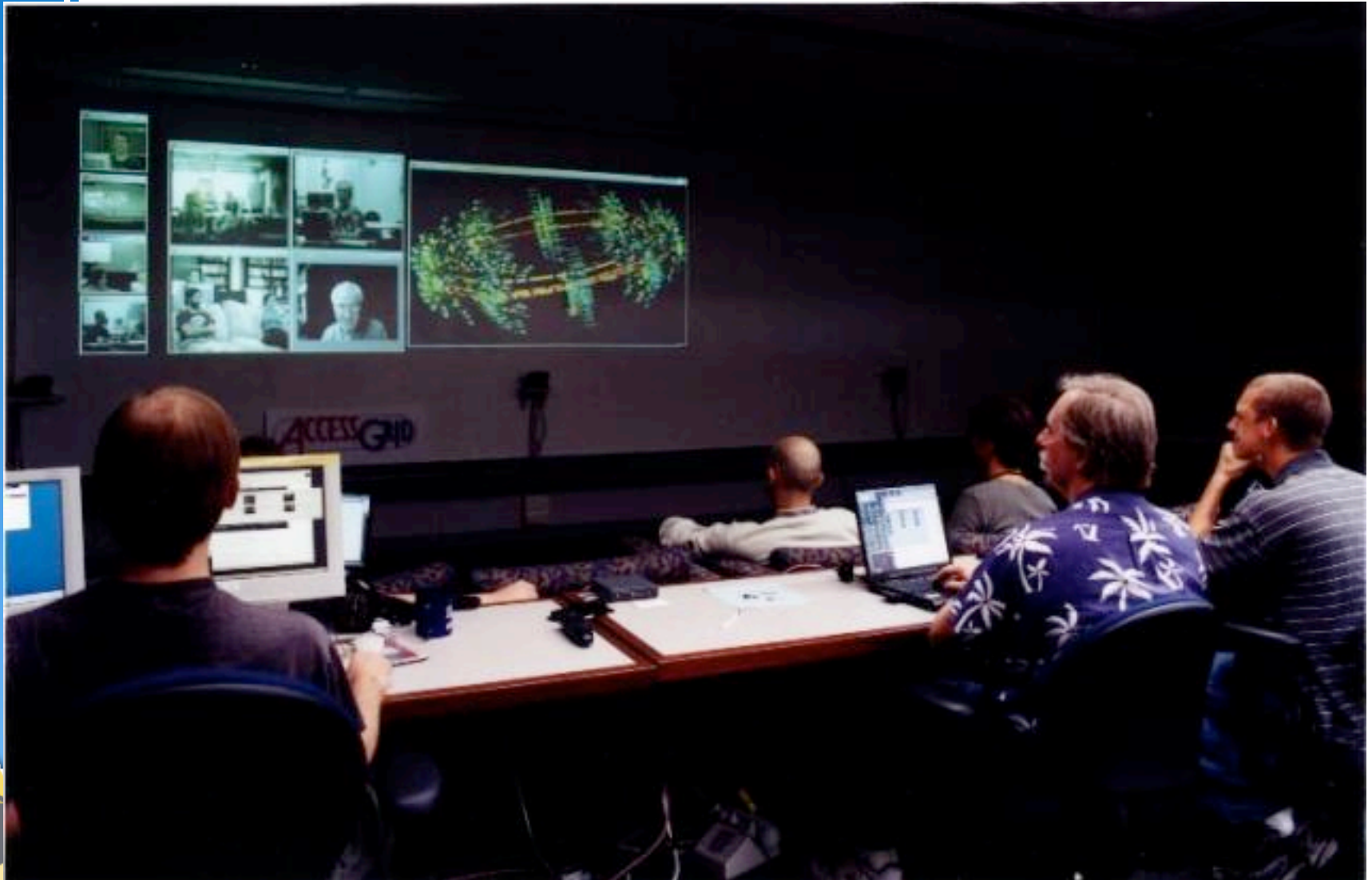


CSE 4/60373: Multimedia Systems

- ▶ Outline for today
 - **Teleimmersive systems: Hydra, Coliseum, Teeve**
- ▶ **The goal of these systems is multi-site, multi-view collaboration**



Access Grids - Argonne Laboratory



Access Grid - Jackson State, MS



Access Grid - CRC, ND



I-Glass

i-glasses™



VIDEO



Demo of Hydra

- ▶ Virtual symphony
- ▶ Each site uses HD cameras + high fidelity audio
 - 24.2 audio?
- ▶ Synchronize and play the symphony together

- ▶ Watch more modest demo



Coliseum

- ▶ Tele-immersive video conferencing system
- ▶ Near commodity gear
 - (Very) powerful desktops
 - 5 VGA cameras connected to a rig that can be attached to the monitor. The cameras can slide out during conferences and then be stowed away
 - Generate a 3D representation of the user and ship it to other participants. Render them on a virtual background (which is stored locally and hence not transmitted)
 - Head tracking proved too computationally expensive . But it is conceivable to add them in future iterations.
 - About 300 ms e2e delay
 - Network was 3 ms. Cross country around 30-40 ms delay



Rendering

► Image processing techniques

- Distinguish foreground from background (foreground is image without user)
 - Reduce contour complexity using piecewise linear approximation
 - Correct lens distortion
 - Trade expensive operations for speed
- Color calibration - these are cheap cameras which may or may not be in exact focus and orientation
 - Not a trivial problem to solve

► Reconstruction

- Motion parallax



Systems issues

- ▶ Develop software framework to build these systems
 - This is a complex piece of code!!
 - End-to-end performance measurements
 - Piecewise measurement of the different components

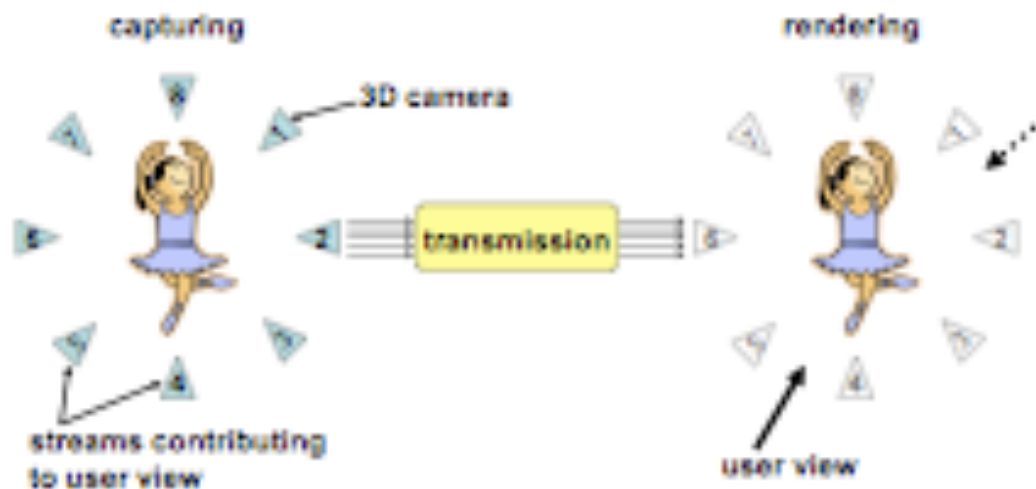


Video from HP Labs - from ACM-MM 03



Teeve

- ▶ Multiparty, multisite teleimmersive application
- ▶ Generate 3-D models of participants, send it to remote sites using a Peer-to-peer overlay and then render them on the other end



- ▶ Demo video

