



GRASPED and STAMINA4Space

Romer Kristi Aranas
University Researcher
STAMINA4Space: GRASPED

46st GEP-Region 3 Annual Regional Convention
14-15 February 2020



STAMINA **A** *SPACE*

**Space Technology and Applications
Mastery, Innovation, and Advancement**





Space Technology and Applications Mastery, Innovation and Advancement (STAMINA4Space) Program

Program leader : Dr. Joel Joseph Marciano, Jr.

DOST-ASTI - Acting Director

SATELLITE TECHNOLOGY RESEARCH & DEVELOPMENT

Project 1

Optical Payload Technology,
in-depth Knowledge
Acquisition and Localization
(OPTIKAL)

Dr. Maricor Soriano
Project Leader
Affiliation: UP NIP

UP NIP, UP TCAGP
Implementing Institution



Project 2

Building PHL-50: Localizing the
Diwata-1 and Diwata-2 Bus
System as the Country's Space
Heritage 50kg Microsatellite
(PHL-50)

Dr. Marc Caesar Talampas
Project Leader
Affiliation:UP EEEI

UP-EEEI
Implementing Institution



TECHNOLOGY & KNOW-HOW PROLIFERATION

Project 3

Space Science and
Technology Proliferation
through University Partnerships
(STeP-UP)

Engr. Paul Jason Co
Project Leader
Affiliation:UP EEEI

UP-EEEI
Implementing Institution



OPERATION AND DATA PRODUCTS

Project 4

Ground Receiving, Archiving,
Science Product Development
and Distribution
(GRASPED)

Dr. Joel Joseph Marciano, Jr.
Project Leader
Affiliation: DOST-ASTI

DOST-ASTI, UP TCAGP, UP IESM
Implementing Institutions



The logo for the Philippine Microsatellite Program. It features the text "PHL" in a serif font above "MICROSAT" in a bold, sans-serif font, followed by "T" in a similar font. The letter "O" in "MICROSAT" is replaced by a blue and white globe. To the right of "MICROSAT" is a stylized orange map of the Philippines. A thin black line representing an orbit circles the globe.

PHL
MICROSAT T

Philippine Microsatellite Program





Build, launch, utilize the country's first microsatellite for high precision earth observation



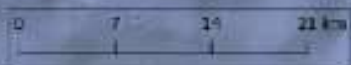
*The Philippines' first microsatellite, **Diwata-1**, was deployed into space last **27 April 2016** via the International Space Station.*

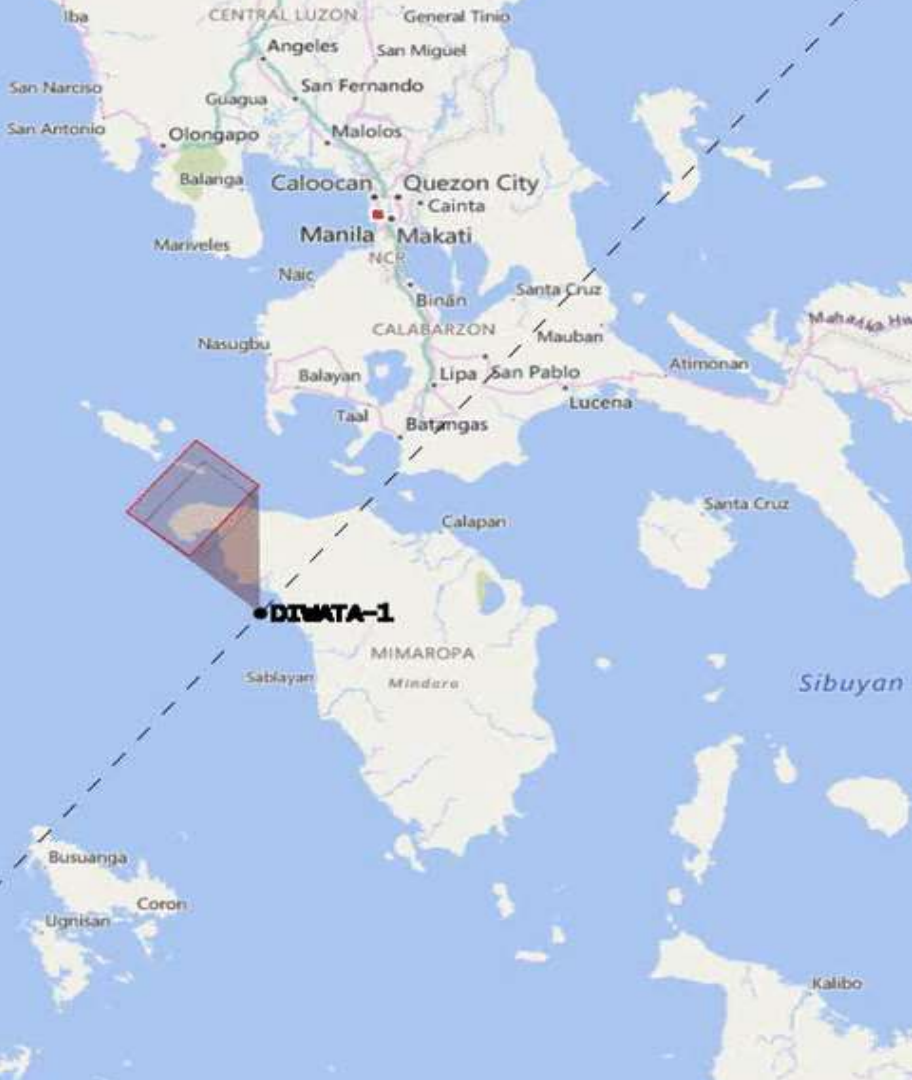


Animation was made from photos courtesy of NASA and JAXA.

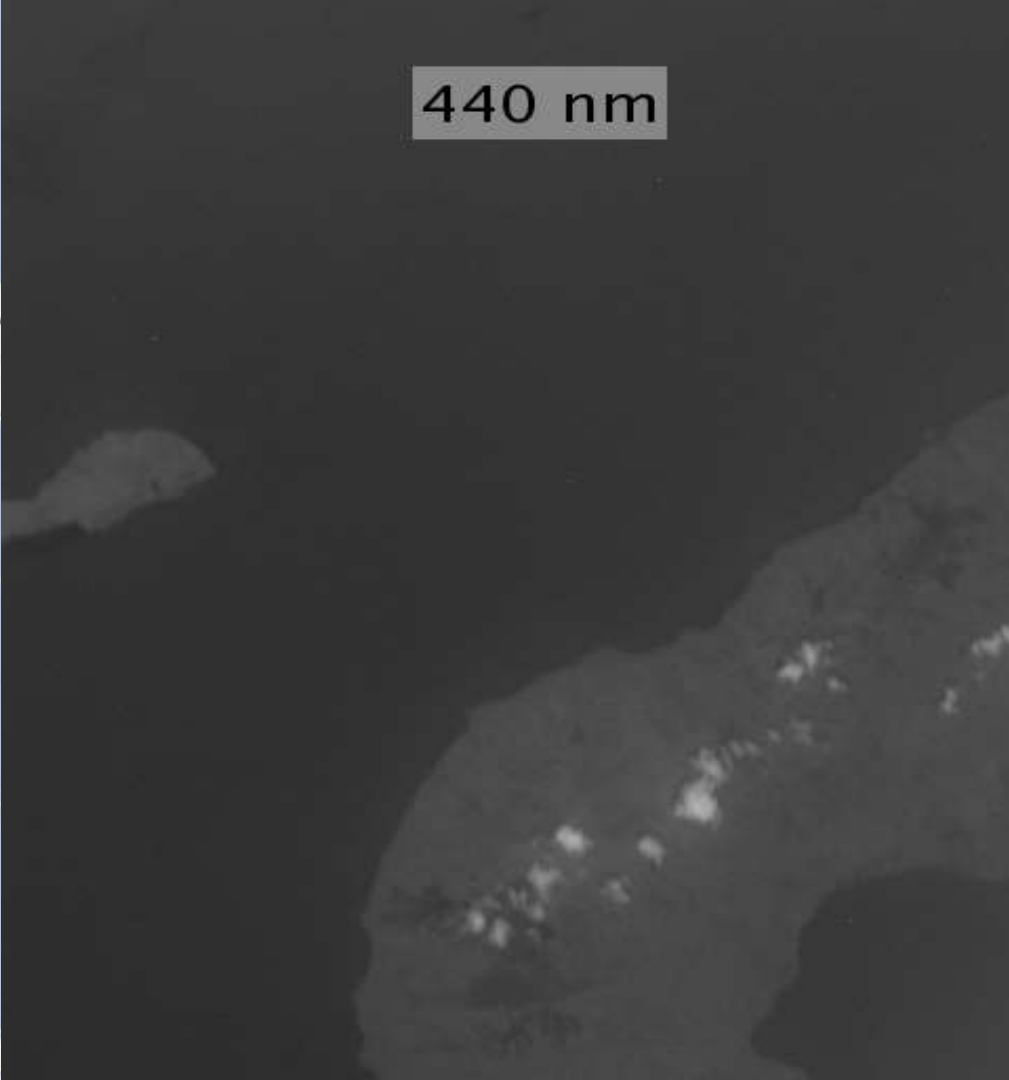
DATA

DATA from scientific earth observation that lead to more actionable information and responsive programs, policies and interventions across various societal applications;





440 nm



INDUSTRIAL BASE

INDUSTRIAL BASE for high value-add activities and innovations in aerospace technology and affiliated sectors;

Not just about the *Data*. Developing a local *Industrial Base*.

Locally-developed Experimental Modules onboard Diwata-2



Amateur ("Ham")
Radio Payload



Attitude Control
Unit (ACU-Ex)



Sun Aspect Sensor (SAS-
Z)

ENVIRONMENT

ENVIRONMENT for
interdisciplinary R&D, leading
to a stronger local ecosystem
for scientific innovation



Building an *enabling environment* for interdisciplinary collaboration in space technology



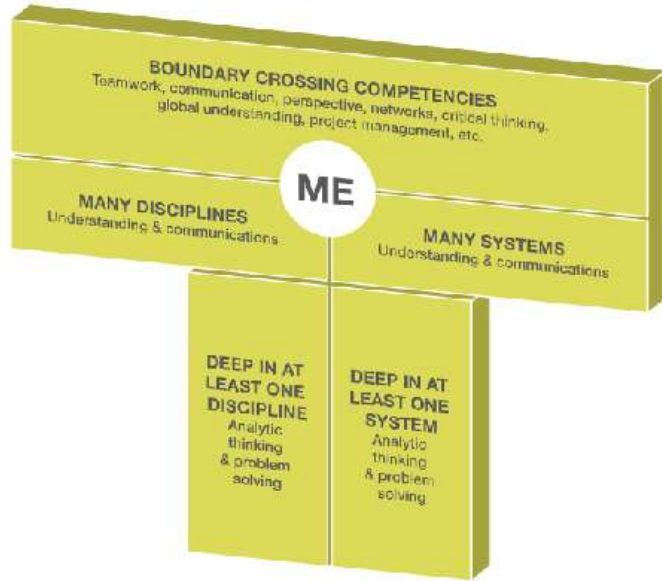
PEOPLE

PEOPLE that work together
across different technical
disciplines to tackle high-
impact, societal-scale
challenges for the country.



- Aerospace Engineering*
- Computer Science
- Cosmo-science
- Electrical Engineering
- Electronics and Communication Engineering
- Energy Engineering
- Environmental Science
- **Geodetic Engineering**
- **Geomatics Engineering**
- Material Science and Engineering
- Mechanical Engineering
- Meteorology
- Physics
- **Remote Sensing**
- Space Engineering*

When we build satellites, we also build *People*.



Satellite is *king of systems*

- Broad disciplines
 - Systems engineering, electronics, mechanical, structural, material, etc
- Numerous parts
 - Learn systems engineering through satellite development



Electrical, electronics, mechanical engineers

→ **Systems Engineers**

Remote sensing scientists

→ **Data Scientists**



DATA

INDUSTRIAL BASE

ENABLING ENVIRONMENT

PEOPLE



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OPERATION AND DATA PRODUCTS

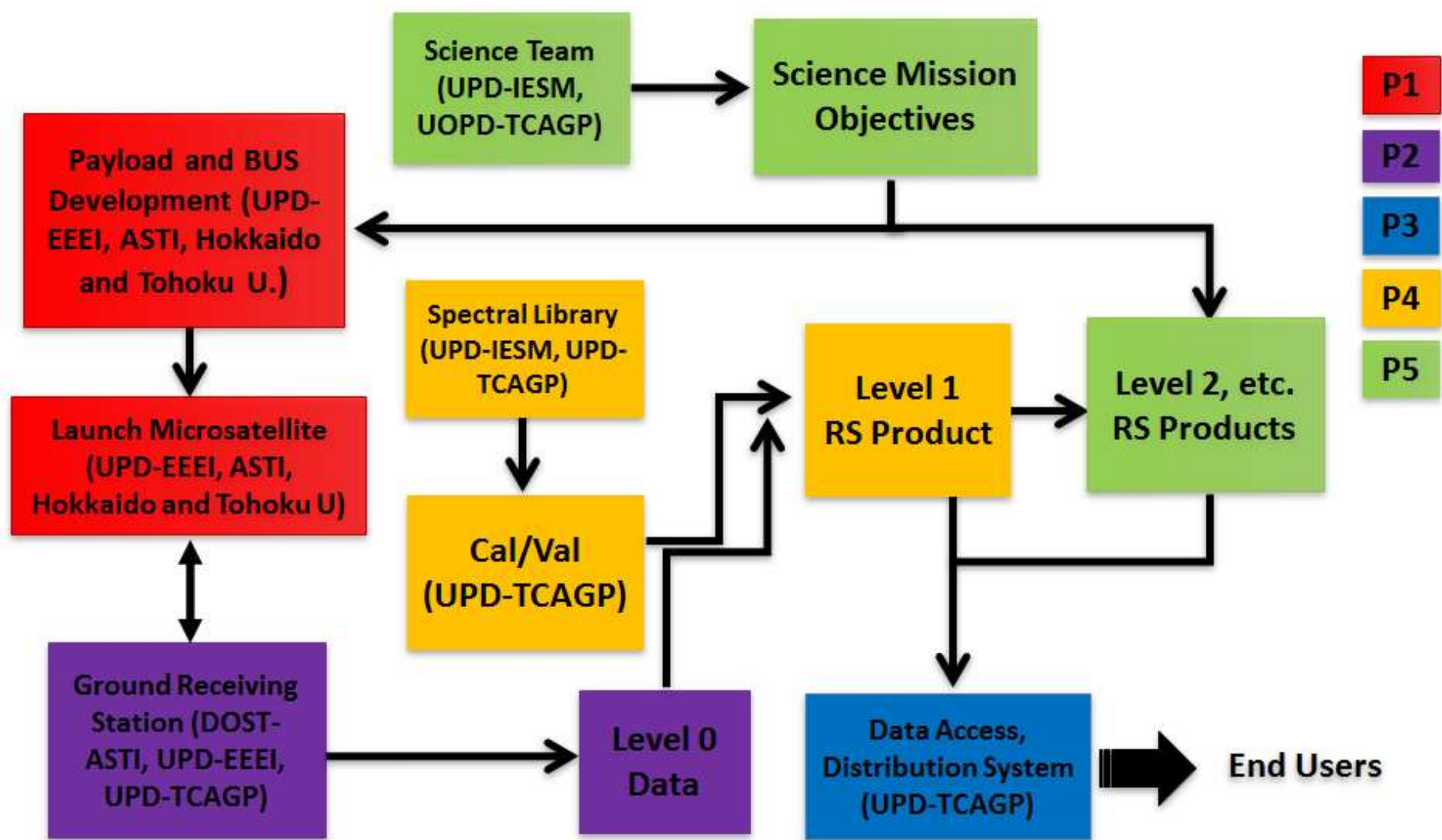
Project 4

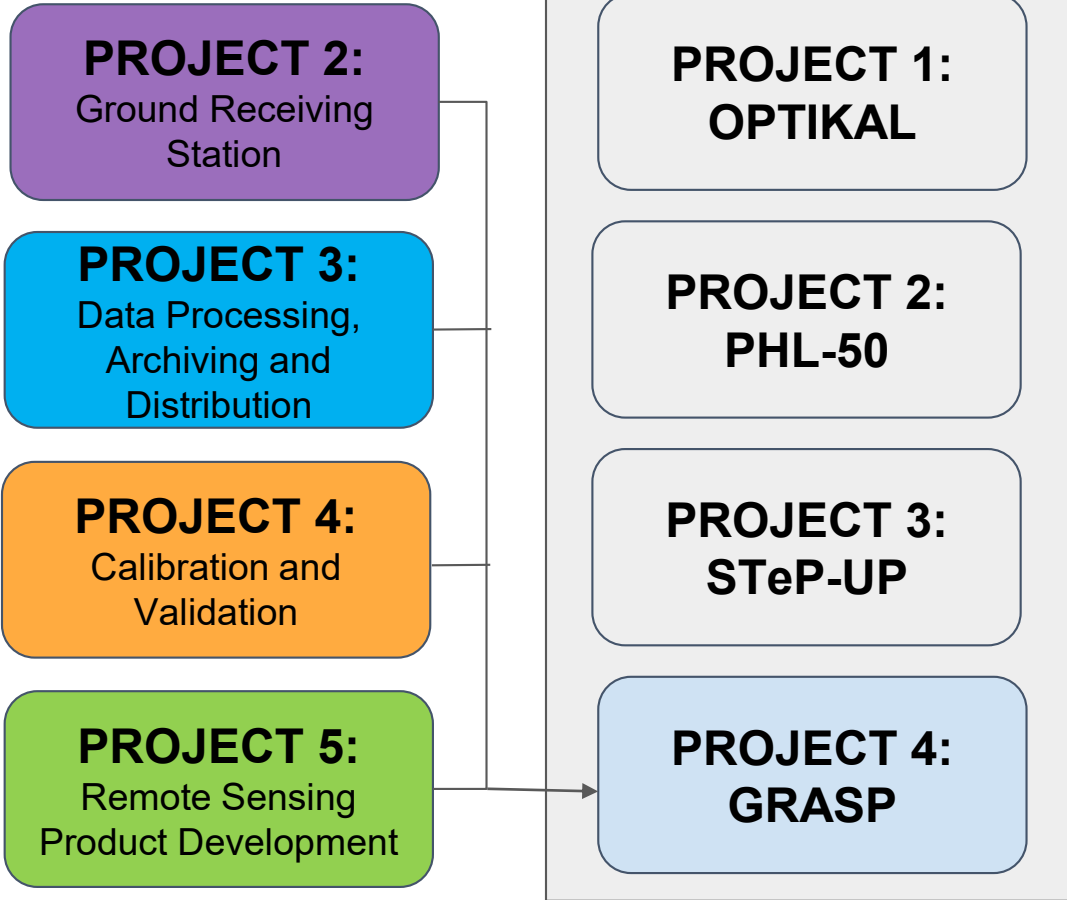
Ground Receiving, Archiving,
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Implementing Institutions









OPERATIONAL



RESEARCH



**CAPACITY
BUILDING**

DOST ASTI



**Ground Receiving
Station Operations**

UP IESM



**Mission
Planning**

UP IESM/TCAGP



**Satellite Calibration,
Data Processing, and RS
Product Development**

UP TCAGP



**Data Distribution and
Software Development**

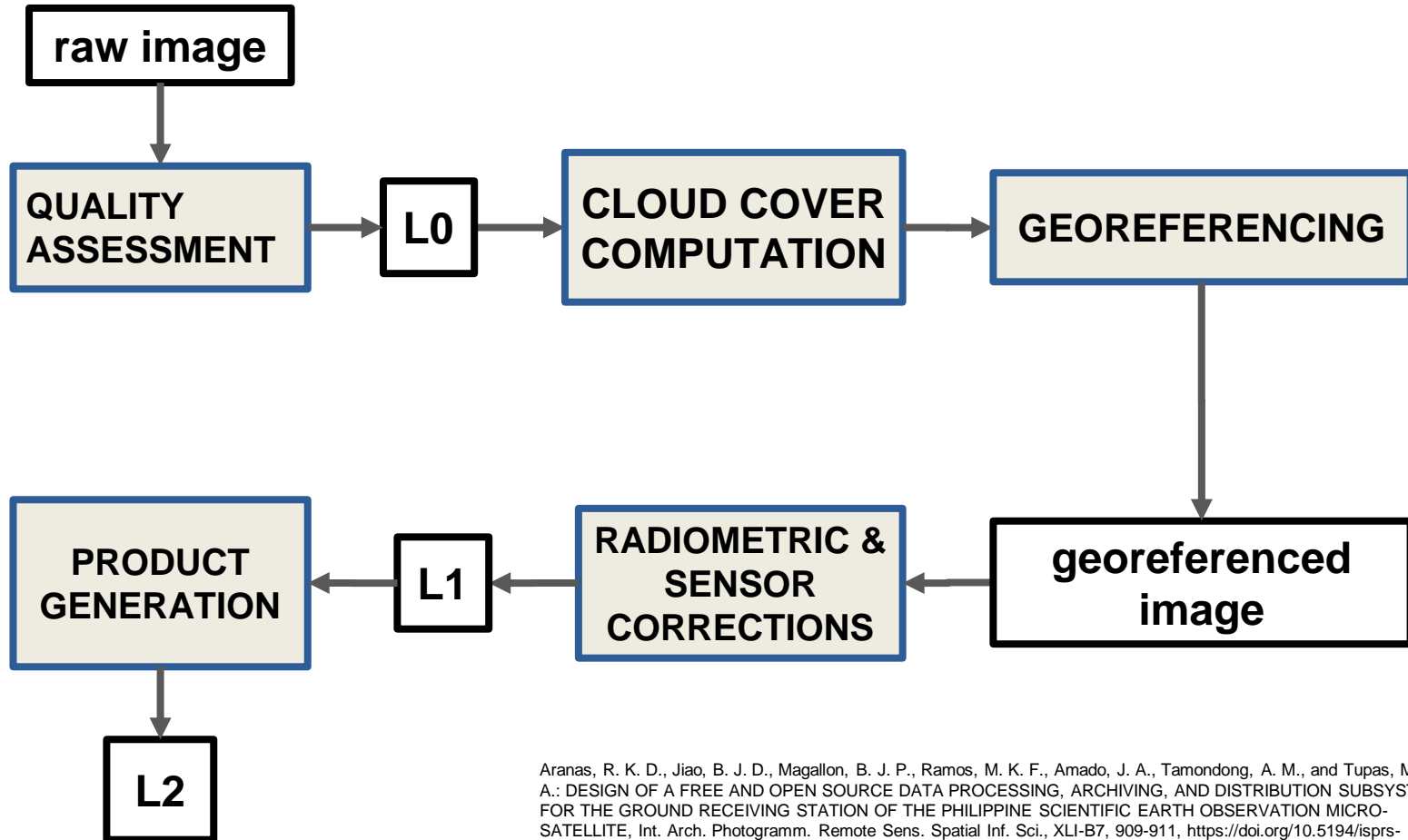
DOST-ASTI



Public Relations

GRASPED

IMAGE (PRE)PROCESSING

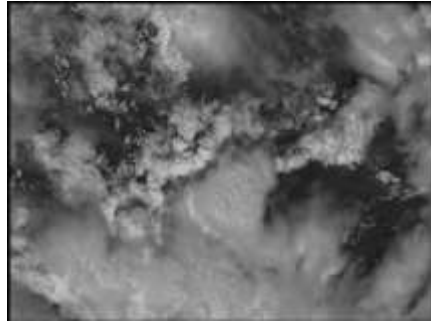


Aranas, R. K. D., Jiao, B. J. D., Magallon, B. J. P., Ramos, M. K. F., Amado, J. A., Tamondong, A. M., and Tupas, M. E. A.: DESIGN OF A FREE AND OPEN SOURCE DATA PROCESSING, ARCHIVING, AND DISTRIBUTION SUBSYSTEM FOR THE GROUND RECEIVING STATION OF THE PHILIPPINE SCIENTIFIC EARTH OBSERVATION MICRO-SATELLITE, *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XLI-B7, 909-911, <https://doi.org/10.5194/isprs-archives-XLI-B7-909-2016>, 2016.

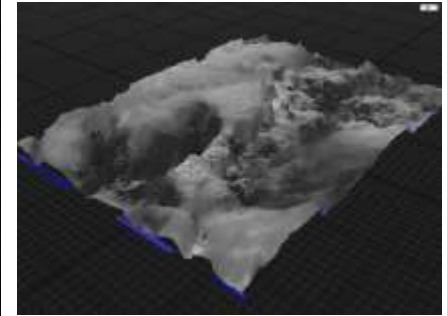


LAND COVER AND LAND USE CHANGE MONITORING

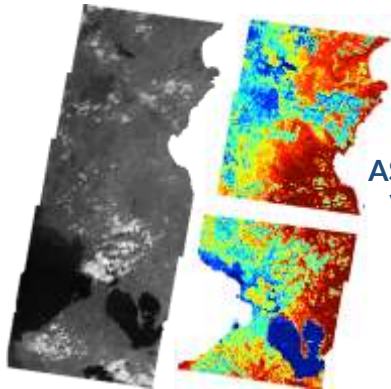
Captured ERC images



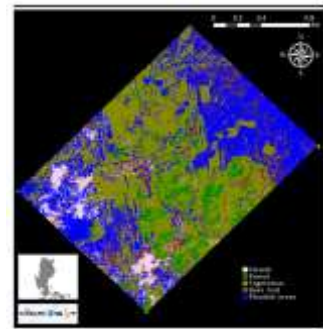
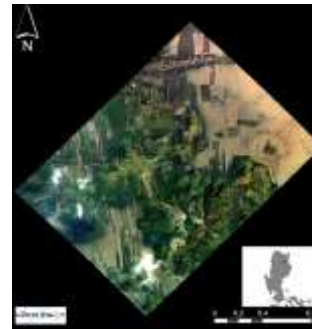
Constructed 3D Cloud Model



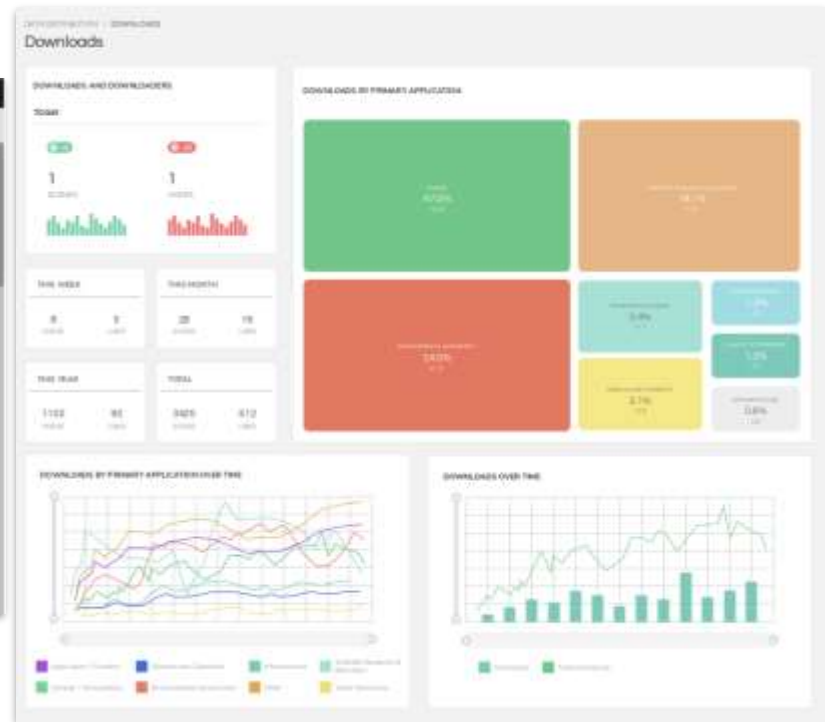
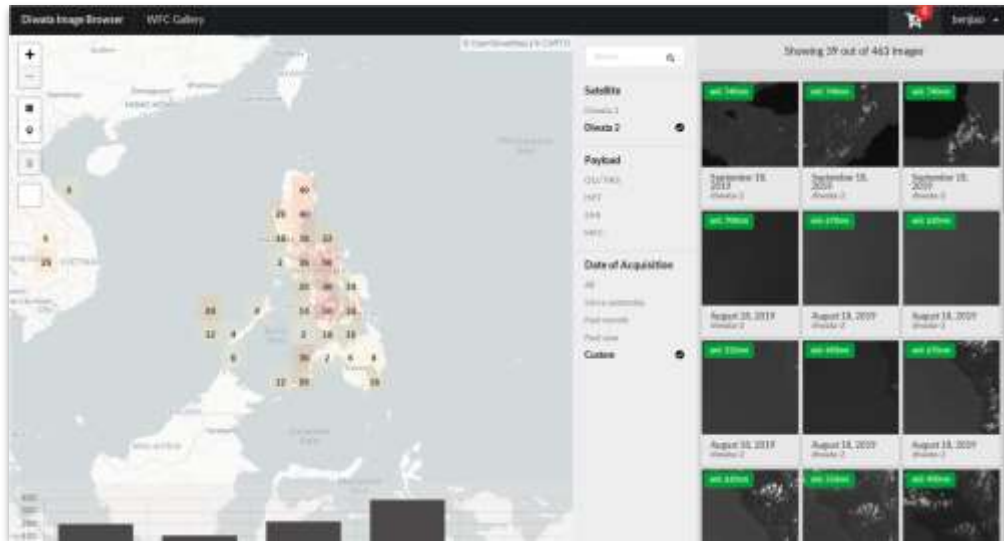
MONITORING CLOUD GROWTH



ASSESSMENT OF VEGETATION HEALTH AND DENSITY



POST TYPHOON DAMAGE ASSESSMENT





Why does this matter to us?

Geodetic engineers are needed
in every step of the
microsatellite development
process

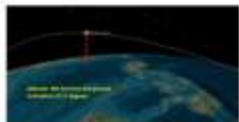
Microsatellite Development

Mission
Planning

Payload & Bus
Development

Post-Launch
Calibration and
Validation

Product
Development and
Distribution



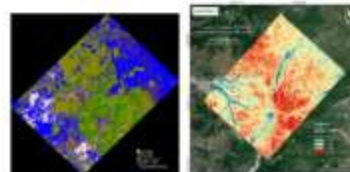
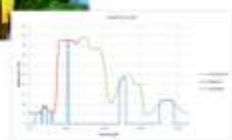
GIS, Geodesy,
Astronomy and
Programming



Photogrammetry
and Remote
Sensing



Remote Sensing,
GIS and
Programming



Remote
Sensing,
Cartography
and
Programming



Dr. Enrico Paringit

Project Leader
PHL-Microsat
Project 4



Engr. Marx Tupas

Project Leader
PHL-Microsat
Project 3 (DPAD)

Project Staff
STAMINA4Space
GRASPED



Engr. Ayin Tamondong

Project Staff
PHL-Microsat
Project 3 (DPAD)



Engr. Jak Sarmiento

Project Staff
STAMINA4Space
GRASPED



**Engr. Romer Kristi
Aranas**

Overall lead
GRASPED

Team lead
DPAD



**Engr. Benjamin
Magallon**

Team lead
GRASPED

Team lead
DPAD



**Engr. Julius Noah
Sempio**

Senior Researcher
GRASPED



**Engr. Cham
Mamador**

**Front-end
Developer**
DPAD



**Engr. Ian
Panganiban**

**Back-end
Developer**
DPAD



Engr. Kristian Monay

Researcher
GRASPED



Engr. Fritz Olivar

Researcher
GRASPED



Engr. Jara Villanueva
Supervising

Researcher
OPTIKAL



Engr. Alaine
Maestro

Researcher
OPTIKAL



Engr. Iris Ventura

Junior
Researcher
GRASPED

We are going upstream

Learn more about us

<https://phl-microsat.upd.edu.ph/>

Get the data

<https://data.phl-microsat.upd.edu.ph/>



Facebook.com/STAMINA4Space



@stamina4space



@STAMINA4space



STAMINA4Space@eee.upd.edu.ph



Thank you for listening!



Collaborators

