Space Activities in Indonesia
(Based on Indonesia Space Act)

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On 6 August 2013, the president of Indonesia signed Indonesia Space Act No. 21.

The objectives of this Act are:

– to achieve self-reliance and improve the competitiveness of the Nation and State in the management of Outer Space Activities;
– to optimize the management of Outer Space Activities for the benefit of the people of Indonesia and productivity of the Nation;
– to ensure the sustainability of the management of Outer Space Activities for the benefit of the present and the future generations;
– to provide the legal basis and legal certainty in the management of Outer Space Activities;
– to achieve Safety and Security in the management of Outer Space Activities;
– to protect the State and its citizens from the negative impact which may cause by the Outer Space Activities;
– to optimize the implementation of international agreements on Outer Space Activities for the sake of national interest; and
– to achieve of the management of Outer Space Activities that becoming a supporting component of defense and the integrity of the Unitary State of the Republic of Indonesia.
Outer Space Activities include:

– Space science;
– Remote sensing;
– Space technology;
– Launching activities; and
– Commercialization of Outer Space Activities.
SPACE SCIENCES ACTIVITIES

Space Weather Monitoring

Communication Frequency Prediction

Space Debris Monitoring

Base on:
• Solar Activities Information
• Space Environment Information
• Ionospheric Activities Information - Radio Communication Frequency Prediction
• Geomagnet and magnetospheric Information

Pemantauan benda jatuh antariksa bekerja sama dengan BAPETEN dalam pengukuran dampak radiasi dari benda antariksa
SADEWA 3.0
Satellite Disaster Early Warning System

Disaster early warning systems can reduce the risk of disaster by improving preparedness in the face of disaster. Sadewa monitor extreme rain events, which could potentially cause floods and landslides throughout Indonesia with a resolution of 5 km² close to real time and transmit early warning information via the website, e-mails and short messages (SMS) to parties related to prevention disaster.

Sadewa consist of sub-system monitoring, forecasting sub-systems, and sub-warning system.

Sadewa integrates atmospheric science, satellite technology and information technology.
Remote sensing data acquired by LAPAN’s Ground Stations

- **Low resolution (≥ 250 meter)**
  - Terra/Aqua
  - SNPP
  - NOAA-18/19
  - MetOp
  - MTSAT-1R

- **Medium resolution (15 - 30 meter)**
  - Landsat-7
  - Landsat-8

- **High resolution (≤ 1.5 meter)**
  - SPOT-6
  - SPOT-7
Mangrove monitoring

FCC SPOT 6 (BAND 5, 6 AND 4)

Riau: November 24, 2013
West Sumatera: November 9, 2013
Aceh: July 12, 2013

Dark Brown colour is the representative of mangrove
Seagrass and coral reef monitoring/mapping

Existing coral reef and sea grass in Pramuka Island and Panggang Island

Citra Landsat 8
RGB-Intensity (432-8)
Pulau Panggang, Pramuka dst
Tanggal 10 September 2013

Citra World View - 2 RGB 532
Pulau Tidung Kepulauan Seribu
Tanggal 4 Desember 2011

Padang Lamun
Karakang
Pasir

Campuran Lamun/Makro Alga/Karakang
Smoke and burned area

SPOT-6, 22 Sep 2015
AGRICULTURE: Irrigation channels identification from SPOT6

Distinguish between street and irrigation channels
LAPAN continues to update the information until now.
AERONAUTICS AND SPACE TECHNOLOGY

Satellite technology program

Rocket technology program

Aeronautic technology program
SATELLITE TECHNOLOGY PROGRAM

 Experimental satellite development

 Operational satellite development

 2015
LAPAN-ORARI
75kg, AIS, APRS, Digicam (made in Indonesia)

 2016
LAPAN-IPB
100kg, multispectral imager

 2018
LAPAN-A4
100kg, multispectral, IR, science

 2018
INARSSAT-1 (equatorial)

 2019
LAPAN-CHIBA
100kg, SAR (w/ Chiba Univ)

 2020
INARSSAT-2 (made in Indonesia)

 2023
INARSSAT-3 (equatorial)

 2024
INACOMSAT
Tele-education/medicine, navigation, and meteorology

National space industry infrastructure development

2007
LAPAN-TUBSAT/A1
57kg, Videocam (made in Jerman)

2018
LAPAN
‐TUBSAT/A1
100kg, multispectral imager

2015
LAPAN
‐IPB
100kg, multispectral imager

2016
LAPAN
‐A4
100kg, multispectral, IR, science

2018
INARSSAT
‐1
(equatorial)

2019
INARSSAT
‐2
(equatorial)

2023
INARSSAT
‐3
(equatorial)

2024
INACOMSAT
Tele-education/medicine, navigation, and meteorology

2018
INACOMSAT
‐2
(equatorial)

SATELLITE TECHNOLOGY PROGRAM

Experimental satellite development

Operational satellite development
<table>
<thead>
<tr>
<th><strong>Mission</strong></th>
<th>Earth Surveillance, maritime monitoring, Amateur Communication</th>
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<tbody>
<tr>
<td><strong>Payload</strong></td>
<td>Digital Space Camera, Analog Video Camera, AIS, APRS</td>
</tr>
<tr>
<td><strong>Spatial resolution</strong></td>
<td>4 m (7 km swath) &amp; 5 m (3.5 km swath)</td>
</tr>
<tr>
<td><strong>Orbit</strong></td>
<td>650 km, 8 deg, Near-Equatorial</td>
</tr>
<tr>
<td><strong>Data TX, TT&amp;C</strong></td>
<td>S-Band : 2220 MHz; UHF : 437,325 MHz</td>
</tr>
<tr>
<td><strong>Downlink</strong></td>
<td>Digital; 5 Mbps</td>
</tr>
<tr>
<td><strong>Total weight</strong></td>
<td>74 kg</td>
</tr>
<tr>
<td><strong>Dimension</strong></td>
<td>500 x 470 x 360 mm</td>
</tr>
</tbody>
</table>
LAPAN-A2 was launched on 28 September 2015 at Sattish Dawam Space Center, India.
- LAPAN-A2 satellite will cover entire near equatorial region at 6 deg South to north all over the globe
- Shipping monitoring activities will be carried out daily and satellite will send the AIS data to Ground Station 14 times/day with 1.7 hours gap.
- Around 2.4 million messages was collected in 24 hours

AIS Data Around Equator
Taken from LAPAN-A2 Satellite
Operation Mode: **Nadir Pointing**, satellite speed 7.5 km/s
- Near equatorial orbit at 6 deg Inclination
- Payload: Sony Camera 1000 mm (analog), Ground Resolution 5m, swath 3.5 km
IMAGE TAKEN BY LAPAN-A2 : Batam Island

- Payload: Sony Camera 1000 mm,
- Ground Resolution: 5 m and Swath Width 3.5 km
- Operation Mode: Automatic Target Pointing

Pulau - Batam
IMAGE TAKEN BY LAPAN-A2:
Kampung Kaniogan, Malaysia

- Geometric Correction, Overlay with LANDSAT 7 data
- Internal Radiometric Correction (First Model – Still in Progress)
- Operation Mode: Nadir pointing
- Ground Resolution 4m, swath 7
LAPAN SOUNDING ROCKET HISTORY

RX-150
RX-250
RX-320
RX-450
RX-550

Diameter x Length 450 x 6777 mm
Weight 1482 kg
Thrust/Burning time 7568 kgf / 19.57 sec
Altitude at elev 70° 44 km
Range 129 km
SOUNDING ROCKET RX 450: FLIGHT TEST

Diameter: 450 mm
Length: 6777 mm
Weight: 1482 kg
Thrust: 7568 kgf
Burning time: 19.57 sec
Altitude at elev 70 deg: 44 km
Range: 129 km
NATIONAL TRANSPORT AIRCRAFT PROGRAM: N219

Rollout in December 2015

First Cutting - Detail Part Manufacturing

Procurement (60-70%) & Detail Design (90%)

LAPAN AND PT DI

Design Phase
APPLICATION OF LAPAN SURVEILLANCE UAV (LSU) to MSS

Demonstration Technology

- Disaster
- High resolution
- LSU02 M
- Agricultural mapping
- Industrialization
- Coastal line monitoring

Lapan Surveillance Aircraft

Varian LSU

Product Technology

Integration System for Maritime Surveillance

Sertification and Cooperation with industri (NIS)
Other Activities

• For launching activity: LAPAN will develop space port by collaborating with foreign partners;

• Encourage any private sectors to participate in commercialization of outer space activity. It also requires regulations.
THANK YOU