Value Creation in Space for Digital Economy, Governance and Inclusion

Mobilizing Space Data, Services and Infrastructure In the Philippines

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The Philippine Space Agency (PhilSA)

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Philippine Republic Act 11363 enacted on 08 August 2019, “An Act Establishing the Philippine Space Development and Utilization Policy and Creating the Philippine Space Agency, and for other Purposes”

**Mission and Vision**

The PhilSA envisions a Filipino nation bridged, uplifted, and empowered through the peaceful uses of outer space.

We will promote and sustain a robust Philippine space ecosystem that adds and creates value in space for and from Filipinos and for the world.

**Mandate**

The PhilSA shall be the primary policy, planning, coordinating, implementing, and administrative entity of the Executive Branch of the government that will plan, develop, and promote the national space program in line with the Philippine Space Policy.
About PhilSA

Key Development Areas

- National Security & Development
- Hazard Management & Climate Studies
- Space Research & Development
- Education & Awareness
- Space Industry Capacity Building
- International Cooperation
Current Space-Related Achievements

Building Upon Past Gains in Space R&D investments

- Development of Philippine Scientific Earth Observation Microsatellites
- Space Technology and Applications Mastery, Innovation and Advancement
- Digital Imaging for Monitoring and Evaluation
- Computing and Archiving Research Environment
- Philippine Earth Data Resource & Observation
- Remote Sensing and Data Science Help Desk
- Understanding Lightning and Thunderstorms
Growing and enhancing capacity in SSTA by developing

People + Capabilities + Infrastructure
Small satellites

Diwata-1 (2016)
53 kg low earth orbit microsatellite
(Re-entered Earth’s atmosphere on 06 April 2020)

Maya-1 (2018)
1 kg nanosatellite
(Re-entered Earth’s atmosphere on 23 November 2020)

Diwata-2 (2018)
57.4 kg low earth orbit microsatellite
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Satellite Technologies

Optical Payloads
- High Precision Telescope
- Spaceborne Multispectral Imager
- Wide Field Camera

Amateur Radio Payload
- Amateur Radio Unit (ARU)
- Ham radio for emergency communication

Store & Forward Payload
- Store: Remote data collection
- Forward: Ground data download
Assembly
- Satellite Bus Design
- Payload Design & Assembly
- Fabrication and Inspection

Integration
- Electronic Functionality Test
- Component and System Checks
- System Integration

Testing
- Orbital Simulations
- Structural & Thermal Analysis & Testing
- Radiation Pattern Testing
Current Space-Related Achievements

Ground Infrastructure

**Luzon**
PEDRO Center
Quezon City (DOST-ASTI)

**Visayas**
Iloilo Ground Receiving Station (Coming Soon)

**Mindanao**
Davao Ground Receiving Station (DGRS)
Our Place in Space

Vol. 1: Space Data Mobilization

Vol. 2: Space Technology

Vol. 3: Capacity-building, outreach and sustainability
Mapping Land Cover Classes
Butuan City, Agusan del Norte

With the increasing availability of Earth observation data such as those in the form of satellite images, deep learning methods (e.g. AI & Convolutional Neural Networks) have shown promising results in identifying the physical aspect of the earth’s surface (land cover). Through these methods and automated systems developed by the DATOS Project, updating of land cover classifications can now be expedited.

In partnership with NAMRIA, different models were created for each class and were later merged to create a land cover map.
Research on remote sensing (RS) techniques allows for faster methods in mapping agricultural resources. In cooperation with the Department of Agriculture and Sugar Regulatory Administration, mapping these high-value crops using advanced RS methods would help streamline and hasten activities in inventory, yield projection, monitoring, data analysis, and assessment.

Cyan areas indicate plantations of high-value seasonal crops, such as sugarcane, rice, and corn. These can be identified through satellite images (temporal SAR) using automated remote sensing methods like time series analysis.
Detecting Road Network Changes

Road Networks in Biñan and Santa Rosa, Laguna

Through machine learning—a component of Artificial Intelligence (AI)—road features that are continuous, long, and with homogenous hue throughout their length are digitized and used as training data to detect road network changes.

AI is able to simulate human vision to detect features, and can also see beyond what is visible to the naked eye. This allows it to detect and isolate these features more accurately.
Currently, DOST-ASTI is conducting data collection and processing to examine the potential of radio frequency modelling and planning in assessing signal propagation. The study will use satellite images from the PEDRO Center, Diwata microsatellites, open source satellite data, and elevation data from the PHL-Lidar project and NAMRIA. The information generated from these assessments can be used by the Department of Information and Communications Technology (DICT), telecommunication companies, TV and radio operators, and other stakeholders operating wireless sensor networks and rural networks to strategically place their transmitters while considering radio parameters, geographical conditions, and possible obstructions.
Current Space-Related Achievements

Data Mobilization

Typhoon Vamco (Ulysses), November 2020
Enabling Timely Disaster Response

Rapid disaster response in Naga, Cebu landslide

The image shows the areas before and after the landslide event in Naga, Cebu. The map layout was immediately sent to the ground. Techniques like machine learning and AI helped enhance rapid disaster response in this situation. The ability to generate this [map] information in a timely manner was crucial.

Identifying building footprints was critical to overlay the extent of the landslide event, enabling rescuers to prioritize areas for search and rescue.
Data Mobilization — COVID-19 Space Data Dashboard

How can space and satellites be useful for COVID-19 response?

The COVID-19 space data dashboard is publicly accessible at: http://space.gov.ph/spacedata/
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Thank you very much.

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