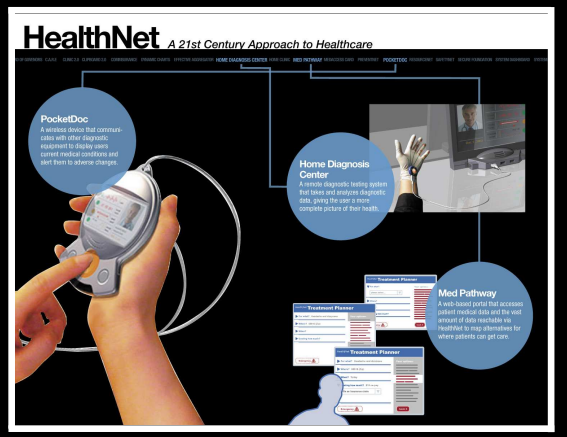
Fall 2003

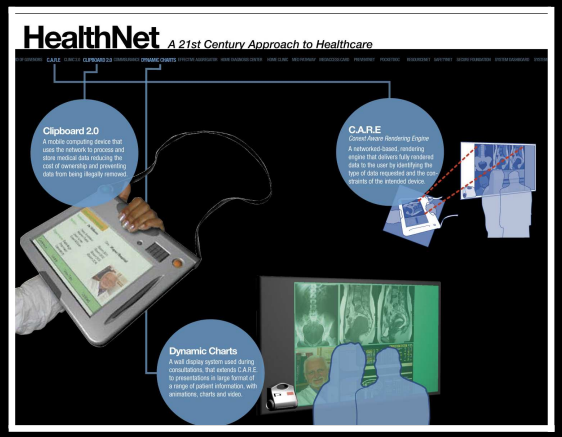
Project

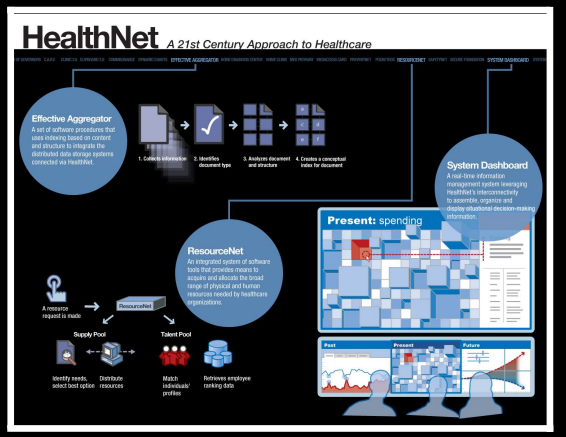
Institutional
National Health Care System

HealthNet

- *Finalist:* Body category
  1st International
  INDEX Awards
  Copenhagen







- *www.id.iit.edu/616/*

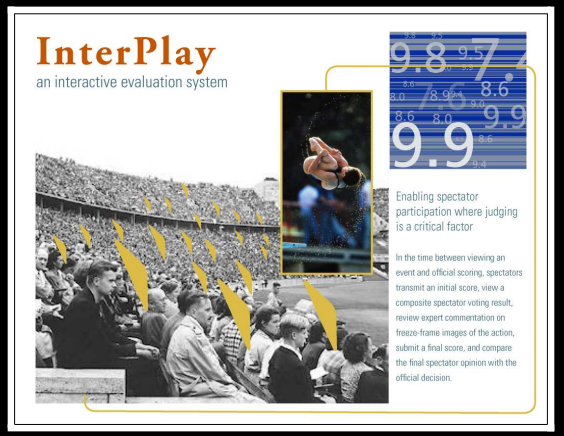
Fall 2003

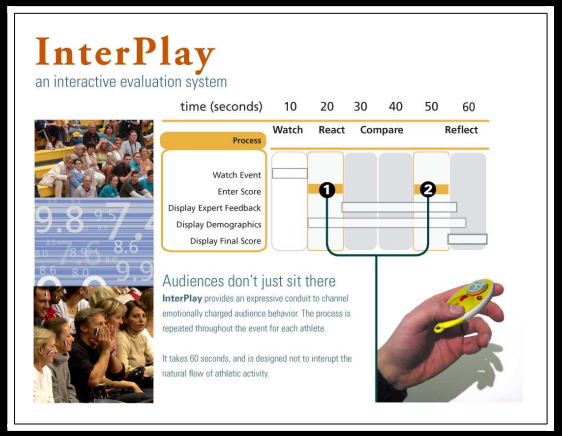
Project

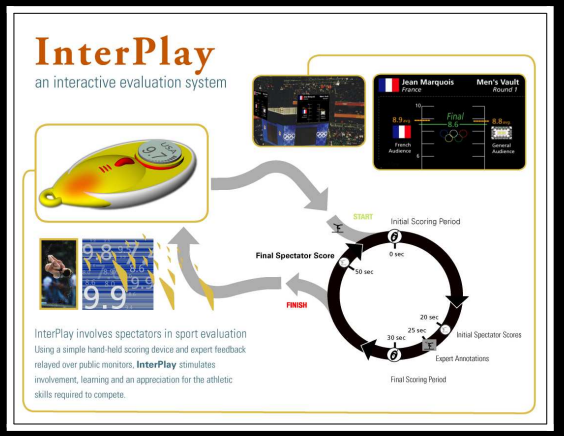
Institutional
International Sport Scoring System

InterPlay

- *Finalist:* Play category
  1st International
  INDEX Awards
  Copenhagen







- *www.id.iit.edu/598/*

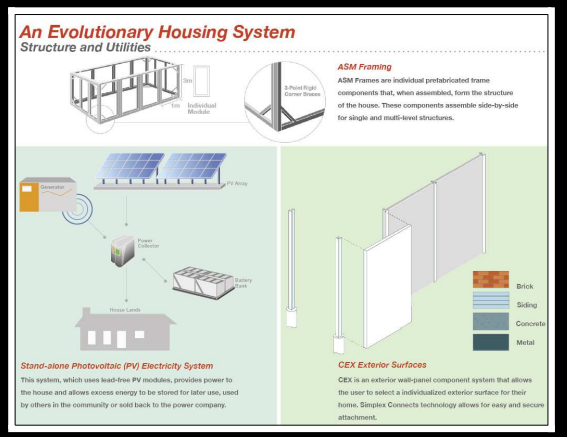
Fall 2003

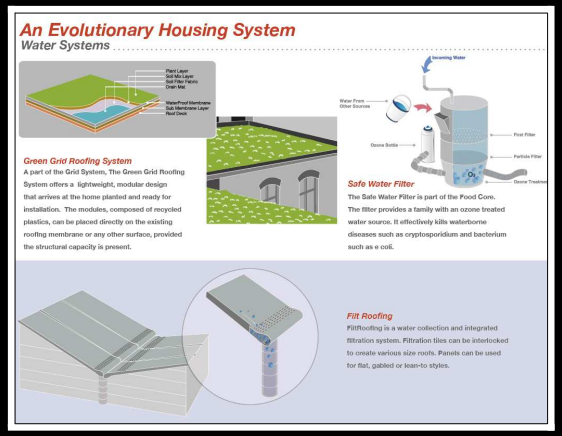
Project

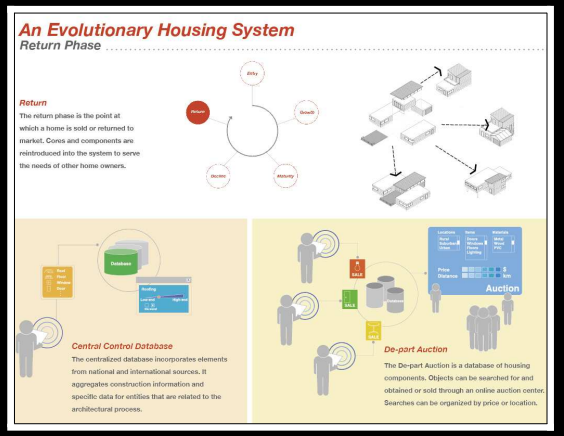
Commercial
International Sustainable Housing System

Evolutionary Housing

- *Finalist:* Home category
  1st International
  INDEX Awards
  Copenhagen







- *www.id.iit.edu/594/*

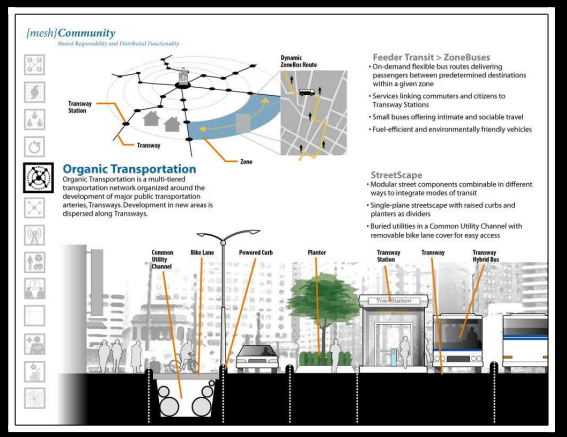
Fall 2004

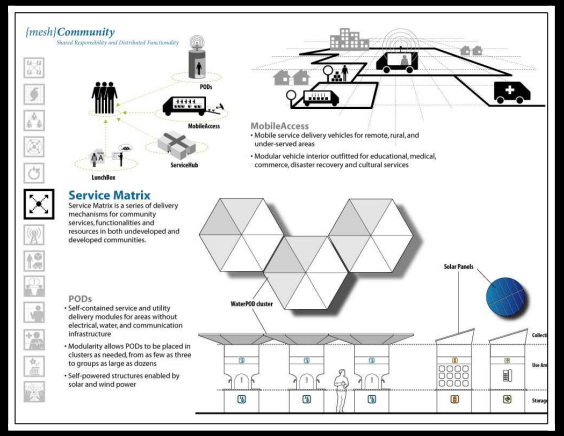
Project

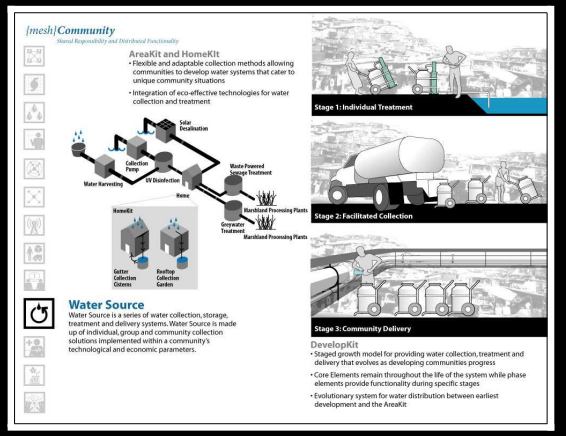
Governmental / Industrial
International Sustainable Community System

{Mesh}Community

- *Entry:* Community category
  1st International
  INDEX Awards
  Copenhagen







- *www.id.iit.edu/553/*

Fall 2004

Project

Governmental
Local/State/National Policy Making Systems

Design Thinking

- *Demonstration project*
  Local, State and National Governments
- *Four Projects*
  Education
  Research
  Campaign
  Demonstration

- Integration of design planning with policy planning

- *www.id.iit.edu/552/*

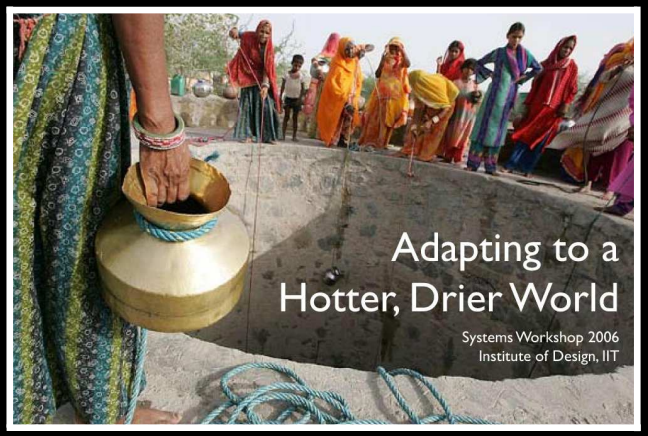
Fall 2005

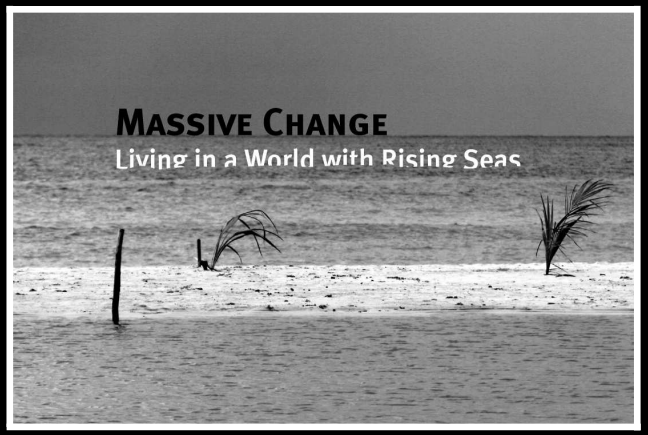
Project

Governmental
Climate Change Adaptive Response Systems

Massive Change

- *Demonstration project*
  Chicago Planning Commission, Department of Environment





- *www.id.iit.edu/550/*

Fall 2006

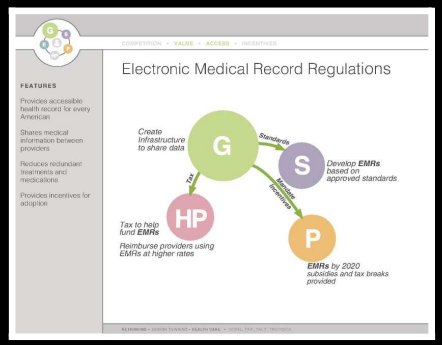
Project

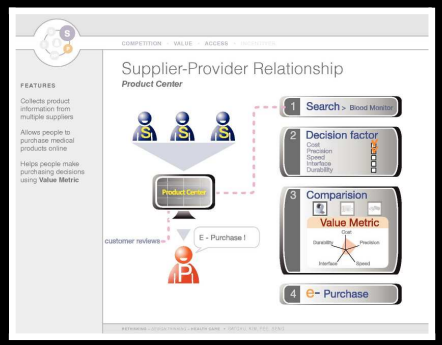
Governmental/Institutional/Industrial
National Health Care System

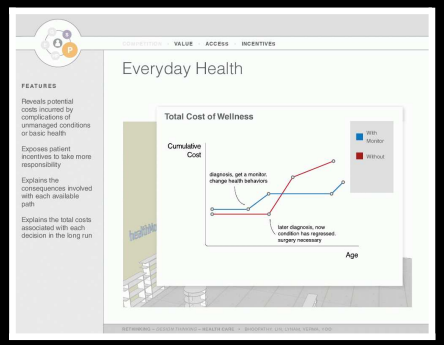
Rethinking–
Designthinking
–Health Care

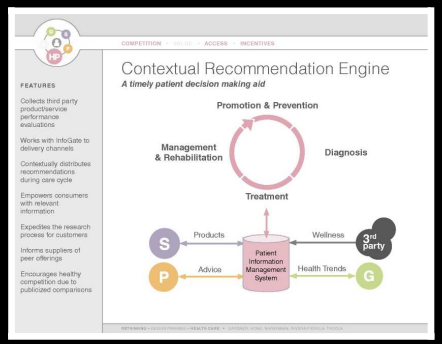
- *Commissioned Project*
  Robert C. Pew II

- *Recommendation*
  2008 Presidential Candidates









- *www.id.iit.edu/824/*

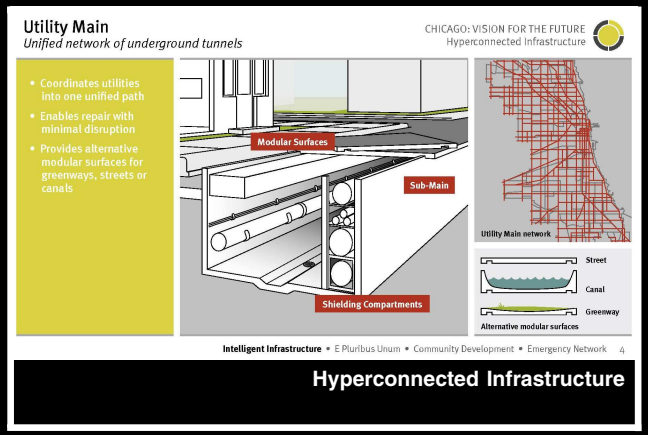
Fall 2007

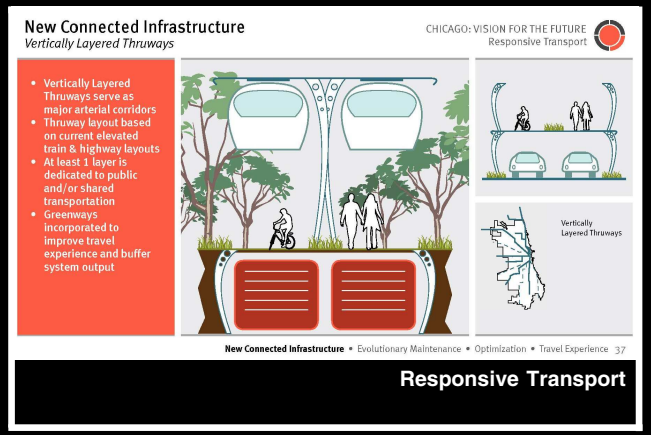
Project

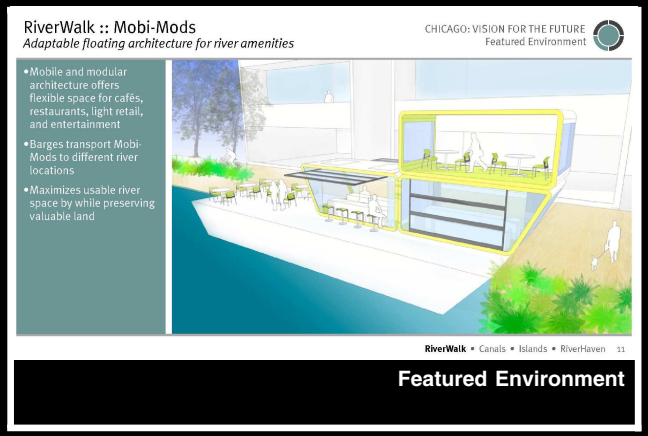
Governmental
Environmental and Infrastructural Systems

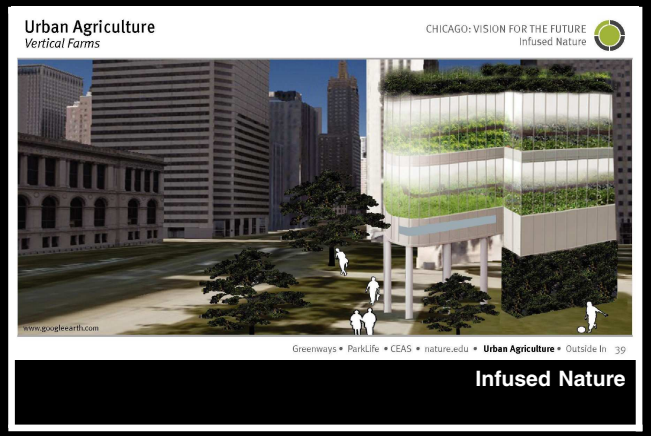
Chicago: Vision for the Future

- *Next 100 Years*
  Burnham Plan
  Centennial









- *www.id.iit.edu/827/*

Fall 2008

Project

Commercial
Self-Sufficient Housing System

Future Living

- *2010 International traveling show*
  d3 Natural Systems "Housing Tomorrow"
- *2010 Bronze Award*
  International Design Excellence Awards IDSA

- *www.id.iit.edu/1021/*

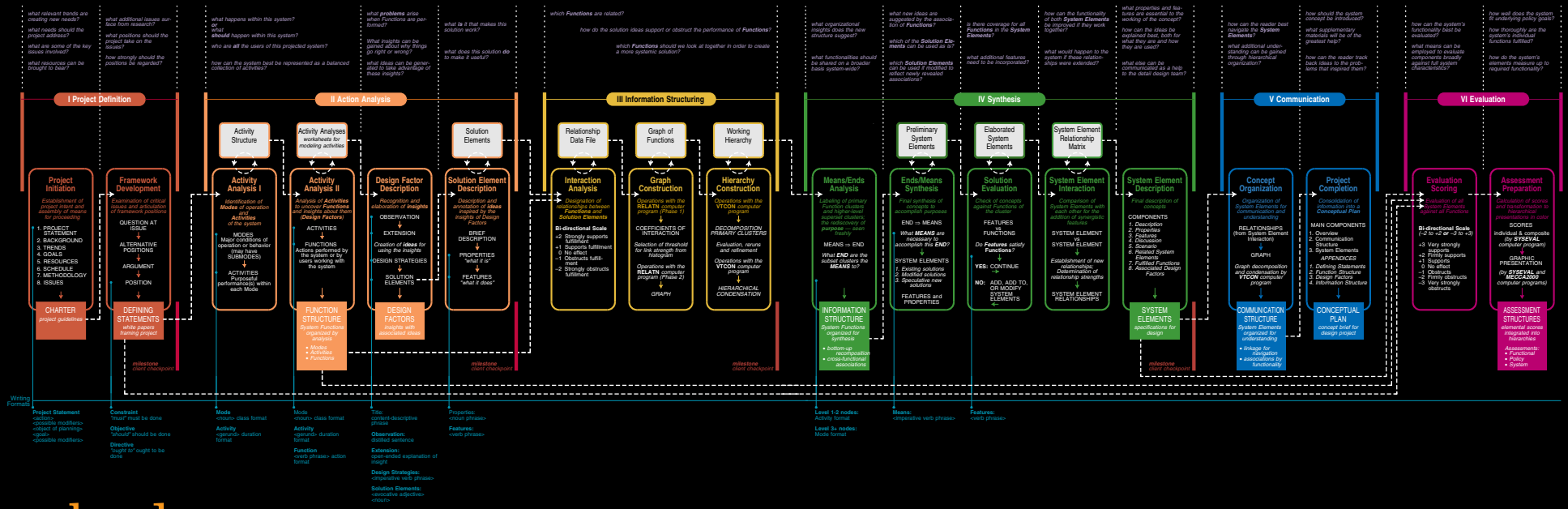
Fall 2009

Today

Structured Planning
Tools for Planning

The Structured Planning Process 2010

- tool kit
- information handling process



- book: **Structured Planning.** Advanced Planning for Business, Institutions and Government

2010

Systems & Systematic Design

Tracing the Evolution of Design Methodology at the Institute of Design 1965 - 2010

Charles L. Owen

Distinguished Professor Emeritus

The projects viewed here in summary are from 109 conducted in the years between 1965 and 2010. Many have full reports, and all since 2003 (including some digitized earlier reports) are in .pdf form at the Institute of Design web site.

All will become part of the IIT Archive.

www.id.iit.edu