

Strategies for Astronomical Outreach Activities in Thailand

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Astronomy is a powerful tool for human resource development and capacity building on Science and Technology. Outreach activities can be used to distribute the opportunities for publics to access Astronomy in various aspects and target groups ranging from young researchers, students and publics. Outreach activities can also bring inspiration, inquiry mind, imagination etc. to people from all walks of life. The National Astronomical Research Institute of Thailand (NARIT) is in charge of operation, promotion and support astronomy outreach activities throughout Thailand under collaborations with academic institutes and related organizations. As NARIT was selected by the Office of Astronomy for Development (OAD) of the IAU for a Southeast Asia Regional Office of Astronomy for Development (SEA ROAD), astronomy outreach activities are then extended to the Southeast Asia countries to support human resource developments and capacity buildings and promote Astronomy as well as Science and Technology in the region.

1. Introduction

Astronomical outreach activities have been carried on in Thailand for several decades. Most activities were done through some educational institutes, but could not make a good impact in promoting and disseminating Science and Technology throughout the country. The National Astronomical Research Institute of Thailand (NARIT) was established since 2009 as a public organization under the Ministry of Science and Technology. NARIT has a support from the Thai government for the achievement of its mission. One of NARIT's mission is to pursue knowledge and technology transfer in the field of astronomy to support education and public outreach of the country. As a result, NARIT, as a main center of astronomy in the country, can make a policy and strategic plan for the astronomical outreach activities of in Thailand.

Several strategic plans are prepared for driving astronomical outreach activities in the country as follows: the development of astronomical infrastructures for serving outreach activities, the national and international collaborations, creation of astronomical knowledge dissemination project, astronomical outreach through mass media and the development of national archives and museum in astronomy.

2. The Development of Astronomical Infrastructures in Thailand

NARIT has developed and managed the Thai national observatory on Doi Inthanon, Chiang Mai with a new 2.4m Thai national telescope to be equipped with several modern instruments. The Thai national observatory serves not only



Fig. 1 The 2.4 m Thai National Telescope



Fig. 2 Network of Thai National Observatory and Regional Observatories for the Public



Fig. 3 Regional Observatory for the Public at Nakorn Ratchasima

for researchers but also to the publics. A large number of people and young generation have been inspired by having the opportunities to access to the state-of-the-art telescope.

To disseminate the opportunities for people to access to astronomy throughout the country, NARIT establishes also the “Regional Observatory for the Public”. The 5 regional observatories are committed to be built in 5 geographical zones in the country. At present, 3 regional observatories have been constructed, namely Cha Cheong Sao (in Central Thailand), Nakorn Ratchasima (in Northern Thailand) and Songkla (in Southern Thailand). The aim of the regional observatory for the public focuses on supporting astronomy education and public outreach activities in the region. Each regional observatory consists of the main observatory



Fig. 4 The NARIT's 1st remote-controlled robotic telescope at CTIO, Chile

which accommodates a 0.7-m telescope and several small reflecting and refracting telescopes, planetarium with full-dome video projection, indoor and outdoor exhibitions (see Reference [1])

NARIT has also built 2 remote-controlled robotic observatories outside the country for supporting astronomical research, education and outreach. The 1st remote-controlled robotic telescope has been established at the Cerro Tololo Inter-American Observatory (CTIO). The Thai 0.6-meter PROMPT8 telescope has operated under the collaboration with the University of North Carolina at Chapel Hill. The telescope has been operated since 2013 for the joint observations on Gamma Ray Burst. However, about 60% of observing time has been allocated to other research projects and outreach activities in Thailand. The 2nd remote-controlled robotic telescope has been installed at Goa Mei Gu Observatory in Li Jiang, P.R. of China under collaboration between NARIT and Yunnan Observatories in 2015. This 0.7-m reflecting telescope has also been used to support school education and outreach activities in Thailand.

3. Country-wide Teacher's Training and Outreach Programs

3.1. Teacher's Training Programs

In Thailand, a subject called "Earth, Astronomy and Space Science" is included in the national science curriculum. Astronomy contents are given in the science subjects from middle to high school level. To strengthen astronomy teaching in schools, NARIT, in cooperation with the Institute for Promotion in Teaching Science and Technology (IPST), creates 3 training programs for school teachers country-wide. The "Basic Level" or "Inspiration Level" is to give teachers some necessary basic background in astronomy, celestial sphere and motion of celestial bodies, the use of planisphere and telescopes etc. and how to use astronomy to inspire students and encourage their appreciation in science and technology.

The "Intermediate Level" or "Skill Level" is to give teachers the experiences in using telescopes and detectors for astronomical observations, using astronomical software, searching information using information technology and creating some basic astronomy projects. The "Advanced Level" or "Research Level" is to guide



Fig. 5 Country-wide Teacher's Training Program



Fig. 6 Star Gazing and Cultural Exchange Youth Camp

teachers on astronomy research projects, how to use telescopes and detectors and software on research works. At present, a large number of teachers in all part of Thailand were trained by NARIT and there are several qualify teachers have achieved advanced level training and been able to conduct astronomy research projects for school students.

3.2. Astronomy Outreach Programs

NARIT initiates several astronomical outreach programs at the Thai National Observatory and Regional Observatories for the public. An astronomical outreach program called “Open the Sky, Search for the Stars” is among one of the popular outreach activities driven by NARIT. This program are organized several times a year and several thousands of people join in this program each year. The other outreach program organized by NARIT is called “Star Gazing and Cultural Exchange Youth Camp”. One to two hundreds of students were selected from several regions all over Thailand to join in this camp. The activity consists of basic astronomy teaching, astronomical observations, science explorations and cultural exchange activities. Besides, NARIT also supports the astronomical outreach ac-



Fig. 7 Delivering the 10-inch Dobsonian telescopes to schools

tivities organized by universities, schools, private and public organizations all over Thailand. Astronomical outreach activities in Thailand are said to be successful activities of the country in bringing inspiration, enthusiasm and awareness in Science and Technology to Thai people and society.

4. Dissemination of Astronomical Opportunities throughout the Country

NARIT responds the government policy to create opportunities for education, and distributing educational opportunity in the Thai society by initiating a project on the dissemination of astronomical opportunities to schools in Thailand. The details of the project is to search for the qualified schools in 77 provinces in Thailand which are active in teaching astronomy and out-of-school astronomical activities and provide schools the 10-inch Dobsonian telescopes (made in Thailand) and educational materials in astronomy. Training has been done to enable teachers to operate the telescopes properly. The follow-up and evaluation are made to ensure the utilization of the telescopes in schools.

In 2015, an auspicious year for the 60th birthday anniversary celebration of HRH Princess Maha Chakri Sirindhorn, a total number of 60 telescopes have been distributed to 60 qualified schools in 35 provinces in Thailand. The dissemination of the rest of the 10-inch Dobsonian telescopes will be done in the following year to cover all the qualified schools in 77 provinces.

5. The Regional Astronomical International Centers in Thailand

5.1. *The Southeast Asia Regional Office on Astronomy for Development (SEA ROAD)*

NARIT has been selected to coordinate the International Astronomical Union (IAU) astronomy-for-development activities in the Southeast Asian region. In 2012 in the IAU General Assembly in Beijing, P.R. of China, the IAU signed an important agreement with NARIT who will host a Regional Node as part of the IAU's decadal strategic plan which aims to realize the societal benefits of astronomy (see Reference [2]).

In 2007 NARIT initiated the Southeast Asia Astronomy Network (SEAN) with its aim to strengthen the research work and education activities among the ten member countries in Southeast Asia, namely, the State of Brunei Darussalam, the Kingdom of Cambodia, the Republic of Indonesia, Lao PDR, Malaysia, The



Fig. 8 Educational materials for schools

Union of Myanmar, the Philippines, the Republic of Singapore, Thailand and the Socialist Republic of Vietnam. In conjunction with the SEAAN, the South-east Asian Young Astronomers Collaboration (SEAYAC) has also established as a mechanism to support young astronomers, researchers and students in the South-east Asian countries for having a forum to exchange and discuss on their research works of their common interests.

The necessity of a Southeast Asia Regional Office of Astronomy for Development (SEA ROAD) in Thailand is inevitable and imperative to the development of astronomy in the entire region. It will facilitate the ongoing and emerging activities, create better channels of communication and mobilize the influx of knowledge transfer and human resource to the region. Furthermore, the existence of this node in Thailand will pinpoint Southeast Asia in the global community of astronomy as the region of sustainable development.

On the 28th May 2015, NARIT has proposed SEAAN for the recognition at ASEAN arena in ASEAN Committee on Science and Technology (ASEAN COST) in the meeting of 69th ASEAN COST. The ASEAN COST is an association body that works to develop planning and execution of science and technology cooperation between ASEAN Member States. The recognition from ASEAN COST will help Southeast Asian countries for a substantial support and cooperation in Astronomy.

5.2. The International Training Centre under the Auspices of UNESCO

A very challenging role of NARIT in the international stage as the institute is the proposal to host the International Training Center in Astronomy under the Auspices of UNESCO. The center will be the international node that garners the knowledge of astronomy and capacity building activities of the global community. This center can extend missions of the SEA ROAD to the regions other than the Southeast Asia, especially Latin America and Africa. The proposal has been endorsed at the 19th session of the Executive Board of the UNESCO at UNESCO



Fig. 9 MoU signing between NARIT and IAU for the SEA ROAD



Fig. 10 International outreach activity under the auspices of the UNESCO

Headquarters in Paris, France on 14th October 2015.

6. Astronomical Archives in Thailand

As astronomy in Thailand has moved forward very rapidly at present, it was realized that Siam (Old name of Thailand) had a long history in astronomy for over 300 years ago, for example at the reign of King Narai, he observed a lunar eclipse in 1685 and a solar eclipse in 1688 with French Jesuits at Loburi (see Reference [3]), King Rama IV was interested in astronomy. He owned several astronomical instruments eg. the telescope, sextant etc. He was a king who made prediction of time and place for a total solar eclipse observable in Siam in 1868 (see Reference [4]). Our great history and heritage in astronomy of our nation have, more or less, driven us to where we are today. With respect to our past history and heritage in astronomy, NARIT initiates a policy to establish a Thailand National Archives

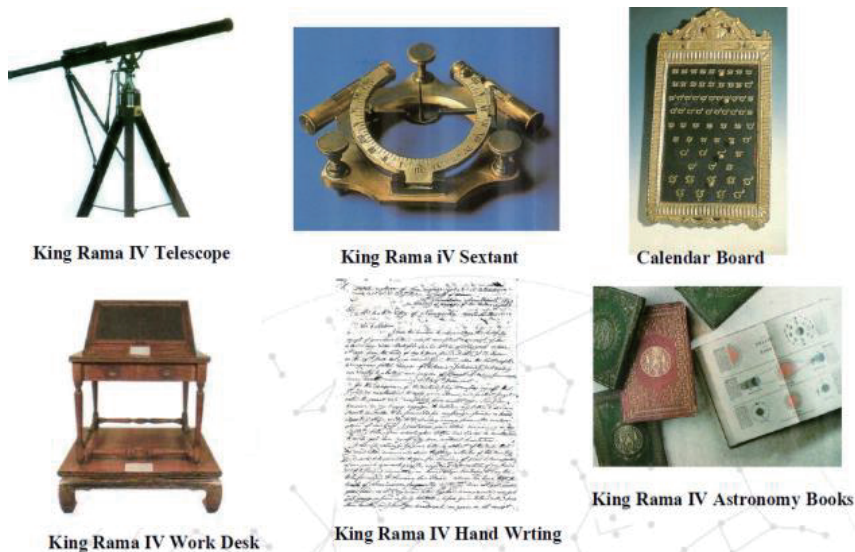


Fig. 11 King Rama IV astronomical instruments and books

in Astronomy at NARIT's Headquarter. The archives will preserve and collect all the information from the past history and heritage relating to astronomy in Thailand to the present time. The establishment of Thailand National Archives in Astronomy is planned to be launched in 2016 fiscal year.

7. Summary

As we realize that astronomy is a significant tool for motivating and inspiring the young people to enjoy science and technology. Astronomy has inserted in many science subjects on the school's education and astronomy is also a frontier science which arouses many university's students to study and do research. Therefore astronomy are widely impact to people in all levels. The astronomical outreach activity has then played an important role in promoting and disseminating knowledge in astronomy to the society.

NARIT is a national astronomical organization which is in charge of the development of astronomy throughout the country. The strategic plan given by NARIT on the astronomical outreach activities will then be implemented to the achievement on the development of human resources in science and technology for the country as a whole.

References

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