



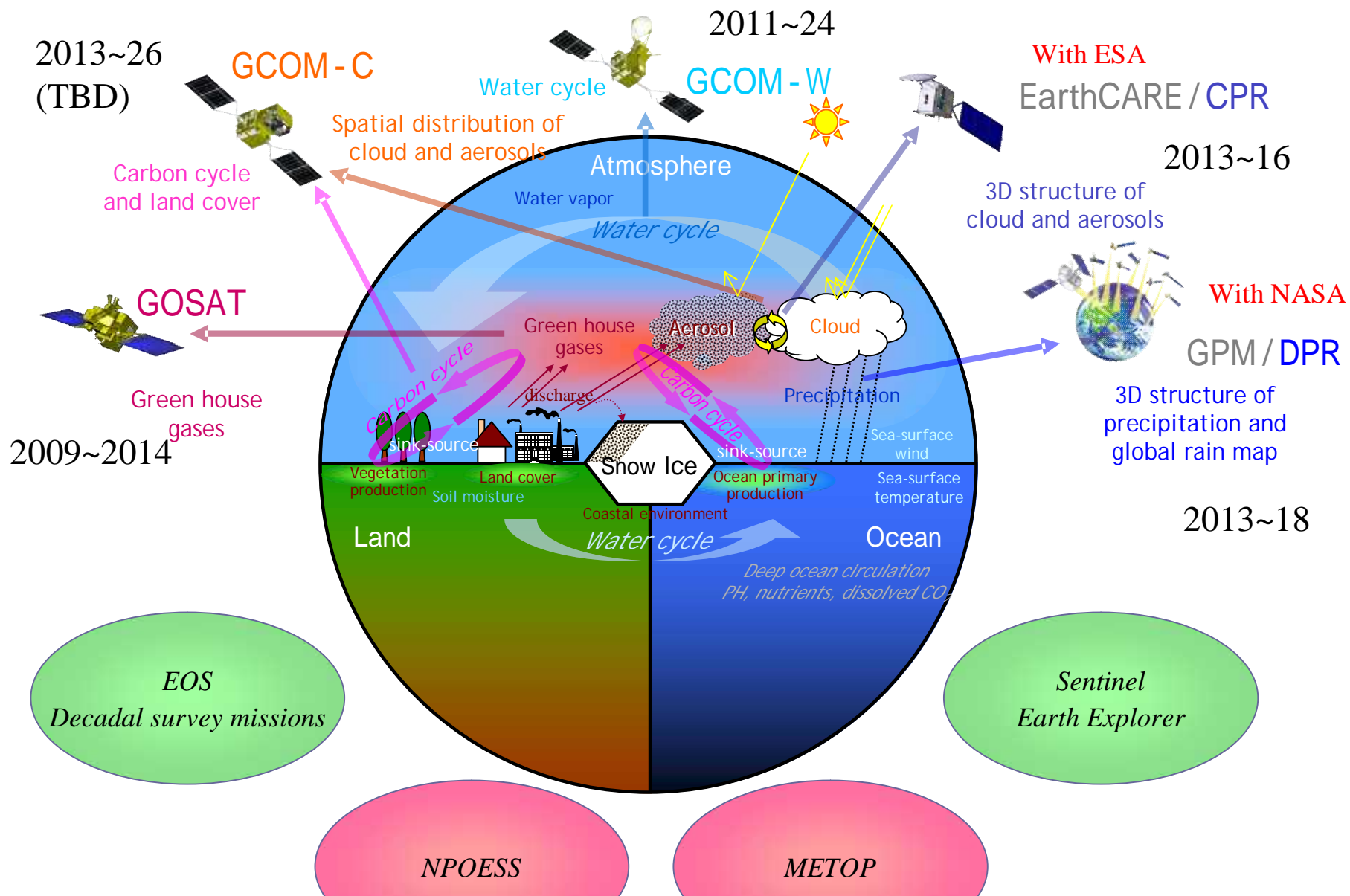
## EarthCARE Program Status from JAXA

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10-12 EarthCARE Workshop, Kyoto, JAPAN

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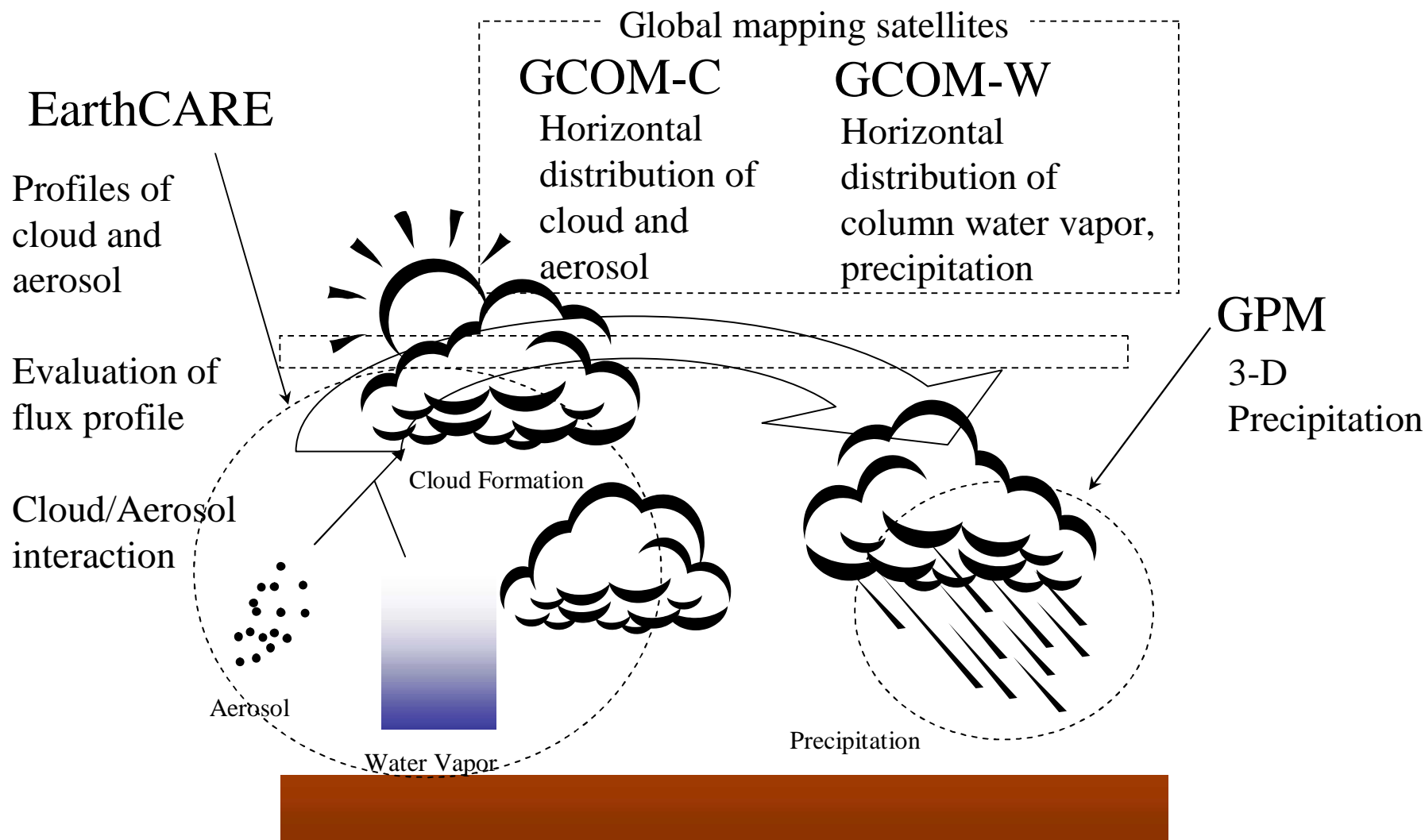
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- Japanese Environmental Missions and EarthCARE
- EarthCARE activities in JAPAN
  - Cloud Profiling Radar
  - Japanese Ground Segment for EarthCARE
  - Science activities
- Schedule



**For several years from 2013, all these satellites are in orbit**

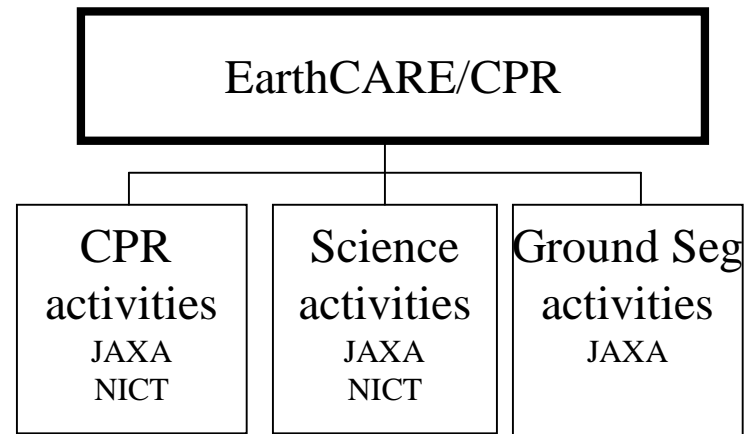
# Aerosol, Water vapor-Cloud-Precipitation Processes and Water cycle system



## EarthCARE activities in JAPAN

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- Cloud Profiling RADAR development contribution to EarthCARE satellite
- Japanese Ground Segment contribution including CPR Level 1 and other products processing to EarthCARE Ground Segment
- Scientific activities contribution including mission definition and algorithm study to entire EarthCARE mission
- Japanese activities are shared or cooperated between JAXA and NICT as a joint development effort



JAXA; Japanese Aerospace Exploration Agency

NICT; National Institute of Information and Communications Technology

## Cloud Profiling Radar (CPR) activity

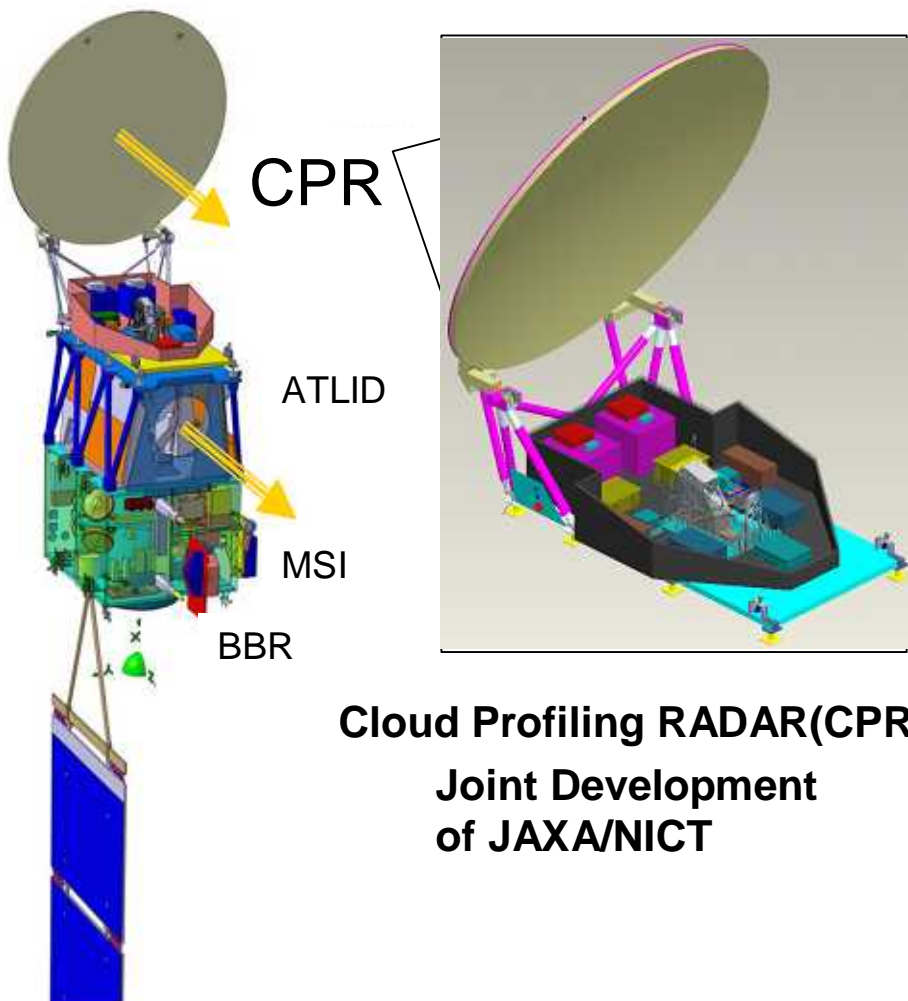
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- JAXA and NICT are jointly developing CPR
  - Interfacing with EarthCARE satellite
  - Radar performance design (NICT)
  - CPR System Design and Development (JAXA)
    - Transmitter and Receiver Subsystem design and development (NICT)
    - Main reflector, telemetry/command-radar control (JAXA)
- JAXA/NICT jointed ESA-System Requirement Review (SRR)
- Subsystem level Preliminary Design Reviews (PDR) were done
- CPR system PDR will be held in next July, and start integration of CPR Engineering Model.



# EarthCARE / Cloud Profiling Radar

## ESA Earth Explorer Core Mission



Radar type	94 GHz Doppler Radar
Center frequency	94.05 GHz
Pulse width	3.3 micro second (equivalent to 500m vertical resolution)
Beam width	0.095 deg
Polarization	Circular
Transmit power	> 1.5 kW (Klystron spec.)
Height range	-0.5 ~ 20 km
Resolution	500 m (100 m sample); Vertical, 500m integration; Horizontal
Sensitivity*	-35 ~ +21 dBZ
Radiometric accuracy*	< 2.7 dB
Doppler measurement	Pulse Pair Method
Doppler range*	-10 ~ +10 m/s
Doppler accuracy*	< 1 m/s
Pulse repetition frequency	Variable; 6100~7500 Hz
Pointing accuracy	< 0.015 degree

\*; at 10 km integration and 387 km orbit height

# BBM activities for Cloud Profiling RADAR design



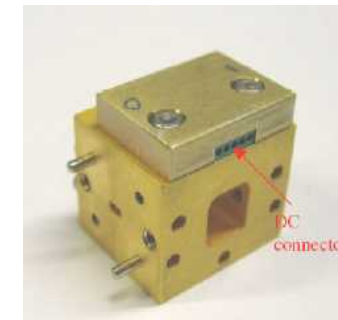
Electronic Power Conditioner for EIK



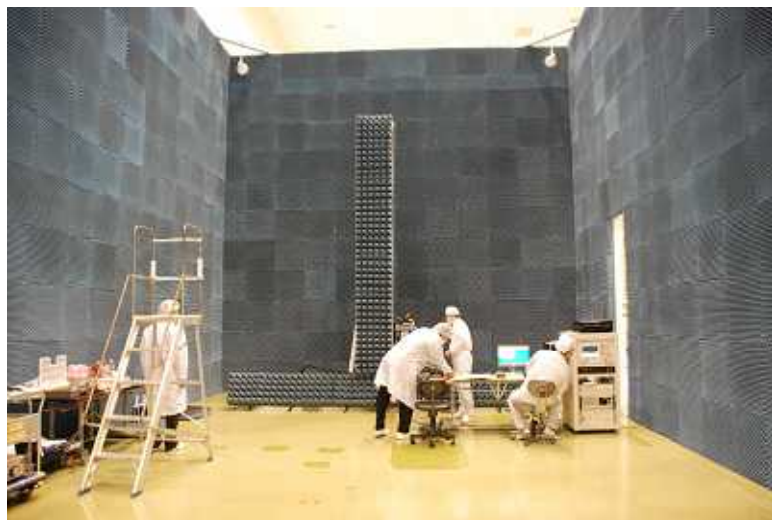
Extended Interaction Klystron (EIK)



I/Q Detector



Low Noise Amp



New Large Near Field Measurement System of JAXA



Full size (2.5m dia.) CPR Antenna BBM with high surface accuracy

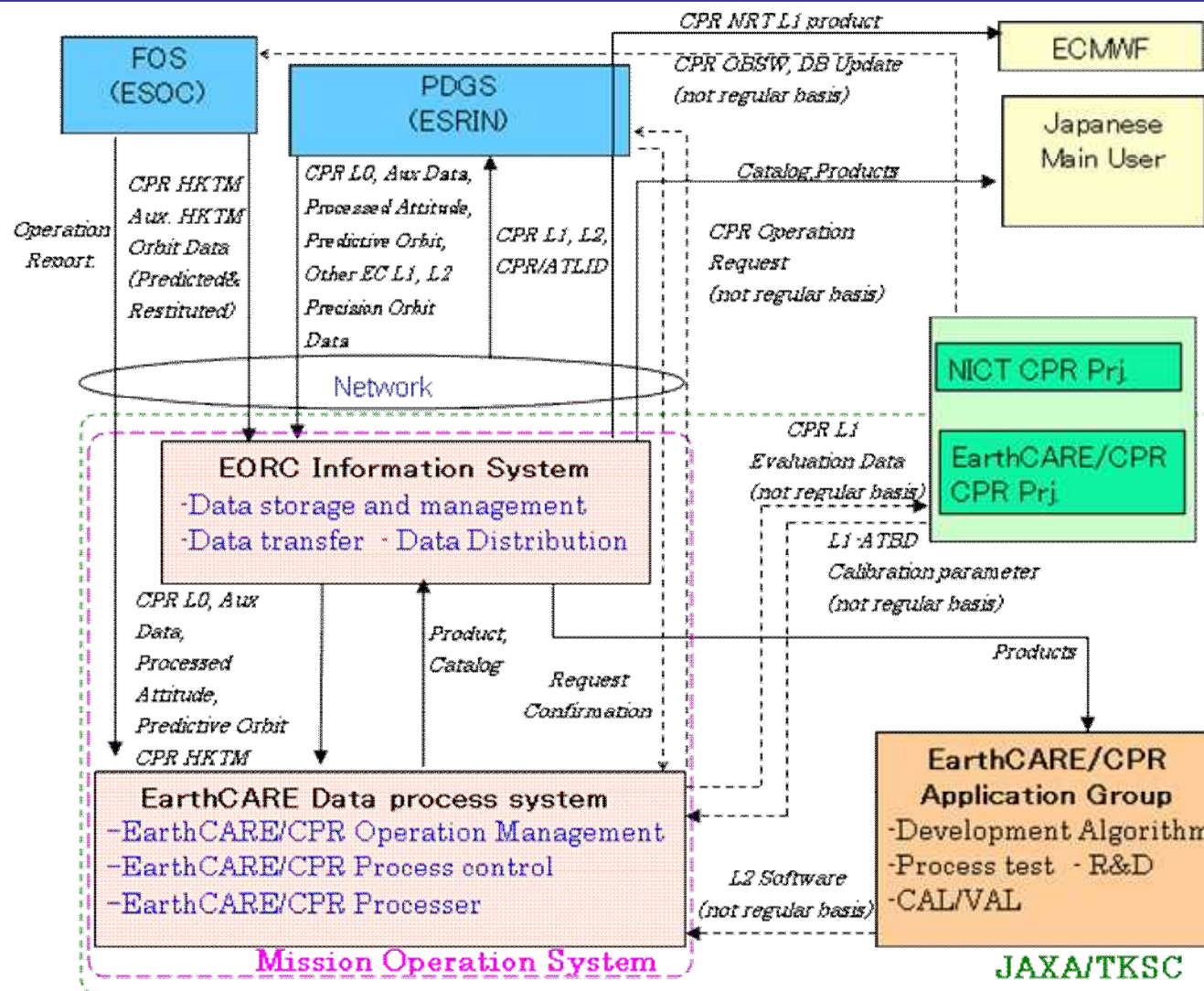


## Ground Segment activity

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- Japanese Ground Segment scopes are;
  - Process CPR Level 1 and higher products
  - Data storage and management for all EarthCARE Level 1 and 2 data as a Ground Segment in Japan (Main GS; ESA)
  - Distribution of the EarthCARE products for users and communities of JAXA
  - CPR operation planning
  - Maintain CPR performance and adoption of cal/val result
- Currently joining ESA-Ground Segment System Requirement Review
- System Definition Review of Japanese Ground Segment will be done towards the end of this year.

# Japanese Ground Segment System Overview



## Science activities

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- JAXA/NICT organized Japanese Mission Advisory Group and Science Team
  - Japanese Mission Advisory Group; led by Prof. Fujiyoshi, Hokkaido University.
  - Science Team; led by Prof. Nakajima, University of Tokyo.
- Science Team joins Joint Mission Advisory Group which is cooperation activity with European and Canadian scientists. Also NASA is joining as observer.
- Science Team is working as a core team for algorithm development and EarthCARE science in Japan
- First algorithm development activities will be done around the end of 2010.

# Science activities ( algorithm studies )

Japanese scientists have been all assigned as a science team

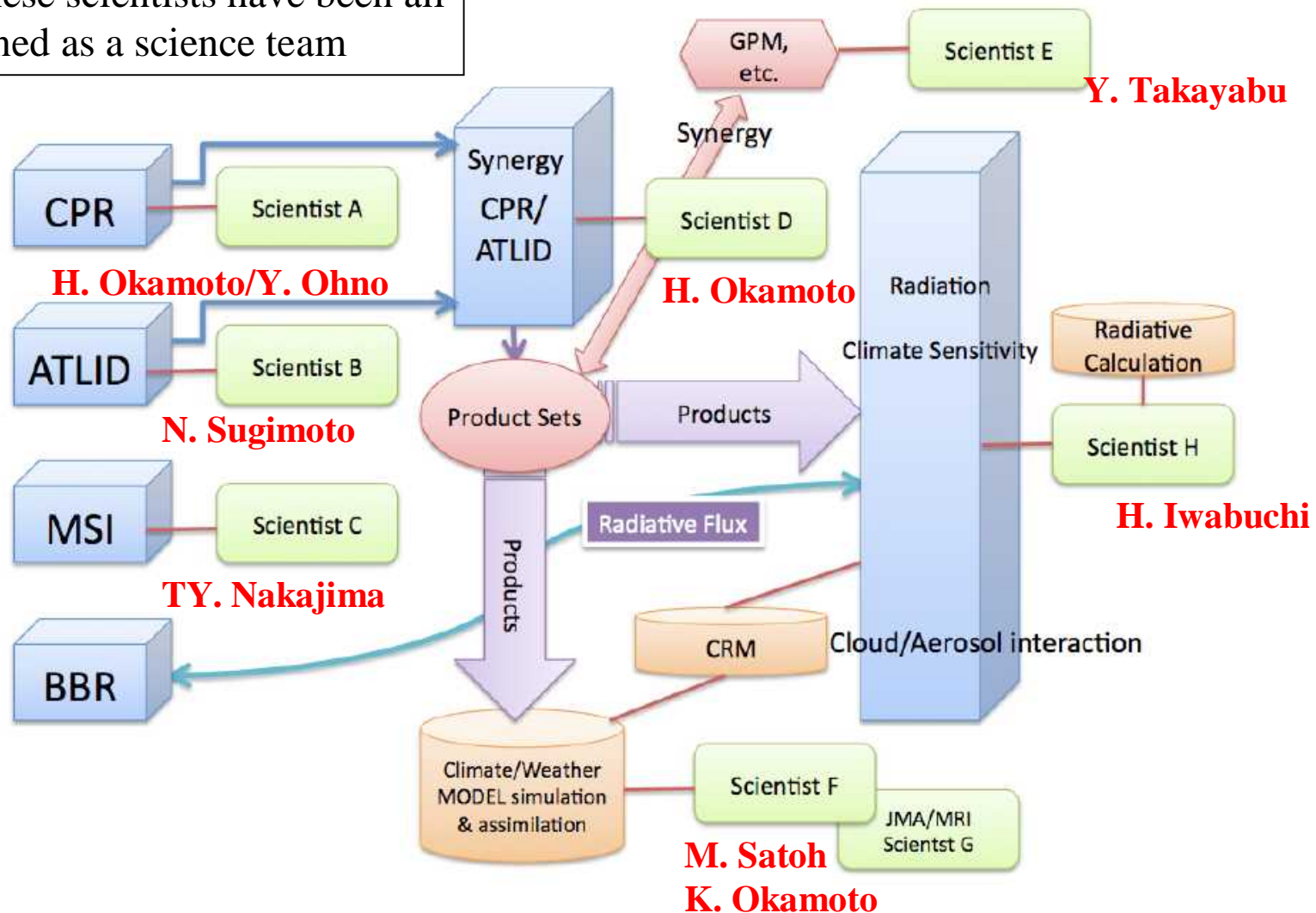
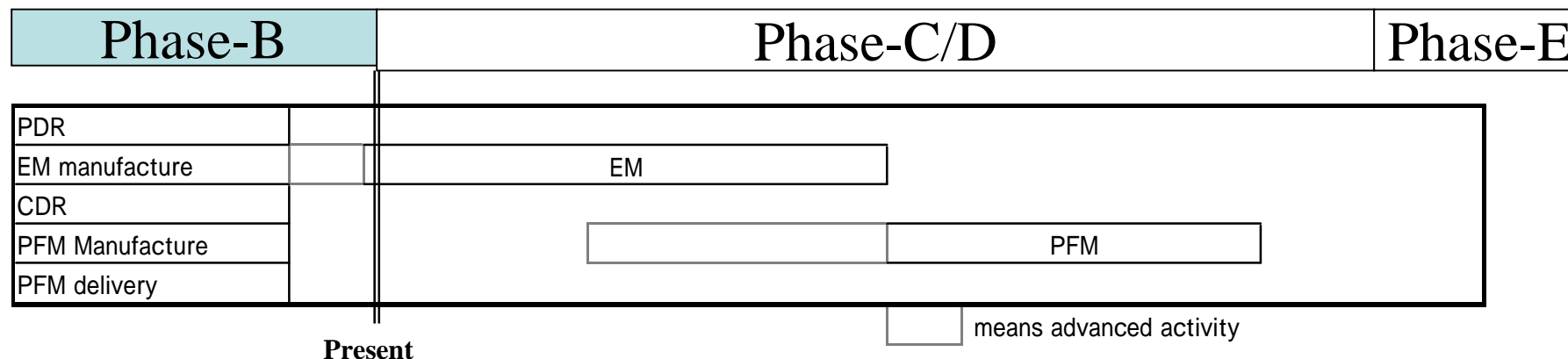


Figure 1. Structure of research activities in the Japanese Science Plan

# Project schedule



- CPR is going to start its Phase C/D after the completion of its PDR in July.
- CPR will ship its flight model to ESA for satellite integration by 2012
- EarthCARE satellite is expected to launch in 2013