INCENTIVISE

Introducing Non-Geostationary Satellite Constellations Test Deployments to Improve Internet Services

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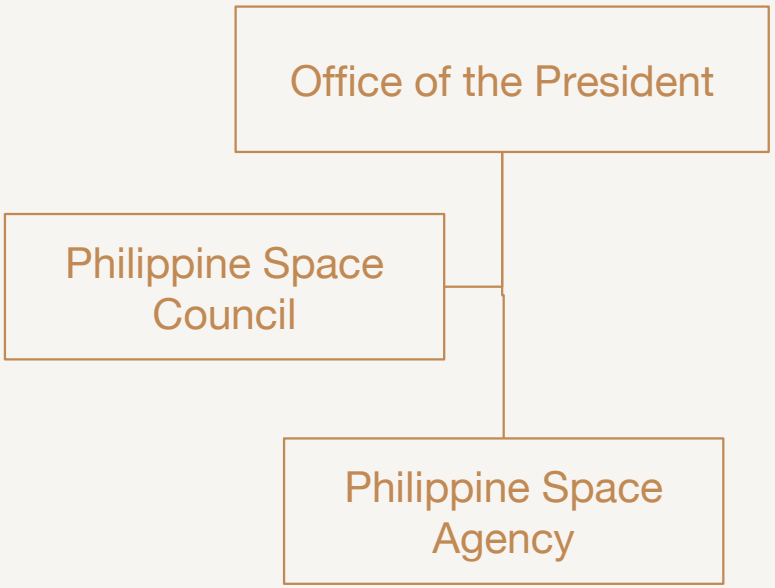
PhilSA

Assessing the Promise of LEO Satellites in Accelerating Rural Connectivity and Closing the Digital Divide
17 March 2022

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



Key Development Areas for SSTA Development

Upstream

- Satellite dev't: assembly, integration, test (AIT)
- Ground systems eqpt & satellite ops
- Launch systems, vehicles & services

Downstream

- Satellite data & services: Earth observation, telecoms, navigation,
- Value-add services: AI/computing, decision support systems

End users

- Consumers, gov't, industry, non-profit
- Various sectors: defense & security, agriculture, marine, energy, transport, etc

System & Infra → Operations → Data & Processing → Advanced Products & Services

$17.4B
Satellite Manufacturing & Launch Services

$253.3B
Space Data & Systems Utilization

$366B
Global Space Economy
(2019 Bryce Reports)

Government Budgets & Human Space Flight (non-satellite Industry): **$95.2B**

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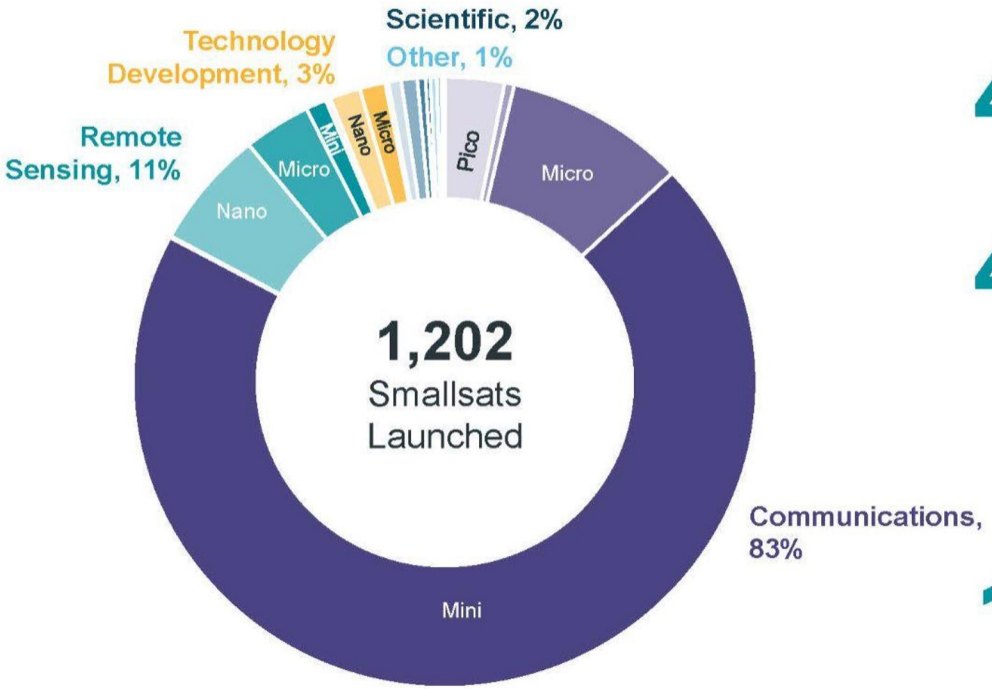
We are living in the *Space Economy*

Trends in Small Satellites

2020 Smallsat Highlights



40% of all smallsats launched in last 10 years launched in 2020

43% of total upmass represented by smallsats in 2020

68 launches in 2020 carried smallsats

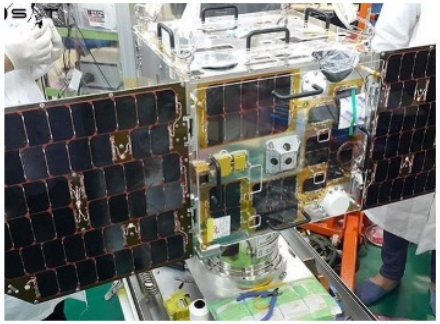
14% of smallsats launched on small/micro launch vehicles in 2020

Smallsats by the Numbers 2021, Bryce Space and Technology, http://www.brycetech.com

Space Infrastructure

Space-based assets

Diwata-1 (2016-2020)



Diwata-2 (2018)

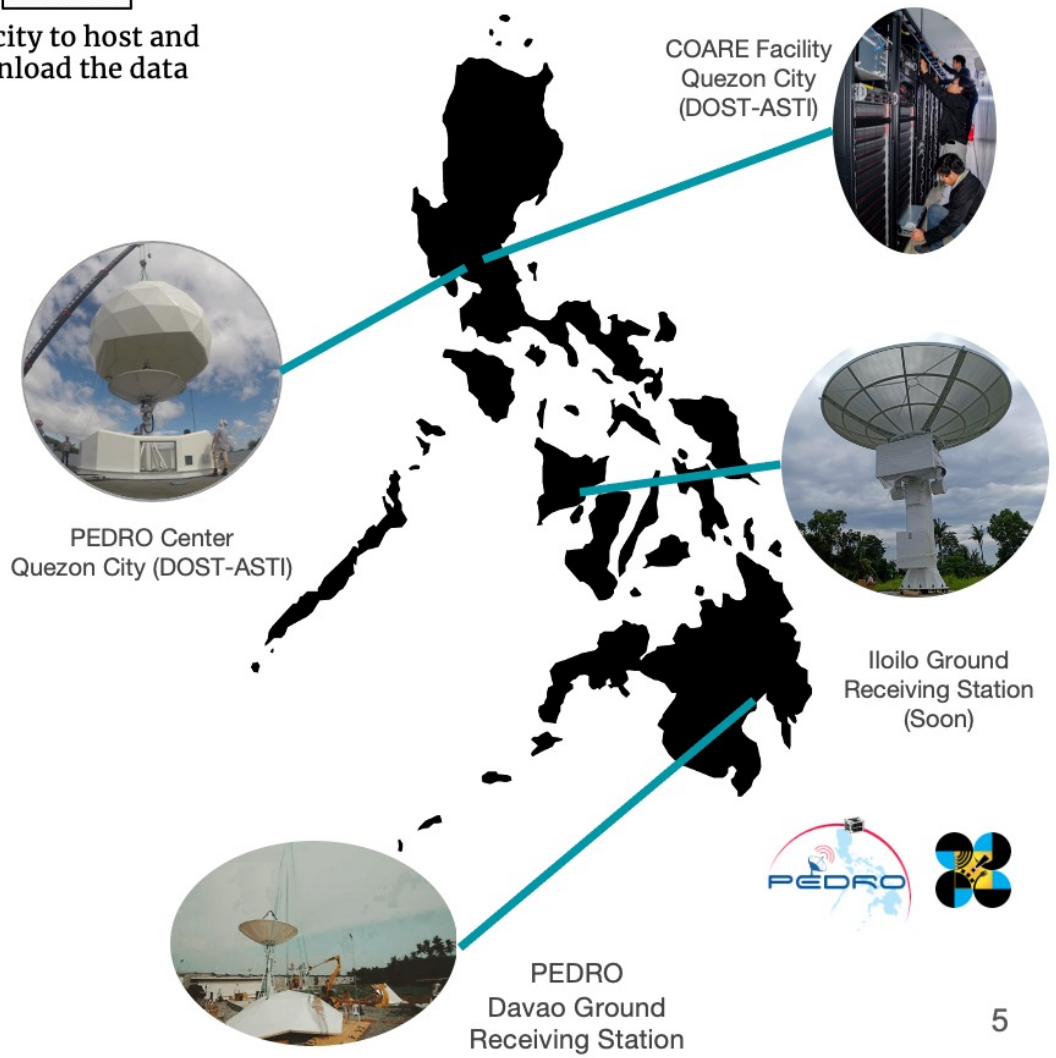
Maya-1 (2018-2020)

Maya-2 (2021)

Small satellites

Ground Infrastructure

Capacity to host and download the data



Address **Digital Divide** through SSTA

Promote Local **Space Industry** and **SSTA Ecosystem** Development

DICT
DEPARTMENT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

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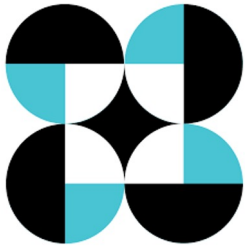

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- **Open call** for new **Satellite Internet Operators (SIO)** to conduct test deployments in the Philippines
- **Supports EO 127 s. 2021** with new satellite options **(downstream)**
- Opens doors to **space-adjacent** companies **(upstream)**
- **Research and development** objectives
- Draws attention to current **relevant telecommunications regulations**
- NGSO companies have sent **Letters of Intent**

“New Space” Technologies

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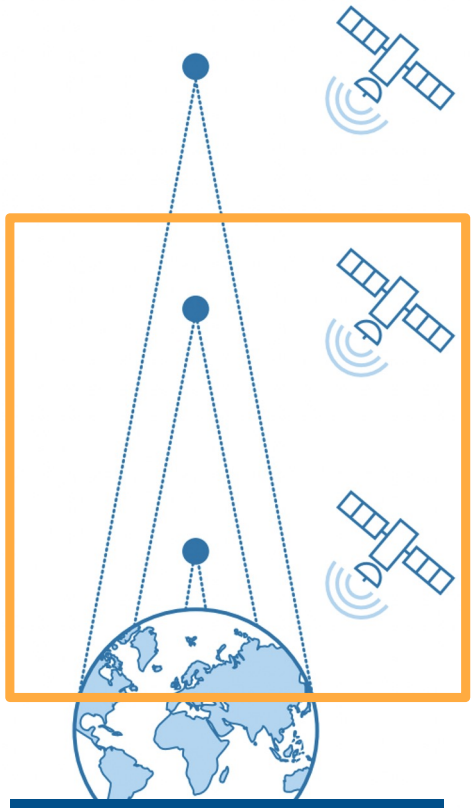
Features	LEO LOW EARTH ORBIT	MEO MEDIUM EARTH ORBIT	GEO GEOSTATIONARY ORBIT
Altitude (km)	~600	~3,000	~36,000
Latency (ms)	<50	~150	~600
# of Satellites to Span Globe	Up to thousands	5 - 30	3
Cost per Satellite	~$500k - $45M	$80M - $100 M	~$100M - $400M
Lifetime (years)	5 - 10	10 - 15	15 - 20



Opens supply chain opportunities

Information & Image Source: *Last Mile Internet Connectivity Solutions Guide*, ITU Development Sector (2020), page 71.

Example: Starlink Satellite Constellation

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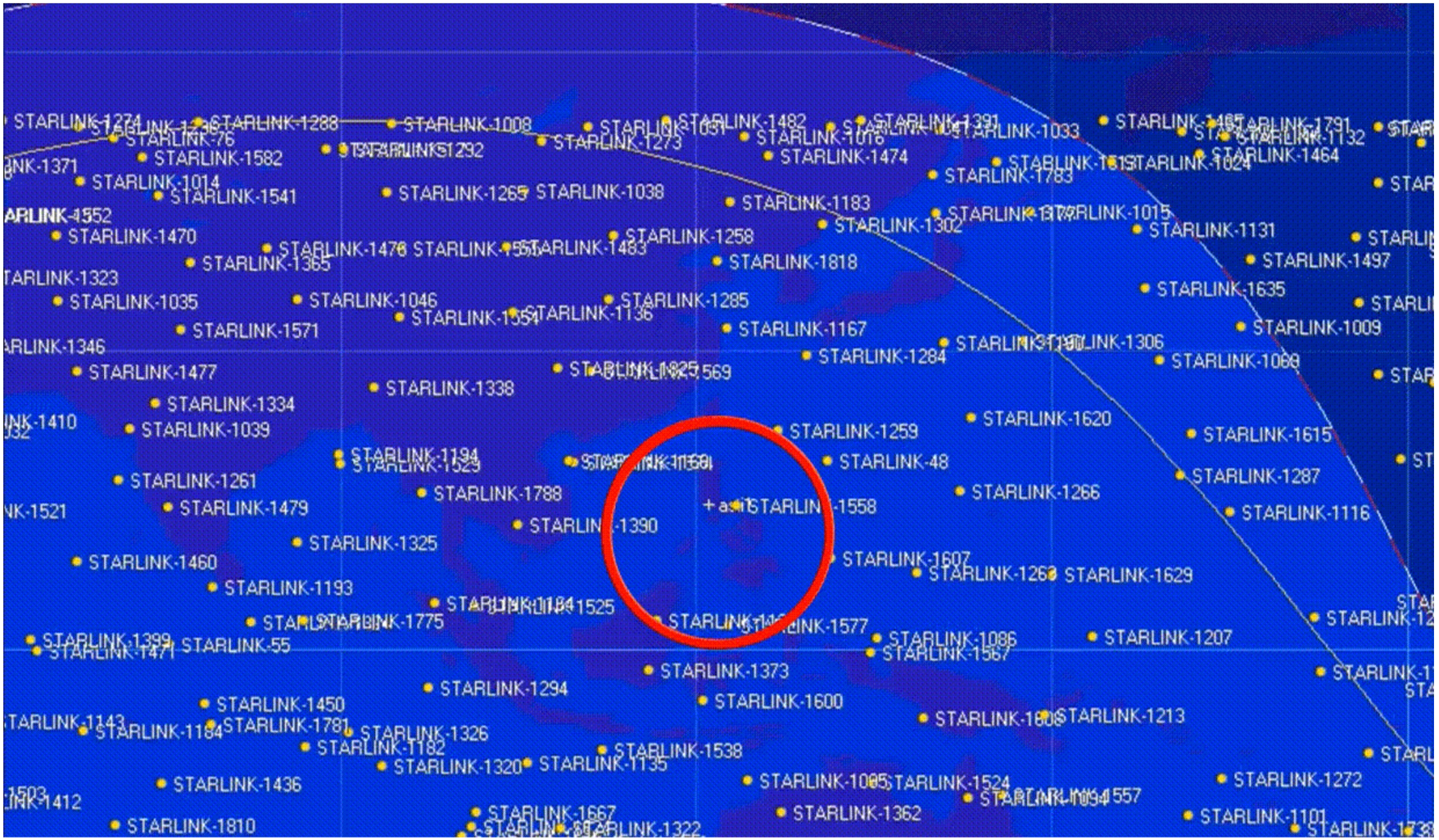

LEO Satellite Internet: Perspective from the ground

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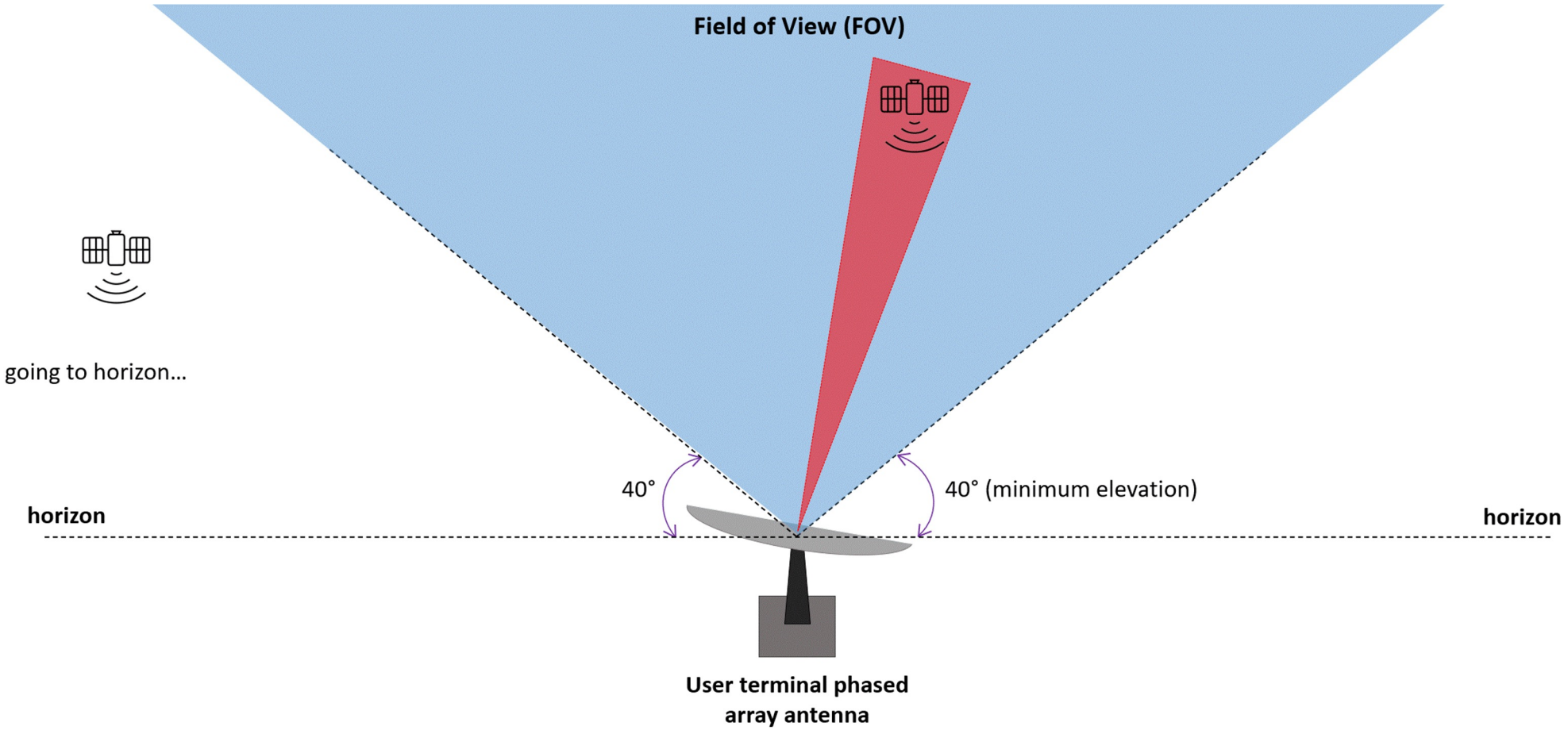

LEO Internet Satellites Tracker

https://philsa.gov.ph/spacedata/project/leo

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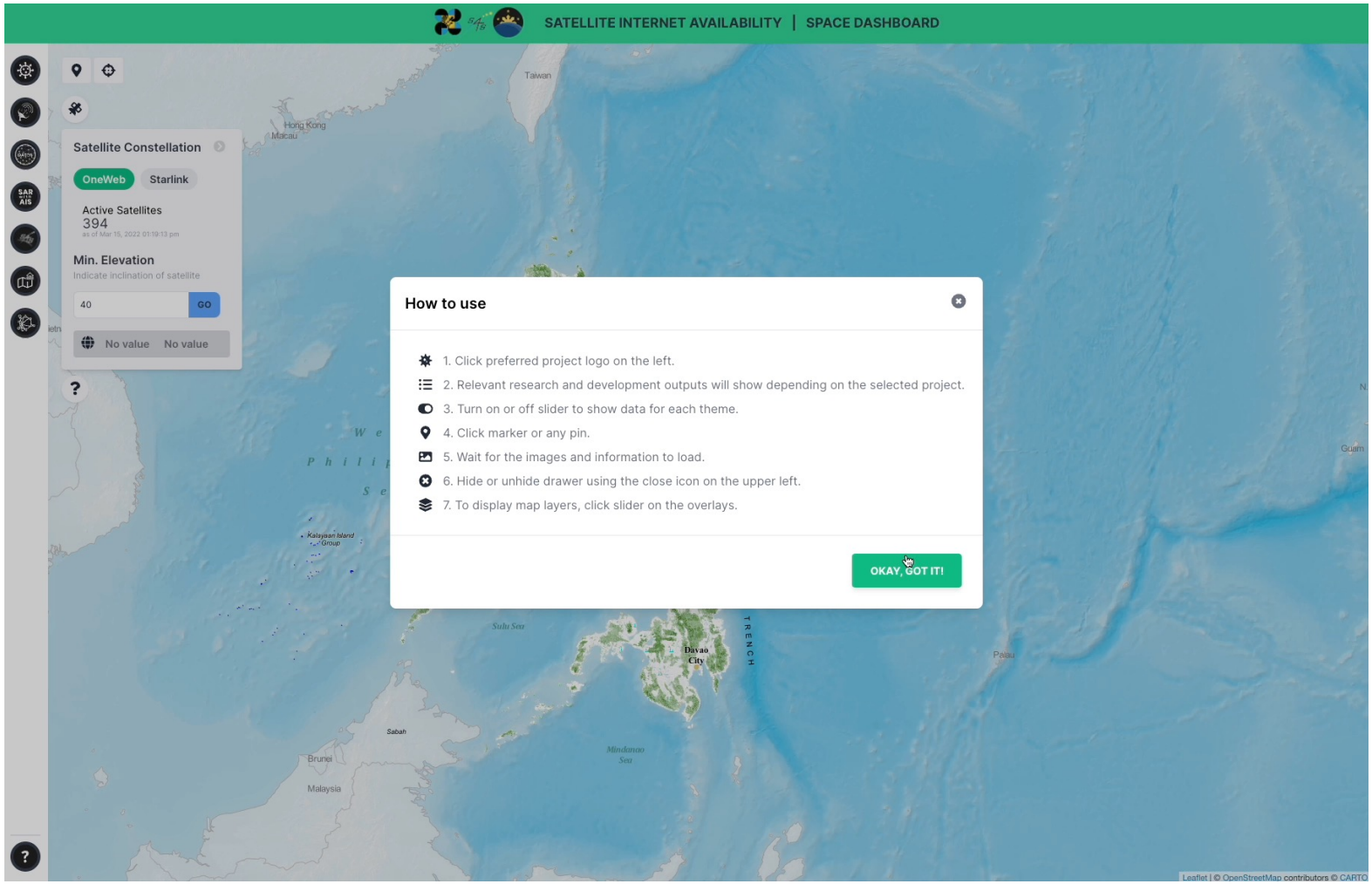

“Availability”

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- Simply counting the # of satellites that pass overhead in a given area at certain minimum elevation
- Necessary, but not sufficient, condition for establishing a connection
- Actual connection, its quality and speed, depends on other factors, such as, among others:
  - Satellite and ground network uptime
  - Availability of the Internet gateway (GW)
  - Weather conditions

INCENTIVISE Open Call

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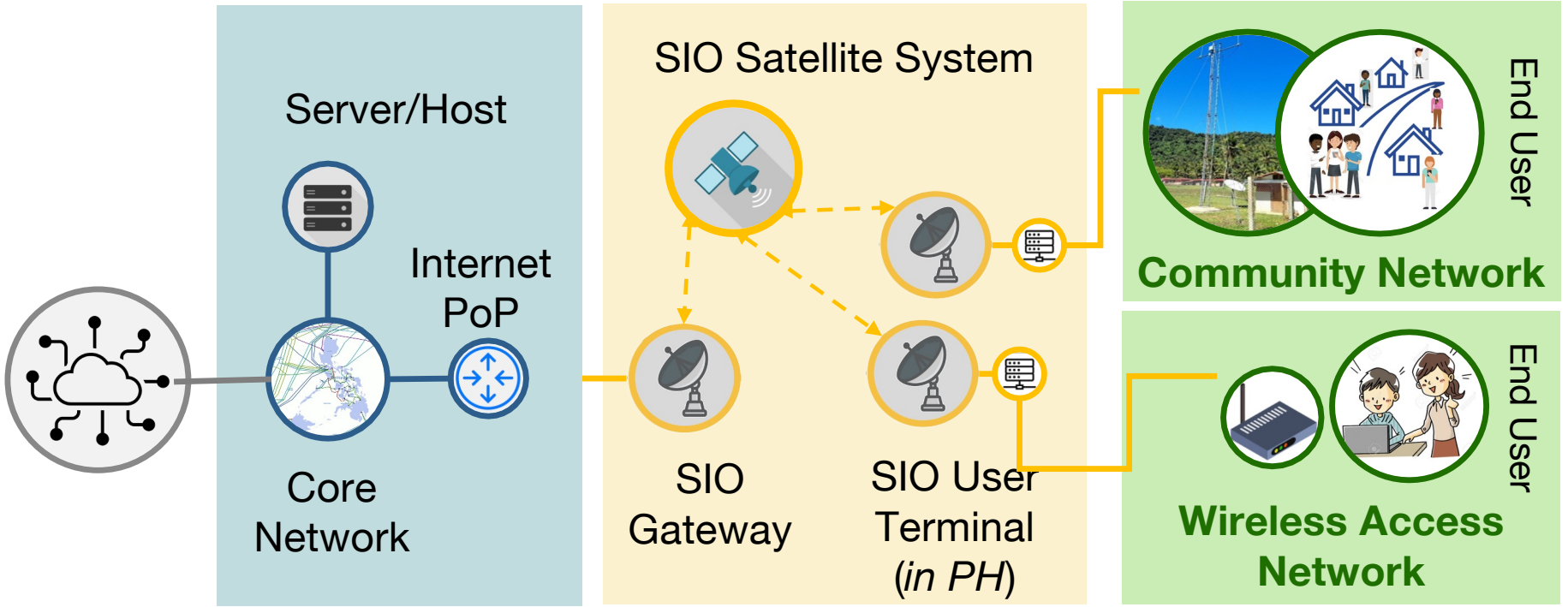
*NGSO: Non-geostationary satellite orbit
*SIO: Satellite Internet Operator
*PoP: Point-of-Presence



The Rest of the Internet

PoP and Core Network

SIO "bent pipe"

Remote User Segment

Observers

Feedback from target end users in remote Community in Aurora, a potential site for test deployment

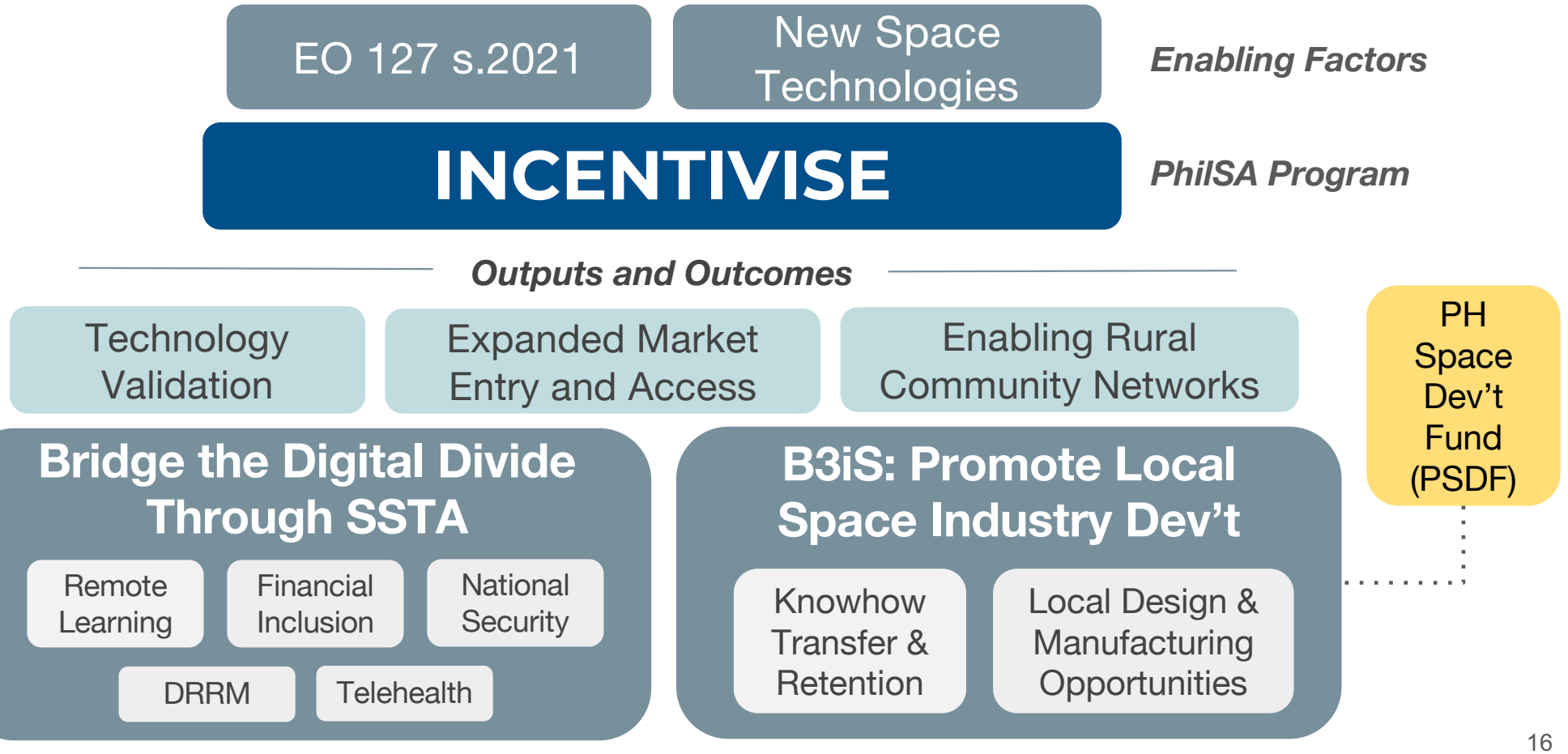
“Nung bagyong Ulysses (Nov 2020), tatlong araw kami walang komunikasyon sa LGU, kahit mga radyo namin walang signal. Kung may malakas na internet, mabilis ang coordination sa LGU habang bumabagyo at pagkatapos. Ma-access rin namin ang PAGASA weather database para makakuha ng sapat na impormasyon ukol sa paparating na bagyo para kami ay makapaghanda.” -Mr. Dela Cruz, DRRM Officer

“Kapag may internet dito, hindi na namin kailangan bumyahe sa bayan tuwing enrolment para magamit ang DepEd online platform. Minsan dun (sa bayan) kami natutulog pag maraming kailangan i-submit na report o may online conference. Gayun din ang mga highschool students, sa kanilang bahay mismo maka-attend sila ng online classess. Magamit rin namin sa pagtuturo”

- Teacher Jason

Bridging the Digital Divide & Building the Local Space Industry

Through Internet Satellites



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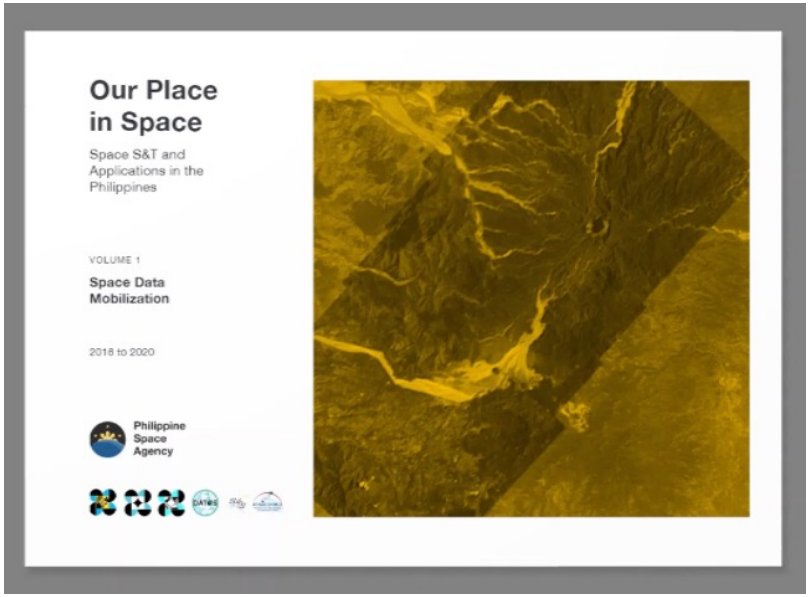
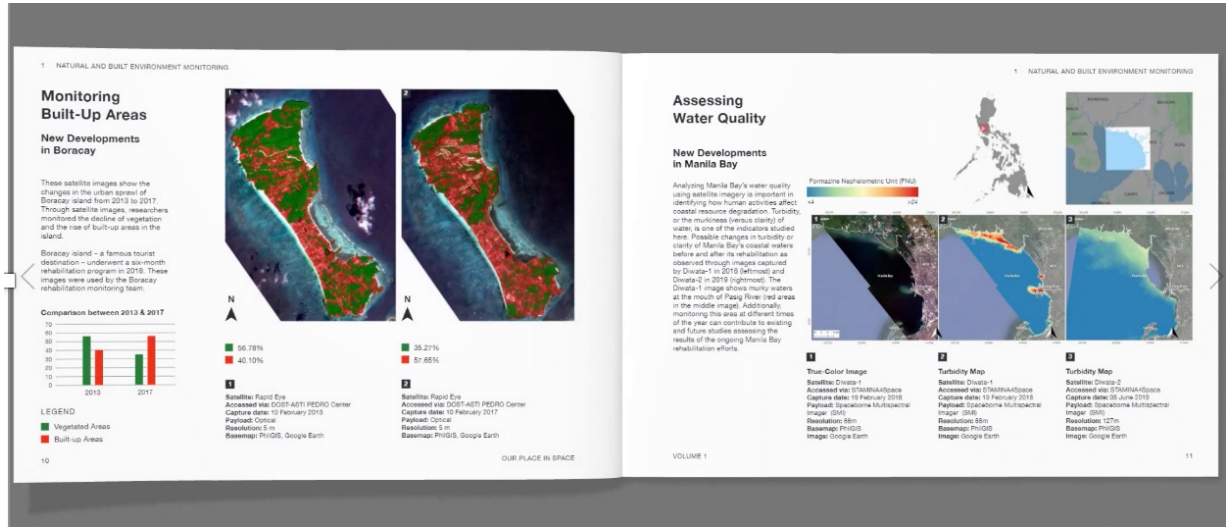
Our Place in Space

https://philsa.gov.ph/our-place-in-space-foreword/



Volume 1
Space Data Mobilization
Volume 2
Space Technology
Volume 3
Capacity-building, Outreach and Sustainability



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**.

Thank you for your attention.

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