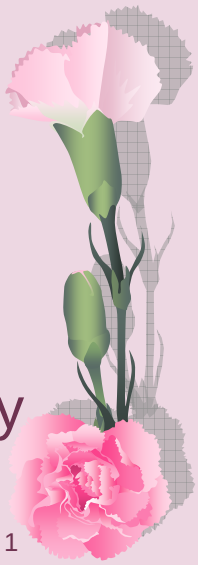
Asia-Pacific Earth Observation Pilot Project

– JAXA's Capacity Building Activities in Field of RS/GIS –

The 3rd Asian Water Cycle Symposium
2 December 2007

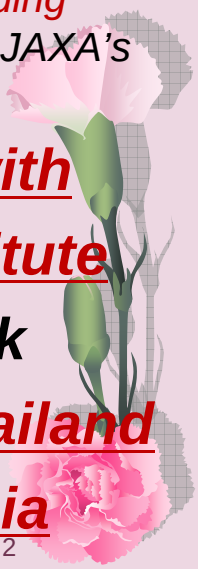
Yoko INOMATA
Special Staff
Satellite Applications and Promotion Center (SAPC)
Japan Aerospace Exploration Agency (JAXA)
http://www.jaxa.jp



Asia-Pacific E.O. Pilot Project

- *"Asia –Pacific Earth Observation Pilot Project" is a general term for JAXA's capacity building activities in field of Earth Observation.*
- *At the "World Summit on Sustainable Development (WSSD)" held in summer 2002 in Johannesburg, South Africa, the Government of Japan proposed the following 3 then on-going capacity building activities of JAXA and they were registered as Japan's and JAXA's contribution to Earth Observation of the Asia-Pacific region:*

1. ***Training Programs in cooperation with Geo-Informatics Center, Asian Institute of Technology (GIC-AIT) in Bangkok***
2. ***ALOS Pilot Project with GISTDA,Thailand***
3. ***ADEOS-II P.P. with LAPAN, Indonesia***



Objectives of JAXA's Capacity Building Activities

1. *Provide necessary technical know-how to the RS & GIS users in the Asian region **as a contribution by Japanese Government to capacity building recognized at WSSD, EO Summit, CEOS, UNWCDR and GEOSS**;*

2. ***Use Japanese satellite data archived for more than last 25 years** for disaster management, sustainable development, planning and monitoring purposes in the region;*

3. ***Develop in-house capacities of prospective users in the region** by working on project-based training programs; and*

4. ***Identify future space technology needs in the region** for better services to be provided by Japanese satellite programs.*

13-Year History of JAXA's Capacity Building Activities with GIC-AIT for Asia

1. *For last 13 years starting from April 1995, JAXA has been entrusting a responsibility to its partner, **Geo-Informatics Center (GIC), Asian Institute of Technology (AIT)** located in Bangkok, Thailand, in order to carry out the training programs focusing on RS and GIS for the Asia-Pacific region.*

2. *The **contents of the training programs have sometimes changed** by the requests made through those years.*

Outline of JAXA's Capacity Building Activities with GIC-AIT

1. ***Number of Trainees (April 1995 - March 2007):***

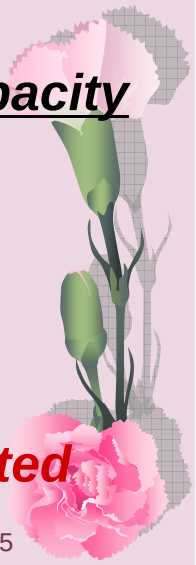
   More than 1,200 persons from 27 Countries

2. ***Annual Project Cost JAXA Spends for Capacity Building Activities with GIC-AIT:***

   Approx. $US300,000

3. ***Staff working at GIC-AIT:***

   12 Asian staff under the Sri Lankan Invited Scientist dispatched by JAXA to AIT



Composition of JAXA's Training Program with GIC-AIT

In order to accomplish the formerly mentioned ***4 objectives of JAXA's capacity building activities****, JAXA and AIT have been focusing on* ***"Mini-Projects"*** *since 2005*

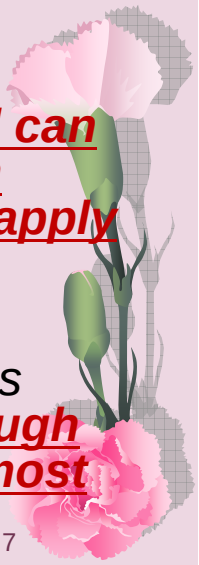
(JFY lasts from April to March.)

Characteristics of Mini-Projects

1. *Mini-projects, **started in 2005**, are **an object-oriented training program in field of RS and GIS**. Participants, who are mainly governmental specialists, are requested to select a topic considered most suitable to their own needs.*

2. *Unlike the conventional topics, **this new method can facilitate the participants to work in their own areas for a considerable amount of time and apply RS in their day to day work**.*

3. *Mini-projects are designed to contribute to JAXA's capacity building for the Asia-Pacific region **through classroom training and field work in a topic most relevant to each participating organization**.*



List of JAXA's Training Programs Conducted in cooperation with GIC-AIT - 1/3

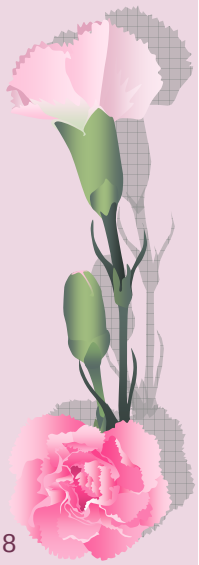
<*JFY1995*>
- *Introduction to PC-Based GIS*

<*1996*>
- *Forest & Natural Resources Management*

<*1997*>
- *RS/GIS/GPS for Mid-Level Managers (Philippines)*
- *GIS and RS for Watershed Management*
- *GIS and RS for Land Use Planning*
- *Remote Sensing and GIS in Nepal (Nepal)*
- *Microwave Remote Sensing*

<*1998*>
- *GIS and Remote Sensing for Watershed Management*
- *SAR data Potentials and Applications*
- *GIS, RS and GPS (Indonesia)*
- *GIS and RS for Flood Mitigation*

<*1999*>
- *GIS and RS for Watershed Management*
- *Mapping from Space (Sri Lanka)*
- *Flood Mitigation (Bangladesh)*
- *SAR Data Potentials and Applications*
- *GIS and RS for Coastal Zone Management*



List of JAXA's Training Programs Conducted in cooperation with GIC-AIT - 2/3

<2000>
- GIS and Remote Sensing for Watershed Management
- GIS and Remote Sensing for Coastal Zone Management
- Potential and Applications for Microwave RS
- Mapping from Space (Cambodia)
- GIS and Remote Sensing for Forest Management (Myanmar)

<2001>
- GIS and Remote Sensing for Coastal Zone Management
- Potential and Applications for Microwave RS
- Watershed Management for ASEAN (Malaysia)

<2002>
- Watershed Management (LaoPDR)
- GLI Training
- GIS and Remote Sensing for Coastal Zone Management
- Moderate to Low Resolution Satellite Data
- Open GIS
- GIS and Remote Sensing for Disaster Mitigation

<2003>
- Caravan Training-I in Philippines
- Potentials & Applications of SAR
- RS & GIS for Urban Planning
- (Bangladesh)
- Caravan Training-II in Cambodia

List of JAXA's Training Programs Conducted in cooperation with GIC-AIT - 3/3

<2004>
- Caravan Training-I in Indonesia
- Basic Course in Remote Sensing and GIS
- Advance Course in RS and GIS
- RS and GIS for Disaster Risk Assessment
- Caravan Training-Ⅱ in Myanmar

<2005>

Caravan Training:
- Coastal Mapping using High Resolution Satellite Data
- RS and GIS for Watershed Management

Mini-Projects:
- Flood Mitigation
- Land Use Planning Resource Management
- Drought, Flood
- Urban Planning for Earthquake Disaster Management
- Landslide, Flood
- Paddy Area Mapping and Yield Estimation
- Landslide Vulnerability
- Mangrove Forest Management for Flood Mitigation

Composition of 2006 Mini-Projects

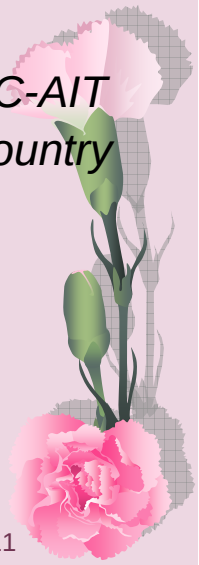
In JFY2006 , JAXA and AIT conducted 10 object-oriented Mini-Projects especially focusing on Disaster Management:

Duration: 9 weeks through the year

1st Term : 4-week classes and research work at GIC-AIT
2nd Term: 1-week field work at each participant's country with GIC-AIT staff who are dispatched
3rd Term: 4-week Final-Report Making at AIT

Number of Trainees:

22 persons of 22 organizations from 11 countries



2006 Mini-Projects focusing on Disaster Management - 1/2

1. Bangladesh: Flood Vulnerability Assessment
1) Bangladesh Disaster Preparedness Centre (BDPC)
2) Local Government Engineering Department (LGED)
3) Flood Forecasting & Warning Center(FFWC)

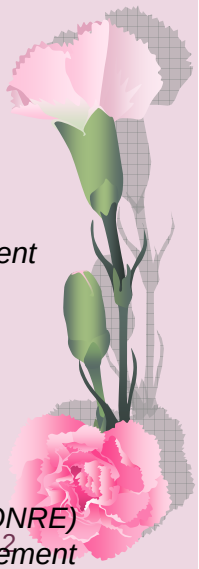
2. Cambodia: Flood Vulnerability Assessment
1) Geography Department, Ministry of Land Administration
2) Mekong River Commission (MRC)

3. China PR: Flood Risk Assessment
1) National Disaster Management Center (NDMC)
2) Beijing Normal University (BNU)

4. Lao PDR: Flood Vulnerability Assessment
1) Environmental Research Institute (ERI), Science Technology and Environment Agency (STEA)
2) Department of Hydrology and Meteorology

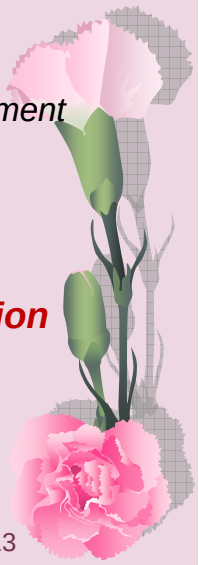
5. Nepal: Flood Risk Assessment
1) Survey Department
2) Department of Hydrology and Meteorology

6. Vietnam: Landslides
1) Remote Sensing Center, Ministry of Natural Resources & Environment (MONRE)
2) Disaster Management Center (DMC), Ministry of Agriculture & Dike Management



2006 Mini-Projects focusing on Disaster Management - 2/2

7. ***Sri Lanka: Landslide Hazard Mapping***
   1) Survey Department
   2) National Building Research Organization (NBRO)
8. ***Philippines: Landslide Hazard Mapping***
   1) National Mapping and Resource Information Authority (NAMRIA)
   2) Philippines Institute of Volcanology and Seismology (PHIVOLCS)
9. ***Vietnam: Landslide Hazard Mapping***
   1) Remote Sensing Center, Ministry of Natural Resources & Environment (MONRE)
   2) Geography Department, Vietnamese Academy of Science and Technology (VAST)
10. ***Indonesia / Malaysia / Thailand / Vietnam:***
    Forest Fire and Hotspot Data Validation
    1) Indonesia: Indonesian National Institute of Aeronautic and Space (LAPAN)
    2) Malaysia: Malaysian Center for Remote Sensing (MACRES)
    3) Thailand: Geo-Informatics and Space Technology Development Agency (GISTDA)
    4) Vietnam: Space Technology Application Center (STAC), Vietnamese Academy of Science and Technology (VAST)

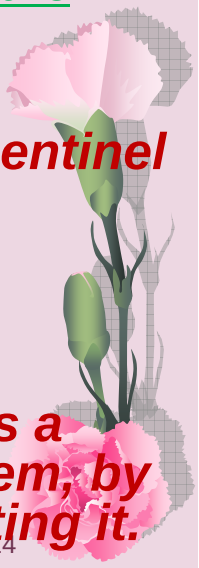


New Type of Participating-Organization Selection-System started with 2007 M-P

At the 3rd Sentinel Asia JPTM (Joint Project Team Meeting) held in Singapore in March 2007, JAXA announced, from JFY2007, it would start selecting ***10 Mini-Projects focusing on Disaster Management*** ***through*** ***the offer for public participation*** ***for the following 2 reasons:***

1. ***To open the door of Mini-Projects to all Sentinel Asia JPT member organizations who are interested in developing their capability in RS/GIS for disaster management.***

2. ***To facilitate Sentinel Asia Project, which is a disaster information sharing support system, by using Mini-Projects as a means of supporting it.***

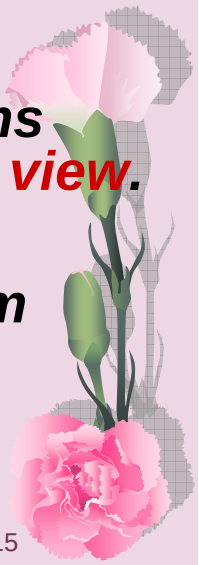


2007 Mini-Project Selection-Result

1. *During May and June 2007, JAXA received 28 proposals from 49 organizations of 13 countries through the HP of GIC/AIT.*

2. *GIC evaluated all the application forms especially from the technical point of view.*

3. *JAXA received the evaluation list from GIC/AIT and finally selected 10 Mini-Projects in the end of July 2007, and the selection-result was announced through the HP of GIC/AIT.*



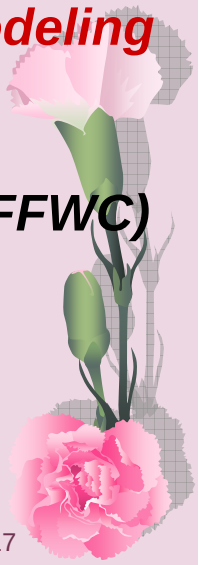
Countries Selected for 2007 Mini-Projects

- 10 Countries Selected -

1. Bhutan
2. Bangladesh
3. Cambodia
4. Indonesia
5. Lao PDR
6. Myanmar
7. Nepal
8. Philippines
9. Sri Lanka
10. Vietnam

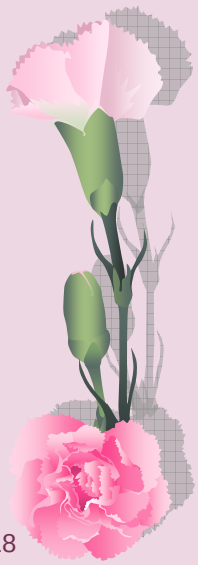
2007 Mini-Projects - 1/3

1. Bhutan: Disaster Management
   - *Department of Survey & Land Records (DSLR)
2. Bangladesh: Risk Assessment / Flood Modeling
   - *Space Research and Remote Sensing Organization (SPARRSO)
   - *Flood Forecasting & Warning Center (FFWC)
3. Cambodia: Water Resource
   - *Geography Department (Geo. Dept.)
4. Indonesia: Tsunami
   - *LAPAN
   - *Institute of Technology Bandung (ITB)



2007 Mini-Projects – 2/3

5. Lao PDR: Flood
   - *Environmental Research Institute (ERI), Science Technology and Environment Agency (STEA)
6. Myanmar: Flood
   - *Department of Meteorology and Hydrology (DMH)
7. Nepal: Water Resource
   - *Survey Department

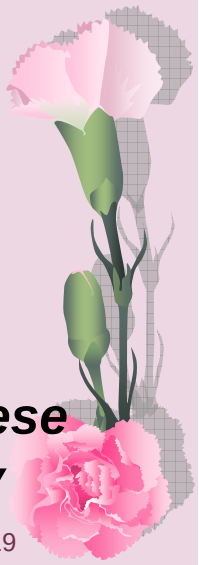


2007 Mini-Projects - 3/3

8. *Philippines: Volcanology*
   - * Seismology (PHIVOLCS)
   - * National Mapping and Resource Information Authority (NAMRIA)

9. *Sri Lanka: Flood*
   - * Survey Department (S.D.)
   - * Irrigation Department (I.D.)

10. *Vietnam: Forest Fire*
    - * Institute of Geography (I.G.), Vietnamese Academy of Science and Technology (VAST)

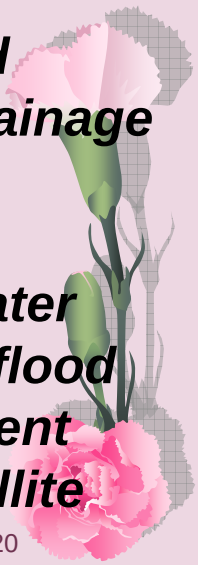


2007 Mini-Project Applied Titles – 1/3

1. *Bhutan: Application of RS/GIS for Disaster Management Planning in Bhutan*

2. *Bangladesh: Flood Risk Assessment and Identification of Proper Drainage Systems using RS/GIS*

3. *Cambodia: Development of 1:25,000 water bodies base map data for flood forecasting and management using high resolution satellite data*

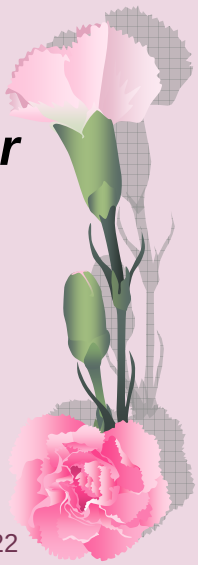


2007 Mini-Project Applied Titles – 2/3

4. ***Indonesia:*** ***Application of RS/GIS for Vulnerability and Risk Assessment of Tsunami***
5. ***Lao PDR:*** ***Flood Vulnerability Mapping in Xe Champhone Basin***
6. ***Myanmar:*** ***Production of Flood Hazard Map for Toungoo Township in Sittoung River Basin***
7. ***Nepal:*** ***Flood Risk Assessment of Kamala River using RS and GIS***

2007 Mini-Project Applied Titles – 3/3

8. ***Philippines:*** ***Lava/Flood Hazard Mapping and Risk Assessment of Mayon Volcano***
9. ***Sri Lanka:*** ***Use of RS/GIS techniques for flood hazard mitigation in Divisional Secretary areas of Kelaniya and Biyagama***
10. ***Vietnam:*** ***Forest Fire Hazard Mapping***



Outline of 2007 Mini-Projects

Duration: 9 weeks through the year

1st Term : 3-week classes and research work at AIT started on 10 Sept. 2007

2nd Term: 1-week field work at each participant's country

3rd Term : 5-week Final-Report Making at AIT during Jan. and Feb.2008

Number of Trainees of 2007: 16

At least 16 persons from 16 organizations of 10 countries

Scenes from 2007 Mini-Projects

Scenes from Past Mini-Projects

Fieldwork in Philippines during 2005

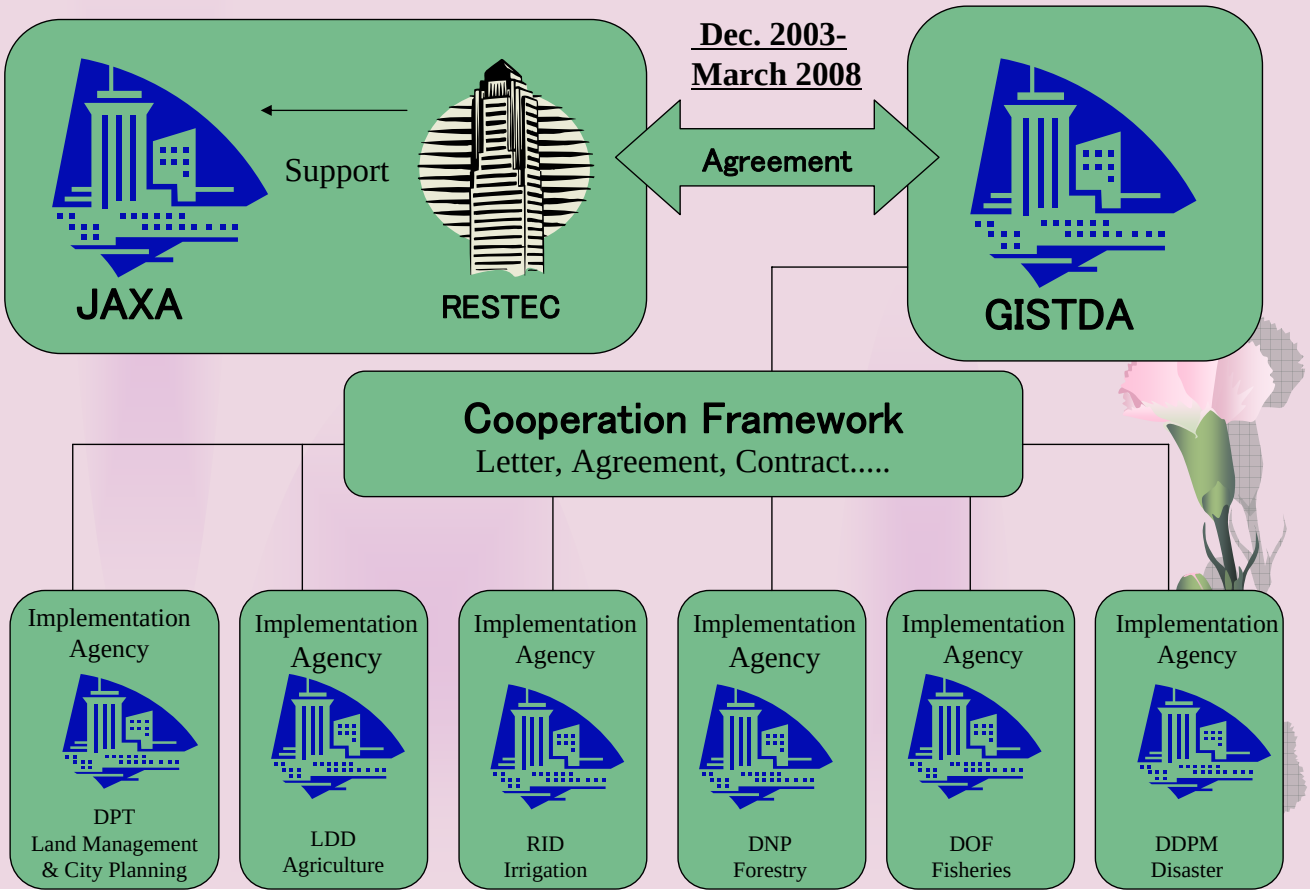
Discussion and Suggestion during 2005 and 2006 Mini-Projects at AIT

Scenes from Past Mini-Projects

Outdoor activities as a part of 2004 Mini-Project at AIT

School scene as a part of 2004 Mini-Project at AIT

ALOS Pilot Project Structure with Thailand



ALOS Data Applications in Thailand

➢**Department of Public Work and Town and Country Planning (DPT)**
- To extract DEM and DTM from ALOS data
- To improve and update the building in city area by using the ALOS data
- To compare and monitoring for the urban change and urban trend
- To evaluate the damage area from disaster
- To create 3D city model

➢**Land Development Department (LDD)**
- Land use/land cover monitoring
- Application of ALOS images and GIS technology for farm pond mapping

➢**Royal Irrigation Department (RID)**
- Irrigation Management in Provincial irrigation Project
- Application of Satellite Imagery for inundation area

➢**Department of National Park, Wildlife and Plant Conservation (DNP)**
- Forest resources assessment, forest cover monitoring and forest inventory on forest resources information and biodiversity of vegetation.
- Forest fire assessment

➢**Department of Fisheries (DOF)**
- Mapping and monitoring aquaculture areas and stationary coastal fishing gears
- To distribute the information derived from ALOS the satellite data to relevant provincial fisheries offices
- To assess the significance of using ALOS satellite data for other fisheries applications

➢**The Department of Disaster Prevention and Mitigation (DDPM)**
- To transform satellite data to be valuable and usable products such as Early Warning Messages, Hazard Map, Damage Assessment, Situation Evaluation of the disaster events and related issues

Past Pilot Projects with Thailand – 1/3

- ***JAXA, GISTDA (Geo-Informatics and Space Technology Development Agency) of Thailand and LAPAN (National Institute of Aeronautics and Space) of Indonesia have been implementing a series of pilot projects aimed at improving the use of satellite data by government agencies in those countries.***

- ***This Asia-Pacific Earth Observation Pilot Project also aims at greatly contributing to promoting capacity building for wider use of satellite data in the region as a whole.***

Background and Objectives

- ***JAXA started a five-year pilot project with GISTDA Thailand in November 1997 and another three-year pilot project with LAPAN Indonesia in March 1999. The objectives of both pilot projects are as below:***
- ***(1) Research in use of satellite data, and***
- ***(2) Training of the staff who work for the pilot projects both in Thailand and Indonesia***

- *JAXA (then NASDA) launched the Marine Observation Satellite-1 (MOS-1) in 1987 and the Japanese Earth Resources Satellite-1 (JERS-1) in 1992. Data from those satellite were received by parabolic antennas in Thailand and Indonesia contributing greatly to expanding the operational use of the satellite data by those countries' governmental entities.*

Pilot Projects with Thailand – 2/3

JAXA's Contribution to Pilot Project with Thailand

- *JAXA launched the Advanced Earth Observing Satellite-II (ADEOS-II) in 2002 and the Advanced Land Observing Satellite (ALOS) in January 2006. Since those satellites were expected to provide new opportunities of using satellites data, JAXA, GISTDA and LAPAN decided to continue the pilot project as a part of the "World Summit on Sustainable Development (WSSD) Type 2 Partnership."*

History of Pilot Project with Thailand

- *1986- : Cooperation program in MOS-1 and JERS-1*
  - *Established data receiving, recording and processing system*
- *1997-2002: JERS-1 Pilot Project*
  - *Researched satellite data utilization possibility in a few fields*
  - *Improved Thai users' skill*
- *2001: Agreement for earth observation and satellite application*
- *2002: Transfer of the data receiving, recording and processing system*
- ***December 2003 – present : ALOS Pilot Project***
  (ALOS P.P. will last until March 2008 due to the delay of ALOS launch.)
  - ***Land management and city planning***
  - ***Practical use and various fields, etc.***

Pilot Projects with Thailand – 3/3

Contents of Pilot Project with Thailand <ALOS>

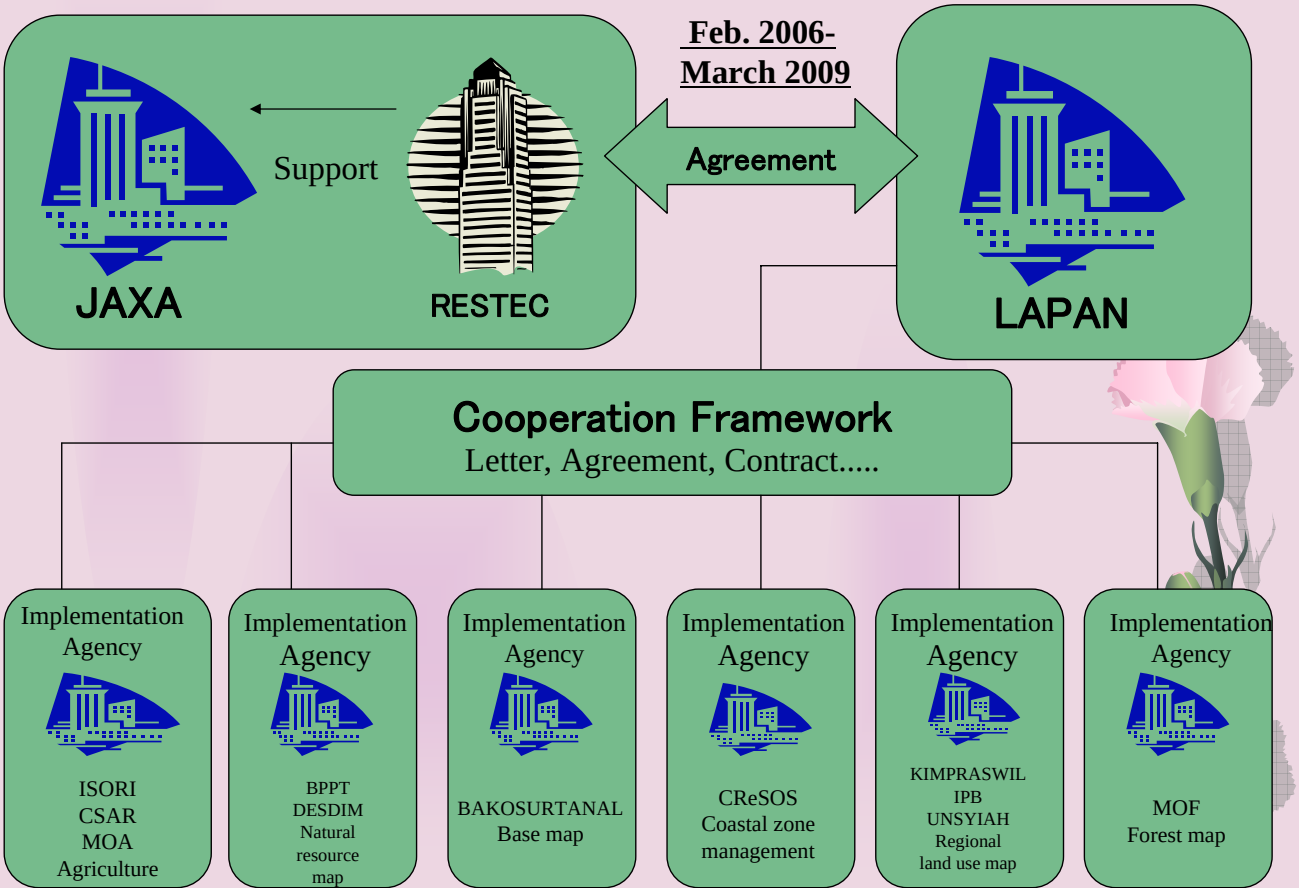
Many Thai engineers have been learning data utilization methods in various fields and some observers started to be interested in the ALOS pilot project and satellite data utilization due to the following occasions prepared both by JAXA and GISTDA every year in Thailand:

- ***(1) Periodical Meeting: 2-3 times / year***
- ***(2) Training: 5-6 times / year***
- ***(3) Field Survey: 1 time / year***
- ***(4) Seminar: 1 time / year***
- ***(5) Report Making: Once at the end of the pilot project***

2005 Training Programs done in Thailand <ALOS>

- ***During 2005, the following training programs were carried out in Thailand:***
- *(1) Disaster Monitoring and Management by using Remote Sensing & GIS*
- *(2) Map Updating using High Resolution Satellite Imagery*
- *(3) 3D using DEM and GIS for Soil Classification and Land Use Planning*
- *(4) Change Detection by Using Remote Sensing and GIS*
- *(5) Advance Map-updating with High Resolution Satellite Data*
- *(6) Remote Sensing and GIS in Marine and Coastal Zone Management*
- *(7) DEM Extraction Software Training*

ALOS Pilot Project Structure with Indonesia



ALOS Data Applications in Indonesia

- **Indonesian Soil Research Institute (ISORI), Center for Soil and Agro climate Research (CSAR), Ministry of Agriculture (MOA)**
  - Assessment of Land Degradation and Mass Movement Using ALOS Satellite Data
- **Geology Development and Research Center (BPPT), Ministry of Energy and Mineral Natural Resources (DESDM)**
  - Modeling For Natural Resources Mapping
- **National Coordinating Agency for Surveying and Mapping (BAKOSURTANAL)**
  - Topographic Map Production using ALOS Data-Benchmark test in urban area of Jakarta, rural area of Bogor and forest area of Kalimantan/Papua
- **Center for remote Sensing and Ocean Sciences (CReSOS), Udayana Univ.**
  - Development of Algorithms for Coastal Zone Management and Vessels Monitoring by Using ALOS Data
- **(1) Regional Development Study Center (KIMPRASWIL)**
  (2)Bogor Agriculture University (IPB)
  (3)GIS and Remote Sensing Center of Aceh Syiah Kuala University (UNSYIAH)
  - Land Use, Land Cover and Terrain Changes in Nanggroe Aceh Darussalam, Indonesia
- **Center for Forestry Mapping, Ministry of Forestry (MOF)**
  - Application of ALOS Satellite Imagery For Indonesian Forest resources Monitoring

ALOS Pilot Project with Indonesia - 1/2

(1) On 15 February 2006, an agreement was concluded as a result of adjustment among JAXA, LAPAN and the other participating organizations of Indonesia.

(2) ALOS P.P. was substantially begun with the training program by both JAXA and LAPAN in March 2006.

(3) The contents of the above training were such as the basic RS for ALOS data use, the 3-dimensional chart making with stereo images obtained by an optical sensor onboard ALOS, and the lecture on SAR use, etc.

(4) 32 people (8 out of 32 were observers) attended the above training, and the most participants evaluated that profitable technological training had been obtained.

ALOS Pilot Project with Indonesia - 2/2

Objectives of ALOS Pilot Project with LAPAN:

(1)Utilization verification of the ALOS data in order to make the regular use of the data possible in fields of the environment, forestry, mapping, and disaster management at the administrative level in Indonesia.

(2) Training for data use is carried out to let each participating organization to be able to use the ALOS data on their own in near future to satisfy participants' technical support demand.

(3) The data utilization proof in each field is advanced by individually making of thematic map using ALOS real data.

(4) To establish technologies necessary for data use in Indonesia and to improve the level of frequency on the data use at the administrative level in Indonesia. ←*Most important purpose*

Thank you very much

Domo Arigato Gozaimashita