A telescope for each highschool in Mongolia

by

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IAU

TUNGALAG by CELESTRON

ГОВЬ-АЛТАЙ

March 21, 2015

Delivering telescope at the school of Tonkhil soum of Govi-Altai province

Project Outline

In Mongolia astronomy is not part of the standard high school curriculum and only a few schools even address it as part of the physics class. In the whole country only a few schools have telescopes, but almost all of them are too old and unusable. Therefore, in order to promote the teaching of astronomy and science in general, through this project we are starting the process of supplying proper educational telescopes to each high school in the country. With the funding from IAU Office of Astronomy for Development, we have acquired 44 telescopes through the local distributor of Celestron - “Tungalag”, and handed them out to various public high schools in Mongolia. More than half of the telescopes were given to schools in the capital city of Ulaanbaatar, while the others were delivered to rural countryside schools. A detailed manual on how to operate the telescope was written in Mongolian language and training events for teachers were organized. The project was advertised through a news conference and several local tv-station interviews, which resulted in appreciable support from local people. Though this first iteration only covered 7% of all schools in the country, we believe that we have inspired other young people and government officials to get involved in our project.

About us

Tuguldur Sukhbold

Purevdorj Davaa

The project “Telescope for each highschool in Mongolia” was founded by two childhood friends, Tuguldur and Purevdorj. In 2004, they started the first astronomy club in the country, after the fall of soviet union. Since then they have been active in promoting astronomy at all levels across the country. Currently Tuguldur is pursuing doctorate degree in astrophysics in the United States, and Purevdorj is running the first ever science store in the country.

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Astronomy in Mongolia

Mongolia is a large, land-locked, central asian country with a rich history and unique nomadic culture. It spent much of 20th century under the soviet sphere and found democracy in 1990. The population is roughly 3 million, with more than one-third of the inhabitants living in the capital city of Ulaanbaatar. The country is divided into 21 provinces, each with dozens of administrative subdivisions called “soum” (329 soums in total).

The development of astronomy in Mongolia reached its peak between 1960 and 1980. With assistance from the former USSR, several Mongolians went abroad to study astronomy in other soviet block countries, built an observatory and planetarium, and astronomy was taught in all high-schools and even in some universities as part of the standard curriculum.

After the collapse of soviet union, funding for science was severed at all levels. As a result, research in astronomy was halted and astronomy gradually disappeared from the teaching curriculum. By mid 2000 astronomy become a small part of the high-school physics course, and today the astronomy part is often skipped in most classes.

Though the situation in general is grim, lately there has been some progress. Due to the mining boom, funding for science has been increasing slowly in recent years. A new planetarium was built, part of the observatory was renewed and a new observatory is under the construction. With some support and guidance, there is a lot of potential for the science education to recover.

Telescope

Celestron

The main requirements we had for the educational telescope were: (1) big enough to resolve some detail on bright planets and some deep sky objects (2) reasonably rugged (3) not to exceed ~$100 per unit. We researched options from buying components and building the telescope ourselves, to buying fully assembled models directly from Russia and China.

The Russian manufacturers had some very sturdy telescopes, but their prices and sizes were unacceptable. Buying components and assembling ourselves was at first attractive. We could find aluminized mirrors and other necessary components for a 5” Dobsonian reflector under $100 per unit, however, we eventually decided it would be too time consuming in general and potentially problematic for countryside users. But this option is worth considering in the next iterations of the project, as the assembling aspect provides unique learning opportunity for students.

In the end we choose to buy Celestron Powerseeker 114 telescopes directly from a manufacturer in China. We chose Celestron specifically since the local science store “Tungalag” was its official distributor. Purchasing through the distributor we were able to save roughly 30% with respect to the retail price in Unites States.

The model Powerseeker 114 is a f/7.9 Newtonian reflector with a 114mm diameter primary mirror. It comes with 2 different eyepieces, a Barlow lens and a 2nd generation equatorial mount. After comparing numereous models, we found that this was the only telescope that could satisfy all of our criteria. A detailed instruction manual for this telescope in Mongolian language was created (see DOCS/telescope_manual.pdf).

Budget

The total expense of the project was nearly 8000 USD, 75% of which was supplied by the IAU's OAD TF-1 grant. The remaining expenses were covered by the local science store "Tungalag" and the office of the governor of the Govi-Altai province. The table below summarizes the project budget and the relevant receipts and invoices are provided in DOCS/receipts/ directory.

The IAU grant money was exclusively spent on telescope purchase and shipping to Mongolia, while the governor's office of Govi-Altai province and the science store "Tungalag" covered the expenses in the countryside and in the capital city respectively. The distribution cost in Ulaanbaatar includes storage rent, and the distribution cost in the countryside includes car rental and gas expenses for a ~3400km trip.

Income	[USD]
IAU OAD grant	5960
Office of the governor of Govi-Altai Province	1080
Local science store "Tungalag"	900
Expense	**[USD]**
Telescope (x44)	4620
Shipping inside China [factory to Erlian]	850
Shipping inside Mongolia + Customs [Zamyn Uud to Ulaanbaatar]	591
Distribution in Ulaanbaatar	900
Distribution in countryside	1080

USD values reflect the conversion to the local currencies at the time of purchase.

On the way to Govi-Altai province

Distribution

There are 112 public highschools in Ulaanbaatar and 512 elsewhere. The provincial center towns usually have half a dozen schools, while the soums (administrative subdivision) typically have only one. The 44 telescopes from this iteration of the project cover about 7% of all public highschools in the country (one per school).

Initially we had planned to give most of our telescopes to countryside schools. However, this turned out to be too time consuming and expensive, and therefore we chose to distribute roughly half of the telescopes in Ulaanbaatar and the rest in one of the 21 provinces.

Govi-Altai province (red). Wikimedia Commons

In country side, we focused on the province of Govi-Altai, located in the south-western part of the country. Govi-Altai is the least dense and one of the poorest provinces, with most part still not connected to power and highway grids. It is also Purevdorj's home province, so we were able to utilize his connections with the locals to help with our effort.

Delivering telescope at the school #2 in town of Altai

The provincial center town Altai has 5 schools, and the 18 soums have one each. We have provided telescopes to 4 schools in the town of Altai, and 12 telescopes in various soums. See DOCS/school_lists/list.pdf for the full list and other relevant information.

In August 2014, through the facebook group page for the project, we have announced a competition among countryside schools to send us a creative video in order to win a telescope. We received a half dozen entries and chose the entry from Umnu-Govi province's Gurvan-Tes soum's school.

In October 2014, Purevdorj drove about 3400km from the capital all the way to Govi-Altai to deliver the telescopes. On the way back, he stopped by the Umnu-Govi province to hand out the telescope to the video contest winners. A brief training on how to use the telescope was provided upon each delivery. See PIX/countryside/ for the full set of pictures.

Purevdorj presenting the project during a press conference

Distribution in Ulaanbaatar

In the capital city, we randomly selected 26 schools to receive telescopes and in December of 2014 we organized a news conference to hand them over. We gave interviews to several local TV-stations (Tv8, MNB, Tv9 and LikeHD) and had a great chance to publicize our work. Teachers and representatives from the various schools, including many from schools that were not selected, were present and we made important connections with government officials.

Upon request, we handed out the last telescope to the Teacher's development center - an organization under the ministry of education. After the conference we provided a comprehensive training to all recipients.

See PIX/ulaanbaatar/ for pictures and DOCS/school_lists/list.pdf for more information on schools.

On the way to Govi-Altai province

Future Prospects

Overall, our project was well received and we are confident that we have initiated a significant change to astronomy education in Mongolia. Students and teachers were very enthusiastic and the schools that received the telescopes have promised to fully teach the astronomy sections of their physics curriculum.

During the press conference in Ulaanbaatar we had a chance to meet with Mr. Batjawkhlan from the ministry of education. He had expressed a keen interest in our project and promised future support and cooperation. Specifically, he promised to look for opportunities to further fund the

project for all remaining high schools in the country, and push for astronomy to be built back into the standard science curriculum.

In the next round of the project, the local science store “Tungalag” will be providing 50 telescopes to countryside schools by the Fall of 2015. We will more seriously consider the option of providing parts and letting the teachers and students assemble. Also we’ll become a registered non-profit organization and will aim to finish the work we started on a smart phone and tablet app (see the android template in DOCS/app-tplt.apk) that is focused on astronomy education.

Achieving our goal of bringing astronomy back into Mongolia's standard curriculum depends strongly on maintaining the momentum gained during this project. As we move forward to future iterations, we will focus on having as much local support and involvement in the project as possible.

Acknowledgements

This project would not have been possible without the support from the IAU. We are extremely grateful to IAU not just for the funding of this project, but for all of the great work they are doing to develop astronomy in Mongolia. We would like to specially thank local photographer N. Enkhbat, who spent many hours of his time in supporting work. The distribution of telescopes to Govi-Altai was only possible with the support from the Governor O. Amgalan. We also thank many of the local astronomy enthusiast who supported our cause.