

Design & Build Chicago Scale Model for Dynamic Disaster Simulation

July 2008



Problem Formulation



- The Chicago fire department is the nation's leading fire department in term of disaster preparedness and event forecasting
- They need very understandable means to communicate and decipher a complex system of multiple emergency services and protocols that occur simultaneously during a disaster.
- Chicago mass transit falls short in evacuation planning, federal report says :
Recommends upgrades to move elderly and disabled in emergency

By Richard Wronski and Liam Ford (Chicago Tribune reporters)
July 23, 2008

Project Objectives

- To Map in Three Dimensions the Highest Density City Areas
- To develop a training tool for Chicago Fire Department use
 - Familiarizing Fire Department Personnel with Target Area
 - Identifying Problematic Scenarios
 - Illustrating a Vast Array of Potential Disasters
 - Simulating Disaster Response in Real-Time
- To be used for other studies:
 - Wind Tunnel Testing
 - Environmental Impact Testing & Show Case

Introduction

Scale Model

Manufacture

Dynamic Projection

Demonstration

Questions



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Advisor and Members

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Bogdan Rus

Diyanna Russeva

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Team Organization

Introduction

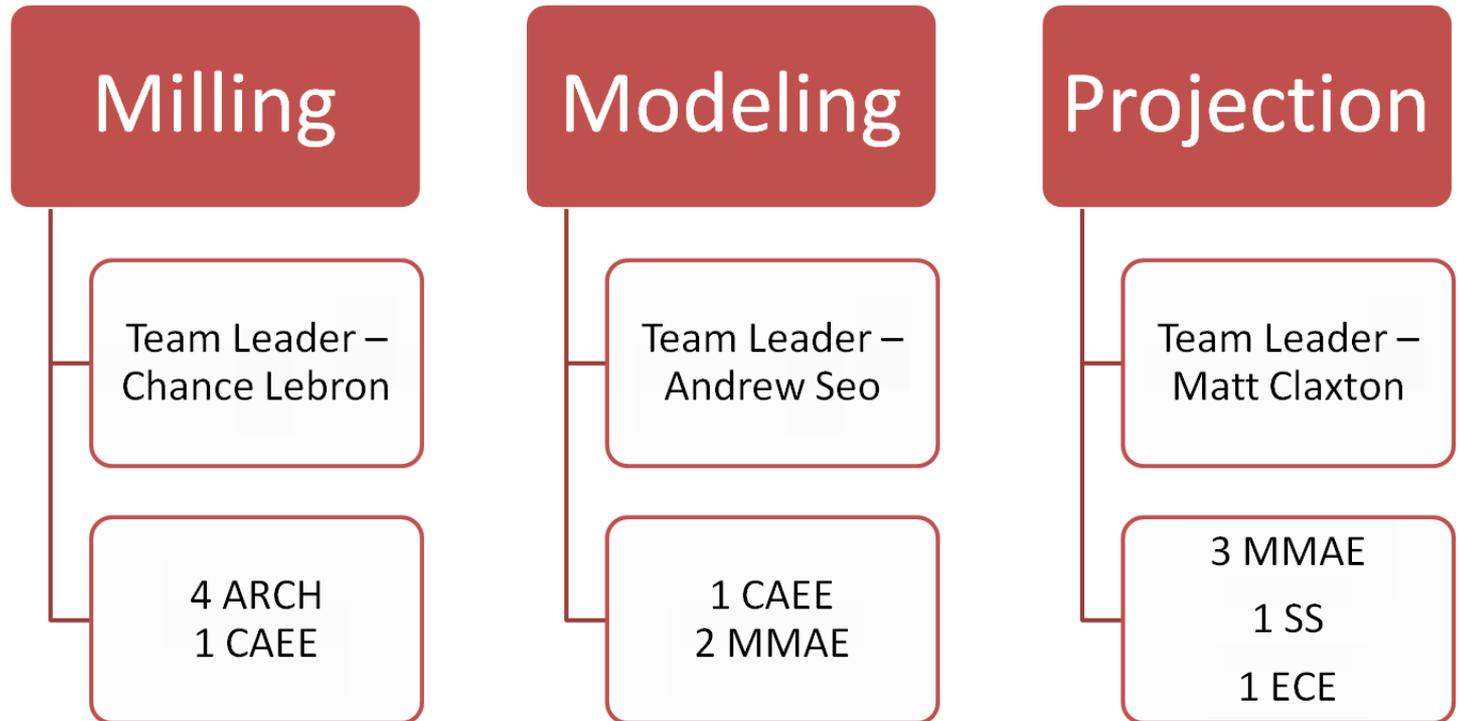
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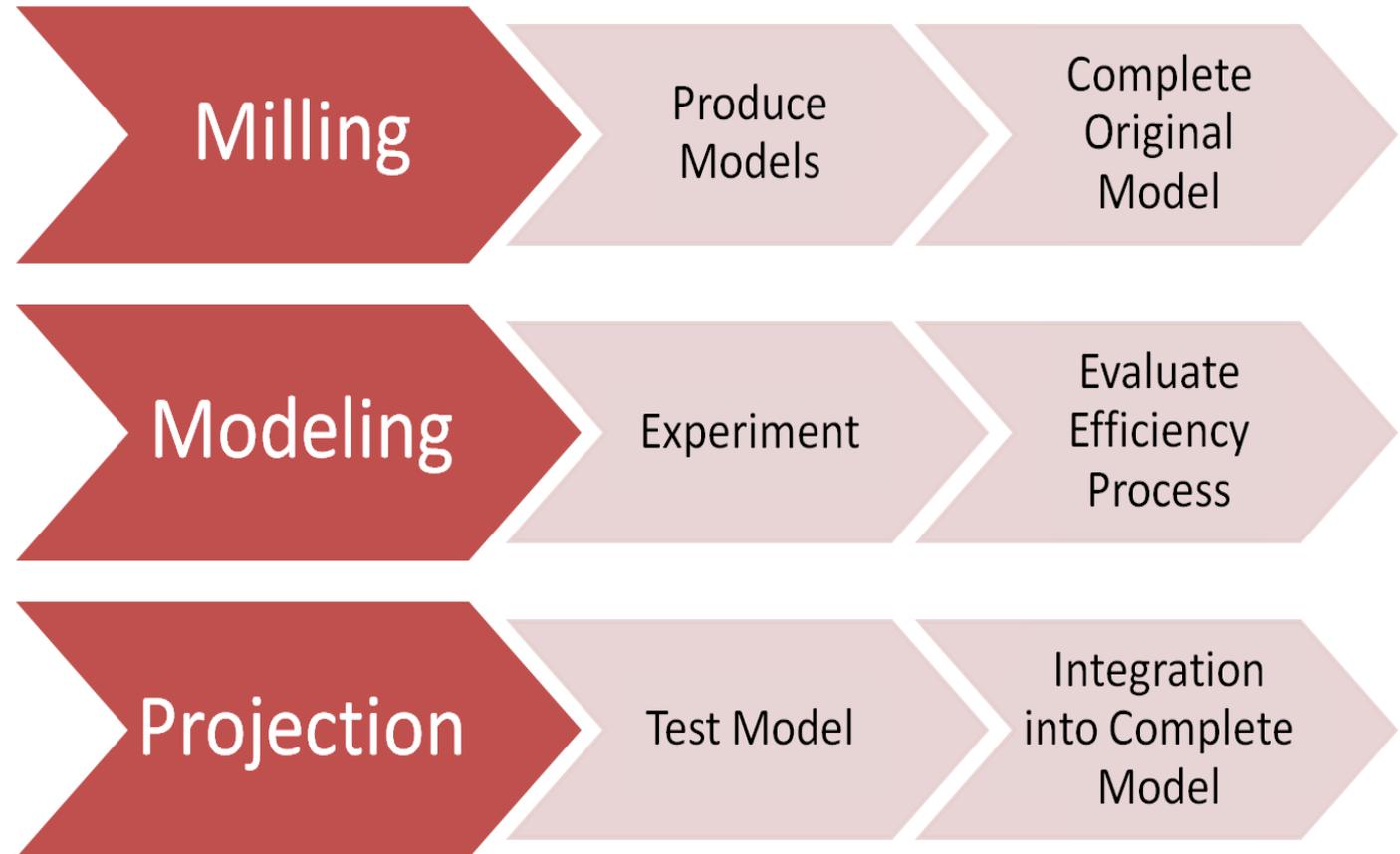
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Building the scale model

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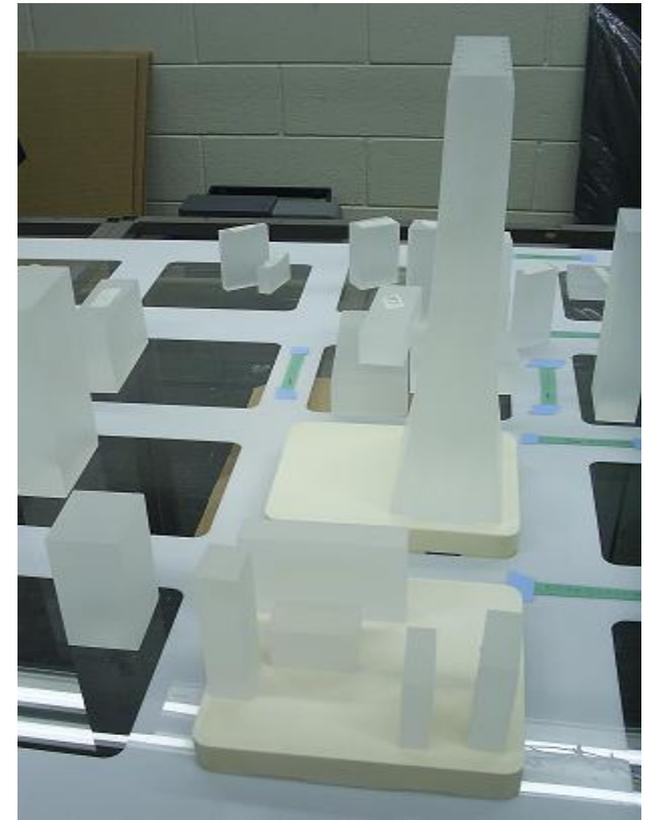
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- Completion of the model, including wrapping up the milling process on the CNC machine, sandblasting all buildings, bonding buildings and proper labeling and placement of buildings, base manufacture, composing street system.

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Description of Scale Model

Introduction

Scale Model

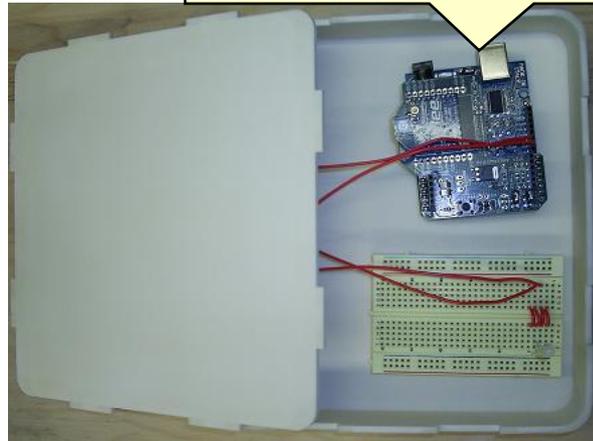
Manufacture

Dynamic Projection

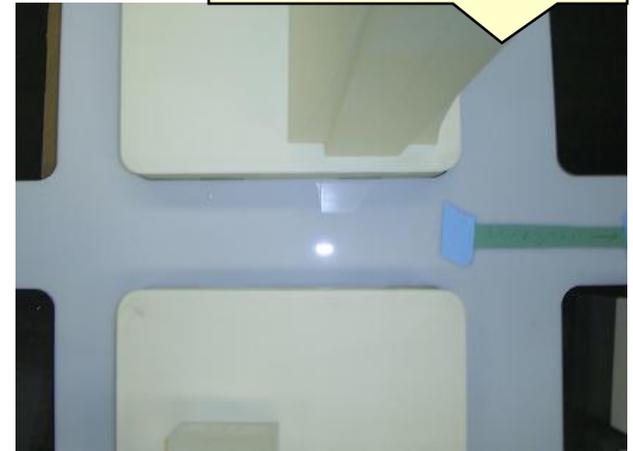
Demonstration

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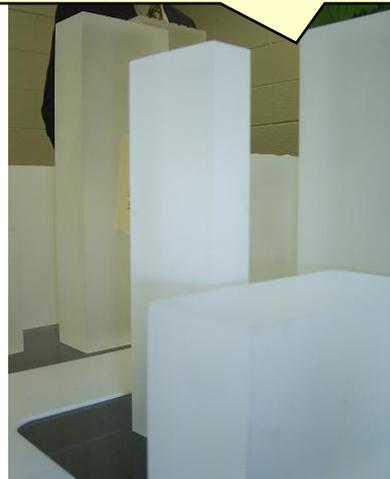
Base



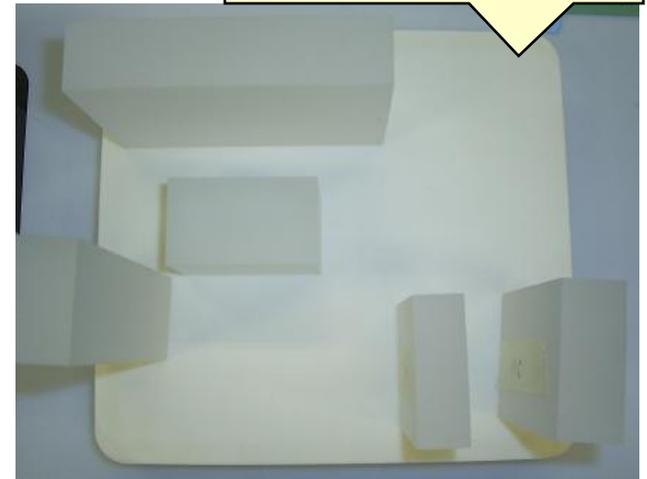
Street System



Building



City Blocks



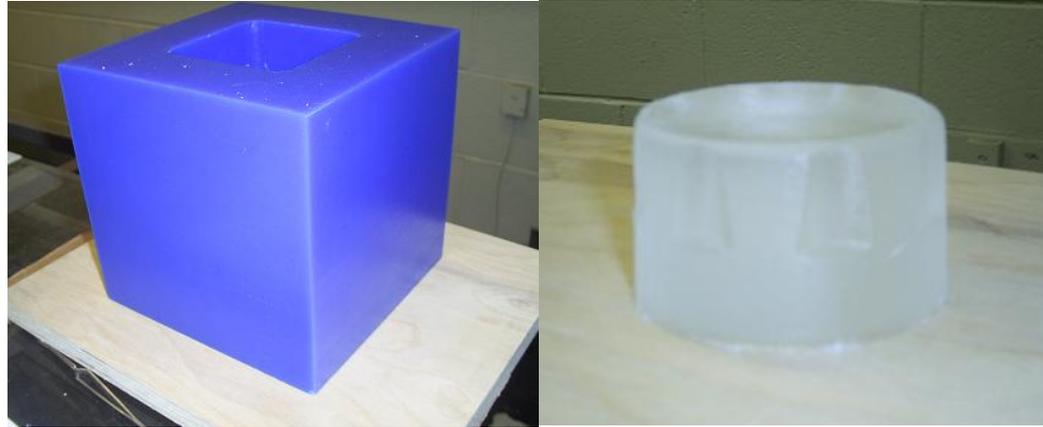
- Explored the various types of acrylic bonding methods and finalize a strategy

Clear Casting Resin



- Research different materials to prepare a molding cast, in order to meet temperature requirements, be cost effective and gain ease of manipulation.

- Experimented different forms of molding making and provided small samples.



- Selective Laser Sintering process: utilizes powdered nylon or metal to create 3-D molds

Integration of LEDs and Projector

Introduction

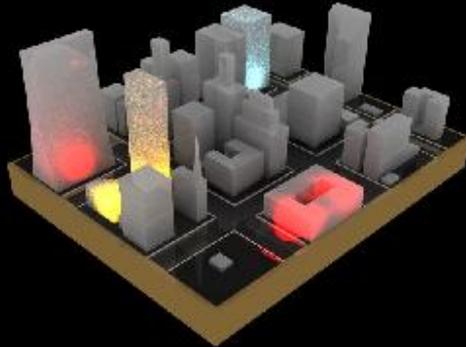
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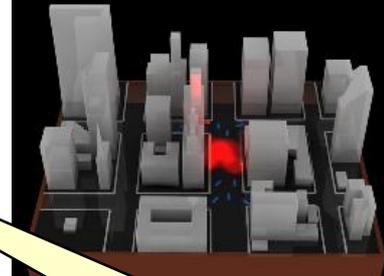
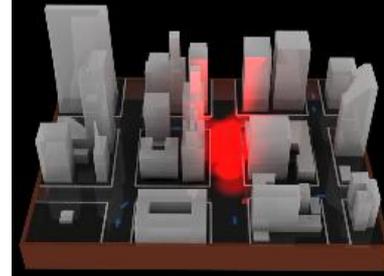
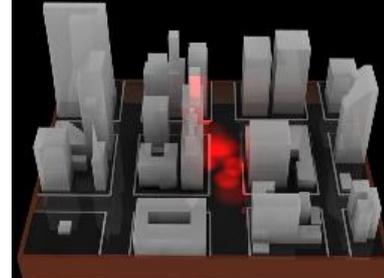
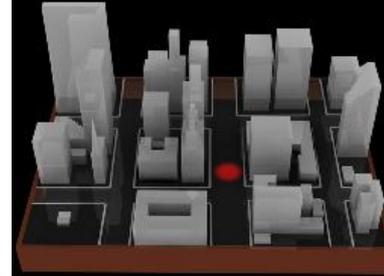
Questions



Building System



**Controlled by one main
computer**



Street System

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LED Control

Introduction

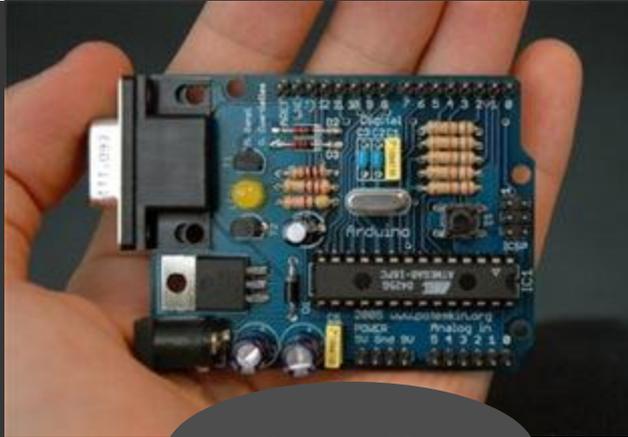
Scale Model

Manufacture

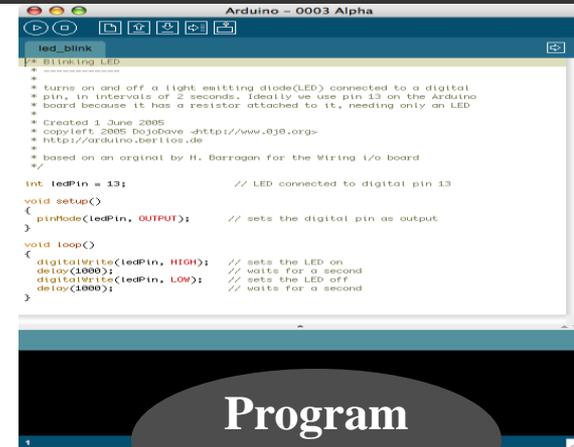
Dynamic Projection

Demonstration

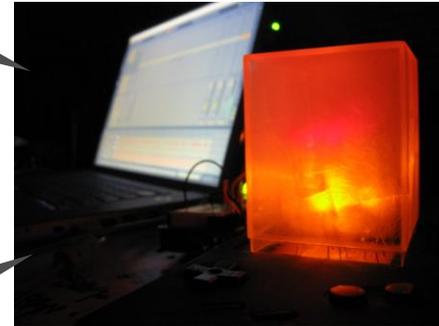
Questions



Controller



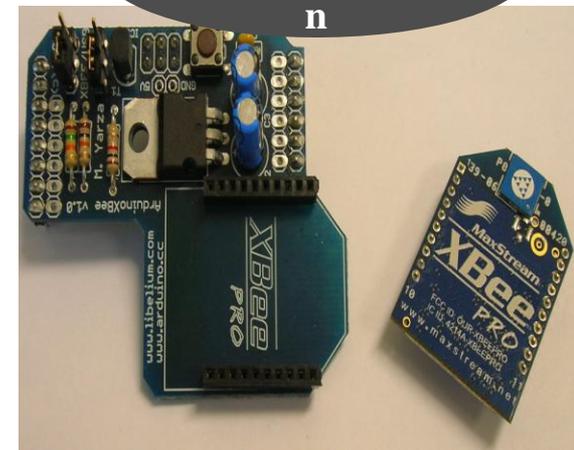
Program Code



Wireless Communication



LEDs



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Projector Control

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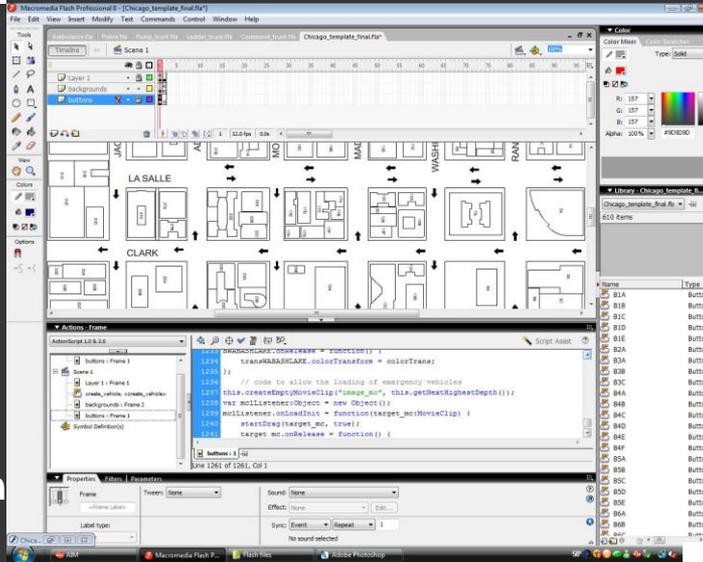
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Flash Software



Flash Video Scenario



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Video or Picture

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Thanks!

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