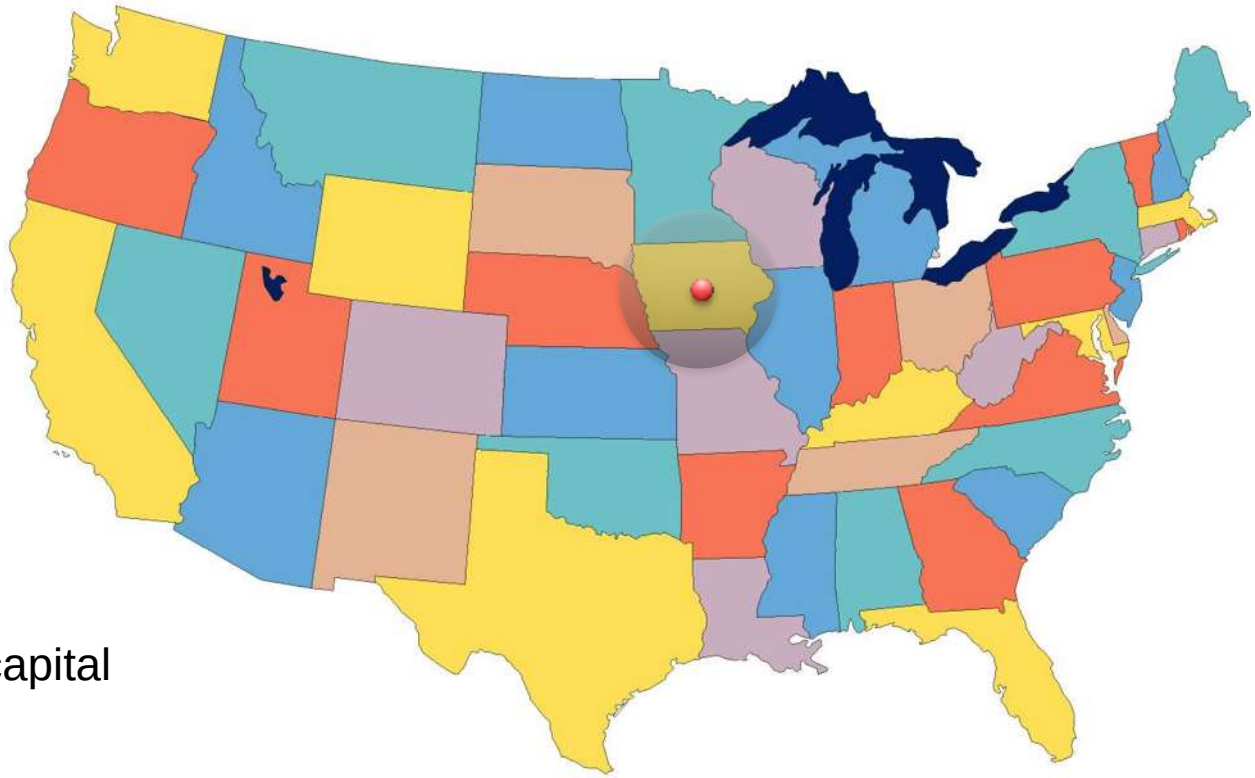
IOWA STATE UNIVERSITY

Next Generation Classroom

Department of Aerospace Engineering
Iowa State University

Dr. Richard Wlezien
Professor and Vance and Arlene Coffman
Endowed Department Chair in Aerospace Engineering

Final Configuration



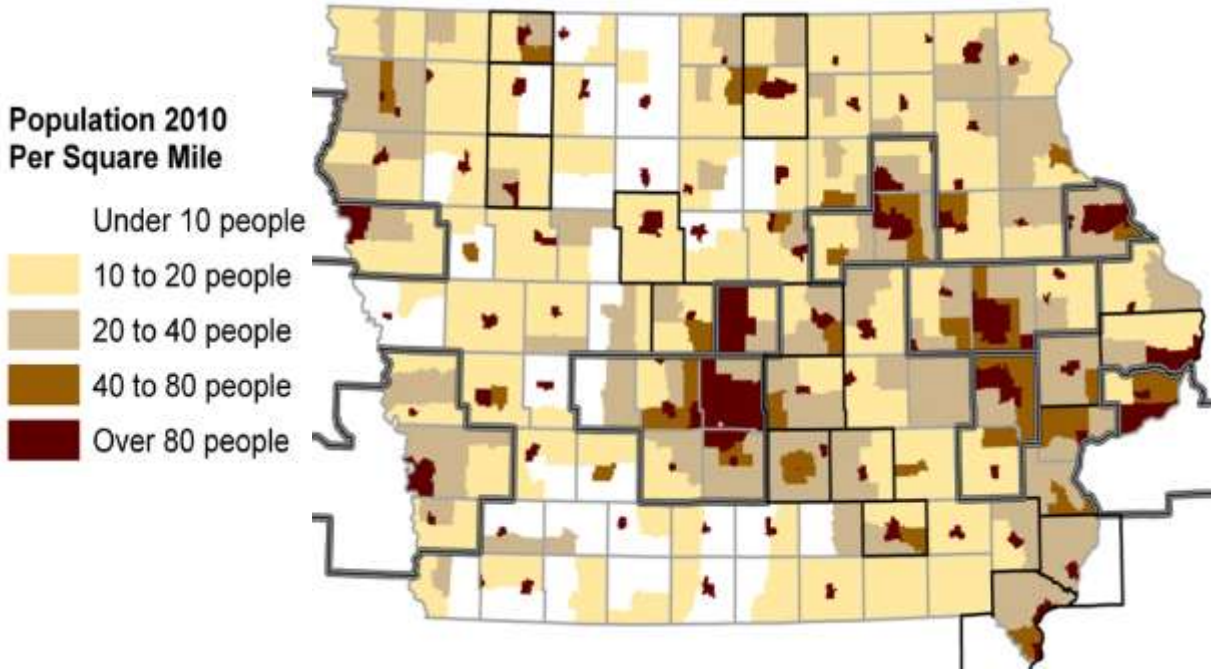
Ames, Iowa

30 miles from

Des Moines, the state capital

Within 200 mi of 7 other states

Iowa is a Sparsely Populated Agricultural State



Slightly over 3M population (avg 55/sq mi)

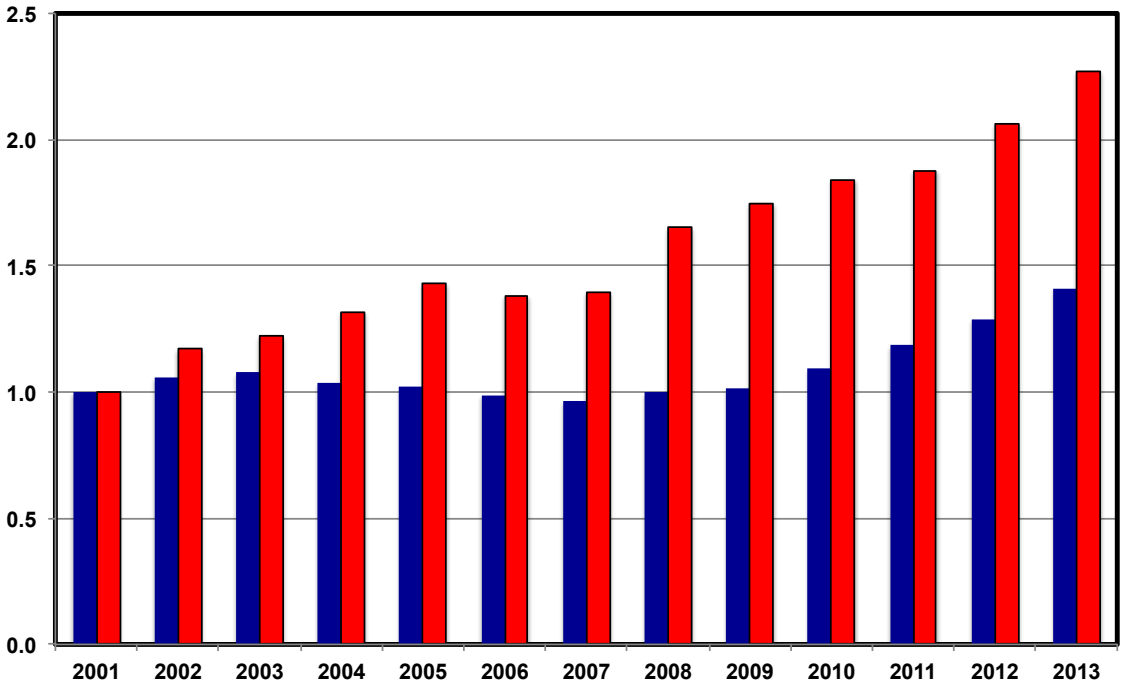
Vast majority of students are from small towns

Vast majority are first generation engineers

Iowa State Facts

- First land-grant university in the US
  - Chartered in 1864; opened in 1868
- University Enrollment
  - Hit a record high 31,040 students in fall 2012.
  - Increase 4% from previous year.

Enrollment Challenges



- **College of Engineering**
  7,508 students in Fall 2012.
  Increase of 8.2%

- **Aerospace Engineering**
  706 undergrads in Fall 2012.
  Increase of 10%

Howe Hall

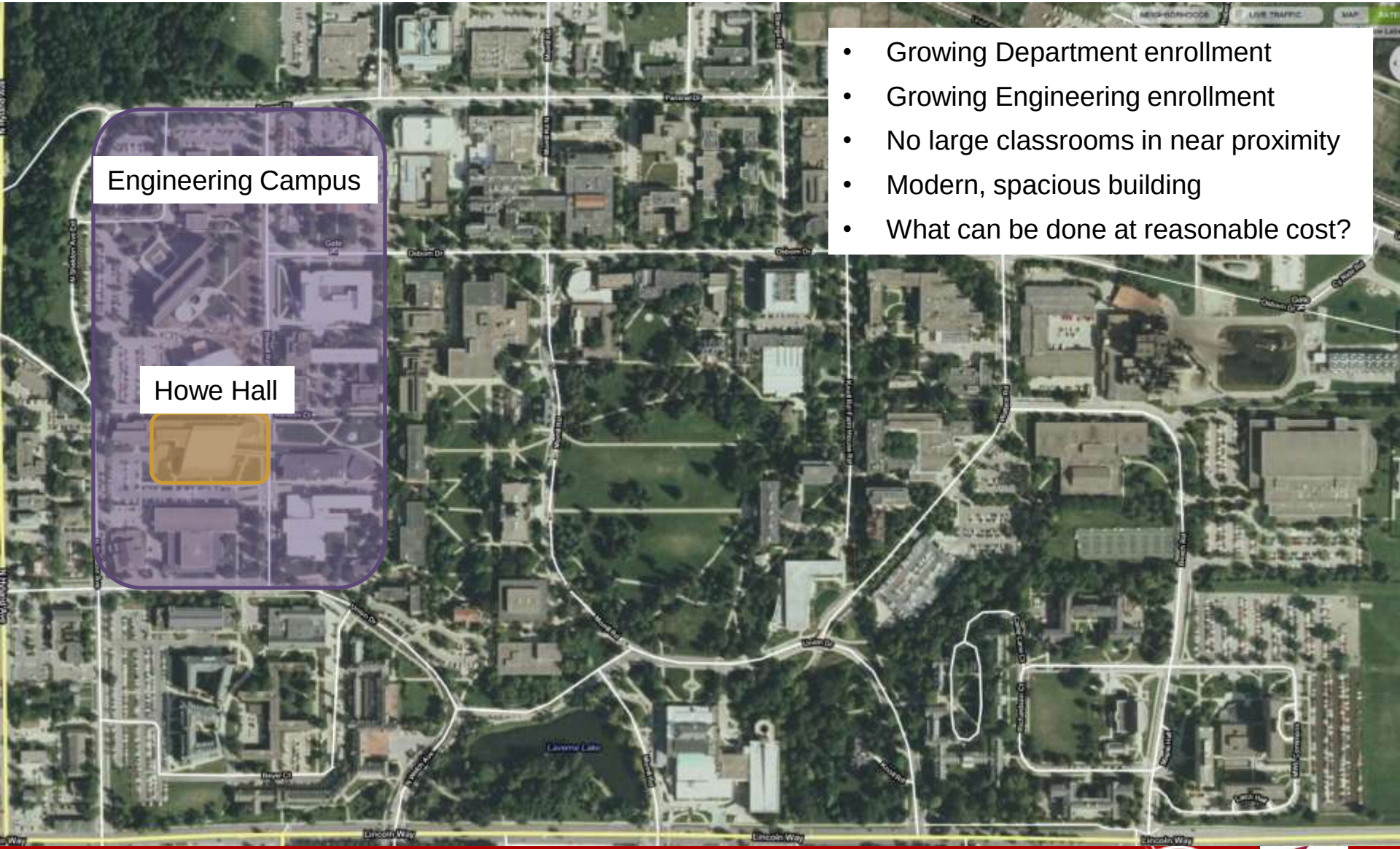
Department of Aerospace Engineering
Online Learning
Virtual Reality Applications Center
Center for Industrial Research and Services.

192,944 total sq. ft.

Construction

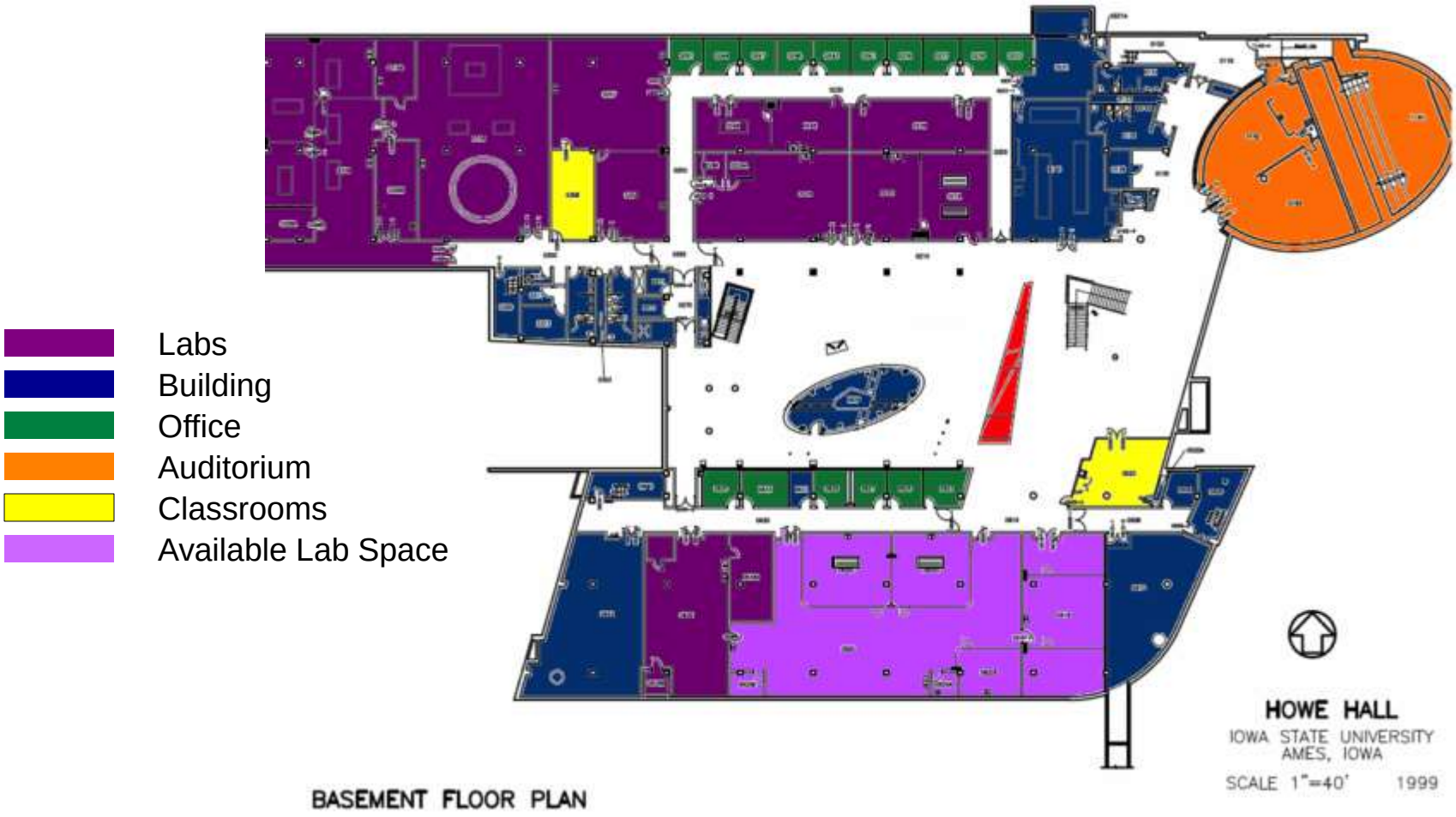
Opened in 1999

Challenges and Opportunities



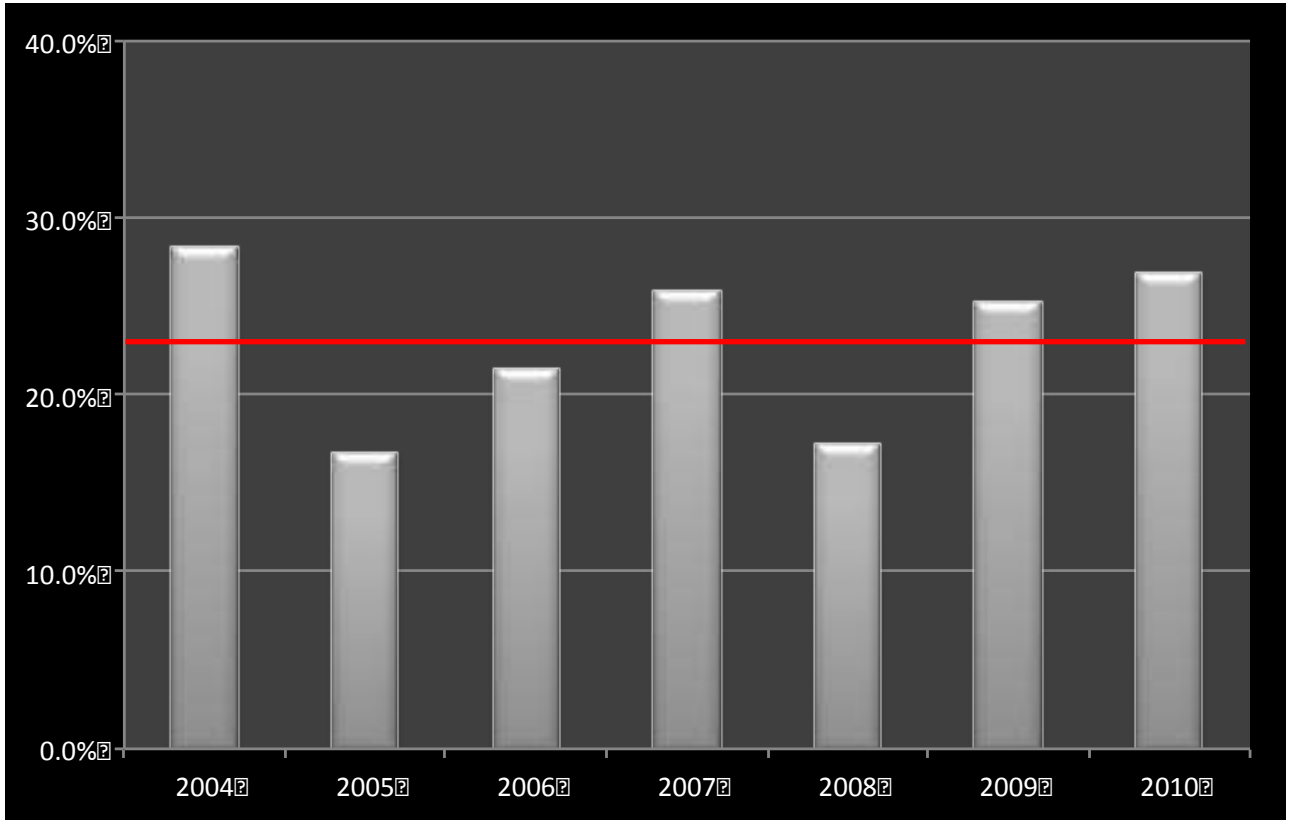
- Growing Department enrollment
- Growing Engineering enrollment
- No large classrooms in near proximity
- Modern, spacious building
- What can be done at reasonable cost?

Lower Level Configuration



Freshman Retention Challenge

Student attrition first to second semester



Objectives

Adjust to growing enrollment

- Create a classroom space capable of supporting 120 students

Increase student retention

- Improve the freshman retention rate
- Inspire students from sophomore year and beyond

Implement new technology

- Develop a classroom concept that utilizes new technology
- Create flexibility to encourage innovation
- Avoid technology overload

Step 1: Develop hands-on program for undergraduates

The DARPA Director spoke to Congress about one of our Nations biggest challenges: the decline in our ability to make things.

Simply stated, “to innovate, we must be able to make”.

M:2:I is a for-credit independent study program in which student teams build things.

They must have a goal, a faculty advisor, and a team to execute their vision.

The goal is to engage 50% of our students in M:2:I.

Step 2: Develop a freshman course to build excitement

Goal: Generate excitement about aviation and space

Based on MIT's "Introduction to Aerospace Engineering" but scaled=up from 40 to 240 students

Hands-on team projects

Introduction to MATLAB

Focus on qualities (e.g. team building, ethics, and writing)

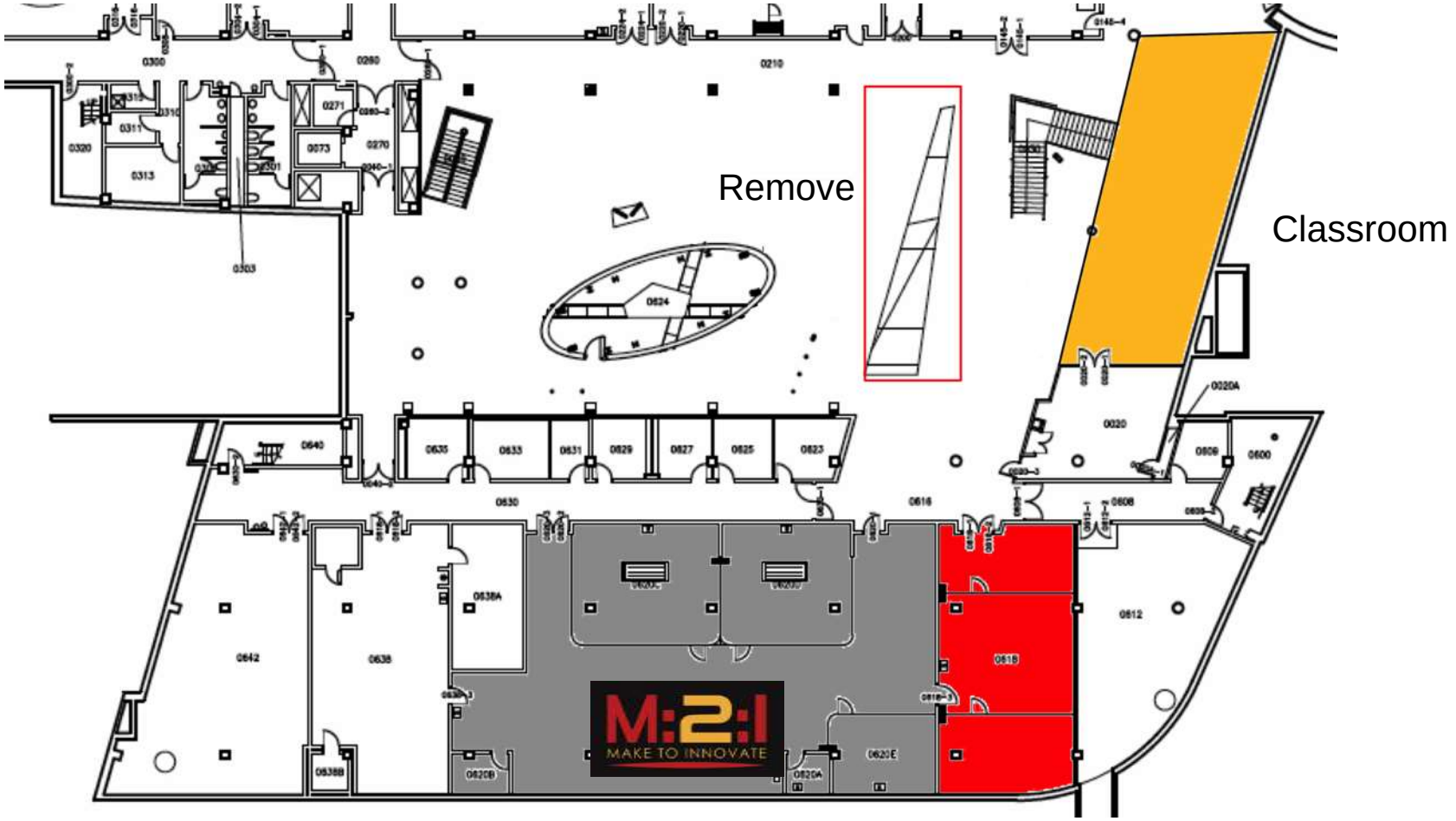
Step 3: Provide the facilities to execute the plan

Lab space was easiest part, and was handled by reallocating existing space.

Other labs were consolidated and moved to smaller rooms.

Classroom space was far more difficult to acquire

Proposed Space Reallocation

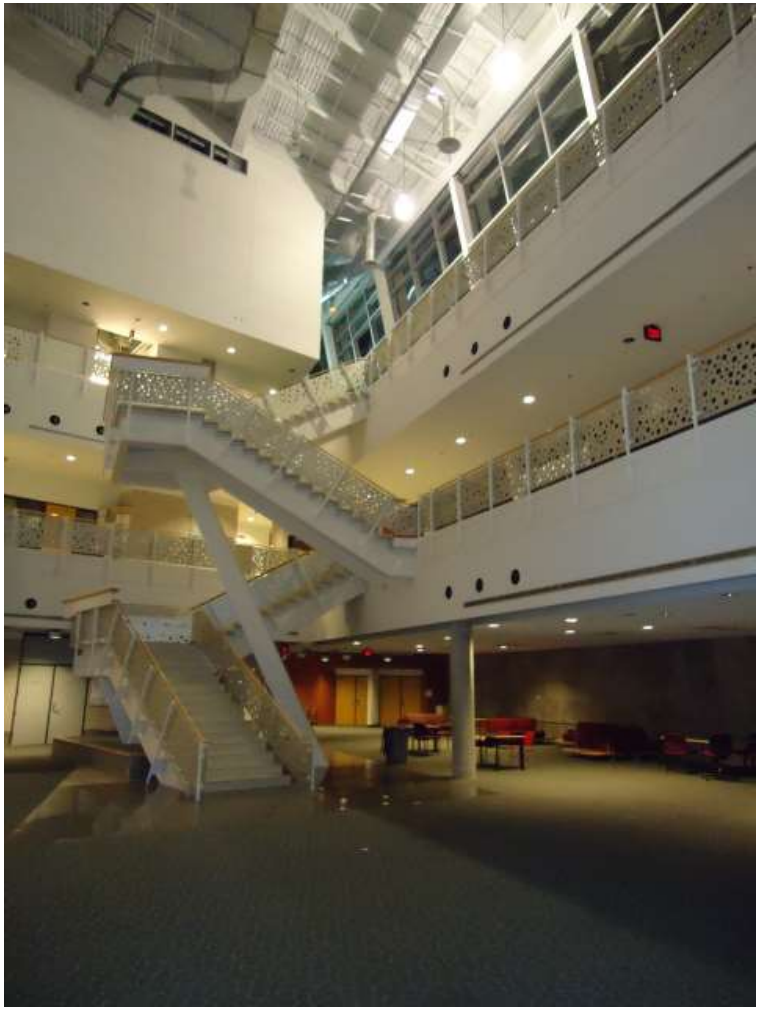


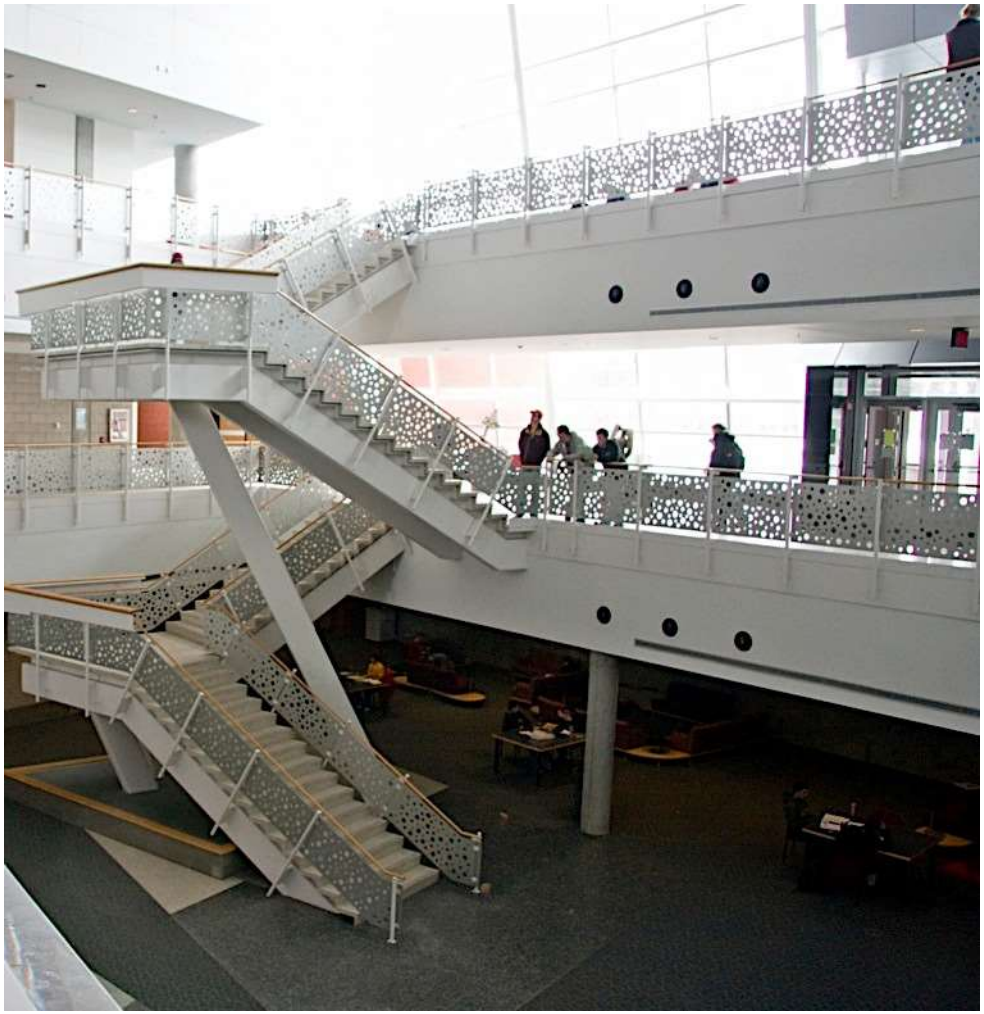
Atrium Area

The Wing

Concrete wing10 ft. at widest point, and 48 ft. long.

Proposed Classroom Space





Pilot Project – Fall 2011

Folding chairs and a projection screen

Space returned to other use between classes

Results

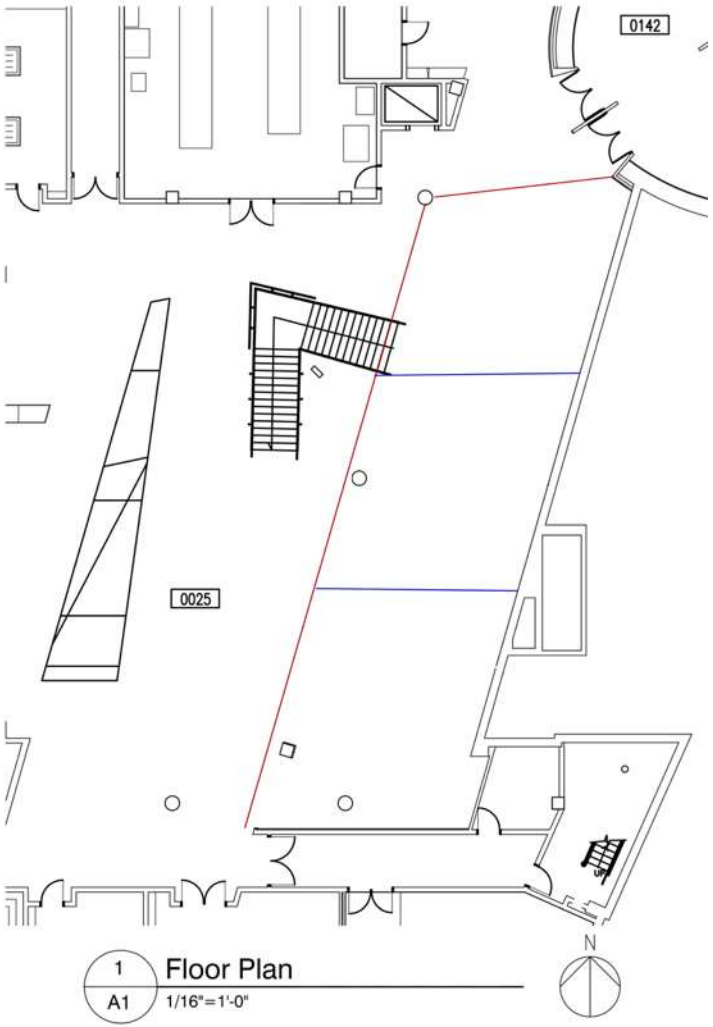
Noise and distractions were not an issue

Students enjoyed the open environment

Faculty were generally surprised that it worked

People who walked by the class stopped to observe and listen

Our Concept: Conventional Classrooms



Three simple rooms

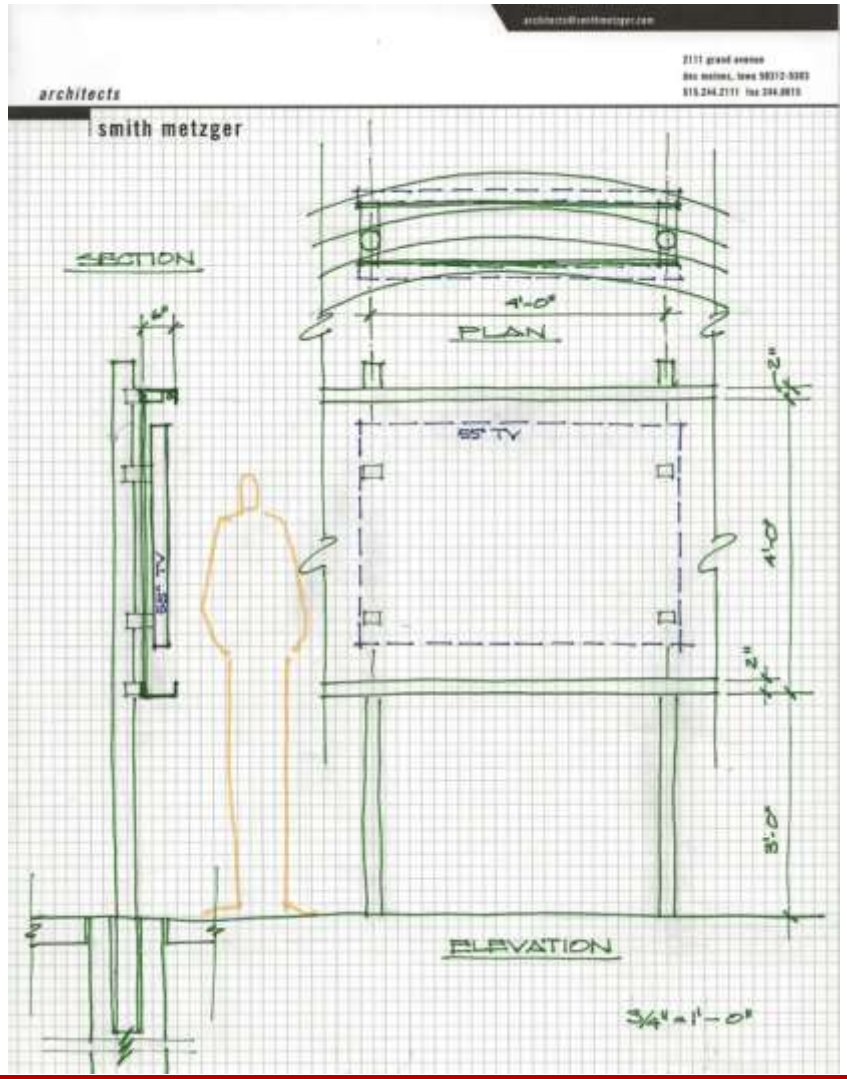
Movable partitions to allow expansion

Boring, dull, and conventional

Proposal to Provost for Next Generation Interactive Classroom

- Video, whiteboard, and LED lighting

Architect's Screen-Wall Concept



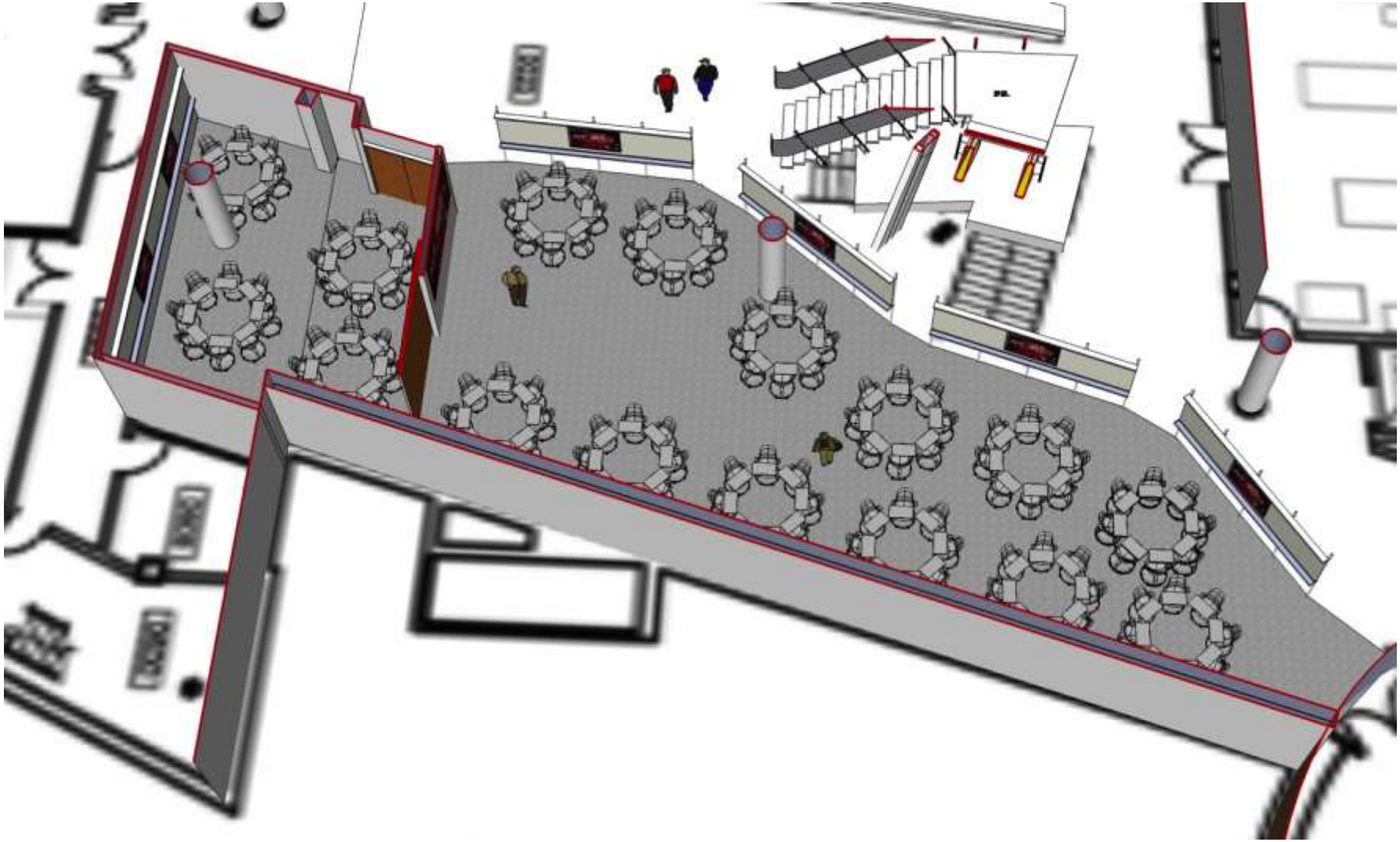
Desire to preserve open environment

Dramatic concept consistent with the design of the building

Focus cost on technology and not on bricks and mortar

Curved Whiteboard Configuration

Glass Whiteboard Configuration



Final Configuration

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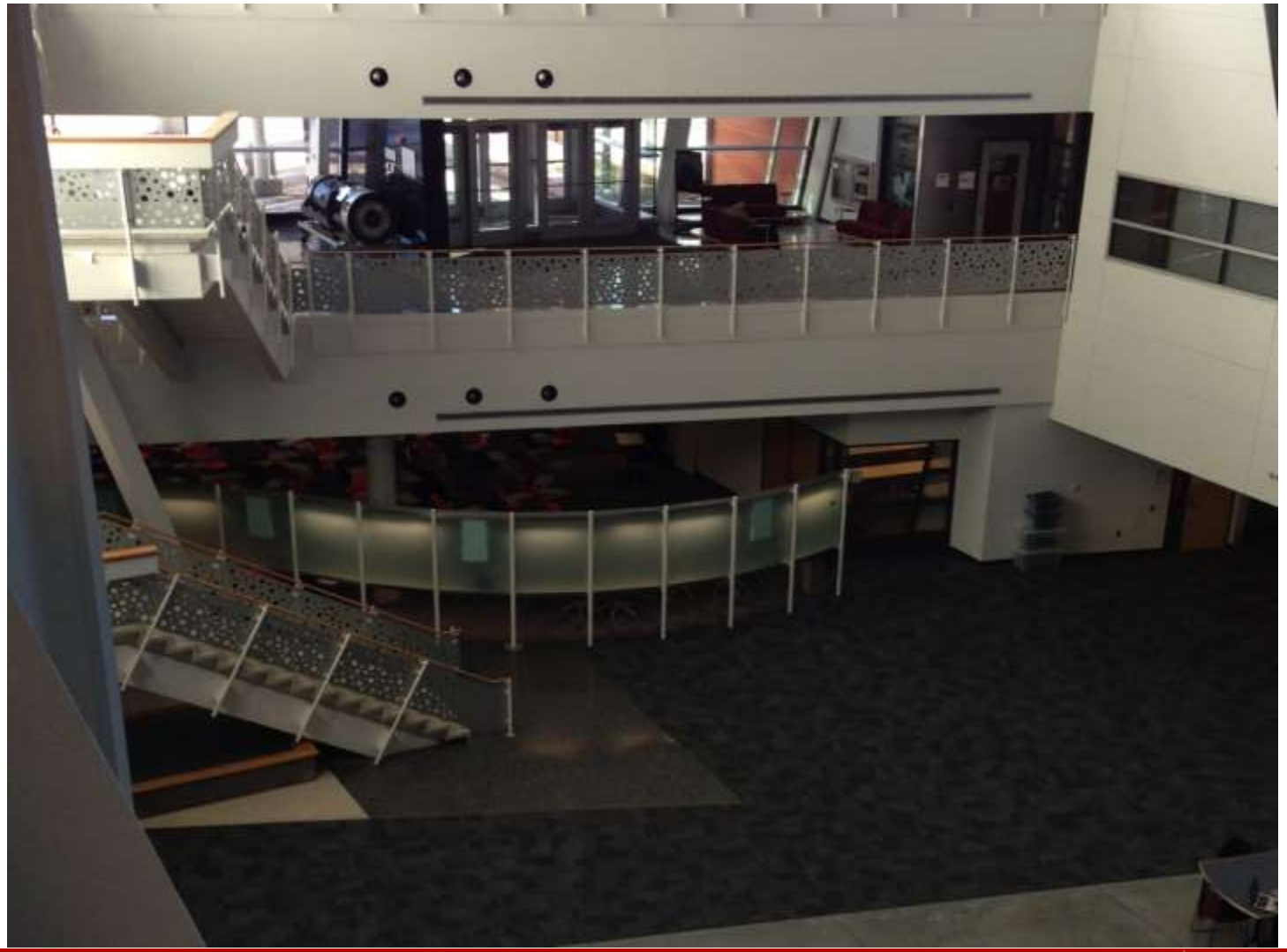
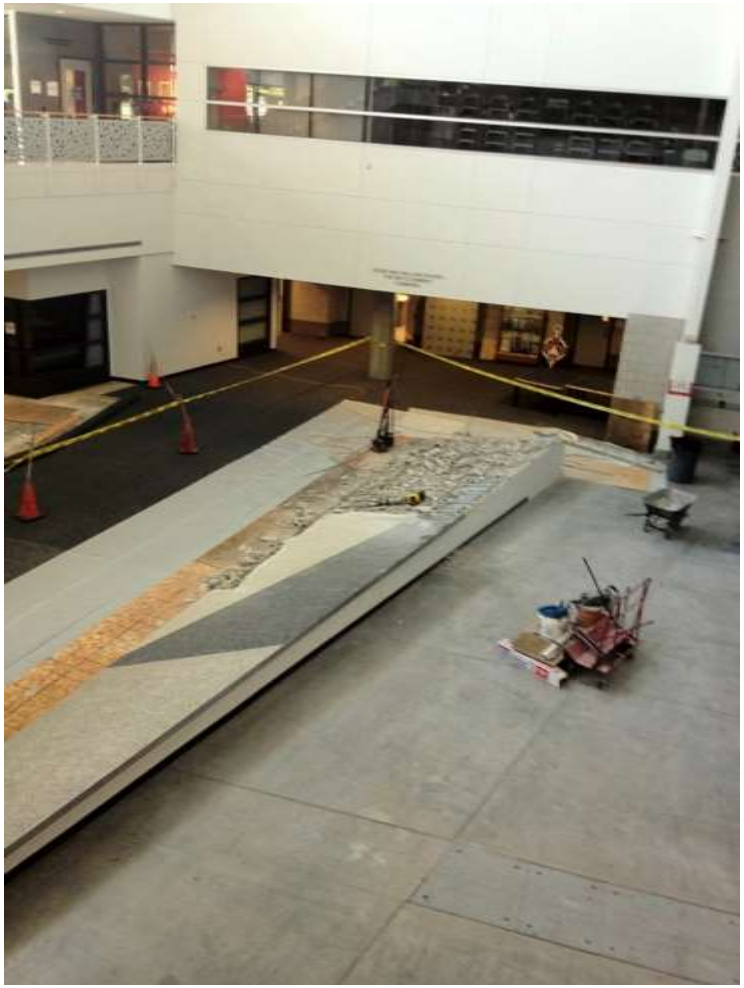
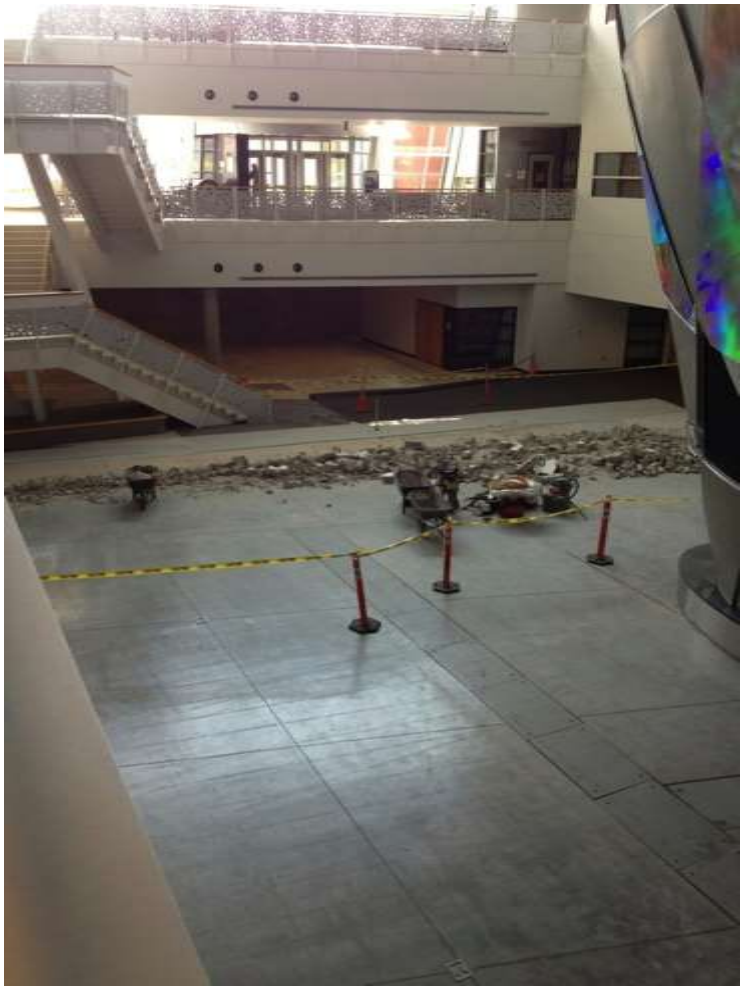
Classroom as Built



Demolition





Completed Classroom

Seating

Steelcase Node Chair

- Five-Star Base
  - Designed for movability
- Personal Work surface
  - Adjustable
  - Non-handed
  - Large enough for laptop
- Seat
  - Flexible
  - Easy maintenance

Clarus Glassboards

Frost style.

Laminated ¼ inch tempered safety glass.

4-5 times stronger than normal glass.

Non-staining writing surface.

Modular.

LED lightbars

Screens

NEC 42” Large Format Display.

12 Screens spread around the room.

Each screen has HDMI and VGA connections.

Full HD resolution.

Low power consumption.

3 modes

Lecture Mode

All screens show same content. Direct connect to single laptop

Lab Mode

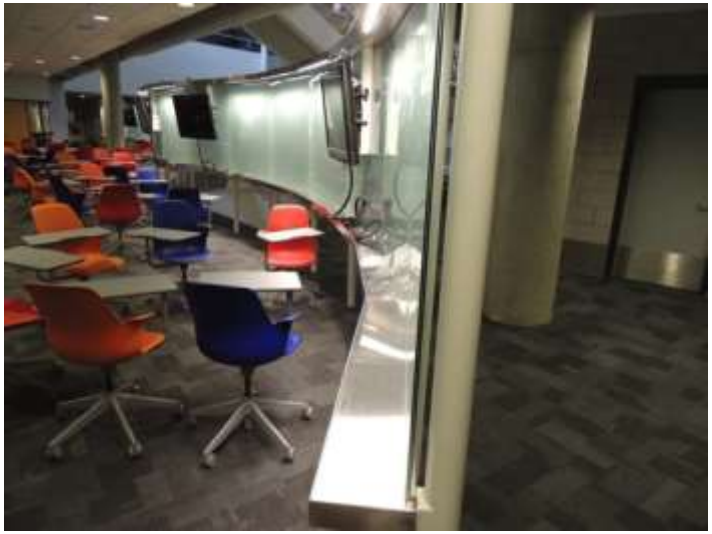
Student teams tether laptop to each screen.

Wireless mode

Direct broadcast to Apple TV from laptop, iPad, or even iPhone

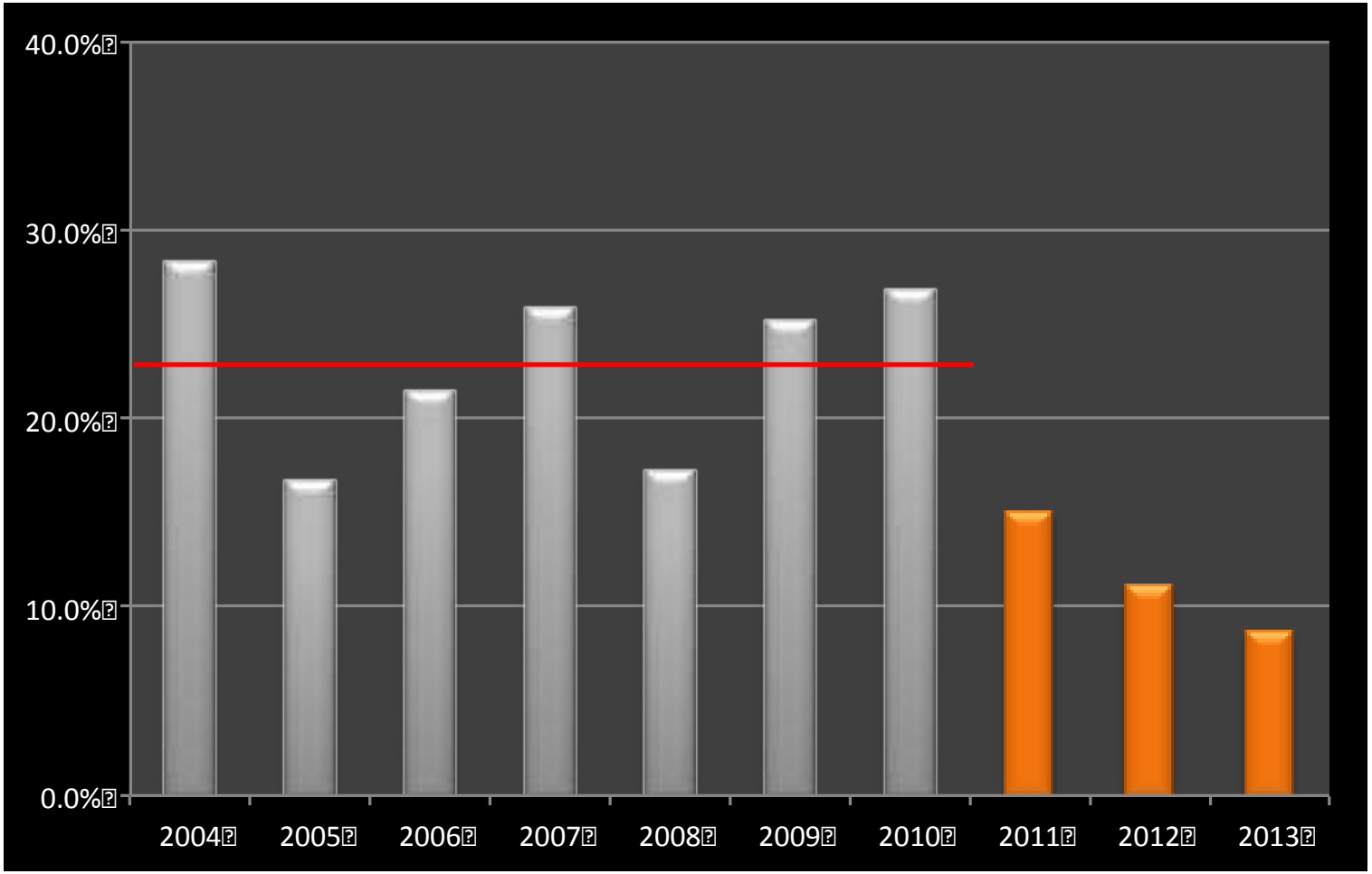
Lecture mode

Lab Mode



Lighter-Than-Air Competition

Change in Freshman Attrition Rate



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LSC Workshop at Portland State University

- February 9, 2013

LSC Webinar: Learning Environments for Creating Interdisciplinary, Global Problem Solvers

- March 7, 2013

Contact Information

For more information:

http://www.pkallsc.org/