INEXPENSIVE VIDEO CONFERENCING AT NSCL

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The concept of collaboration and the associated need for visual interfacing is becoming more important for today's research. Video conferencing is not new but the use of the internet for video conferencing is relatively new. A small research project was undertaking to investigate the possibilities of using the internet for video conferencing at NSCL. As opposed to alternatives with large initial investments, operating cost and limited access the criteria of this application is that it must be inexpensive and easily available to the individual.

The first approach was to look into the popular application, CUSEEME, developed at Cornell University as part of a NSF grant. The software is free to the user and has visual, audio and "chat" capabilities. Currently the product is black and white only but color is in beta. The camera used is the QuickCam from Connectex, again a popular choice for this application. A commercial version of the software CU-SEEME developed by WhitePine was also investigated. The software has the capacity for point to point contact or, through the use of "reflectors", multiple users. Reflectors are computer sites, with appropriate software, that enable several users to see each other concurrently. A reflector site was also set up at NSCL. Various aspects of video conferencing with these products were and are being investigated. Such things as cost, visual and audio performance, computer requirements, network load, modem requirements and applicability were investigated.

Use of the system has meet with mixed results at this time. With respect to cost the software is free and the cameras are less than $100 for B/W and $200 for color. With camera prices dropping and the advantages of color it is felt that color is recommended. The cost/performance advantage of the commercial software (less than $60) to do color will be evaluated after the free Cornell version is released and evaluated. In any case this puts a color system on the desktop for under $260 with prices dropping. Audio and visual performance was hard to measure in that it was highly dependent on the computers on each end and the individual expectation. Clear but small (160x120 pixel) pictures are obtainable and good to excellent frame rates with 166Mhz and higher machines directly on the ethernet. Larger pictures are available but the frame rate goes down. The measured effect on the bandwidth of the ethernet was negligible and does not appear to be a concern. Clear audio was obtained between sites in the lab and between NSCL and IUCF (Indiana) along with video. Again, performance was highly dependent on the configuration of the computers on each end. Slower computers and/or slow modems (14.4kbps) would handle clear pictures at rates that could be called "real-time stills". Audio was not a consideration with these machines. In all cases "chat" (typing) was available for communication. Tests with links to Europe were limited but again video connections were made and in some cases audio was achieved. Some of these tests were done over public reflectors and these sites limited rates. Tests with the local NSCL reflector had slower rates than point to point but this was dependent on the fact that the site was on a relatively slow machine.

The conclusion draw to date is that with today's computer performance video conferencing can be achieved inexpensively. The major limitation is some user's reaction to the small frame size and the need to use "chat' when audio can not be achieved. More test situations are required to draw any firm conclusions as to the user's acceptance. With respect to the hardware, a look at the next step up in cost/performance is expected. Video interface cards ranging around $200 plus are available that are expected to increase performance and therefore frame size and allow for more bandwidth for audio. Some of these interfaces require video cameras and this might push the total price too high.