Space Science and Technology Initiatives of the Philippines

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Mandated to:

- Conduct scientific R&D in the advanced fields of ICT and Microelectronics
- Undertake long term researches to strengthen and modernize S&T infrastructure
- Complement the overall endeavour in the scientific field with intensive activities in the computer and information technologies
**DIWATA-1**
- **Weight:** 53 kg
- **Dimensions:** 55x55x35 cm
- **Inclination:** 51.6 degrees
- **Orbit:** Circular
- **Altitude:** 403 km
- **Deployment Date:** April 27, 2016
- **EOL:** ~3Q, 2019

**DIWATA-2**
- **Weight:** 57.4 kg
- **Dimensions:** 50x50x50 cm
- **Altitude:** 621 km, sun synchronous
- **Life Span:** 3 - 5 years
- **Launch Date:** October 29, 2018

**MAYA-1**
- **Weight:** 1 kg
- **Dimensions:** 10x10x10 cm
- **Altitude:** 400 km
- **Life Span:** 9-12 months
- **ISS Deployment:** August 10, 2018
Philippine Earth Data Resource and Observation (PEDRO) Center

Davao GRS
Remote Sensing and Data Science (DATOS) Help Desk

Central Visayas Center for Environmental Informatics - CENVI
September 22

High resolution maps from DOST-ASTI DATOS and UP Cebu CENVI were provided to the Naga rescue operations command to aid their efforts. The landslide maps will help reduce the search zone and allow targeted search of buried houses and victims.
HOW ARE THESE SATELLITE IMAGES BEING USED?

AGRICULTURE

DOST-ASTI partnered with Sugar Regulatory Administration to supplement their monitoring of Sugar cane Yield using Remote sensing, GIS, and Artificial Intelligence technology.

Dynamic time Warping using SAR image for Sugar Cane mapping and analysis in Tarlac
HOW ARE THESE SATELLITE IMAGES BEING USED?

MONITORING

Monitor built up activities done during the rehabilitation period of government-implemented projects

IN PHOTOS:
Boracay Island Rehabilitation Monitoring

Time series of the observed built up of coastal structure in the shores of Bulabog beach. The built up started around the 18th of May 2018. The Satellite images were taken from the daily image captures of Dove satellite (3m GSD) constellation.
Flood Extent Map using change detection analysis from Synthetic Aperture Radar Images overlaid on high resolution optical images (Aparri, Sept 16, 2018)
Houses buried by the landslide

The building footprints shown in the image are gathered from previous satellite images before the landslide. Because of this, it narrows the search area for rescuers where to dig.

NAGA, CEBU LANDSLIDE DELINEATION AND BUILDING FOOTPRINTS MAPPING
Use of Artificial Intelligence to Detect Ground Features from Satellite Images

With NAMRIA, ASTI develops algorithms to generate land cover maps automatically to supplement NAMRIA’s mandate in generating landcover maps of the country.
Argawanon Road leading to Hagnaya Wharf, Cebu

Project ID: P00230144VS
Start Date: 28-Feb-18
End Date: 18-Jun-18
% of Accomplishment: 94.34%
SAGAP (Signal Assessment using Geospatial Analysis on Propagation)

Input Data
- Synthetic Aperture Radar (SAR) Interferometry from PEDRO
- Digital Surface Model (DSM) data from Phil-Lidar or NAMRIA

Digital Surface Model (DSM)

Imported to specialized RF propagation simulation softwares

Results
- Test signal source
~2000 weather stations
400M records
Sensor Data

Caraycaray sensor reading, snippet from 15 to 19 December 2017 illustrating a rise in the water level of the surrounding river, peaking at 6.14 meters.
The CoARE was setup in response to the increasing demand for data storage and compute power. The project was conceptualized to address these **three (3) user-driven needs**, where our services are aligned:

### DATA STORAGE
**Storage Service**
- Repository of scientific data
- Support for long-term data archiving
- Storage can handle large datasets (TB to PB)

### SCIENCE CLOUD
**Science Cloud**
- Delivers cloud-based services
- For researchers and students
- Enables secure sharing of data among specific groups
- Provisioning of virtual machines

### DATA DISTRIBUTION & SHARING
**Data Catalog**
- Web portal for data generated from CoARE research initiatives
- Publicly accessible datasets
- Supports open data for research and educational purposes

### HIGH PERFORMANCE COMPUTING
**HPC**
- Processing of large data sets
- High-performance calculations and analysis
- 312 cores with 10Gbps network speed
PREGINET

- The Philippines’ only REN
- Operating for nearly 2 decades
- Connected to and an active member of major international RENs (APAN, TEIN)

What are RENs?

- Develop networking capacity to support Research and Education
- Build a community that is a forum for collaboration
- Roll out of next generation services (e.g. IPv6)
- Testbeds for Innovations
ASTI Labeling Machine (ALaM)
Unsupervised learning on satellite images

**Example end-use**

Methods for applications

ALaM data
(labeled images, loc-obj files, etc.)

Application (e.g., road management)

Ave traffic: Light to moderate
Road condition: Good
Potential hazard: Tree (Up-Left)
ASTI S&T Infrastructure: Responding to Operational Needs

DOST-ASTI

Satellite-related initiatives
- Philippine Earth Data Resource and Observation Center (PEDRO)
- Development of the Philippine Microsatellite Program (PHL-Microsat)

HPC, Storage and Cloud Facility
- Computing and Archiving Research Environment (CoARE)

Data Science, GIS and Remote Sensing Processing and R&D
- Remote Sensing and Data Science (DATOS) Helpdesk | ALAM

Stakeholders
- PHIVOLCS
- PAGASA
- NAMRIA
- NDRRMC
- DBM

Agencies with GIS/RS products requirements
- PREGINET
THE PHILIPPINE SPACE DEVELOPMENT ACT

Creates the Philippine Space Agency (PhilSA) that shall be the primary policy, planning, coordinating, implementing, and administrative entity of the Executive branch that shall plan, develop, and promote the national space program in line with the Philippine Space Development and Utilization Policy (PS DUP)
PSDUP KEY DEVELOPMENT AREAS

Philippine Space Development and Utilization Policy (PSDUP)

- National Security and Development
- Space Industry Capacity Building
- Space Education and Awareness
- International Cooperation
- Hazard Management and Climate Studies
- Space Research and Development
THANK YOU FOR LISTENING