

Philippine Space Agency (PhilSA)'s Initiatives for Knowhow Sharing and Capacity Building

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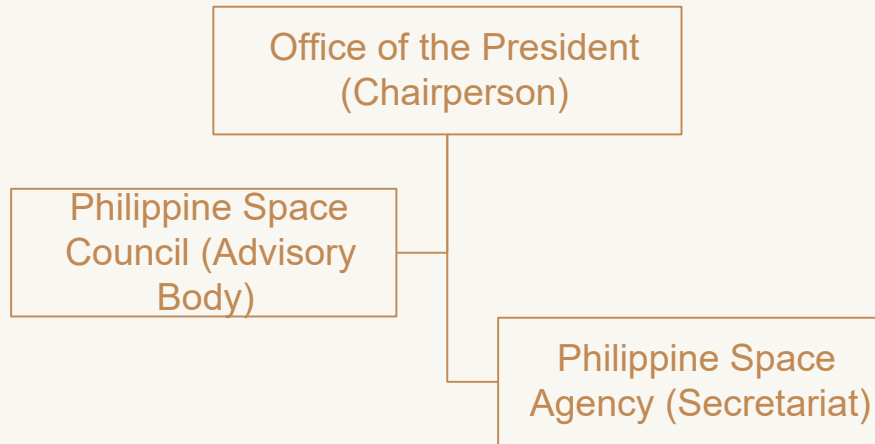
Philippine Space Agency (PhilSA)



PhilSA

Republic Act 11363 “Philippine Space Act”

An Act Establishing the Philippine Space Development and Utilization Policy and Creating the Philippine Space Agency, and for Other Purposes



08 August 2019

Signed by the President

03 September 2019

Effectivity of R.A. 11363



PhilSA

Philippine Space Agency (PhilSA)

- Established as the central government agency addressing all national issues and activities related to space S&T applications.
- Mandated to 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.

Key Development Areas & Strategic Directions of PhilSA



Key Development Areas

Spur **scientific growth** that fosters patriotism and accelerates national progress.

Promote **improved public access and resource-sharing** for the utilization of spaceborne data, space-enabled services and space-related facilities.

Accelerate the **transfer and diffusion of space technologies and knowhow** throughout Philippine society towards developing a robust and vibrant local space industry and economy.

Create a **coherent and unified strategy** for the development, utilization and promotion of *Space Science and Technology Applications (SSTA)* in line with the **Philippine Space Policy**.

Enhance the Philippines' **official representation and contribution in the international space community** for establishing cooperation.

PhilSA Vision & Mission



Our Vision

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

Our Mission

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.**



Overview of PhilSA's SSTA Program

Flagship projects since 2020:

- **Build, Build, Build in Space (B3iS) Project**

-Will continue the development of Philippine satellites as a vital component of national information infrastructure

- **Space Data Mobilization Project**

-Mobilizing space data for digital inclusion, economy, and government

Human capital development

- Integration of SSTA in the basic education program (K to 12) curriculum

- AD ASTRA Scholarship grants for SSTA-related postgraduate studies

- Capacity building of our government and industry partners



PhilSA's ISKUELA Thrust

Inclusive SSTA Know-how Utilization, Exchange, and Localization Activities (ISKUELA)

- PhilSA's thrust of **cascading** space science and technology applications (SSTA) knowledge and capabilities across the country



Building space ecosystem by engaging and capacitating the stakeholders and other partners through technology transfer and training



Some PhilSA ISKUELA Projects (2022~)

- ACCESS Nanosat Project
- B3iS – ECRADLE Project
- B3iS – INDUS3US Project
- B3iS – Flexible LEO Platform (FLP) Integration Project
- NNESTS Project
- Asi@connect SIKAP+ Project



ACCESS Nanosat Project

Advancing Core Competencies and Expertise in Space Studies (ACCESS) Nanosat Project

- PhilSA is set to continue the country's nanosatellite research, development and educational initiatives through the ACCESS Nanosat Project.
- Provides opportunities for Filipinos to pursue a master's degree specialized in space engineering with hands-on satellite project experience

Scholarship grants for *Master of Science / Master of Engineering in Electrical Engineering* program (*nanosat engineering track*) of UP Diliman

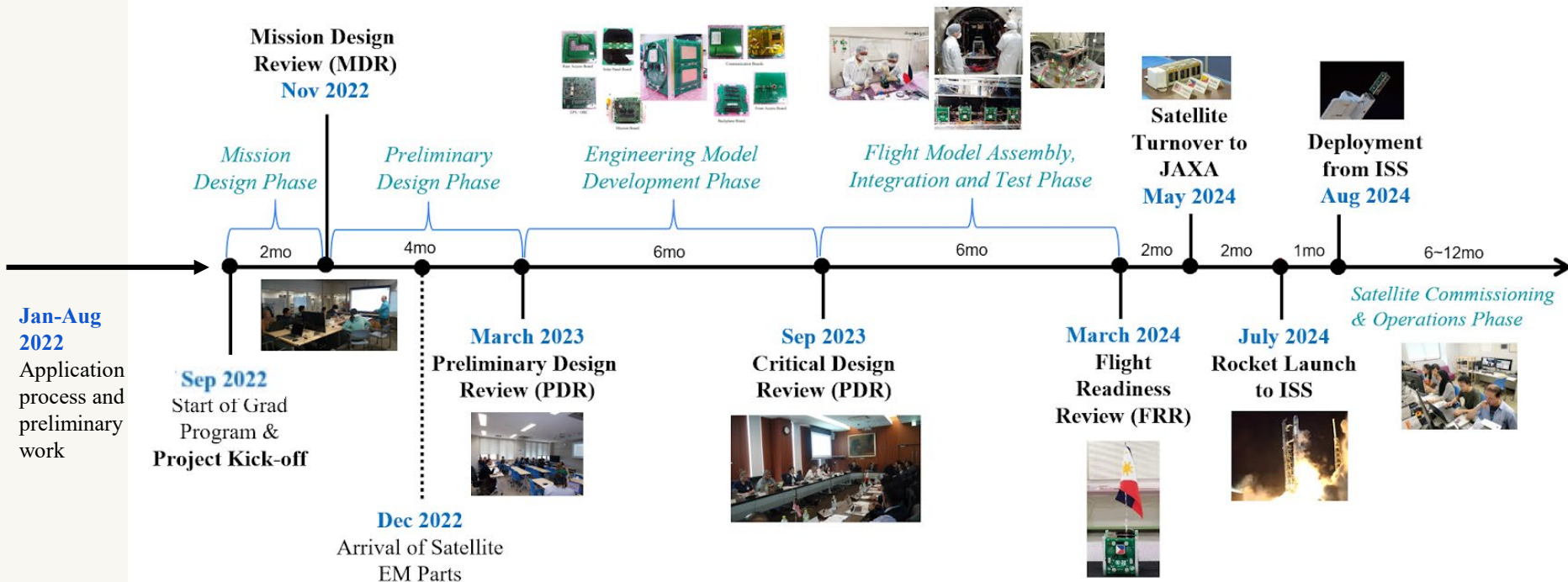
+

Hands-on nanosatellite project experience with PhilSA personnel serving as mentors

ACCESS Nanosat Project

- ACCESS Nanosat Team students - members are selected from different parts of the country through a selection process.
- Successful applicants
 - Receive PhilSA AD ASTRA Scholarship grants
 - Enrol in the nanosatellite engineering track under the MS / MEng EE program of the University of the Philippines EEI
 - Sign up for the CubeSat project funded, managed and supervised by PhilSA in cooperation with UP EEI.
- Project-based learning approach - satellite development activities are part of the nanosat engineering courses.
- Scientists, engineers, and researchers from PhilSA will mentor and guide the scholars in the overall process of satellite development.

ACCESS Nanosat Project Life Cycle



Total Satellite Project Duration from KO: ~2.5 years

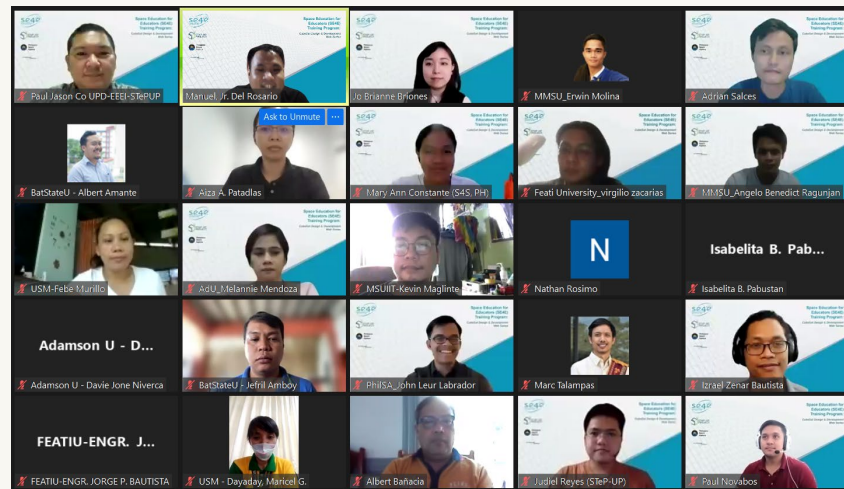
B3iS-ECRADLE Project

ECRADLE: Expanding CubeSat Research and Development Efforts in Philippine Universities

- Aims promote the expansion of nanosatellite education and R&D activities in the academe, leveraging the momentum gained from previous efforts

ECRADLE Activities

- *SE4E: Space Education for Educators – CubeSat Design & Development Web Series*
 - organized by STEP-UP Project and PhilSA
 - held from June 13 to July 1, 2022
 - Introductory Topics:
 - Small satellite systems engineering and project management
 - Space environment & testing
 - CubeSat subsystems
 - Ground station operations
 - Safety review process
 - BIRDS Open Source BUS



B3iS-ECRADLE Project

ECRADLE Activities

- *Nanosatellite Mission Idea Contest (NMIC)*
 - provides Philippine university teams an opportunity to propose mission ideas for the 2U CubeSat to be developed by ACCESS Nanosat Project
 - top three (3) winning teams will have the chance to realize their proposals and get involved in a nanosatellite mission design phase up to MDR.

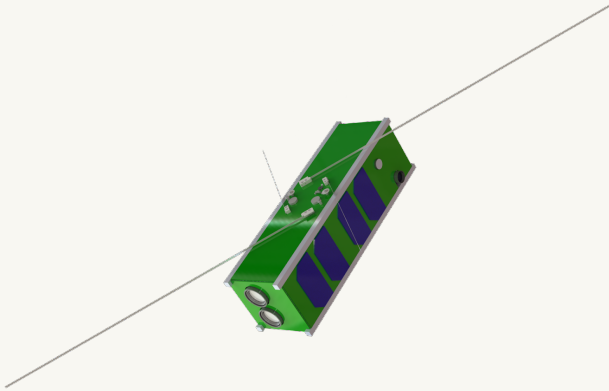


B3iS-INDUS3US Project

INDUS3US: Integrated Development of a Unified Standard 3U System

3U CubeSat built with Industry Engineers

Philippine Space Technology Standards/ Handbook

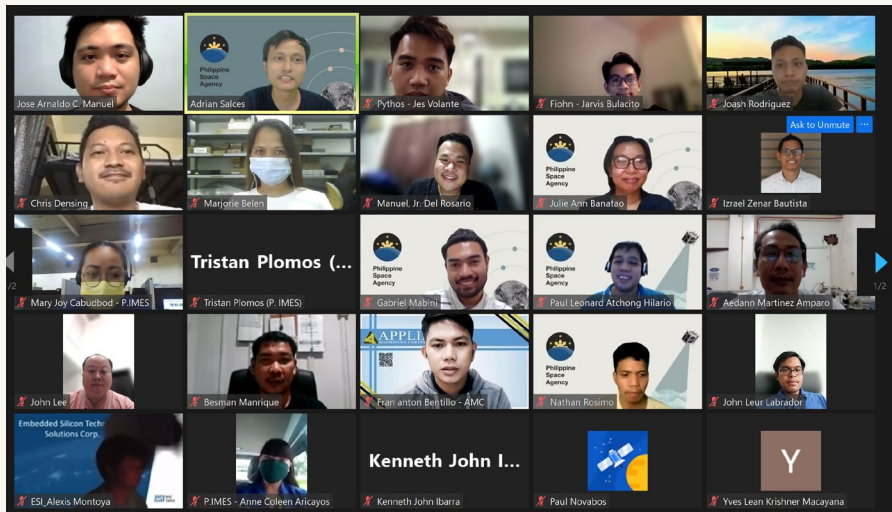


Objective #1: To inform, encourage, and guide local companies to do activities in space technology

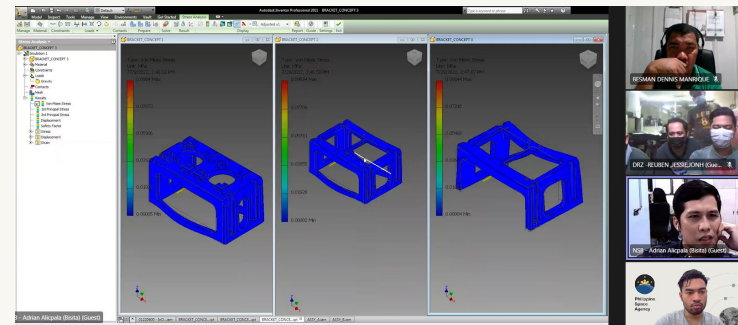
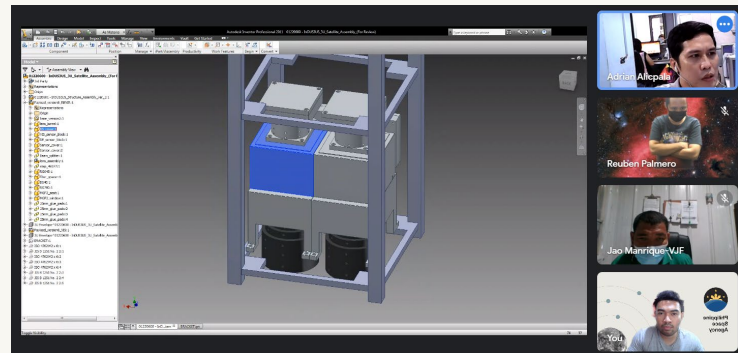


Objective #2: To ensure the safety and reliability of future upstream space technology products and services developed in the Philippines

B3iS-INDUS3US Project – Satellite Engineering Theory & Practical Trainings



Industry Engineers underwent a crash course in small satellite systems engineering, project management and CubeSat subsystems via an online platform

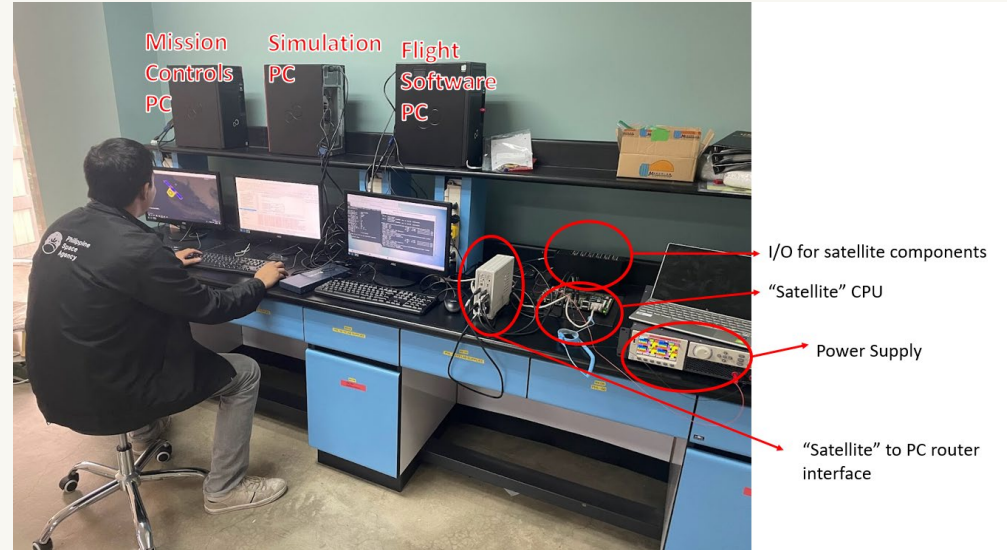


Mentoring per subsystem between PhilSA and Industry Engineers throughout the preliminary design process

B3iS-FLP Integration Project

FLP: Flexible LEO Platform Integration Project

- Aims increase our capacity in testing hardware modules as part of a flexible LEO system and integrating locally developed satellite bus and payload modules from the STAMINA4Space projects.
- Serves as training platform to inform, encourage, and empower local government agencies, educational institutions, and industrial corporations in the integration and testing phases of space technology



FLP Setup at UPD ULYSE3S

NNESTS Project

- NNESTS: Nationwide Network for Educational Satellite Terrestrial Stations
- Aims to deploy amateur radio kits in 20-30 senior high schools to stimulate interests in satellite technology and promote STEM education
- Trainings and learning materials will be provided to enable teachers and/or school personnel to use the kit.
- **Main features and capabilities**



Portable, easy to set-up and use



Experiential learning and hands-on activities

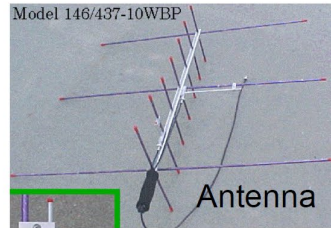


Communication device in times of disaster



Photos from AR operator DU7JAY

Block Diagram of Amateur Radio Kit



RG58 SMA Cable +
PL259 to BNC/SMA
Adapter

Power Supply



Kenwood TM-V71A/
Yaesu FT5DR
(for Satellite comms.)

OR

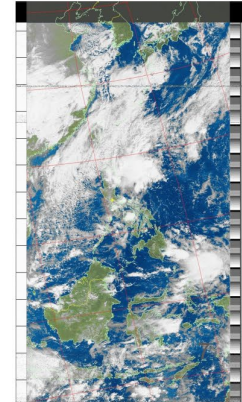


OR



AirsPy mini SDR
(for weather data)

PC/R-Pi/
Smartphone



Alignment with the PH Department of Education Science Curriculum

Target Grade Level: **Grade 10**

Content	Content/Performance Standards	Learning Competency	Proposed Activity
Electromagnetic Spectrum (2nd qtr)	understand the different regions of the electromagnetic spectrum	cite examples of practical applications of the different regions of EM waves, such as the use of radio waves in telecommunications	Receiving and transmitting signals using an amateur radio (Communicating via satellites using radios)
Plate Tectonics (1st qtr)	demonstrate ways to ensure disaster preparedness during earthquakes, tsunamis, and volcanic eruptions		

Amateur Radio and STEM Education

- ✓ Promotes interdisciplinary education
- ✓ Helps students understand complex technical concepts and supports STEM instruction
- ✓ Motivates students to take up STEM careers
- ✓ Demonstrates day-to-day applications of space technology

*“Amateur radio **applies mathematical and scientific principles and uses technology to communicate with people.** It is thus both a **technical** and a **social** activity which can enhance learning in almost any subject area at any grade level.” - Peter R. Newell, American Radio Relay League (ARRL)*

*“In the classroom, applying the technologies and techniques of Amateur Radio is an ideal way to promote STEM education experiences in a way that prioritizes hands-on learning and fosters student engagement and achievement.”
- ARRL*

SIKAP+ Project: About

SIKAP+ : Space Infrastructure, Knowhow and Applications Acceleration through Promotion and Training

- Asi@Connect provides dedicated high-capacity internet connectivity for research and education communities across Asia-Pacific
- **Work Package**



WP5: Promoting Asi@Connect-enabled Research and Education Collaboration for Societal Benefit

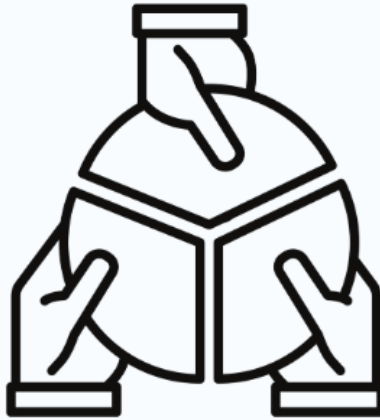
Duration: 01 April 2022 - 31 March 2023

Funding: € 149,356.00

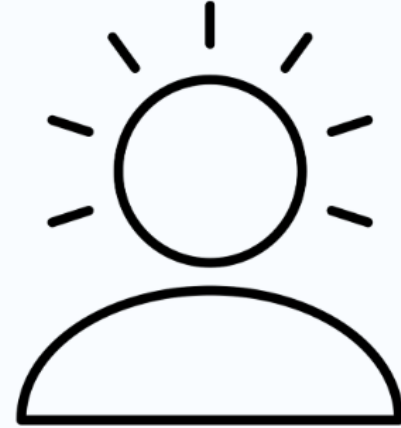
SIKAP+ Project: Objectives



#1 Promote Exchange of Know-How and Best Practices



#2 Facilitate Resource Sharing for Scientific Studies



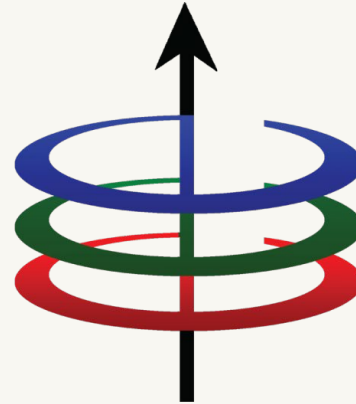
#3 Advance Space Situational Awareness and Sustainability of Outer Space Activities

SIKAP+ Project: Partners

**Department of Science and Technology
Advanced Science and Technology Institute**



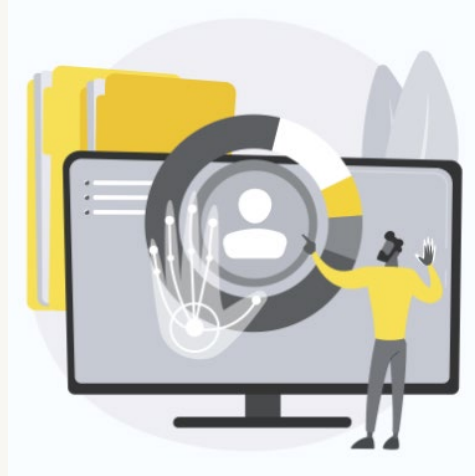
**University of the Philippines
Electrical and Electronics Engineering Institute**



SIKAP+ Project: Beneficiaries



Operators of GRS and Amateur
Radio Satellites



Remote Sensing Practitioners

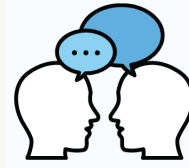


New and Emerging Actors in the
Space Community

SIKAP+ Training Activities

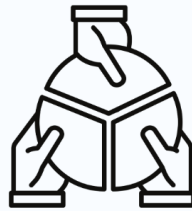
Training	Target Participants	Expected Outcome	Schedule
1. Ground Station Administration Training	Satellite ground operators, amateur radio operators, any other interested	Participants equipped with the knowledge and skills for utilization of amateur radio kits for satellite and terrestrial communications	Aug 18 & 31, Sept 6, 7-12, 13, 22-23
2. Satellite Data Processing Training	Remote sensing community	Participants learned the methods and techniques used in processing remote sensing data and applications	October – December 2022
3. Advance Situational Awareness Training	Technical teams working on SSTA	Participants equipped with the knowledge and skills in space debris mitigation & detection, regulations and standards of safety for rockets and space modules, launch & in-orbit collision risk, space traffic management, prediction of space debris re-entry	January – March 2023

SIKAP+ Activities



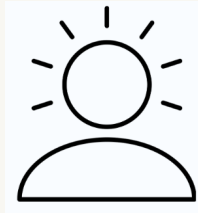
1. Establish **partnerships** among emerging and new space entrants in the **utilization of National Research and Education Networks (NREN)**
2. Organize workshops and webinars for **knowledge exchange** on the following topics:
 - a. Introduction to Satellite Communications
 - b. Setup and Operations of an Amateur Ground Station
 - c. Amateur Satellite Applications
 - d. Advanced Satellite Communications and Radio Regulations Procedure
 - e. Satellite Orbit Analysis and Tracking
 - f. Satellite Antenna Operations, Calibration and Maintenance Best Practices
 - g. Data Processing and Remote Sensing Applications
3. Create a **platform for knowledge sharing** where participants can sustain relationships established during the training events
4. Collect **participant feedback** for the assessment of the activities success and for the improvement of the succeeding trainings
5. **Preserve courses in the learning platform** so that it can be reused and updated by future trainers

SIKAP+ Activities



1. Identify and assess **mechanisms for resource sharing** through focus group sessions among the partner institutions
2. Organize training on using the **collaborative mission planning software** and get feedback for improving the platform as well as ideas on how it can be used by partner institutions
3. Create a **platform for sharing resources and scientific studies**
4. Co-author and publish **scientific papers**

SIKAP+ Activities



1. Organize **trainings on space situational awareness** particularly on the following topics:
 - a. Space debris mitigation & remediation
 - b. Space debris detection, tracking, and risk assessment
 - c. Space Weather and Space Environment
 - d. Regulations and standards for safety
 - e. Launch and In-Orbit Collision Risk
 - f. Space Traffic Management
 - g. Prediction of Re-entry hazards
2. Explore the uses of accessible and **open source tools** for tracking and monitoring space debris and objects
3. Undertake **group consultations** and gather inputs to formulate mechanisms for joint monitoring of space debris and to promote space situational awareness
4. **Preserve courses** in a learning platform so that it can be reused and updated by future trainers

Summary

- PhilSA's ISKUELA thrust is geared towards cascading SSTA knowledge and capabilities across the country.
- This is done by engaging and capacitating the stakeholders and other partners (academe, government agencies, private sector and industries) through various technology transfer and training activities.
- Thus, ISKUELA initiatives contribute towards building a space ecosystem and creating value in space.
- SIKAP+ Project facilitates know-how transfer and sharing of best practices among ground station and amateur radio operators, remote sensing practitioners, and new and emerging actors in the space community.



Thank you for your attention!



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