

Development of Public Observatory: Gunma Astronomical Observatory, Japan and ITERA Astronomical Observatory, Lampung, Indonesia

Hakim Luthfi Malasan, Osamu Hashimoto, Akihito
Higarashi, Robiatul Muztaba, Ofyar Z. Tamin, Moedji
Raharto

Why public Observatory?

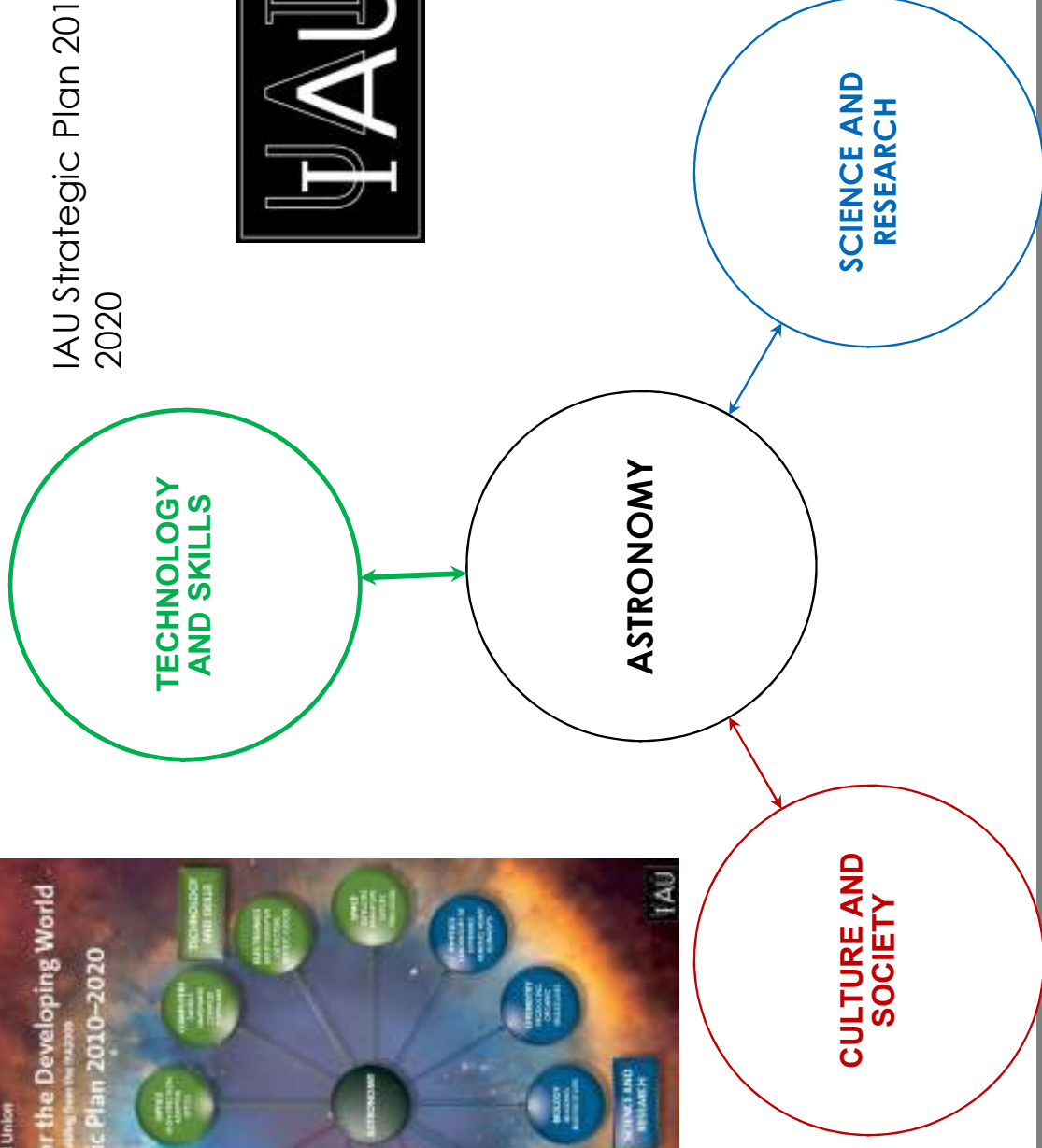
SARAS 2018

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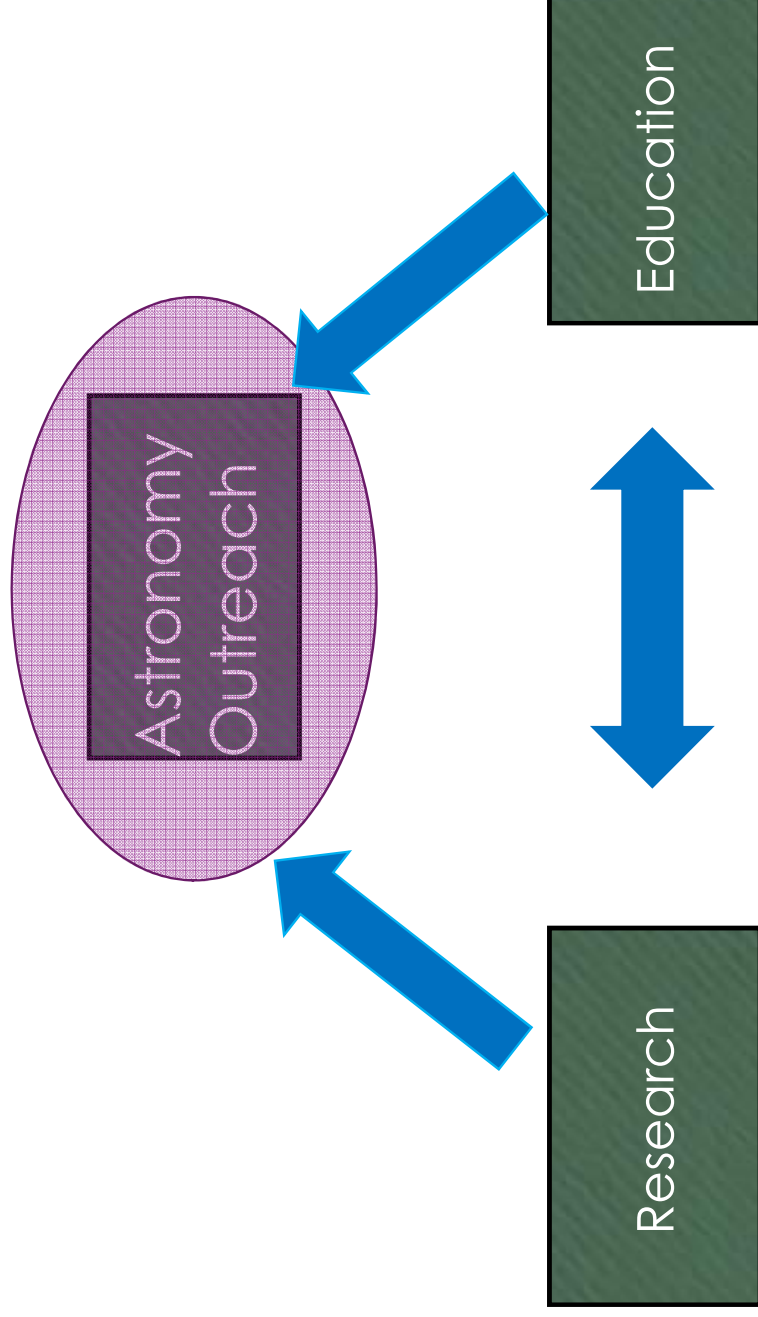
Astronomy for the Developing World

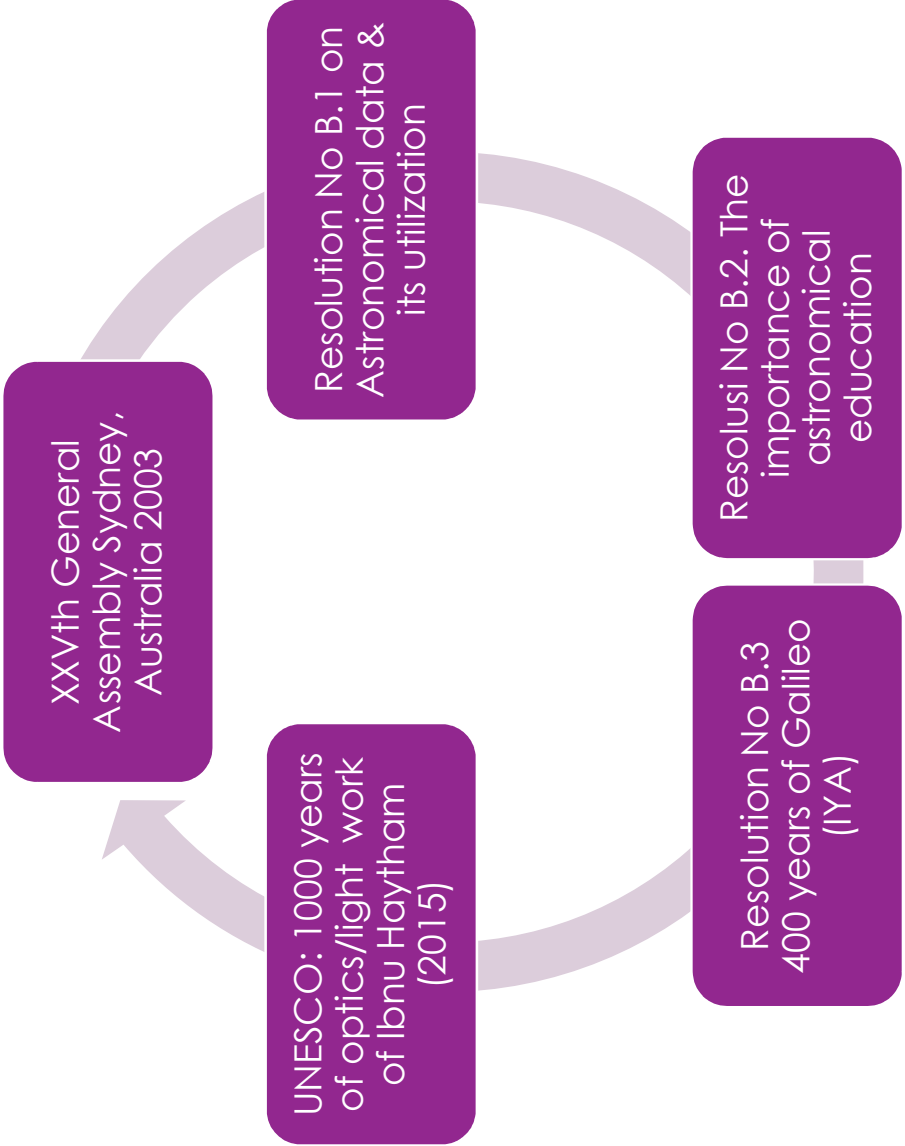


IAU Strategic Plan 2010-2020

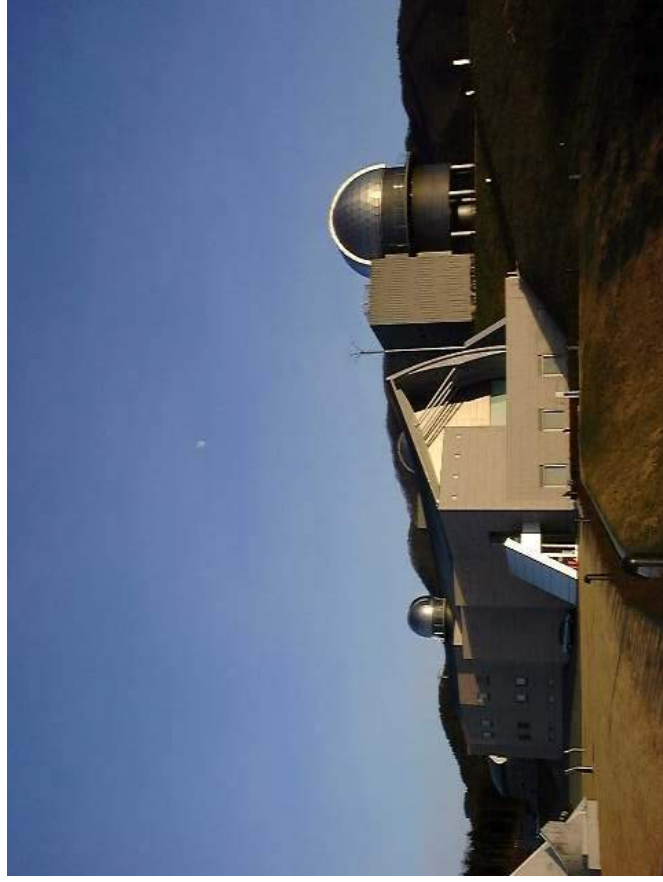


... the implementation through ...





Gunma Astronomical Observatory A Public Observatory with a Large Telescope (since 1998)



Osamu Hashimoto,
Hakim L. Malasan,
Akihito Igarashi



Gunma Astronomical Observatory (GAO)

established in April 1999 by Gunma prefecture local government

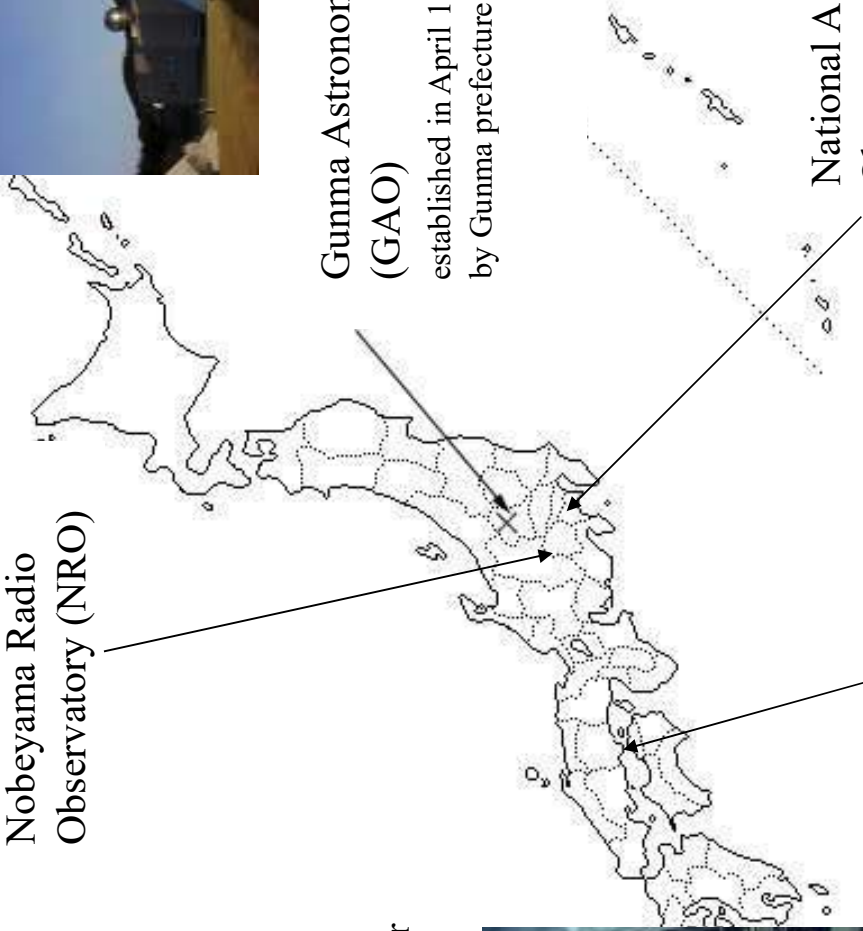
Nobeyama Radio Observatory (NRO)



GAO 150cm reflector

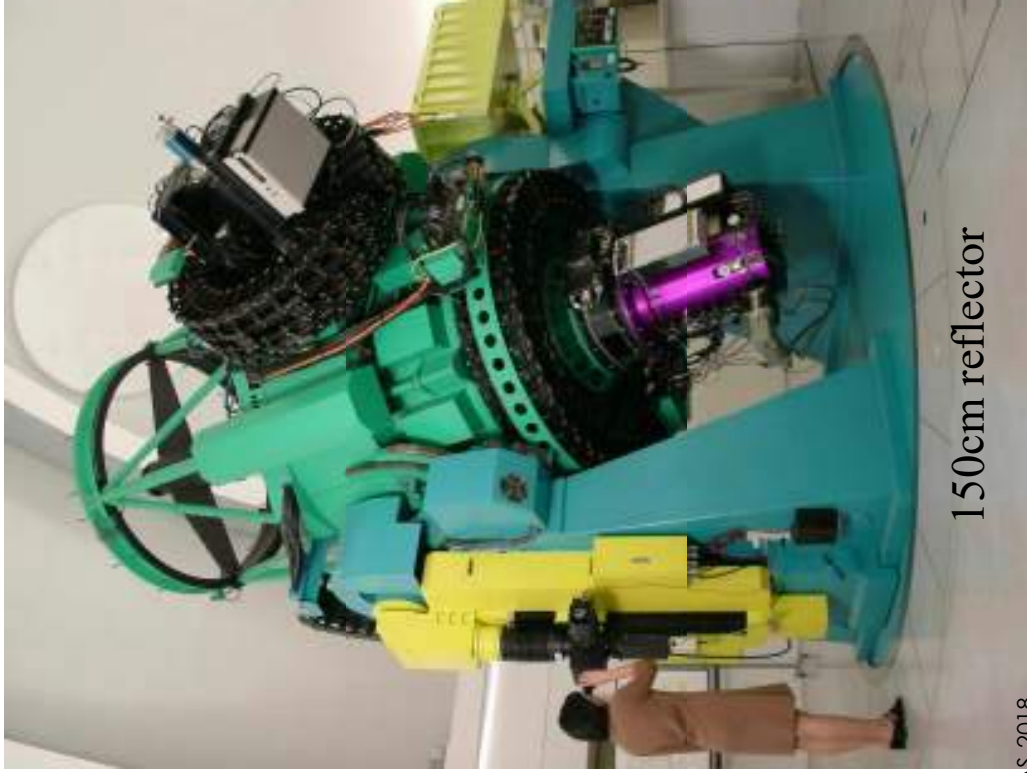


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OAO 188cm reflector



National Astronomical Observatory of Japan (NAOJ) Mitaka, Tokyo

10/18/2018



150cm reflector

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GAO is not utilized only for
Astronomical research
but also for
the **school and public education**
of various kinds of individual & group visitors

Children - elderly people

Children of elementary schools
Jr. high and high school students
University & graduate students

Star gazing with large telescopes

In addition to the **research observations** by
university & graduate students and
professional & amateur researches

10/18/2018

Telescopes and Scientific instruments of GAO

150cm reflector

- High resolution echelle spectrograph (GAOES) 2k x 4k CCD, $R = \lambda/\delta\lambda \sim 10^5$
- Infrared camera/spectrograph (J,H,K bands) 1k x 1k HgCdTe, 7' x 7' or R~900
- Imaging camera and low resolution spectrograph 1k x 1k CCD, 10' x 10' or R ~400



65cm reflector

- Compact spectrograph (GCS) 1k x 1k CCD, $R \sim 500-2000$
- Imaging CCD camera 1k x 1k CCD, 10' x 10' etc.
- Photometer Photomultiplier Hamamatsu R6357



Solar telescope

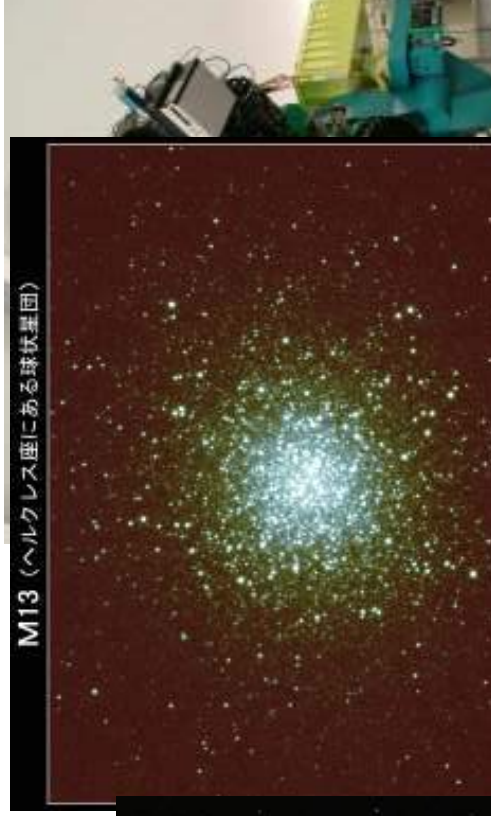
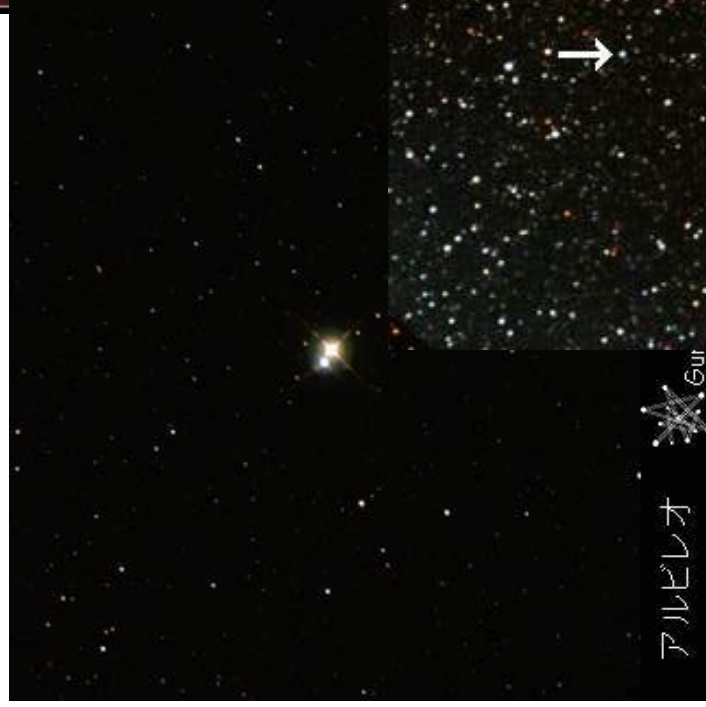
CCD cameras for images and spectrum



- 25-30cm telescopes (6 sets)**
- Imaging CCD camera (B,V,R,I, etc.)
- 1.5k x 1k CCD, etc.
- Photometer



Star gazing



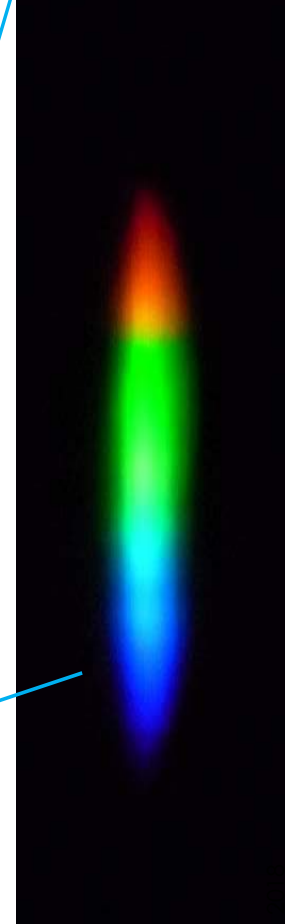
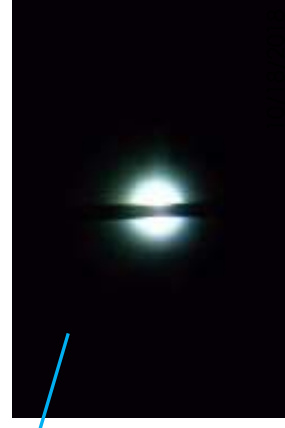
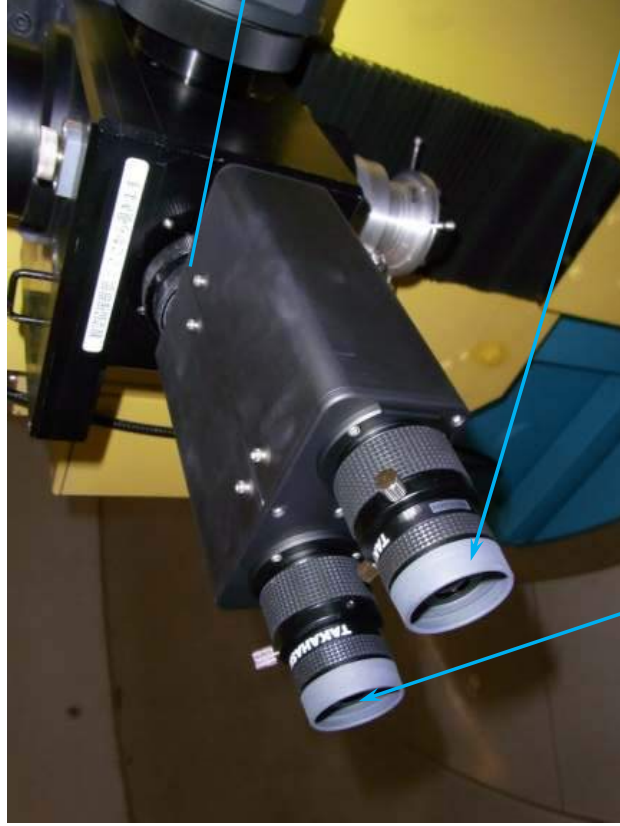
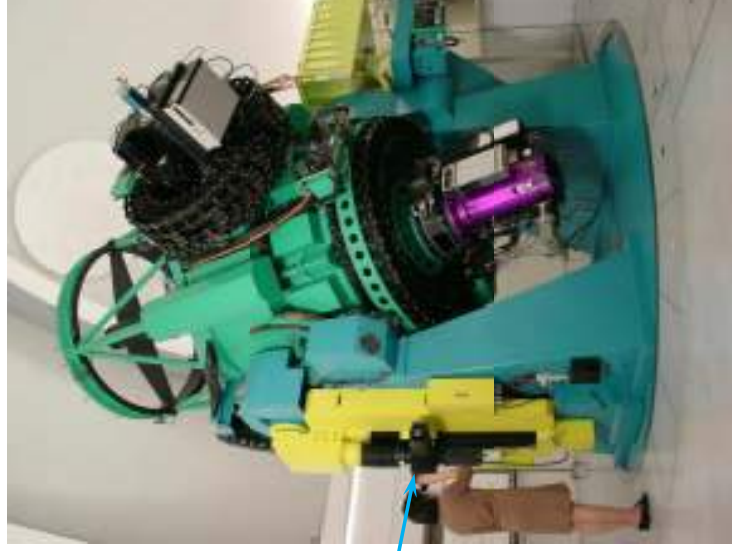
冥王星 2008年8月7日

Gamma Astronomical Observat...

土星 (可視光)

Gamma Astronomical Observatory

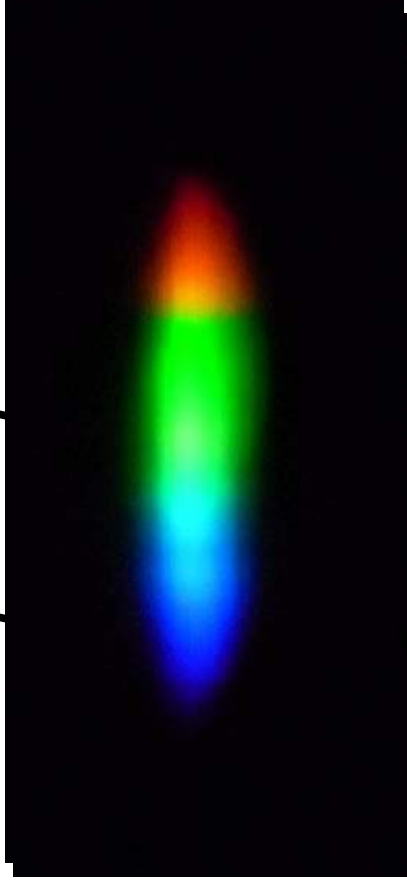
Eyepiece spectrograph



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Eyepiece spectrograph

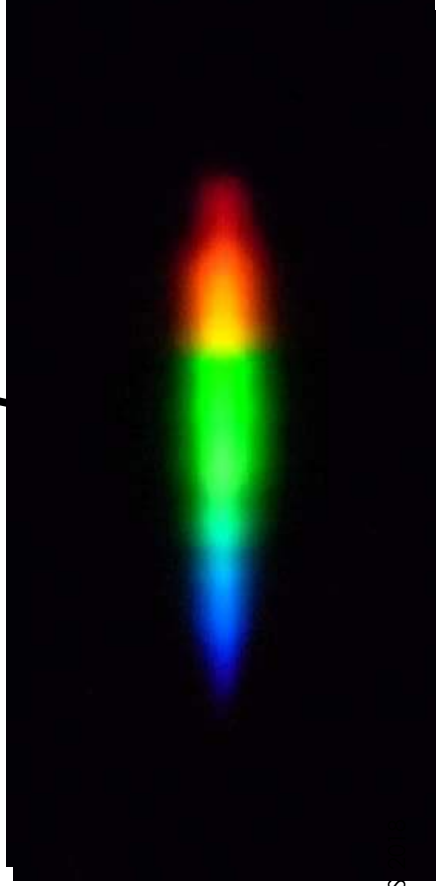
H β absorption



α CMa

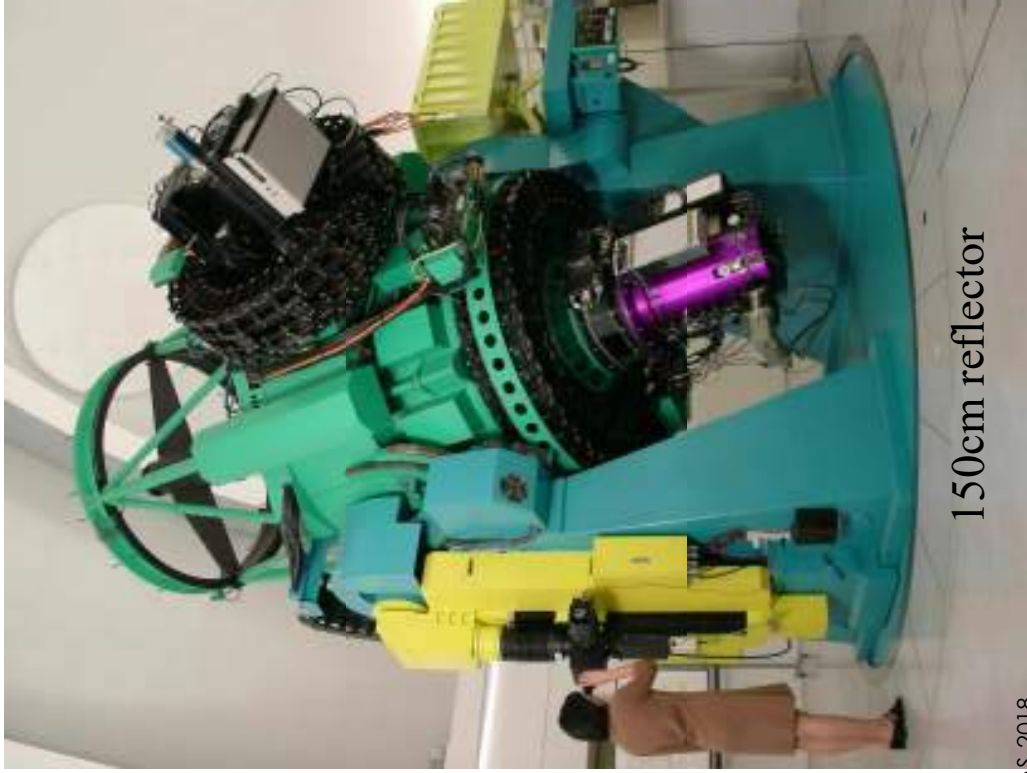


TiO absorption bands



α Ori





150cm reflector

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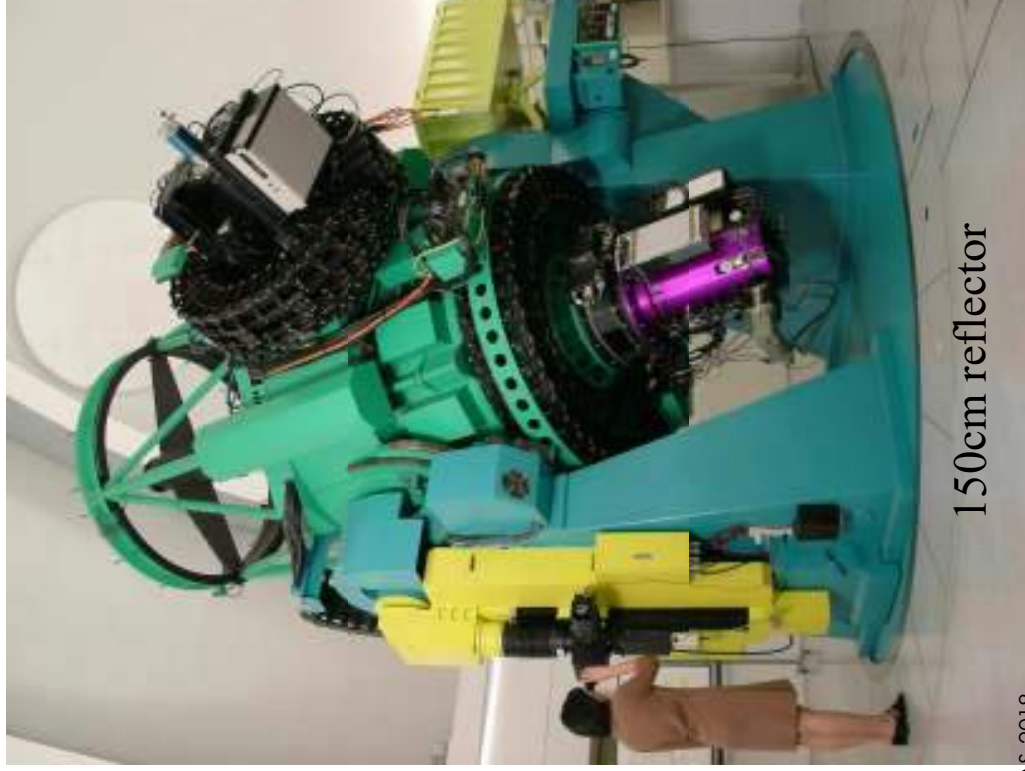
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Activities as a **Museum**
(daytime, weekday
as well as weekend evenings)

Telescopes
Solar telescope
Exhibition instruments
Outdoor monuments

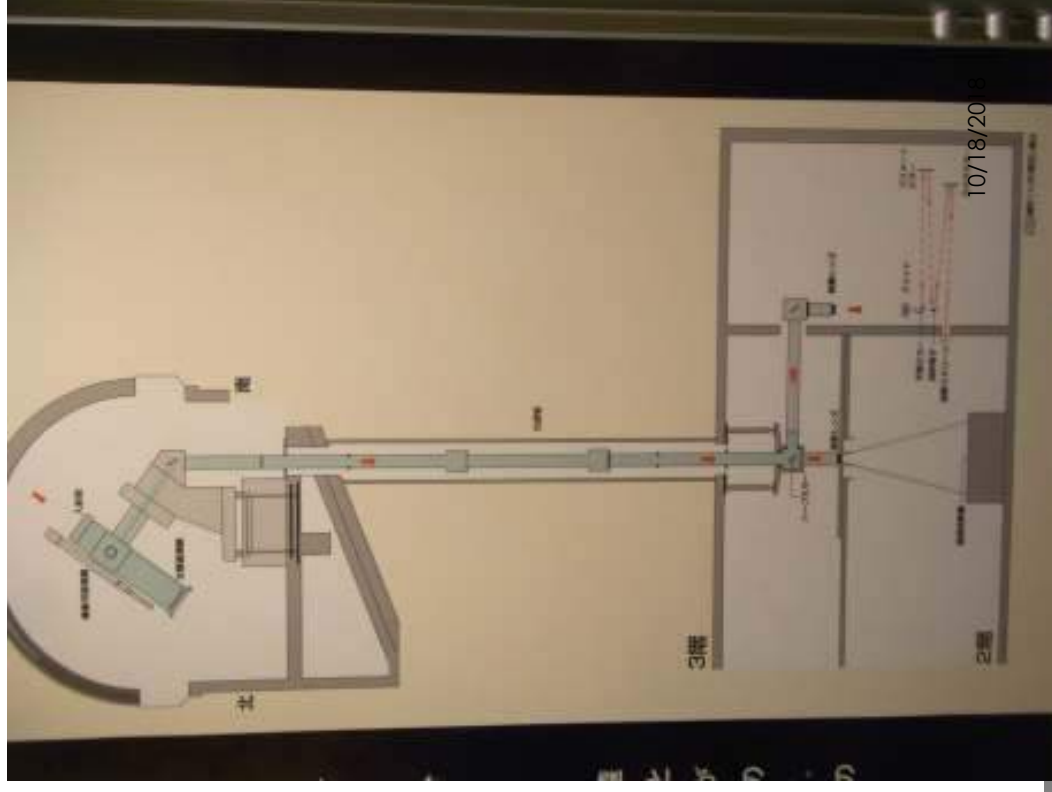


150cm reflector

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Gunma Astronomical Observatory (GAO) 30 cm Solar Telescope



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30cm Solar Telescope



Direct image of Sun



High resolution spectrum



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Real time images in white light and H α
whole and magnified images

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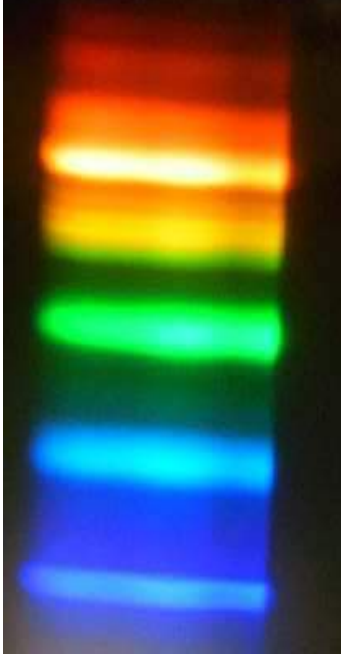


Exhibition space of GAO

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An example of exhibition items of GAO



fluorescent light



incandescent light

How can we see
the physical characteristics of
distant objects without touching
by **spectroscopic observations** ?

Exhibition items of GAO



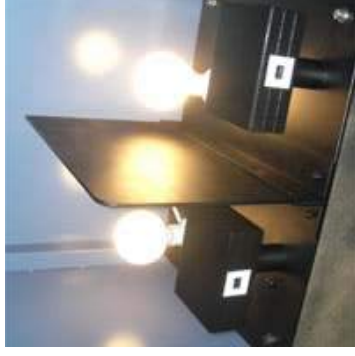
Scale model of GAO
150cm reflector



Difference of
the aperture sizes



Dummy weight of the
primary mirror of GAO
150cm reflector



How spectroscopic
observation works



How infrared (IR)
observation works

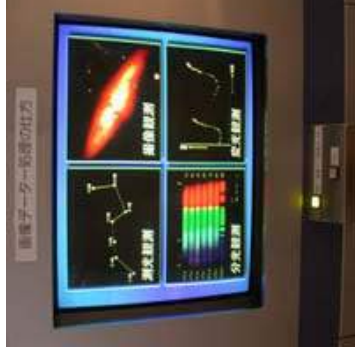
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How spectrographs
work



Alt-Az mounting and
equatorial mounting



PC and Video tools

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Outdoor monuments



Jantar Mantar



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Stone Circle

10/18/2018

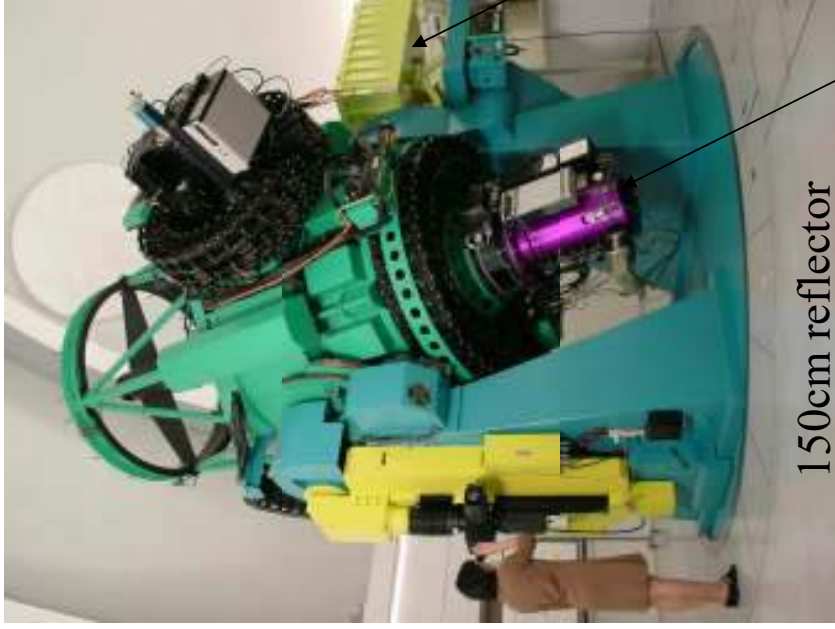
Gunma Astronomical Observatory (GAO)

Gunma Astronomical Observatory
established in April 1999
by Gunma prefecture local government

*designed for both
astronomical research
and
public use*

with devices and facilities for
full scale observational research,
such as 150cm reflector and GAOES

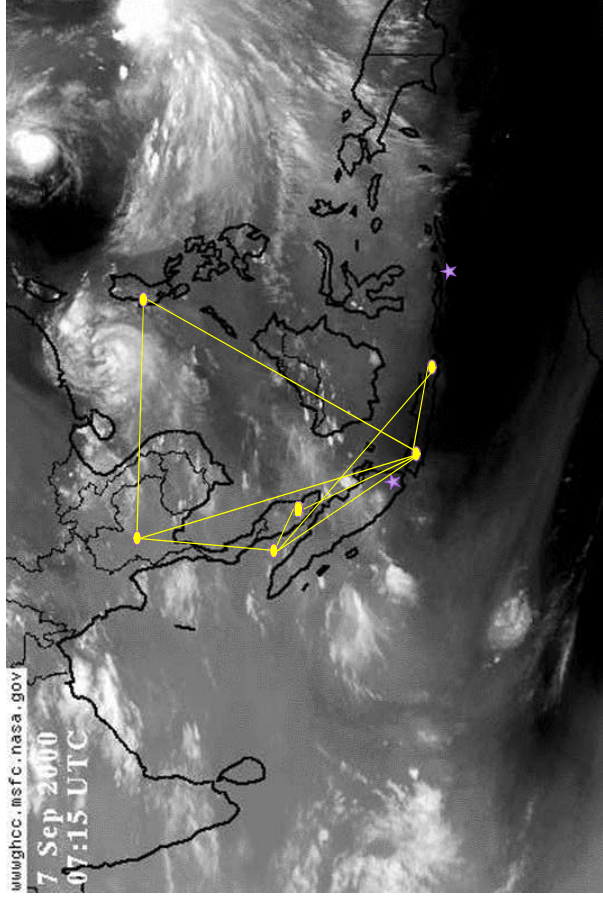
We are hoping that all of those who visit our
observatory come in contact with wonders of
their universe and the latest information about
astronomy; thereby being able to have an
opportunity to think about nature, the
environment and the future of the human race
in general.



150cm reflector

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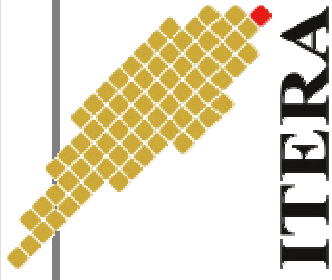
Infrared Camera/Spectrograph
GAO Echelle Spectrograph
(GAOES) 10/18/2018



IAO-ESSECS

ITERA ASTRONOMICAL OBSERVATORY, EARTH AND SPACE SCIENCES
EDUCATION CENTER IN SUMATERA

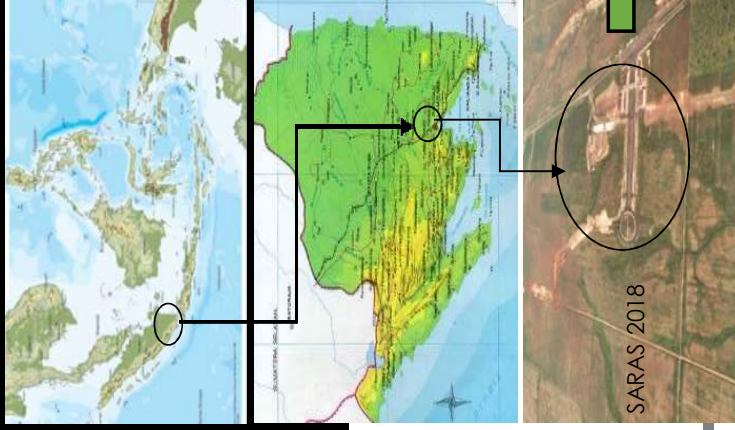
OBSERVATORIUM ASTRONOMI ITERA, PUSAT PENDIDIKAN SAINS KEBUMIHAN
DAN KEANTARIKSAAN DI SUMATERA



Smart
Friendly and
Forest Campus



- Established on 6 October 2014 by President of Republic of Indonesia
- Total Students until 2017 = 2500
- Study Programs: **Atmospheric and Planetary Sciences**, Physics, Urban planning, Geophysics, Geomatic, Informatics, Electrical Engineering, Civil Engineering, Architecture, Environmental Engineering, Geology, Mathematics, Mechanical Engineering, and Biology.



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Buildings for academic activities and Future Plan



**ITERA Astronomical
Observatory, Earth and Space
Science Education Center in
Sumatera (IAO ESSECS)**

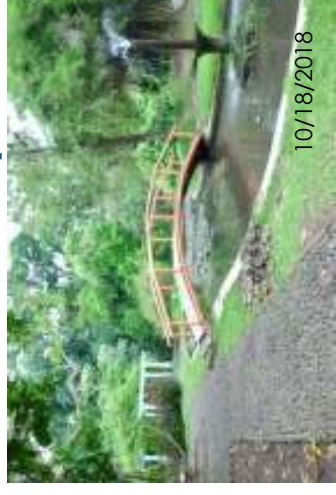


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Sport Center



Masjid Raya ITERA



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ITERA Botanical Garden

Background

Continuous threat from space

Comet/Asteroid/Space debris
(Potentially hazardous objects)

Sun storm

Understand calendar & applications in
human life: Sun and Moon, Qiblah, Time
system & application

Astro-navigation, **Achaeo & Ethno-astronomy**,
Celestial mechanics, & Satellite orbits.

Research and development in the field
astronomy & astrophysics.

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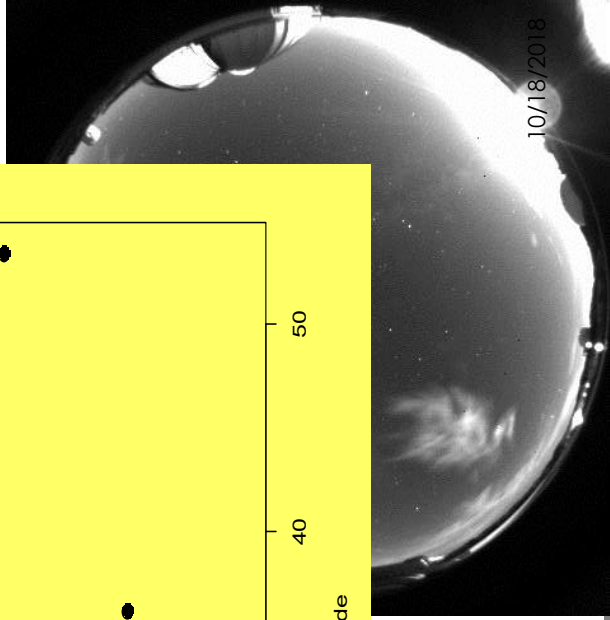
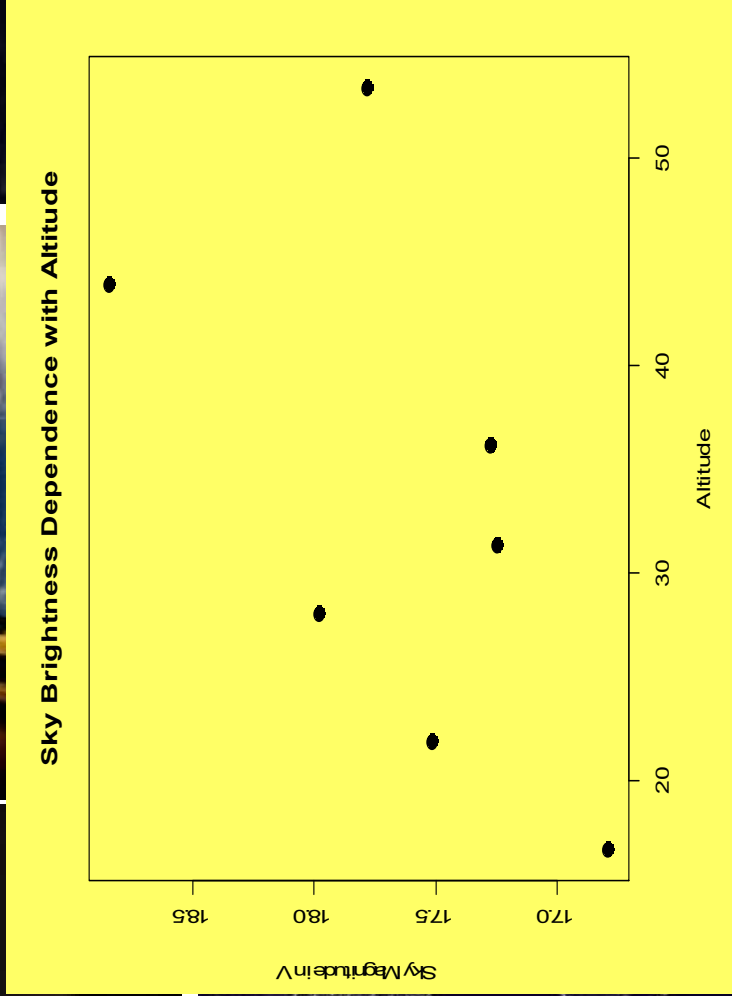
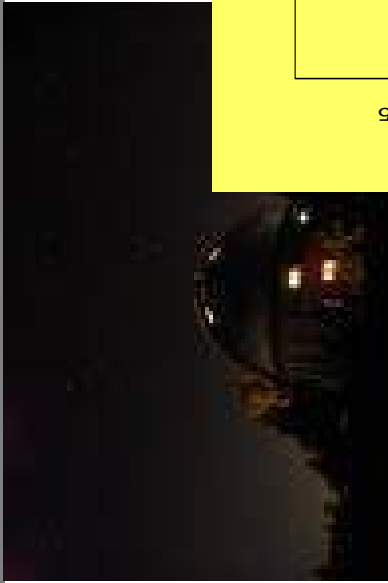
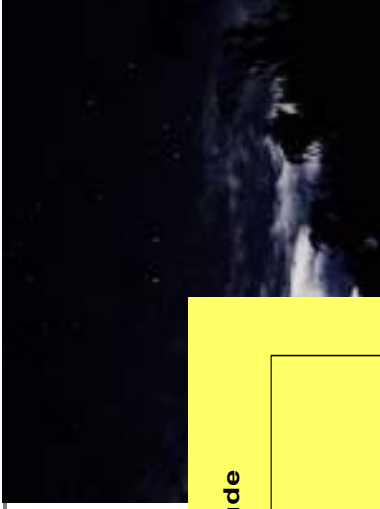
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The existence (and threat) of Bosscha Observatory (1923)



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- Long tradition of astronomy development in Indonesia
- Used also for research, education and public services
- Limited capacity.
- Source of inspiration for long-term space science education



SAFAS 2018

GERT (Giant
Equatorial Radio
Telescope); Institute
of electronic and
space sciences
(1985)

Indonesian new
technology
telescope (2-
meter class
telescope) 1984

Development of Astronomy in Indonesia

Indonesian
National
Observatory (4-
meter class
telescope) 2016

IAO-ESSECS in Mt.
Betung, Lampung (0.6
- 1 m class; 1.5 - 2
meter class telescope)

Objectives of IAO-ESSECS

1. Research and exploration of sky over Indonesia

2. Using the existing sky for space education for the benefit of ITERA, ITB, Lampung & Sumatera people

3. IAO-ESSECS for edu-tourism, especially in sciences & technology

4. Build national and international collaboration to explore the sky for the benefit of man kind

Comparative advantageous

Strategic geographics location

At the equator

Conserve area (protected from light pollution)

Topographically among major observatories in Thailand, Malaysia and Indonesia

Good sky coverage

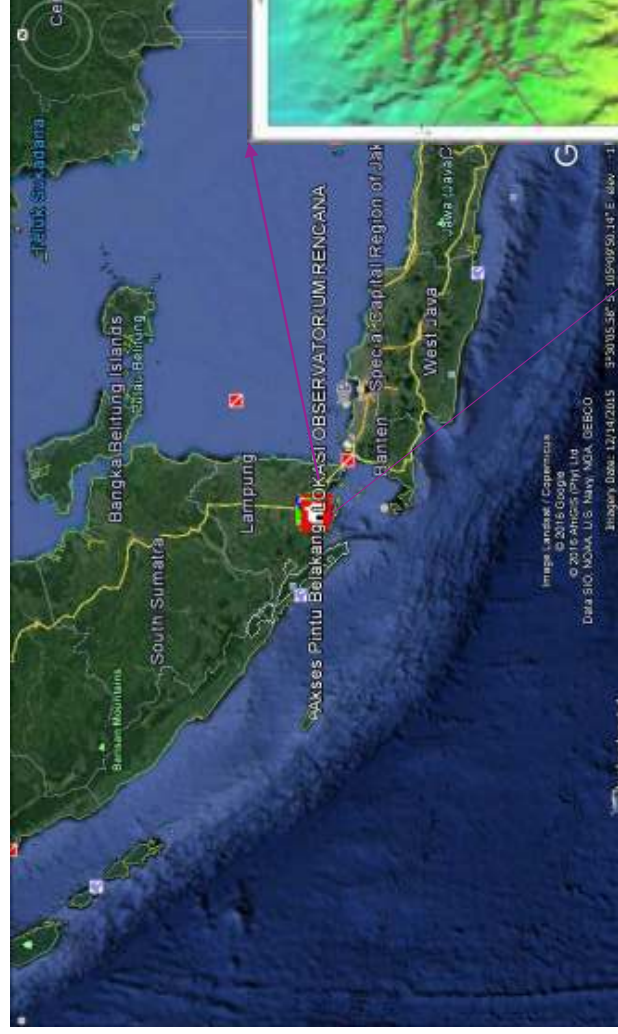
Galactic objects studies

General sky survey

Flexibility

Multidisciplinary activities

IAO-ESSECS : ITERA Astronomical Observatory, Earth and Space Science Education Center in Sumatera

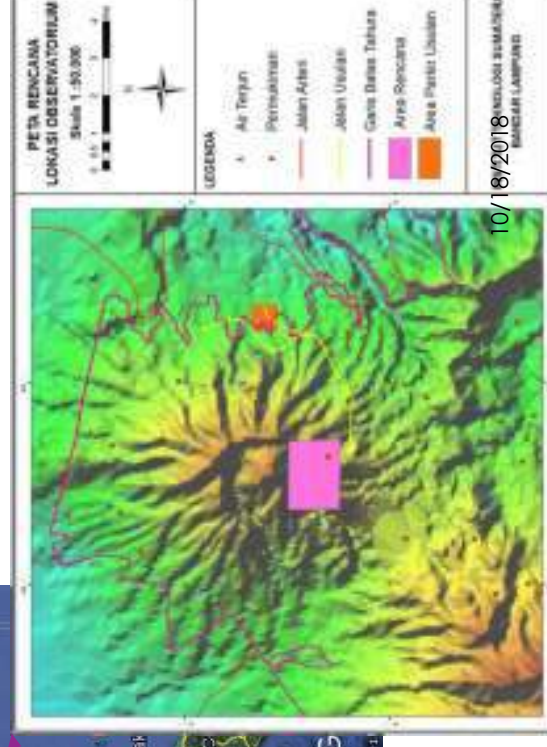


Location

Longitude = 105°9':7" E

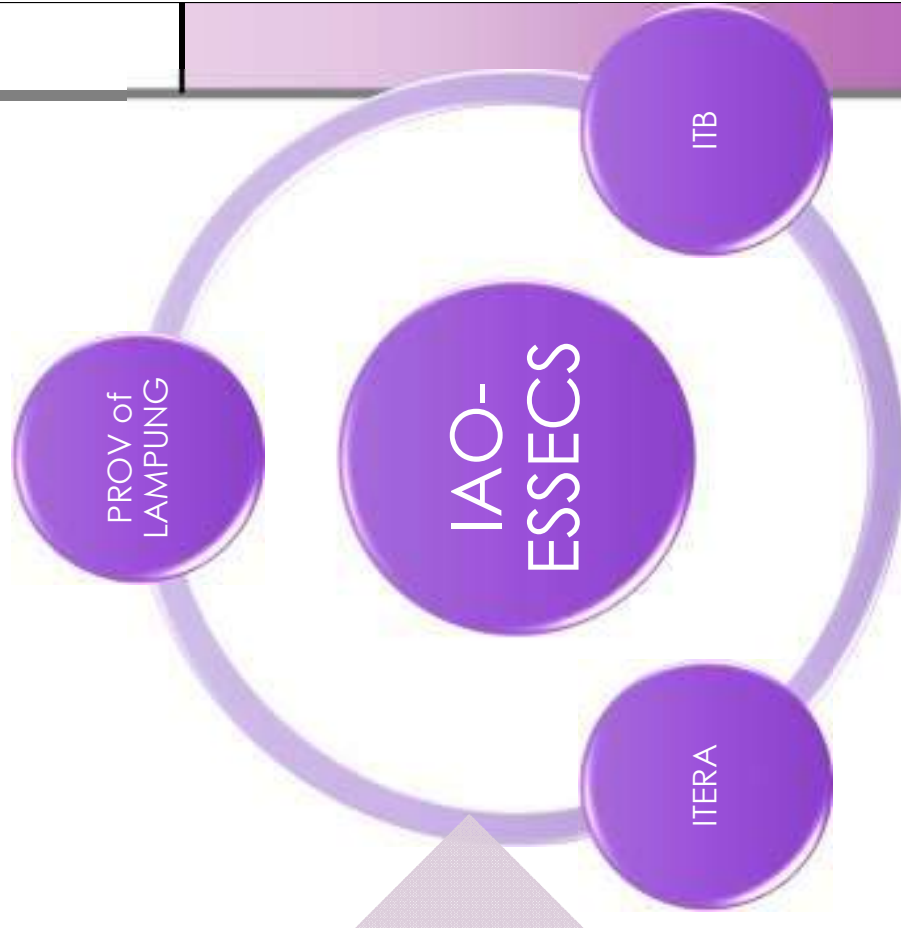
Latitude = -5°27':13"

Altitude = 800 – 1039 m

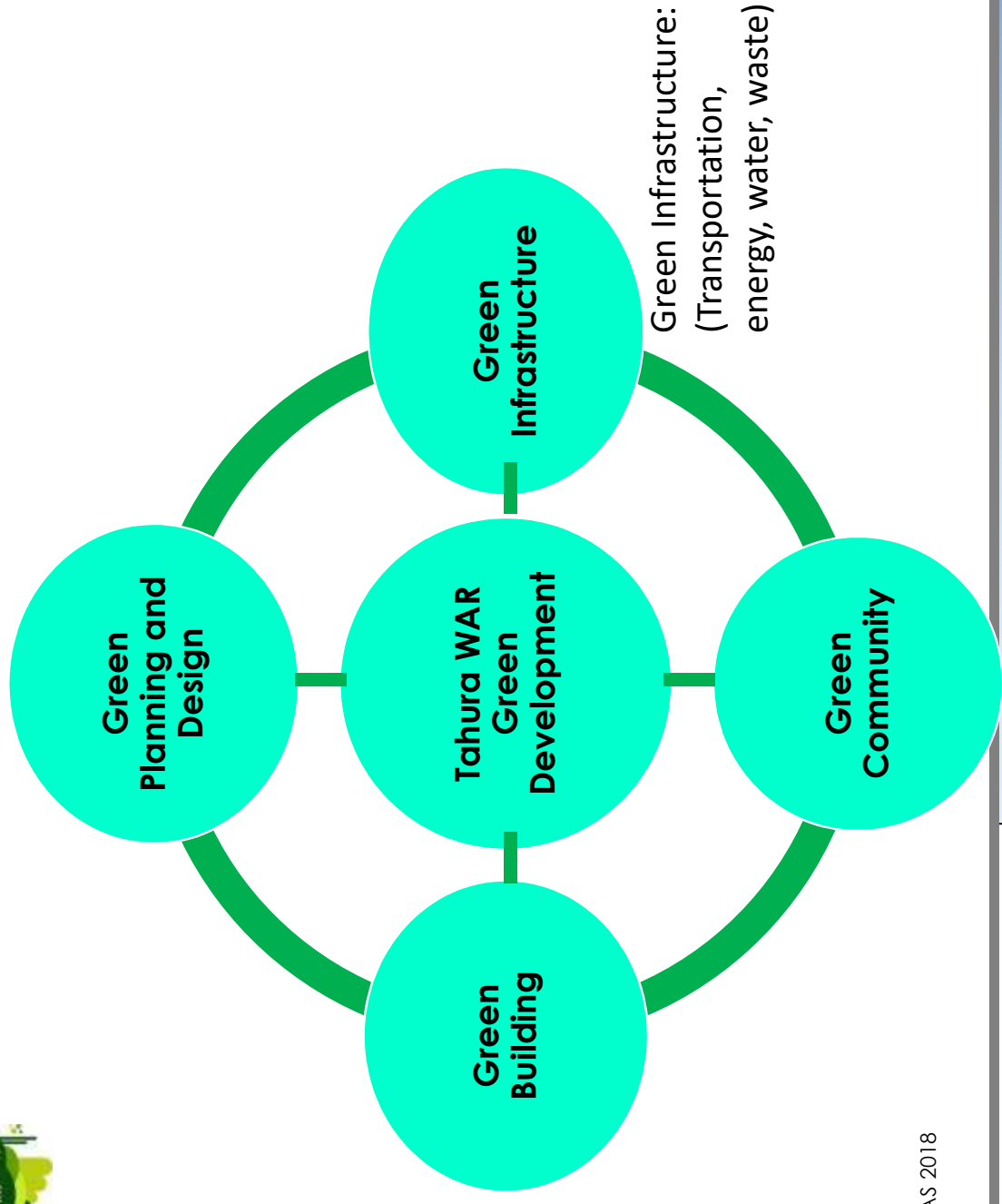


Vision of consortium

- Educating people
- Proactive in sky exploration & patrol
- Promoting localities
- Life environment : Maintaining preserved area
- Advancement of science and technology through cultural approach

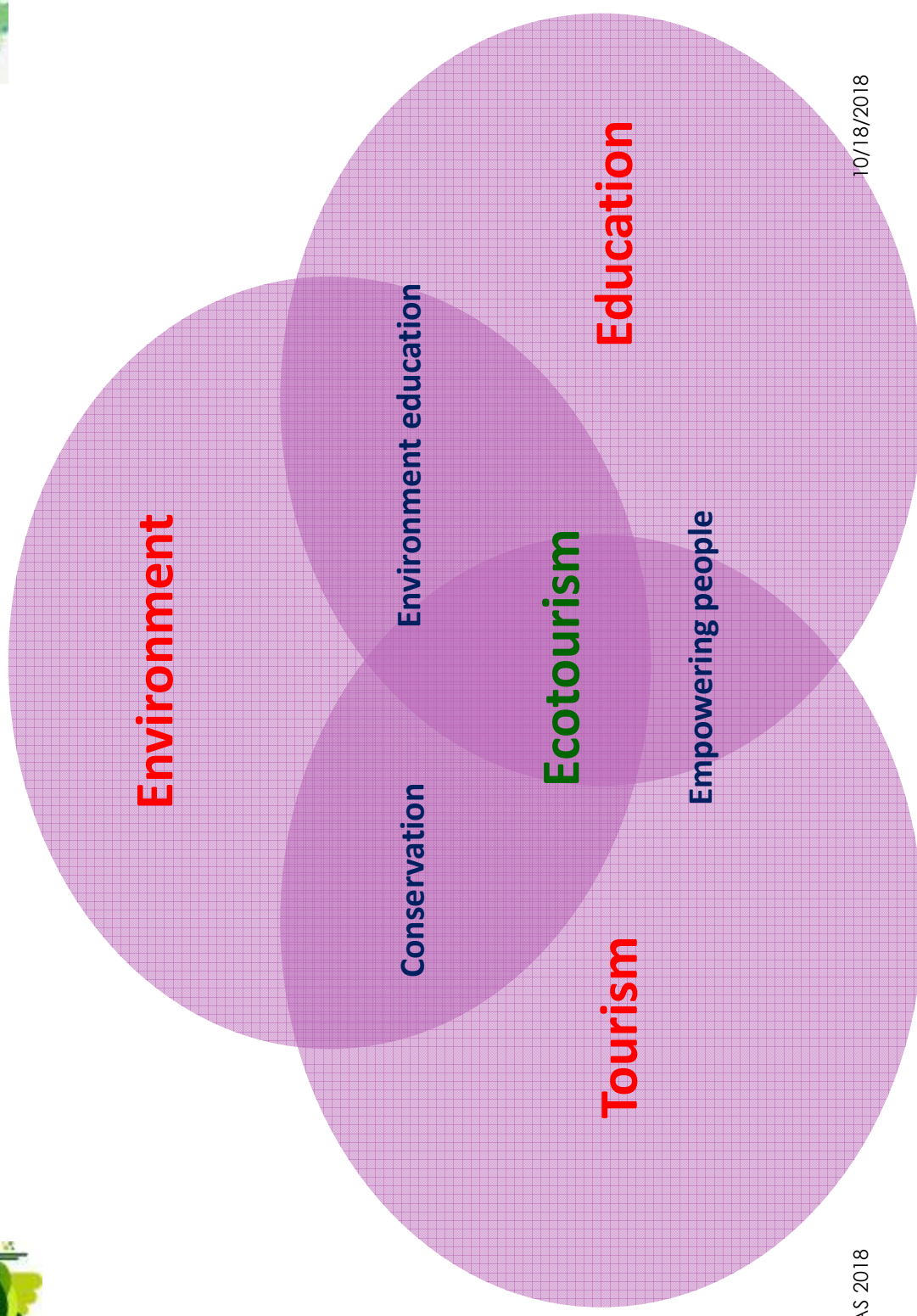


Green Development





Ecotourism



IAO-ESSECS

ITERA ASTRONOMICAL
OBSERVATORY, EARTH AND SPACE
SCIENCES EDUCATION CENTER IN
SUMATERA



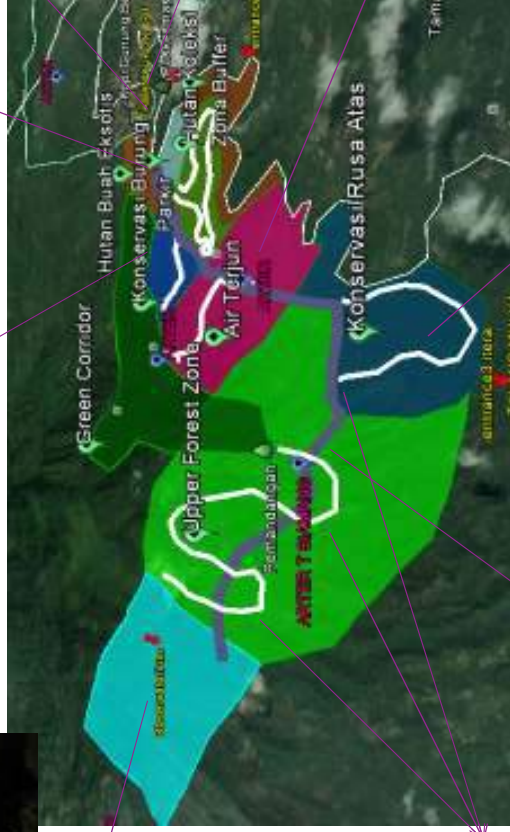
ITERA ASTRONOMICAL OBSERVATORY, EARTH AND SPACE
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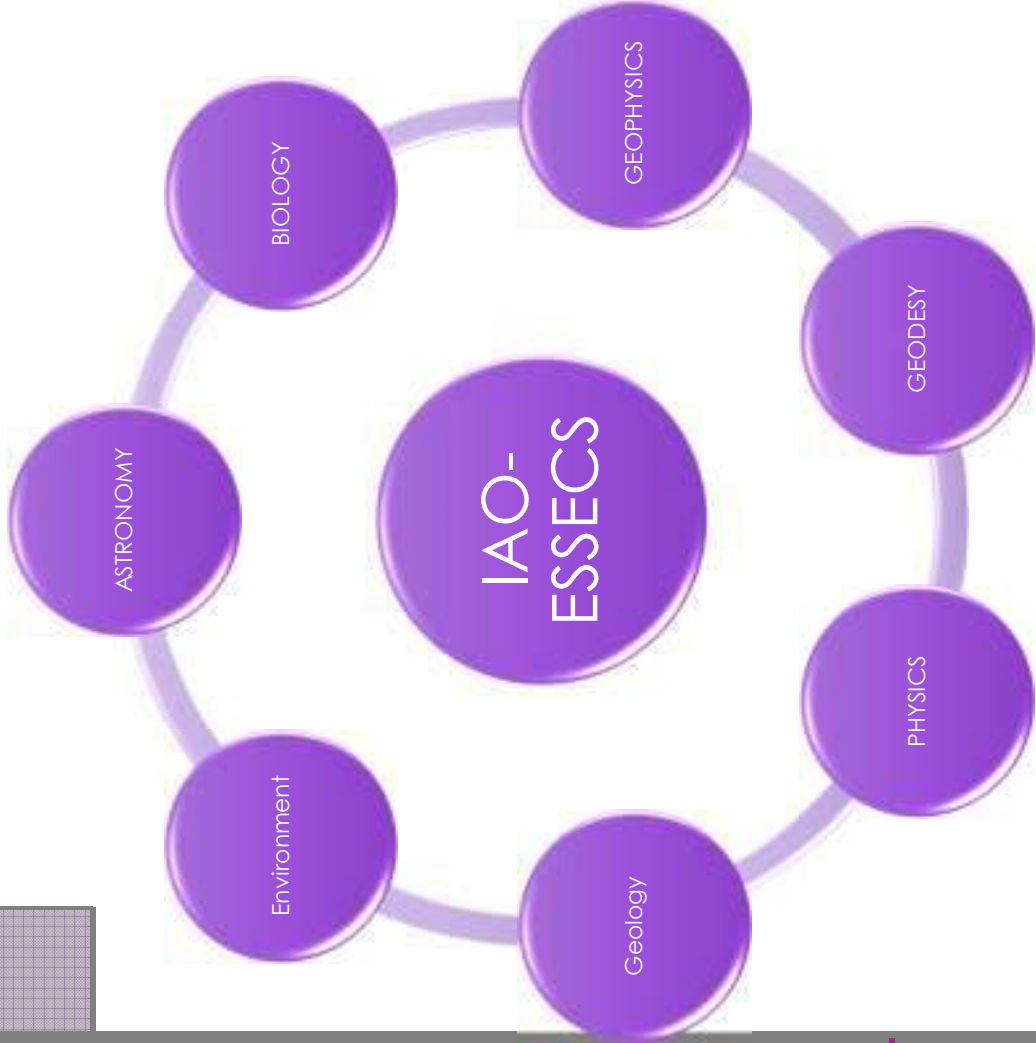
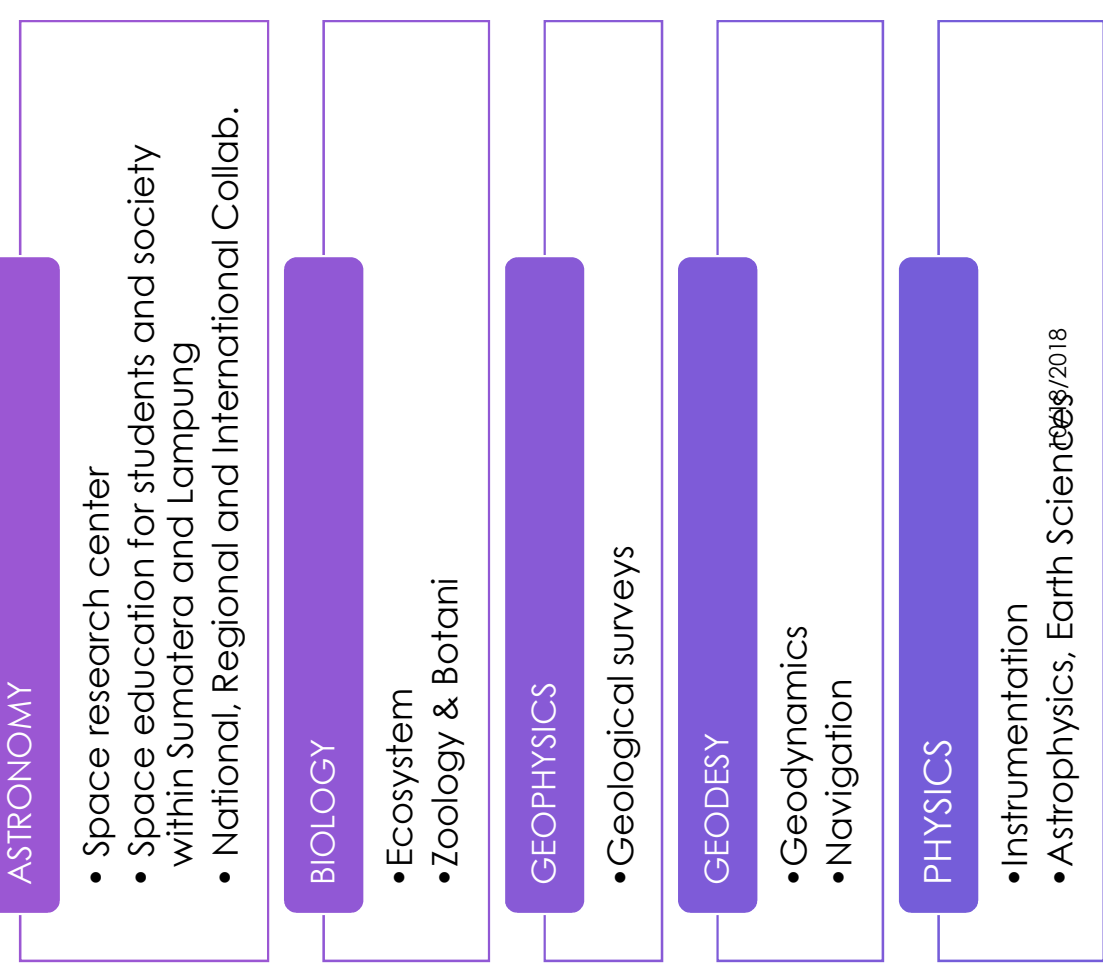


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Block Plan at Tahura Wan Abdurrahman





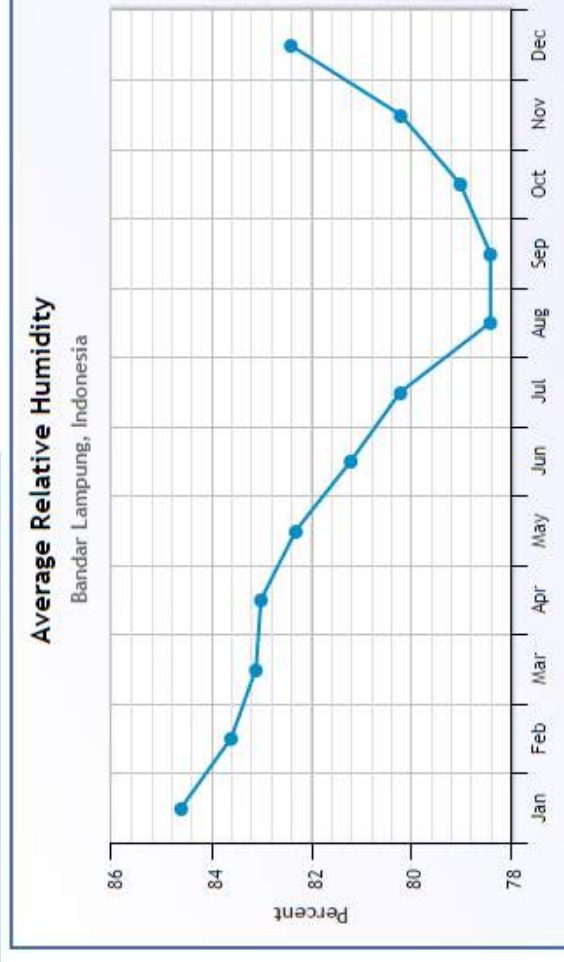
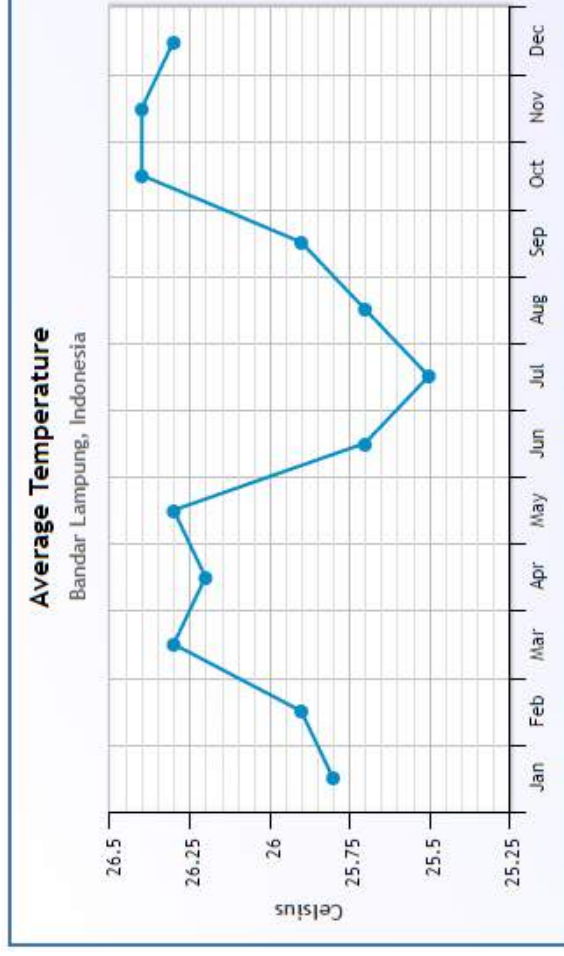
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Temperature and Humidity

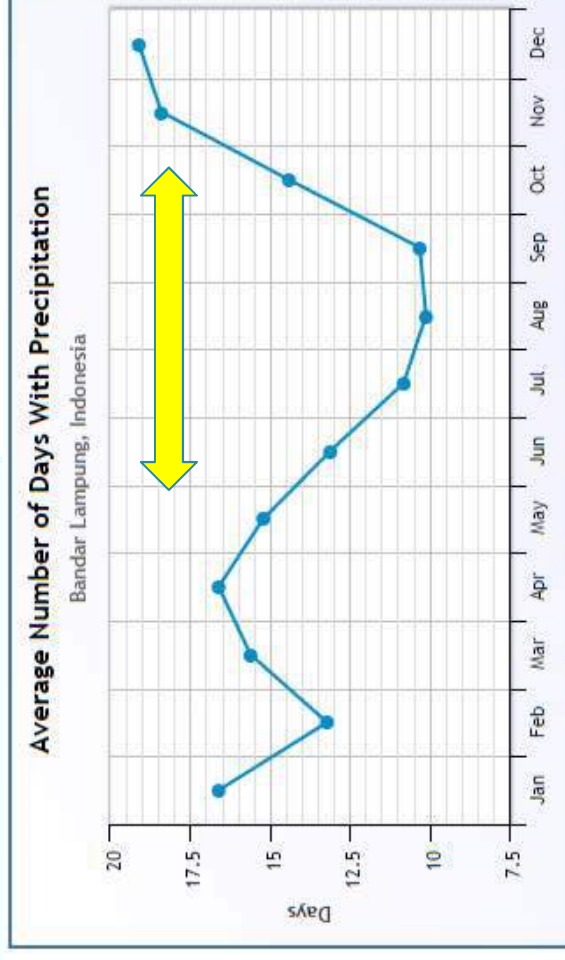
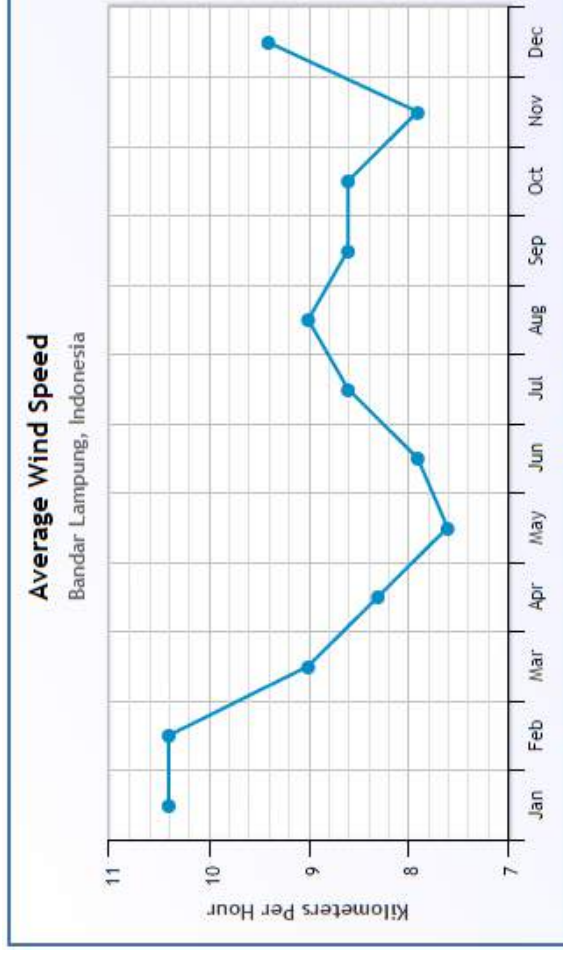
<http://www.weatherbase.com/>

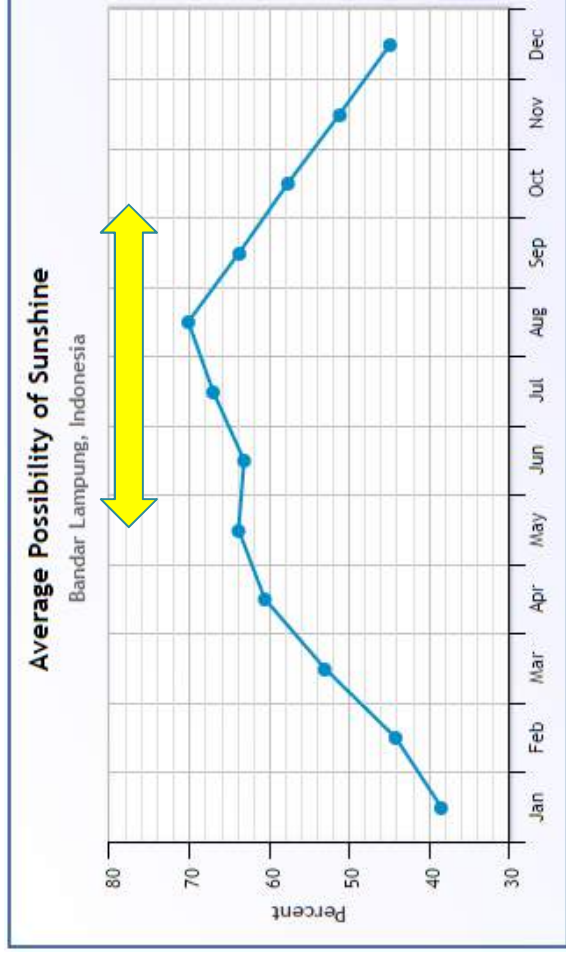
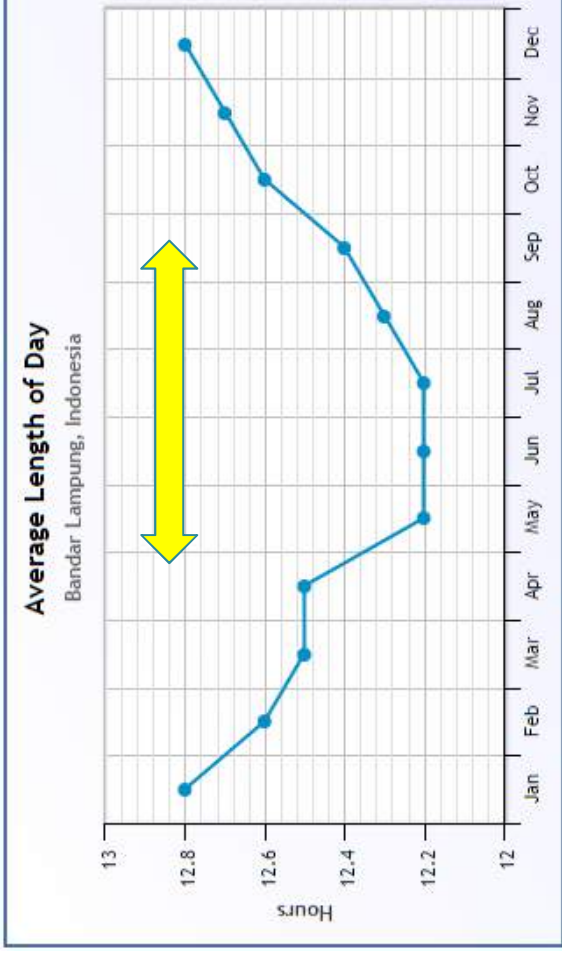
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Wind speed & Days with precipitation





Hasil Perakaman dengan All Sky Camera

2017-08-06 21:54:40

017-8100000



Selatan

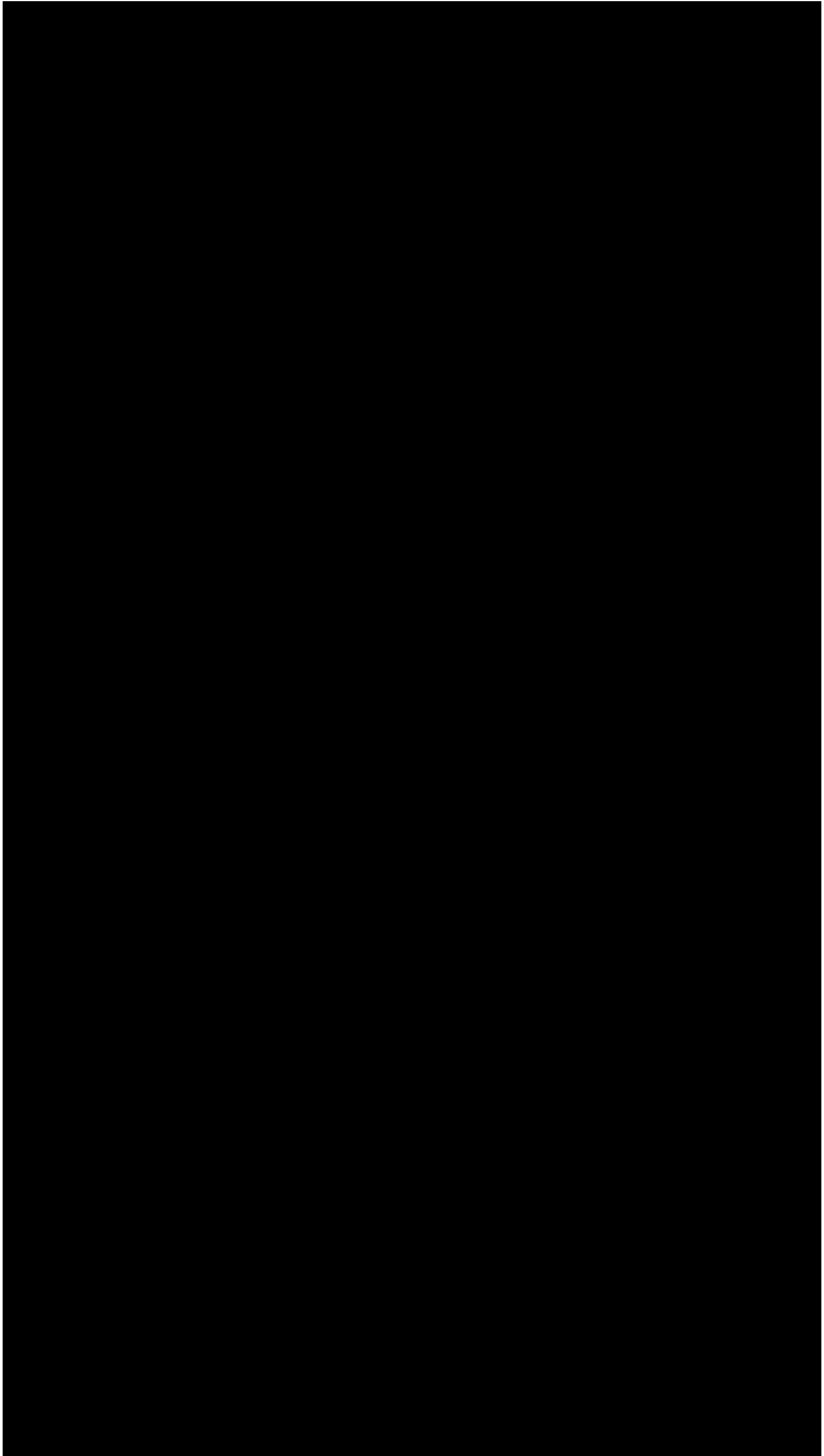


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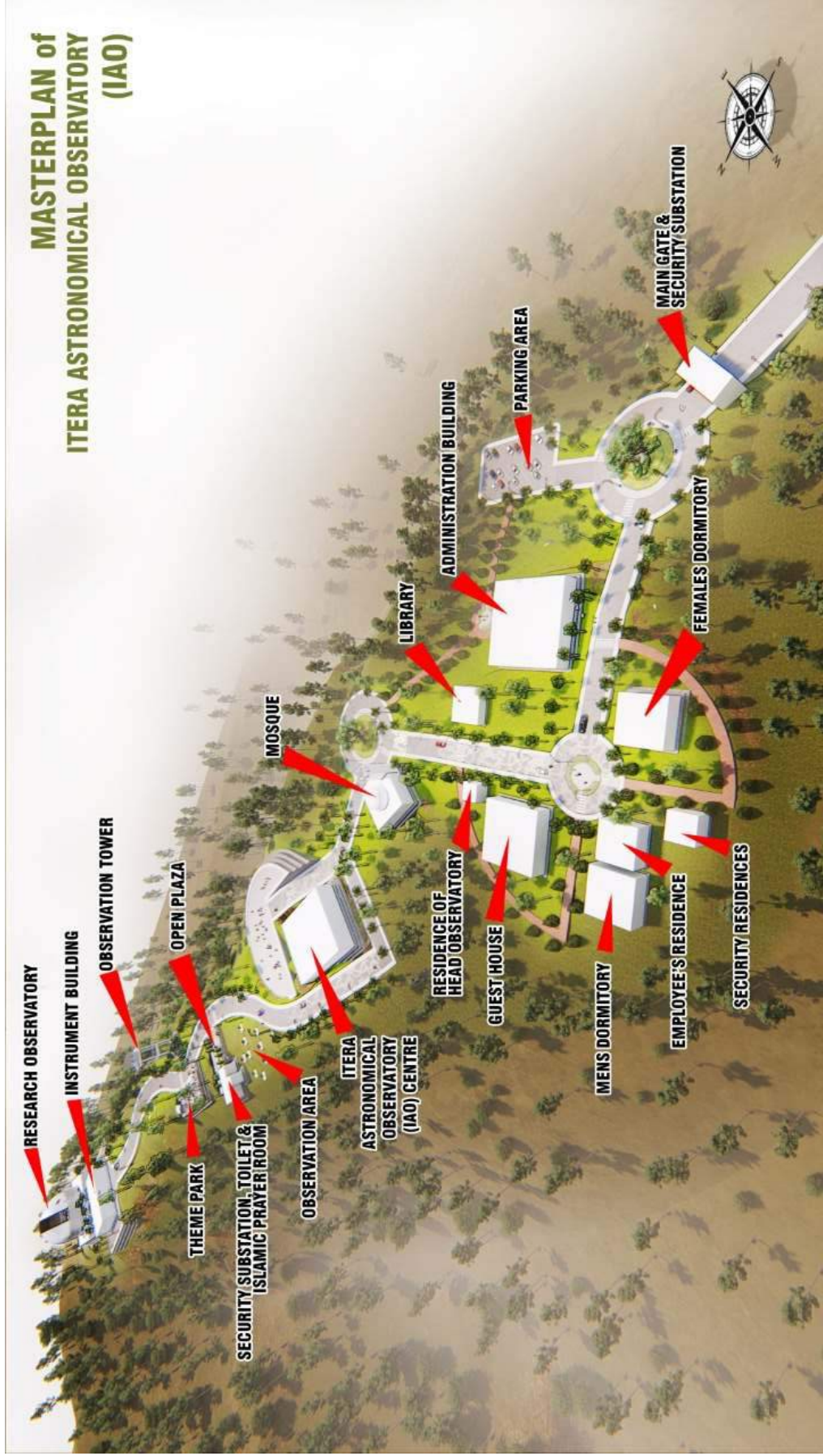
10/18/2018



Timur



MASTERPLAN of ITERA ASTRONOMICAL OBSERVATORY (IAO)



PHASE PREPARATION
AND DEVELOPMENT

PHASE I : CONCEPT

PHASE II : PROPOSAL

PHASE III : STAGE-1

PHASE IV : STAGE-2

PHASE V : STAGE-3

PHASE VI : TESTING/OPERATION

2016-
2017





Refractor (portable)

- Crescent sighting
- Solar observation
- Outreaches

Solar Telescopes

- Study of Solar activity



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10"-14" Reflectors (portable)

- Support education (laboratory)
- Public outreach



Accessories/Instruments

- GOTO MOUNT : ASA DMM 60
- Eyepiece Set : Wide Field
- Class UBVR/I Filter + Wheel
- CCD / Video Camera
- House : Sliding Roof / dome

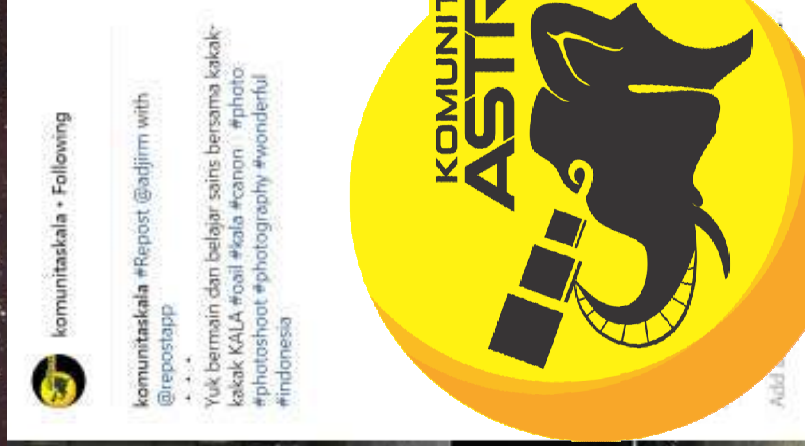


Observatory Activity Program

Public service	Edu-tour	Education	Training	Research
Observatory open house	Edu-tour for ES/JHS/SHS/university students	Astronomy lecture	Hilal / moon observation	Survey of Red Stars in Cluster
Astronomy activity and picture exhibition	Edu-tour for family	Astronomy observatory	Astronomy club / olympiad training	Variabel Star
General lecture	Edu-tour public night	Astronomy and Astrophysics Discussion	Astro-photography	Emission line star
Observatory annual book publication	Astro-camp	National / international conference	Reduction data of astronomy	Solar activity
Integrated Science Museum	Planetarium		Training for teachers	Milky way population
Technology, Science, and Al-Quran dialog	Education tour package			Publication in Journal

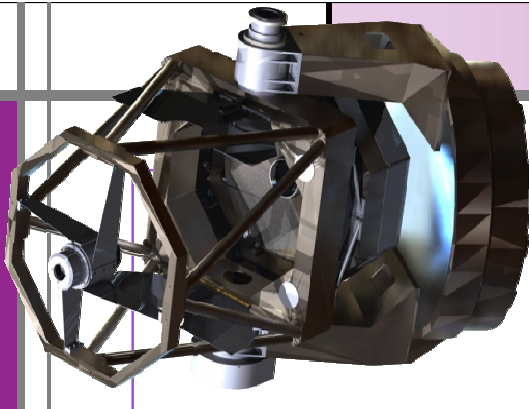
KALA (Komunitas Astronomi Lampung)

- Dibentuk pada tanggal 9 April 2017



PHASE V : STAGE 3 DEVELOPMENT

- 2 Meter class telescope
- Modern instrument based acquisition system



1.5 - 2 M R-C Reflector

- Photometry
- Imaging
- Spectroscopy
- Astrometry

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Mounting and support

- Telescope construction
- Dome construction
- Automated weather system
- Teleskop pears
- Control system
- Optical workshops and laboratory

Instrument

- CCD camera & acquisition system
- Medium to high resolution spectrograph
- Integrated instrument control system

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PHASE VI : TESTING/OPERATION

- First light, Testing/Operation of Facility
- Human resource development
- Instrument characterization
- Research program implementation (fulfilling outcomes of space science related study program in ITERA)

Remarks

1. GAO is an successful example of a public observatory in Japan
2. IAO-ESSECS is planned to be fully operational as Center of Excellence in 2019:
 1. Regional collaboration is very much welcome
 2. Research and Education in-line with mission of ITERA (toward establishing Study program related to Astronomy)
 3. Public observatory characteristics : Edu-tourism including Astro-tourism

Factors affecting quality of outputs and outcomes

- **Site** \Rightarrow A site with little 'photometric time' in the traditional sense *can still be used* for observational program (e.g. relative photometry, spectroscopy)
- **Equipments** \Rightarrow choice of instrument \equiv continuous maintenance & updating
- **Communications** \Rightarrow effective networking of small telescopes
- **Personnel** \Rightarrow *best science is done by the smartest and most committed people*

Atmospheric and Planetary Sciences Study Program, Faculty of Sciences, INSTITUT TEKNOLOGI SUMATERA (starting from THIS YEAR)



Atmospheric and Planetary Sciences

Institut Teknologi Sumatera



EDUCATION PROSPECT

Atmospheric and Planetary Sciences (APS) is a program focused on developing human resources who have potential knowledge in atmospheric and planetary research technology. In order to identify human resources, APS have student track design program who have potential knowledge in atmospheric and planetary.



CURRICULUM STRUCTURE

Consisted by 120 credits over APS 4 semester. Description of Science 105 credit (84 credits). The total credits must be completed 30 credits in Public Interest class (Semester 1 and Semester 2) and 100 credit over APS class (Semester 3 and Semester 4).



LABORATORY FACILITIES

APS has various laboratory facilities such as Observation Laboratory and Observatorium Astronomi ITERA Lampung (OAI) and Meteorology, Climatology, Geophysics and Laboratory. We also have 2 laboratory additional which is Physics Laboratory, Chemistry Laboratory and Computer Lab Laboratory. All of laboratory were equipped APS technology human resources to improve research quality.



INFORMATION & CONTACT

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Jalan Terusan Riepocalla, Duta, Way, Tiga, Kecamatan Jati Agung, Lampung Selatan, 355265

Telephone :
+6275-8030-188 / +6271-8030-189

Website :
www.aps.itera.ac.id



GRADUATE PROSPECT

The Atmospheric and Planetary Sciences (APS) graduates need to meet all education sectors over Atmospheric and Planetary Science technology. Besides, Academic and Planetary and continue education Master degree. The APS attract graduate prospect working at MOEs.



1. Researcher in BMKG, BPPT, LAP, and BERTIDUK (Local Indonesian)
2. Lecturer and Staff government or private institutions
3. Analyst in agriculture technology, Marine engineering, Energy, Hydrology, Electrical engineering and instrumentation, and Computer Science
4. Technical support in industry, Scientific research and development system
5. IT technology and software developer for Atmospheric and Planetary prediction with forecasting event.
6. Journalist

NATIONAL COLLABORATION

In the implementation, APS will collaborate with three Indonesian universities such as Institut Teknologi Bandung (ITB), Institut Teknologi Sepuluh Nopember (ITS), Institut Teknologi Sumatera (ITERA), Institut Teknologi Kalimantan (ITK), Institut Teknologi Padang (ITP), Lembaga Penelitian dan Pengabdian Masyarakat (LPPM) and Lembaga Penelitian dan Pengabdian Masyarakat (LPPM) with research collaboration and target to disseminate and transfer to other institutions.



INTERNATIONAL EVENT

International Event in annual APS forum (forum APS) were held in research forum in Atmospheric and Planetary Engineering (International forum) in various city country. This programme annually International Collaboration in Atmospheric and Planetary Sciences (ICAPS) held by Bogor/ISI Conference Paper/ Journal International in Book Chapter.



INTERNATIONAL FIELD TRIP

APS held trip program to various subject in Space event to sharing knowledge with expert Atmospheric and Planetary Sciences in ASEAN countries. The collaboration country on field trip Singapore, Malaysia, Thailand, France, Lombok, Borneo, Devon Island, Myanmar, Vietnam, Vietnam, dan Laos.




Atmospheric and Planetary Sciences STUDY PROGRAMME

“**S**ains Atmosfer dan Kepelantaran (SAK) merupakan salah satu program studi baru yang ada di Institut Teknologi Sumatera. Program Studi Sains Atmosfer dan Kepelantaran merupakan Program studi yang pertama di Indonesia, dengan kelas kejuruan pada bidang Ilmu Sains Atmosfer dan Astronomi. Sains atmosfer menitikberatkan kajian mengenai atmosfer atmosfer dekat yang mengesajuti perilaku atmosfer terhadap perubahan cuaca dan iklim di Bumi dan atmosfer antariksa jauh jauh yang mempelajari perilaku interaksi antara Matahari terhadap Bumi dan Planet-planet lain di Tata Surya dalam kajian “Cuaca Antariksa”. Bidang Astronomi mempelajari mengenai Fisiologi, Struktur Galaksi, Astralika Bintang, dan lintasan orbit benda-benda langit.”



VISION, MISSION, & LECTURER Atmospheric and Planetary Sciences



“Menjadi program studi yang unggul, bermartabat, mandiri, dan diakui dunia, serta berinovasi pada bidang sains atmosfer dan kepelantaran melalui pendidikan, penelitian, dan pengabdian masyarakat yang mampu meningkatkan kesejahteraan bangsa Indonesia dan dunia dengan memberdayakan potensi yang ada di wilayah Sumatera dan sekitarnya.”



Menyelenggarakan pendidikan dasar dan terapan dalam bidang meteorologi dan astronomi yang berdaya saing global diimbangi dengan peningkatan kualitas tenaga pendidik dan kependidikan.
Meningkatkan kolaborasi dan prestasi masyarakat terbahaya sains atmosfer dan kepelantaran.
Mengadakan kerja sama dengan pemerintah (pusat dan daerah) maupun badan swasta terkait dalam melakukan penelitian, penelitian dan pengabdian masyarakat dibidang meteorologi dan astronomi.

LECTURER



Kemal Maulana Albasa, S.T, M.Sc, PhD
(Electrical Instrumentation, Chemical Atmosphere, Seismics, and Artificial Intelligence)



Wahyu Sasongko Putro, S.T, M.Sc
(Space Weather, Natural Hazard Disaster, and Artificial Intelligence)



Annisa Novia Indra Putri, S.Si., M.Si
(Galaxy, Physics and Cosmology)



Rabiatul Muztaba, S.Si, M.Si
(Astronomy Instrumentation and Stellar Physics)



Wirid Biravstri, S.Si, M.Si
(Subsseasonal to Decadal Climate Variability and Climate Modelling)



Nindhita Pratiwi, S.Si, M.Si
(Stellarite Technology and Measurements)

THE 10TH SOUTHEAST ASIA ASTRONOMY NETWORK (SEAN) 2018 MEETING

SEAN
LAMPUNG INDONESIA
19-21 OCTOBER

BEKTI RANDU HOTEL AND RESTAURANT,
BANDAR LAMPUNG, LAMPUNG, INDONESIA

PARTICIPANTS



THEME

- OPTICAL ASTRONOMY
- RADIO ASTRONOMY
- SOLAR PHYSICS AND NEUTRINO ASTRONOMY AND ASTROPHYSICS
- THEORETICAL AND COMPUTATIONAL ASTRONOMY AND ASTROPHYSICS
- INTERDISCIPLINARY TOPICS RELATED TO EARTH AND PLANETARY SCIENCE
- INTERDISCIPLINARY SPACE SCIENCES
- INDICATION (EARTH AND SPACE)

SCIENTIFIC ORGANIZING COMMITTEE

- Assoc. Prof. Husein MASLAK (ITEL, Indonesia)
- Prof. Dr. Triwahyuni Satrio Nugroho (INSTITUTE OF AERONAUTICS AND SPACE - LAPAN, Indonesia)
- Prof. Bhanupakdi Sornchai (SRIKARTHAKI THAILAND)
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- Prof. Bainsi Sri Mulyo (CAMBODIA)
- Dr. Chivanna Uthairat (PHILIPPINES)
- Dr. Chien Chia-Wei (TAIWAN)

IMPORTANT DATES

Registration period : 19th - 21st Oct 2018
 Local fee : 1.500.000
 Breakfast : 1.000.000
 Pre-Registration fee : 100.000.000
 FOR DETAIL INFORMATION :
 SEE OUR WEBSITE : www.sean2018.com

KEYNOTE SPEAKERS

- Prof. Bambang HIRAWAT
Department of Space Science and Technology
- Prof. Usman HAJIHAJIRI
Department of Physics, Institut Teknologi Sepuluh Nopember

PUBLICATION PARTNER



CHAIRMAN OF LOC (PROF. TOTO WINATA)

LIMITED SEAT

SEAN
LAMPUNG INDONESIA
19-21 OCTOBER

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