GPS Data Network and Ionospheric Monitoring in Thailand

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Outline

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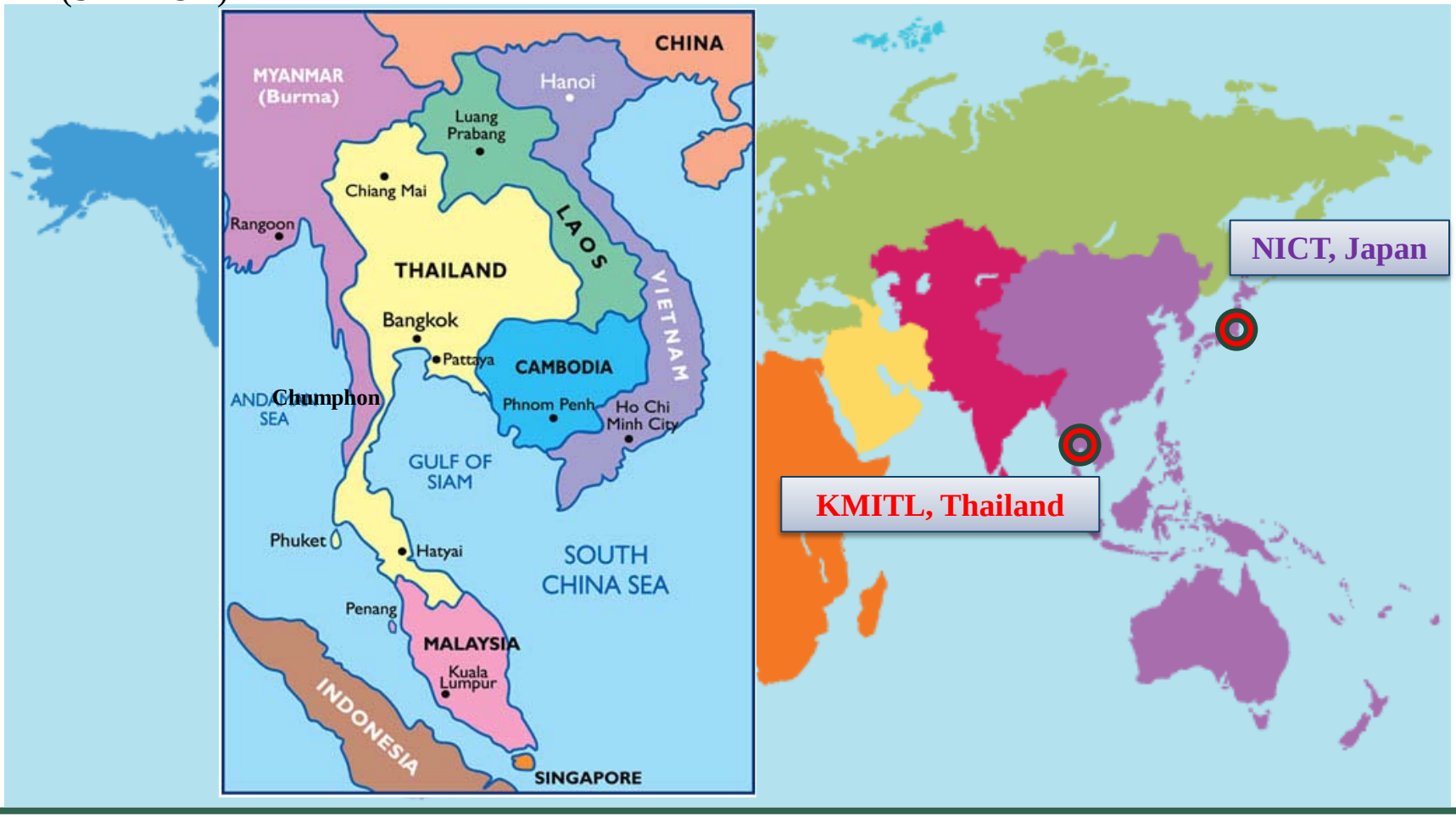
- Available GPS and Ionospheric stations in Thailand
- Chumphon and Nongkai Stations Setup
- Network Setup
- Thai GPS and Ionospheric Data Center Website
- Implementation and Future Plans

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)



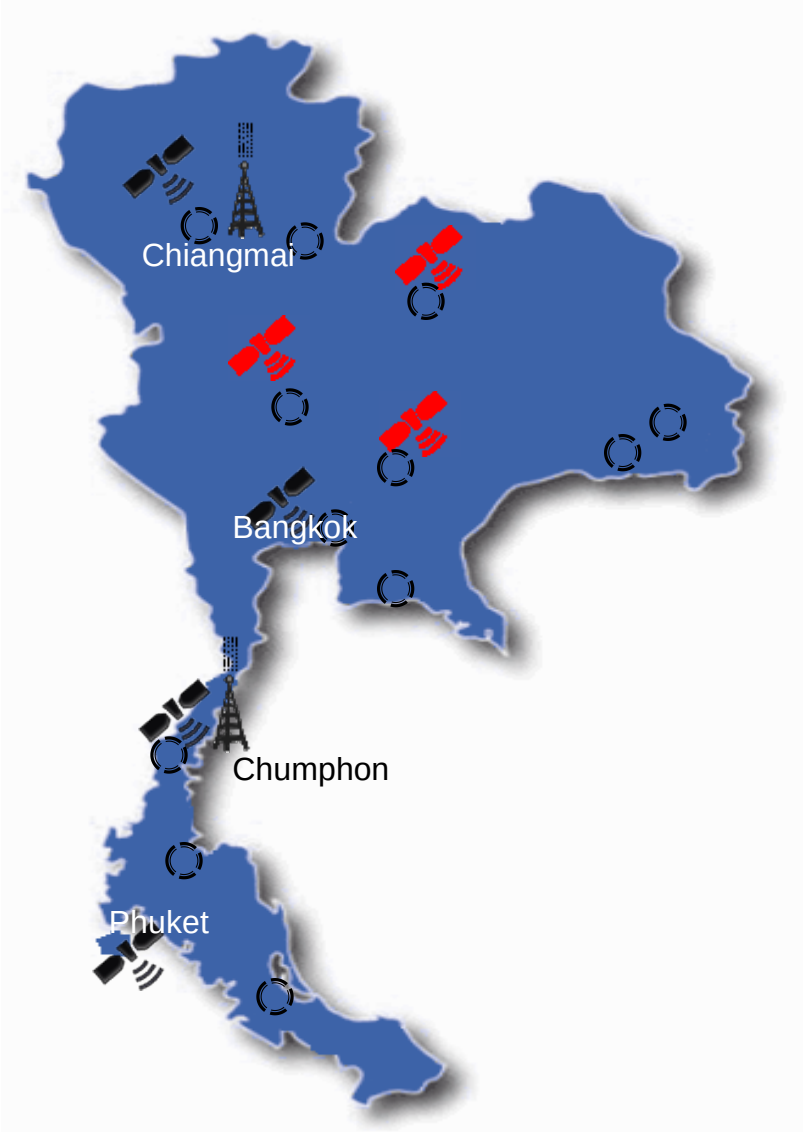
Background and Motivation

- 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)

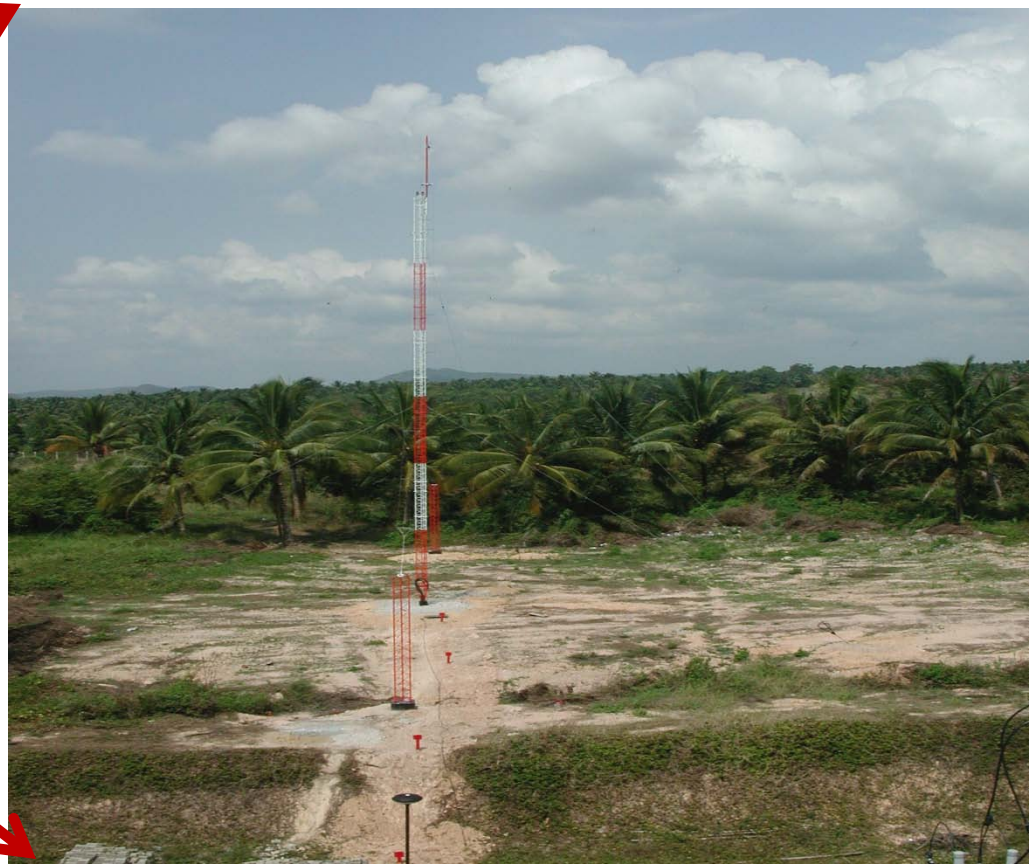
Aeronautical Radio of Thailand (AEROTHAI)

Royal Thai Navy (3 Ionosonde stations)

ENRI+KMITL+Stamford University+AEROTHAI

Chumphon Station

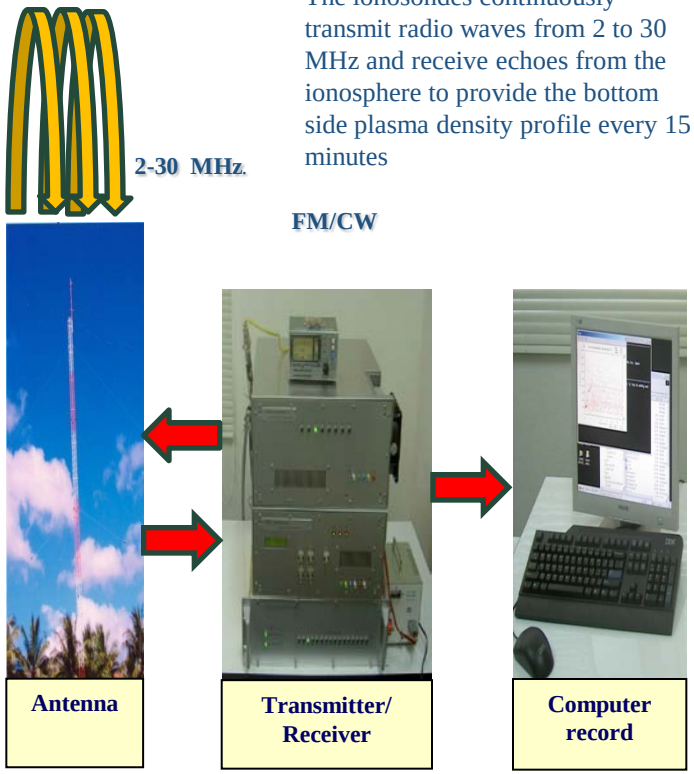
Location	Latitude	Longitude	Geomagnetic Latitude
Chumphon	10.72 °N	99.37 °E	3.00 °



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



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

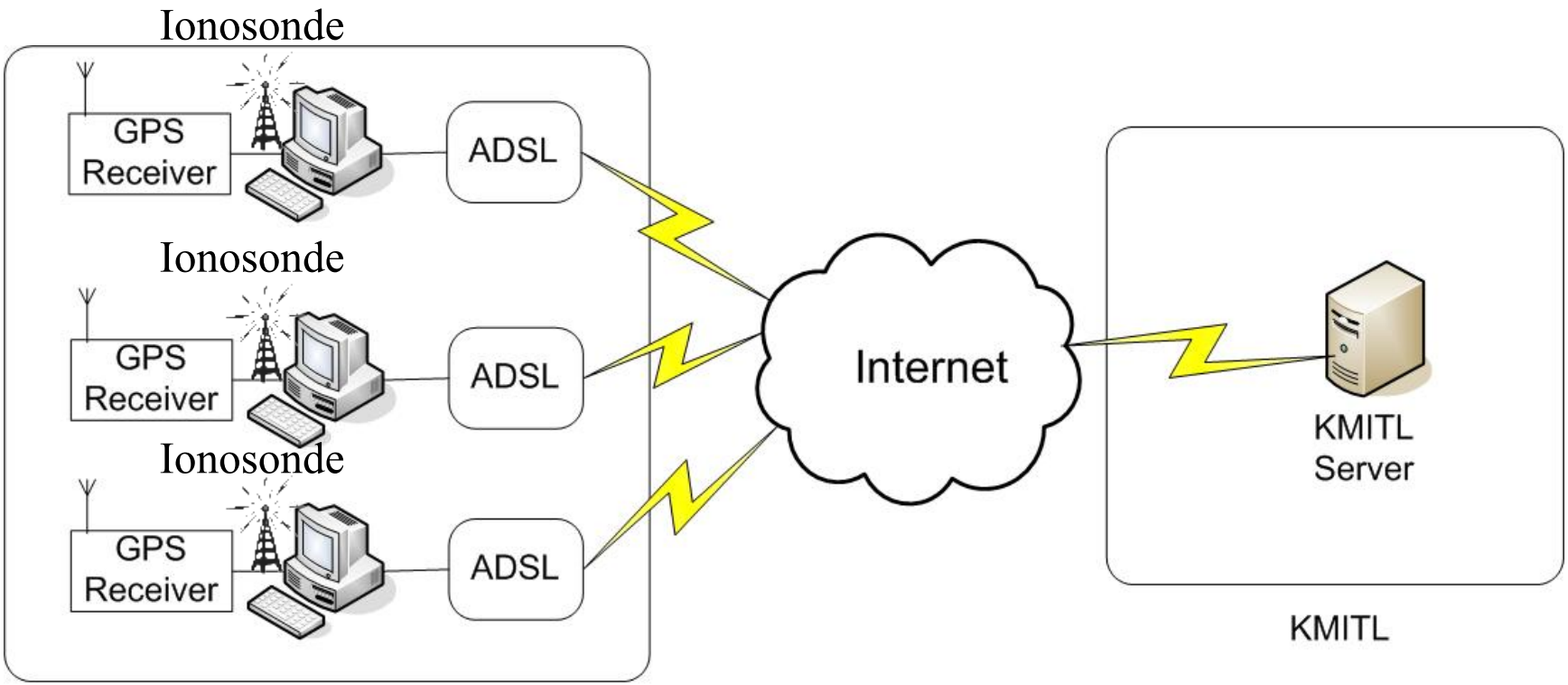
GPS Data

Nongkai Station

Nongkai Station Building

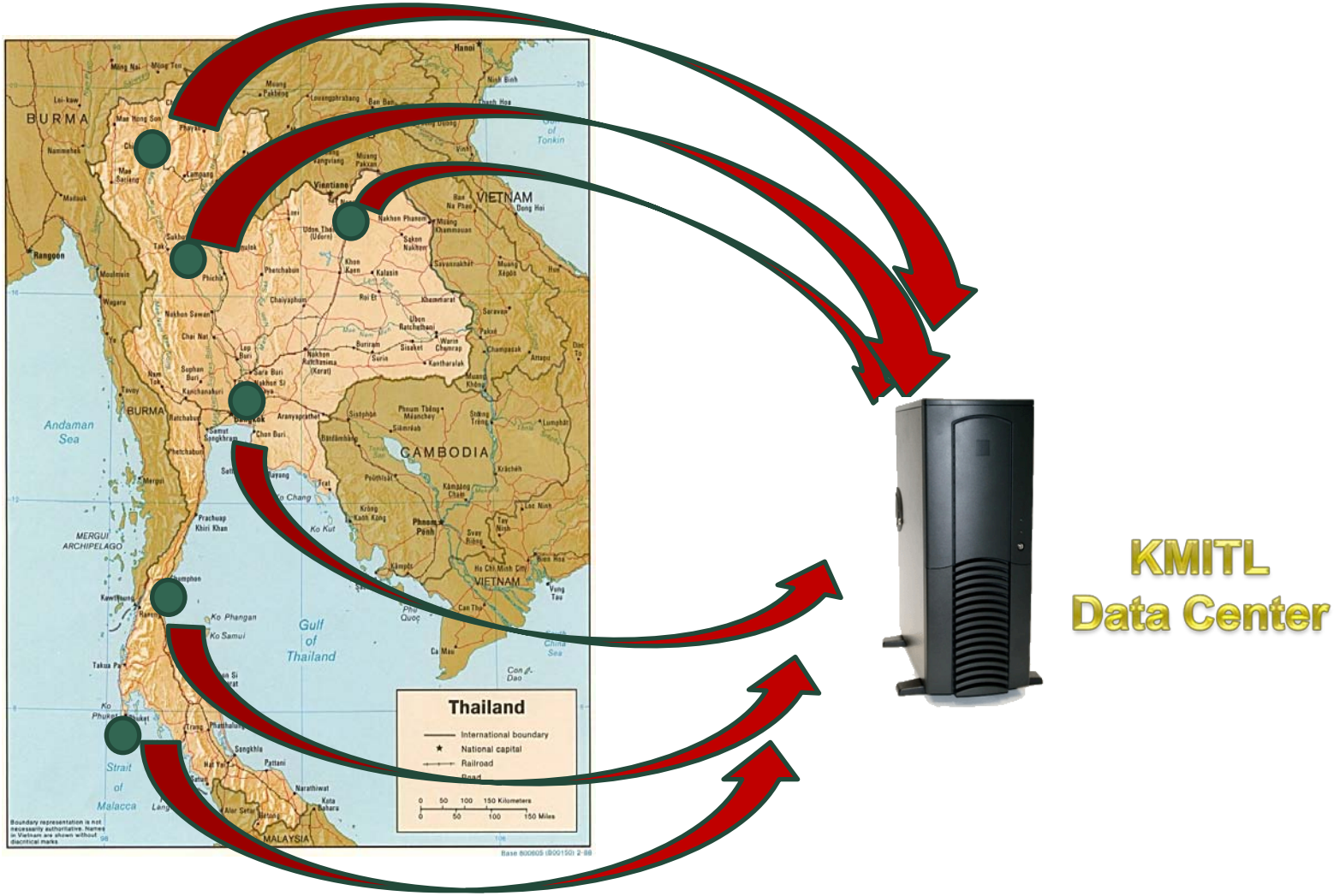
Server and GPS receiver

Network Setup

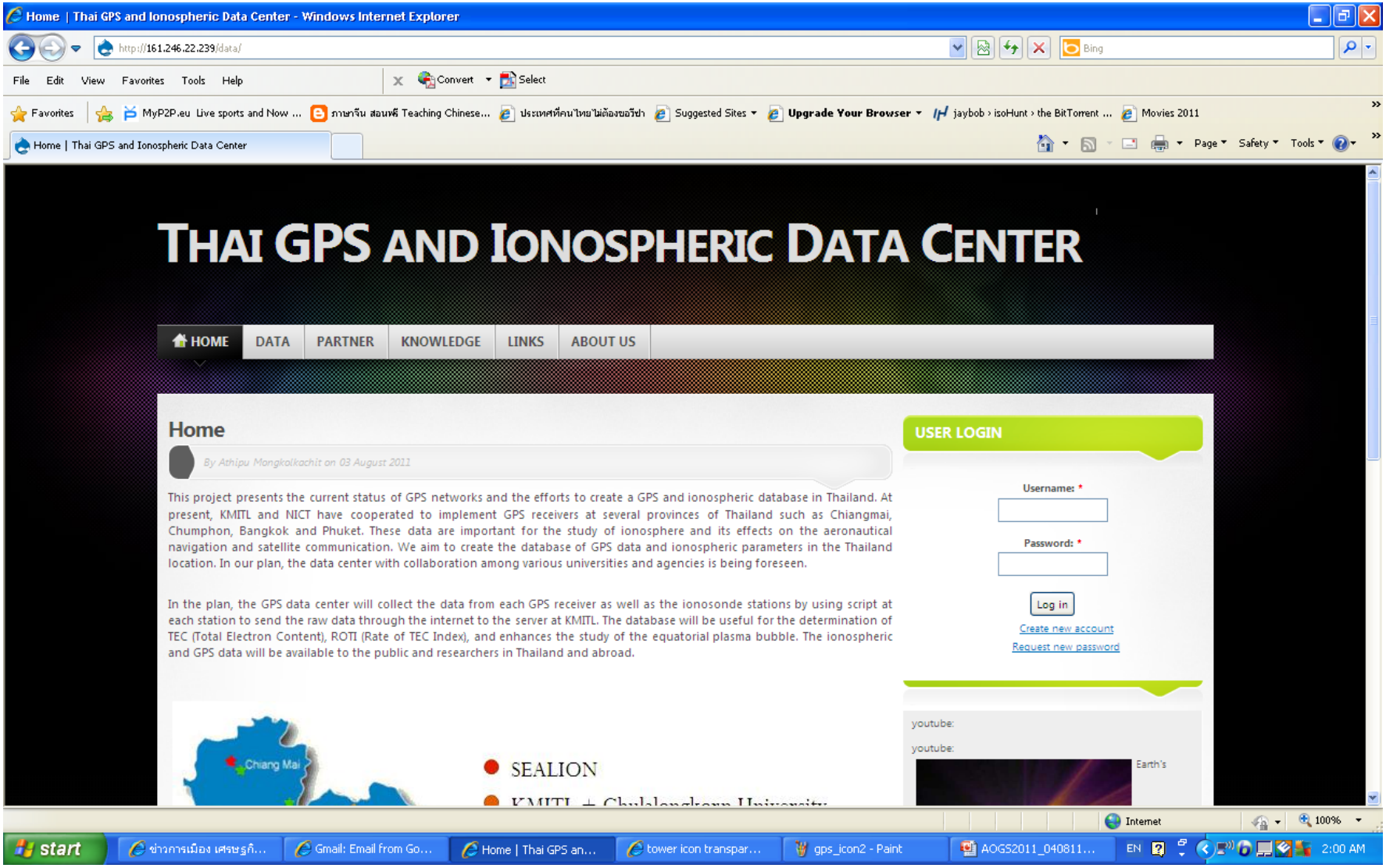


GPS and Ionosonde station

Network Setup (Cont.)



Thai GPS and Ionosperic Data Center Website



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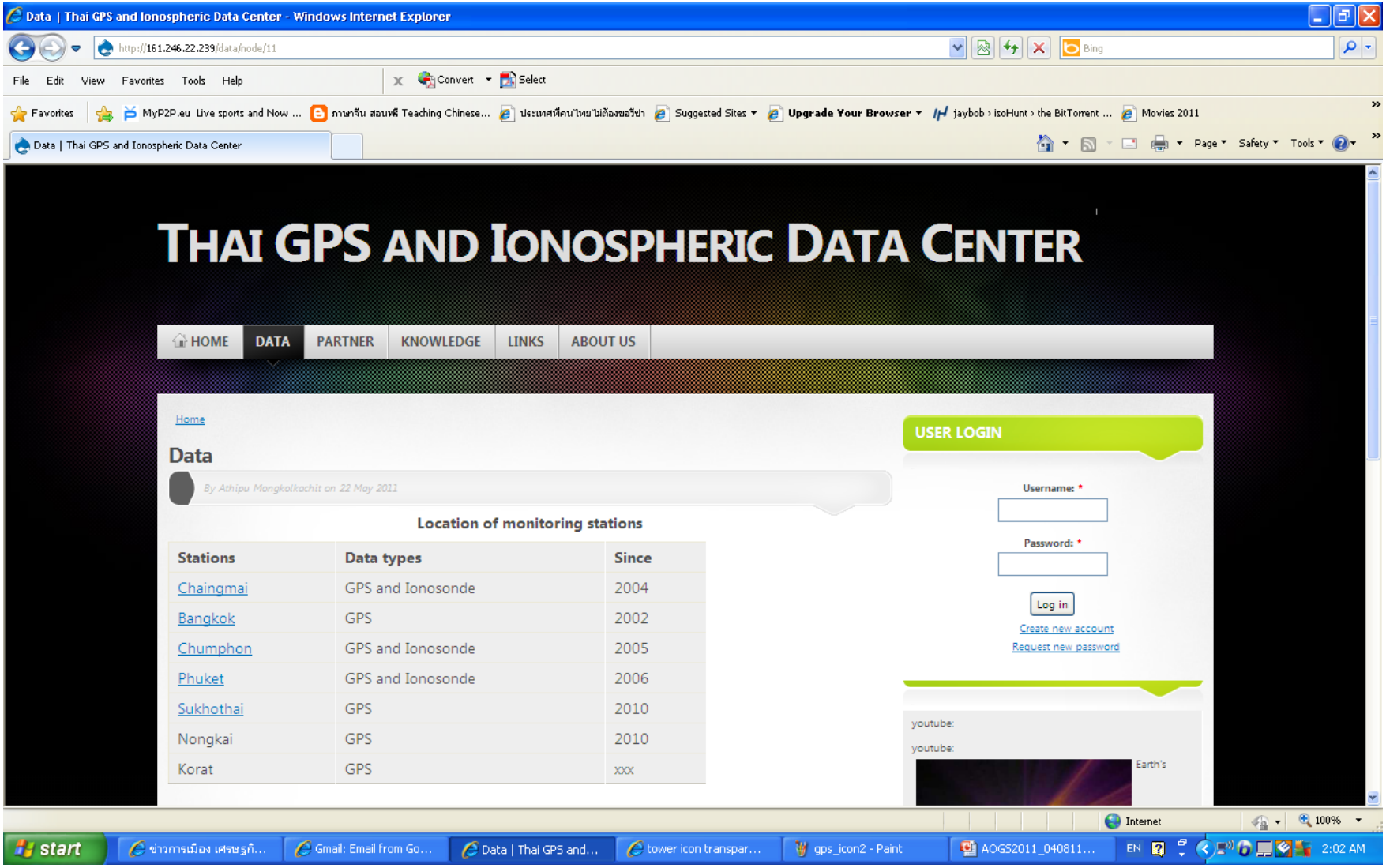

Implementation and Future Plans

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)	Februrary 2012

Thank you very much
for your kind attention