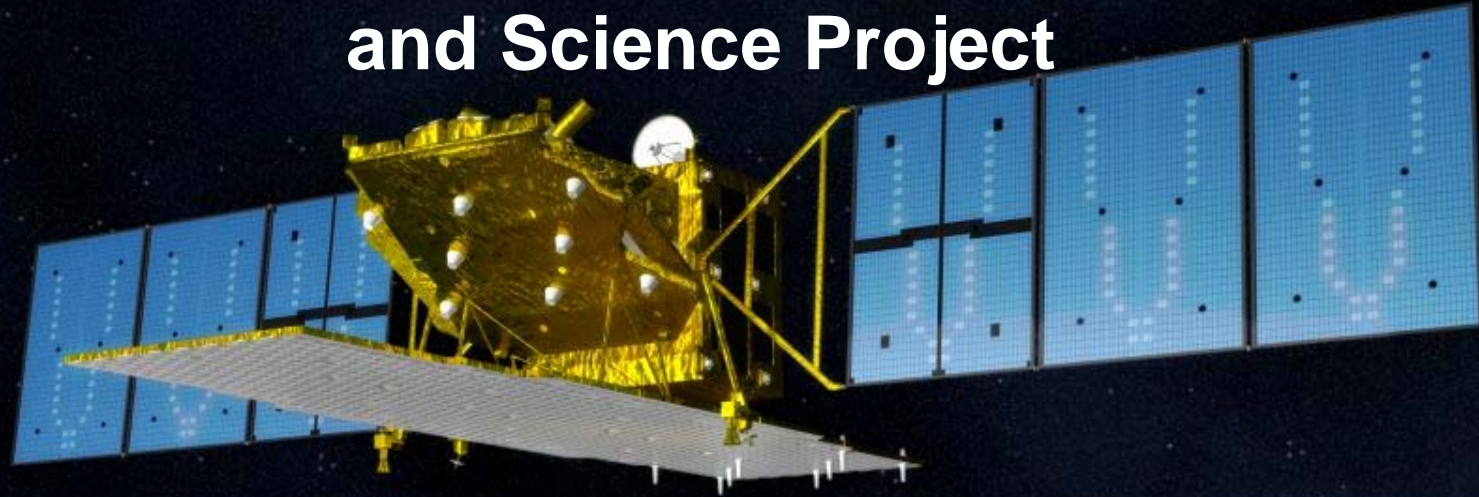
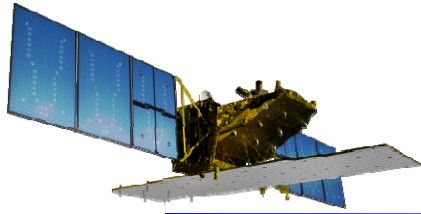


# The Current Status and Brief Results of Engineering Model for PALSAR-2 onboard ALOS-2 and Science Project



The 16<sup>th</sup> KC meeting

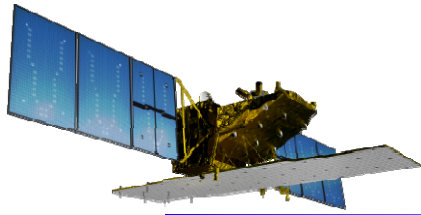
Japan Aerospace Exploration Agency  
Masanobu Shimada, Yukihiro KANKAKU



# The mission of ALOS-2



- Advanced Land Observing Satellite-2(ALOS-2) is the **post ALOS PALSAR mission** (PALSAR is the L-band SAR onboard ALOS )
- ALOS-2 is an **L-band SAR (PALSAR-2) satellite** planned to be launched in **2013**
- The main objection of ALOS-2 is as follows,
  - Land management
  - Resource management
  - Resource exploration
  - Disaster monitoring
- In order to meet the requirements, ALOS-2 observes **higher resolution, better sensitivity and higher image quality** than PALSAR.

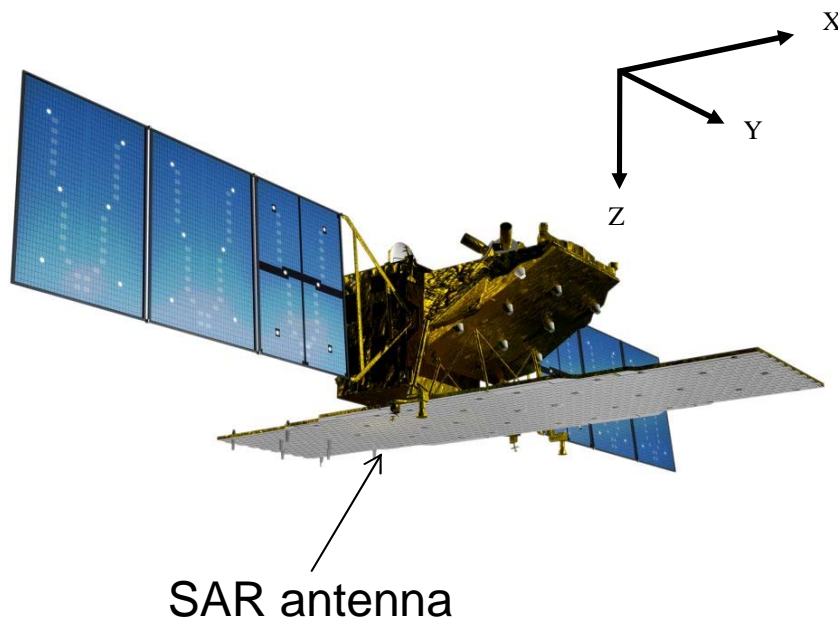


# The overview of ALOS-2



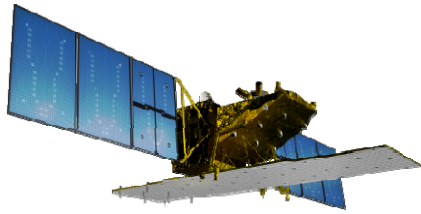
## ALOS-2 satellite parameters

- Orbit type : Sun-synchronous
- Launch : 2013
- Altitude : 628km +/- 500m(for reference orbit)
- Revisit time : 14days
- LSDN : 12:00 +/- 15min



## PALSAR-2 (Mission Sensor)

- L-band Synthetic Aperture Radar
- Active Phased Array Antenna type  
two dimensions scan (range and azimuth)
- Antenna size : 3m(EI) x 10m(Az)
- Bandwidth : 14 to 84MHz
- Peak transmit Power : 5100W
- Observation swath : 25km to 490km
- Resolution : Range 3m to 100m  
Azimuth 1m to 100m



# Specification of PALSAR-2



	Spotlight	Ultra Fine	High sensitive	Fine	ScanSAR nominal		ScanSAR wide
Bandwidth	84MHz	84MHz	42MHz	28MHz	14MHz	28MHz	14MHz
Resolution	Rg × Az: 3 × 1m	3m	6m	10m	100m		60m
Swath	Rg × Az: 25 × 25km	50km	50km	70km	350km 5scan		490km 7can
Polarization	SP	SP/DP	SP/DP/FP/CP		SP/DP		
NESZ	-24dB	-24dB	-28dB	-26dB	-26dB	-23dB	-23dB
S/A	Rg	25dB	25dB	23dB	25dB	25dB	20dB
	Az	20dB	25dB	20dB	23dB	20dB	20dB

SP : HH or VV or HV , DP : HH+HV or VV+VH , FP : HH+HV+VH+VV , CP : Compact pol (**Experimental mode**)

The each observation mode will be used for ...

**Spotlight** : Emergency Observation

**Ultra Fine** : nominal observation to collect the basemap for InSAR.

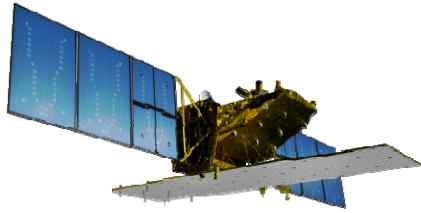
**High sensitive** : flood observation.

**Fine** : same as PALSAR observation.

**ScanSAR nominal (28MHz bandwidth)** : ScanSAR-ScanSAR InSAR.

**ScanSAR wide** : ship detection.

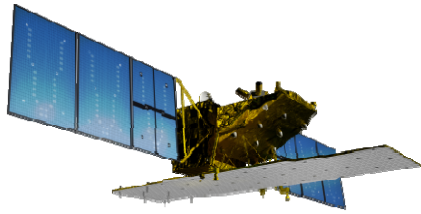




# New techniques



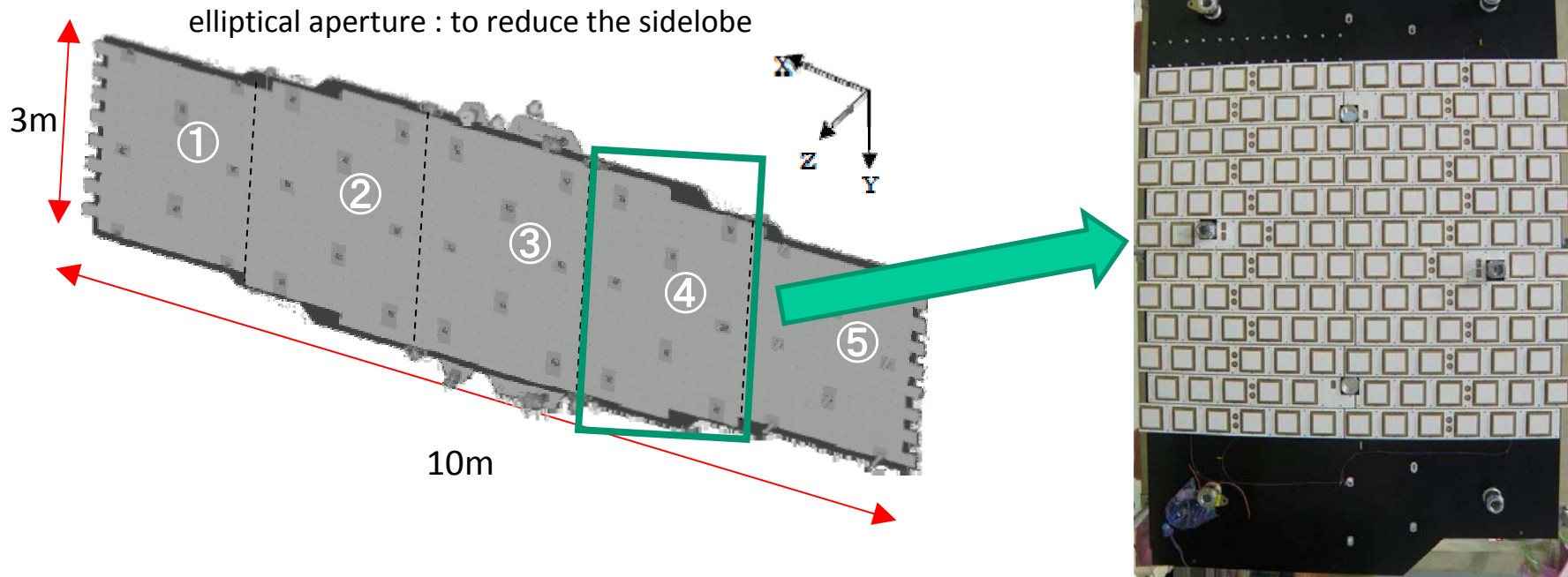
- High power and efficiency device
  - to get high quality image (better NESZ)
  - GaN HEMT  $\Rightarrow$  the first flight for satellite in the world.
- Dual receive antenna system
  - to get wide swath (low PRF)
  - SAR antenna is consisted from 5 electric panel.
  - full aperture for transmission and divided antenna for receiving
- Chirp modulation
  - to get high quality image (better S/A)
  - Up/Down and Phase modulation to distinguish the pulses
- New data compression algorithm
  - updated BAQ algorythm



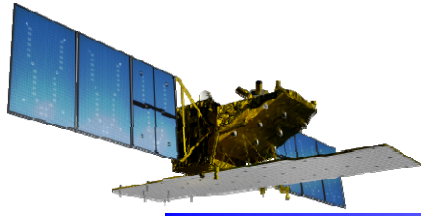
# The Engineering Models



- The antenna Engineering Model (EM)
  - the size for antenna EM is half of one electric panel.



The structure is one electric panel size, however the only half quantity of antenna radiation elements are mounted.

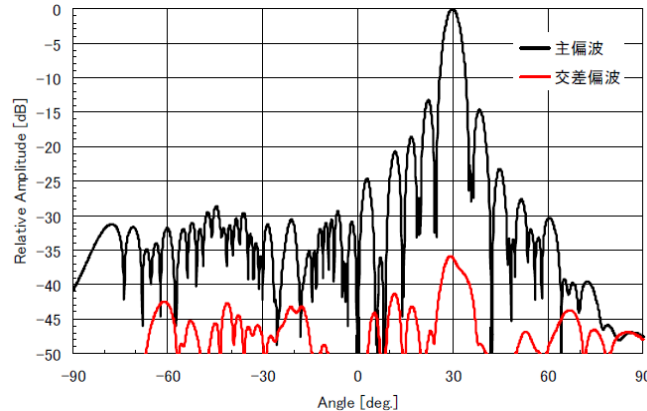


# The Engineering Models

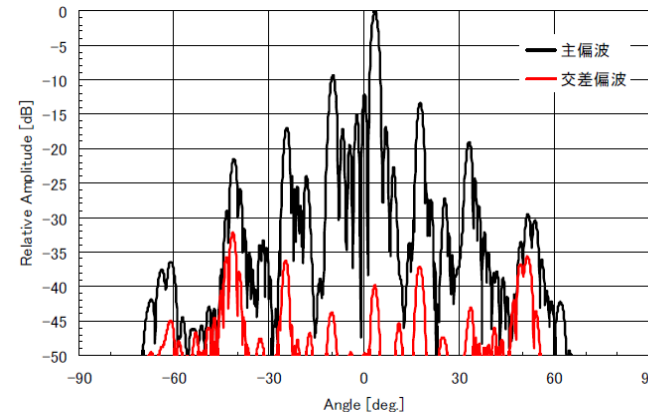


- The interface between antenna elements and the components mounted on antenna was confirmed.
  - mounted components are transmission and receive module(TRM), power supply for TRM(MPSU) and control unit (CDU) etc.
- The analyzed radiation antenna pattern using EM of antenna elements was good result,

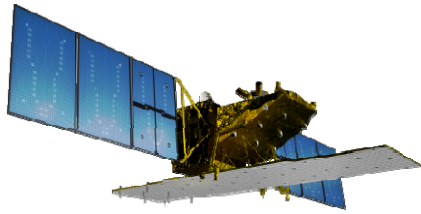
EL 30deg stterubg



Az 3.5 deg stterubg



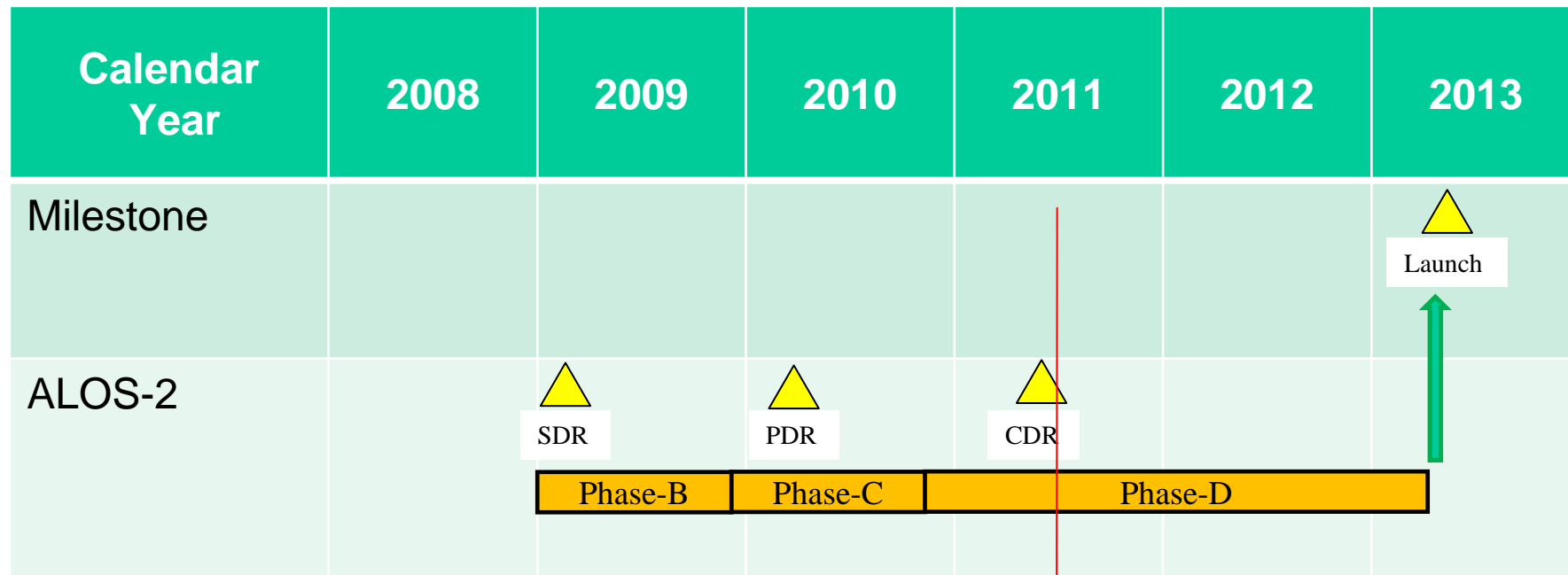
- The realistic radiation antenna pattern (antenna EM size) will be measured in this week.



# The future schedule



- The Critical Design Review for ALOS-2 was completed last week.
- The Proto Flight models will be manufactured.



28<sup>th</sup> ISTS



CAL/VAL: Calibration of PALSAR-2

SAR imaging and applications (Sigma-SAR update)

High level product (Ortho, Slope, InSAR-DEM)

Application:

Forest monitoring (REDD+, Illegal Logging)

Disaster monitoring (DinSAR, Change Detection, Oil spill, subsidence, earthquake, volcano)

Wind speed measurements (Coastal field)

Ionospheric monitoring

Cryospheric observation

Coastal line observation

RA programs (RA-4, July 2012, Node is not available)



# Schedule

L+0~L+2: Initial Check(i.e., launch Aug 2013)

L+2~L+5: Initial Calibration

L+5~ : Operation Start (i.e., Jan. 2014)

# Conclusion

- ALOS-2 in preparation for 2013 launch.
- ALOS-2 CDR has been successfully conducted on June 2 2011.
- Basic observation Plan needs to be prepared. Collaboration with InSAR research groups and REDD+ users.
- L1.1 or higher is the main products for distribution.