

The MicroObservatory Net

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1. The MicroObservatory Net

Beginning in 1990, a group of scientists, engineers and educators based at the Harvard-Smithsonian Center for Astrophysics (CfA) developed a prototype of a small, inexpensive and fully integrated automated astronomical telescope and image processing system. The MicroObservatory combines the imaging power of a cooled CCD, with a self contained and weatherized reflecting optical telescope and mount. A microcomputer points the telescope and processes the captured images. Software for computer control, pointing, focusing, filter selection as well as pattern recognition have also been developed. The telescope was designed to be used by teachers for classroom instruction, as well as by students for original scientific research projects. Probably in no other area of frontier science is it possible for a broad spectrum of students (not just the gifted) to have access to state-of-the-art technologies that allow for original research projects. The MicroObservatory has also been designed to be used as a valuable new capture and display device for real-time astronomical imaging in planetariums and science museums. The project team has now built five second generation instruments. The new instruments will be tried with high school and university students and teachers, as well as with museum groups over the next two years.

Though originally designed for use in individual schools, we are now planning to make the MicroObservatories available to students, teachers and other individual users over the Internet. We plan to allow the telescopes to be controlled in real time or in batch mode, from a Macintosh or PC compatible computer. In the real-time mode, we hope to give individuals access to all of the telescope control functions without the need for an "on-site" operator. Users will sign up for a specific period of time. In the batch mode, users will submit requests for delayed telescope observations. After the MicroObservatories complete a job, the images will be e-mailed back to the user.

At present, we are interested in gaining answers to many technical and educational questions including: (1) What are the best approaches to scheduling real-time observations? (2) What criteria should be used for providing telescope time? (3) With deployment of more than one telescope, is it advantageous for each telescope to be used for just one type of observation, i.e., some for photometric use, others for imaging? (5) How much trouble is to be expected in controlling telescopes and shipping images over the Internet in real-time? (6) What access and queuing software should be developed? And, most importantly, (7) What are the real educational benefits of using the MicroObservatories?