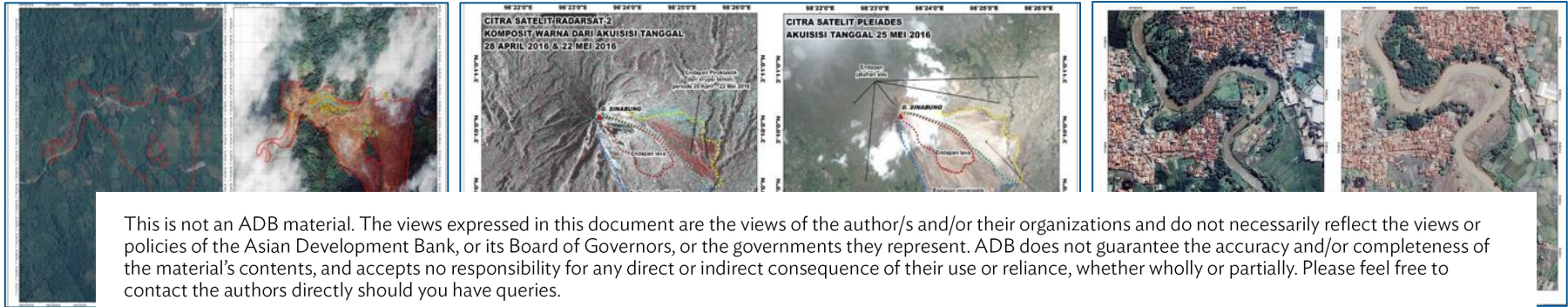




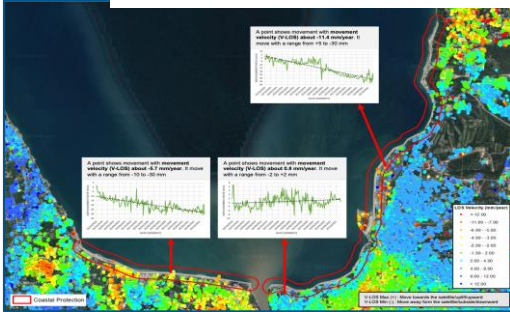
BRIN
BADAN RISET
DAN INOVASI NASIONAL



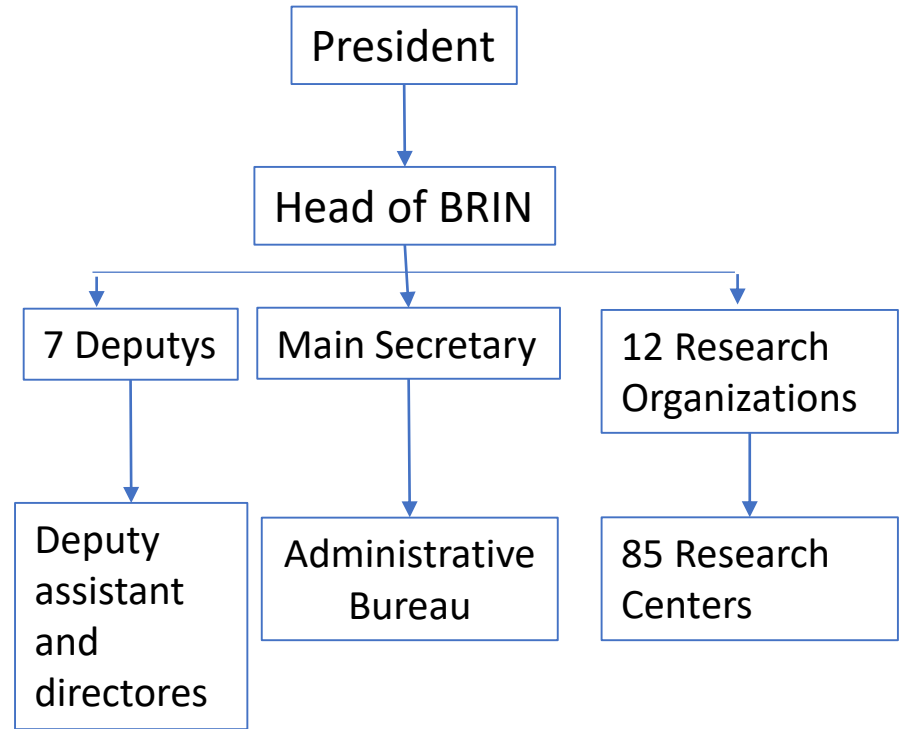
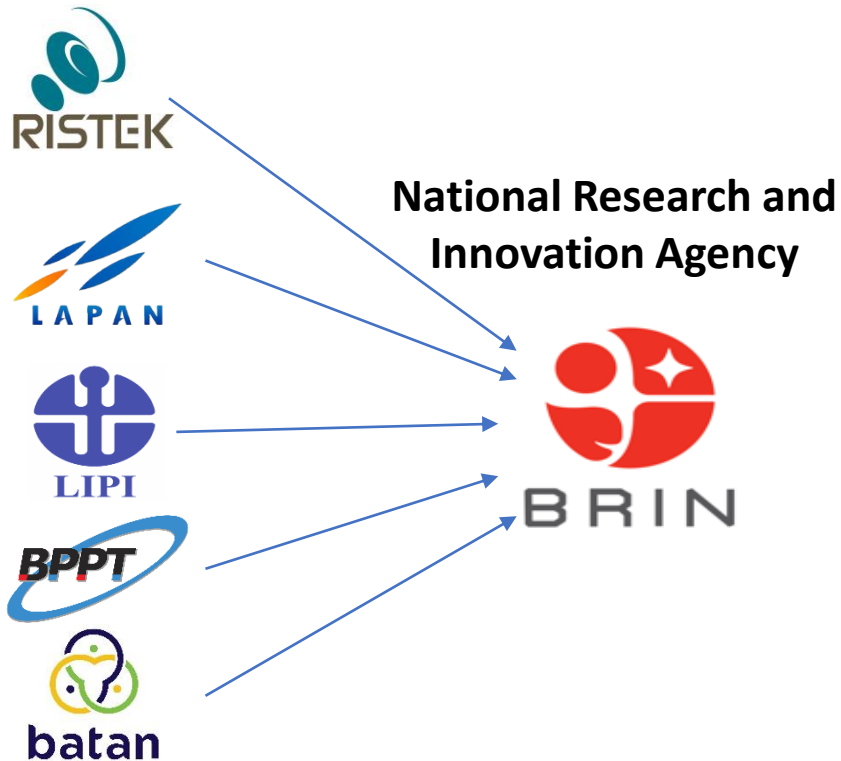
CURRENT STATUS OF EARTH OBSERVATION DEVELOPMENT AND THE ADB AND ESA SUPPORTS FOR INDONESIA



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National Research and Innovation Transformation in 2021

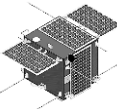
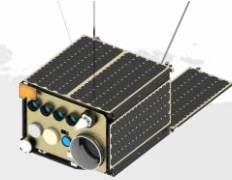


LAPAN Transform to Research Organization for Aeronautics and Space



BRIN
BADAN RISET
DAN INOVASI NASIONAL

BRIN Satellites



A5/NEI-1
Satellite

AIS, High & Medium Res Multispectral,
Bolometer, Magnetometer Payload

A4/NEO-1
2024



AIS, Multispectral, Digital & Video Cam,
Magnetometer Payload

LAPAN-A3/LAPAN-IPB
2016

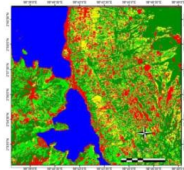
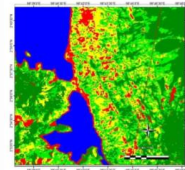
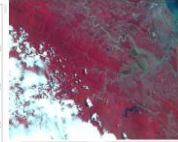
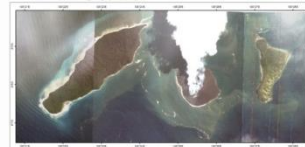
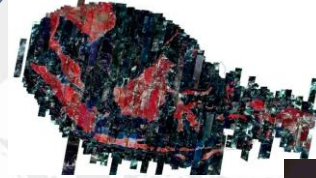
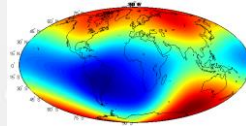
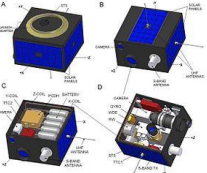
AIS, Digital & Video Cam,
Amateur Emergency Comm Payload

LAPAN-A2/LAPAN-ORARI
2015



High & Med Res Video Cam,
Amateur Payload

LAPAN-A1/LAPAN-TUBSAT
2007

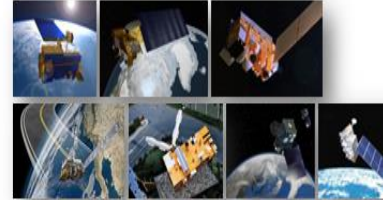


1. CATALOG OF REMOTE SENSING DATA AVAILABILITY

<http://inderaja-catalog.lapan.go.id/dd4>

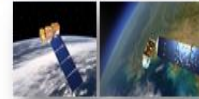
The screenshot shows the Inderaja catalog interface. At the top, there are tabs for 'ZOOM TO LOCATION', 'FILTERS', and 'DEFINE AOI'. A search bar contains 'Sentinel'. Below the search bar are buttons for 'Products', 'Criteria', 'Draw', 'Modify', and 'Upload'. The main area features a map of Southeast Asia with a red polygon highlighting a region in Indonesia. On the left, a table lists search results for 'SPOT7 MS ORT' data from January 18, 2018. The table includes columns for 'Estimated number of results', 'Optical Results', 'Sort by', and 'Checked/checked all'. The bottom of the interface shows a navigation bar with various satellite names and a status bar with search parameters like 'Date: Jan 1, 2010 - Sep 18, 2022' and 'Res: 0.0 - 6,000.0m'.

2. OPTICAL DATA AND SAR WERE ACQUIRED BY BRIN



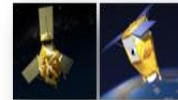
Low resolution optical data (≥ 250 m)

- Terra/Aqua
- S-NPP
- NOAA-18/19/20
- MetOp-A
- Himawari-8
- FY-3B/C



Medium resolution optical data (15 - 30 m)

- Landsat-7
- Landsat-8



High resolution optical data (1,5 m)

SPOT-6/7



Very high resolution optical data (50 cm)

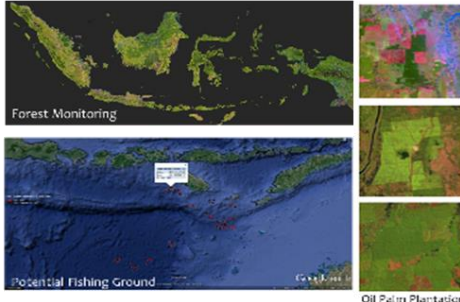
Pleiades-1A/B



Synthetic Aperture Radar data (SAR)

TerraSAR-X/TanDEM-X (StripMap, 3 m)

NATURAL RESOURCES



ENVIRONMENT AND DISASTERS

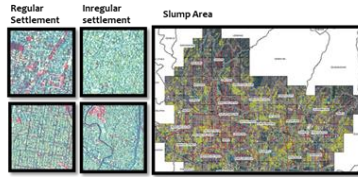


OTHER STRATEGICS

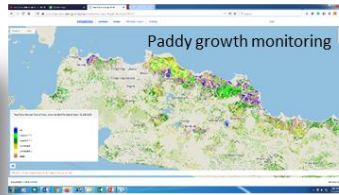


SUSTAINABLE DEVELOPMENT GOALS (SDGS)

SDGs01: No Poverty



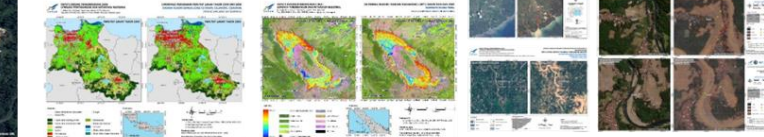
SDGs02: No Hunger



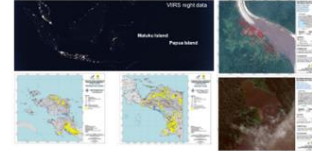
SDGs03: Good Health and Well Being



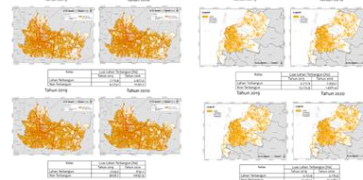
SDGs06: Clean Water and Sanitation



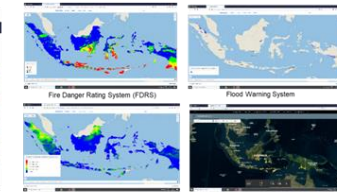
SDGs07: Affordable and Clean Energy



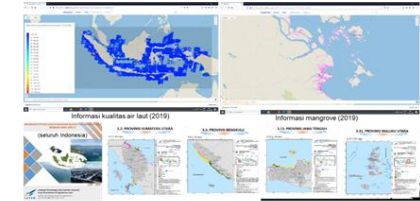
SDGs11: Sustainable Cities and Communities



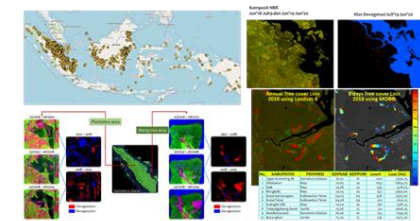
SDGs13: Climate Action



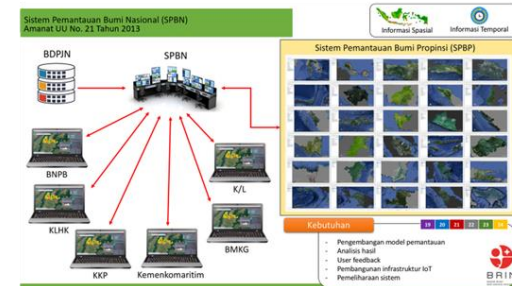
SDGs14: Life Below Water



SDGs15: Life on Land



REMOTE SENSING PLATFORM



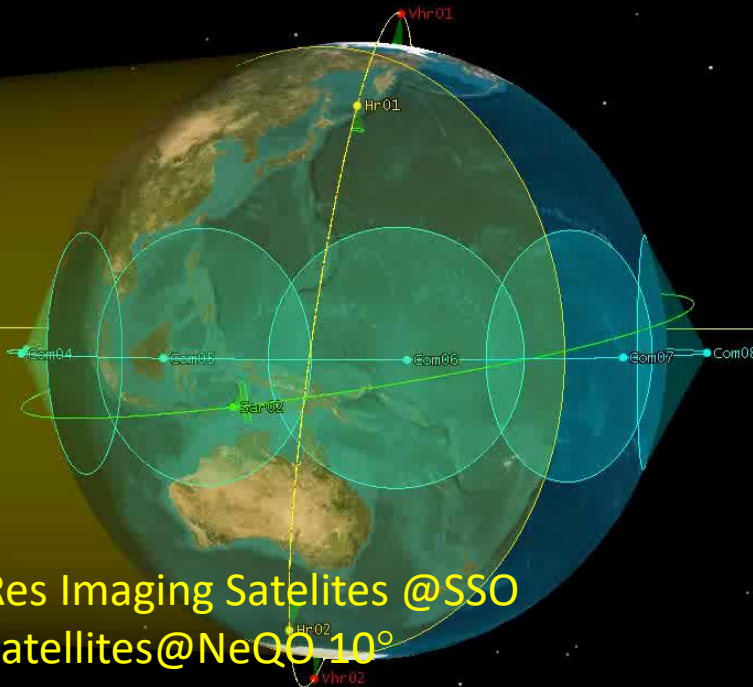
Geo1 Classical Orbit Elements
 Time (UTCG): 15 Mar 2022 23:54:50.000
 Semi-major Axis (km): 42166.258681
 Eccentricity: 0.000000
 Inclination (deg): 0.122
 RAAN (deg): 90.619
 Ang of Perigee (deg): 0.000
 True Anomaly (deg): 196.369
 Mean Anomaly (deg): 196.369

Com1 Classical Orbit Elements
 Time (UTCG): 15 Mar 2022 23:54:50.000
 Semi-major Axis (km): 7178.137000
 Eccentricity: 0.000000
 Inclination (deg): 0.122
 RAAN (deg): 90.608
 Ang of Perigee (deg): 0.000
 True Anomaly (deg): 59.177
 Mean Anomaly (deg): 59.177

Vhr01 Classical Orbit Elements
 Time (UTCG): 15 Mar 2022 23:54:50.000
 Semi-major Axis (km): 6978.137000
 Eccentricity: 0.000000
 Inclination (deg): 97.878
 RAAN (deg): 135.792
 Ang of Perigee (deg): 0.000
 True Anomaly (deg): 93.199
 Mean Anomaly (deg): 93.199

Hr01 Classical Orbit Elements
 Time (UTCG): 15 Mar 2022 23:54:50.000
 Semi-major Axis (km): 6978.137000
 Eccentricity: 0.000000
 Inclination (deg): 97.878
 RAAN (deg): 135.792
 Ang of Perigee (deg): 0.000
 True Anomaly (deg): 138.199
 Mean Anomaly (deg): 138.199

SAP01 Classical Orbit Elements
 Time (UTCG): 15 Mar 2022 23:54:50.000
 Semi-major Axis (km): 6978.137000
 Eccentricity: 0.000000
 Inclination (deg): 9.976
 RAAN (deg): 349.704
 Ang of Perigee (deg): 0.000
 True Anomaly (deg): 133.953
 Mean Anomaly (deg): 133.953

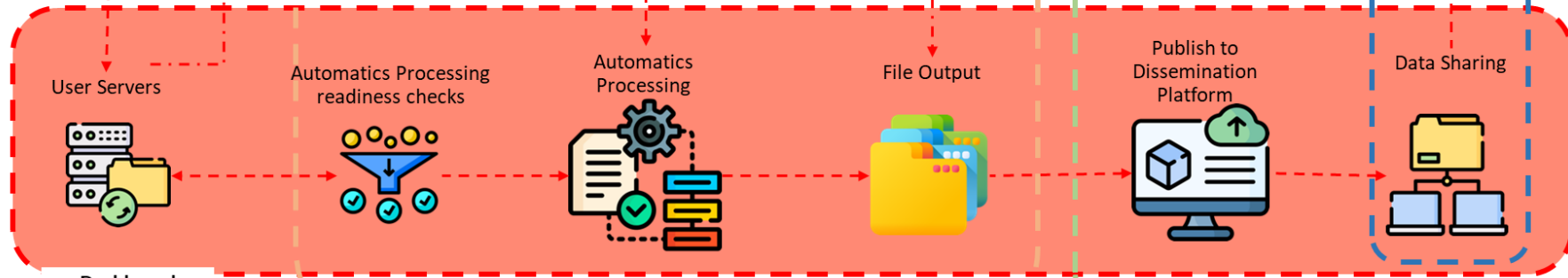
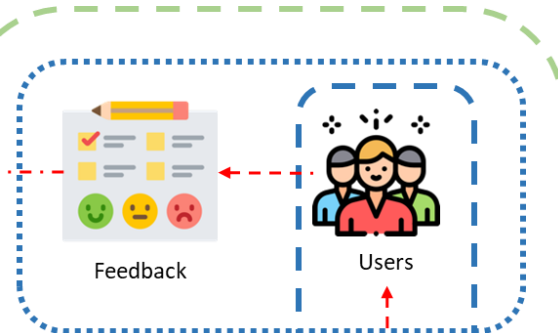
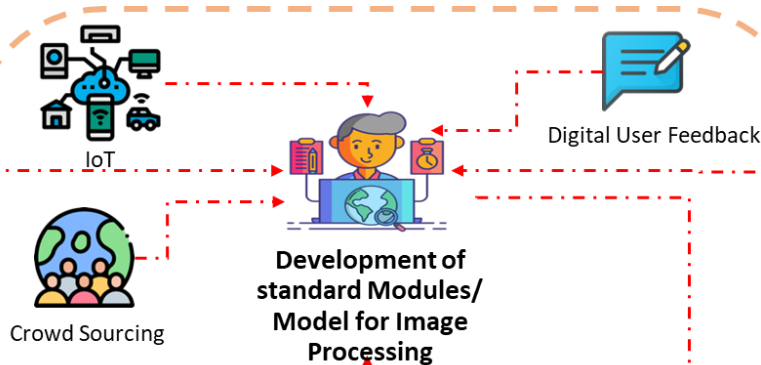
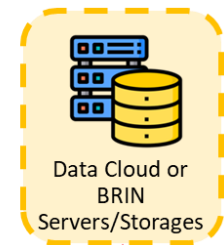


- 4 HighRes & 2 VeryHighRes Imaging Satelites @SSO
- 2 Synt.ApertureRadar Satellites@NeQO 10°
- 10 Satcom LEO for IoT/M2M @EquatorialOrbit 0°
- 1 Satcom GEO

Current Development Strategies:

- 2 VHR satellites (1st to be built in partner's country, 2nd to be built in Indonesia):
 - public private partnership : BRIN as satellite operator & captive user for Indonesian images; private partner as investor and reseller for images outside Indonesia
 - Join development (cost & technology sharing)
- 2 SAR satellite in near equatorial orbit : foreign loan (1st to be built in partner's country, 2nd to be built in Indonesia)
- 10 IoT satellites in equatorial orbit : private development and operator partners welcome; to be built in Indonesia and partner's country

Development of Standard Data Processing Methods



Dashboard

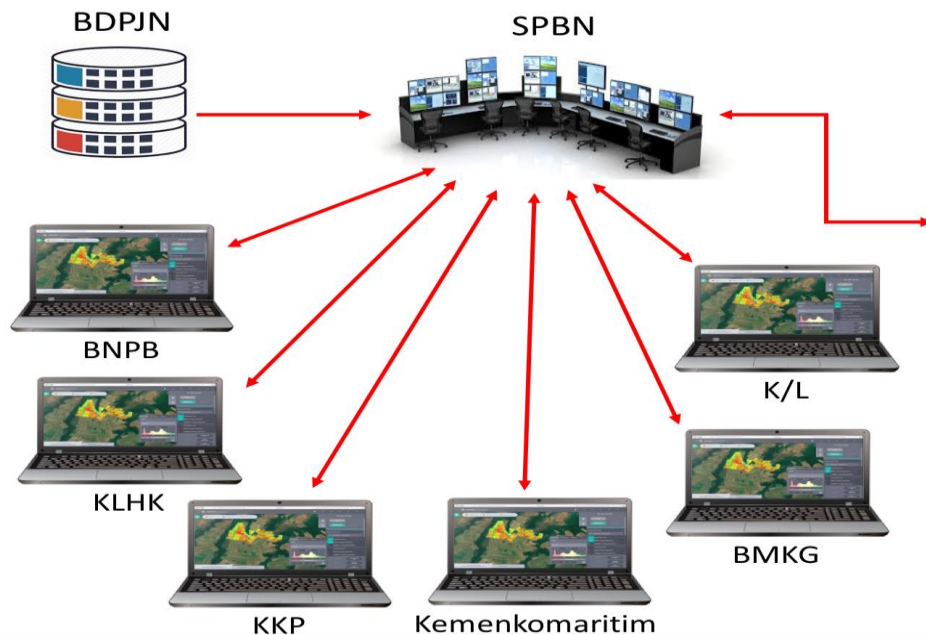


Digital Platform Development

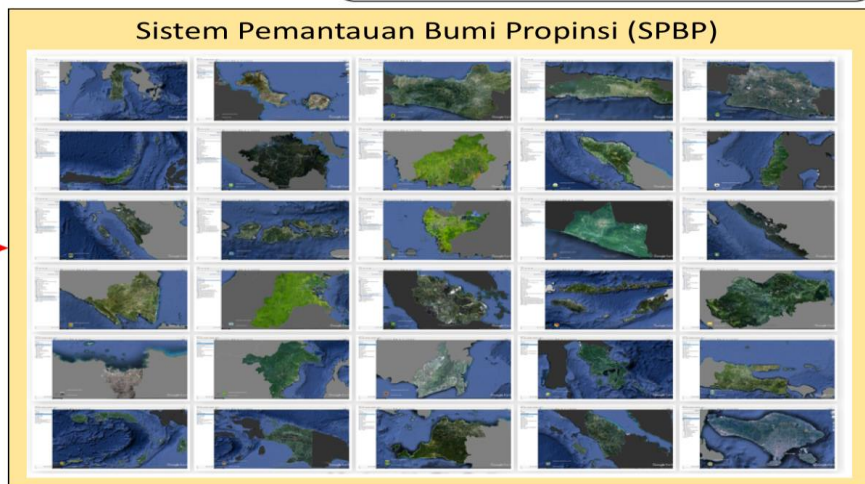
Digital Platform Connectivity

The platform will have some dedicated users (ministries, agencies, and also local government) who can access the EO informations

Sistem Pemantauan Bumi Nasional (SPBN)



Sistem Pemantauan Bumi Propinsi (SPBP)



Kebutuhan

19 20 21 22 23 24

- Pengembangan model pemantauan
- Analisis hasil
- User feedback
- Pembangunan infrastruktur IoT
- Pemeliharaan sistem

INTRODUCING THE EARTH OBSERVATIONS SERVICES:

- Support for Build Back Better Infrastructure of Emergency Assistance for Rehabilitation and Reconstruction Project in Central Sulawesi
- Support to Water and Food Security Planning and Investments in Indonesia
- Transfer of Technology, Knowledge and Capacity Building

THE EARTH OBSERVATION SERVICES

1. MAPPING OF SUBSIDENCE AND OTHER INFORMATION FOR THE DISASTER RESILIENCE PLANNING



2. SET OF STABILITY MAPS FOCUSING ON BUILDINGS AND CRITICAL INFRASTRUCTURES



3. MAPPING OF FLOODS AND OTHER INFORMATION FOR THE DISASTER RESILIENCE PLANNING



4. CROP AND WATER USE MAP

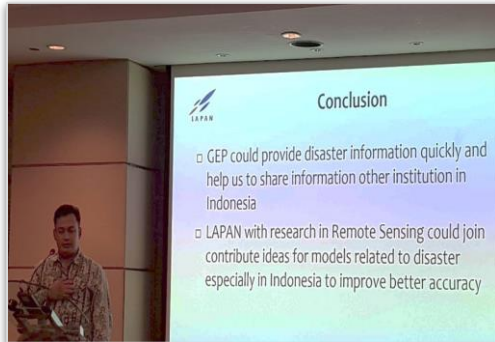


5. SATELLITE-BASED MONITORING SERVICE OF THE COASTAL AND MARINE AREAS

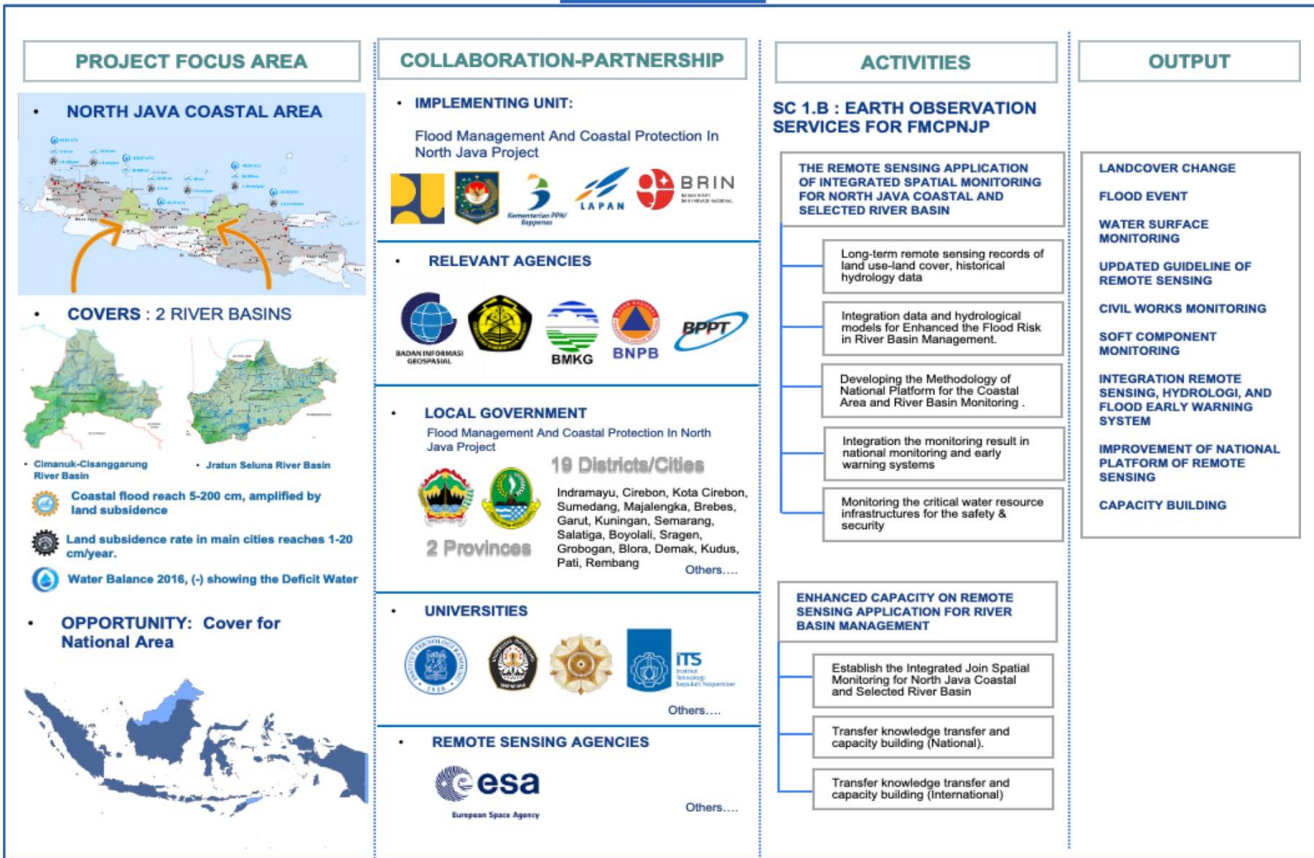


THE EARTH CAPACITY BUILDING

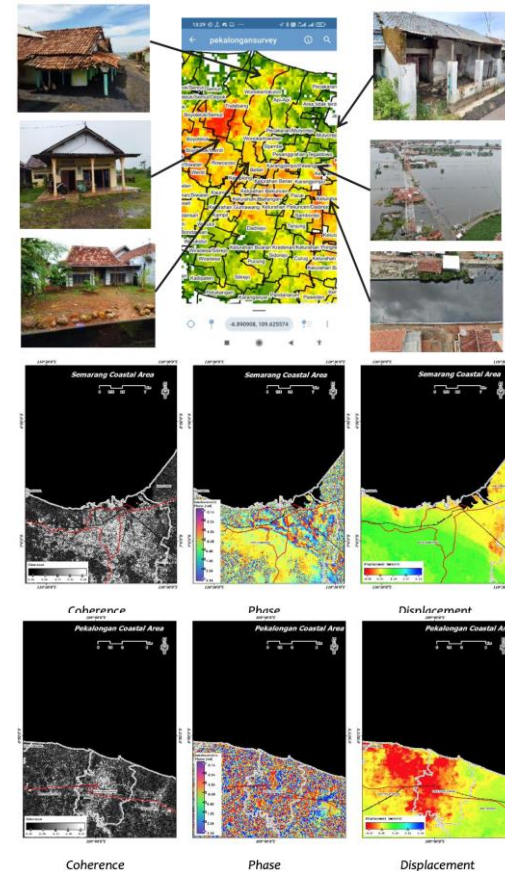
DATE	TRAINING & CAPACITY BUILDING
17-21 June 2019	International Training and Capacity Building of Earth Observation Products to Support the Enhanced Water Security Investment Project and Emergency Assistance for Rehabilitation and Reconstruction.
13 August 2019	Advance Training of Geohazard Exploitation Platform (GEP)
23-29 January 2020	Advance Training of GeO4IRBM dan EO4SD
24-28 May 2021	Training-1: Advance Training of Remote Sensing Application and Geospatial Technology for Reconstruction Monitoring, Module-1: Introduction to SAR for Reconstruction Monitoring
12-16 July 2020	Training-2: Advance Training of Remote Sensing and Geospatial Technology for Reconstruction Monitoring, Module-2: Land Stability Monitoring
22-26 November 2021	Knowledge Sharing and Capacity Building of Earth Observations Services for Water and Food Security Planning in Indonesia

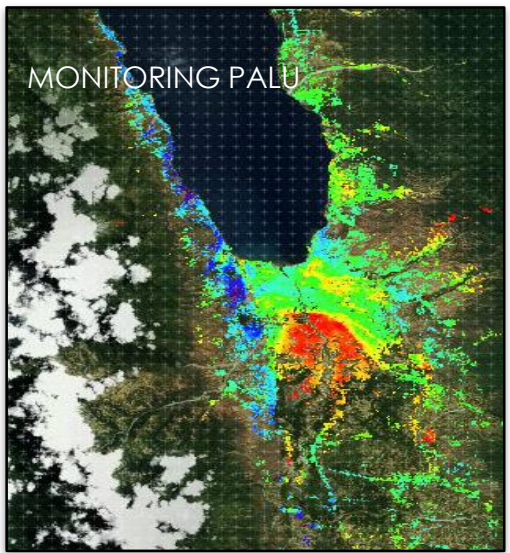


PROVIDE A BETTER DATA, BETTER PROJECT DESIGN AND SOLUTION

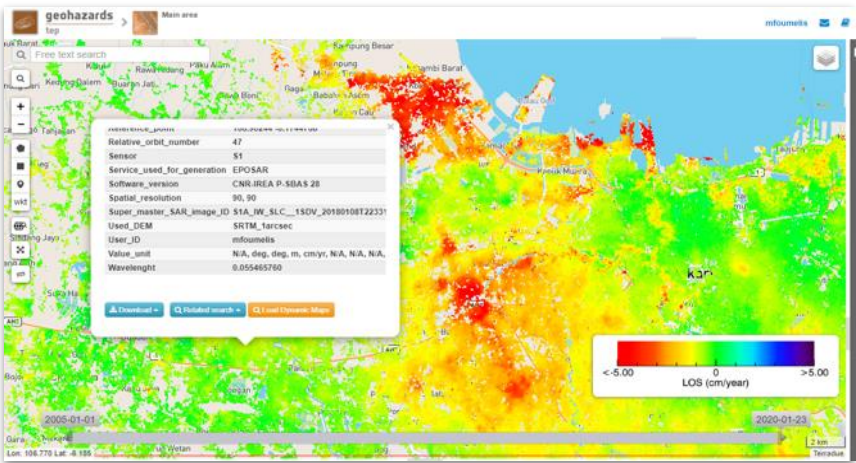


NORTH JAVA





- In 17 June 2019 ADB supported by ESA and the Ministry of Public Works and Housing held Training In Remote Sensing Application Center
- The Purpose of Training is to learn the utilization of earth observation products. One of product is Geo Hazard Exploration Platform (GEP)
- LAPAN got Licenses to access Platform Geo Hazard Exploration Platform (GEP)
- Thematic GEP Which Could Acces in LAPAN



GEOHAZARDS EXPOLITATION PLATFORM

Licenses GEP for Indonesian Agencies

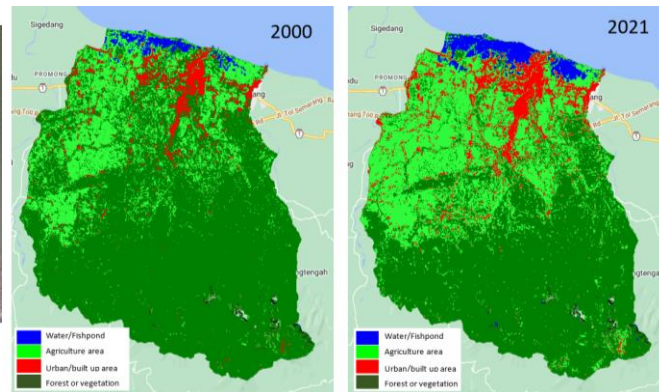


- GEP give access to LAPAN thematic application which could access
 - EO Services Volcanoes Monitoring
 - EO Services For Landslide Analysis
 - EO Services For Earthquake Response
 - EO Services For Land subsidence Monitoring

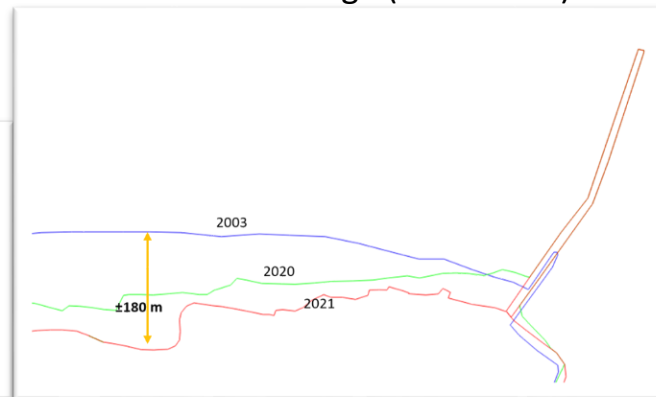
• But In Fact We can Explore another Hazard which not contain in thematic application



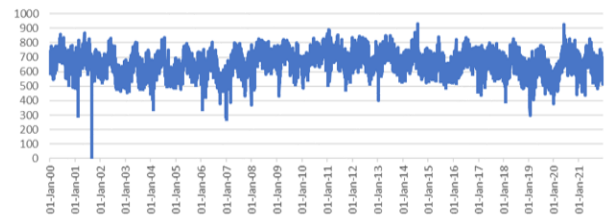
LandCover Change (2000-2021)



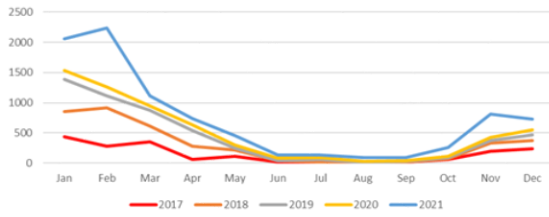
Coastline Change (2003-2021)



surface_elevation

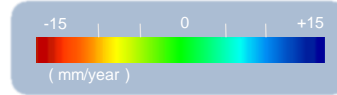


Monthly Rainfall (mm): WIRADESA





RHETICUS BUILDING CHECK



• Areas of Interest:

- Jakarta
- Cirebon
- Pekalongan
- Semarang
- Surabaya

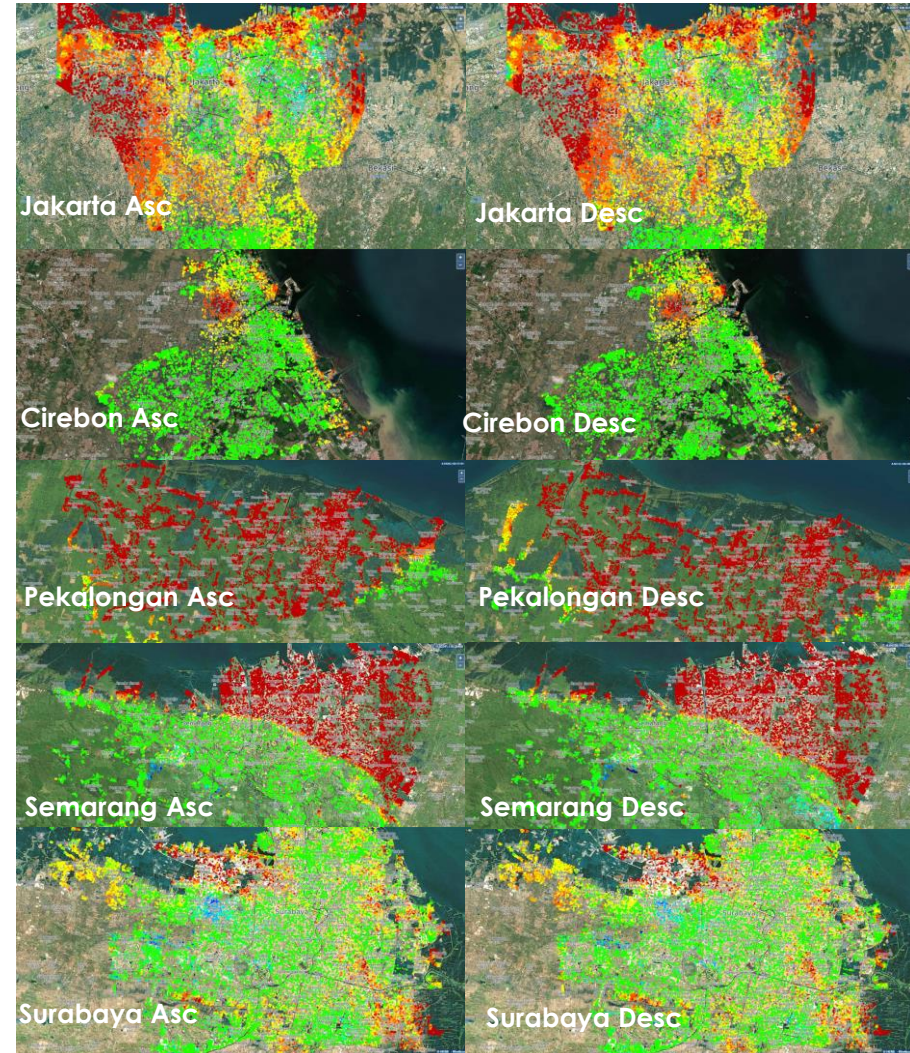
• Data used:

- Satellite: Sentinel-1
- Orbit: Ascending and Descending
- Period: April 2015 – June 2021

• Methodology;

The ground motion map obtained through the Rheticus® cloud platform that implements the Persistent Scatterers Interferometry technique, identifies zones and infrastructures more/less prone to instabilities. The ground motion map contains the average velocity of the measured points called Persistent Scatterers (PS) and Distributed Scatterers (DS) highlighting the areas and infrastructures that are moving with respect to the others that are stable.

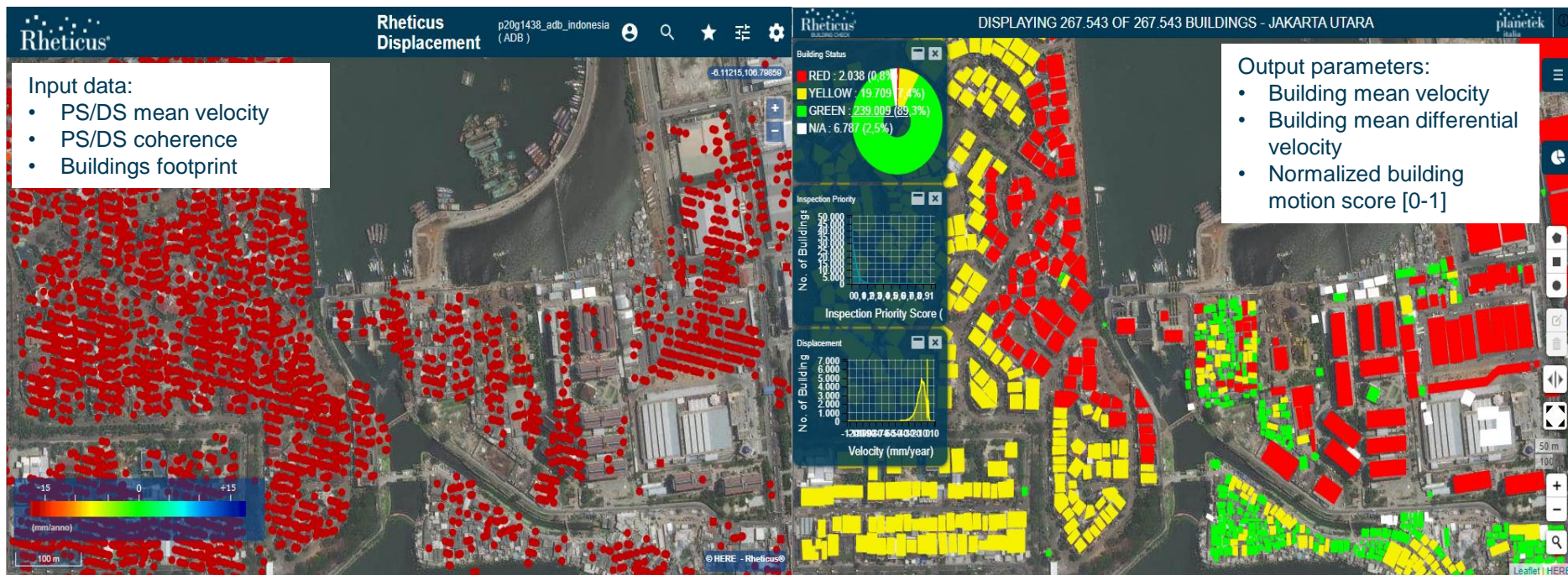
The measured points are thematized based on the average velocity along the satellite Line-of-Sight (LOS), according to the following colour ramp:



RHETICUS BUILDING CHECK

Rheticus® Building check – Building stability Methodology

The buildings are classified in into 4 motion classes (Red, Yellow, Green, N/A) according to the normalized building motion Score [min: 0 – max:1] that is provided for each building.





THANK YOU