CANARIE

CA∧*net⁴

Advanced Applications Program

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Quarterly Progress Report

CANARIE

Project Information

Lead Contractor:	McGill University			
Project Name:	Shared Spaces		Project #:	AAP-03
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Participant 1:	University of British Columbia			
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Date:	February 17, 2006.			
Claim Period:	July 1, 2005.	To:	December 31, 2005.	

Impact Report

The project enabled the continued employment of two full time positions and created one new half time position.

The project demonstrated the *Shared Spaces* widescreen technology for the first time at the SuperComputing 2005 Conference in Seattle, November 14-17, 2005. Title of the demonstration was *Wide Screen Window on the World: Life Size HD Videoconferencing.* As part of the *Bandwidth Challenge* competition at the Conference, the project was given an award for "Most Innovative Use of New Technology." The citation reads, "McGill used high bandwidth to reduce latency on their high definition video conferencing between Seattle and Montreal, so that two way synchronized interaction of musicians was truly possible."

See: http://www.sc05.org/initiatives/bandwidth_winners.php

More than 1,000 people came by the project's booth at the Conference to try the technology by interacting with people in Montreal and by remotely operating a model train in Montreal. In addition to high definition video and surround sound, the project transmitted vibration data from a model bridge over which the train passed. Those in Seattle stood on a platform which reproduced the vibration to give the same sensation that one would feel if one could stand on the bridge. This was an enormous hit with the crowd.

The award and booth generated a great deal of interest in the system with some potential users asking for more time to try the system once the Seattle end has been moved to its permanent location at UBC in Vancouver.

Project Activities

1. Schedule

The deliverables postponed from Milestone 1 were completed.

The Milestone 2 deliverables were completed.

Three deliverables not due until Milestone 3 were largely completed ahead of schedule by transmitting three streams of HD video between McGill and the SuperComputing 2005 Conference in Seattle in November 2005:

1. All project servers installed and tested at McGill and UBC, successful completion of operations test.
2. Wide screen HD Video capture and display on multiple plasma displays demonstrated.
3. Transmission of multiple HD video streams between McGill and UBC demonstrated.

The Seattle end was then moved to UBC and transmission between McGill and UBC will be demonstrated as scheduled for Milestone 3.

2. Deliverables

1. End-to-End Lightpath infrastructure installed and operational.
   Complete.

2. Initial project servers installed and tested at McGill and UBC, successful completion of operations test.
   Complete.

4. Solution found for HD video to multiple plasma displays in native resolution to maximize quality and minimize latency.
   Complete. The solution is to use the 720p60 format output directly from the cameras using HD-SDI and input directly to the plasma displays equipped with HD-SDI input cards.

5. Test transmission completed of multichannel audio and single HD video stream to single display between McGill and UBC.
   Complete.

6. Report on network performance during HD video transmission.

Complete. The CA*net 4 network was used between McGill and the SuperComputing 2005 Conference in Seattle to transmit three streams of HD video plus multichannel audio and vibrosensory data to Seattle and one stream of HD video and audio back to McGill. The bandwidth used to Seattle was approximately 3.6 Gbps and the network delay was in the order of 50ms. Network performance between McGill and UBC was not measured until after December 31, 2005.

7.   Progress report on multichannel audio echo cancellation if applicable.
      As reported for Milestone 1, it was concluded that this is not feasible.

8.   Progress report on software development for multicast transmission.
      Complete. There were several meetings of project staff to discuss possible approaches to multicast transmission and a decision was expected early in 2006.

9.   Wide screen HD Video capture and display on multiple plasma displays demonstrated.
      Completed ahead of schedule.

Updated Project Plan

The updated Project Plan for Milestone 3 appears below.

Milestone 3 – June 30, 2006.

1.   All project servers installed and tested at McGill and UBC, successful completion of operations test.
2.   Transmission of multiple HD video streams between McGill and UBC demonstrated.
3.   Report on network performance during multiple HD video streams transmission.
4.   Report on latency of final system.
5.   Progress report on software development for multicast transmission.
6.   Progress report on possible development of immersive 3D audio projection for use in music.

Technological Progress

There was excellent technological progress in that the project was able to demonstrate transmission of three simultaneous streams of HD-SDI video and multichannel audio in November 2005, six months ahead of schedule. As a bonus, the simultaneous transmission of vibrosensory data was also demonstrated although this was not a deliverable of the project.

There was an intermittent video stability problem caused by bugs in the new 64-bit Linux drivers for the AJA video capture cards. It took some time to establish that the problem was not related to the HP servers nor to the 10G network interface cards. At the end of Milestone 2, a good

working relationship had been established with AJA's technical staff and it was anticipated that it would take a considerable period of testing to isolate and fix the problems.

At the end of Milestone 2, a module failed in the Foundry 10G switch located at McGill which resulted in a complete loss of connectivity between McGill and UBC. A replacement module was on order.

Communications

There was an information sheet published that describes the technology and the network connectivity used for the Supercomputing 2005 demonstration in Seattle. A copy is attached.

Web Site Information

http://www.canarie.mcgill.ca