Las Cumbres Observatory Global Telescope Network: Keeping Education in the Dark

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The Las Cumbres Observatory Global Telescope Network is a privately-funded, non-profit organization that is creating a global network of telescopes ranging in size from 0.4 meter to 2 meters for educational and scientific uses. All will be equipped with high quality CCD imagers with the larger ones with spectrographs. An online interface will be used for observing both in real time and in a queue. Any registered school or group will have the capability to remotely observe using a telescope that is currently in the dark from the comfort of their classroom or science center, half a world away. Accompanying the online telescope-control interface will be a library of resources and activities that will be available in the formal classroom setting, informal groups and clubs, and for public outreach in the community for all age-groups and levels of science. Using the LCOGT network as a tool to enjoy real astronomical research will not only create a new awareness and excitement towards science and technology, it will also make visible connections between science and humanities.

1. Introduction

Las Cumbres Observatory Global Telescope Network, Inc. (LCOGTN) is an international science and education organization, based in Santa Barbara, CA, that is building the tools and resources to create a cutting edge science and innovative education program. Our team includes scientists, engineers, educators, and more working together towards the creation of the network. The overall idea is not to create more astronomers around the world, but to create a tool where learners and educators alike can gain a greater understanding of science, technology, engineering, and math while learning how to apply the skills gained to everyday life.

2. The Telescope Network

LCOGTN currently operates the two 2.0m Faulkes Telescopes on Haleakala, Maui (Faulkes Telescope North, FTN) and Siding Spring Observatory, Australia (Faulkes Telescope South, FTS). Both telescopes are currently being used primarily by scientists and UK schools. Major renovations are scheduled to take place at both sites to improve the quality of the instrument.

The educational network will consist of approximately twenty-eight 0.4m telescopes, currently being designed and prototyped in Santa Barbara, CA. The telescopes will be in clusters of four forming rings in the Northern and Southern hemispheres so there will always be at least one cluster in the dark at any time. The four in each cluster will be able to act as either a single, larger instrument or four separate telescopes. Each telescope in the cluster will have its own high quality CCD imager and filter wheel. Sedgwick Reserve in the Santa Ynez Valley, CA will be host to the first cluster in mid 2008 with Haleakala and Siding Spring Observatory to follow.

The science network will consist of approximately twenty-eight 1.0m telescopes which are currently being designed. As with the education network, these telescopes will also be in clusters of four in rings in the Northern and Southern Hemispheres. The two Faulkes Telescopes will be a part of the science network.

The initial locations for the 0.4m telescopes will be the Santa Ynez Valley in CA, Haleakala in Maui, and Siding Spring Observatory in Australia. Other possible sites include Chile, South Africa, the Canary Islands, and southern Asia. It is planned to have a cluster of 1.0m telescopes near each 0.4m cluster.

All telescopes will be completely robotic and will be controlled through a web interface. This opens possibilities to observe during the day time with a

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telescope on the other side of the world as well making long observations of transients and variable stars by passing observations from one cluster to another.

3. History of LCOGTN Education

Dill Faulkes, a British businessman set up the Dill Faulkes Educational Trust which was the beginning of the Faulkes Telescope Project (FTP) in hopes of bettering science education for UK school children. Telescopes Technologies Limited (TTL), based in Liverpool, UK, designed and built the two Faulkes telescopes. The telescopes were placed in locations that will provide access during the UK school day.

The Astrophysics Research Institute (ARI) of Liverpool John Moores University (LJMU) operated the two FTs while Cardiff University (CU) hosted the FTP educational program, providing a real-time interface for controlling the telescope to the UK schools.

LCOGTN bought the FTP in 2005. Operations of the telescope are currently in transition from LJMU to LCOGTN. The education program is being run between CU and LCOGTN, with teams in both locations. Affiliated education teams are located at the University of Hawaii (through FTN) and the Australian National University (through FTS).

LCOGTN is continuing the UK education program while both bringing it to the USA and spreading it around the world. Current pilot programs are currently in place with partnerships with EU-HOU and the British Council in Poland, Portugal, France, and Russia, with others in line.

4. Future LCOGTN Education

LCOGTN will provide the tools and resources which will supplement the learning experience both for formal and informal education. While the approached is focused on astronomy, the methods for carrying out a research project are basically the same in any subject area. By using the tools provided by LCOGTN will ideally leave the observers more comfortable to be able to use other types of technology in their everyday lives where before they were hesitant.

The tools will consist of the telescopes, data archive, and online processing software. Access to the telescope will be available for any school or education group that is registered (no cost to register) with the option to observe in either real-time or through a queue schedule. The network of 0.4m telescopes will be primarily used for education, with opportunities to move up the scale to use the 1.0m and 2.0m telescopes. The data archive will be freely accessible to the public. Online data processing software will be available so there will be no need to download, install, and troubleshoot several different software packages on a local computer.

All resources will be available through the website. These will include information on using the telescope network, observing ideas, ongoing research programs, as well as activities that use archived data or are hands-on using classroom materials. The website will also include interactive widgets such as pod/vodcasts and java/flash applets that compliment using the telescope network.

Learners will be able to participate in real astronomy research ranging from supernova follow-up to NEO tracking, from variable star light curves to extrasolar planet hunting, and everything in between. The skills acquired from the research process will not be limited to the sciences, but will be valuable to all areas of study.

5. Conclusion

LCOGTN is currently working towards creating meaningful partnerships with EPO groups and organizations around the world. Without these partnerships, it will be difficult for LCOGTN to succeed. Several groups are already doing excellent education and working together will greatly enhance the experiences for all involved groups between the sharing of resources and tools.