

Observation Fields for Ionosphere monitoring in Chiang Mai

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Together with NICT & STEL lab



Since 2002, CMU, NICT and STEL started their Ionospheric observation in Thailand project.

There are two sites of observatory; at Mae Hea Campus and Sirindhorn Observatory, Chiang Mai University site.

A FM-CW ionosonde was operated since 2002 at Mae Hia Campus.

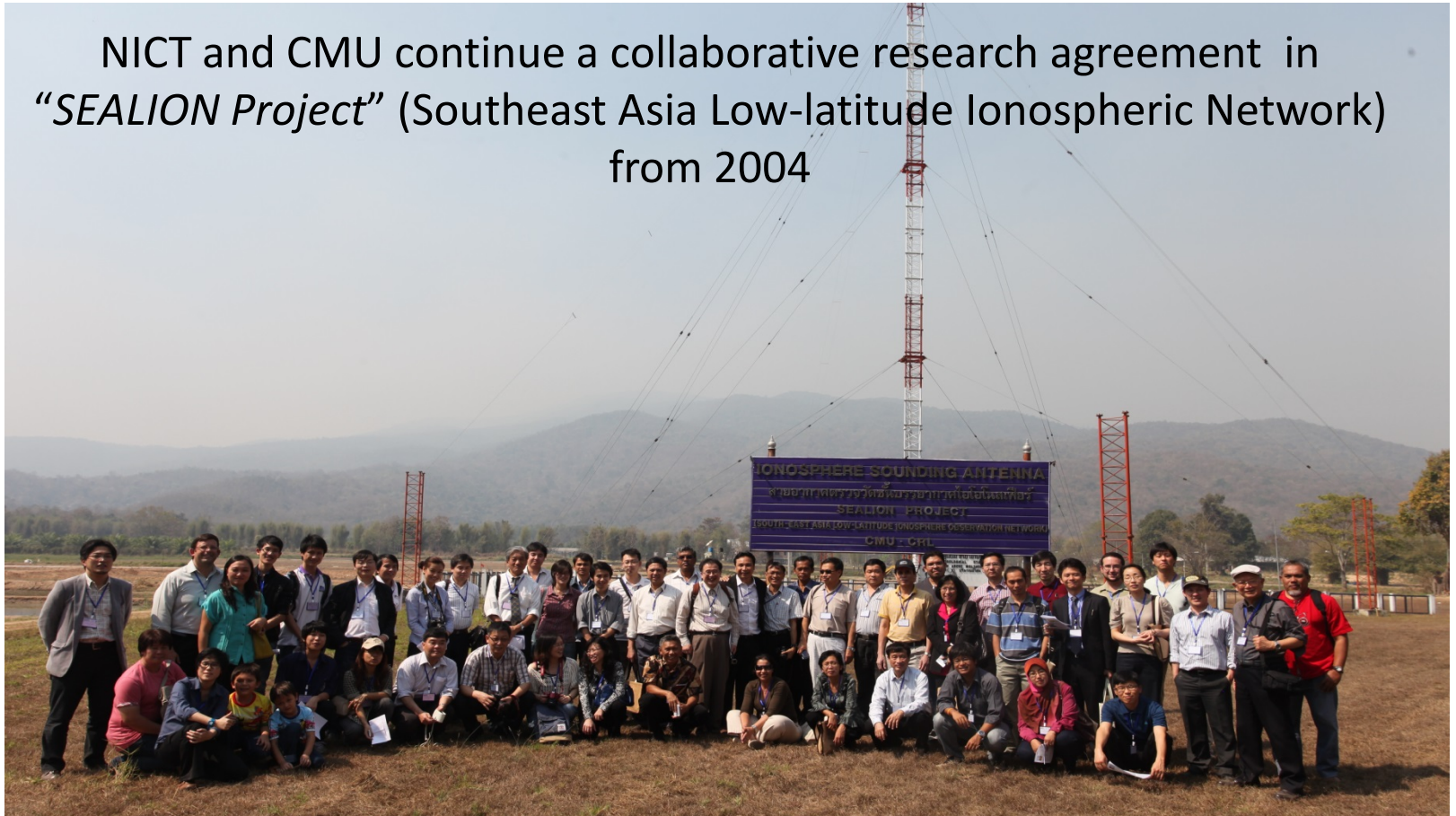
An all-sky imager and a Fabry-Perot interferometer were installed in 2009 at Sirindhorn Observatory, Chiang Mai University.

The data collected from these instruments was achieved and analysis by the NICT (SEALION project) and STEL.



Space Environment Research Activity

NICT and CMU continue a collaborative research agreement in “*SEALION Project*” (Southeast Asia Low-latitude Ionospheric Network) from 2004



CMU staff members

- Asst. Prof. Tharadol Komolmis, Faculty of Engineering.
- Asst. Prof. Siramas Komonjinda, Faculty of Science.

MOU

Memorandum of Understanding between NICT and CMU in
Information and Communications Technology
(*Photonics Communications And Space Environment*)

Duration 1 November 2012 – 31 October 2015

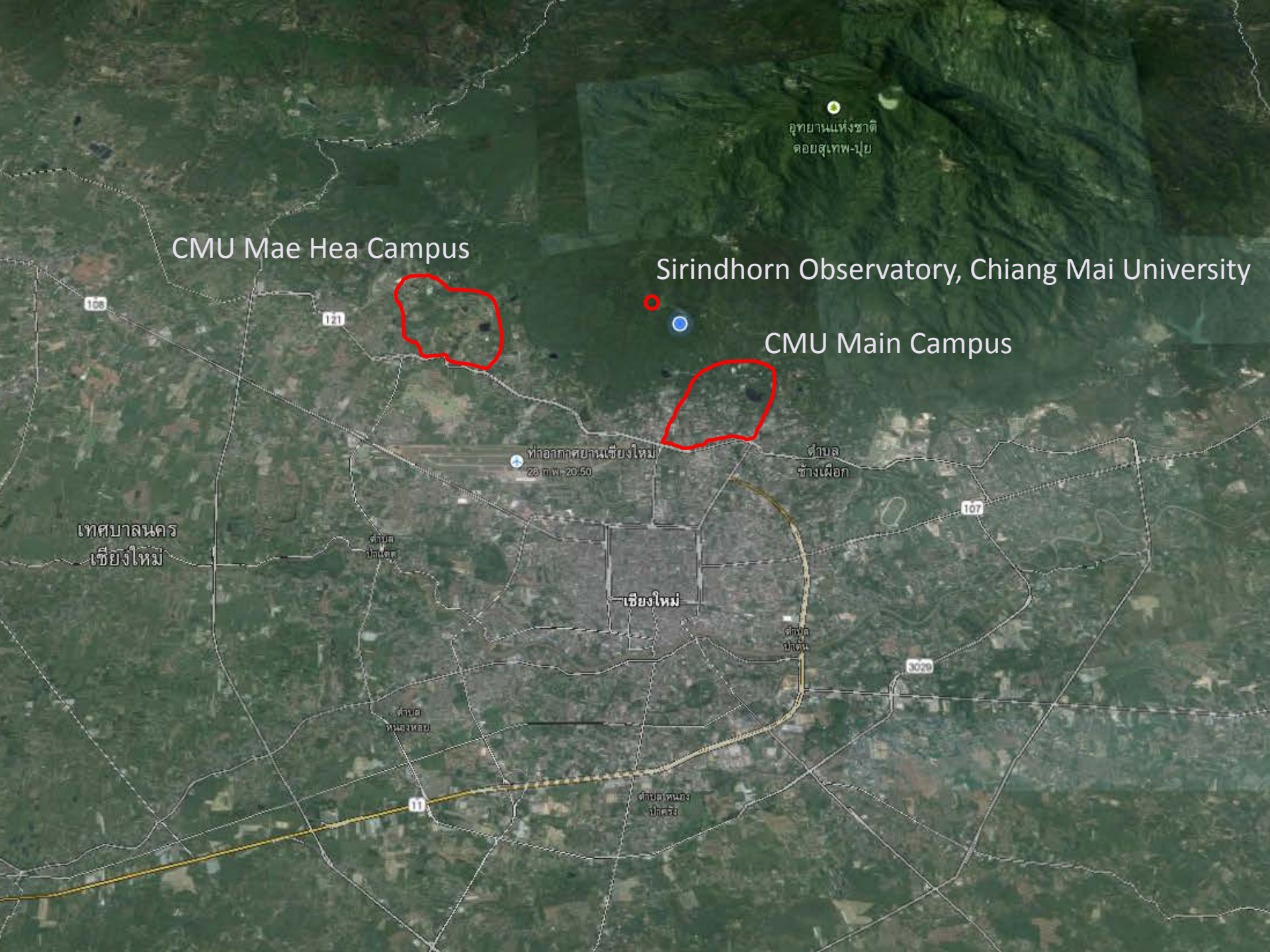
Signed on 17 December 2012



Space Environment Research Activity

1st AOSWA Workshop





CMU Mae Hea Campus

Sirindhorn Observatory, Chiang Mai University

CMU Main Campus

อุทยานแห่งชาติ
ดอยสุเทพ-ปุย

เทศบาลนคร
เชียงใหม่

เชียงใหม่

ตำบล
ป่าแดด

ตำบล
ช้างเผือก

ตำบล
หนองหอย

ตำบล
ป่าแดด

ตำบลหนอง
ป่าครั่ง

ท่าอากาศยานเชียงใหม่
20 กม. - 20.50

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101

107

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11

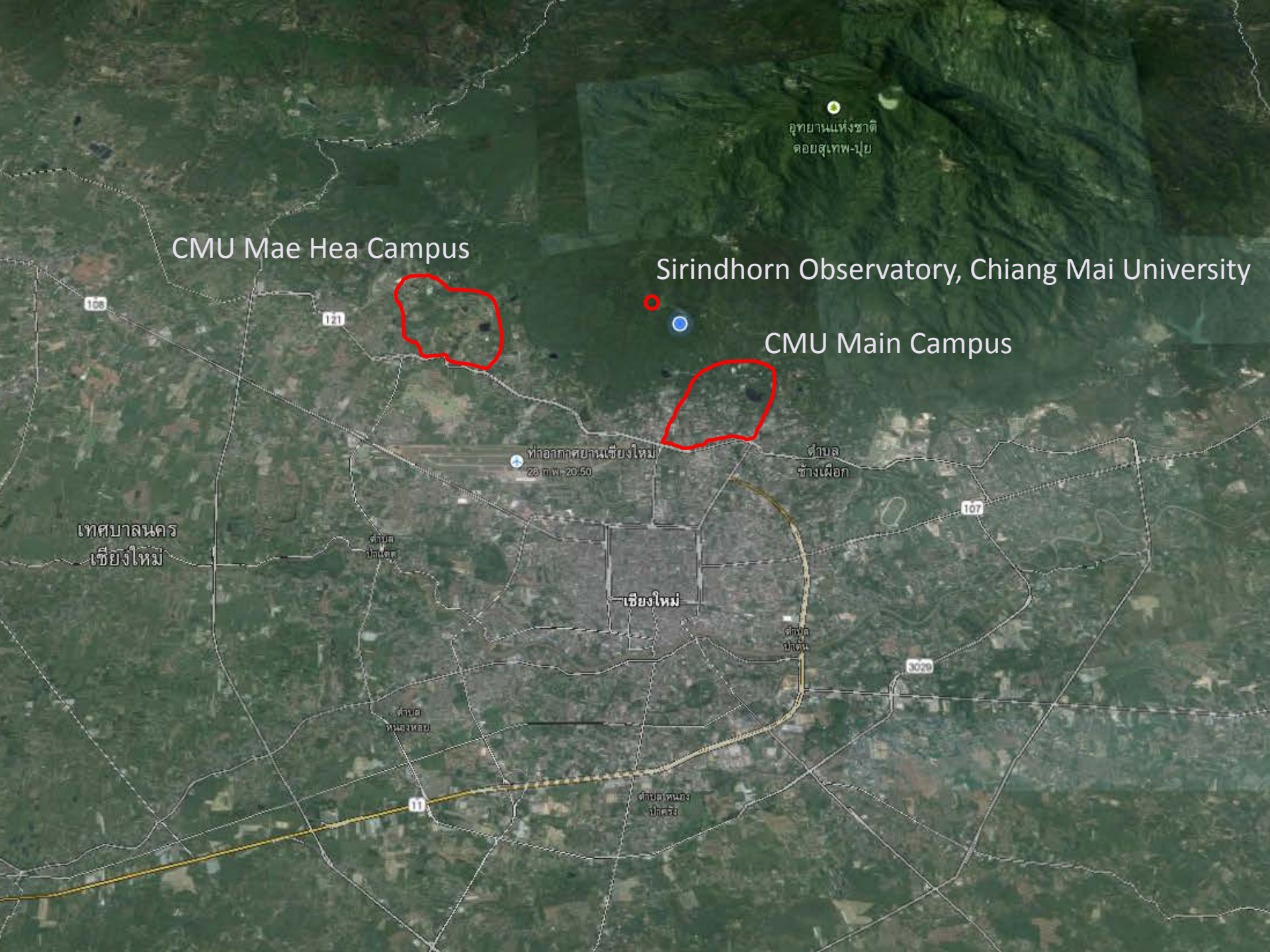
Mae Hea Campus



Space Environment Research Activity

- Operate Ionosonde Observation station at Mae Hea campus to collect Ionogram, Total Electron Content (TEC) and GPS data.





CMU Mae Hea Campus

Sirindhorn Observatory, Chiang Mai University

CMU Main Campus

อุทยานแห่งชาติ
ดอยสุเทพ-ปุย

เทศบาลนคร
เชียงใหม่

เชียงใหม่

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ท่าอากาศยานเชียงใหม่
28 กพ-20.50

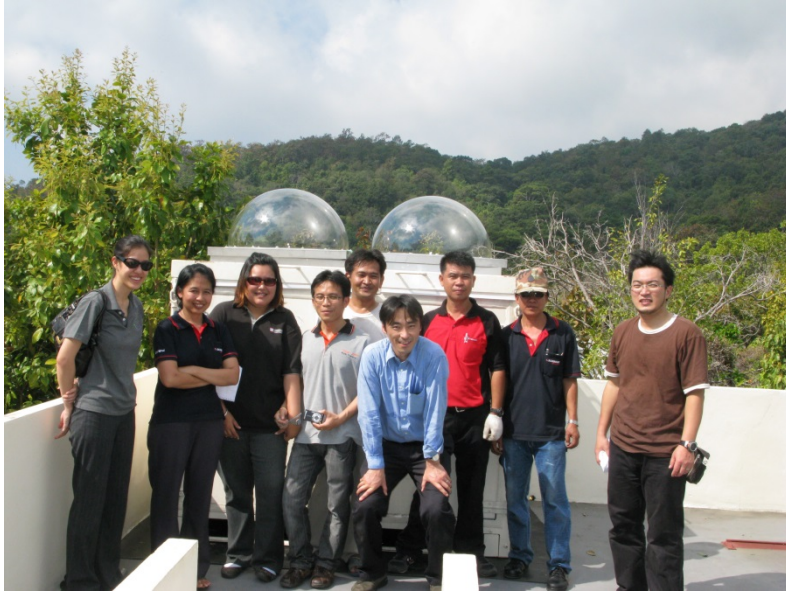
Sirindhorn Observatory, Chiang Mai University

(18° 57' N, 98° 55' E, 789-m AMSL)



Space Environment Research Activity

- Operate an All-Sky Imaging system installed at Sirindhorn Observatory ,Chiang Mai University.



Collaborative Research Agreement

NICT and CMU signed a collaborative research agreement in the topic
“Standardization of a method for optoelectronic frequency response measurement”

Scope: 1. Photodiode measurement method
2. International Standardization

Period: 3 years from 29 January 2013

Meetings concerning the research agreement:

1. Regular meetings over Skype
2. Meetings during visits and standardization forum

Collaborative Research Agreement

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“Standardization of a method for optoelectronic frequency response measurement”

Publications:

International Conference papers

- T. Tangmala, U. Mankong, K. Inagaki and T. Kawanishi, “PD frequency response measurement technique using MZM with two-tone lightwave power control,” in *Lasers and Electro-Optics Pacific Rim (CLEO-PR), 2013 Conference on*, Kyoto, Japan, 30 July – 4 August 2013.
- K. Inagaki, U. Mankong and T. Kawanishi, “Error Analysis of Optoelectronic Frequency Response Measurement of Photodiodes Using High-Extinction Ratio Mach-Zehnder Modulator,” in *The 11th International Conference on Optical Communications and Networks (ICOON2012)*, Pattaya, Thailand, 28-30 November, 2012.
- T. Tangmala, S. Potha, U. Mankong, K. Inagaki and T. Kawanishi, “Optoelectronic Frequency Response Measurement Using Standard Mach-Zehnder Modulator,” in *The 11th International Conference on Optical Communications and Networks (ICOON2012)*, Pattaya, Thailand, 28-30 November, 2012.

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Standardization Publication and attendance:

Asia pacific standardization program forum meetings (ASTAP)

- Expert Group on Millimeter Wave Communication Systems, 20th Asia Pacific Telecommunity (APT) Standardization Program Forum, 30 July – 1 August, 2012
- Expert Group on Millimeter Wave Communication Systems, 21st Asia Pacific Telecommunity (APT) Standardization Program Forum, 11 – 15 March, 2013
Contribute Input document “Realization of Two-tone O/E Characterization Technique” ASTAP21-INP95
- Expert Group on Millimeter Wave Communication Systems, 22nd Asia Pacific Telecommunity (APT) Standardization Program Forum, 11 – 14 September, 2013
Work published in APT Report on Characteristics and Requirements of Optical and Electrical Components for Millimeter-wave Radio on Fiber Systems
[**APT/ASTAP/REPT-03 \(Rev.1\)**](#)

Staff & Student visits to NICT

1. CMU staff members : Asst. Prof. Dr Ukrit Mankong and Asst. Prof. Dr. Nipapon Siripon visit to NICT
To conduct research in Optoelectronic Measurement
30 June 2013 – 13 July 2013
2. CMU student: Mr Tanawat Tangmala (for MEng degree) visit to NICT
Under NICT Internship program for 2 month period between May-July 2013
To conduct research in AM&PM Characterization And Frequency response of EAM

NICT visits to CMU

1. Dr. Keizo Inagaki and Dr. Atsushi Kanno's visit to CMU
30 August 2013
2. Dr. Keizo Inagaki's visit to CMU
25 November 2013

Discussion topics:

- (1) mobile back haul study
- (2) PD's Frequency response measurement system
- (3) EA modulator's experiment.

NICT visits to CMU

for Space Environment Research Activity

- Dr. Takuya Tsugawa and Dr. Takumi Kondo visit to Ionosonde station and Sirindhorn observatory on 23-25 April 2013.

To Repair FMCW system, Replace PCs, Install JAXA's Multi-GNSS receiver and antenna at Ionosonde station and check status of the All-sky imaging system.



NICT visits to CMU

for Space Environment Research Activity

- Dr. Takuya Tsugawa and Dr. Takumi Kondo visit to Ionosonde station and Sirindhorn observatory on 6-8 August 2013.

To repair the Ionosonde antenna.



National Observatory

ดอยอิน
ทนนท์

อุทยานแห่งชาติ
ออบหลวง

อุทยานแห่งชาติ
ดอยอินทนนท์

ลำพูน

เทศบาลนคร
เชียงใหม่ เชียงใหม่

CMU New Campus (Sri Bua Barn)

อุทยานแห่งชาติ
ดอยขุนตาล

ลำปาง



Thai National Observatory

(18° 34' N, 98° 28' E, 2,457-m AMSL)



Thai National Telescope



Thank you for your attention.
Research collaborations are welcome.

