Network-Enabled Platforms (NEP-2) Program
Semi-Annual Progress Report

Project Information

Lead Contractor:	McGill University		
Project Name:	Open Orchestra	Project #:	NEP-54
Date:	March 31, 2010.		
Claim Period:	October 1, 2009	To:	February 28, 2010.

PROGRESS REPORT CHECKLIST – Please ensure the following sections are completed:

Project Progress	Completed
1. Technological Progress	Yes
2. Project Development & Activities	Yes
3. Project Plan	Yes
4. Updated Claim Forecast	Yes
5. Intellectual Property	Yes
6. Communications	Yes
7. Web Site Information	Yes

CLAIM CHECKLIST - Please ensure the following sections are completed and attached to this document:

	Completed and Attached
8. Financial Claim Schedule	Yes
9. Invoices for Eligible Costs over $1000 incurred and paid	Yes
10. Employee Timesheets (signed by employees and supervisor)	Yes

APPENDIX CHECKLIST – Please include any relevant materials:

	Attached
11. Communication Materials	No

1. Technological Progress

1. Hardware technology to be used for video and audio acquisition

This is described in "Appendix 3: Initial Video and Audio Acquisition" document.

2. Software technology

This is described in "Appendix 5: Software Specifications" document.

3. Hardware technology to be used in the Student Workstation

The workstation consists of:

- high end computer
- monitor mount and lift mechanism
- three widescreen video monitors
- one widescreen touchscreen monitor in the music stand position for displaying the electronic score and system controls
- noise cancelling headphones
- stereo microphone
- audio monitor control unit

Computer

- requires ability to simultaneously decode three streams of high bandwidth h.264 avc encoded video
- Dell Studio XPS 9000 currently being tested
- Intel® Core™ i7-920 processor(8MB L3 Cache, 2.66GHz)
- 6GB DDR3 SDRAM AT 1066MHZ
- 500GB SERIAL ATA 2, 7200 RPM
- NVIDIA Quadro NVS 450 Quad Monitor 4xDVI

Monitor mount and lift mechanism

- If the system becomes a commercial product, the monitor mount and motorized lift mechanism will be custom designed and built for this purpose. Extensive discussions have already been held with Peter Melnik, President of Melnik Resources Ltd. in Mount Brydges, Ontario which specializes in this type of product. Unfortunately, construction of a custom prototype is beyond the budget of this project.
- For this project, a much larger motorized work table is being investigated as a cheaper alternative. A Teknion model is currently being tested.

Widescreen video monitors

- The original plan outlined in the SOW specified 24" monitors, but we have been able to increase the size to 32" for a more immersive experience by using HDTVs with HDMI computer inputs instead of more expensive computer monitors.
- The 32" Samsung LN32B360 is currently being tested.

Touchscreen monitor

- The touchscreen is a challenge because the student must be able to write on the electronic score to make notes on how the music should be played or to write comments for later review by the instructor. While tablet computers are designed for handwriting, most touchscreen displays are not.
- A 22" Dell touchscreen was tested, but it lacks "palm rejection" so that resting the palm on the touchscreen while writing registers as a touch and prevents accurate writing.
- It was decided to investigate 3M MicroTouch™ technology which provides a stylus for writing and only the touch of the stylus is recognized by the touchscreen. The stylus requires a special screen controller so the touchscreen monitor is a custom assembly that would normally be very expensive. The possibility of assembling a 24" monitor at McGill with this technology is being investigated.

Noise Cancelling Headphones

- Prevent leakage from tracks to the microphone
- Reduce the audible noise in the workstation space
- Provide repeatable audio balance
- Remove errors from loudspeaker set up
- Ensure comfort and privacy in long sessions

Stereo Microphone

- Stereo ribbon microphone in single package
- Bi-directional characteristic reduces room noise
- Fixed mounting from the ceiling
- Smooth sound, quality construction, low price
- Made in China, modified at McGill

Audio Monitor Control Unit

- Provides adjustable headphone monitor level
- Serves one or two headphones (2 persons)
- Allows calibrated setting of mic-preamp gain
- Easy balance adjustment between tracks and mic
- Built it reverb

2. Project Development & Activities

1. **Project team hired and website established**
   Status: Complete
   The long term members of the team have been hired as scheduled. The SOW also provided for additional short term staff to be hired for the audio and video recording. This will be done when the recording schedule has been established.

   The project website has been established: http://canarie.mcgill.ca/project_nep2_index.html

2. **Project scope document complete**
   Status: Complete
   See Appendix 1

3. **Plan for use of digital libraries complete**
   Status: Complete
   See Appendix 2

4. **Initial video and audio acquisition document complete**
   Status: Complete
   See Appendix 3

5. **Database specifications document complete**
   Status: Complete
   See Appendix 4

6. **Software specifications document complete**
   Status: Complete
   See Appendix 5

7. **Video and audio acquisition test complete**
   Status: Delayed to April and May 2010.

   The audio and video acquisition document prepared during the claim period (item 4 above) specifies a three camera rig for simultaneous acquisition of three streams of broadcast quality high definition video to give a panoramic view of the orchestra. Design and manufacture of this camera rig by the Department of Computer and Electrical Engineering at McGill required additional time.

   It was decided that much of the audio and video acquisition testing could be combined with tests of voice acquisition (deliverable item 9 in the next claim period) so that the camera rig and the use of the system for teaching opera will be tested at the same time. This should save time and expense.

8. **Test server installed**
   Status: Complete

3. Project Plan

The project has followed the plan outlined in the SOW with the following exceptions:

1. **User Group meeting**
    The original plan was to hold the User Group meeting at the very beginning of the project in November 2009. In preliminary discussions with the McGill Music professors who are members of the User Group, it was realized that it would be far more valuable to first formulate options for the system and then discuss those options with the User Group. The meeting was therefore postponed to January 2010 when it was possible to get far more detailed feedback than would have been possible earlier. Full details on the User Group meeting are given in "Appendix 1: Project Scope."

2. **Video and audio acquisition test**
    The original plan was to record audio and video of a test performance early in the project. As explained in the Project Development report above under deliverable #7, the design and manufacture of the camera rig required more time. It was decided to do that work at McGill where two rigs could be produced for the price of one from external sources, but with a longer delivery. The testing will be combined with the tests of voice acquisition to save time and money.

3. **Touchscreen**
    The original plan was to purchase an existing 22" touchscreen product for the electronic musical score and system control display. As explained in the Technological Progress report above, testing of existing products revealed a "palm rejection" problem when writing on the touchscreen. It was therefore decided to investigate building our own 24" touchscreen. We have received advice from 3M on how to do this and expect to pursue this option.

Deliverables – August 31, 2010
The deliverables at the end of the next two quarters on August 31, 2010 are:

1. Video and audio acquisition test complete
2. Voice acquisition successful or abandoned
3. Simultaneous multiple track playback from database complete
4. Multiple track video and audio player test complete
5. Track synchronization implemented if necessary
6. Revised video and audio acquisition document complete
7. Video and audio recordings for software development ready for editing
8. Score playback with overlay complete
9. Record function operational
10. Comments indexed to score and both retrievable from database
11. Audio mixing console complete
12. Evaluation documents complete for video, audio and score playback, audio record
13. Player/recorder demonstrated for CANARIE staff

4. Updated Claim Forecast

The actual cash flow summary, with actuals and forecasts for the remaining claim periods, is attached as Appendix 6. There is also an explanation of variations from the original budget.

5. Intellectual Property

There was no Intellectual Property developed during the reporting period.

6. Communications

There were no communications related to the project that took place during the reporting period.

7. Web Site Information

The project web site address where documentation is being maintained is:
http://canarie.mcgill.ca/project_nep2_index.html