IRA A. FULTON SCHOOLS OF ENGINEERING

Leading engineering discovery and innovative education for global impact on quality of life.

Multiple delivery formats for implementing global partnership curriculum

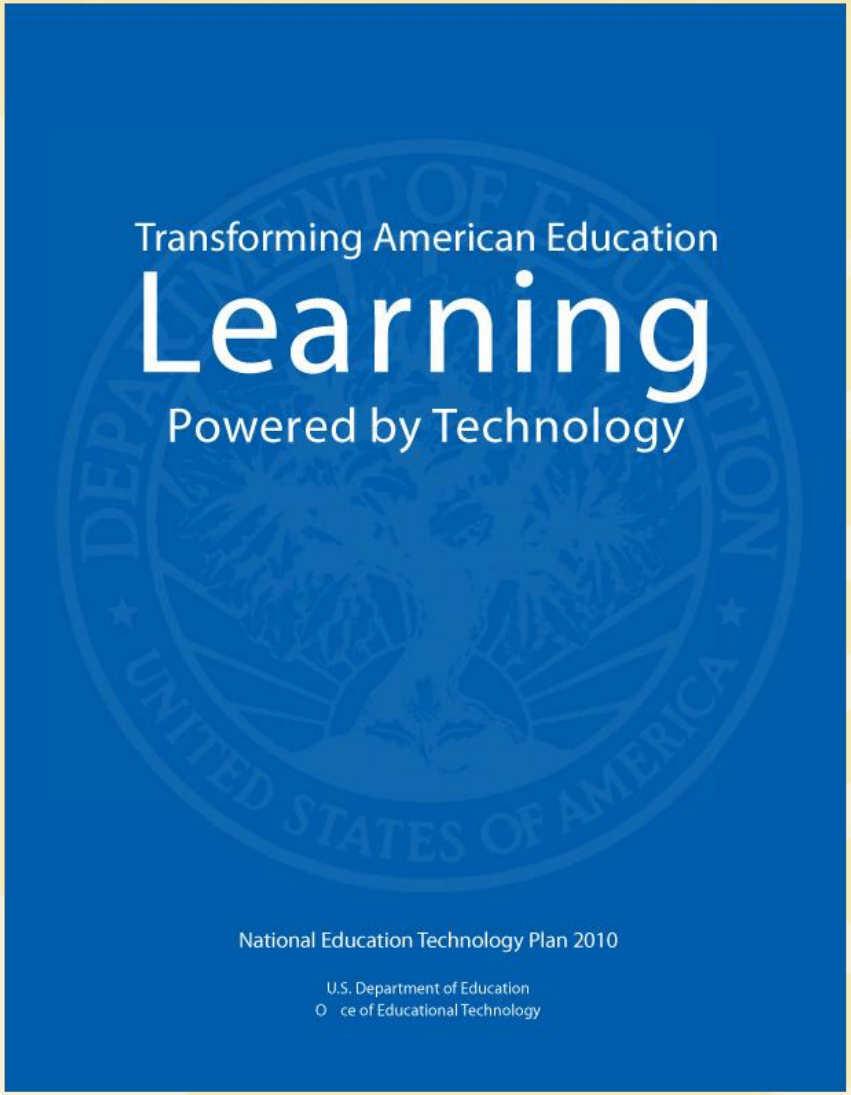
ASU Arizona State University

Some quick recent facts:

- number of online learners in the USA crossed 2 million recently
- Google Apps for Education count now over 5 million users
- every university now uses some form of online learning management system

"Our nation's schools have yet to unleash technology's full potential to transform learning."

National Education Technology Plan 2010



Engineering Distance Education at ASU

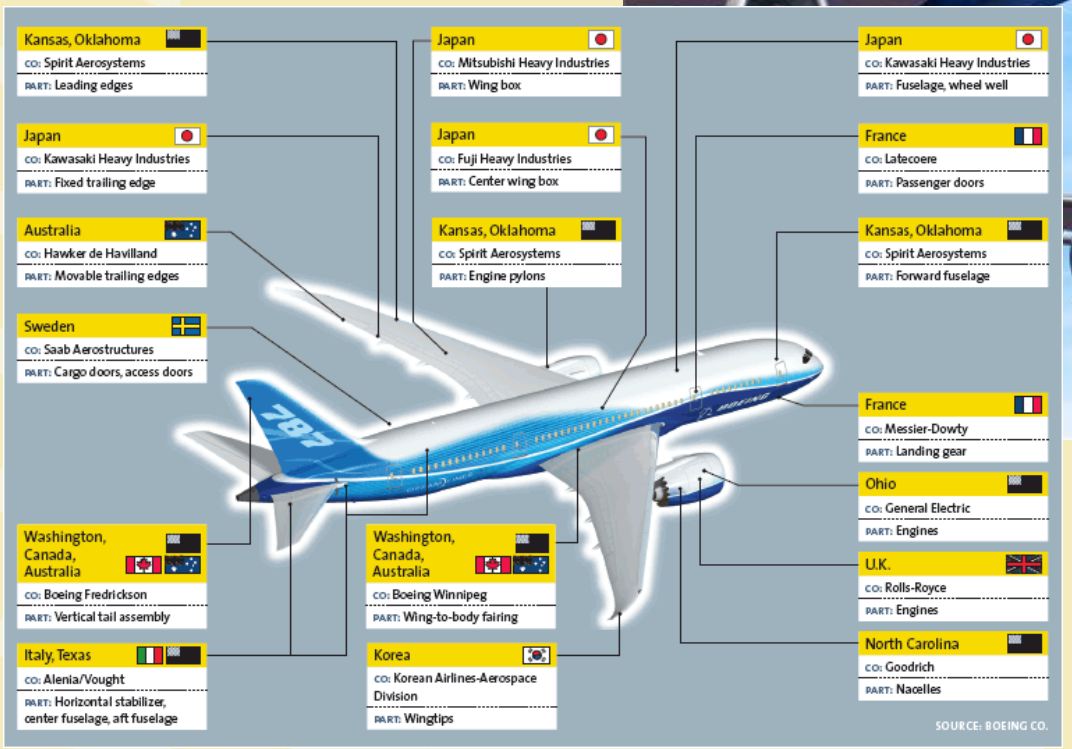
History

- Fulton School has offered distance learning courses for over 20 years through video and ITFS/Cable Distribution
- Online course expansion in 2000
- Complete Online Graduate Engineering Programs in 2002

Today

- Online, accelerated, and blended graduate professional programs
- Flexible delivery and customized program options
- Capstone project options to demonstrate new knowledge and “value-added” ROI for sponsoring organization
- Over 150 online engineering courses offered annually to over 1500 students

New Challenges: Global Design



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New Objectives

- Provide students with a unique global teaming opportunity
  - Participate on a large multidisciplinary team
  - Exposure to working on a complex engineering design project with multicultural teammates
  - Practice working on a complex engineering design project on a geographically dispersed team.
- Provide students with a “major culminating” design experience with a global engineering component.
- Provide students with the ability to design a complex system at the conceptual level.

Team Communication

- Video Conferencing
- Email
- Web Conferencing
- Collaboration Environment
- Travel (if funding can be secured)

Team Composition and Responsibilities

Integrated Teams

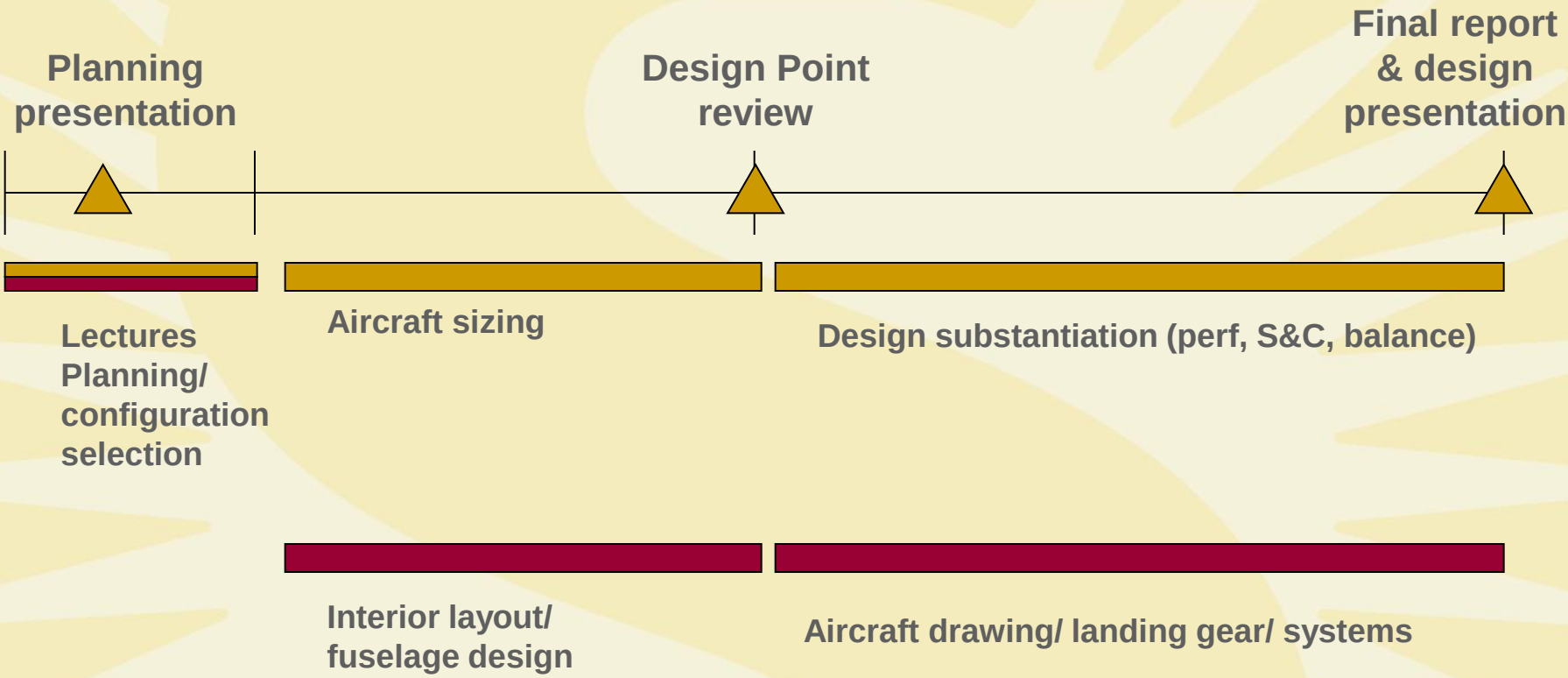
- Aerospace (ASU/NTU)
- Mechanical (ITESM)
- 8-10 students/team

Responsibilities

- **Aerospace**
  - configuration selection
  - A/C sizing
  - aerodynamics
  - propulsion
  - performance
  - stability & control

- **Mechanical**
  - configuration selection
  - CAD drawings
  - structures
  - landing gear
  - systems

Typical Course Timeline



Primary Modes of Delivery

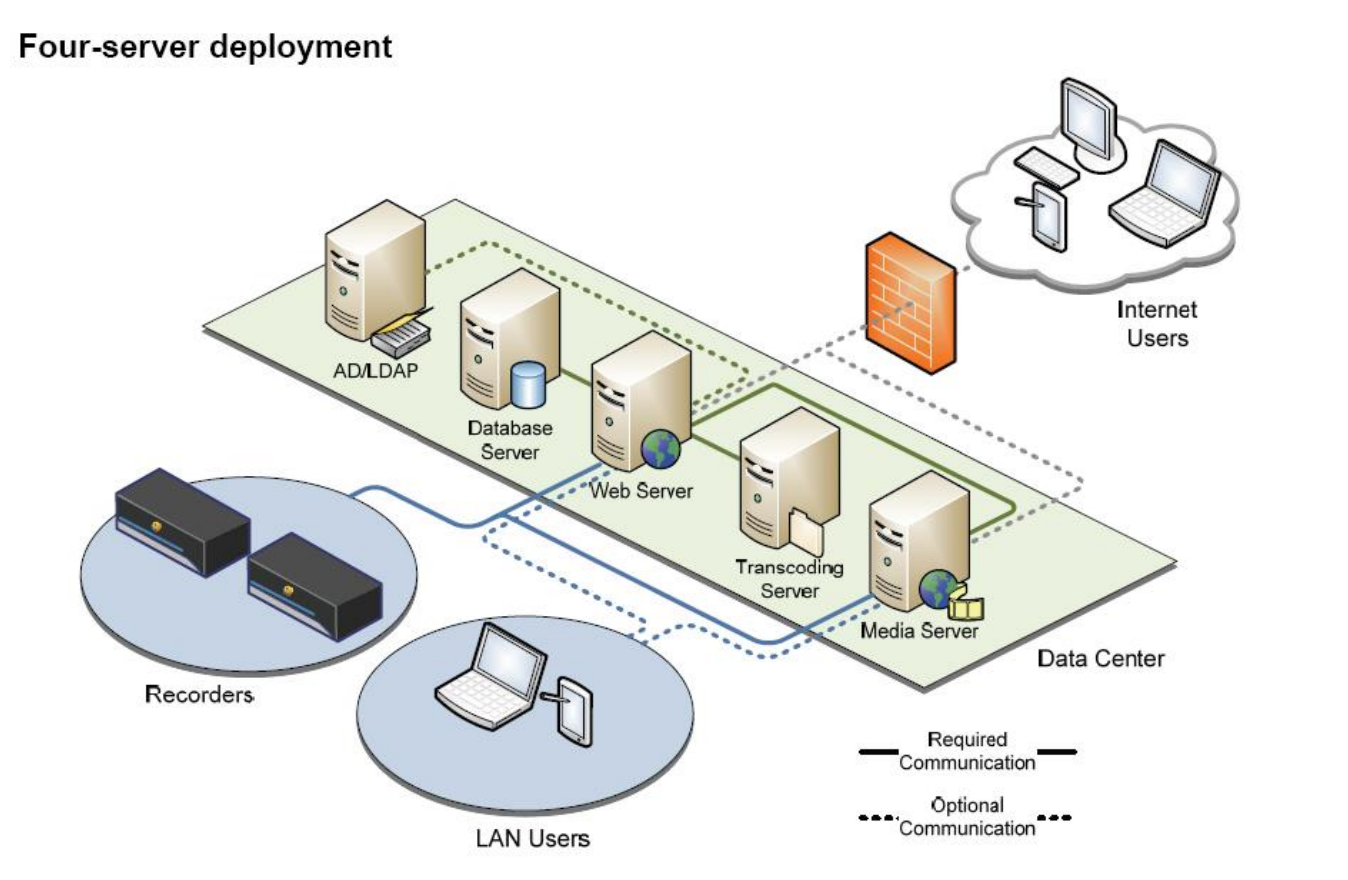
- **Asynchronous using Mediasite system:**
  - Lectures are recorded and shortly after posted to Blackboard.
  - The entire course is available for review to online students through the duration of the semester

- **Synchronous using Tandberg videoconferencing system:**
  - Lectures delivered live to the central remote campus (e.g. Monterey Tech) where they are moderated and sent live to the satellite campuses.
  - Students can ask questions through the moderator and get immediate answers.
  - The lecture is also recorded through Mediasite and can be made available to the participants for online viewing.

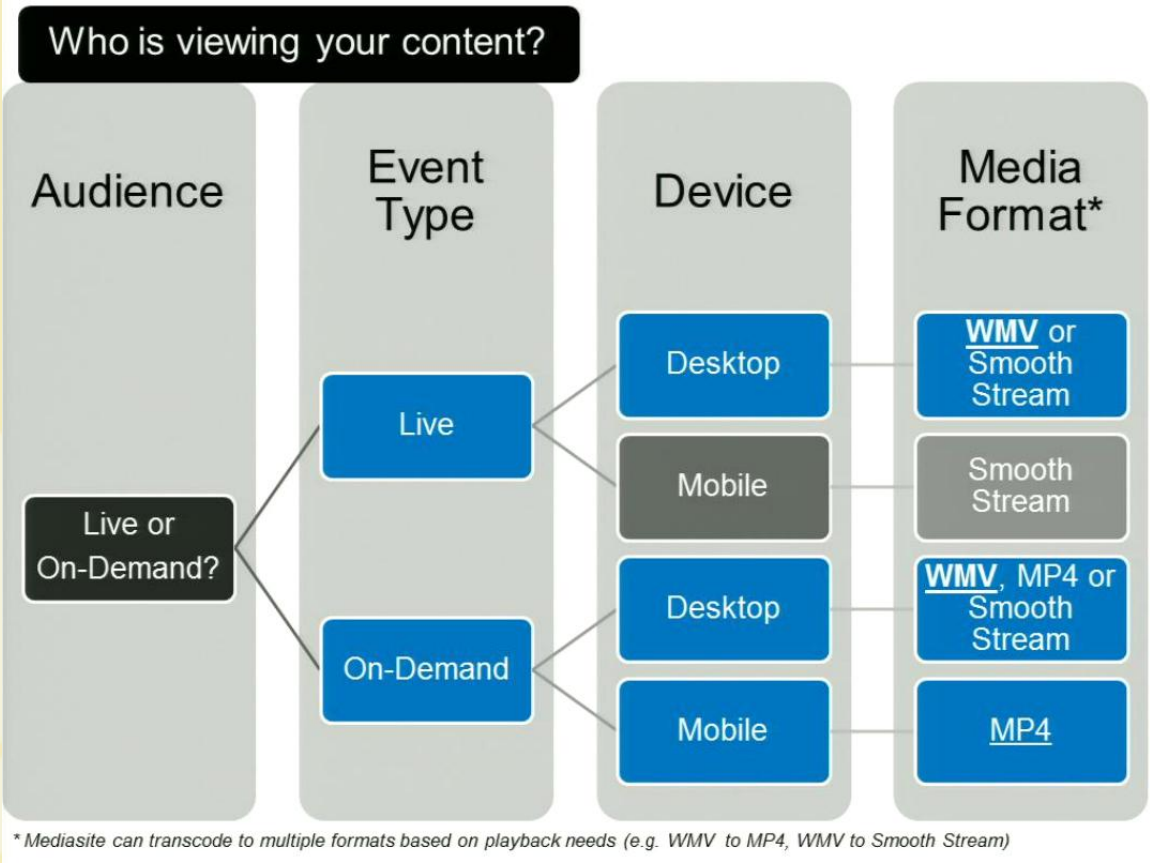
Additional Modes of Delivery

- **Asynchronous for portable devices using Mediasite system:**
  - Lectures are transcoded to h264 format and available for viewing on iOS and Android devices
- **Semi-synchronous using Mediasite system:**
  - Lectures are webcast live with 12 second delay and also recorded for on-demand availability
  - Students can ask questions through a chat window
- **Synchronous using web conferencing systems:**
  - Adobe Connect
  - Vidyo
  - Skype

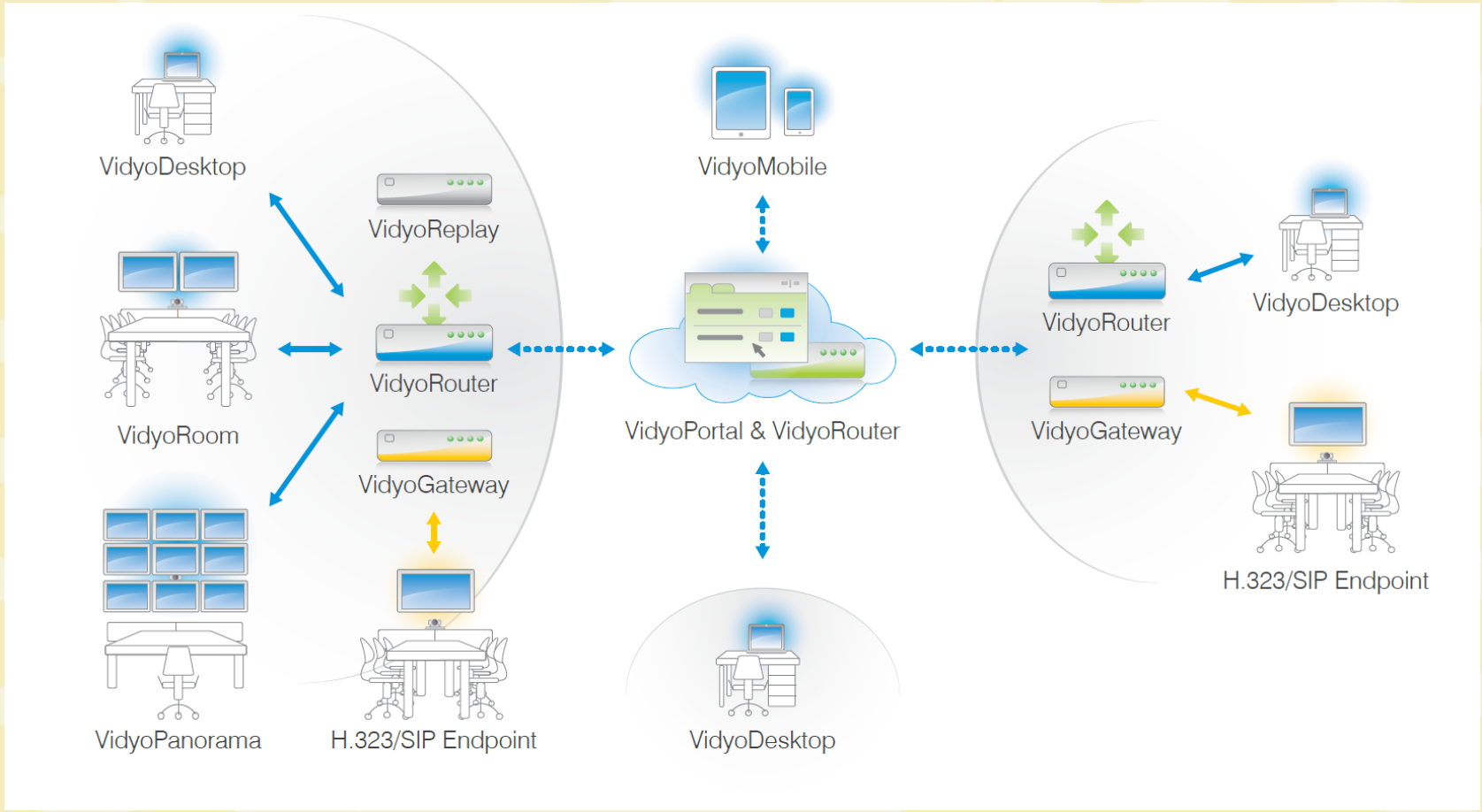
Additional Modes of Delivery
H.264 transcoding



Additional Modes of Delivery
H.264 transcoding



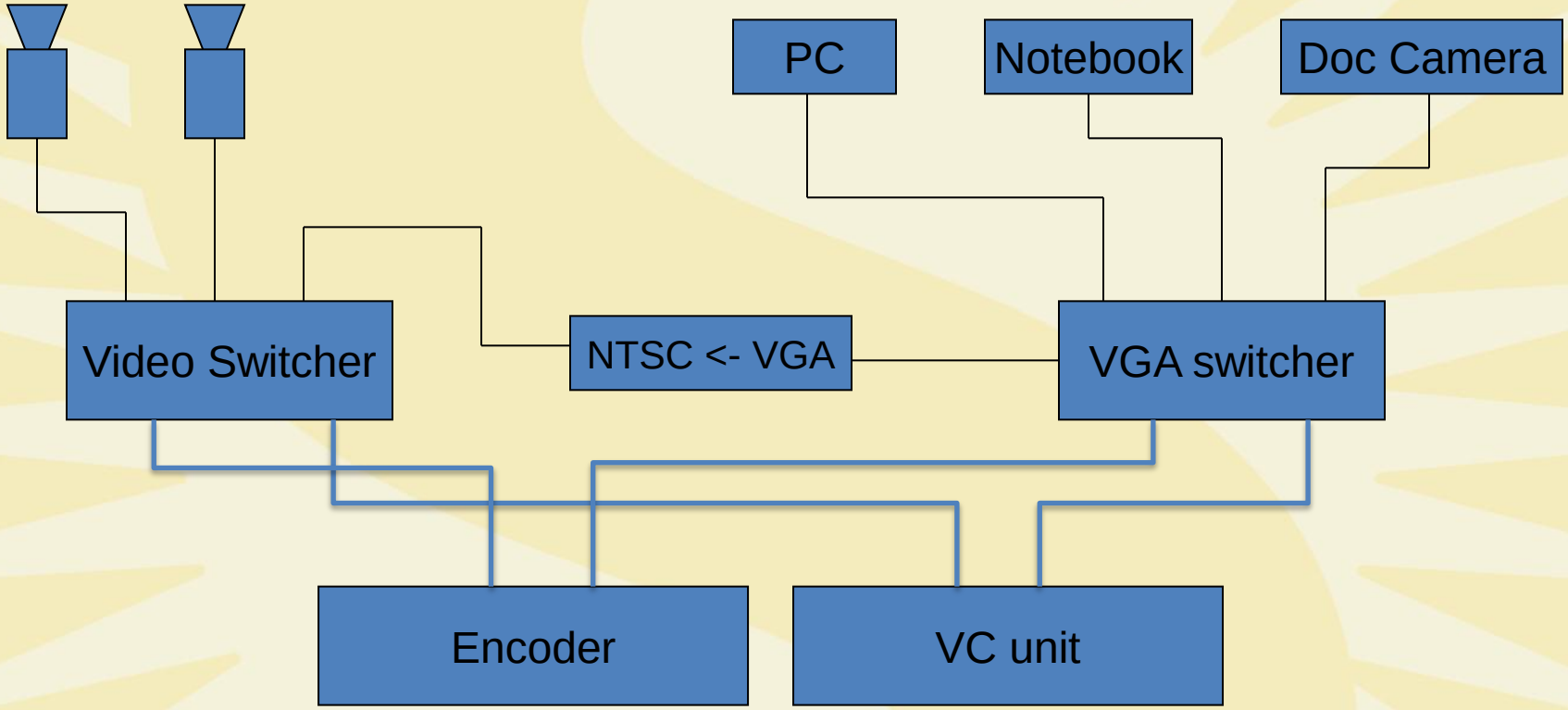
Additional Modes of Delivery
Vidyo: web to H.323 connectivity

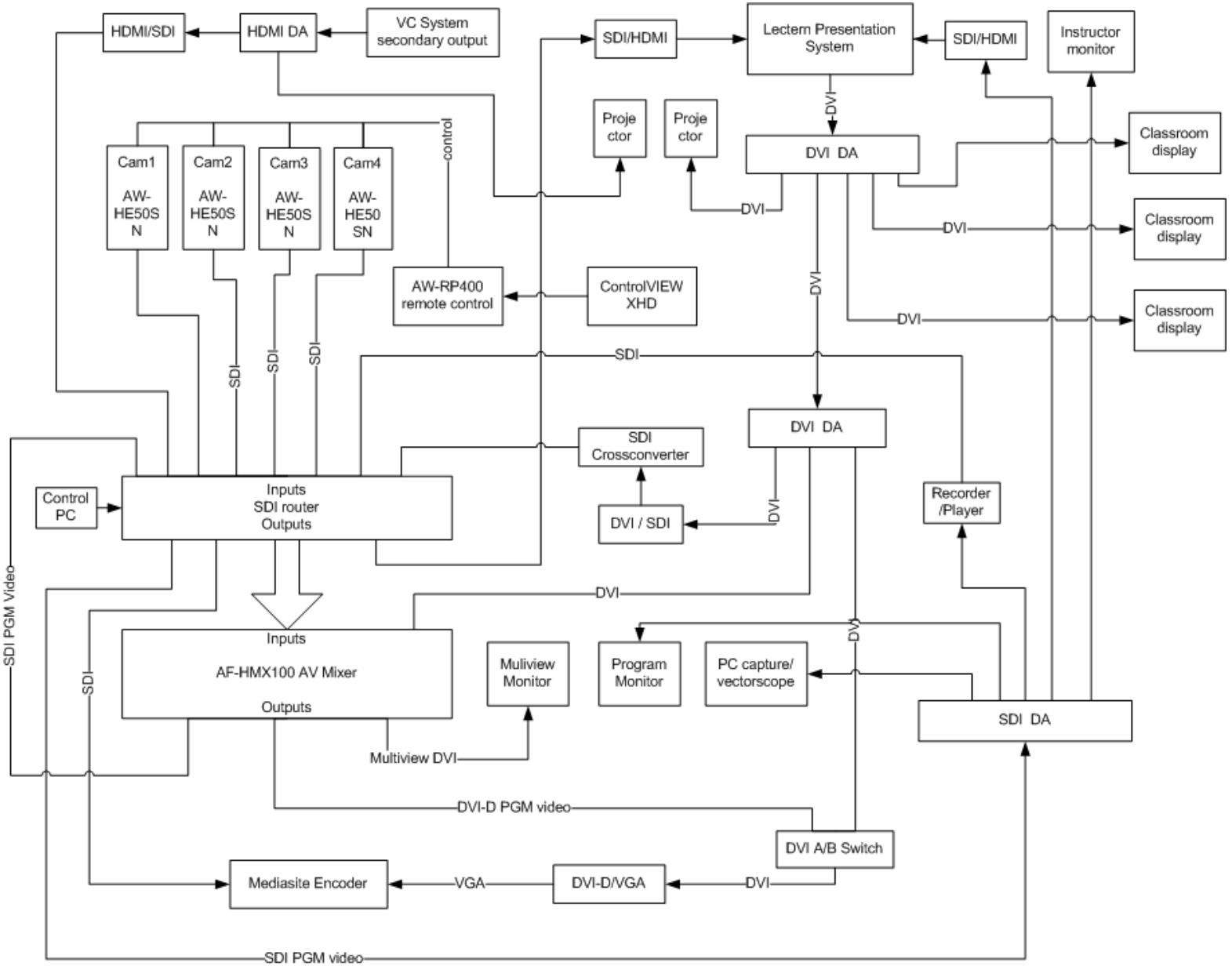


Capturing and transcoding online engineering courses for multiple devices presents unique challenges

- Recording high resolution (XGA, SXGA or higher) images
- Ability to capture from diverse sources:
  - presentation computer at the lectern
  - instructors own notebook computer
  - document camera
  - overhead video camera or other video source including audio and video for the webcasting session.
- Unobtrusiveness and transparency of the capture process
- Minimal and timely postproduction

Basic solution with Mediasite and a VC unit




HDMI/SDI
HDMI DA
VC System secondary output
SDI/HDMI
Lectern Presentation System
SDI/HDMI
Instructor monitor
Proje ctor
Proje ctor
DVI
DVI DA
Classroom display
Classroom display
Classroom display
Cam1 AW-HE50S N
Cam2 AW-HE50S N
Cam3 AW-HE50S N
Cam4 AW-HE50 SN
control
AW-RP400 remote control
ControlVIEW XHD
SDI
SDI
SDI
SDI
DVI
DVI
DVI
DVI
DVI DA
SDI Crossconverter
Control PC
Inputs SDI router Outputs
DVI / SDI
DVI
Recorder /Player
SDI PGM Video
DVI
Inputs
AF-HMX100 AV Mixer
Outputs
SDI
Muliview Monitor
Program Monitor
PC capture/ vectorscope
DVI
SDI DA
Multiview DVI
DVI-D PGM video
DVI A/B Switch
Mediasite Encoder
VGA
DVI-D/VGA
DVI
SDI PGM video

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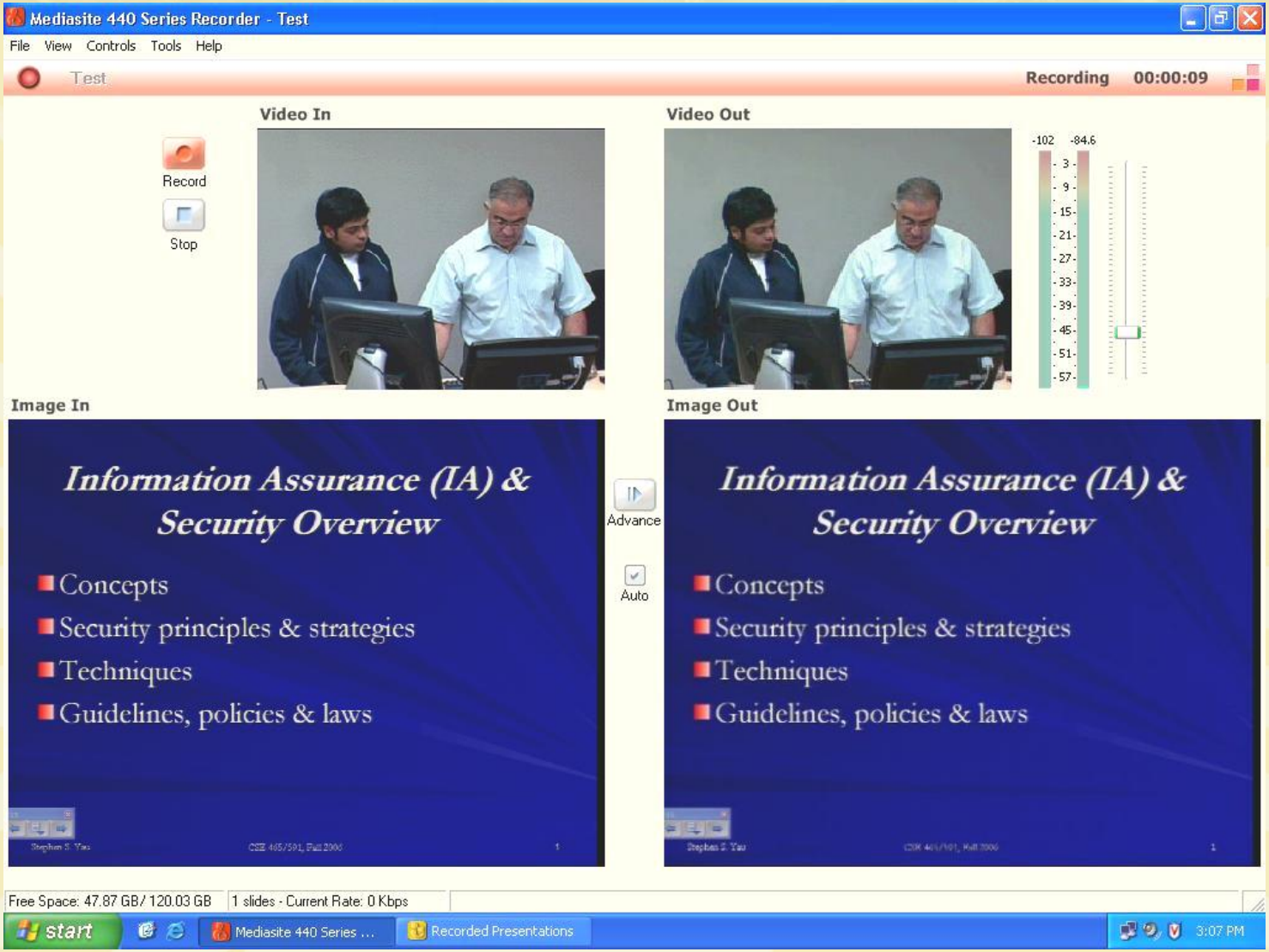

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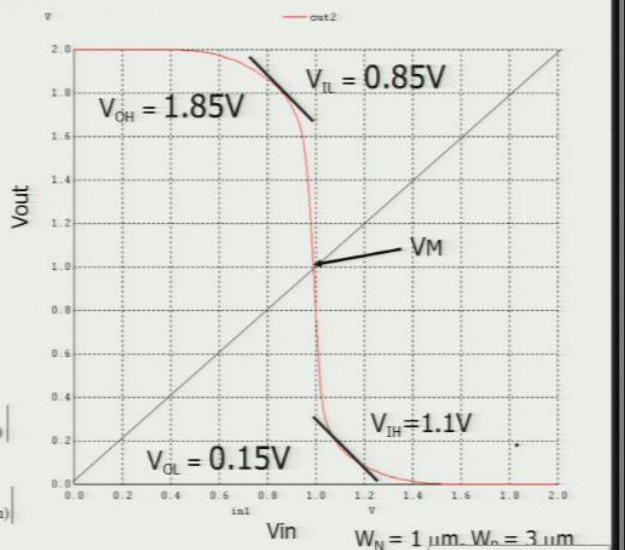
Voltage Transfer Curve

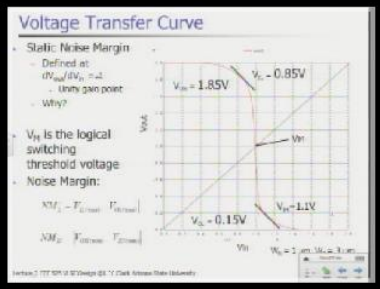
- Static Noise Margin
  - Defined at $dV_{out}/dV_{in} = -1$
    - Unity gain point
  - Why?
- V_M is the logical switching threshold voltage
- Noise Margin:

$$NM_L = \left| V_{IL(\max)} - V_{OL(\max)} \right|$$

$$NM_H = \left| V_{OH(\min)} - V_{IH(\min)} \right|$$



Lecture 3 EEE 525 VLSI Design ©L. T. Clark Arizona State University



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Slide 115 of 330

powered by mediasite

Paused 24:59/01:13:39

1x

EEE 531 Semiconductor Device Theory I - FA10_007 (Shortcut)

Dieter Schroder

9/13/2010 2:00 PM PDT Length: 01:13:39 More...

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Issues Experienced by Students

- Communicating with team mates (time, availability, technology)
- Teammate responsiveness: build into planning. Plan on iterating from the first submission
- Cultural differences
- Engineering discipline differences

Future

- Future plans include the formation of a global design commons.
- Will provide design students with a dedicated facility where they can conduct virtual team meetings and work on designs any time of day.
- Will provide video conferencing capability for all class lectures.
- To be funded through industry sponsorship

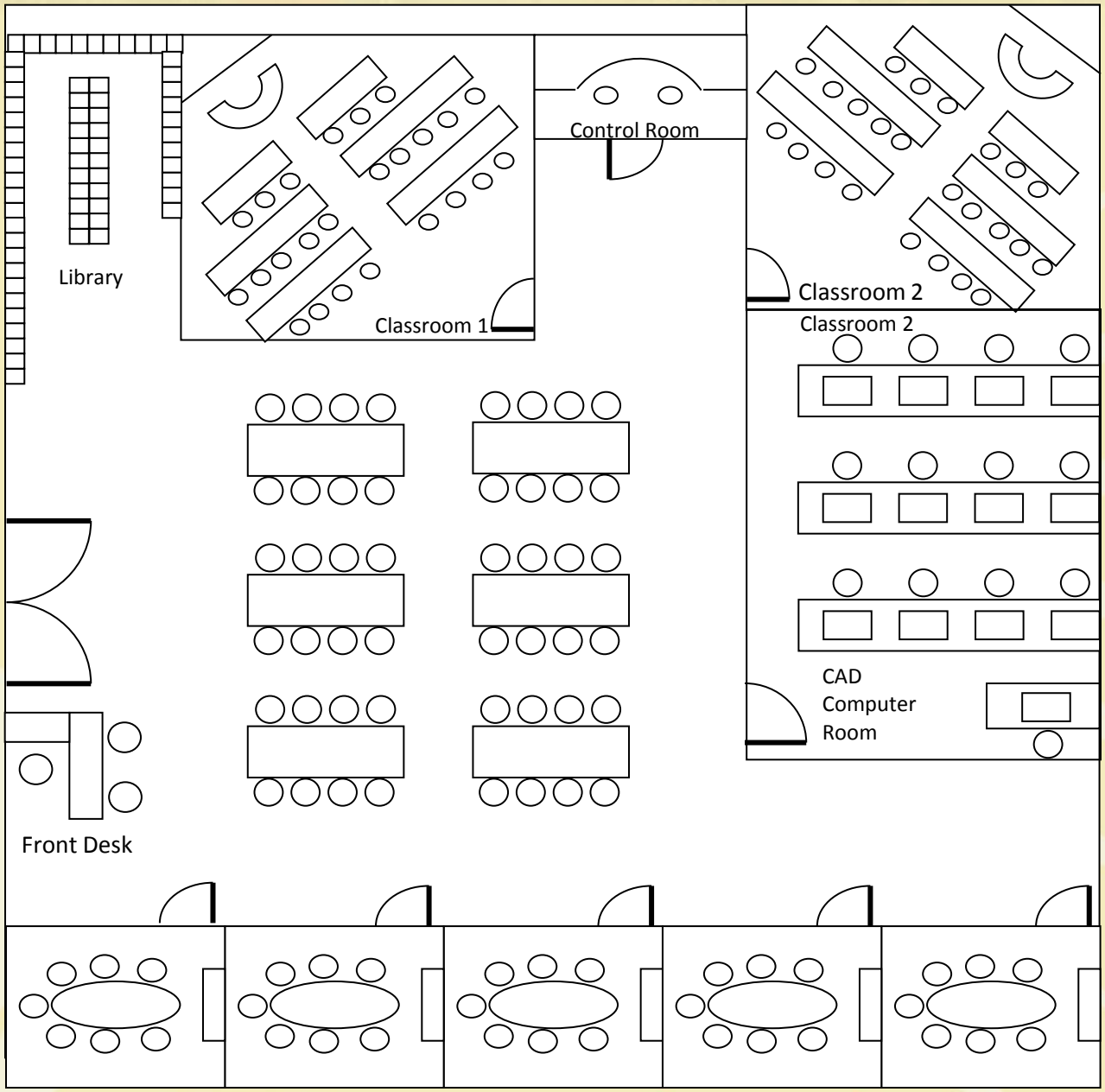
Desired ASU Global Design Commons Characteristics

- The commons will be a dedicated facility located in the engineering part of campus, accessible to students at all times.
- The commons will include video conferencing/video meeting equipment of sufficient bandwidth and speed to conduct real time design meetings and file sharing. Remote controls will provide maximum benefit for interaction between sites.
- Design workstations with appropriate SW design and analysis tools will be available in sufficient numbers to support each team.

Desired ASU Global Design Commons Characteristics (cont.)

- A design library will be included with design texts, references, and other relevant aircraft design material.
- Individual team meeting rooms will allow multiple teams to meet simultaneously with the ability to use the communications infrastructure previously described.
- A video conferencing classroom will be included for common lectures provided to all remote sites.
- A variety of industry-provided, design-related displays will enhance the understanding of design concepts and functionality.

Conceptual Design Commons Layout



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Learning and Workshop Center

Media Classroom

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Group meeting room with VC equipment