Thai Science Projects in Antarctica

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Why Antarctica?

- It is a remote area separated from other continents with extremely cool temperature and no permanent human living. Due to its superb pristine environment, Antarctica is a perfect place for scientific researches.
- Presently, scientists from all over the world travel to Antarctica to study Atmospheric Science, Astrophysics, Marine Science, Geology, Ecology etc.

Astronomy at Polar Region

Polar region (Arctic/Antarctic Plateau) is a perfect place for astronomical observations:
- Long and continuous 6 month dark clear winter sky
- Stable atmospheric condition with excellent sky seeing

We can do the long-term, unbroken and continuous monitoring of various types of celestial objects eg: variable stars, exo-planets, flare stars, gamma ray bursts etc.
Investigations of the aurora phenomena on earth.
Thailand and Antarctica

- HRH Princess Maha Chakri Sirindhorn graciously visited Antarctic in November 1993. She was the first Thai who made a journey to Antarctica.
- A book written by HRH "Antarctica: Chilling Summer" depicts her journey to New Zealand and Antarctica which she named this journey as "My great adventure".

The 2nd Thai in Antarctica

- In 2004, with the collaboration between NSTDA and NIPR, Dr. Voranop Viyakarn was selected to join with the 46th Japanese Antarctic Research Expedition.

MOU between NSTDA-CAA (signed in 2013)

Since 2014, there have been 5 Thai scientists joining the Antarctic Expedition with the Chinese team of scientists, organized and supported by CAA. Two more will be participating next year.
HRH Princess Maha Chakri Sirindhorn’s visited CAA and PRIC

Antarctic Sino-Thai Collaboration under HRH initiatives

- HRH Princess Maha Chakri Sirindhorn graciously visited State Oceanic Administration (SOA), Chinese Artic and Antarctic Administration (CAA) on 8 April 2013 and Polar Research Institute of China (PRIC) on 11 April 2013
- MoU between NASTDA and CAA on 30 July 2013

- 4 Chinese bases in Antarctica. The 5th base at Terra Nova Bay’s under construction.

- Xue Long Icebreaking Research Vessel in Antarctica

- HRH at HRH/Xue Long Icebreaking Research Vessel on 11 April 2013

MoU Signing with Polar Research Institute of China (PRIC) on 6 April 2016
National Astronomical Research Institute of Thailand

Established since 1 January 2009

under the Ministry of Science and Technology
NARIT’s Infrastructures

Thai National Observatory, TNO

Regional Observatories for Publics

Thai Robotic Telescope Network

AstroPark, NARIT’s Headquarter and HPC
DOME A (Kunlun Station)

- Chinese Station
- Astronomy managed by Purple Mountain Observatory (Nanjing)
- Strong collaborations with Australia

Instrumentation as of 2015
- AST-3 #1 telescope (68/50 cm) working
- AST-3 #2 telescope installed, start April 2015
- AST-3 #3 one year later (Infrared?)
- smaller telescopes (Gattini, CSTAR)

Status as of 2015

AST-3#1 alignment on Dome A, Jan. 2012

AST-3#2 mounted on Dome A in Jan. 2015
Join Bright Stars Survey Telescope (BSST) Project at Zhongshan Station, Antarctica, 2016
(30 cm aperture, 3.4°x 3.4° Field of View)
Sciences in the Arctic

Signing the MOU between University Centre in Svalbard and Chulalongkorn University

November 13, 2015
EVA Project in Antarctica and Arctic

The Evryscope ("wide-seer")
A Gigapixel-scale Imager with a 8,000 square degrees FOV
Array of 27 telescopes with 7-cm in diameter

Key capability: long-term, high-cadence monitoring of millions of targets simultaneously

Key capability: long-term, high-cadence monitoring of rare all-sky targets

>30,000 M-dwarfs w. habitable-zone Jupiter sensitivity
5X increased yield

~1000 white dwarfs rapidly enough to see transits
5-10X increased yield for long periods

70,000 bright (V<9) stars
5X increased yield

TESS targets w. many-year baselines; confirm long-period giant planets
5X increased yield

The Antarctic Evryscope
Dome tracks sky, rotating once per day
Central camera aligned on the Celestial Pole

384-sq-degree, 20 MPix interline CCD cameras
Only moving part

8,300 square degrees every 2 minutes

Expected Sites for the Evryscope
PEARL Station
Ellesmere Island
Arctic

Amundsen-Scott Base
Antarctic
### Roadmap for Thai Antarctic Research

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<thead>
<tr>
<th>Year</th>
<th>Research Area</th>
<th>Location</th>
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<td>2014</td>
<td>Marine Biology</td>
<td>Great Wall</td>
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<tr>
<td>2015</td>
<td>Oceanography</td>
<td>Zhongshang</td>
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<tr>
<td>2016</td>
<td>Pollution and climate change</td>
<td>Great Wall</td>
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<td>2017-2018</td>
<td>Geology หรือ Aurora/Astronomy/Satellite</td>
<td>Great Wall/ Zhongshan</td>
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