



Republic of the Philippines

Department of Science and Technology

Advanced Science and Technology Institute



Small Satellite Development for Scientific Earth Observation and Data Utilization in the Philippines

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Acting Director, DOST-Advanced Science and Technology Institute

Committee on the Peaceful Uses of Outer Space
Scientific and Technical Subcommittee Meeting
57th Session
05 February 2020 Vienna, Austria

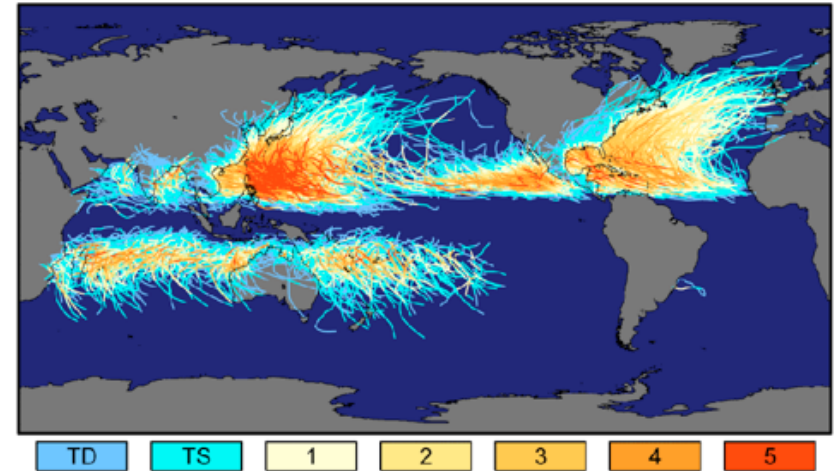


The PHILIPPINES

A “megadiverse”
country



<https://www.cbd.int/countries/?country=ph>

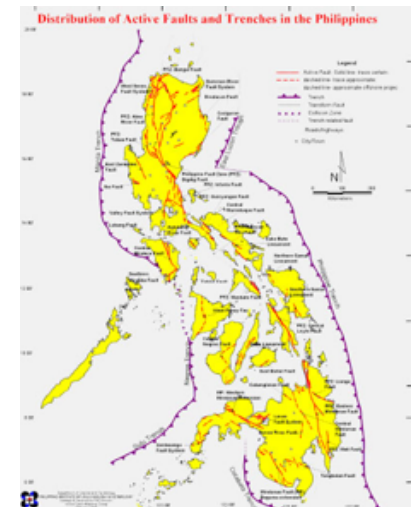


Saffir-Simpson Hurricane Intensity Scale

Source: NASA Earth Observatory

<https://earthobservatory.nasa.gov/images/7079/historic-tropical-cyclone-tracks>

Beset by
challenges
from natural
disasters



Source:
Phivolcs

STAMINA
SPACE

PHIL
MICROSAT

The Department of Science and Technology (DOST) in Space Technology and Applications (2010-2019)



**R&D Investments: 7.5B PhP
(~ 150 Million USD)**

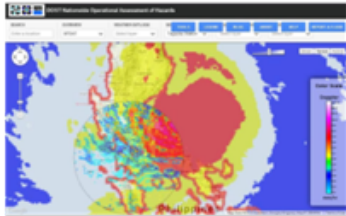


RECENT HIGHLIGHTS

PHILIPPINE SPACE TECHNOLOGY DEVELOPMENT

2014-2018

Development and launch of DIWATA-1 (March 2016), DIWATA-2 (October 2018) microsatellites and the MAYA-1 nanosatellite (June 2018).



2016-2019
Satellite Ground Station Launch and Operations



PhilSA 2019

2011-2017

Nationwide DREAM and PHIL-LIDAR 1 and 2 Programs and Nationwide Operational Assessment of Hazards (NOAH)



2018-2021

Small Satellite Bus and Payload Development through STAMINA4SPACE Program



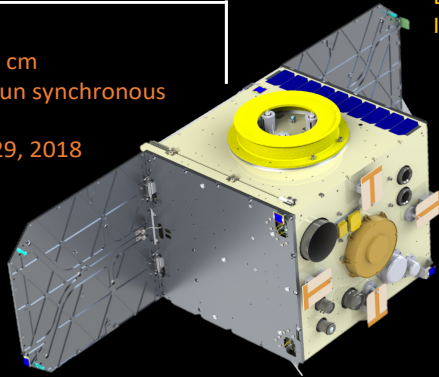
Astronomy Research and Development



PHILIPPINE SMALL SATELLITES

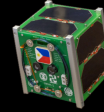
DIWATA-2

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



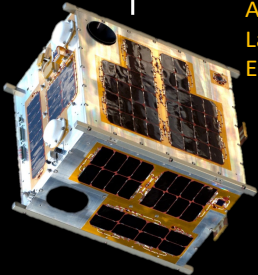
MAYA-1

Weight: 1 kg
 Dimensions: 10x10x10cm
 Altitude: 400km
 Life Span: 9-12 months
 ISS Deployment: August 10, 2018



DIWATA-1

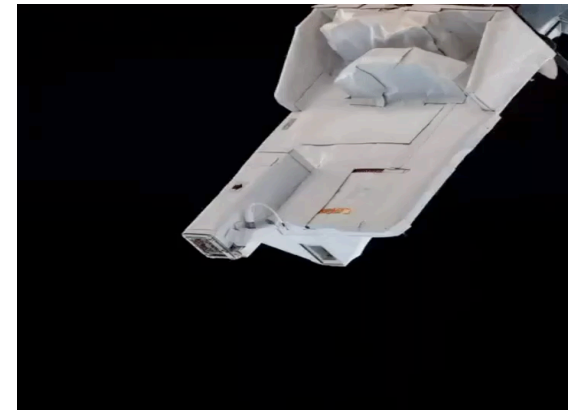
Weight: 53 kg
 Dimensions: 55x55x35cm
 Inclination: 51.6 degrees
 Orbit: Circular
 Altitude: 403km
 Launch Date: April 27, 2016
 EOL: ~ 3Q, 2019



Diwata-1 (2016)



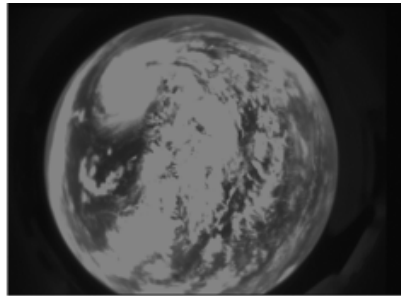
Maya-1 (2018)



Source: NASA / JAXA



DIWATA-1 Imaging Payload



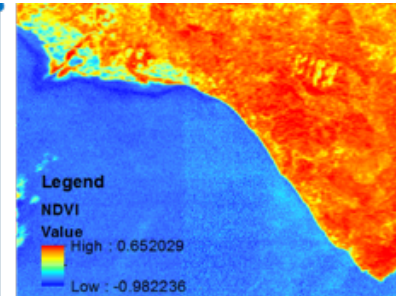
WIDE FIELD CAMERA

Observation of cloud patterns and weather disturbances



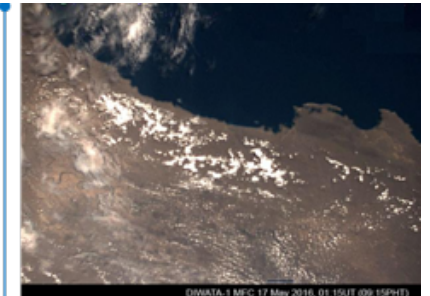
HIGH PRECISION
TELESCOPE

Determine the extent of damages from disasters
Profiling and archiving of cultural and natural heritage sites



SPACEBORNE
MULTISPECTRAL
IMAGER

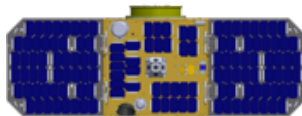
Assessment of the changes in vegetation
Assessment of ocean productivity



MIDDLE FIELD CAMERA

Assists in determining the locations of images captured using the HPT and SMI

New in DIWATA-2



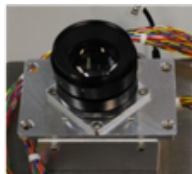
Deployable Solar Panel
Increase in power generation



Amateur "Ham"
Radio Unit
Communication at times of emergencies



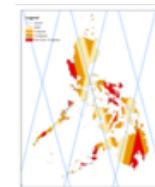
ACU-Ex
Experimental attitude determination module



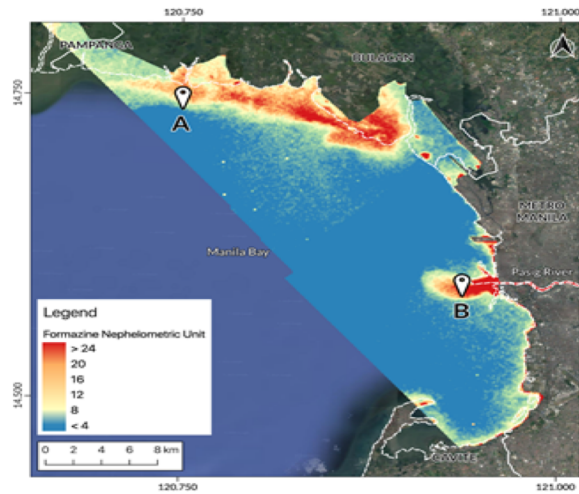
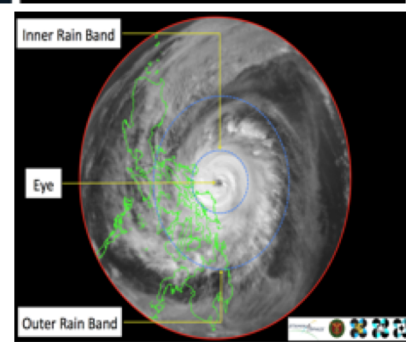
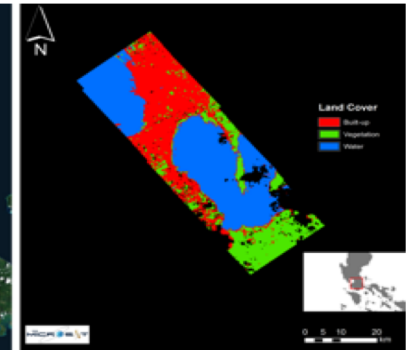
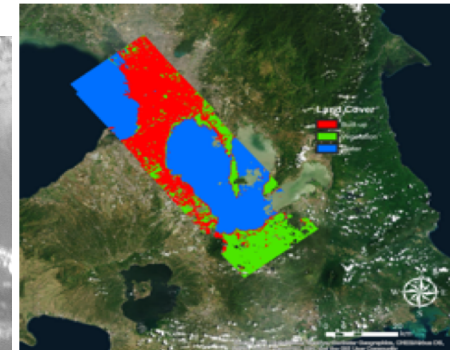
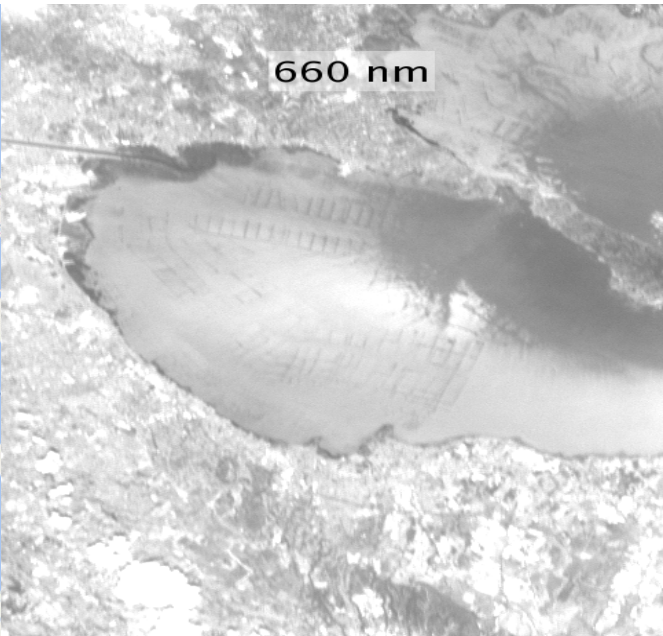
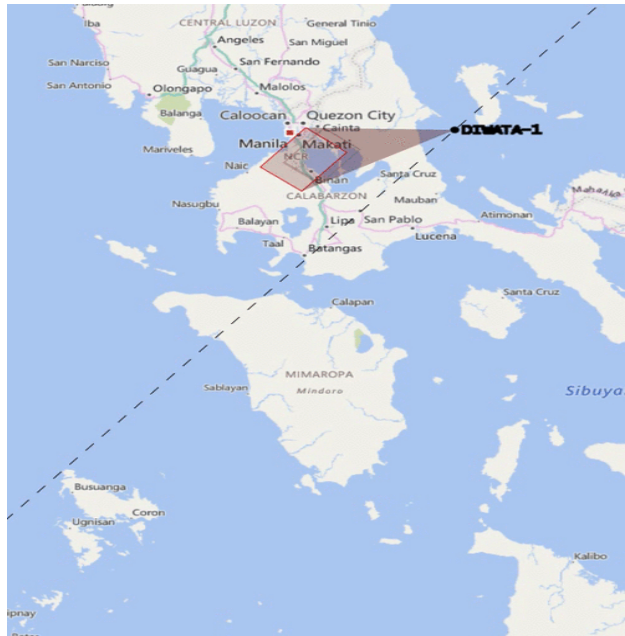
Enhanced Resolution
Camera
Enhancement in imaging capability



SAS-Z
Omnidirectional sun-aspect sensor



Sun-Synchronous Orbit
Fixed revisit interval and larger area of coverage

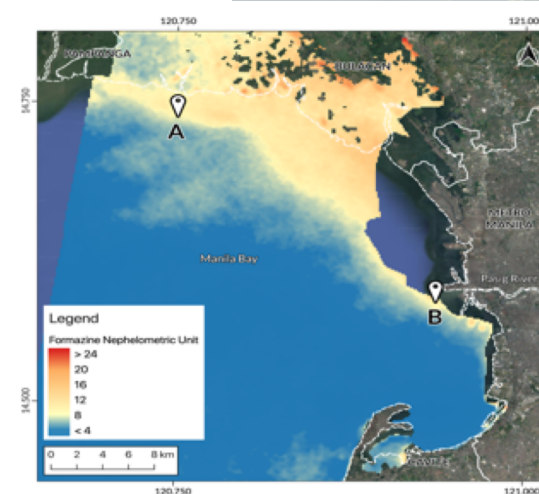


Turbidity at Manila Bay

Date of Capture: February 19, 2018
Satellite: Diwata-1
Sensor: SMI

STANBAG SPACE

Baseemap Source: PhilGIS
Image Source: Google Earth



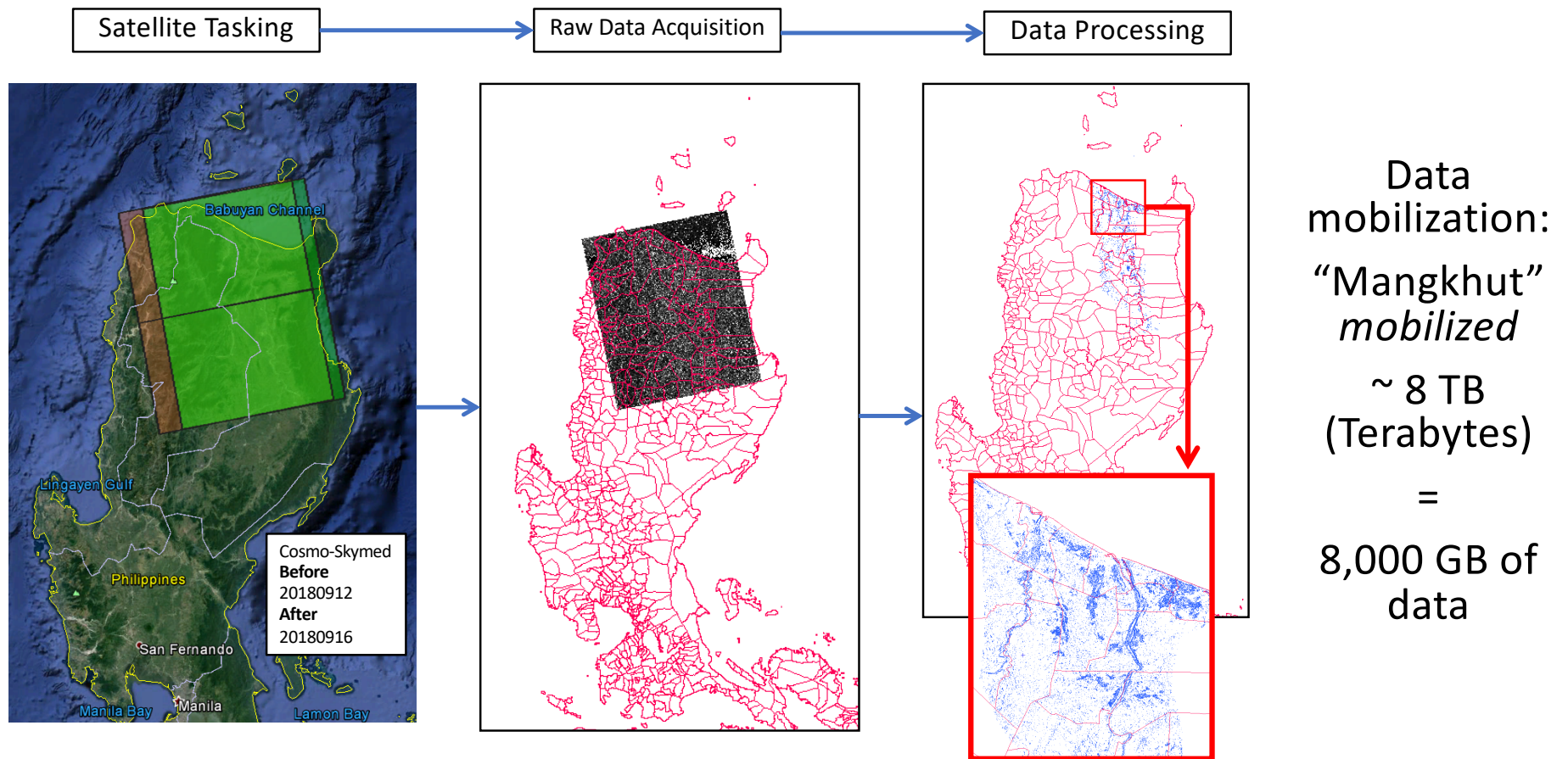
Turbidity at Manila Bay

Date of Capture: June 5, 2019
Satellite: Diwata-2
Sensor: SMI

STANBAG SPACE

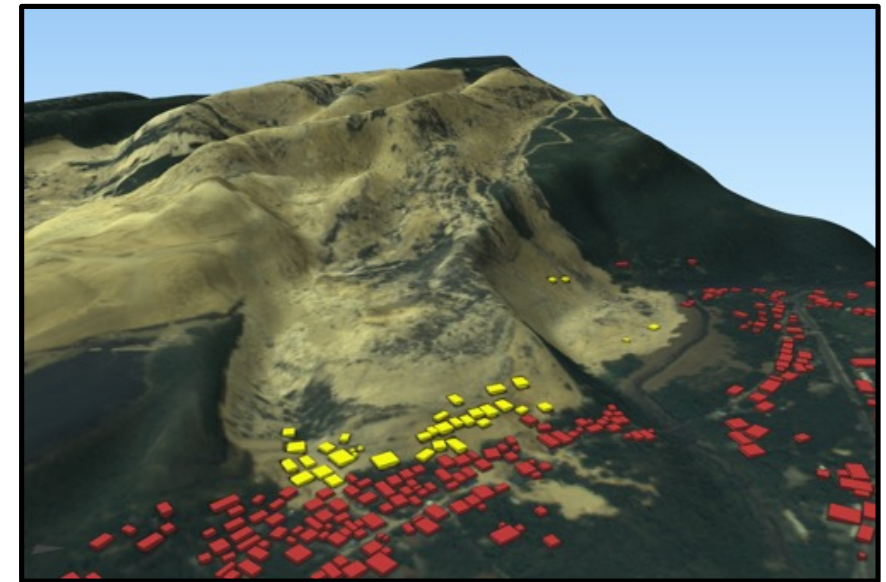
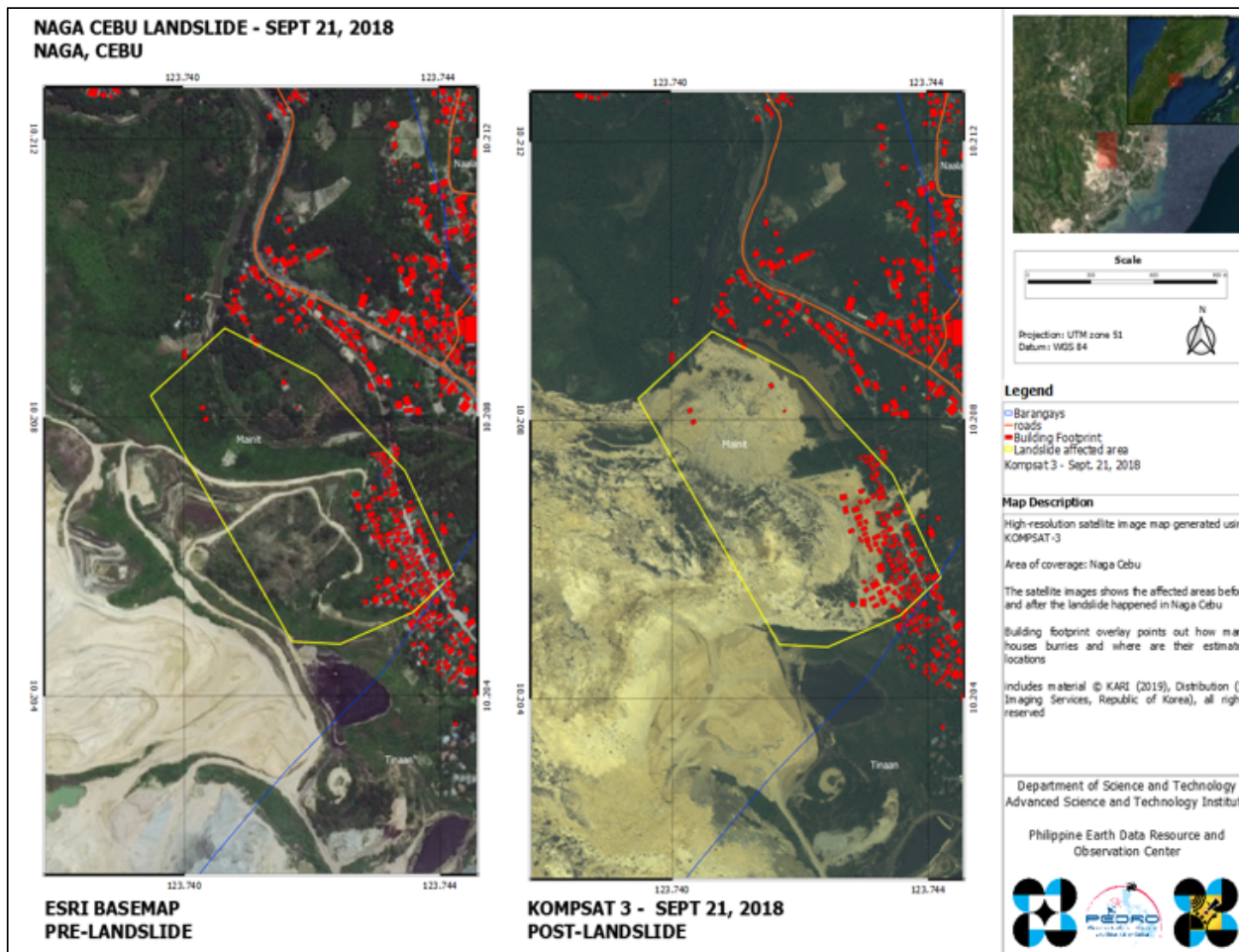
Baseemap Source: PhilGIS
Image Source: Google Earth

Data Mobilization for Typhoon Mangkhut (2017)



Data mobilization - a *new* way to categorize typhoons (and other natural disasters)

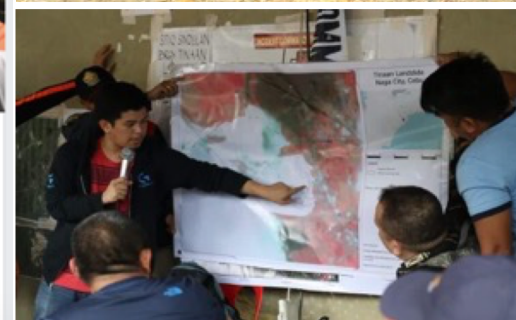
Naga, Cebu landslide delineation and building footprints mapping



These maps (among other geospatial data) were given to the OCD, Cebu Provincial DRRMO, Naga City Mayor's Office, and colleagues from UP Cebu



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Central Visayas Center for Environmental Informatics - CENVI

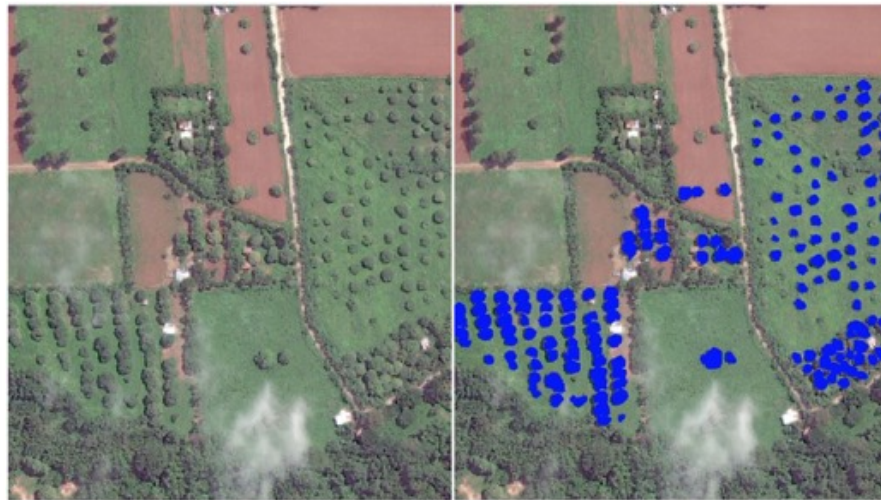
September 22 · 🌐

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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.



Road Network Prediction



Object identification
(mango and coconut trees)

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”*

S. No. 1983
H. No. 8541

Republic of the Philippines
Congress of the Philippines
Metro Manila
Seventeenth Congress
Third Regular Session

Begun and held in Metro Manila, on Monday, the twenty-third day of July, two thousand eighteen.

[REPUBLIC ACT NO. 11363]

AN ACT ESTABLISHING THE PHILIPPINE SPACE DEVELOPMENT AND UTILIZATION POLICY AND CREATING THE PHILIPPINE SPACE AGENCY, AND FOR OTHER PURPOSES

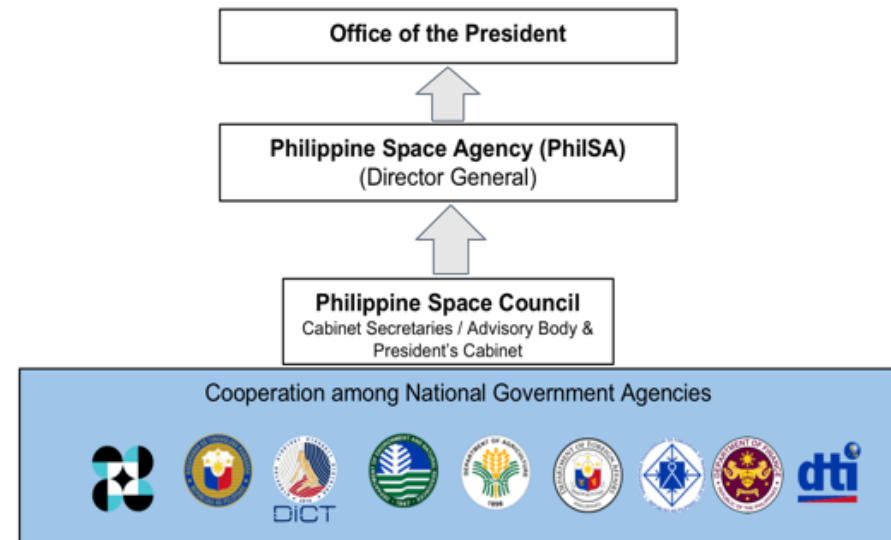
Be it enacted by the Senate and House of Representatives of the Philippines in Congress assembled:

SECTION 1. *Short Title.* – This Act shall be known as the “Philippine Space Act”.

SEC. 2. *Declaration of Policy.* – It is hereby declared the policy of the State:

(a) To safeguard Philippine sovereignty, territorial integrity, Philippine interest, and the right to self-determination as mandated by Article II, Section 7 of the 1987 Constitution;

Source: <https://www.officialgazette.gov.ph>



Philippine Space Policy Framework

Stakeholders
Consultation



Six (6) Key
Development
Areas (KDAs)

The 6KDAs under the Philippine Space Policy Framework

1. National Security & Development
2. Hazard Management & Climate Studies
3. Space Research & Development
4. Space Industry Capacity Building
5. Education & Awareness
6. International Cooperation



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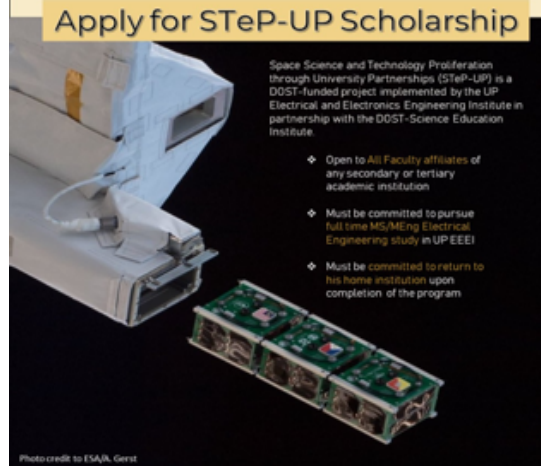
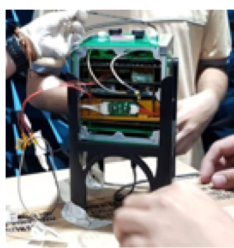
DOST, UP: Small satellite subjects put space within students' reach



PHL-Microsat Follow
Aug 23, 2019 · 4 min read



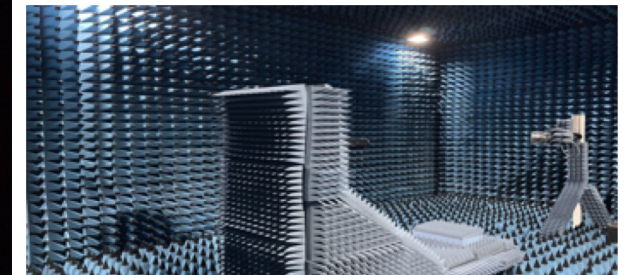
More scholarships on nanosatellite/cube satellite engineering under way



DOST, UP announce local cube satellite development program



PHL-Microsat Follow
Oct 18, 2018 · 2 min read



STAMINA4Space

Small Satellite Development Program



Thank you



STAMINA4Space
DOST-ASTI



STAMINA4Space
Diwata2PH (Diwata-2 ARU updates)
phlmicrosat



stamina4space



stamina4space@eee.upd.edu.ph

<http://www.asti.dost.gov.ph>

[http:// phl-microsat.upd.edu.ph](http://phl-microsat.upd.edu.ph)

[http:// blog.phl-microsat.upd.edu.ph](http://blog.phl-microsat.upd.edu.ph)

