N92-12830

Astrometric Observations of Comets and Asteroids and Subsequent Orbital Investigations

Smithsonian Institution
Astrophysical Observatory
Cambridge MA 02138

B. G. Marsden

Strategy

Astrometric observations are made with the 1.5-m reflector at the Oak Ridge Observatory.

Progress and Accomplishments

The transformation of the Oak Ridge astrometry from a photographic program to a CCD program can now be considered complete, and the number of observations being made is now approaching an order of magnitude greater than in the old photographic program. The dead time between exposures is now typically down to only 2.5 minutes. The backlog of reductions that had accumulated during the changeover was eliminated, and the identification, measurement and reduction process is now so automated that essentially all the reductions from a month with even 400 observations can be completed in only three days. The possibility of developing an autoguider, using a second CCD, was considered, but it was concluded that there would be no increase in efficiency. Instead, a simple tracking system using a short-focus guide telescope has been introduced. There therefore exists now the option of offsetting an exposure to allow for the motion of the object being observed, although most of the objects observed hitherto have in fact been bright enough to allow tracking at the sidereal rate. We made the last known observations of five new comets and eight new earth-approaching minor planets. Last-minute astrometry of 1990 MF and 1991 AQ was obtained during bright moon to ensure the success of radar-bouncing efforts. Several unusual numbered minor planets were observed, as well as of (243), (449) and (951) in response to requests in connection with NASA missions. Observations at Oak Ridge were made of as many as 64 percent of the minor planets that were newly numbered during the year, and 28 percent of the new numberings were made solely because of Oak Ridge observations. The influence on new numberings is so overwhelming that the increase in the volume of the Oak Ridge observations has allowed the introduction of more stringent, but appropriate, requirements for numberings.

Projected Accomplishments

Observations are expected to continue much as usual as occasion demands. Although the CCD data provide both astrometric and photometric information, we have hitherto done little with the latter, something we hope to be able to correct during this next year.

Publications

2952 observations were published during the past year on 83 Minor Planet Circulars and 9 IAU Circulars. Orbit computations were in the same publications.

As far as observations are concerned, the MPCs have been declared a refereed journal, and observations from Oak Ridge plates are contained on MPC Nos. 16123-16326, 16150-16156, 16346, 16482-16483, 16530-16537, 16656, 16677-16678, 16774, 16828-16830, 16935-16936, 16938, 16988-16992, 17086-17087, 17133-17136, 17275-17276, 17278-17280, 17349-17356, 17489-17492, 17565-17577, 17684-17687 and 17720-17725.