

# THE DEVELOPMENT AND STATUS OF ASTRONOMY IN THAILAND

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## Introduction

Astronomy is a powerful tool in human scientific capacity building, attracting and inspiring the young people to scientific careers, bringing knowledge and wisdom to the community. Astronomy also initiates the acquisition and creation of new technologies and fostering the national and international collaborations in the country. Those mentioned crucial reasons have urged almost every communities including Thailand to realize how important it is to develop astronomical research, education and outreach activities in the country.

Modern Astronomy has been introduced in Thailand for nearly 150 years ago when King Rama IV made precise calculation and prediction on the time and location for the observation of the Total Solar Eclipse on 18 August 1868. However, the knowledge in Astronomy has not yet been delivered widely to the publics.

During the past decade, astronomy has significantly developed in Thailand. Astronomy has been taught in schools and universities in Thailand. Some new astronomical infrastructures and human resources in astronomy were developed mainly in the universities and also

some international astronomical cooperation was initiated between Thai universities and foreign astronomical institutes. Nevertheless, Thailand still lacks of standard infrastructures and critical mass of human resources in Astronomy in order to ride and compete with the current global development. In 2009, the National Astronomical Research Institute of Thailand was established under the Ministry of Science and Technology. The new standard infrastructures, human resources and collaboration on national and international levels both in supporting education and research in Astronomy and related fields have been established. The leap growth on this establishment has provided exciting opportunities for the future development and sustainability of astronomy in Thailand.

## The Establishment of NARIT

The National Astronomical Research Institute of Thailand (NARIT) has officially established on the status of public organization since 1 January 2009 under the Ministry of Science and Technology. Core functions of NARIT are to conduct research and development, establish national and international collaboration

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and transfer knowledge and technology in the field of Astronomy.

During the past 6 years, to lay a sustainable foundation of Astronomy in Thailand, NARIT developed some national astronomical infrastructures as well as the increase in the number of human resources in Astronomy. The main infrastructure of NARIT is a Thai National Observatory (TNO) located 44.4 km from the foot of Doi Inthanon National Park in Chiang Mai at the altitude of 2457 m above the mean sea level. The Thai National Observatory accommodates one of the Asia most advanced facility in Astronomy, namely the 2.4-m Thai National Telescope (TNT) with several advanced detectors such as the ULTRASPEC (a high speed

CCD camera),  $4k \times 4k$  CCD camera, a medium resolution spectrograph. The TNT has been operated since 2013 and used by researchers worldwide for several research areas.

Apart from the TNO, the regional observatories for the public have been established in several part of Thailand for the distribution of opportunities for people in all parts of the country with access to Astronomy. NARIT has also installed the Thai Southern Hemisphere Telescope (TST), a 0.6-m telescope with CCD camera, at Cerro Tololo Inter-American Observatory (CTIO) in Chile under collaboration with the University of North Carolina for the joint collaboration on PROMPT project, the Gamma Ray Burst (GRB) monitoring. TST is



Figure 1. The Thai National Observatory and the 2.4-m Reflecting Telescope

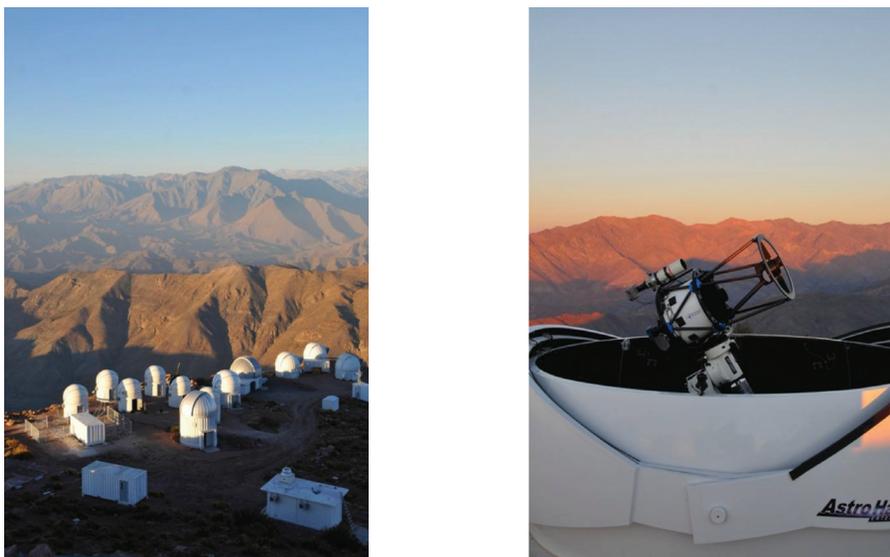


Figure 2. The Thai Southern Hemisphere Telescope (TST) at CTIO, Chile

one of the Thai Robotic Telescope Network (TRTN) of NARIT.

In 2015, the installation of a 0.7-m Thai Robotic Telescope is also underway at Gao Mei Gu Observatory, Li Jiang, PR of China and the other 0.7-m Thai Robotic Telescope is planned to be installed at Siding Spring Observatory, NSW, Australia in 2016. The TRTN will be used in astronomical research, education and public outreach activities. They will also be used as an optical follow-up for collaborative project under Princess Maha Chakri Sirindhorn initiatives such as Antarctica project with PR of China on Gamma Ray Burst and Supernovae observations, Cherenkov Telescope Array project with DESY in Germany on Astroparticle Physics etc.

**Astronomy Education and Research in Thai Universities**

Since the establishment of NARIT, Thailand has a strong commitment to the development of astronomical research and education throughout the country. In order to enhance close relations and deepen research cooperation in astronomy on the basis of the good cooperation and outstanding achievements, NARIT signed the MOU with the 10 Thai public universities, namely Chulalongkorn University, Khon Kaen University, Chiang Mai University, Suranaree University of Technology,

Naresuan University, Mahasarakham University, Mahidol University, Srinakharinwirot University, Prince of Songkla University and Ubon Ratchathani University. These universities offer teaching and research in Astronomy, Astrophysics and related fields in both undergraduate and graduate levels. Figure 3 shows human resources of active lecturers in different levels and those in need for overseas scholarships and Figure 4 shows the annual student admission capacity of the universities in B.Sc., M.Sc. and Ph.D. levels.

Apart from the above mentioned 10 Thai public universities, there are also 40 Rajabhat Universities in 40 provinces in Thailand. Several of these Rajabhat Universities offer teaching and research in Astronomy, but mainly in B.Sc. level.

**Roles of NARIT in Supporting Astronomy Education and Research in Thailand**

A critical mass of human resources in Astronomy is a crucial factor for the sustainable development of this field in Thailand. NARIT cooperates with educational institutes ranging from schools to universities for human resource development in Astronomy.

To empower the strategic plan for human resource development in schools, NARIT, together

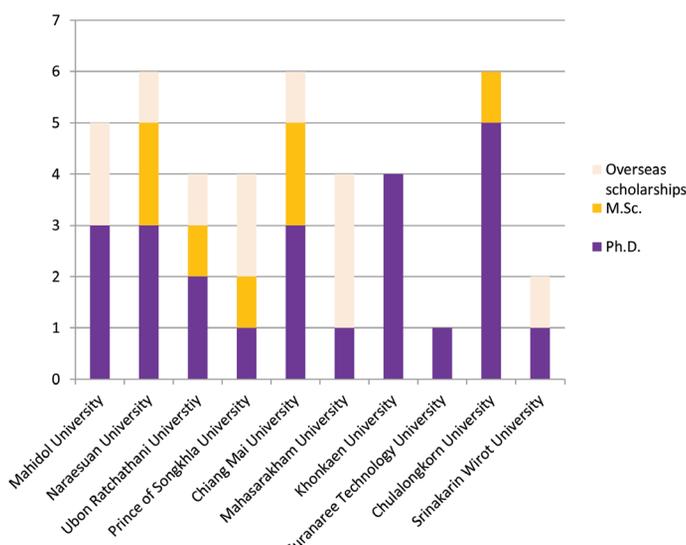
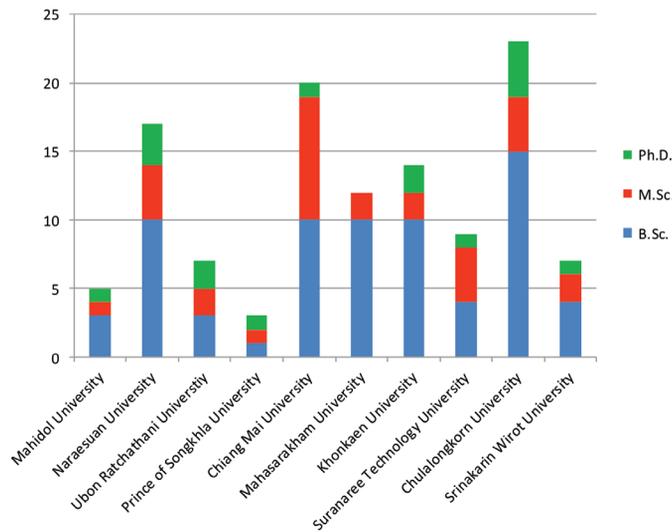


Figure 3. Human resources of active lecturers in different levels and those in need for overseas scholarships



**Figure 4. Annual student admission capacity of some Thai public universities**

with the Institute for Promotion in Teaching Science and Technology (IPST), offers nationwide schoolteacher training workshops. The training is comprised of 3 different levels: Basic, Intermediate and Advanced. Each year, over 700 schoolteachers from schools all over Thailand participate in this training workshop. The training has been arranged all year round. Knowledge and experiences received, schoolteachers are able to develop the appropriate curriculum in Astronomy for teaching, produce teaching media in Astronomy and teach efficiently in the classroom. Several public outreach activities of NARIT for example: Astronomy Youth Camp, Star Party etc. give opportunities to students the direct experiences in Astronomy.

To support universities for promoting human resource development in Astronomy, NARIT cooperates with the universities in joint supervision to student research projects both undergraduate and graduate levels. Research assistantships are granted to students and Postdoctoral Fellowships to Ph.D. graduates. Internship Program is also offered to students both from Thai universities and overseas for a short-term training at NARIT. Moreover,

university staff and students have opportunities to obtain observational data using NARIT's infrastructures. During 2014-2015, there are 9 research projects conducted by the collaboration between NARIT and universities with 23 undergraduate and graduate students involved.

### Summary

With a strong commitment to the development on astronomical research and education throughout the country and the support from the Thai government during the past decade, NARIT manage to develop the standard national astronomical infrastructures to serve effectively on its mission. Having reached this milestone, NARIT with its extensive collaborative network has contributed a great deal in expanding their research collaborations far and wide in the country. In pursuit of academic excellence, NARIT has long sought after collaborations with local universities and institutions available, those with Astronomy, Astrophysics and related science disciplines taught. This aforementioned search has set a benchmark for excellence in developing Astronomy and its people in the long run.