"Two Heads are Better than One"
Using Tiled Graphics Displays to Enhance Parallelism and Awareness in Advanced Collaborative Environments

Kyoung S. Park, Atul Nayak,
Jason Leigh, Andrew E. Johnson
cavern@evl.uic.edu
Electronic Visualization Laboratory,
1120 SEO, MC 154, 851 S. Morgan St.,
University of Illinois at Chicago,
Chicago, Illinois 60607

``*Each vantage point, each mode of organization will create a new structure. And each new structure will enable you to see a different manner of meaning, acting as a new method of classification from which the whole can be grasped and understood." -- Richard Saul Wurman, Information Anxiety, 1989.*

The **Continuum** is an augmented work environment that enables distantly located participants to work in intensive collaboration campaigns (www.evl.uic.edu/cavern/continuum). The Continuum is motivated by prior research in "warrooms" which have been shown to significantly enhance performance in **co-located** work teams[Olson98]. The Continuum attempts to achieve the same benefits for **distributed** teams.

The Continuum consists of four main technologies: 1. an Access Grid node to support group-to-group communication; 2. a high resolution tiled display for providing shared views of text documents, web pages, spreadsheets, graphs & charts, and scientific visualizations; 3. an AGAVE (Access Grid Augmented Virtual Environment) passive stereoscopic display for sharing immersive views of three dimensional content[Leigh01]; and 4. a shared plasma touch screen to support whiteboarding.

We are currently trying to understand how the Continuum's tiled displays can be used in enhancing parallelism and awareness during a intensive collaboration campaign. Tiled displays are often used to project a single extremely large, high resolution visualization. It is our belief however, that for collaboration, a better way to use a tiled display is as a large distributed "cork board" which allows meeting participants to "pin up" informational artifacts for all to see. From our prior experience in developing tele-immersive environments, we have found that there are benefits to be gained when participants do NOT all see the same view during a collaboration[Park00]. By being able to tailor their individual views, collaborators can work in parallel on a problem. In fact we found that within a real-time tele-immersive scientific visualization exercise, participants tended to work independently for the most part and then synchronize from time to time to maintain awareness. The distributed "cork board" is a means to support both parallelism and awareness.

To determine the validity of our hypothesis we intend to run a set of experiments in which we examine the following conditions:

- CS: Collaborators are co-located and work together on a scientific discovery task on a single large projected display.
- CT: Collaborators are co-located and work together on the same task, on a tiled display.
- DS: Collaborators are distributed and work together on a single large projected display (one at each distributed site).
- DT: Collaborators are distributed and work together on tiled displays.

We predict that, provided the collaborators are appropriately trained in the use of the displays:
    CT > DT >= CS > DS (where ">" means "will be better than")

Abstract submitted to Access Grid Retreat 2002.

In our experiment we hope to show that participants will take advantage of multiple display screens when given the opportunity. And if not we would like to understand why they don't. Furthermore we hope to show that providing multiple display screens can help alleviate some of the awareness problems associated with distributed collaborations, and that multiple display screens can enhance parallelism in a collaborative meeting. We'd like to also understand how to develop an interface to support the use of a tiled display as a distributed cork board.

Olson, J. S., Covi, L, Rocco, E., Miller, W. J., and Allie, P. (1998) A room of your own: What would it take to help remote groups work as well as collocated groups? *Short Paper the Conference on Human Factors in Computing Systems (CHI'98),* 279-280.

Park, K. Kapoor, A., Leigh, J., Lessons Learned from Employing Multiple Perspectives In a Collaborative Virtual Environment for Visualizing Scientific Data, Proceedings of ACM CVE 2000, San Francisco, CA, 09/10/00-09/12/00, pp. 73-82

Leigh, J., Dawe, G., Talandis, J., He. E., Venkataraman, S., Ge, J., Sandin, D., DeFanti, T. A., AGAVE : Access Grid Augmented Virtual Environment, Proc. AccessGrid Retreat, Argonne, Illinois, Jan, 2001.