

# KMA's Geostationary Meteorological Satellite

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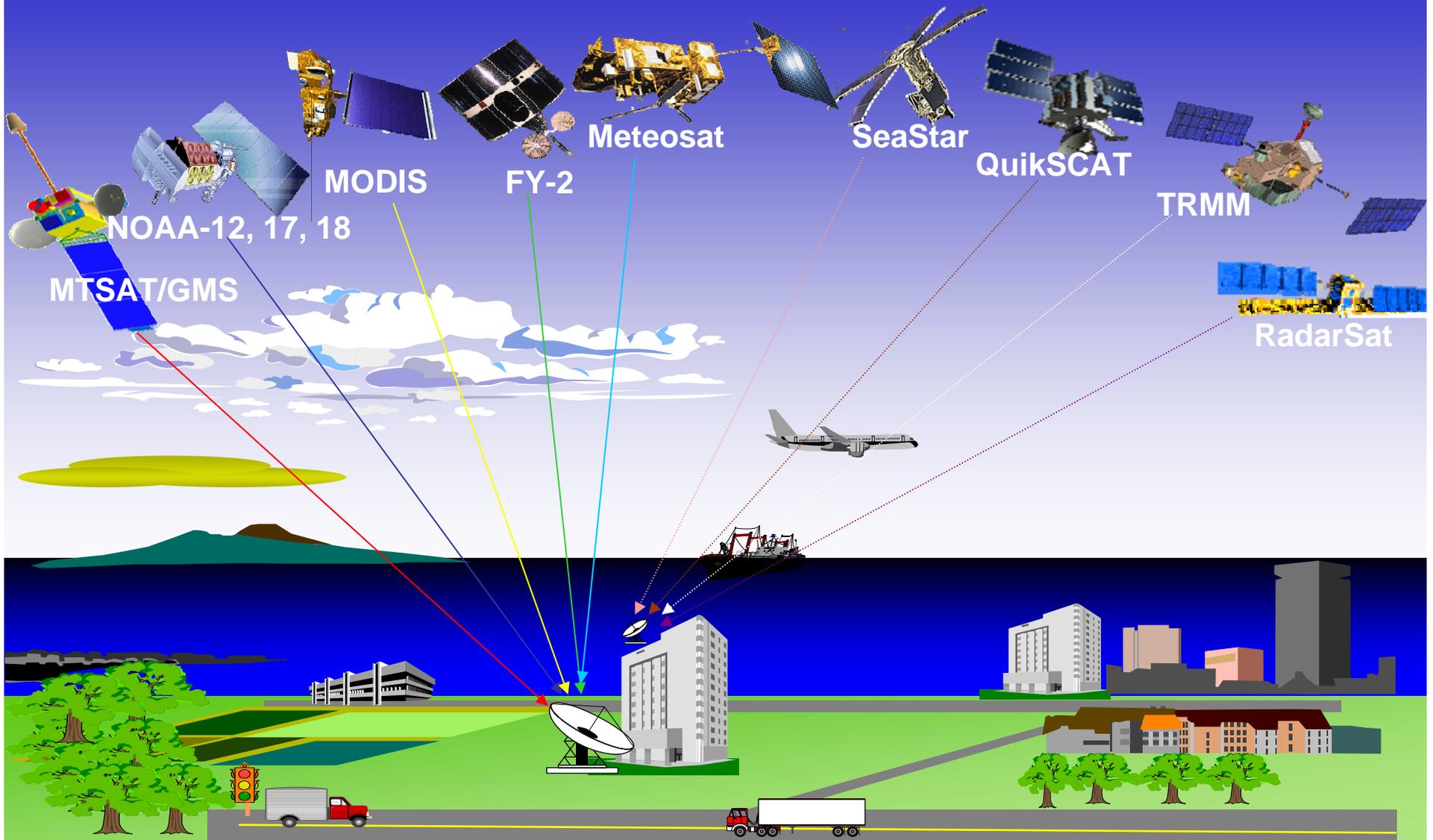
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*5<sup>th</sup> GOES-R Users' Conference*  
*New Orleans, LA, January 23, 2008*



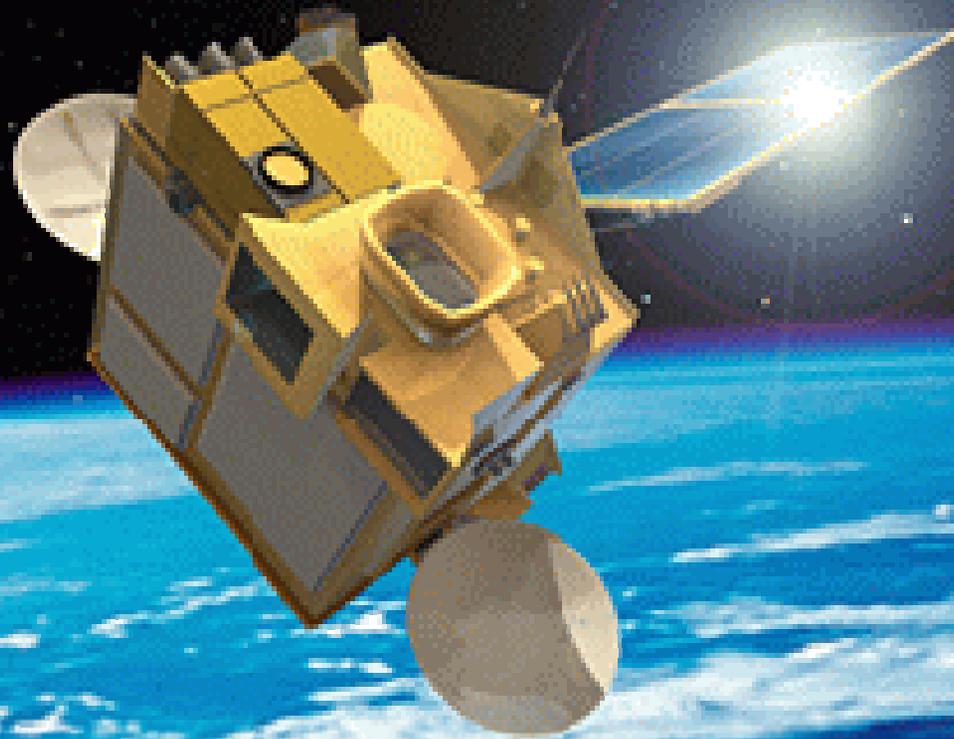
# Current KMA receiving Satellite



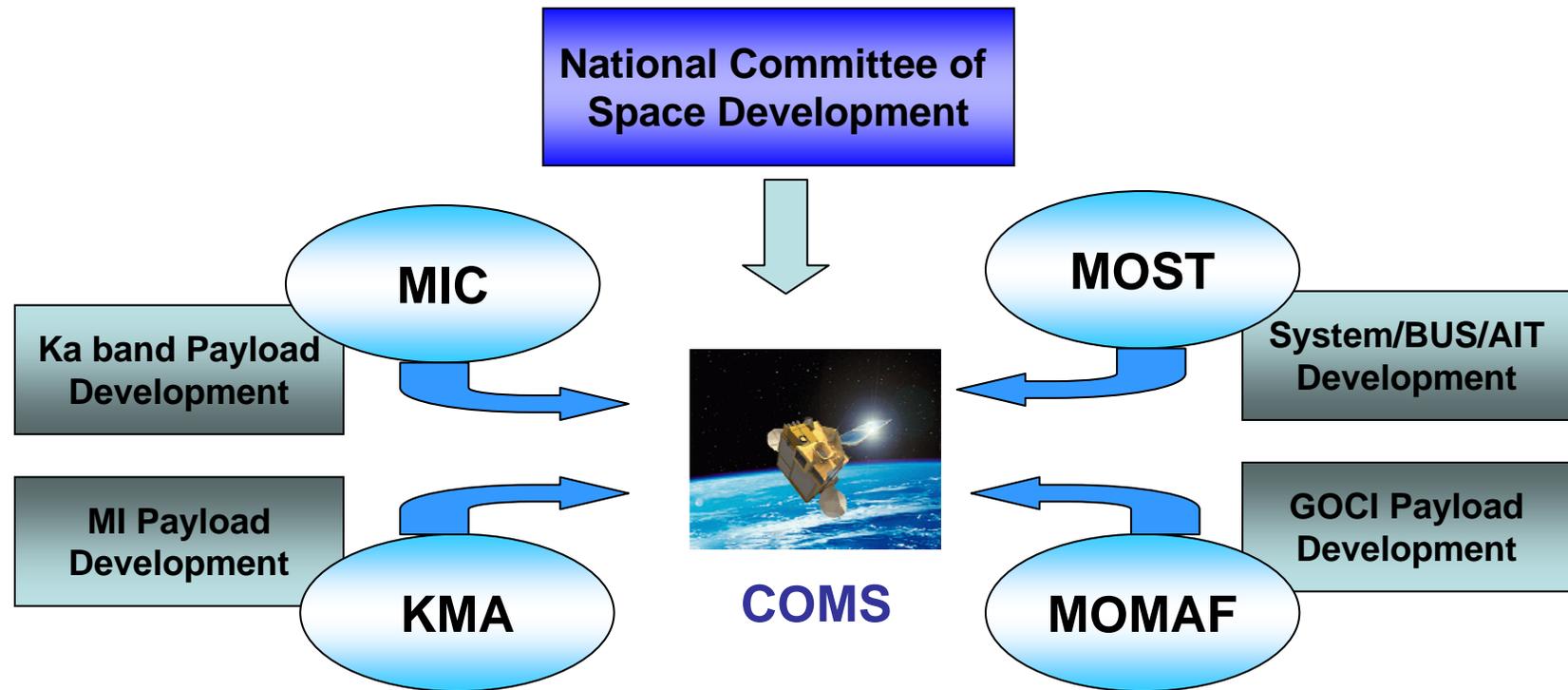
# COMS 2009

(Communication, Ocean, Meteorological Satellite)

: Korea's First Meteorological Satellite



# Korean governmental Strategy for COMS Development



- **MOST** : Ministry of Science and Technology
- **MIC** : Ministry of Information and Communication
- **MOMAF** : Ministry of Maritime Affairs and Fisheries
- **KMA** : Korea Meteorological Administration





# Mission Objective of COMS



## Weather Monitoring Mission

- Continuous monitoring of imagery and extracting of meteorological products with high-resolution and multi-spectral imager
- Early detection of special weather such as storm, typhoon, yellow sand
- Monitoring of long-term change of sea surface temperature and cloud

## Ocean Monitoring Mission

- Monitoring of marine environments around the Korean peninsula
- Production of fishery information (Chlorophyll, etc.)
- Monitoring of long-term/short-term change of marine ecosystem

## Satellite Communication Mission

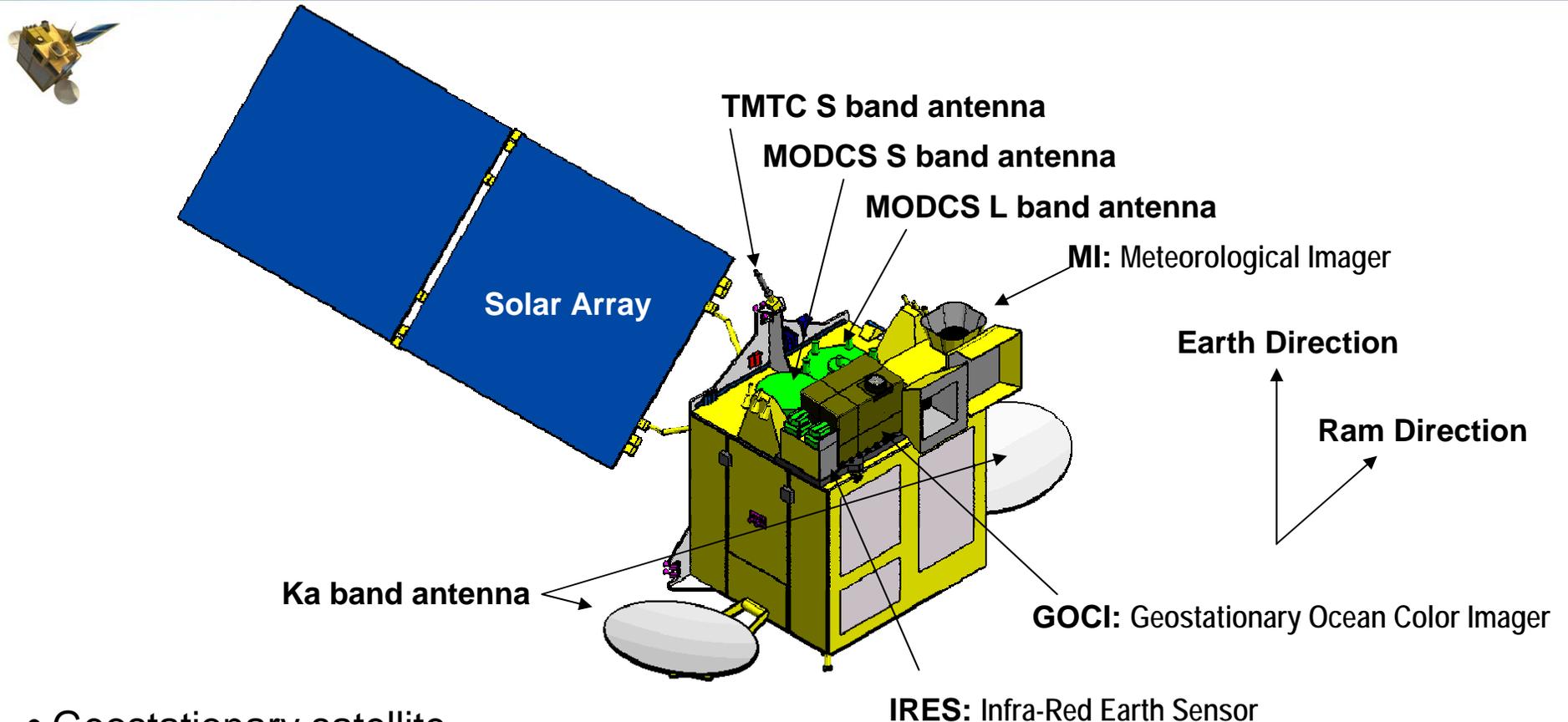
- In-orbit verification of developed communication technologies
- Experiment of wide-band multi-media communication service



# History of COMS development



# COMS Flight Configuration

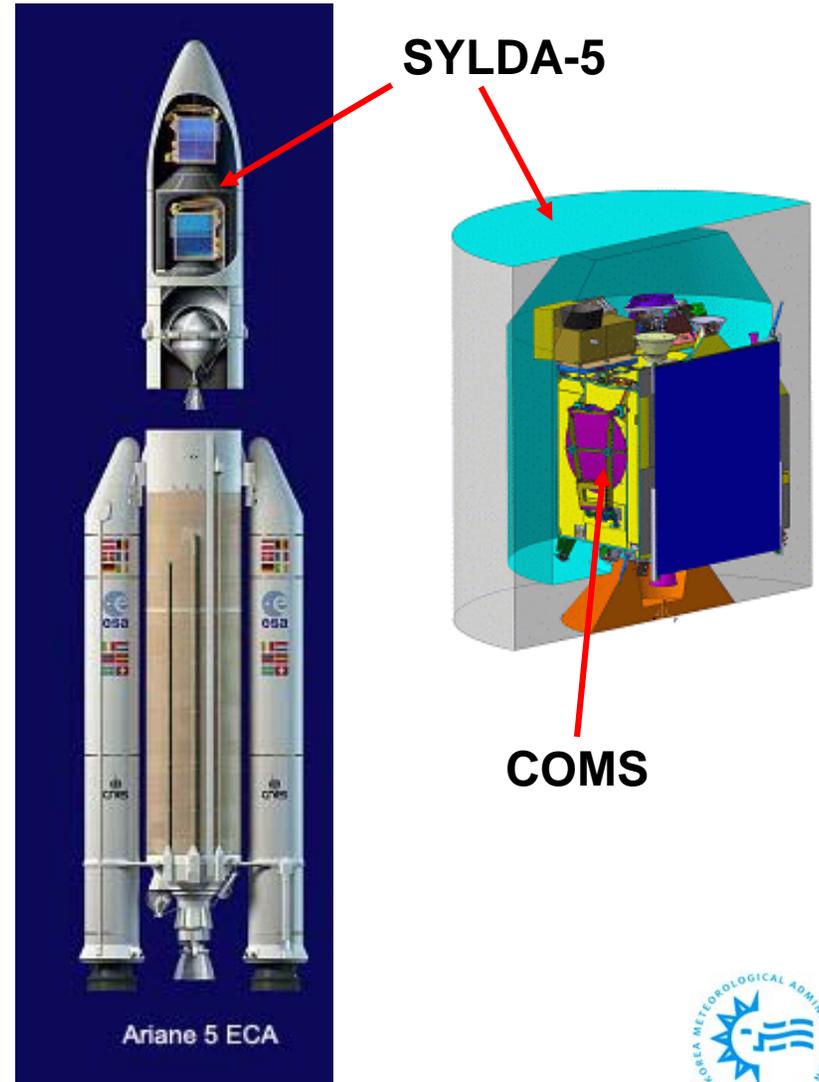
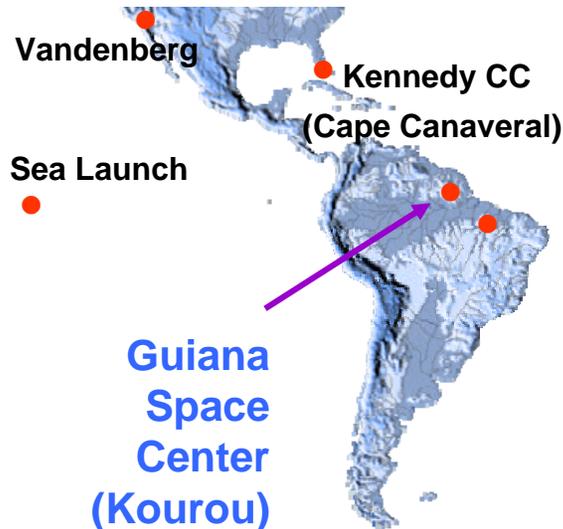


- Geostationary satellite
- Mass at launch: 2500 kg
- Design life time: 10 years
- Operational life: 7.7 years from launch
- Launcher: Ariane 5



# Launcher: Ariane 5 ECA

- Dual launch configuration
- Launch Mass  
: Max 9200 kg for GTO  
(COMS - 2500kg)
- Lower position for COMS



# Current Status of COMS/MI Development



## Structure Model of COMS



COMS MI Integration





# System Requirement



## Satellite Lifetime

- Operational Life > 7 years from the end of In-Orbit-Test period
- Design Life > 10 years

## Spacecraft Stabilization

- 3-axis Stabilized Spacecraft for monitoring any regions at any time

## Reliability

- > 0.8 for Meteorological Mission at End of Life
- > 0.75 for the Ocean Monitoring Mission at End of Life
- > 0.85 for Communication Payload based on 12 years of Design Life

## Orbital Location

- Geosynchronous Orbit at 128.2E



# GOCI Requirement



Item	Requirements					
Spatial Resolution	500m X 500m ( $\pm 10\%$ )					
Coverage	2,500km X 2,500km					
No. of Band	8 Visible bands					
	Band Center [nm]	Band Width [nm]	Nom. Rad [ $\text{Wm}^{-2} \text{um}^{-1}\text{sr}^{-1}$ ]	Max. Rad. [ $\text{Wm}^{-2} \text{um}^{-1}\text{sr}^{-1}$ ]	NEdL	SNR
Band Center	412	20	100	150.0	0.100	1,000
Band Width	443	20	92.5	145.8	0.085	1,090
Nominal Radiance	490	20	72.2	115.5	0.067	1,170
Max Radiance	555	20	55.3	85.2	0.056	1,070
NEdL	660	20	32.0	58.3	0.032	1,010
SNR	680	10	27.1	46.2	0.031	870
	745	20	17.7	33.0	0.020	860
	865	40	12.0	23.4	0.016	750
MTF	$\geq 0.3$ at Nyquist frequency					
Dynamic Range	$\geq 11\text{bit}$					
Sensor Calibration	- Calibration type : Solar Calibration - Accuracy of Radiometric Calibration : $\leq 3\%$					
Number of observation	<ul style="list-style-type: none"> <li>• 10:00 ~ 17:00 : 8 times,</li> <li>• 22:00, 02:00 : 2 times</li> </ul>					



# MI Requirement



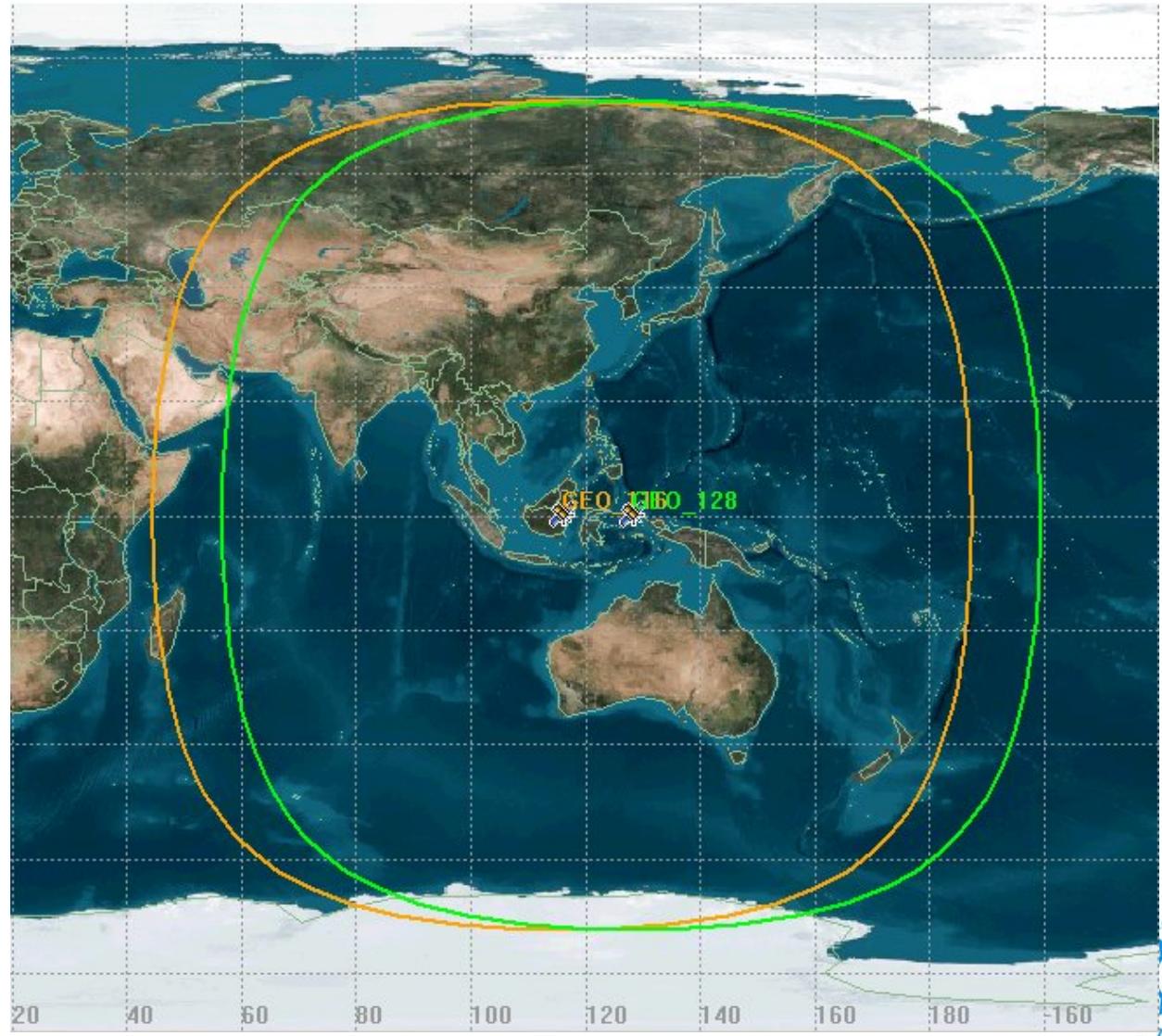
Number of Channels	5ch (Vis-1ch, IR-4ch)		
Digitization	10 bits		
Full Disc Scan Time	< 27min.		
Channel	Spectral band( $\mu\text{m}$ )	IFOV (km)	Application
VIS (Visible)	0.675	1	Daytime cloud imagery Detection of special event (yellow dust, fire, haze, etc.), Atmospheric motion vector
SWIR	3.75	4	Nighttime fog/stratus, Fire detection, Surface temperature
WV (Water Vapor)	6.75	4	Upper atmospheric water vapor, Upper atmospheric motion
WIN1 (Window)	10.8	4	Standard IR split window channel (Cloud, Sea surface temperature, Yellow sand detection)
WIN2 (Window)	12.0	4	Standard IR split window channel (Cloud, Sea surface temperature, Yellow sand detection)



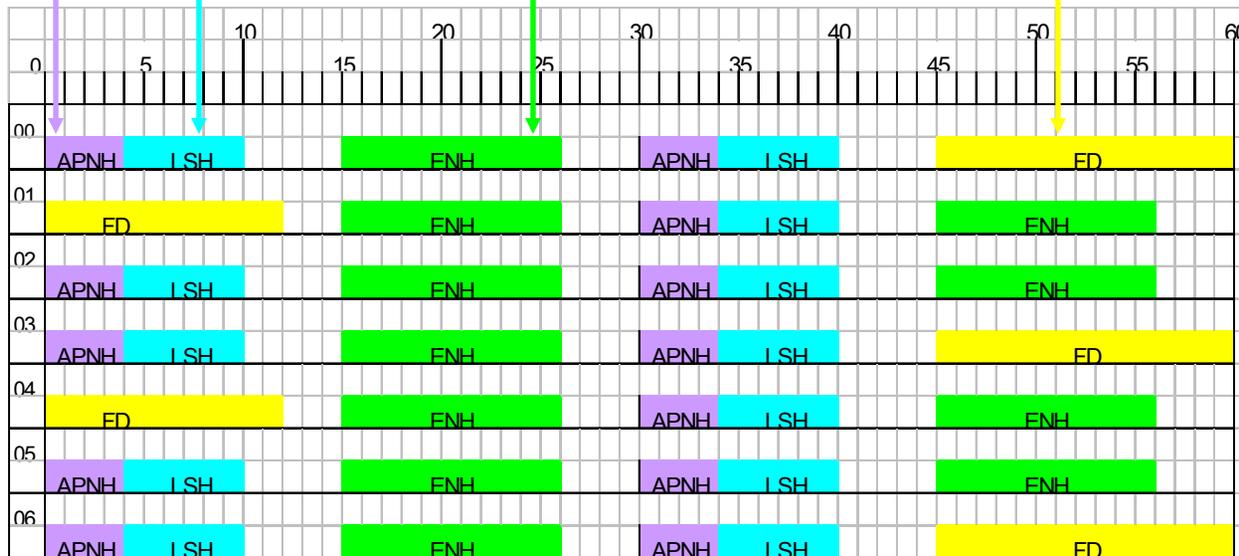
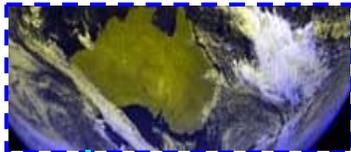
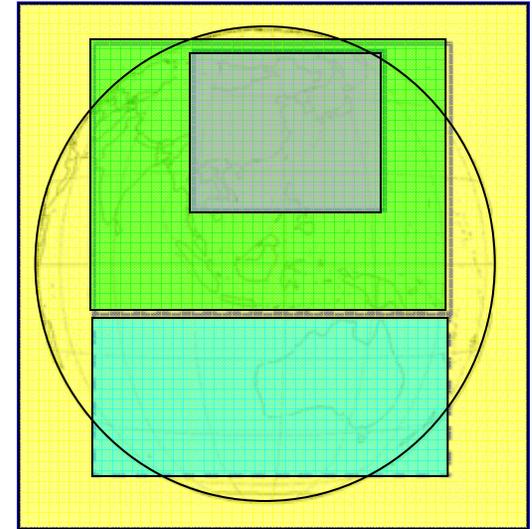
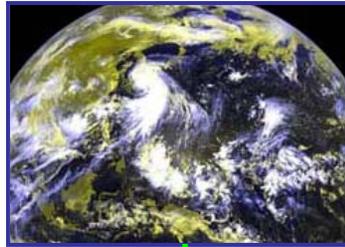
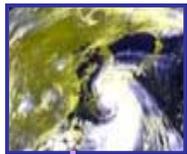
# Processed Data Distribution Coverage



- COMS orbit is **128.2°E**
- COMS will provide HRIT/LRIT service for MI (Meteorological Imager) data



# Provisional COMS/MI Scenario 1 (Normal)

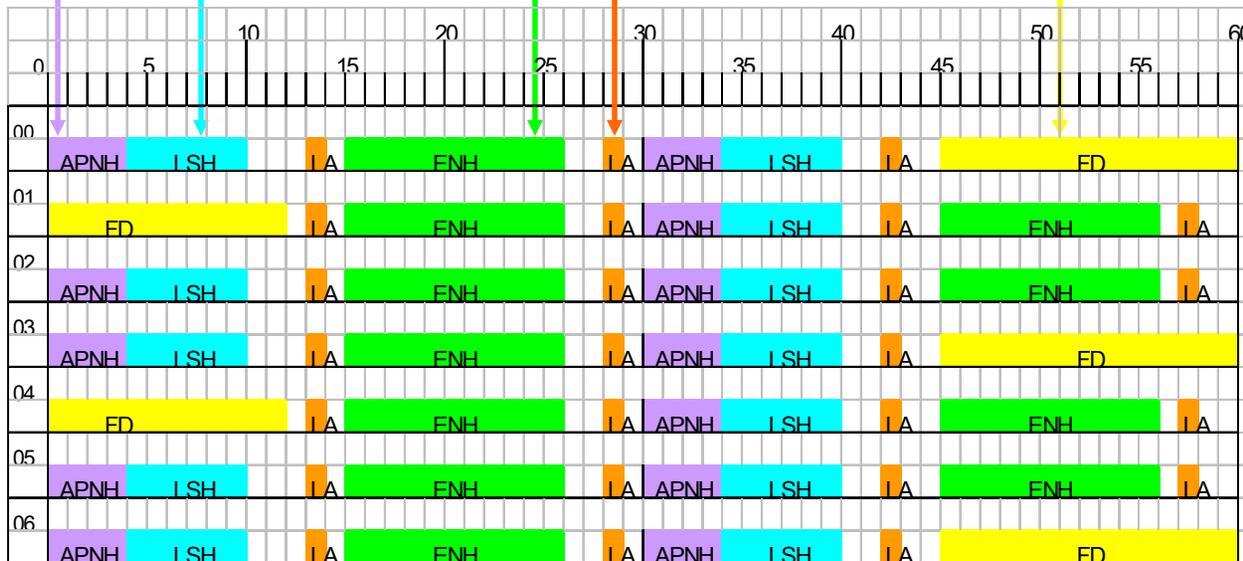
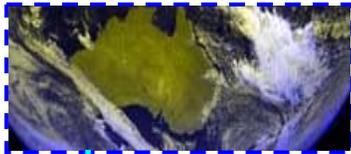
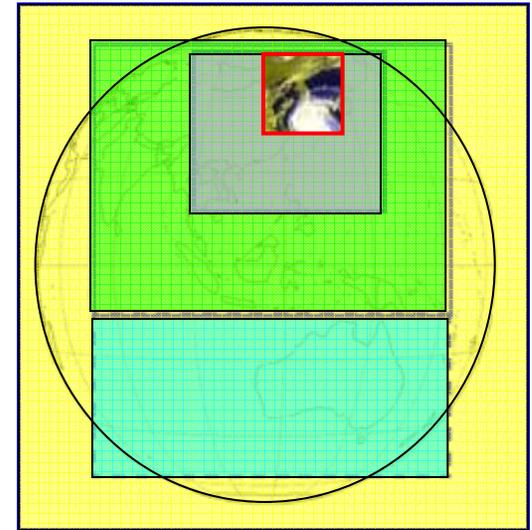
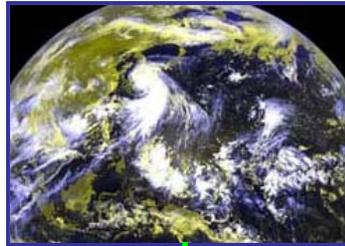
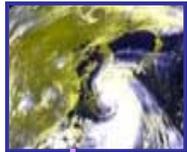


← Normal mode

- Full Disk every 3 hours
- N. Hemi every 30 min.
- East Asia every 15 min.



# Provisional COMS/MI Scenario 2 (Severe Weather)

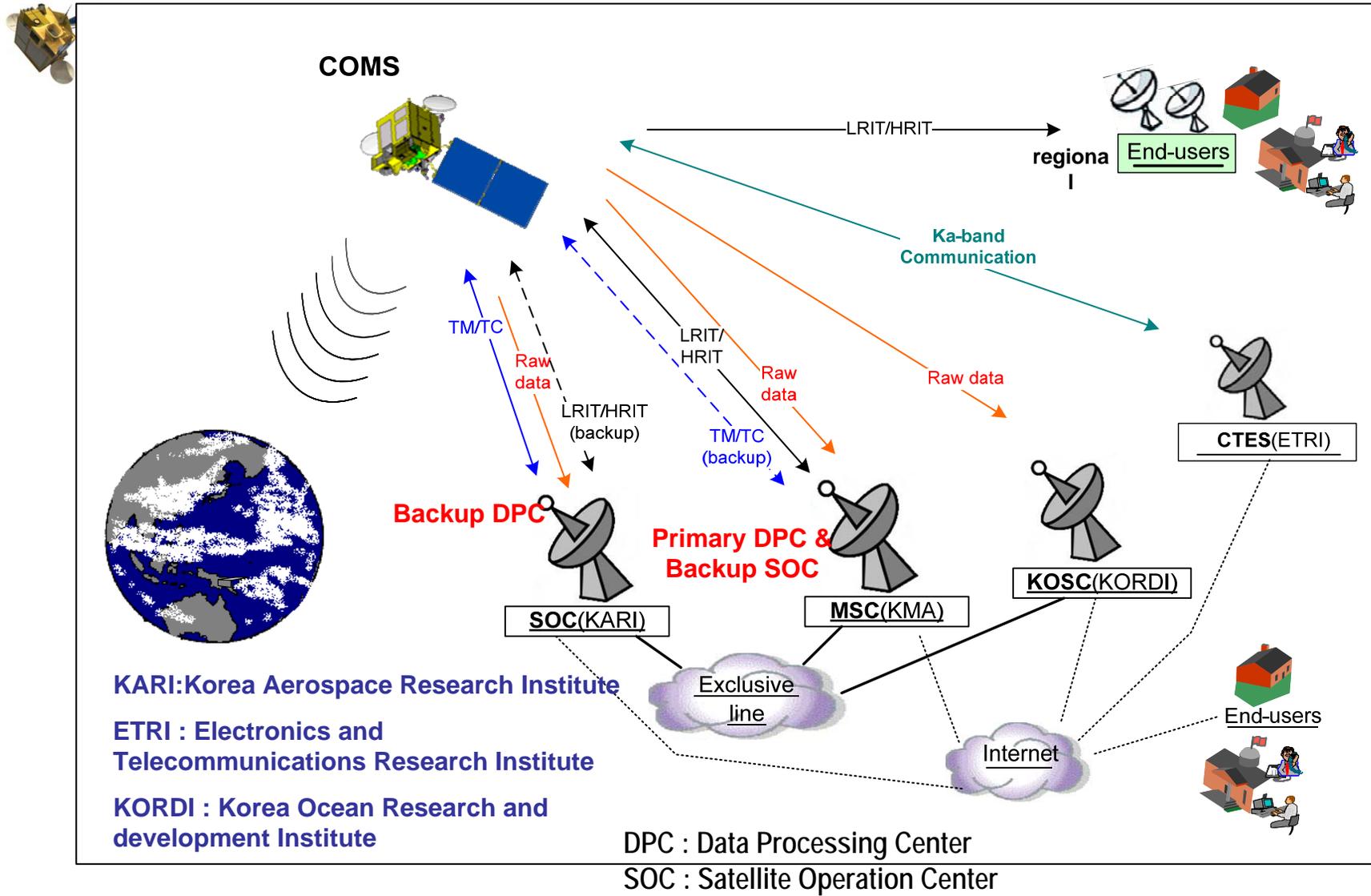


Special mode

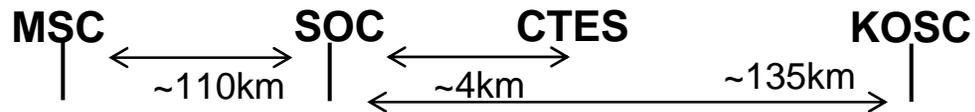
- Full Disk every 3 hours
- N. Hemi every 30 min.
- East Asia every 15 min.
- Korean Penin. every 8min



# Concept of Ground Segment for COMS



# COMS Ground Station Locations



MSC: Meteorological Satellite Center  
SOC: Satellite Operation Center

KOSC: Korea Ocean Satellite Center  
CTES: Communication Test Earth Station





# Baseline for COMS MI Data Distribution



## □ Policy

- Provide MI images and products of a nominal schedule w/ free of charge

## □ How to distribute

- Direct readout through HRIT/LRIT
- KMA internet home page
- To authorized users for L1B data

## □ HRIT

- Complete to disseminate within 15 min from end of observation
- All 5 channels in full resolution

## □ LRIT

- Auxiliary information
  - Conv. Table, Dissemination Schedule, Encryption Information
- GOCI data : 8 times a day w/ size up to 3MB



# MSC Building

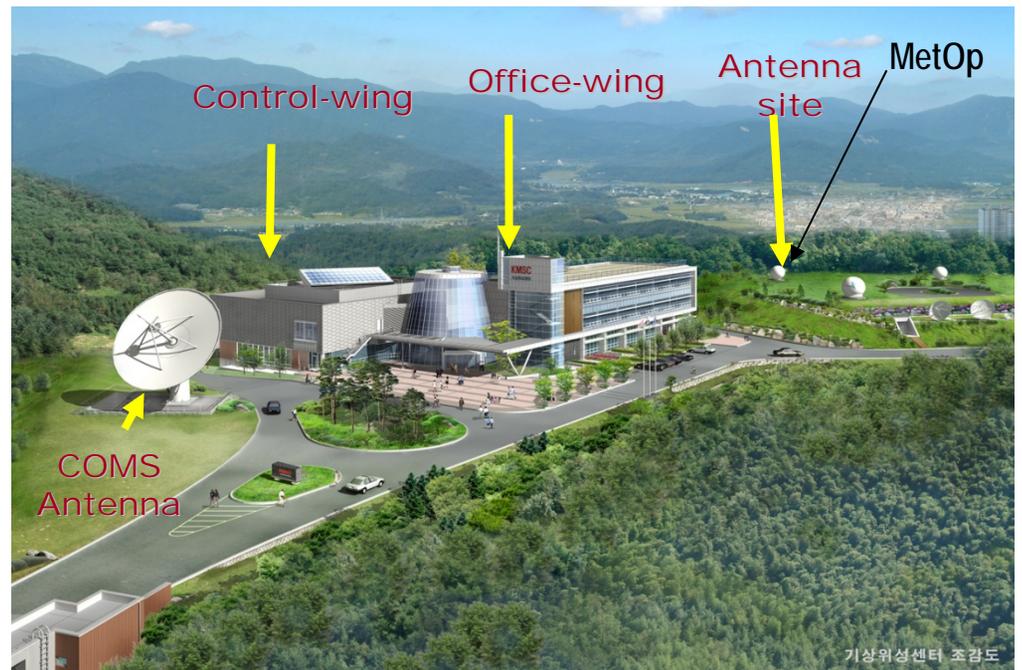


- Main building is under construction (end: mid of 2008)
- Location: Jincheon, 110km south of Seoul
- Major facilities test started at the end of 2007

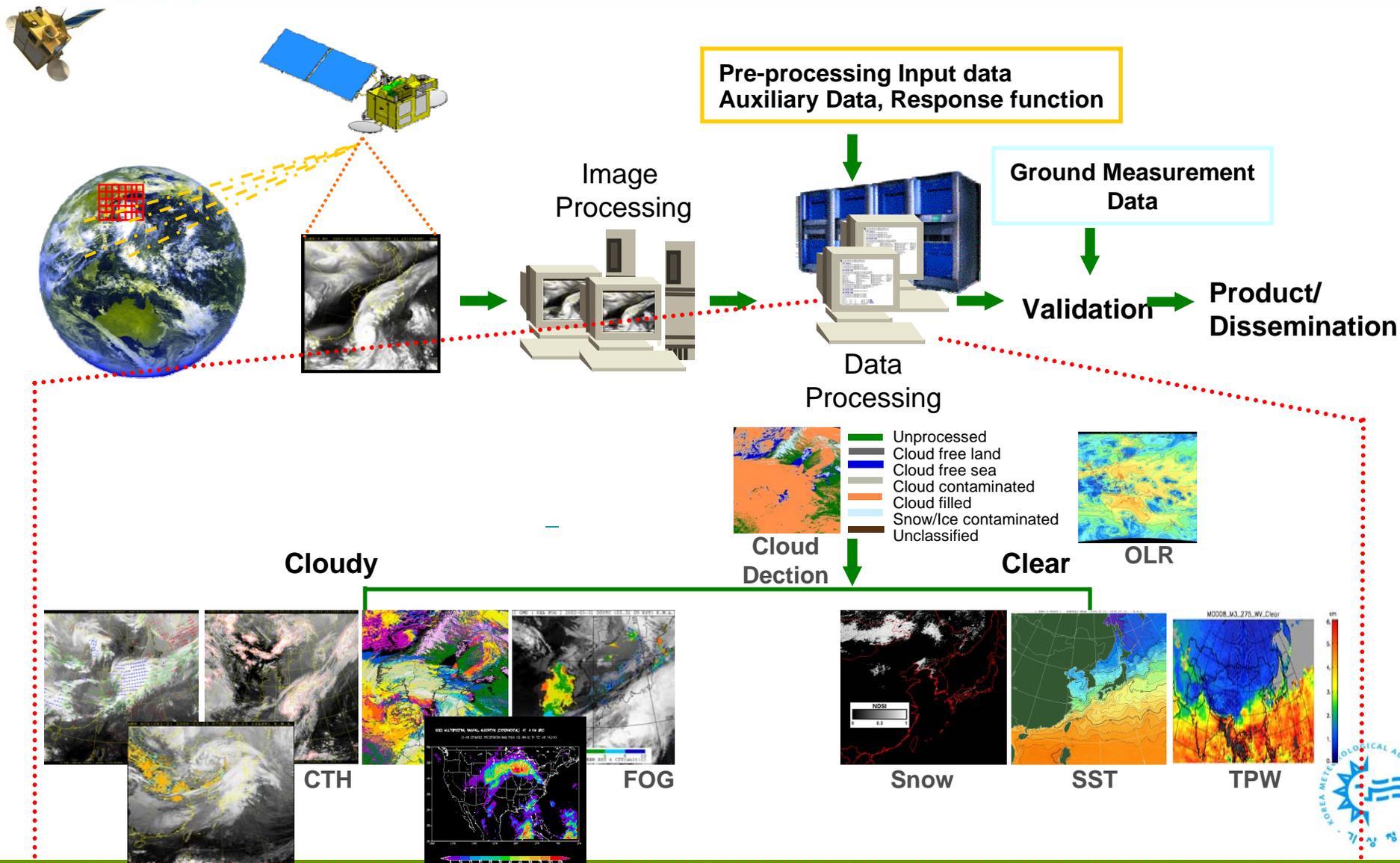
December 2007



A bird-eye's view of MSC



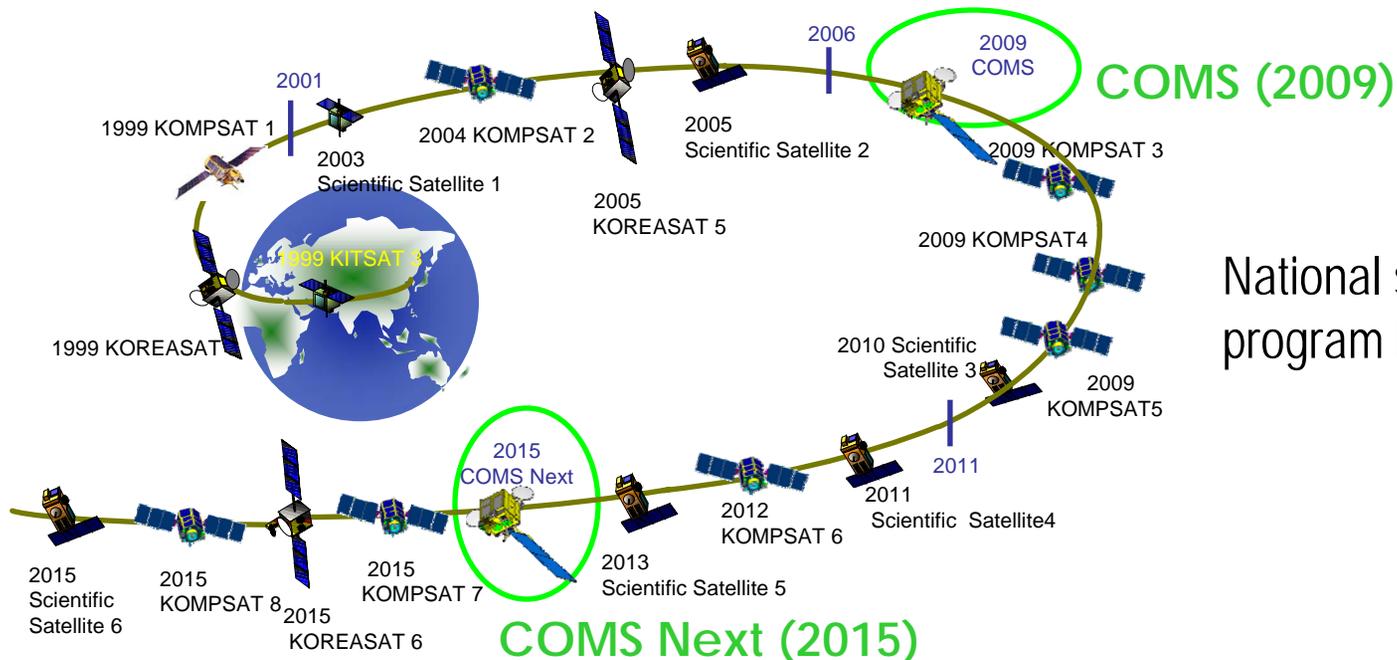
# COMS MI Data Processing System (CMDPS)



# COMS follow-on Satellite Program



- The preliminary study for meteorological mission of the follow-on satellite was finished in 2007.
- The feasibility study for next multi-purpose geostationary satellite is scheduled on August 2008.
- COMS follow-on satellite program is scheduled to begin in 2010, and to be launched in 2015.
- Plan to develop the high performance MI of the next generation satellite.



National space program in Korea



# The First COMS Training Course



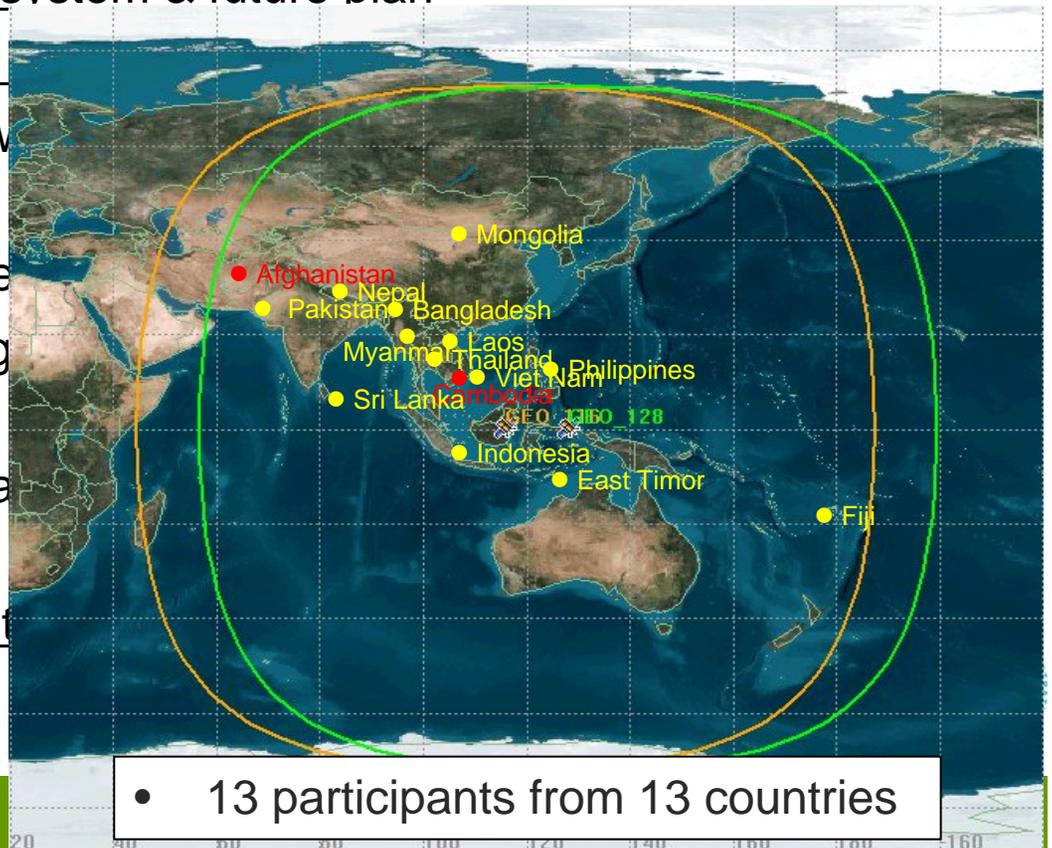
■ **Duration: September 2 - 17, 2007**

■ **Participants : 13 persons from 13 countries in the Asian-Pacific Area**

## ■ Objectives

- ◆ To introduce the COMS system & future plan
- ◆ To make understand the
- ◆ To enhance overall know reception and utilization
- ◆ To improve ability of sate
- ◆ To extend understanding satellite data
- ◆ To apply satellite informa forecasting
- ◆ To form a user communit

■ **Frequency : Every year**





Fifth GOES-R Conference in conjunction with 88th AMS Annual Meeting  
(New Orleans, LA, January 23-24 2008)

# Future Plan



- COMS MI/GOCI Integration into satellite : April 2008
- COMS GS Level Interface Test : Mid 2008
- 2<sup>nd</sup> COMS Training Course : September 2008
- COMS Pre-Shipment Review : Early 2009
- COMS Launch : June 2009
- 1<sup>st</sup> COMS International Users Conference : Late 2009

