Network-Enabled Platforms (NEP-2) Program
Progress Report – August 31, 2011.

Project NEP54: Open Orchestra
Appendix 2: Conference Presentations

Presentations

1. John Roston of McGill and Mark Zuberbuhler of UBC at the BCnet Conference in Vancouver on May 3, 2011
2. Steve Bellamy of Humber at the Canada 3.0 Conference in Stratford on May 2 – 4, 2011

See next page.

BCNET Conference 2011

Vancouver, May 3, 2011.

Open Orchestra: A High-Fidelity Immersive Music Simulator

John Roston, McGill

Mark Zuberbuhler, UBC

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Open Orchestra Project

Objectives

- Provide a music student practicing alone the realistic experience of playing in an orchestra or singing in an opera.
- Provide an electronic music stand version of the score and custom audio controls.
- Allow the student to record himself or herself for later review by an instructor who may be at a remote location.
- Allow the student and instructor to communicate asynchronously with oral and written comments linked to points in the score.

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Open Orchestra Project

Overview

- HD recording of jazz band, orchestra and opera
- All files stored on servers at McGill
- Student workstations deployed across Canada
- Individual workspace for each instructor and student
- CANARIE network used to deliver video and audio in real time

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Open Orchestra Project

Lead Institution

McGill, Schulich School of Music,

Centre for Inter-disciplinary Research in Music, Media and Technology (CIRMMT)

McGill Team Leaders

- Video & Project Coordinator – John Roston
- Audio – Wieslaw Woszczyk
- Software & Networking – Jeremy Cooperstock

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Open Orchestra Project

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- UBC, Centre for Teaching, Learning and Technology – Mark Zuberbuhler
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Open Orchestra Project

Technical Support & Funding

- Canarie Inc.

Collaborating Corporations

- Panasonic Inc.
- Melnik Resources Ltd.

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Open Orchestra Project

Student Workstation

- Panoramic HD video
- Three 32” monitors
- Monitor on each side angled at 45 degrees
- Touchscreen music stand displays electronic score and system controls

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Open Orchestra Project

Student Workstation

- Surround audio via headphones
- Overhead mic for audio recording
- Webcam for video recording

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Open Orchestra Project

Student Workstation

- Electric lift for standing and sitting positions
- Monitors, touchscreen and computer move together.
- Workstation custom built by Melnik Resources in Ontario

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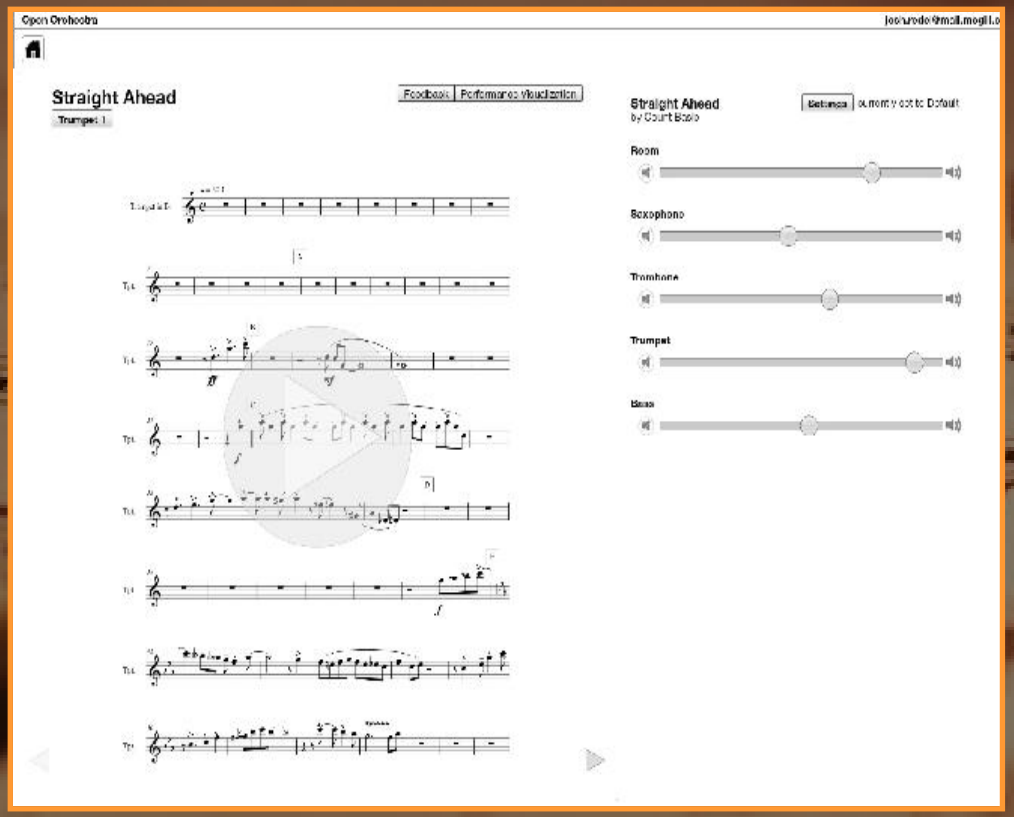
Open Orchestra Project

Student Workstation

- Touchscreen music stand shows the electronic score at left.
- System controls at right allow student to turn audio tracks on and off and adjust levels.



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Open Orchestra Project

Student Workstation

- Student selects his or her instrument.
- Student sees and hears what would be seen and heard at that position in the orchestra.
- Student can also choose to see and hear at conductor's position.

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Open Orchestra Project

Video & Audio Transmission

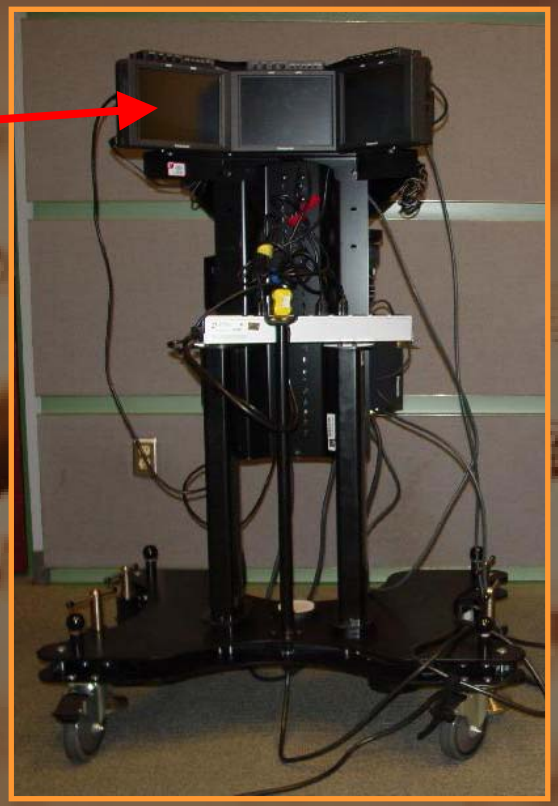
- Target HD video is three simultaneous streams of 720p60 H.264 AVC @ 25 Mbps each
- Flash file format
- Playback not yet stable @ 25 Mbps so have been using “triple stitched” stream @ 15 Mbps
- 128 kbps audio mixed at the server and transmitted separately
- Video & audio synchronized at client end
- Currently using Wowza to stream video and gstreamer for audio

Open Orchestra Project

Camera Rig

Front:
Cameras

Back:
Monitors



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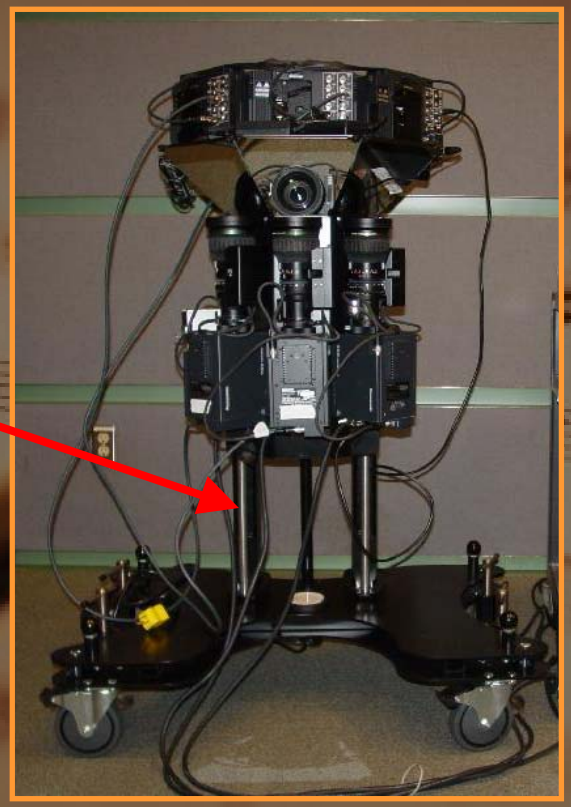
Open Orchestra Project

Camera Rig

- Electric lift mechanism for sitting and standing positions



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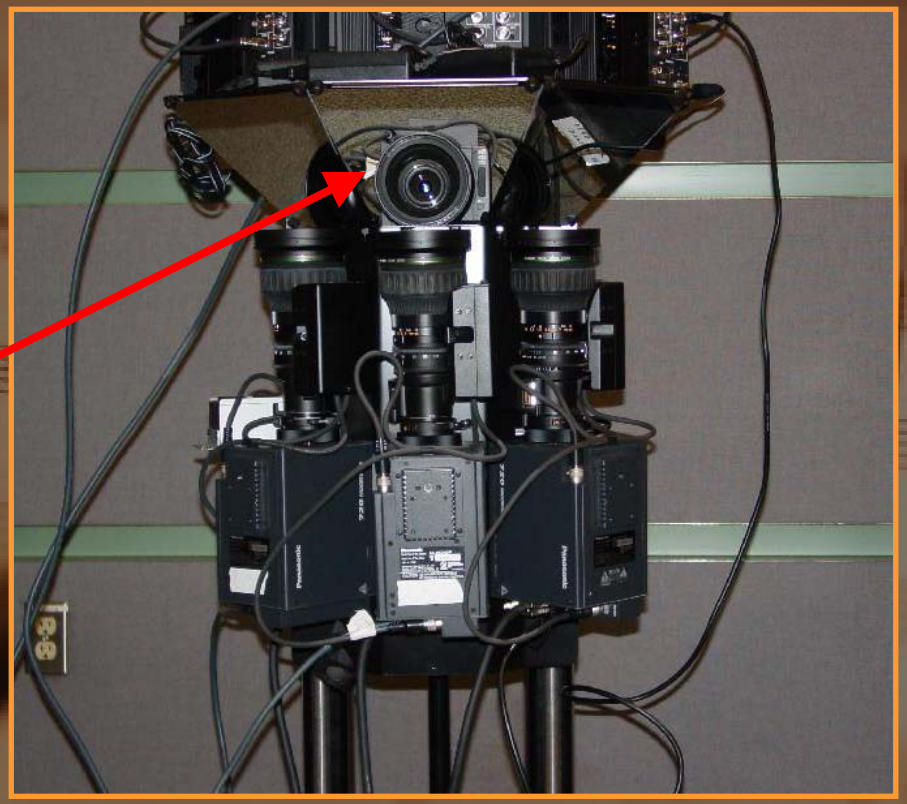
Open Orchestra Project

Camera Rig

- 3 Panasonic broadcast 720p60 cameras
- Mounted vertically looking into 45 degree angle front surface mirrors



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Open Orchestra Project

Camera Rig

- Camera rig replaces trumpet player

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Open Orchestra Project

Camera Rig

- Panoramic video display has 2 vertical blind spots between monitors where the monitor bezels meet.
- Cameras are aligned to allow for these blind sports.

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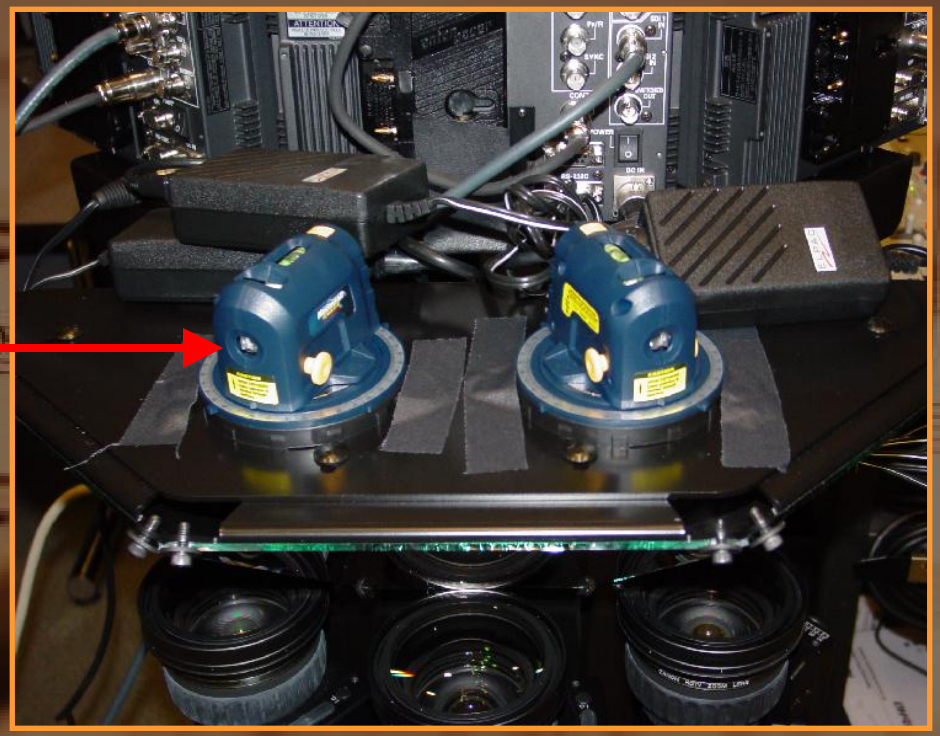
Open Orchestra Project

Camera Rig

- To facilitate moving musicians out of these blind spots, laser beam transmitters are mounted on the camera rig to transmit a vertical line in the blind spot.



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Open Orchestra Project

Audio Recording

- Multi-track system
- Musician replaced by camera does not play.
- This musician records post-sync track later in sound studio.
- Student can use this track to hear how he or she should sound.
- Student can play duet.

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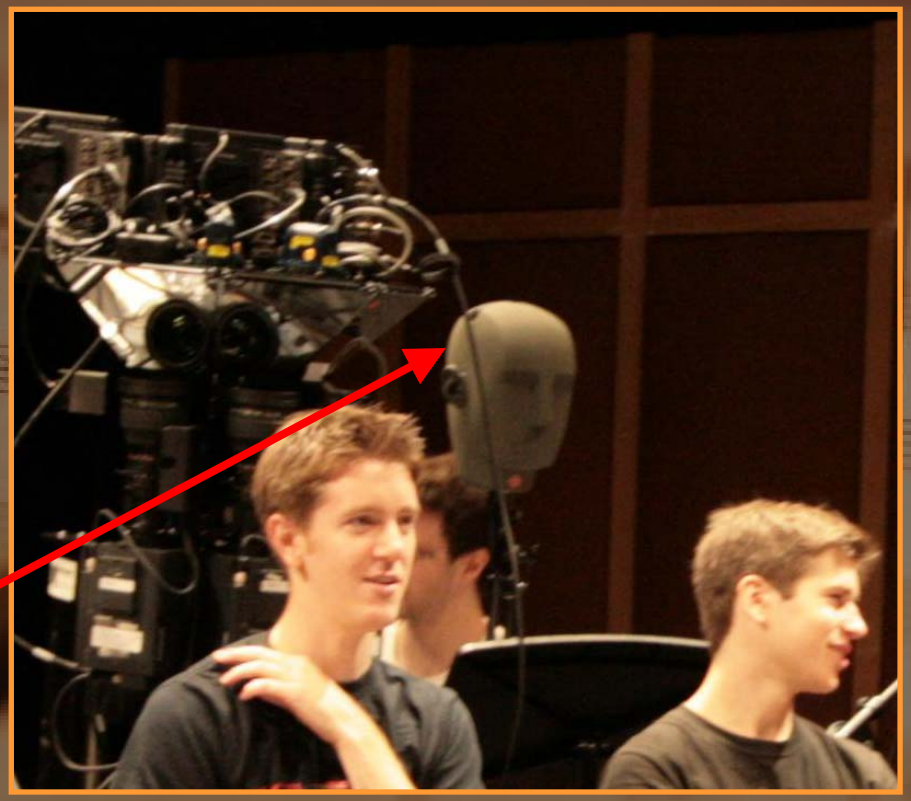
Open Orchestra Project

Audio Recording

- Student can hear how orchestra sounds at musician's position or conductor's position.
- Reference audio recorded at musician's position using dummy head.



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Open Orchestra Project

Opera Recording

- Phase 1: static opera singers at music stands
- Camera rig replaces singer

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Open Orchestra Project

Opera Recording

- Phase 2: moving opera singers on stage
- Camera rig must move as singer would move.

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Open Orchestra Project

Opera Recording

- Where the camera replaces one member of a couple moving together, a handle is used to keep the singer in position beside the camera.

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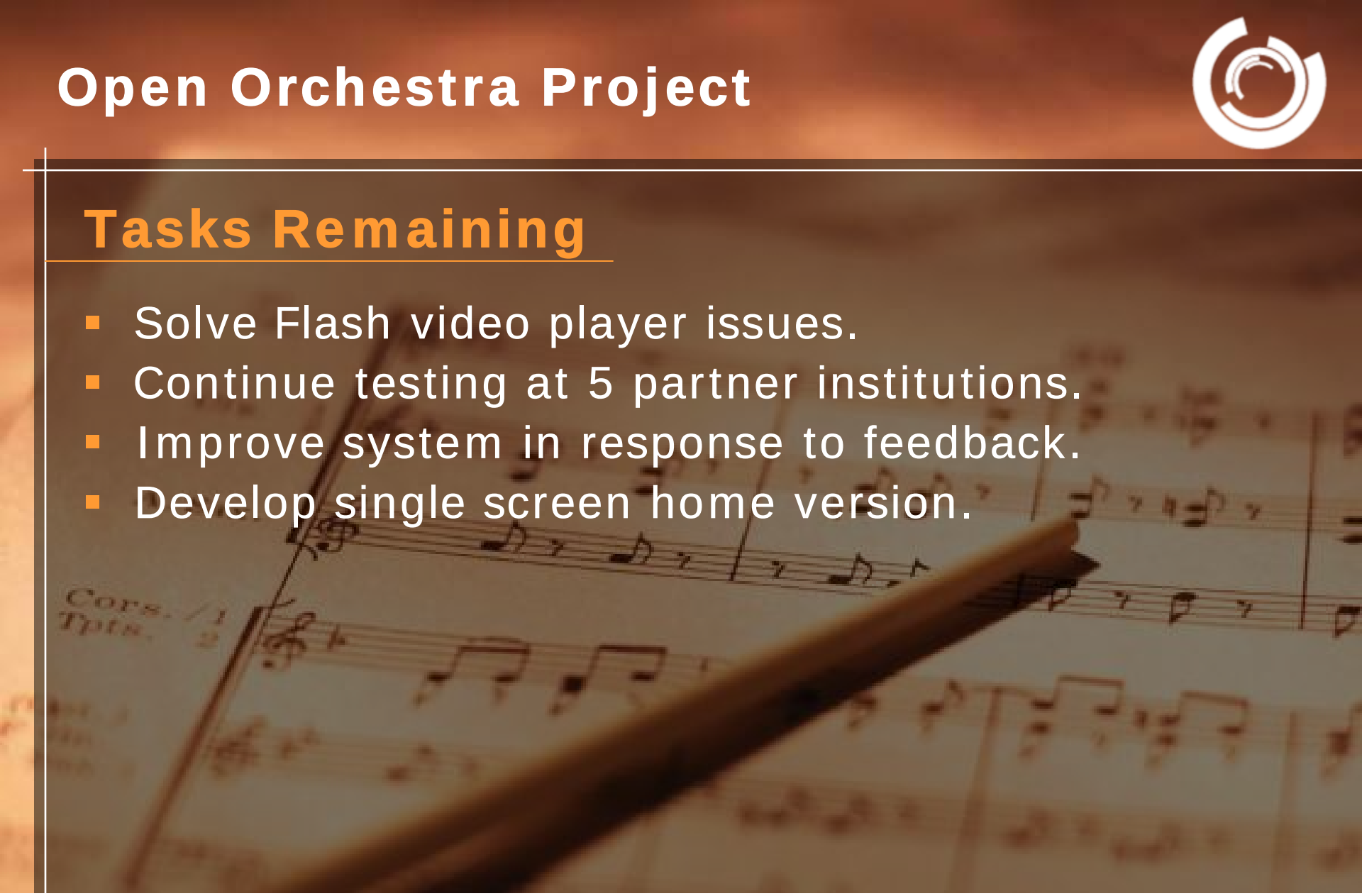
Open Orchestra Project

Tasks Remaining

- Solve Flash video player issues.
- Continue testing at 5 partner institutions.
- Improve system in response to feedback.
- Develop single screen home version.



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Open Orchestra Project

More Information

- Web Site:
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- Blog:
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- john.roston@mcgill.ca
- mark.zuberbuhler@ubc.ca

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Canada 3.0 Conference

Stratford, May 2-4, 2011.

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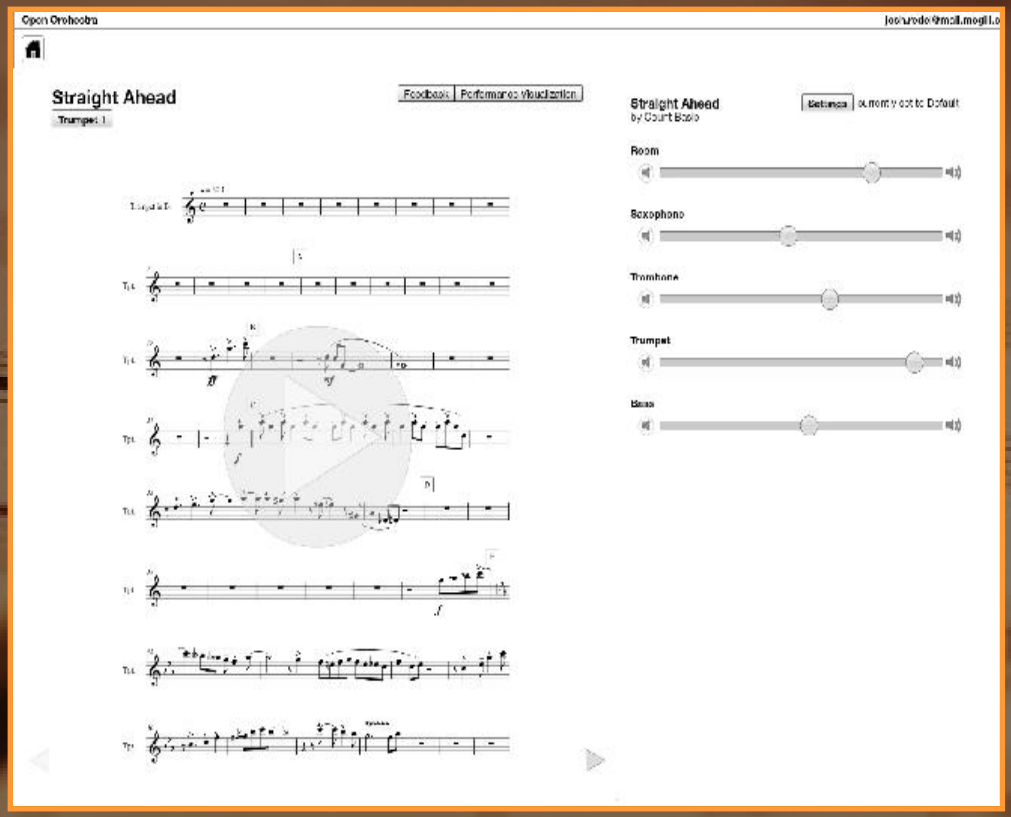

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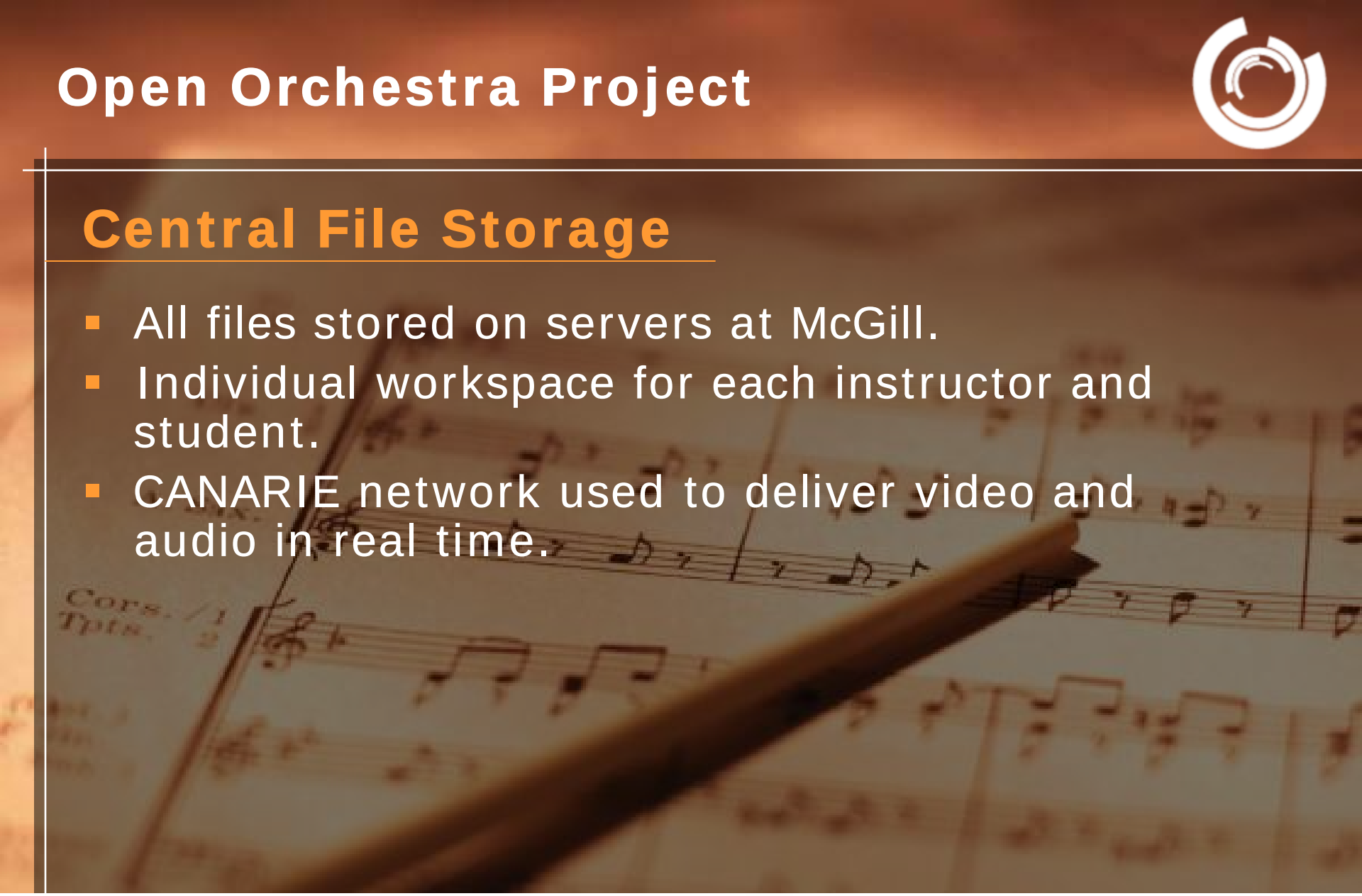

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- Audio transmitted separately
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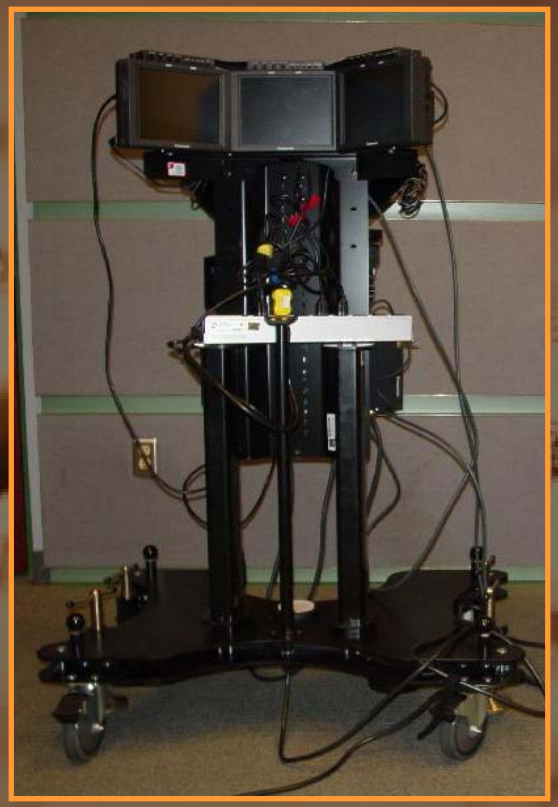

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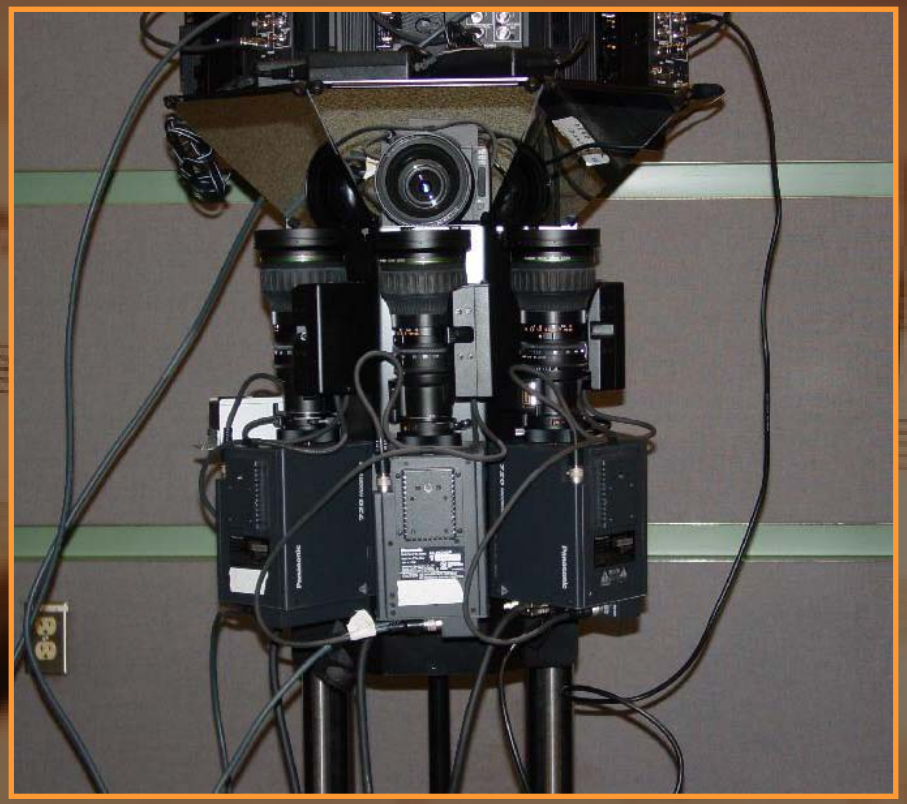

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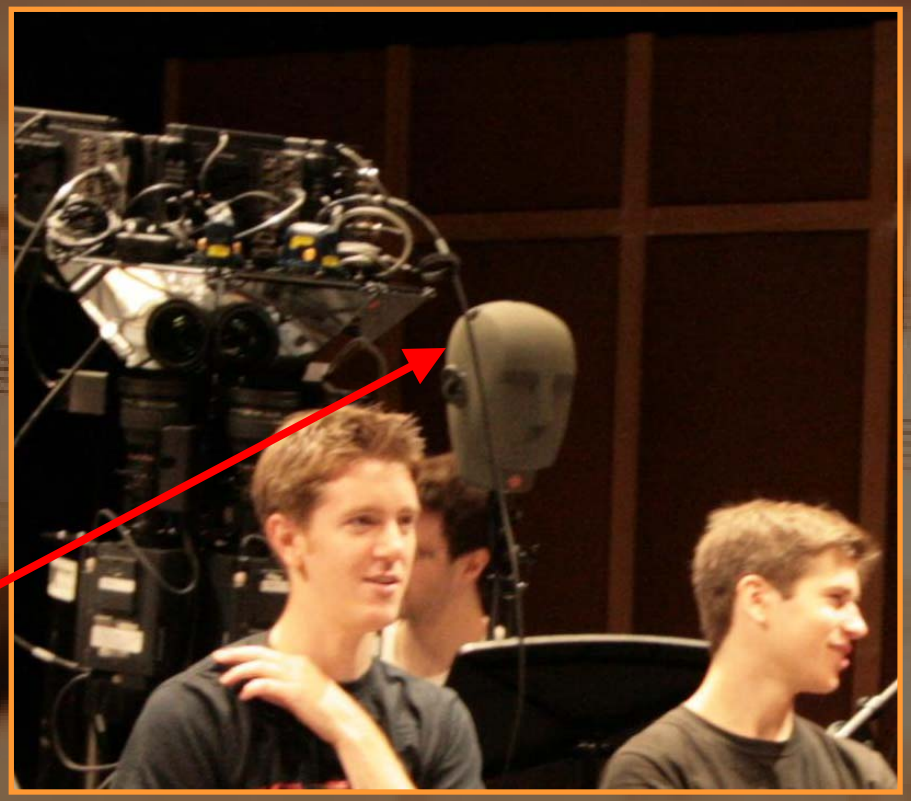

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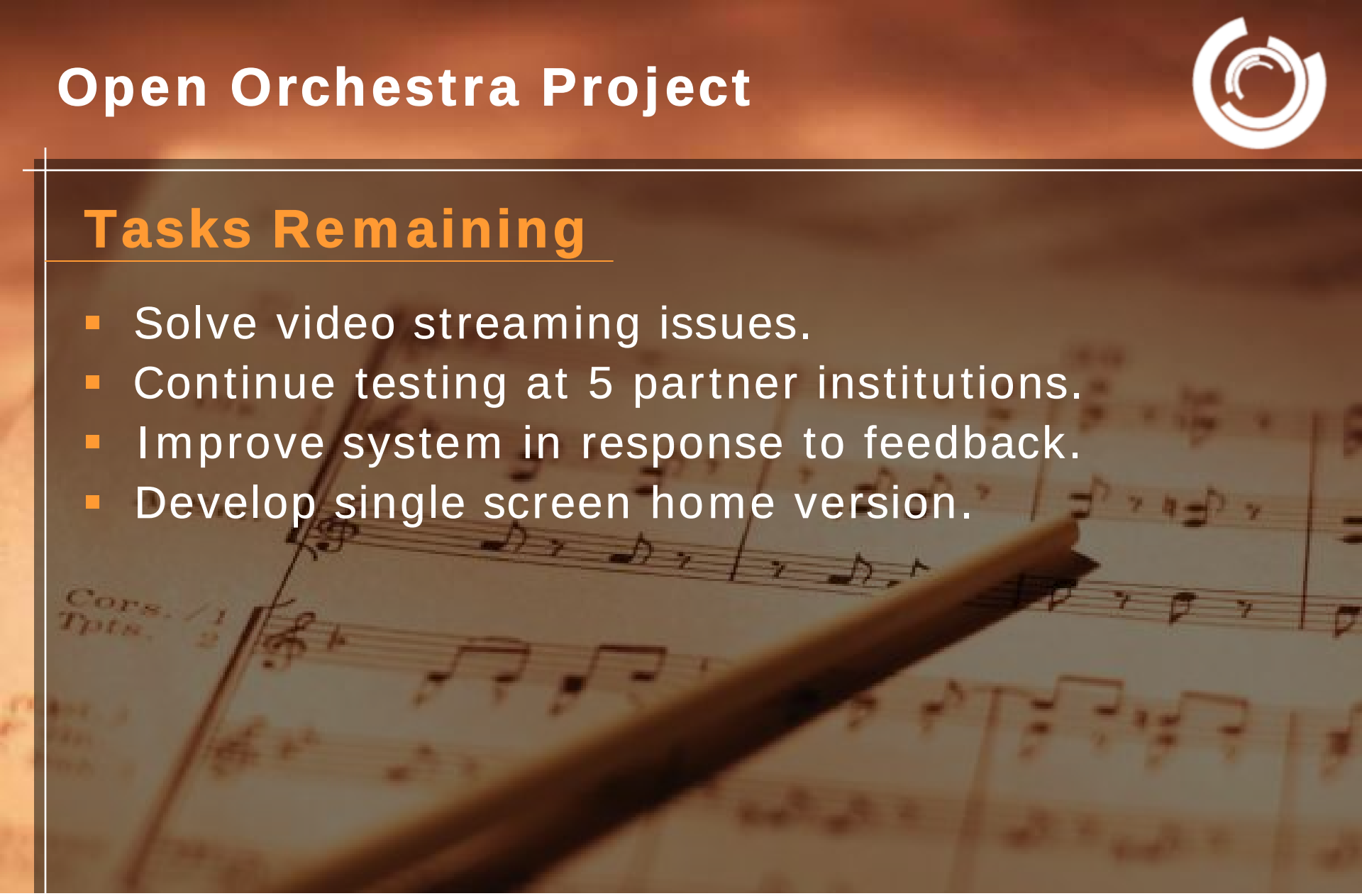

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