EOS Activities in Thailand:
Current Status

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Thailand EOS Facilities

- Activities under the direction of GISTDA, MOST
- 2 EOS Ground Receiving Stations
- Thailand EO satellite: THEOS
- EO Satellite data archiving system and data distribution: major EO satellites since 1984
- Applications in various fields
- Active member of CEOS and GEO – CEOS Chair 2009
Thailand EOS Ground Receiving Station

Current status:

- LANDSAT-5, RADARSAT-1, SPOT 2,4, 5
- THEOS
- ALOS (Asian sub-node)
- being upgraded for RADARSAT-2 and TERRA / AQUA MODIS
THEOS GROUND CONTROL STATION
SRI RACHA, CHOLBURI, THAILAND

S-band

X-band
Earth Observation Satellite Data Services

Satellite Data Archives & Services: since 1984
- LANDSAT, SPOT, MOS, ERS, JERS, ADEOS, RADARSAT, IRS, ALOS, IKONOS, QuickBird, WorldView
- TERRA/AQUA-MODIS (cooperation with AIT & U. of Tokyo)

Value-added Products Services:
- Image-maps
- Customer oriented products

On-line services:
- CBS (Web based satellite data browsing system)
- Web page: http://www.gistda.or.th
Open access of EO data:

GISTDA Webpage

- Public awareness:
  - Disasters situation: view from satellite
  - Web map server
2008 Flood
2008 Forest Fire
All products processed are published daily on the internet at http://modis.gistda.or.th

GISTDA’s MODIS Web Page: daily update

MODIS Value-added products via Internet

- Normalized Difference Water Index (NDWI) = (Band2 – Band5) / (Band2 + Band5)
- Normalized Thermal Index (NTI) = (Band22 – Band32) / (Band22 + Band32)
MODIS Products: False Color (MIR NIR Red)
MODIS Products: True Color (Red, Green, Blue)
Example of MODIS Products:

Normalized Difference Vegetation Index (NDVI)
Thailand Monitoring System

EOS Database and Services

End Users
- Policy makers
- Crisis managers
- Governors

Portals & Interfaces
- GISTDA Web GIS
- Sentinel Asia
- Asian +3

STD
- Map Server
- Database Server
- Web Server

Thematic Processing
- Land cover Map
- Cloud Map
- Flood Area Map
- Fire Spot Map
- Erosion Map
- Etc.

Spatial Database
- In Situ Data
- Image Preparation
- Image Correction
- Image Enhancement

Spatial Model
- Change detection
- Risk assessment
- Yield prediction
- Hydrology model
- Land zoning
- Etc.

Spatial Model
- Land Resources
- Marine Resources
- Disasters
- National Security

Satellite Images
- Satellite Images

Data

Information
THEOS Satellite

- THailand Earth Observation System (THEOS) program is developed by GISTDA with EADS ASTRIUM as a prime contractor (contract signed 19 July 2004)

- Mass: 750 kg.
- Orbit: Sun Synchronous
- Altitude: 822 km.
- Inclination: 98.7
- Repeat Cycle: 26 days
- Mean Local Time: 10.00 a.m.
- Payload:
  - Panchromatic telescope
  - Multi-spectral camera
- On-board Memory: 51Gb
- Mission Data: X-band Link
- TT&C: S-band Link
- Design Life Time: At least 5 Years
<table>
<thead>
<tr>
<th>THEOS Performance</th>
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| **Distance Between Passes (at Equator)** | 108 km (2 closest passes)  
2800 km (2 consecutive passes) |
| **Coverage Area** | All earth surface |
| **Access time** | 2 days with 50° tilting angle  
5 days with 30° tilting angle |
| **Off-nadir viewing** | ± 50° (roll and pitch) |
Acquisition Capabilities

- **Imaging Mode**
  - Multi target mode
  - Covering or Strip imaging

- **Repeat Viewing Capabilities**

- **Stereoscopic Capabilities**
THEOS Imagery

<table>
<thead>
<tr>
<th></th>
<th>PAN</th>
<th>MS</th>
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<tbody>
<tr>
<td>Resolution</td>
<td>2 m</td>
<td>15 m</td>
</tr>
<tr>
<td>Imaging swath</td>
<td>22 km</td>
<td>90 km</td>
</tr>
</tbody>
</table>
| Spectral ranges (µm) | P: 0.45 - 0.90 | B1(blue):0.45-0.52  
                       |         | B2(green):0.53-0.6  
                       |         | B3(red):0.62-0.69   
                       |         | B4(NIR):0.77-0.90   |

PAN | MS | PAN Sharpening
THEOS Launch

- THEOS was launched, at 13.37 BKK time on October 1, 2008, from Yasni launch site in Russia by Dnepr Rocket to 690 km. parking orbit
- Operating orbit, 822 km. will be reached within 2 weeks
THEOS First Image Acquisition on October 3, 2008
by Ladkrabang GRS
THEOS First Image Acquisition on October 3, 2008 at 690 km altitude
First THEOS multi-spectral image over (GSD: 1 5 m.)
Phuket island October 3, 2008 10h11 local time
First THEOS multi-spectral image (GSD: 1.5 m.)
Phuket island October 3, 2008 10h11 local time
First THEOS Panchromatic Image (GSD: 2 m.)
Phuket island October 3, 2008  10h11 local time
Potential Role of GISTDA

• Satellite data provider
• Sub-regional data clearinghouse (ASEAN)
• Training and capacity building within ASEAN
• GISTDA’ CEOS 2009 priorities:
  • support for key new tasks; climate change initiatives, forest carbon monitoring system, GHG emission coordination group…
Thank You for Your Attention

www.gistda.or.th