

GPS Data Network and Ionospheric Monitoring in Thailand

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Outline

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- ❖ Available GPS and Ionospheric stations in Thailand
- ❖ Chumphon and Nongkai Stations Setup
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- ❖ Implementation and Future Plans



Background and Motivation

Since 2005, KMITL and NICT have cooperated to install the ionosondes, magnetometer, all-sky imager and the GPS receivers at several provinces of Thailand at Chiangmai, Chumphon, Bangkok and Phuket. This is part of the SouthEast Asia Low-Latitude Ionospheric Observation Network (SEALION)





Background and Motivation

- ❖ GPS data collection is central to the research and study in many areas such as ionospheric study, land movement study, weather model, satellite communication, aeronautical applications and others.
- ❖ There exists a number of GPS stations /sites in Thailand, whereby separate agencies are involved and responsible for.
- ❖ It is necessary to continue GPS and Ionospheric data collection and make the data available to researchers and interested domestic and international agencies/organizations.

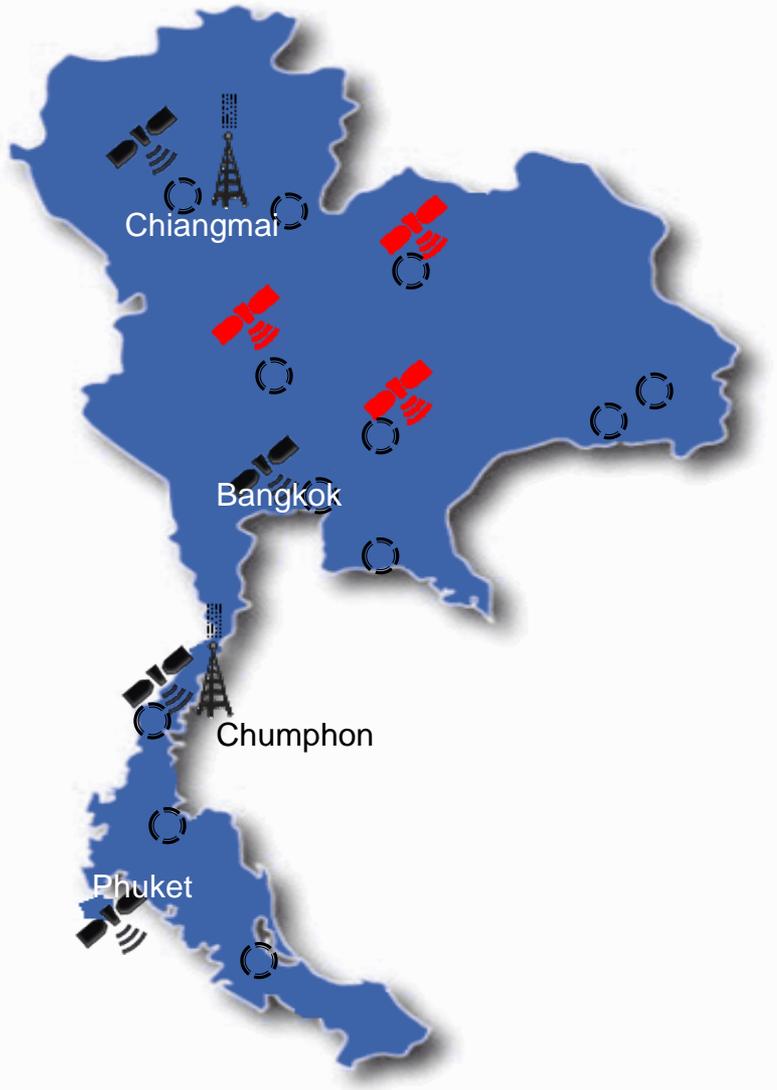


Available GPS and Ionospheric Stations in Thailand

- ❖ SEALION
- ❖ KMITL + Chulalongkorn University + Kyoto University
- ❖ Chulalongkorn University (1 IGS station)
- ❖ Department of Public Works and Town and Country Planning (11 stations)
- ❖ Department of Lands (11 stations)
- ❖ Aeronautical Radio of Thailand (AEROTHAI)
- ❖ Royal Thai Navy (3 Ionosonde stations)
- ❖ Electronic Navigation Research Institute (ENRI) + KMITL + Stamford University + AEROTHAI



Available GPS and Ionospheric Stations in Thailand



- SEALION
- KMITL+Chulalongkorn Univ. + Kyoto Univ.

-  GPS data
-  Ionosonde data
-  Future stations to add in the network

More future additional locations but not shown on map

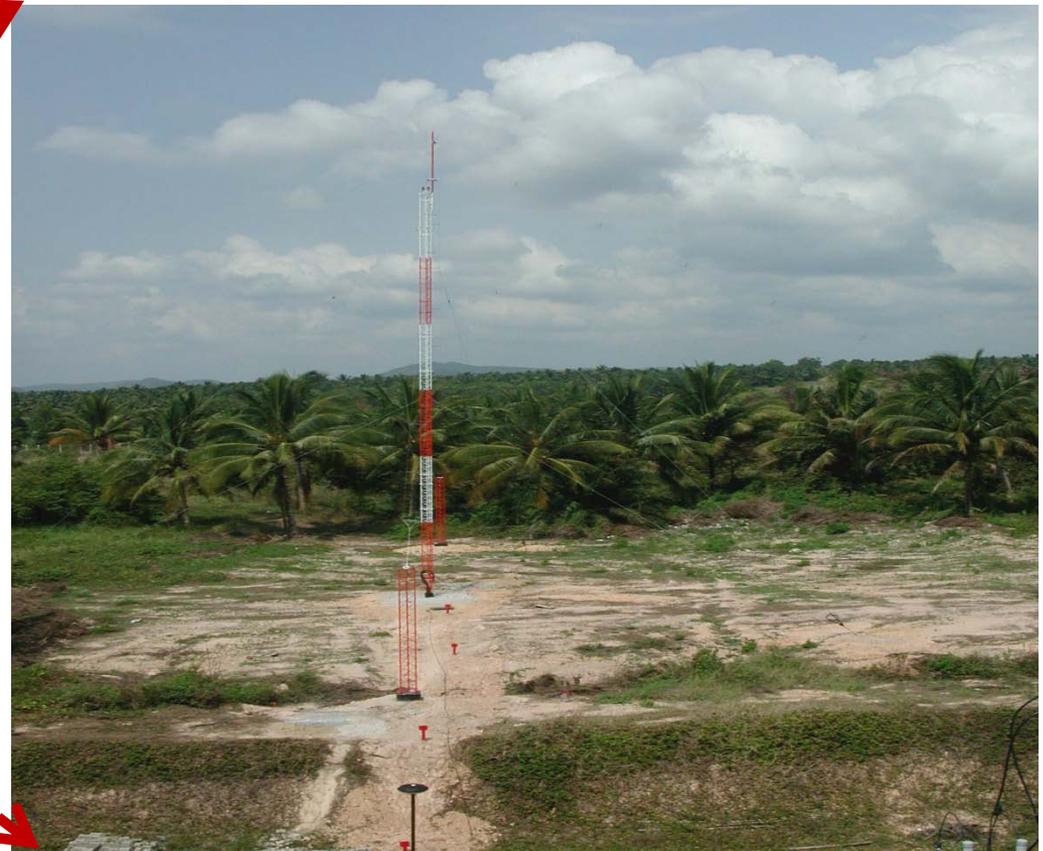
- Department of Public Works and Town and Country Planning (11 stations)
- Department of Lands (11 stations)
- Aeronautical Radio of Thailand (AEROTHAI)
- Royal Thai Navy (3 Ionosonde stations)
- ENRI+KMITL+Stamford University+AEROTHAI



Chumphon Station



Location	Latitude	Longitude	Geomagnetic Latitude
Chumphon	10.72 °N	99.37 °E	3.00 °





Chumphon Station Setup (Cont.)

Ionospheric irregularities

The ionosondes continuously transmit radio waves from 2 to 30 MHz and receive echoes from the ionosphere to provide the bottom side plasma density profile every 15 minutes



2-30 MHz

FM/CW



Antenna



Transmitter/
Receiver



Computer
record

Ionosonde Data

Specification	GPS measurement
Frequencies	$f_1 = 1575.42$ MHz $f_2 = 1227.60$ MHz
Polarization	Right hand circular
Antenna	Microstrip antenna
LNA gain	26 dB
Receiver model	JAVAD-GPS



GPS Data



Nongkai Station



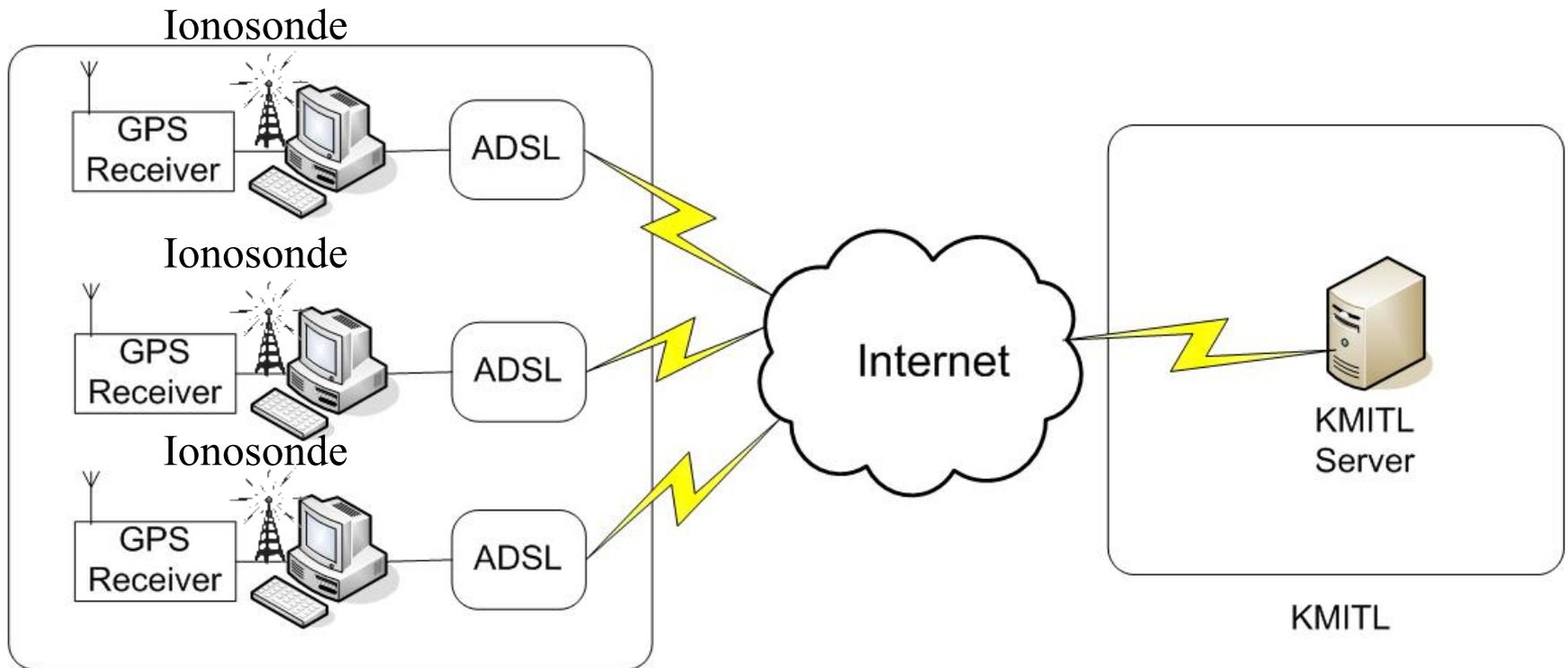
Nongkai Station Building



Server and GPS receiver



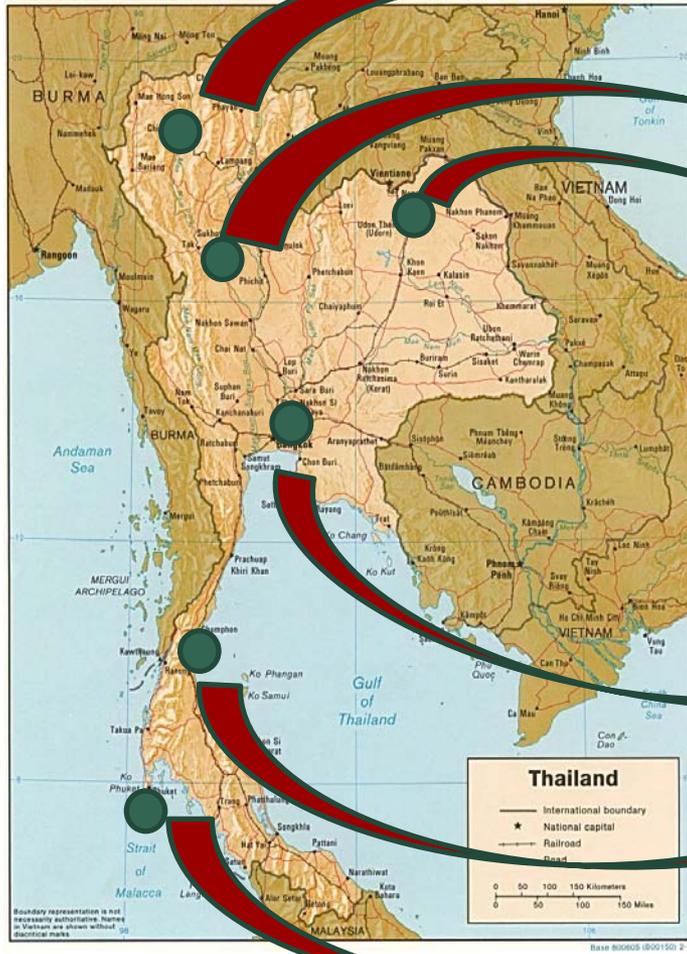
Network Setup



GPS and Ionosonde station



Network Setup (Cont.)



**KMITL
Data Center**



Thai GPS and Ionospheric Data Center Website

Home | Thai GPS and Ionospheric Data Center - Windows Internet Explorer

http://161.246.22.239/data/

File Edit View Favorites Tools Help

Home | Thai GPS and Ionospheric Data Center

THAI GPS AND IONOSPHERIC DATA CENTER

HOME DATA PARTNER KNOWLEDGE LINKS ABOUT US

Home

By Athipu Mongkolkachit on 03 August 2011

This project presents the current status of GPS networks and the efforts to create a GPS and ionospheric database in Thailand. At present, KMUTL and NICT have cooperated to implement GPS receivers at several provinces of Thailand such as Chiangmai, Chumphon, Bangkok and Phuket. These data are important for the study of ionosphere and its effects on the aeronautical navigation and satellite communication. We aim to create the database of GPS data and ionospheric parameters in the Thailand location. In our plan, the data center with collaboration among various universities and agencies is being foreseen.

In the plan, the GPS data center will collect the data from each GPS receiver as well as the ionosonde stations by using script at each station to send the raw data through the internet to the server at KMUTL. The database will be useful for the determination of TEC (Total Electron Content), ROTI (Rate of TEC Index), and enhances the study of the equatorial plasma bubble. The ionospheric and GPS data will be available to the public and researchers in Thailand and abroad.

USER LOGIN

Username: *

Password: *

Log in

[Create new account](#)

[Request new password](#)

youtube:

youtube:

Earth's

Chiang Mai

● SEALION

● KMUTL + Chulalongkorn University

start

อินเทอร์เน็ต

2:00 AM



Thai GPS and Ionospheric Data Center Website

The screenshot shows the website interface within a Windows Internet Explorer browser. The address bar displays the URL <http://161.246.22.239/data/node/11>. The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. The address bar also shows navigation buttons and a search engine (Bing). The website's navigation menu includes HOME, DATA, PARTNER, KNOWLEDGE, LINKS, and ABOUT US. The main content area features a large heading "THAI GPS AND IONOSPHERIC DATA CENTER" and a "USER LOGIN" section with input fields for Username and Password, a "Log in" button, and links for "Create new account" and "Request new password". Below the login section is a "Location of monitoring stations" table.

Stations	Data types	Since
Chaingmai	GPS and Ionosonde	2004
Bangkok	GPS	2002
Chumphon	GPS and Ionosonde	2005
Phuket	GPS and Ionosonde	2006
Sukhothai	GPS	2010
Nongkai	GPS	2010
Korat	GPS	xxx



Implementation and Future Plans

Plans	Time range
Collaborate to other organizations, such as AEROTHAI, Stamford University	July – September 2011
Install GPS station at Ubolratchathani station	October 2011
Analyze data (RINEX, ROTI, etc.)	November 2011
Implement 2D TEC map of Thailand	January 2012
Products (TEC/Ionospheric package analysis)	February 2012

*Thank you very much
for your kind attention*