Project Report: Development of an Intelligent Telescope Scheduler

Project Investigator:	***Kimberly Binsted***

Project Progress

Co−I K. Binsted has been working with University of Hawaii (UH) undergraduate and graduate students to develop a scheduler for the Lowell observatory 31−inch telescope which is being used in a collaborative UH−NAI research and educational outreach program. Specifically, we need to develop robust software that can take teacher and student−requested observations and intelligently schedule these requests with a minimum of human intervention. The work schedule of these telescopes is basically created according to customers' observation requests. It is concerned by a lot of external factors, such as the movement of clouds and the positions of stars. With the amount of observation work increasing, creating a reasonable and efficient observation schedule becomes more difficult. The currently existing scheduling engine is not adequate to handle a large number of jobs. We have designed and created a more powerful scheduling engine to replace the current one. Inspired by the applications of artificial intelligence in many science fields, we choose to use the Genetic Algorithms, which have already been successfully applied to many scheduling problems, as the basis of the new engine. We have worked out the basic framework of the new algorithm and have already implemented it as a program and have obtained some good results. The program works quickly and the results look reasonable and good. The program has included augmenting the Lowell Observatory observation database, writing an interface to the system, and developing the scheduler.

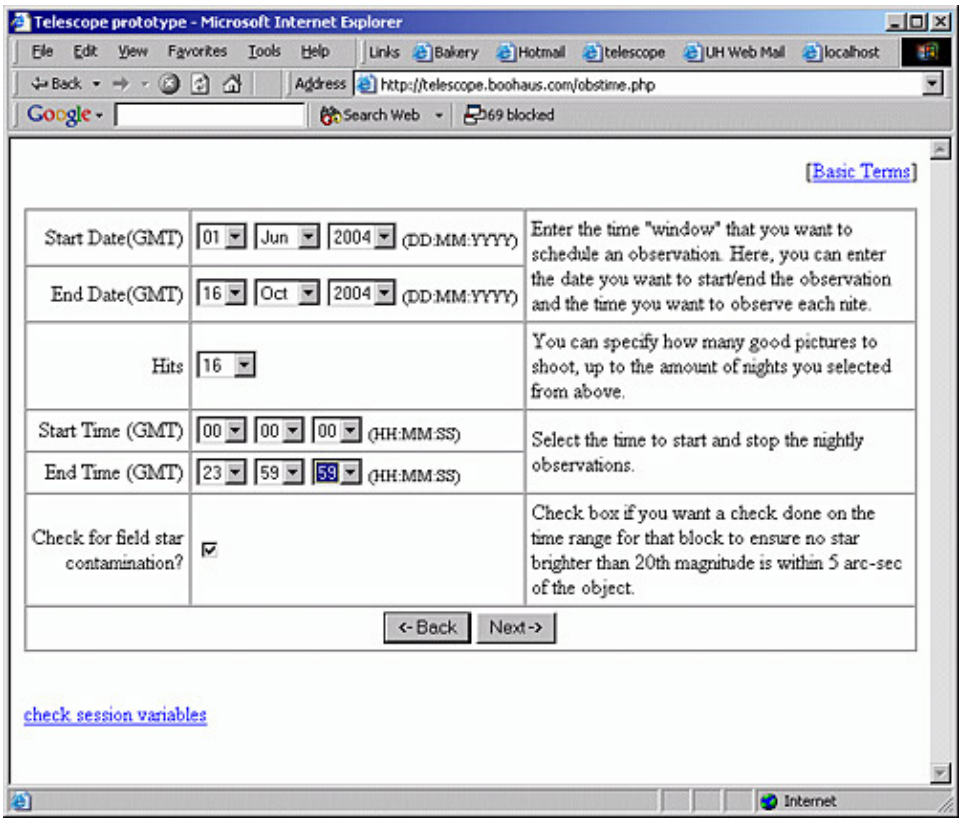

Figure 1. Screen shot of the intelligent scheduler interface for the Lowell Observatory 31 inch telescope.

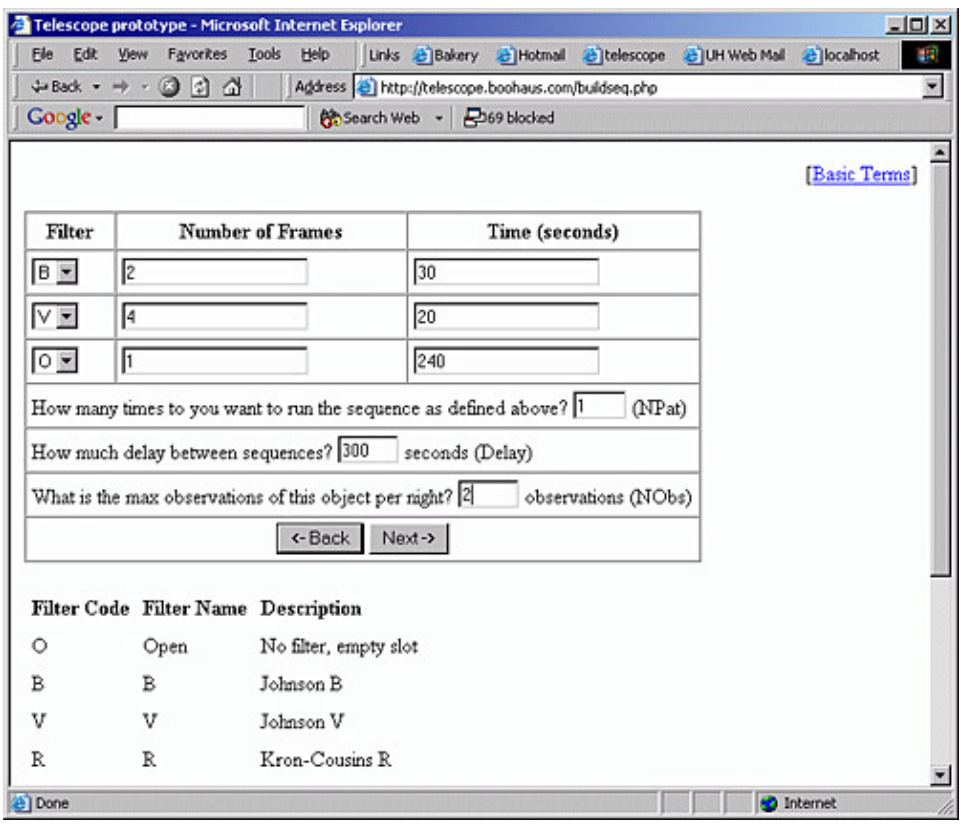

Figure 2. Screen shot of the intelligent scheduler interface for the Lowell Observatory 31 inch telescope.

Highlights

- The Lowell 31−inch−telescope observing database has been upgraded. An interface to interact with the database has been created, and an intelligent scheduler developed and nearly fully debugged. Anticipated completion is expected during summer, 2004. The complete system will be used for scheduling astronomical observations, both for research and outreach.