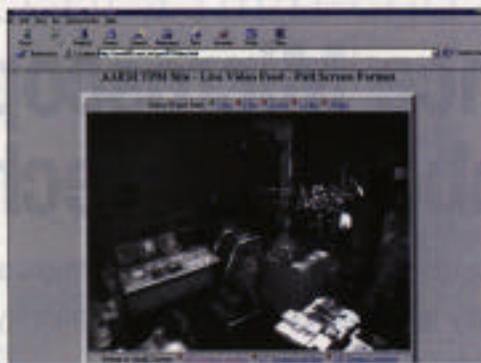


including high-end distributed computing systems, interactive virtual reality systems, and state-of-the-art networking capabilities.

**TPM differs from** conventional remote control of instrumentation over networks. Conventional remote control is basically a simple task of computer interfacing or programming of a system and has been done successfully over the past few years. Conventional remote control does not generally afford the ability to observe and actively control dynamic experiments that deal with imaging or spectroscopic systems. Even "Web-cam" systems only take snapshots of items that are not in real time and not combined with interactive control of instrumentation.

TPM brings three key elements—instruments, data, and people—together in an electronic space. By creating this permanent interactive environment where these resources are available online, TPM frees its users to explore



A live user-controlled view of a large electron microscope in the TPM lets the users interact with staff members and physically see the equipment that they could be performing their experiments on.

new experimental relationships with each other. TPM users can view live experimental details (images, spectra, instrument and control parameters, and data archives), control instruments, and participate in live collaborations via video/audio conferences. TPM deals with real-time data, data that vary up to

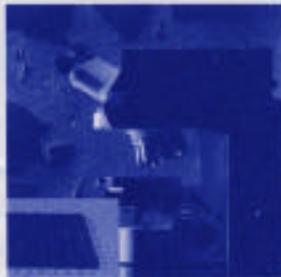
30 frames/sec. The bandwidth available to users is limited only by their connectivity to the Internet, as well as their local CPU processing capabilities. Many current users are located at organizations that support high-speed connections, T1 connections with 1.5 Mb/sec or better speeds.

Argonne's TPM environment has been expanded to the Univ. of Western Australia in Perth, CSIRO's Division of Minerals and Clay in Melbourne, Australia, Northern Illinois Univ. in DeKalb, the Univ. of Illinois at Urbana-Champaign, Oak Ridge (Tenn.) National Laboratory (ORNL), the National Institutes of Standards and Technology, Gaithersburg, Md., and the Univ. of California at Berkeley. At Argonne, the TPM facility involves three scanning electron microscopes, a confocal microscope, a microprobe, and an environmental SEM. Industrial partners involved in the project have included Gatan, R.J. Lee, EMISPEC

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