Framework and Implementation of ALOS Pilot Project in Thailand

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Abstract: This paper contains information and introduction to the cooperation between Japanese Aerospace Exploration Agency (JAXA) and Geo-Informatics and Space Technology Development Agency (GISTDA) in the Pilot Project for utilizing ALOS data. It also gives a tentative guidline of Framework and Implementation of ALOS Pilot Project in Thailand for three years during 2004-2006

JAXA, newly established and took over all responsibility of NASDA, ISAS, NAL since October 1, 2003 has scheduled to launch Advanced Land Observing Satellite (ALOS) in 2004. In this connection, an Agreement between JAXA and GISTDA was made on 25th December, 2003 for cooperation in the field of Space Sciences. As a consequent upon the agreement, "Pilot Project of Utilizing the Advanced Land Observing Satellite" has emerged.

Therefore, GISTDA takes responsibility and coordinating roles to implement the ALOS data applications "Pilot Project"

In this project, GISTDA shall be project coordination and distribution of ALOS satellite data to all Thai participating agencies. Application of the technology and implementation of the project will be carry out by six (6) Thai participating agencies,

The Department of Public Works and Town & Country Planning (DPT)
The Land Development Department (LDD)
The Royal Irrigation Department (RID)
The Department of National Park, Wildlife and Plant Conservation (DNP)
The Department of Fisheries (DOF)
The Department of Disaster Prevention and Mitigation (DDPM)

Through this pilot project, the ALOS data using remote sensing and GIS technology will be successfully implanted at each participating agency and utilize for the actual administrative work in Thailand.

Keywords: ALOS, Framework, Implementation Plan

1) Introduction

Thailand has cooperated with Japan in satellite remote sensing technology development and its applications since 1986. In that time, National Research Council of Thailand (NRCT) and National Space Development Agency of Japan (NASDA) were the implementing agencies for the first cooperation program in Marine Observation Satellite (MOS-1). This bilateral cooperation was expanded and enhanced to Japanese Earth Resource Satellite (JERS-1) program in 1993. Under the JERS-1 cooperation program, the 5-year Pilot Project was one of the major activities.

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2) The objective of Pilot Project

1. To enhance and strengthen capabilities of Thai agencies for practical use of ALOS data in Thai user community under the Agreement between JAXA and GISTDA
2. To carry out scientific research and development for improving the practical utilization of ALOS data for land management including natural resources environment and disaster in Thailand
3. To promote technological transfer and exchange experience in ALOS data application

Participating Agencies

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Due to the non availability of ALOS satellite data, before ALOS is launched, JAXA has distributed relevant data to Participating agencies. And GISTDA also has supported archived and relevant satellite data such as Landsat.
In addition, GISTDA has been managing this project through conducting Thai-Japanese periodical meetings, GISTDA-Participating agencies meetings, seminars, trainings, field surveyings, site visits and technical assistances.
This 3-year project, since December 2003, owning those activities and effect of JAXA, GISTDA and six Thai participating agencies themselves, each agency has reached and satisfactorily achieved its objective to a certain level on the part of all the participating agencies. Due to JAXA's postponed schedule of the launching of ALOS satellite, the Pilot Project will be extended for another 2 years, with a tentative ending date on March 31, 2008.

3) Implementation Themes of Pilot Project

For each participating agency, specific implementation themes of pilot project are set as follows:

Geo-Informatics and Space Technology Development Agency

- Operational Use of ALOS Data for Coastal Zone Monitoring

Department of Public Works and Town & Country Planning

- 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

- Land use/ land cover monitoring.
- Application of ALOS satellite data and GIS technology for farm pond mapping.

Royal Irrigation Department

- Irrigation Management in Provincial Irrigation Project.
- Application of ALOS Satellite data for inundation area.

Department of National Park, Wildlife and Plant Conservation

- Forest resources assessment, forest cover monitoring and forest inventory on forest resources information and biodiversity of vegetation.
- Forest fire assessment.

Department of Fisheries

- Mapping and monitoring aquaculture areas and stationary coastal fishing gears.
- To distribute the information derived from ALOS 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

- Utilization of ALOS Satellite Data: to transform satellite data to be valuable and usable products such as Early Warning Messages, Hazard Map, Damage Assessment, Situation Evaluation of the disaster event and related issues

4) The Organizational Structure

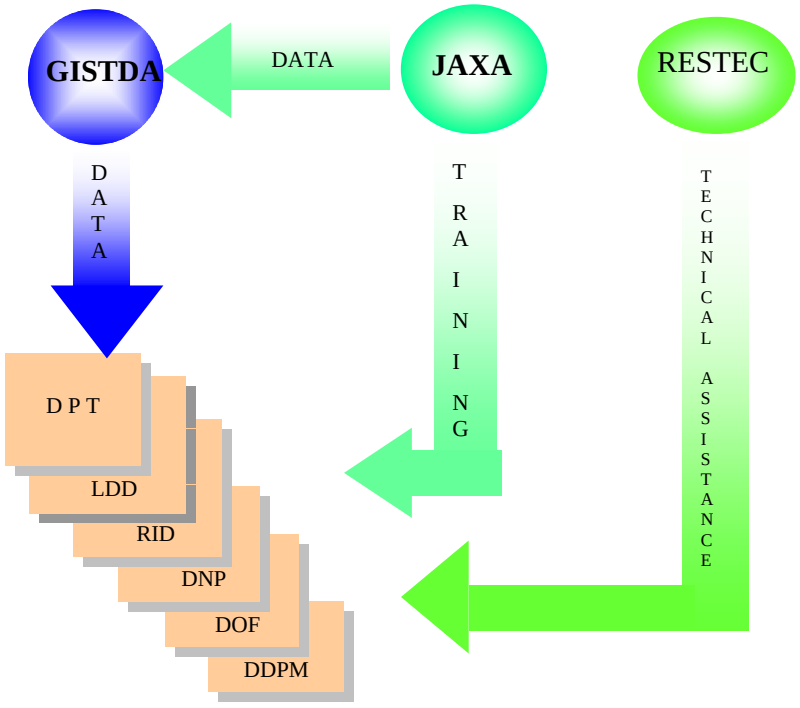


Fig 1. Organization Structure of Pilot Project

Role of JAXA (with RESTEC)

1. To co-ordinate and manage the Master Project
2. To provide GISTDA with technical advice for data analysis and evaluation
3. To provide technical support
4. To evaluate the results of the project

Role of GISTDA

1. To coordinate and manage the pilot project
2. To conduct research and data application
3. To distribute ALOS satellite data or GISTDA archived data to the relevant agencies
4. To organize meetings, trainings and seminars
5. To evaluate the results and make reports of this project.

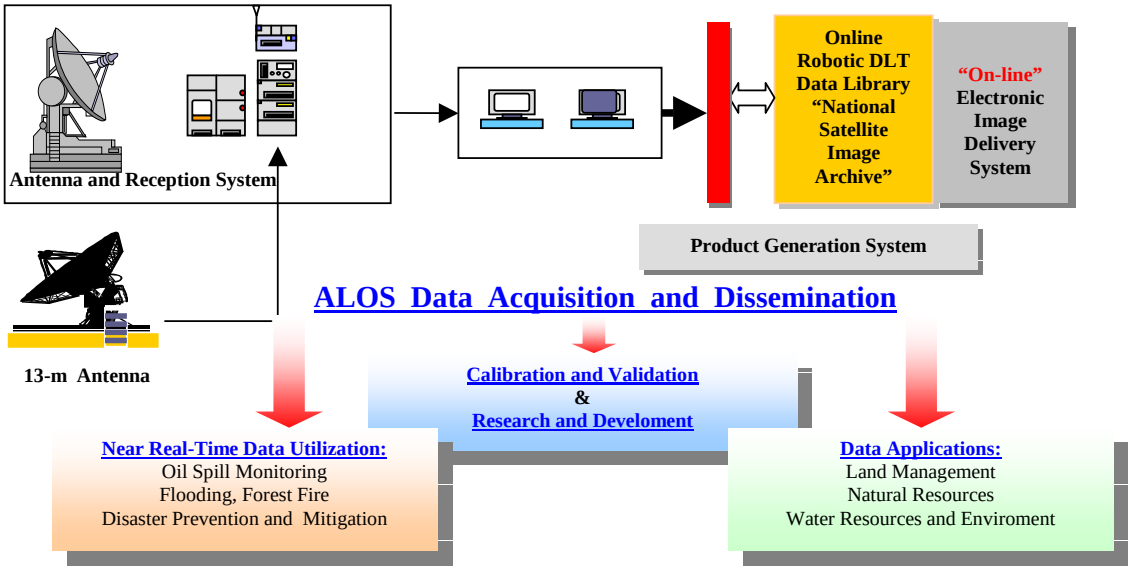


Fig 2. ALOS Data Acquisition and Applications

5) Schedule Program

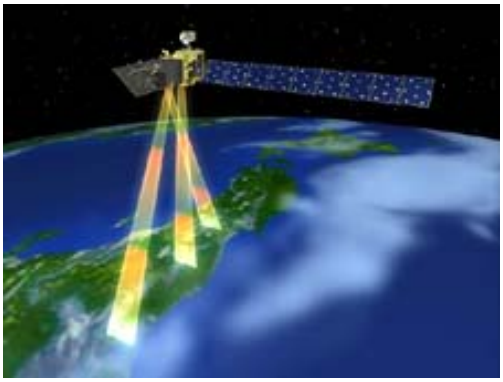
Table 1. Schedule Program

Activity	2004	2005	2006
1. Project Planning			
2. Data Distribution (Substitution for ALOS data.)			
3. Image Analysis for Land Information			
4. Land Management and City Planning			
5. Periodical Meeting			
6. Annual Meeting & Seminar			
7. Training			
8. Field Surveying			
9. Final Report			

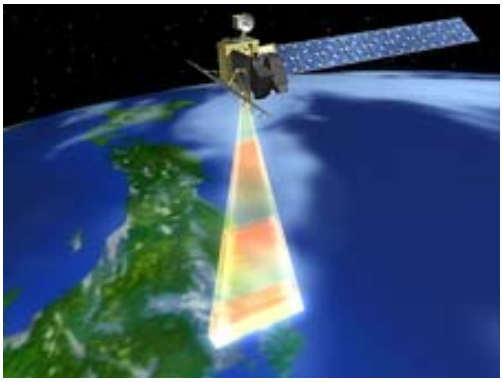
GISTDA and JAXA have considered to extended the Pilot Project for another 2 years, with a tentative ending date on March 31, 2008.

Advanced Land Observing Satellite (ALOS) Overview
Advanced Land Observing Satellite (ALOS) is the type of the Earth observing satellite, and will observe our planet from an orbit.

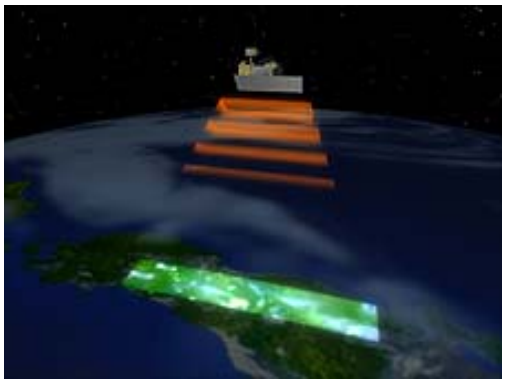
ALOS's Three Remote-sensing Instruments
1. **PRISM**: High-resolution(monochrome) images, collect elevation data PRISM is a panchromatic radiometer with 2.5-meter spatial resolution.In order to obtain terrain data including elevation, PRISM has three optical systems for forward, nadir, and backward view. Precise land information can be obtained frequently by PRISM.



2. **AVNIR-2** :Multi-band(color) images, capability of pointing. AVNIR-2 is a visible and near-infrared radiometer for observing land and coastal zones It will be used to provide land coverage maps and land-use classification maps for monitoring regional environment. The instrument has a cross track pointing capability for disaster monitoring.



3. **PALSAR** :Cloud-free, Day-and-Night radar sensor
   Phased Array type L-band Synthetic Aperture Radar (PALSAR) is the Japanese second spaceborne SAR using L- band frequency. PALSAR is an active microwave sensor for cloud-free and day-and night land observation



6) Conclusions

1. Through this pilot project, the ALOS data using remote sensing technology will be successfully implanted at each Thai participating agency and utilized for the actual administrative work in Thailand.
2. With the advantage of ALOS's Three Remote-sensing Instruments: PRISM, AVNIR-2 and PALSAR, ALOS will be very useful and bring benefits for development of the country in Asian region.

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