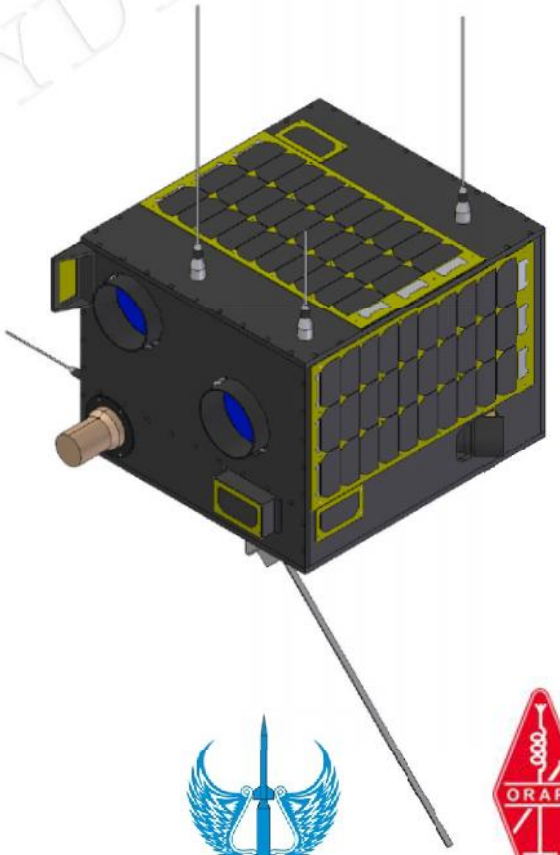
LAPAN-A2/ORARI
SATELLITE



SEANET 2014, 15 NOVEMBER 2014

Wahyudi Hasbi, YD1PRY
Satellite Technology Center,
National Institut of Aernautics & Space - Lapan

LAPAN

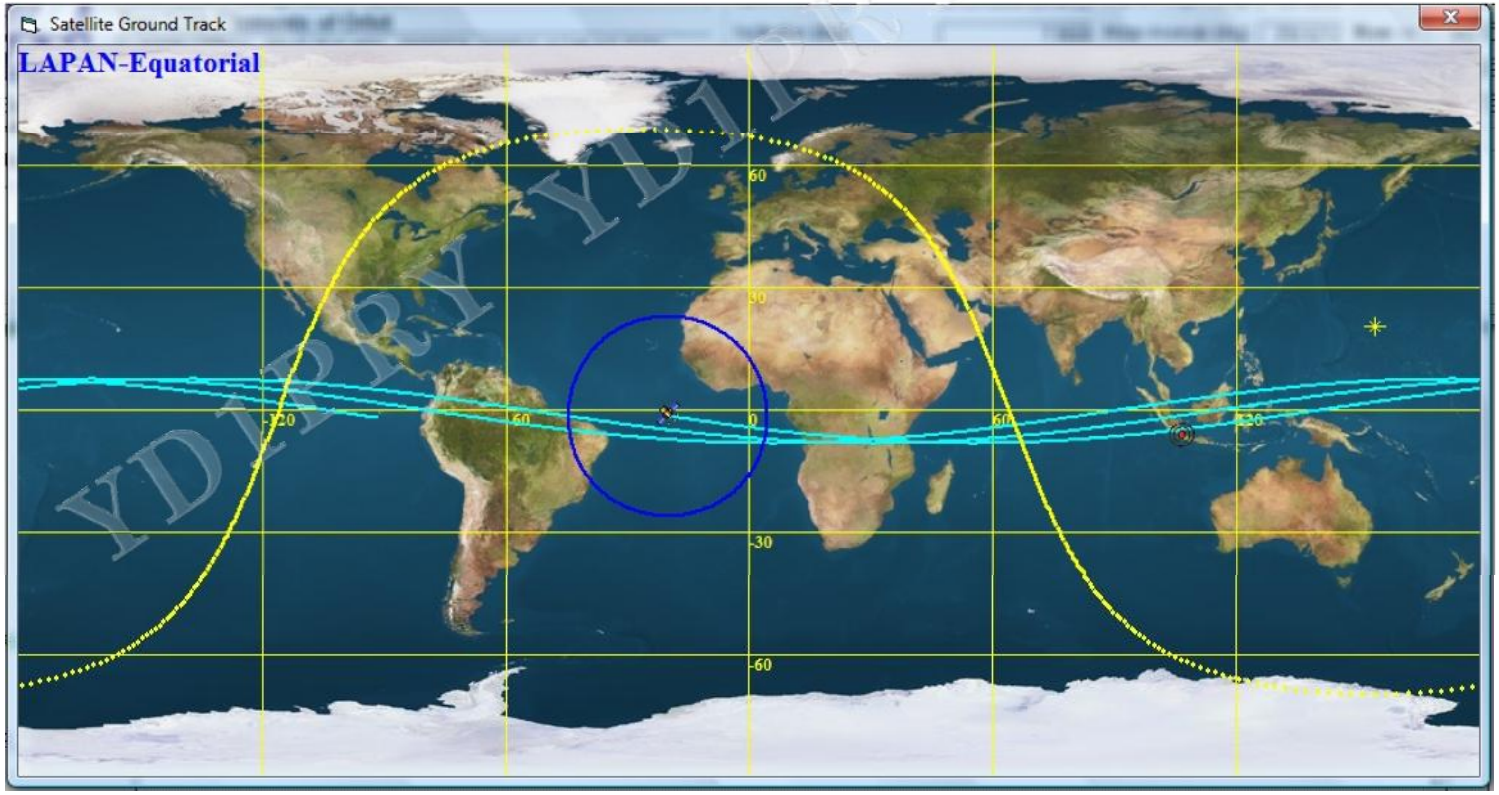
ORARI

Missions

1. Design, integration, test and operation is down in Indonesia

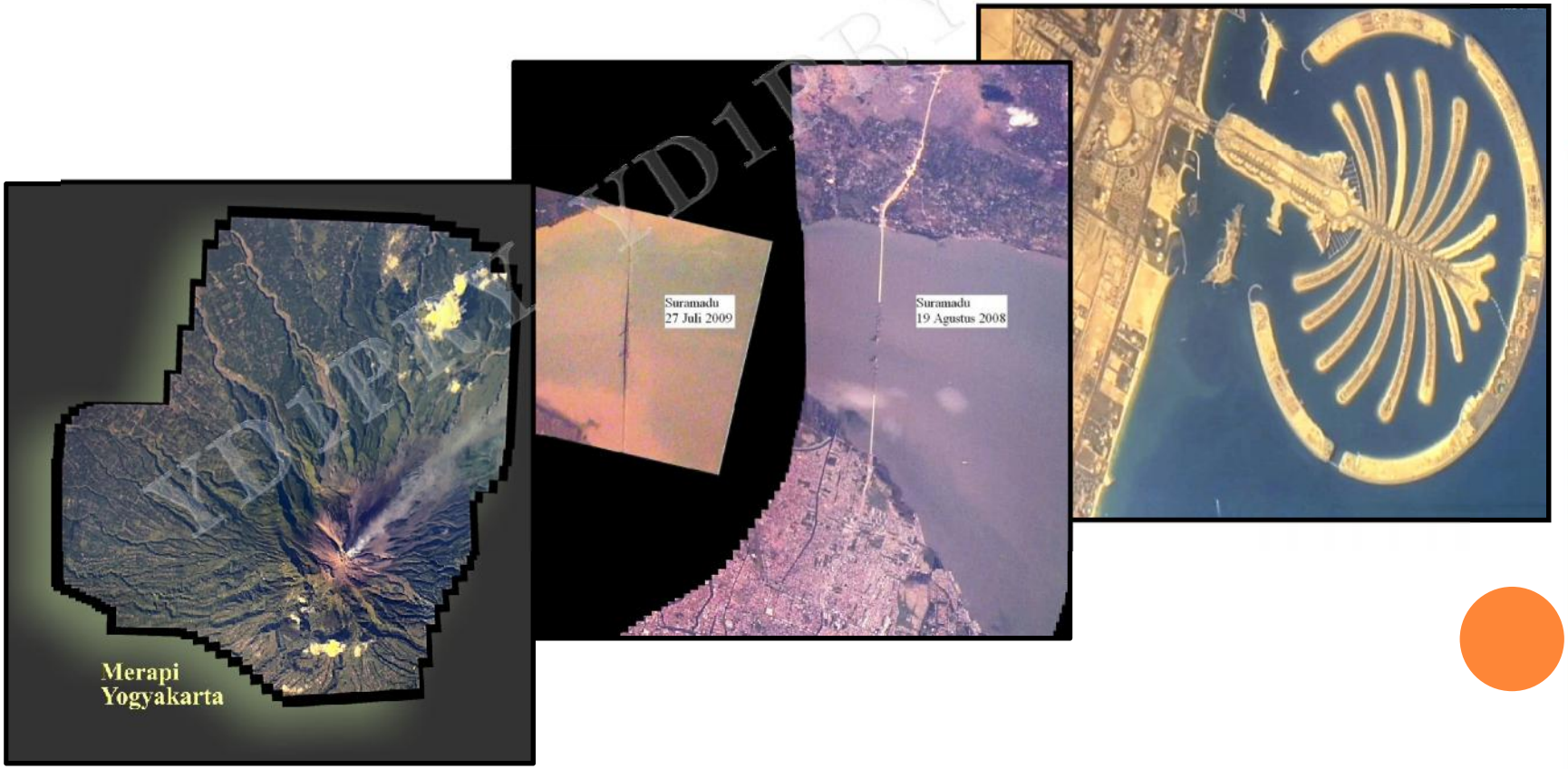
MISSIONS

2. Intensive survaillace on Indonesia (14 times a day) by using equatorial orbit



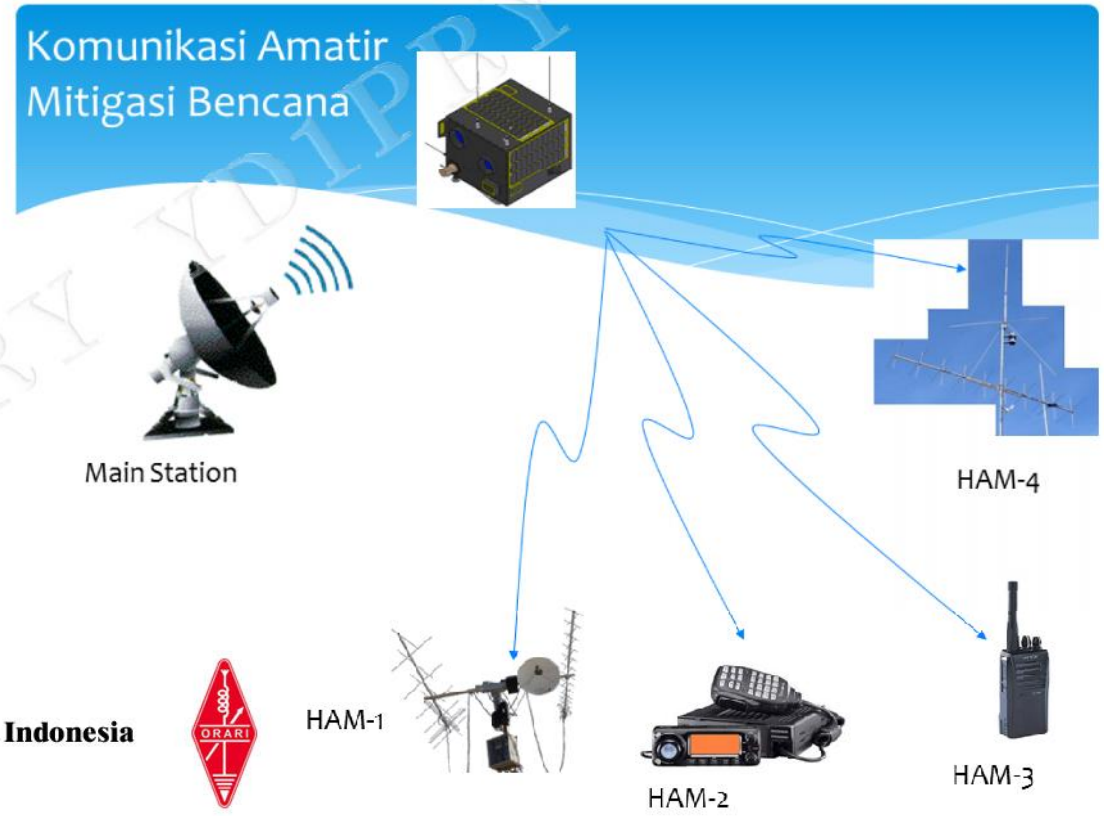
MISSIONS

3. Earth Observation by using Analog Video Camera and High resolution digital camera



MISSIONS

4. Communication support on disaster mitigation by using text and voice communication in amateur radio band



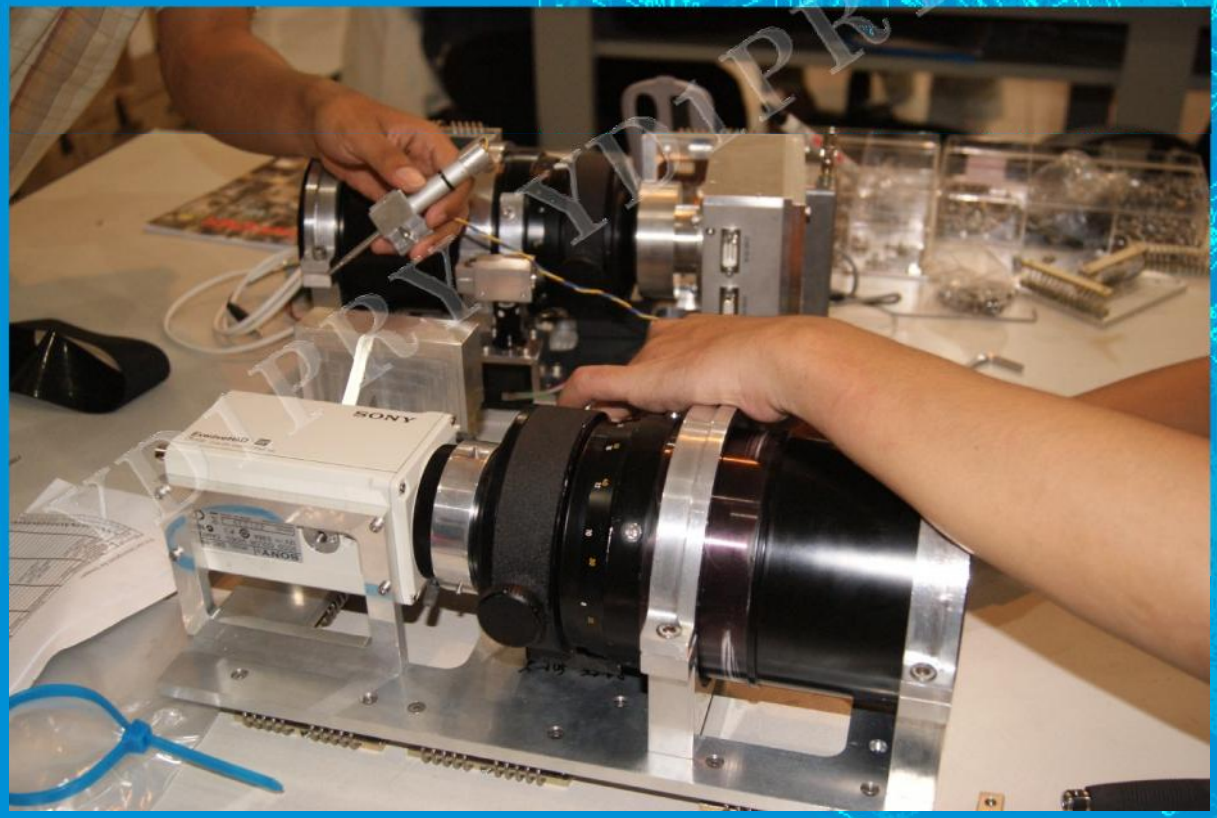
Amatir Satelite Indonesia

MISSIONS

5. Supporting Maritime surveillance by reception of *Automatic Identification System* (AIS) via satellite

Payload Missions

1. Video camera ex LAPAN-TUBSAT with lens of 1000 mm (6 m Resolution, 3.5 km Swatch)
2. Digital Camera 4 Mega Pixel with 1000 mm (6m resolution, 7.5 km swath)



PAYLOAD MISI

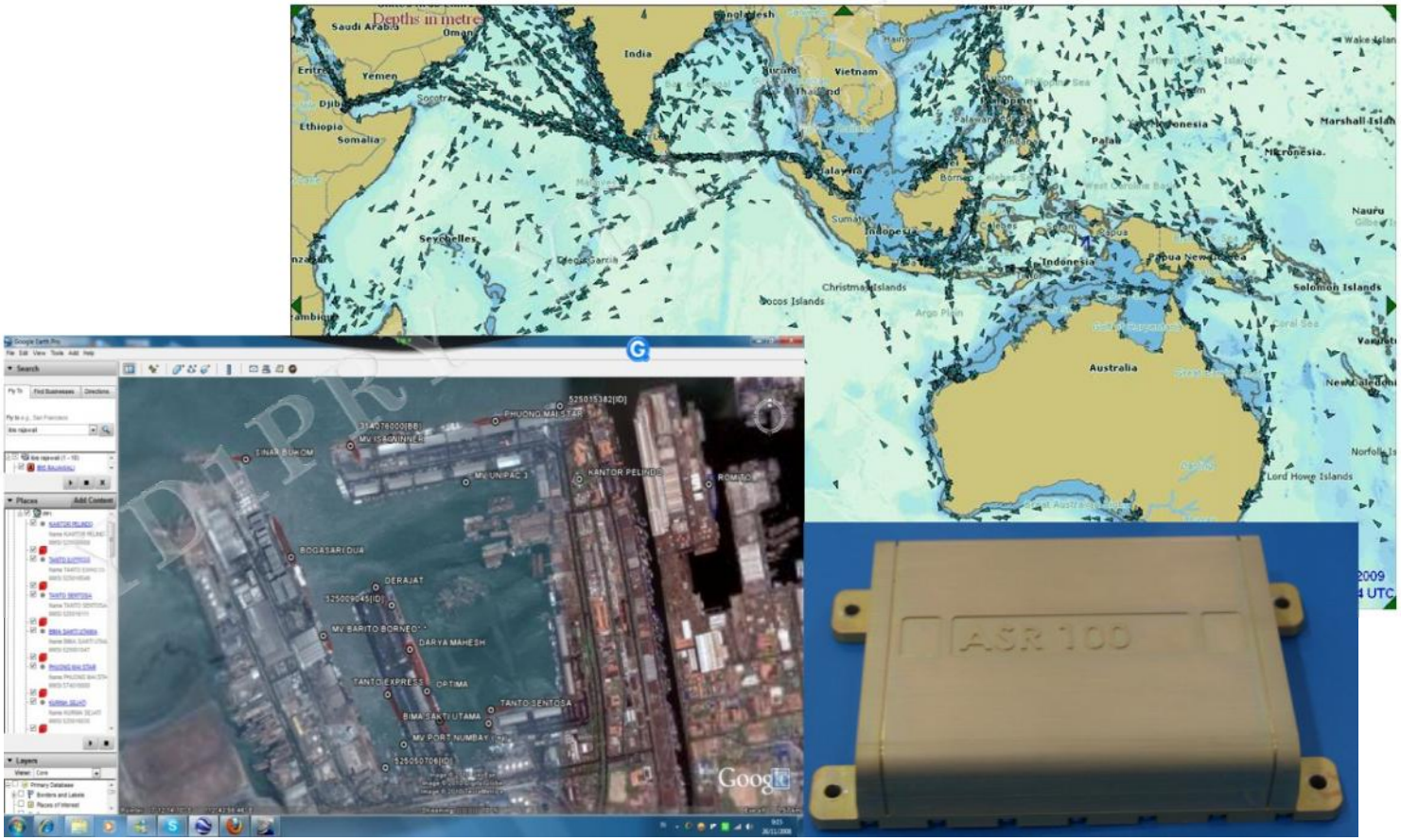
3. Text Repeater (Automatic Packet/Position Reporting System) & Voice Repeater Amateur Radio

- APRS REPEATER
  - Modified COTS component
  - Frekuensi : 145,825 MHz
  - Tx Power Consumption : 1.2 Amps @15V
  - RF power : 6 Watts
  - Parameter adjustable
  - Antenna : Omnidirectional

- VOICE REPEATER
  - Modified COTS core RF unit
  - Downlink Voice : 435,880 MHz
  - Uplink Voice : 145,880 MHz
  - Tx Power Consumption : 1.2 Amps @15V
  - RF power : 6 Watts
  - Adjustable CCTCS Tone
  - Antenna : Omnidirectional

Payload Missions

4. *Automatic Identification System* (AIS) Receiver ex. AISSat-1 (Satelit Norwegia)



Satellite Payload Development

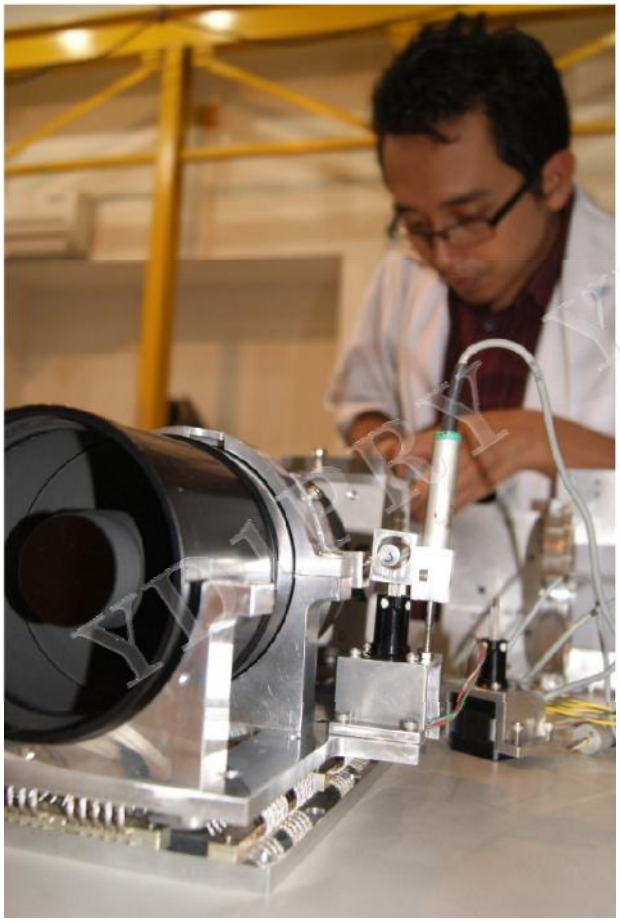
Optical support for surveillance missions

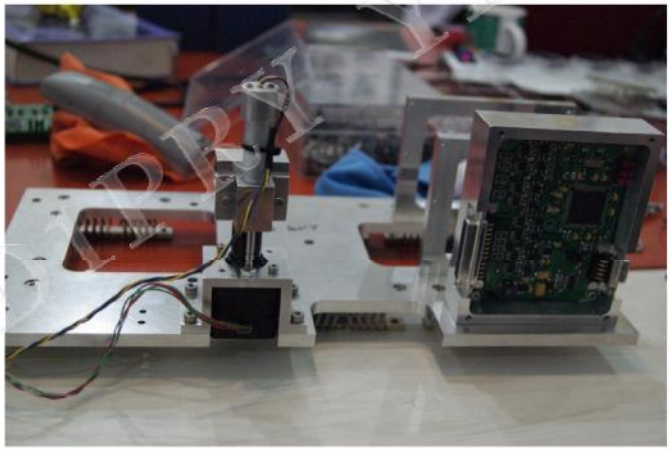
Satellite Payload Development

- Optical Test

Satellite Payload Development

- Lens Focus Control Mechanism





Satellite Payload Development

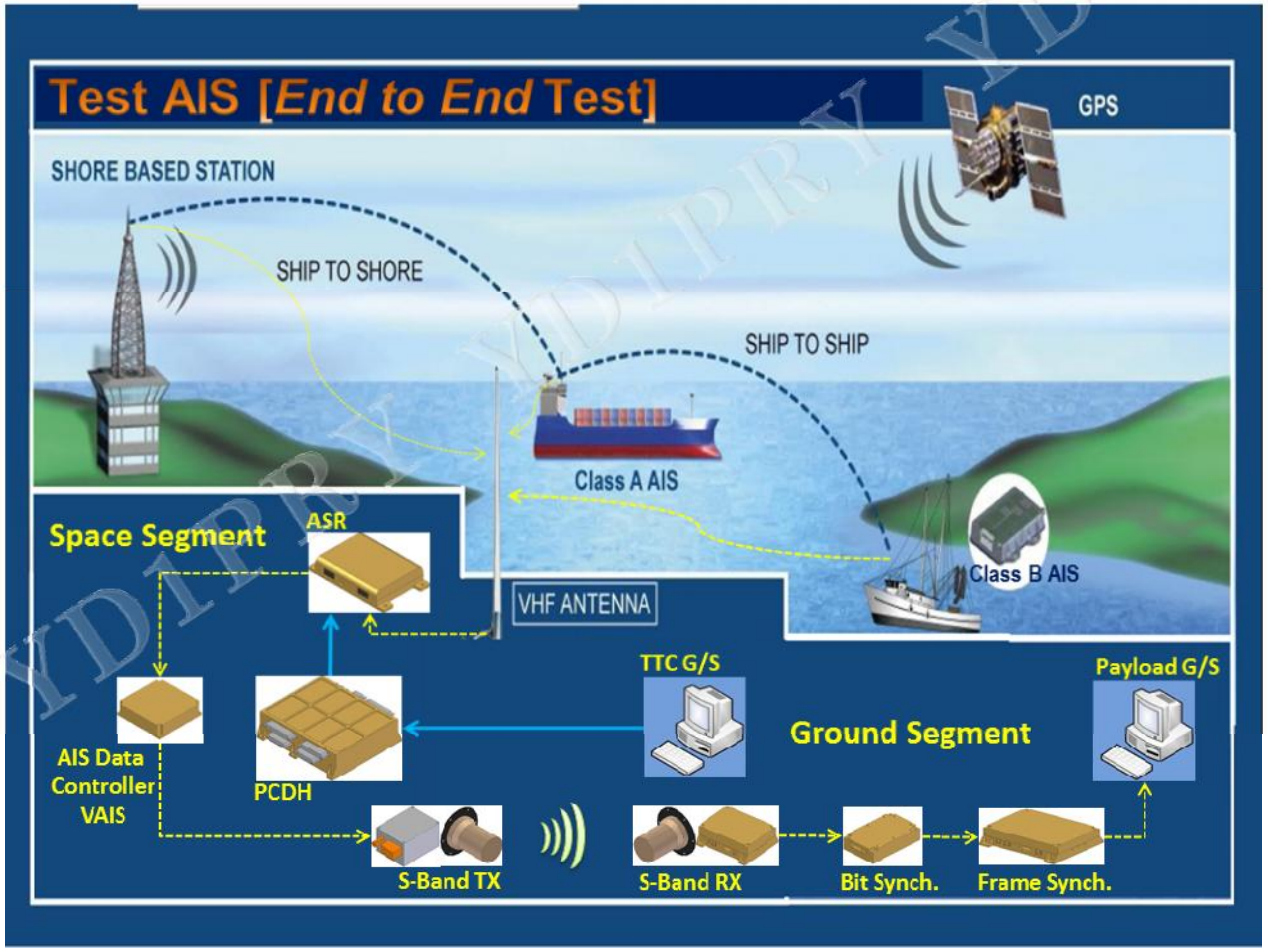
Digital camera test of Lapan-A2/orari

Satellite Payload Development

Joint Test for ORARI payload

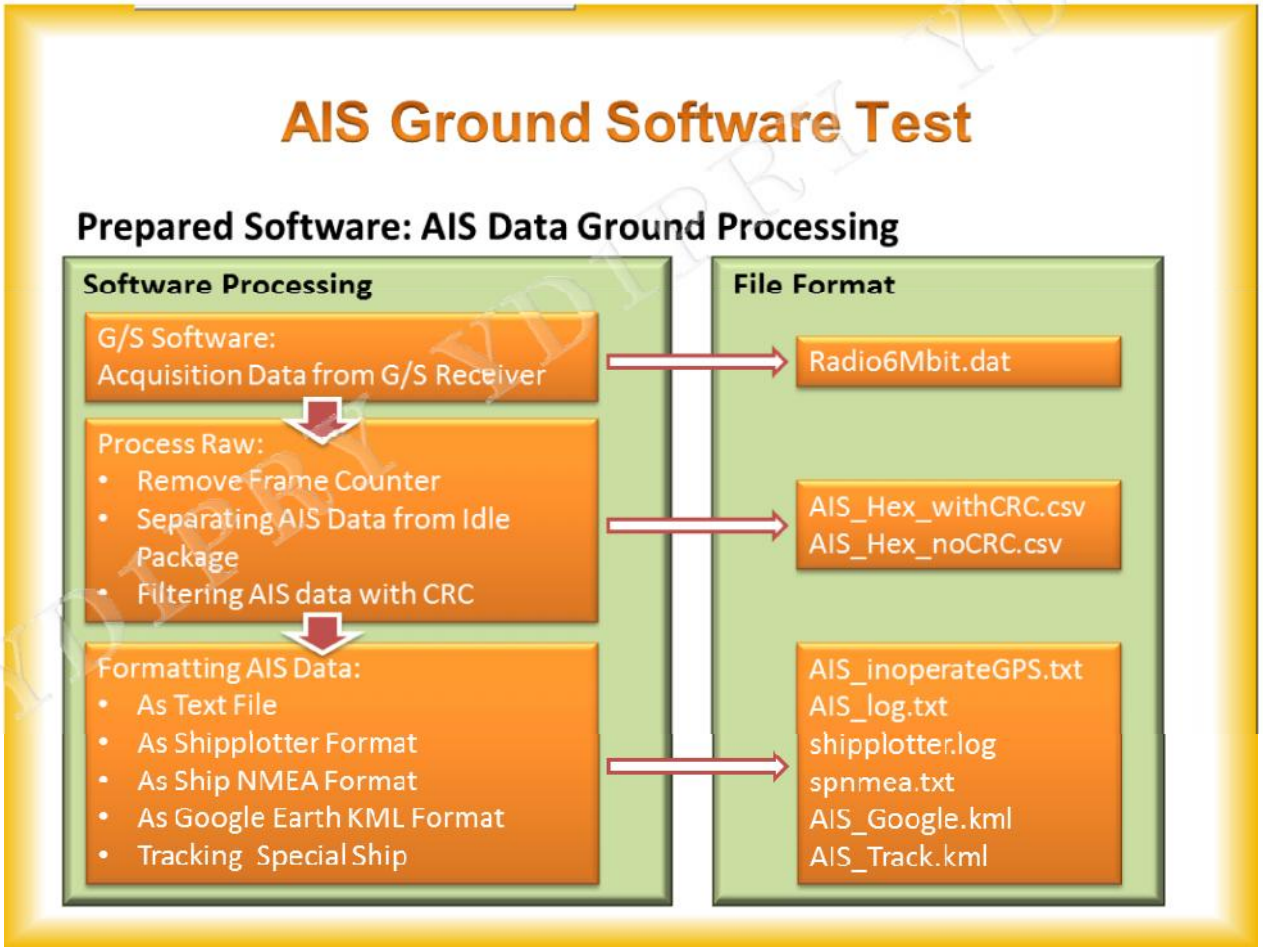
Satellite Payload Development

AIS Payload Test



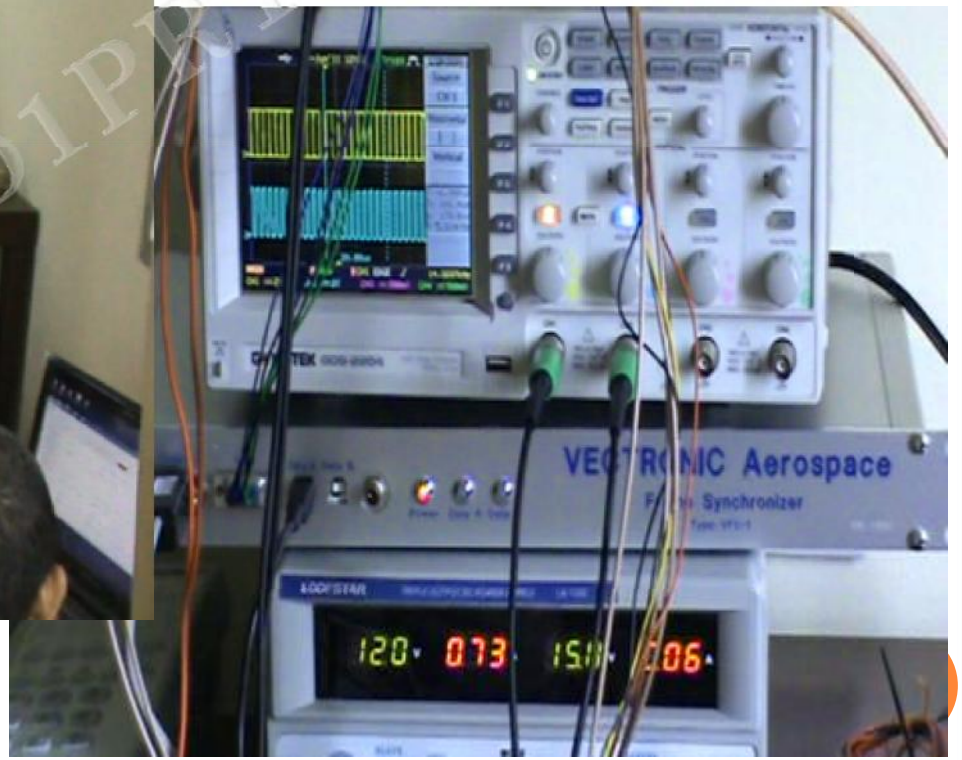
Satellite Payload Development

Test of AIS Payload



Satellite Payload Development

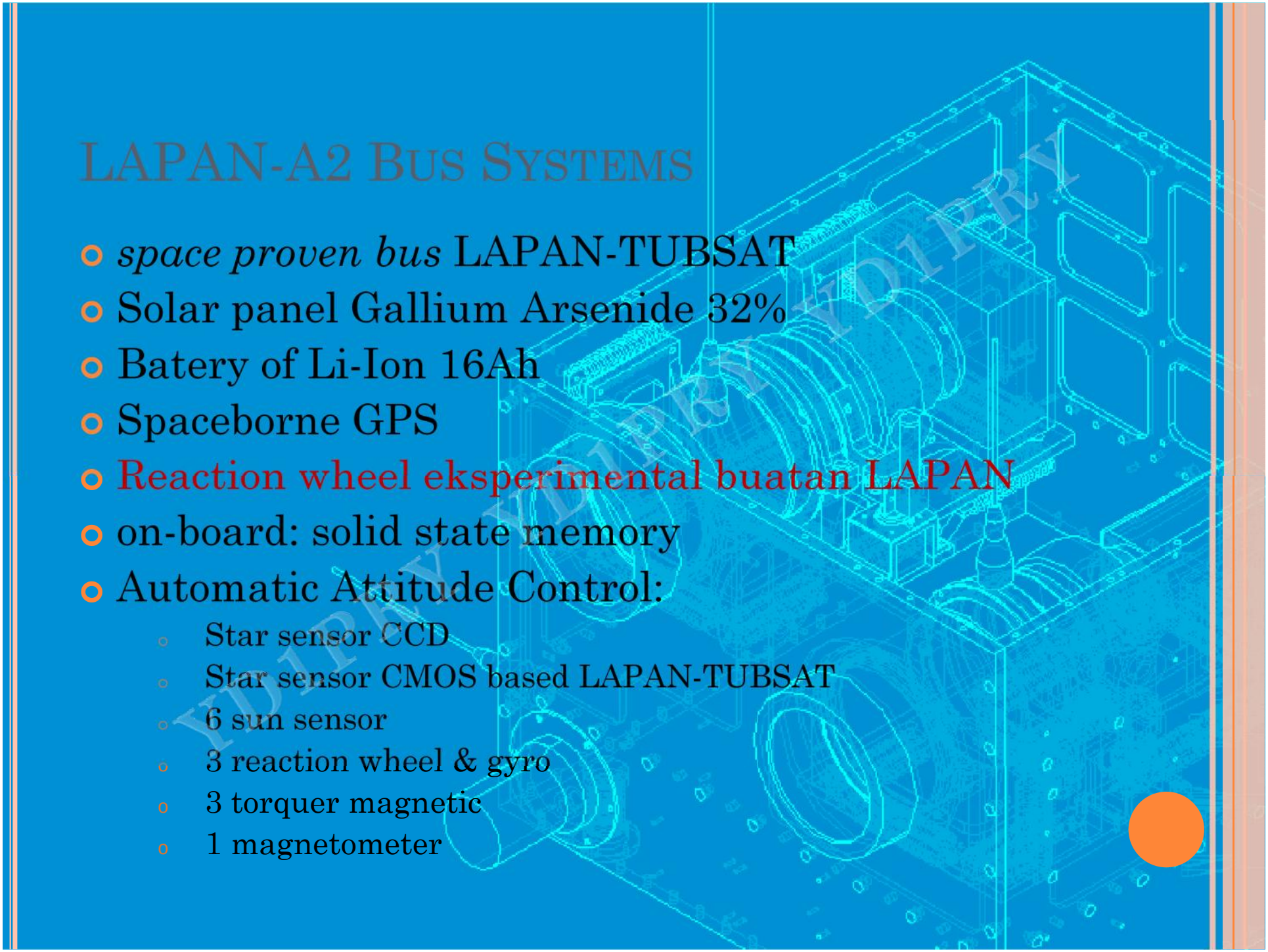
AIS Payload test



BUS DEVELOPMENT

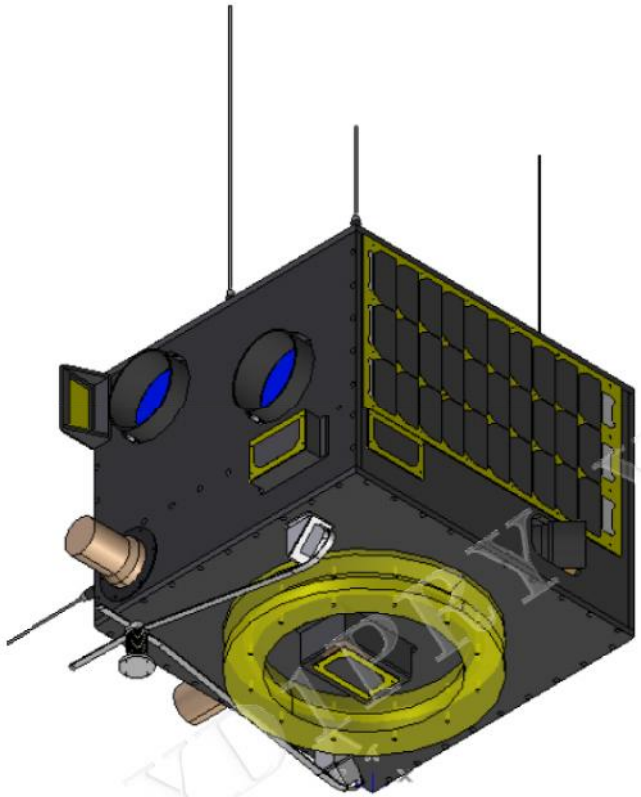
- Supporting payload mission
- Comply with launcher Lunch coditions:
  - weight: 78 kg
  - Dimension 600mm(radial) x 700mm(transversal) x 800mm(Height)
  - Separation: IBL-298 (kelas 120 kg)
  - Quasi Statik Structure:
    - Acceleration Longitudinal: +7g / -2.5g
    - Acceleration Lateral: ±6g
    - *Load Factor*: 1.25
  - Center of Mass
    - Longitudinal < 450 mm
    - Lateral radius ±5mm
  - Natural Freq:
    - Longitudinal: 90 Hz
    - Lateral: 45 Hz

LAPAN-A2 Bus Systems

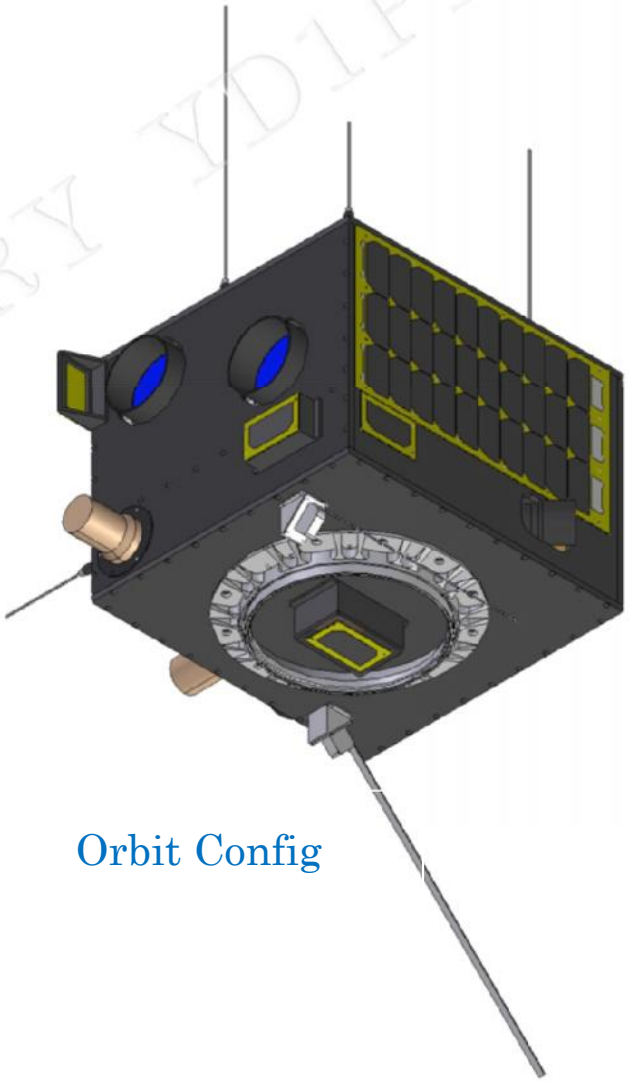


- *space proven bus* LAPAN-TUBSAT
- Solar panel Gallium Arsenide 32%
- Batery of Li-Ion 16Ah
- Spaceborne GPS
- Reaction wheel eksperimental buatan LAPAN
- on-board: solid state memory
- Automatic Attitude Control:
  - Star sensor CCD
  - Star sensor CMOS based LAPAN-TUBSAT
  - 6 sun sensor
  - 3 reaction wheel & gyro
  - 3 torquer magnetic
  - 1 magnetometer

DESIGN

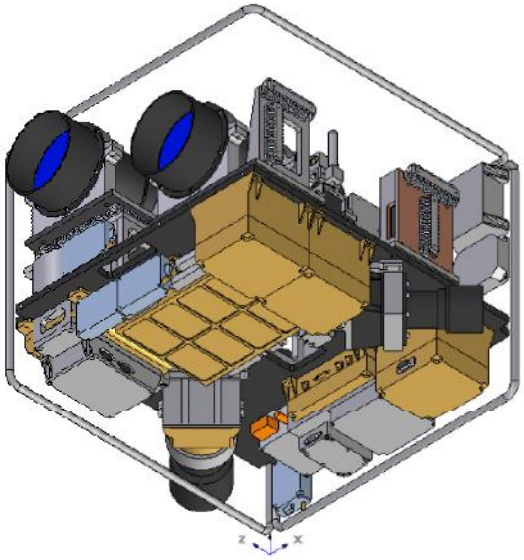


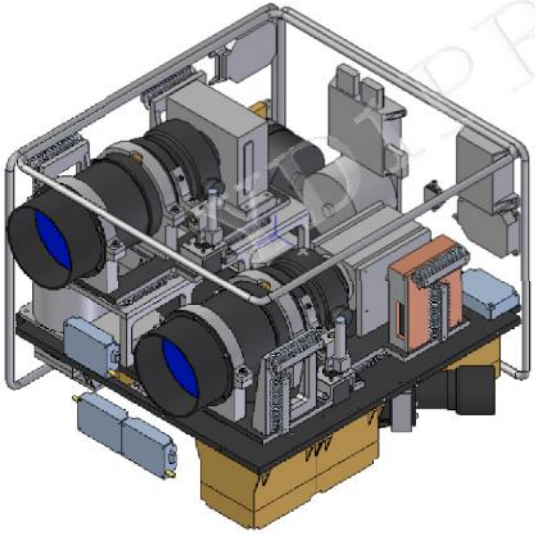
Launch Config

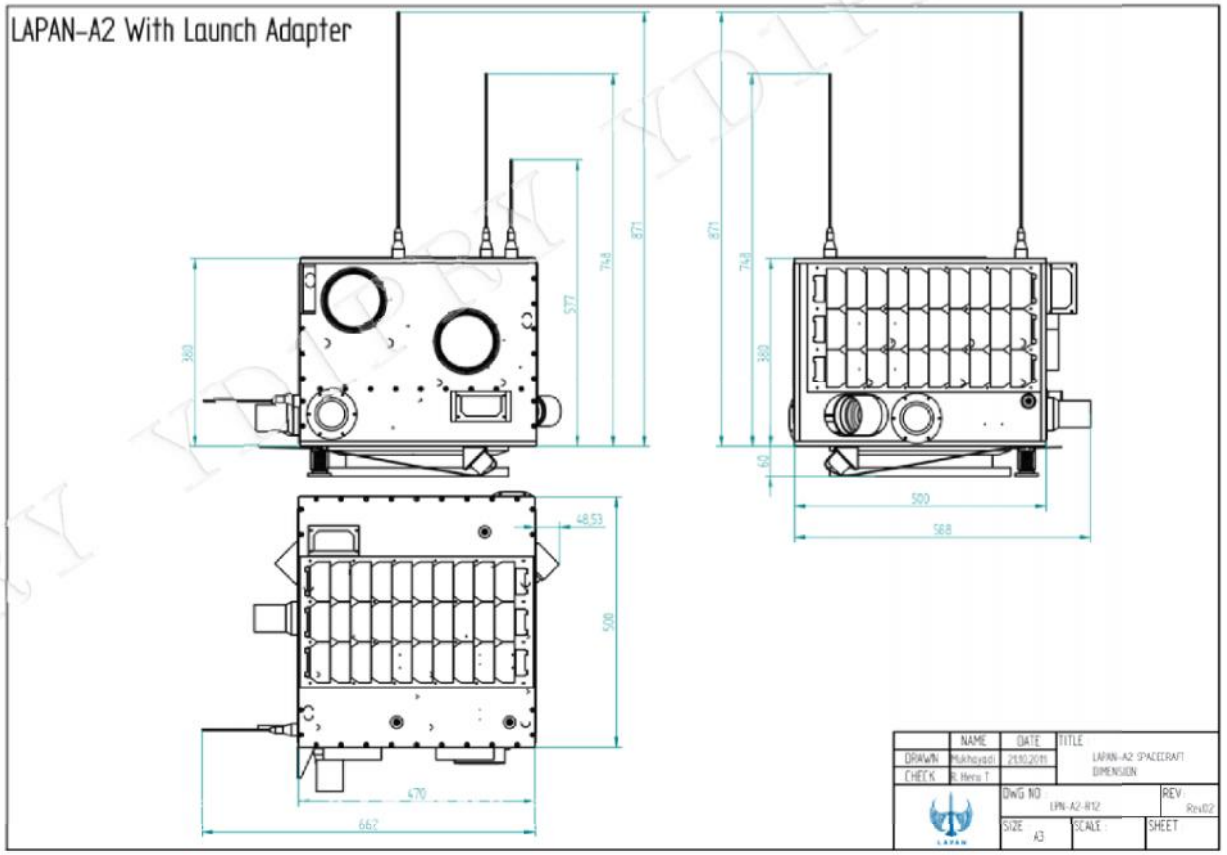


Orbit Config

DESIGN

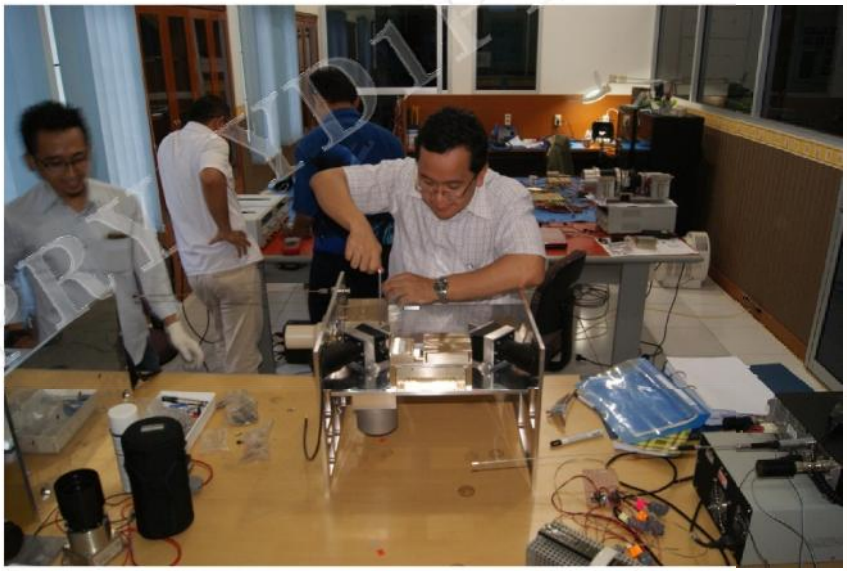





LAPAN-A2 With Launch Adapter
871
748
577
388
48.53
508
470
662
871
748
388
60
500
568
NAME
DATE
TITLE
DRAWN
Mukhoyadi
25.10.2011
LAPAN-A2 SPACECRAFT
DIMENSION
CHECK
D. Henra T.
DWG NO
LPN-A2-R12
REV
Rev02
SIZE
A3
SCALE
SHEET

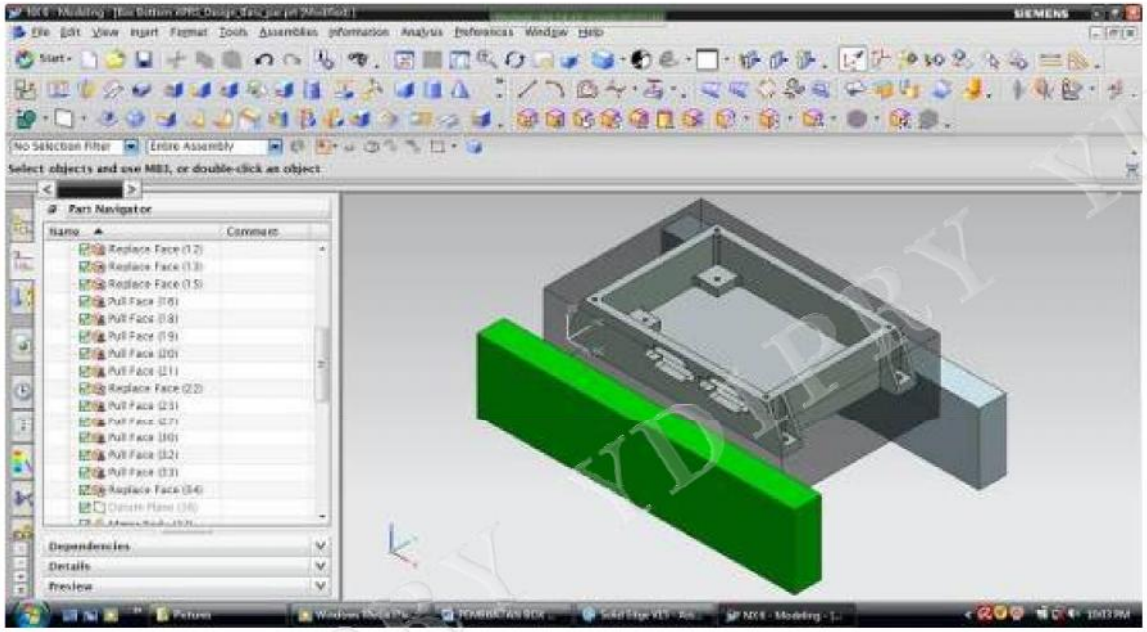
SATELITE INTEGRATION

Mechanic Integration

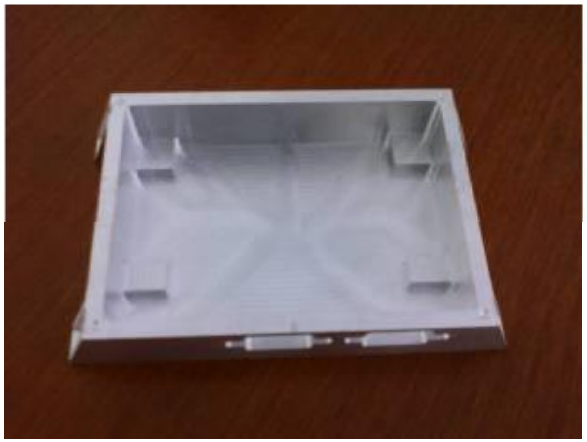


Elektronic Integration

SATELIT INTEGRATION



CNC Workshop

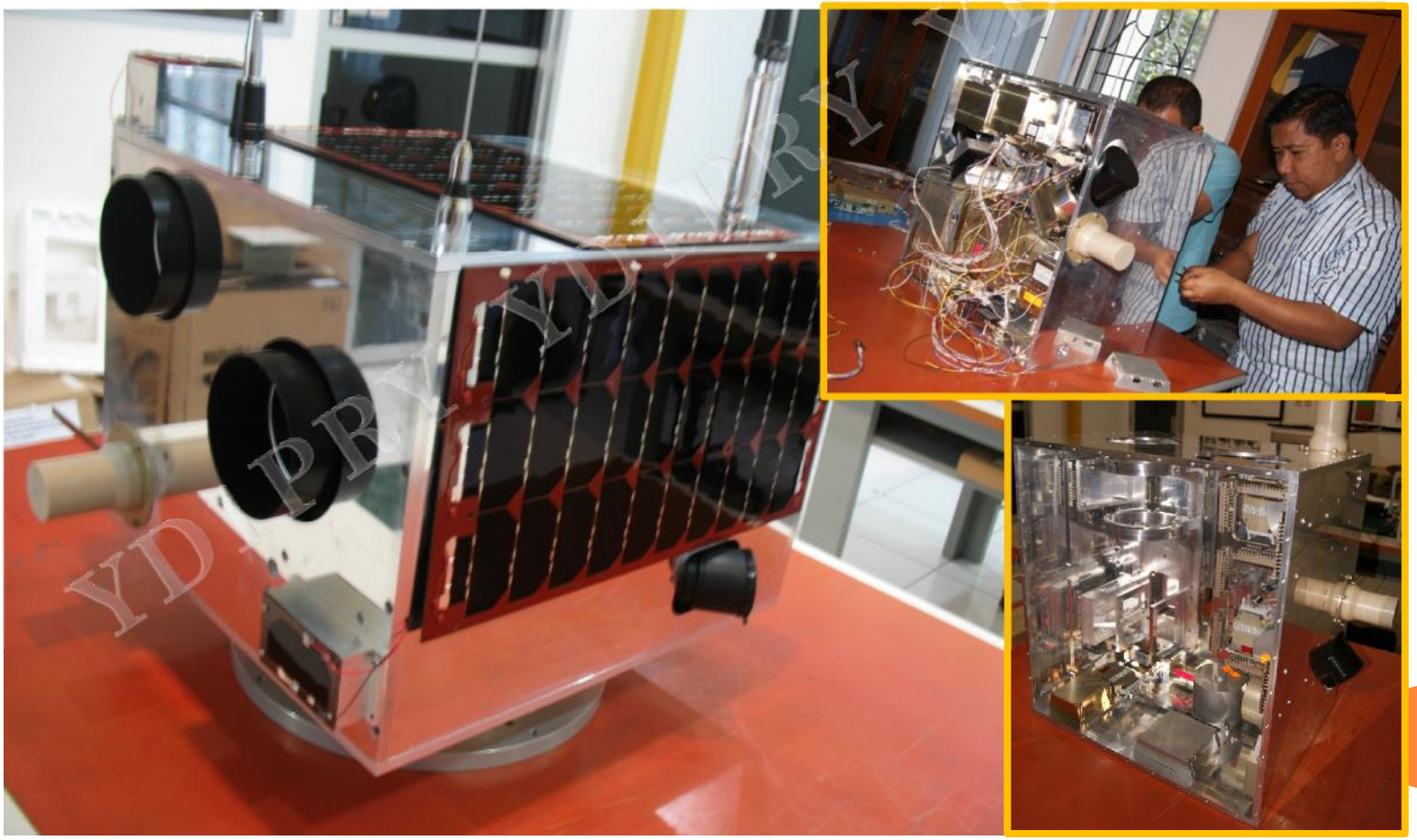


Component Level Test

Thermal

Vacuum

Final Harnessing



Test & Qualification

Vibration

TESTING RESULT

The result of vibration test was shown in table 1 below.

Table 1. The Result of The Vibration Test

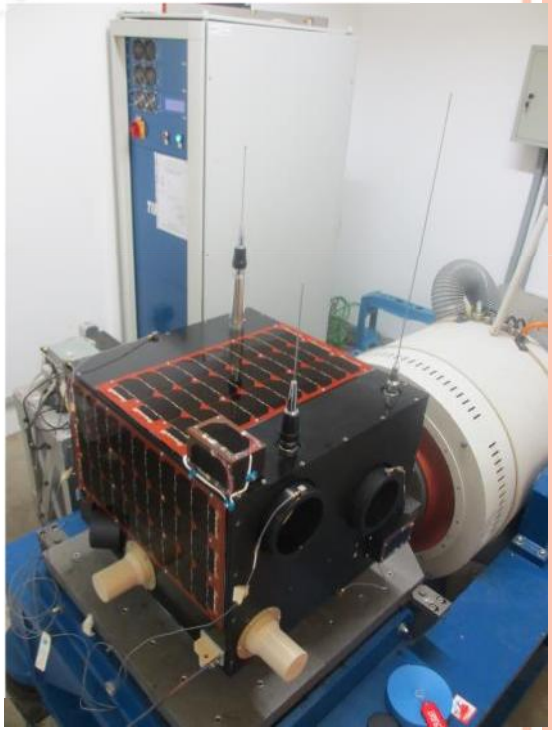
No.	Test Item	Result
1.	Sinusoidal Vibration Test	There was no damage on the sample.
2.	Random Vibration Test	There was no damage on the sample.

Table 2. Test Condition of The Sinusoidal Vibration Test

	Frequency Range (Hz)	Real Test Condition	Remark
Vertical Axis (Upward - Downward)	8 - 100	3.0 G 2 Oct/min	Accordance with the acceptance test level
Lateral I Axis (Frontward - Backward)	8 - 100	2.0 G 2 Oct/min	Accordance with the acceptance test level
Lateral II Axis (Rightward - Leftward)	8 - 100	2.5 G 2 Oct/min	Accordance with the acceptance test level

ORIGINAL

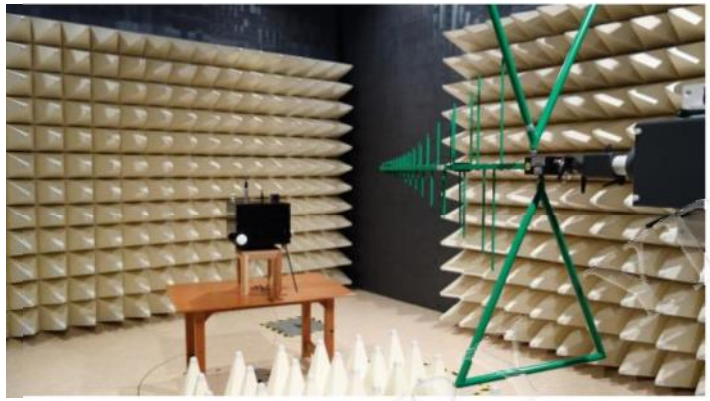
F-015,Ed.C,Rev.0
SENTRA TEKNOLOGI POLIMER - BPPT
Gedung 460, Kawasan PUSPIPTEK Tangerang Selatan 15314 - Banten Indonesia
Telp. (021) 756 3360 (Hunting) Fax. (021) 756 0057
Email. stpoffice@sentrapolimer.com www.sentrapolimer.com
TÜVRheinland CERT ISO 9001

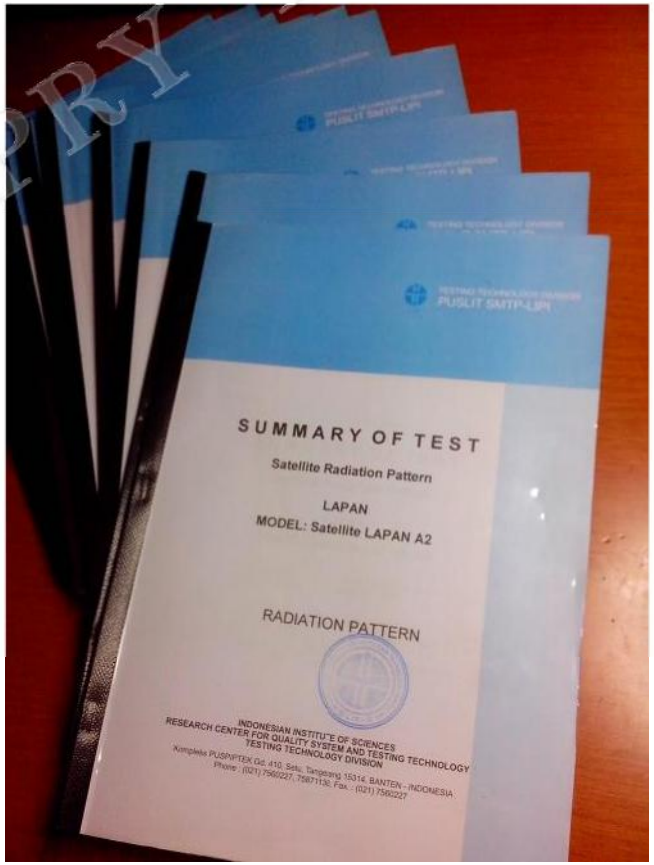


Test & Qualification

EMC

Uji Electromagnetic Compatibility with LIPI





Test & Qualification

Fungsional Check

Fungtional Check via Remote Ground Station
QA by Expert

LAPAN

AMSAT-ID

Amatir Satelite Indonesia

ORARI