

The Current Status of COMS MI Data Processing and Service in NMSC

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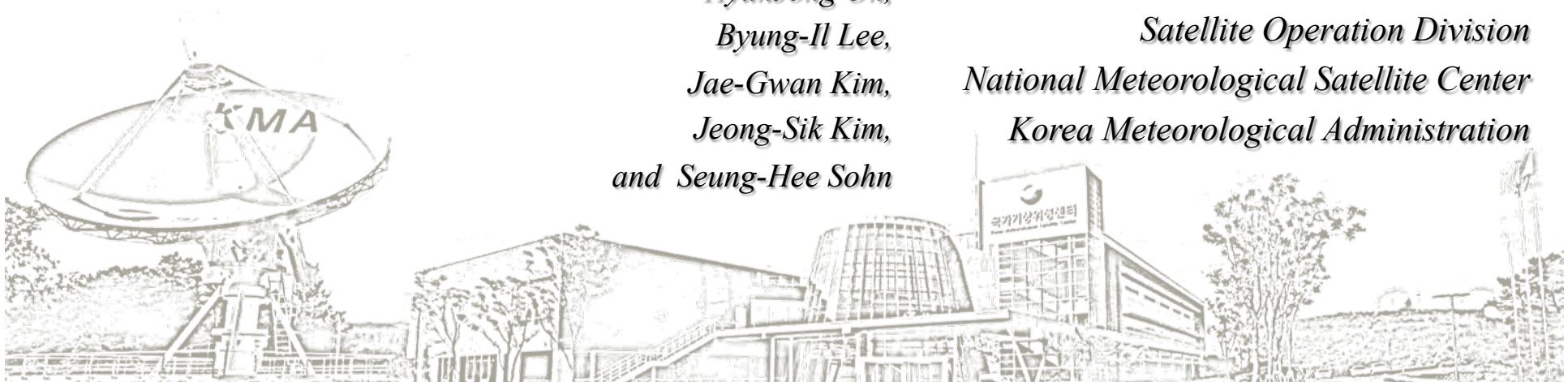
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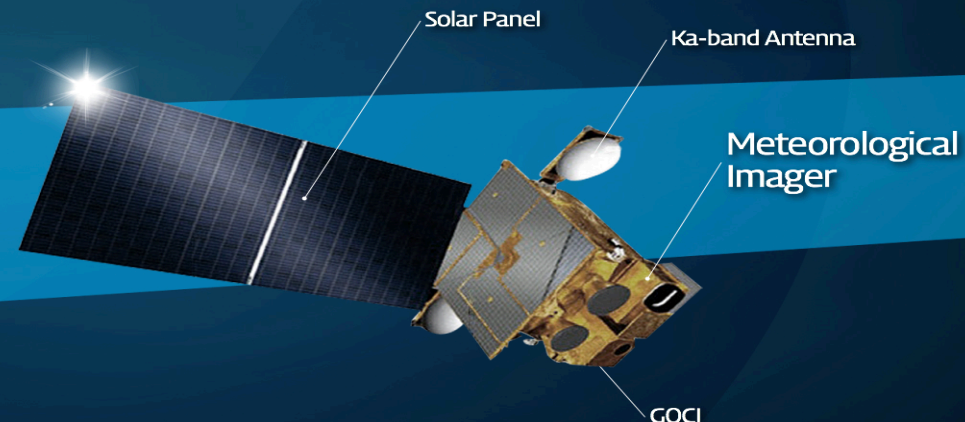
1. Introduction of COMS and MI

COMS Development Program

COMS is the first multi-purpose geostationary satellite for Korea in the application of Meteorology, Ocean and Communication

- Meteorological Mission : Continuous Meteorological Observation to support weather forecasting and early detection of severe weather phenomena
- Period : 2003 - 2010 (8 yrs)
- Orbit : 128.2°E over equator (35,000 km)
- Mass : 2,500 kg
- Design life : 7 years

Communication, Ocean and Meteorological Satellite

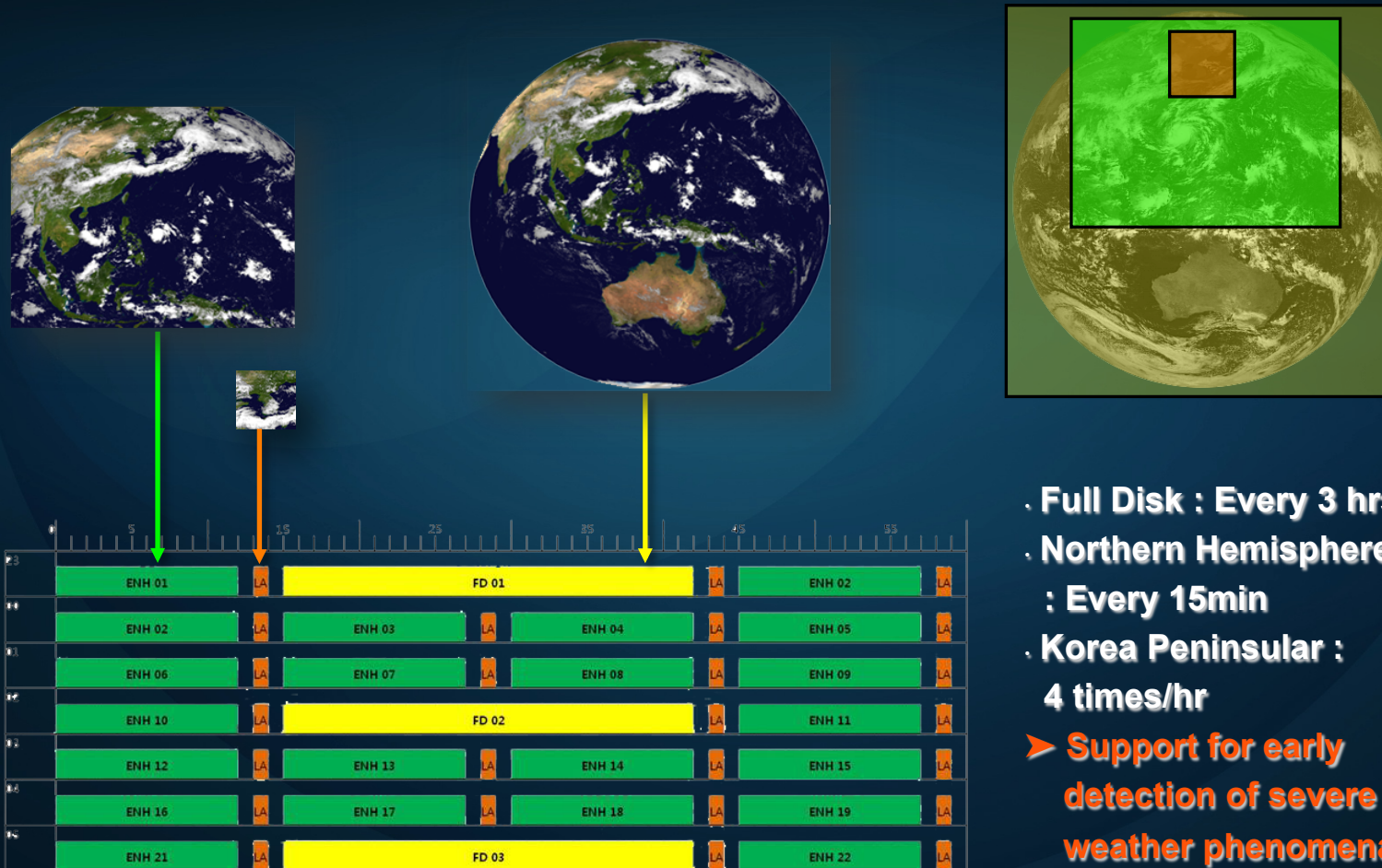


Channel	Band (μm)	Spatial Resolution (km)	Application
Visible	0.55~0.80	1	Cloud, Dust, Fire, Fog detection
SWIR	3.50~4.0	4	Fog, Low Cloud, Fire detection, LST
WV	6.5~7.0	4	Upper Air Humidity & Temperature
IR1	10.3~11.3	4	Cloud & Dust detection, SST, LST
IR2	11.5~12.5	4	Cloud & Dust detection, SST, LST

LST : Land Surface Temperature
SST : Sea Surface Temperature

1. Introduction of COMS and MI

Observation Schedule for COMS



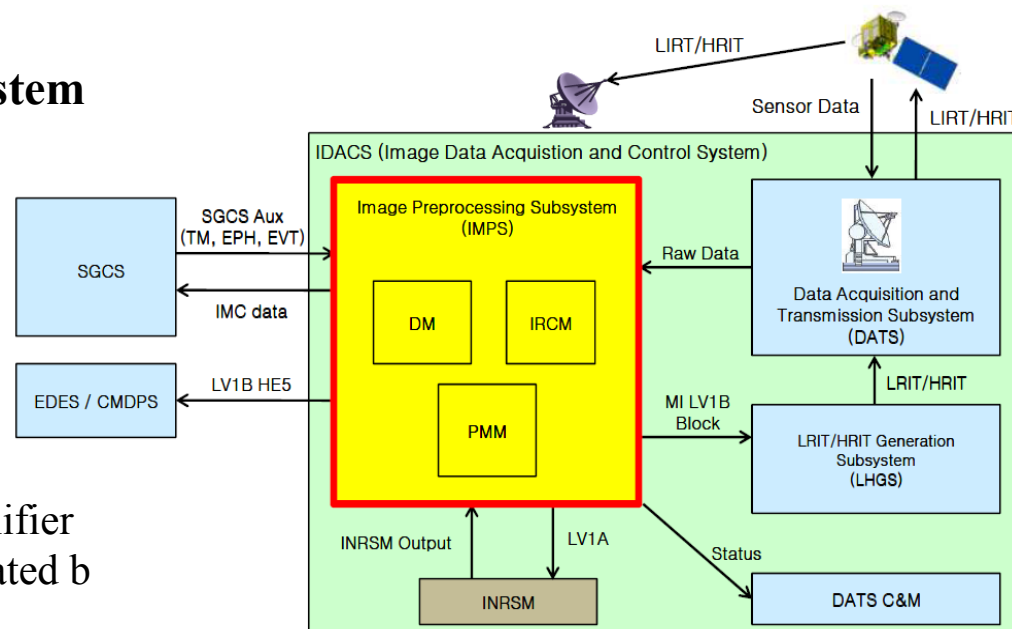
- Full Disk : Every 3 hrs
- Northern Hemisphere : Every 15min
- Korea Peninsular : 4 times/hr
- Support for early detection of severe weather phenomena

2. COMS MI Ground Systems

Image Data Acquisition and Control System

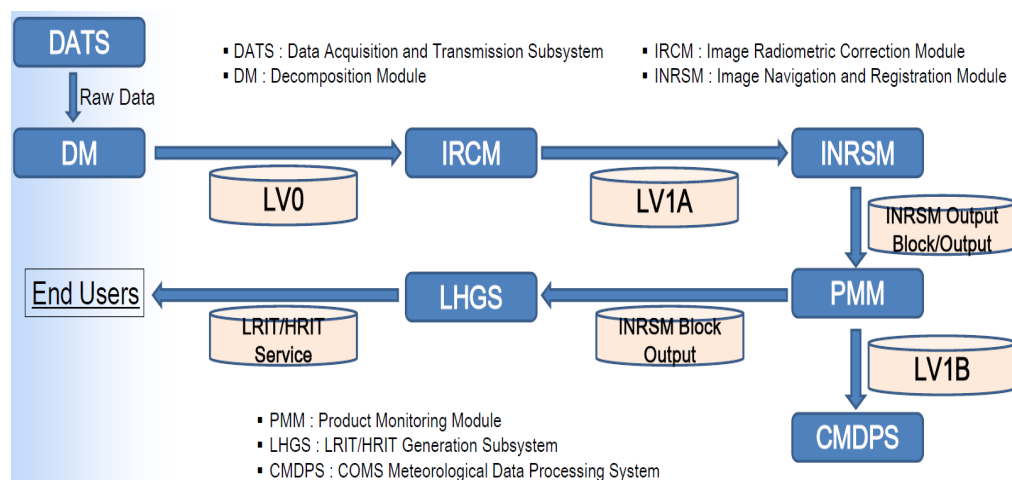
◆ Data Receiving System

- Cassegrain antenna (13m) and Radio Frequency system
- Data Acquisition and Transmission Subsystem (DATS)
- Data signal goes through Low Noise Amplifier and converters after then will be demodulated by Modem B/B



◆ Data Processing System

- Image Preprocessing Subsystem (IMPS)
- Data processed go through the usual procedures with many modules

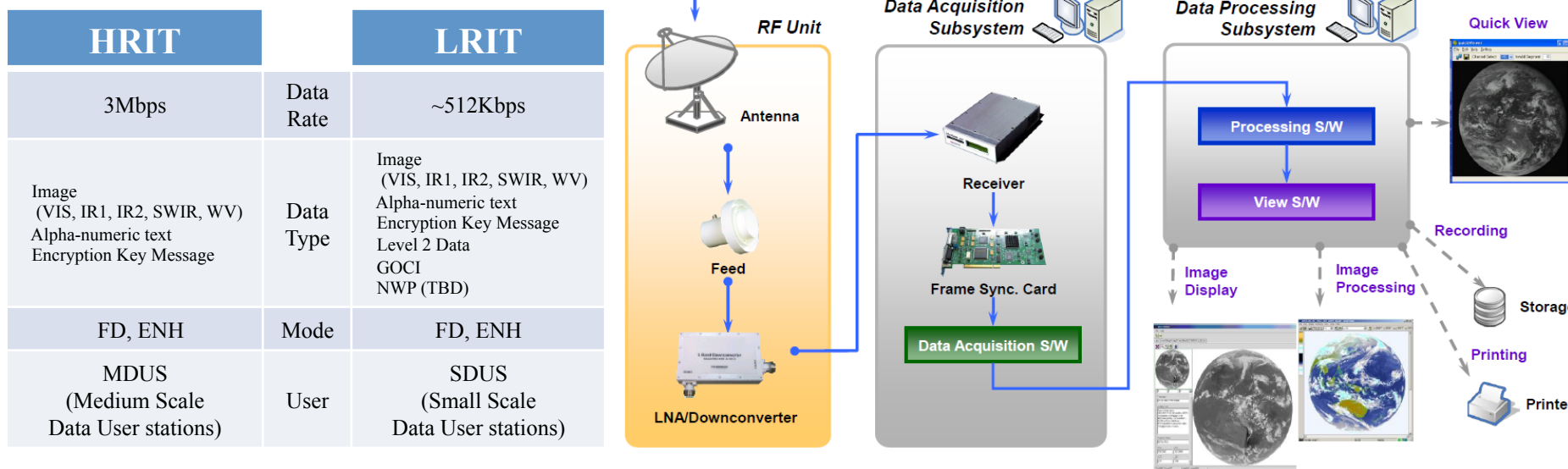
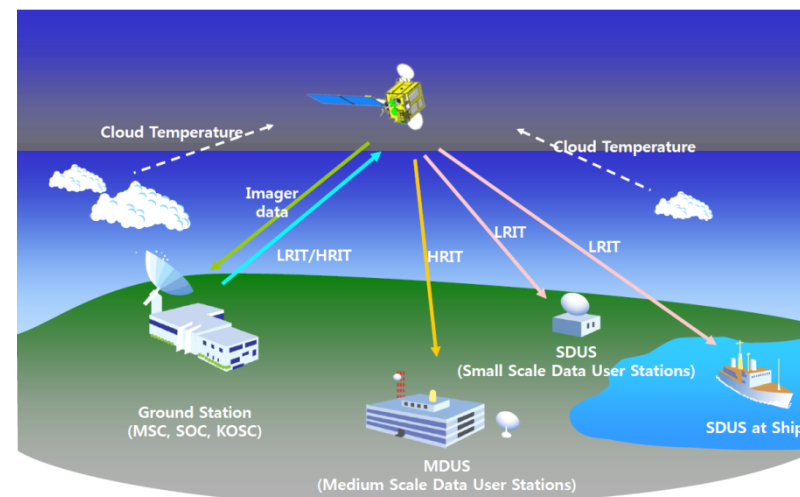


2. COMS MI Ground Systems

Image Data Acquisition and Control System

◆ Data Dissemination System

- L/HRIT Generation Subsystem (LHGS)
- RF systems and Antenna
- User who has M/SDUS can get the data

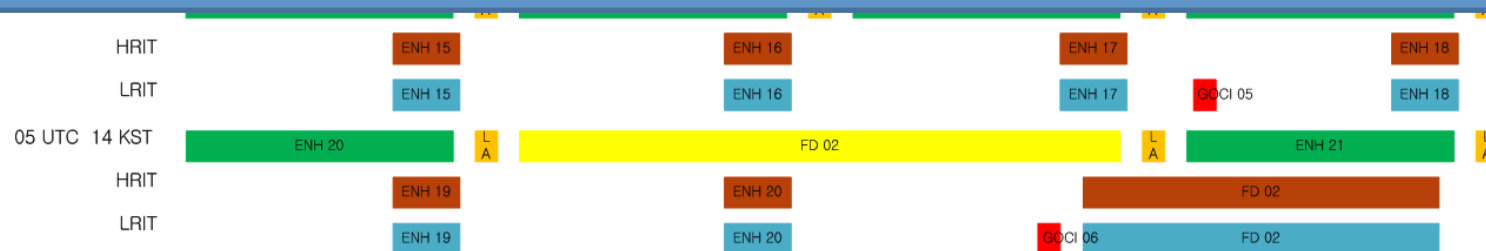


국가기상위성센터
National Meteorological Satellite Center

Timeline diagram showing the sequence of events for the 2015 MERS-CoV outbreak. The timeline is marked in UTC (0 to 60) and KST (00 to 08). Key events include:

- 23 UTC 08 KST: HRIT, LRIT, ENH 01, LA
- 00 UTC 09 KST: ENH 02, LA, ENH 03, LA, ENH 04, LA, ENH 05, LA
- 01 UTC 09 KST: ENH 01, ENH 02, ENH 03, ENH 04
- 02 UTC 09 KST: CTD 08, CTH 08, ENH 01, ENH 02, CTT 08, ENH 03, GDCI 01, ENH 04

- Station keeping (Orbit maintenance) : 2 times/week (N-S(Tue.), E-W(Thr.))
- Wheel Offloading (Attitude maintenance) : 2 times/day (00:45, 06:45, 15:21 UTC)
- Albedo monitoring : 1 time/day (Around 21:35 UTC)
- Dark image observation : 1 time/3 months
- Moon observation : 1 time/month



3. COMS MI Operational Result

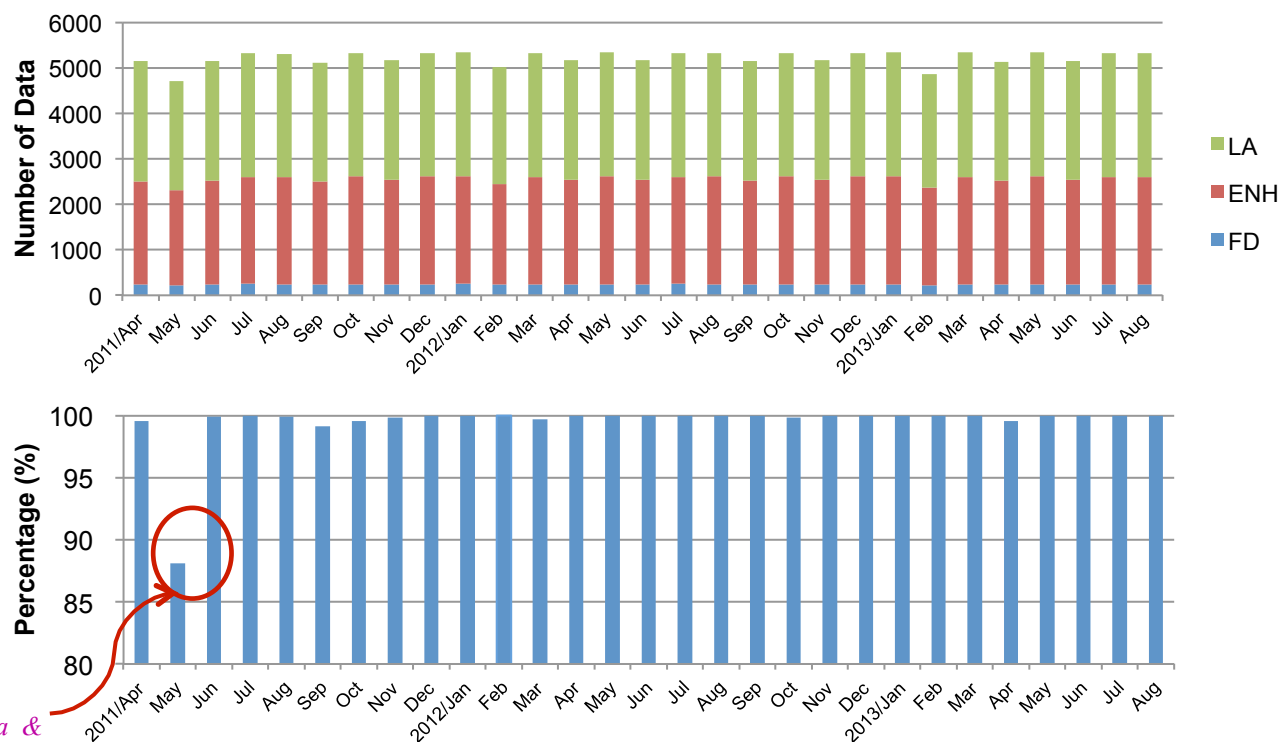
COMS MI operation results in NMSC are based on the data processing and service (dissemination) success rates.

◆ Data Processing Success Rate

- Subject Period: Apr., 2011 ~ Aug., 2013. (29 months)



Processing data	
Success	151,347
Fail	799
Rate (%)	99.47



Maintenance of antenna &
Instability of System ♪

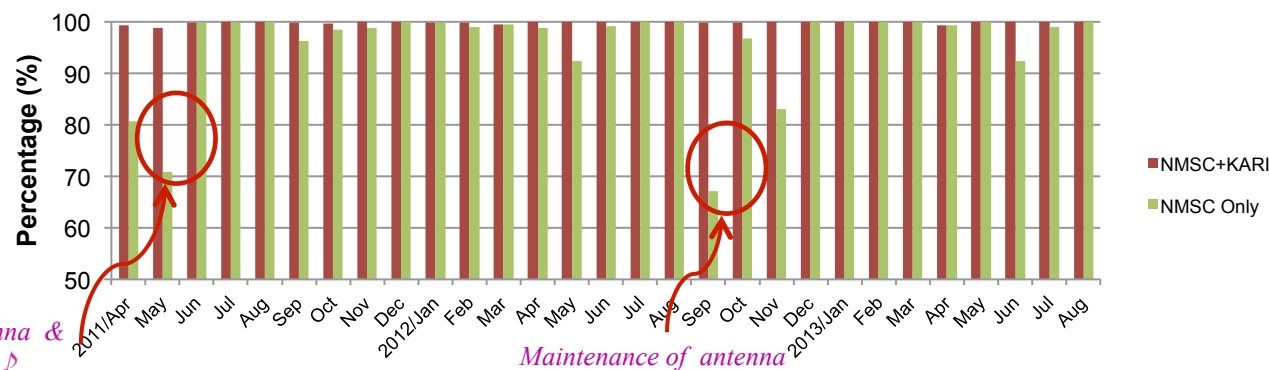
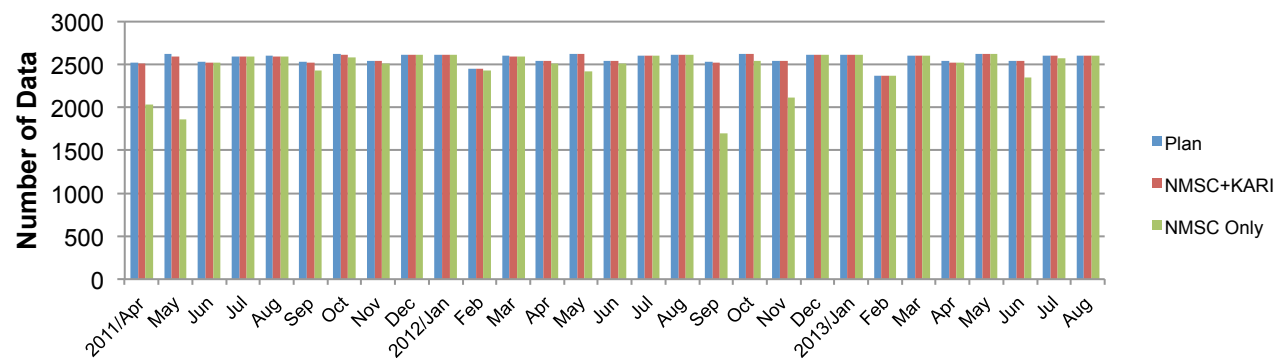
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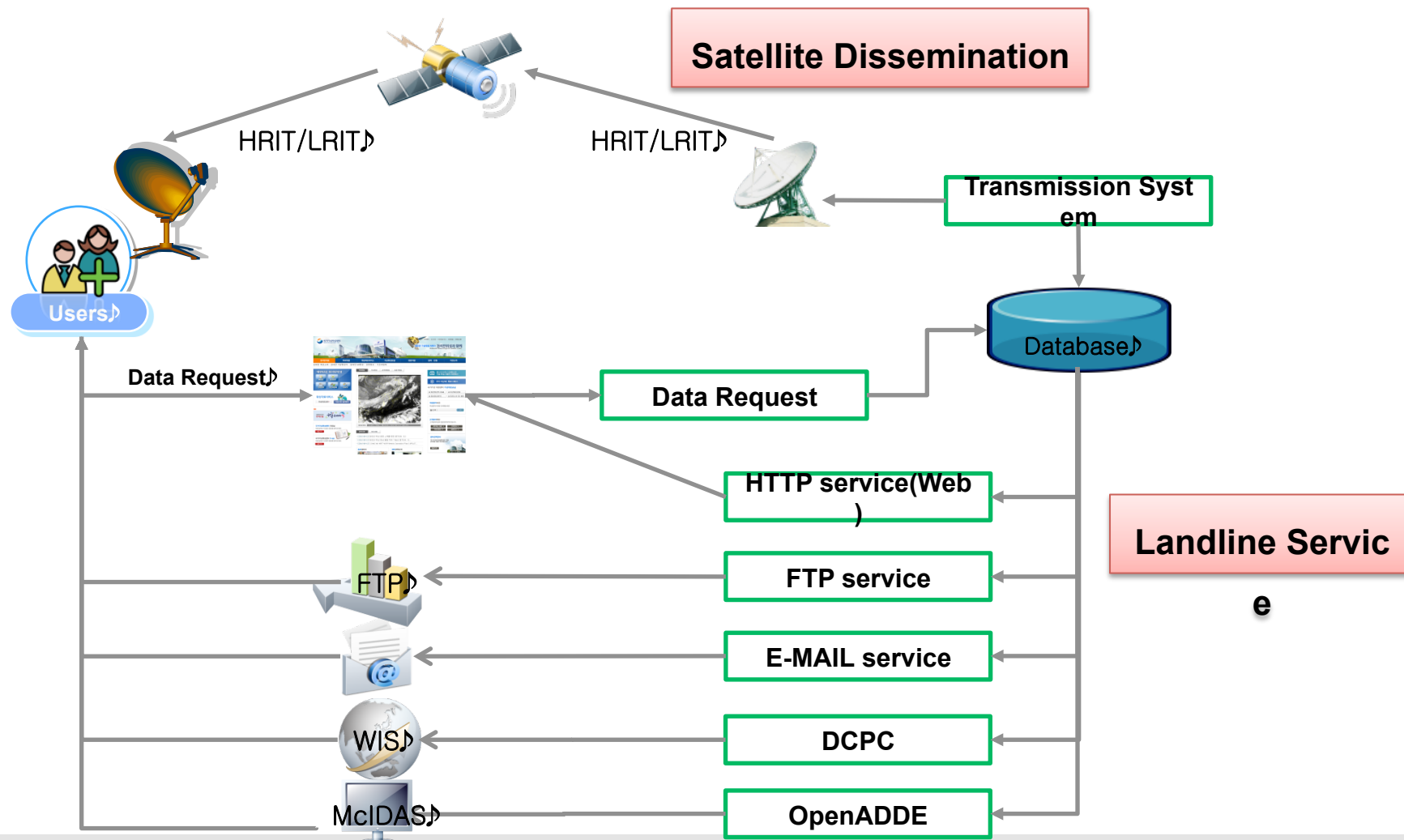
◆ Data Service Success Rate

- Subject Period: Apr., 2011 ~ Aug., 2013. (29 months)

L/HRIT data	NMSC only	NMSC +KARI
Success	71,215	74,404
Fail	3,329	140
Rate (%)	95.53	99.81



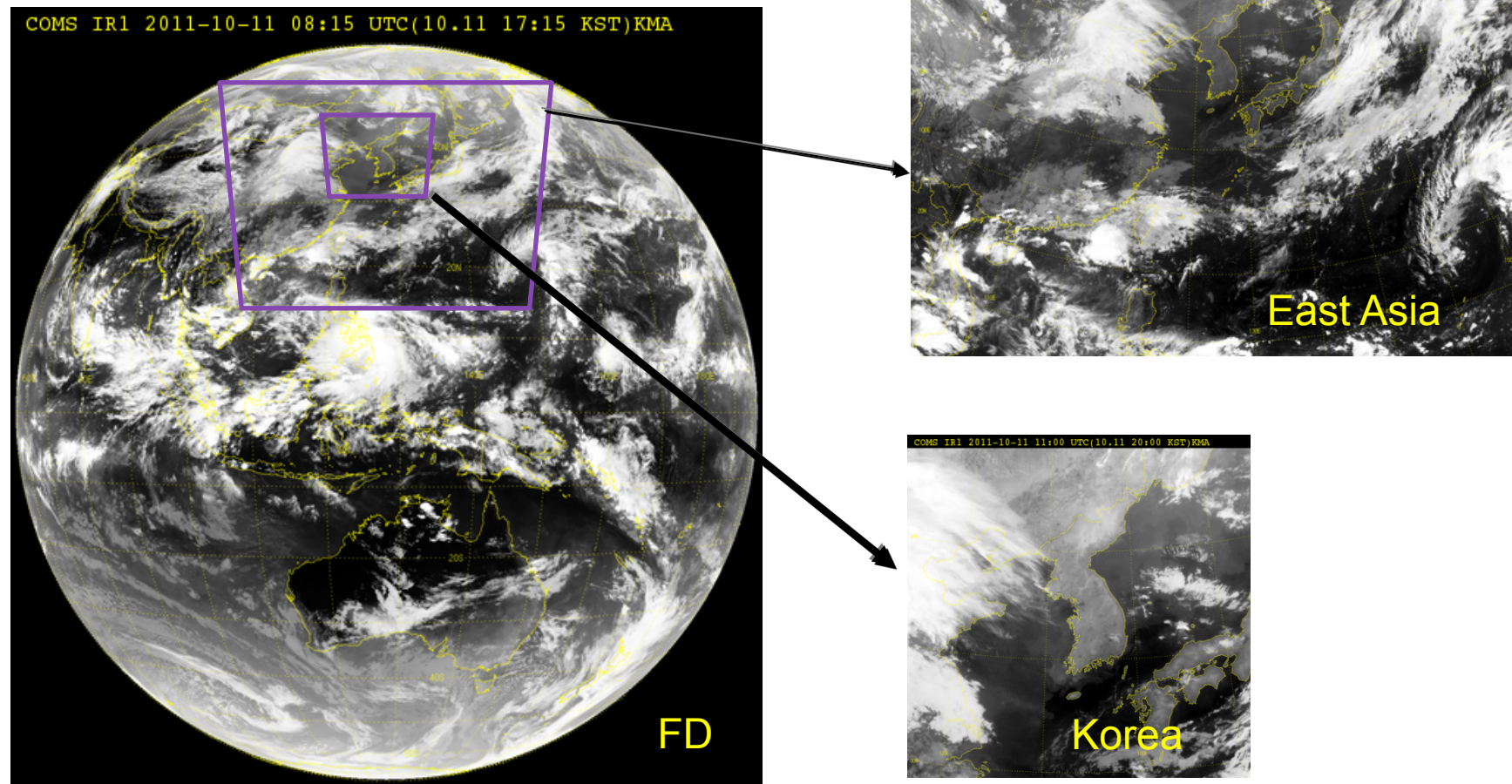
4. COMS MI Data Service : Concept



4. COMS MI Data Service : Image Domain

◆ Service Area and Projection

- Full Disk, Extend Area Northern Hemisphere, East Asia, and Korea
- Polar stereo and Lambert conformal



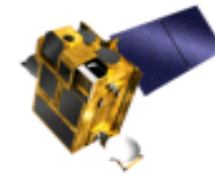
4. COMS MI Data Service : Registration as M/SDUS 국가기상위성센터 National Meteorological Satellite Center

Registration of receiving station and COMS MI Data decryption process

<http://nmssc.kma.go.kr>

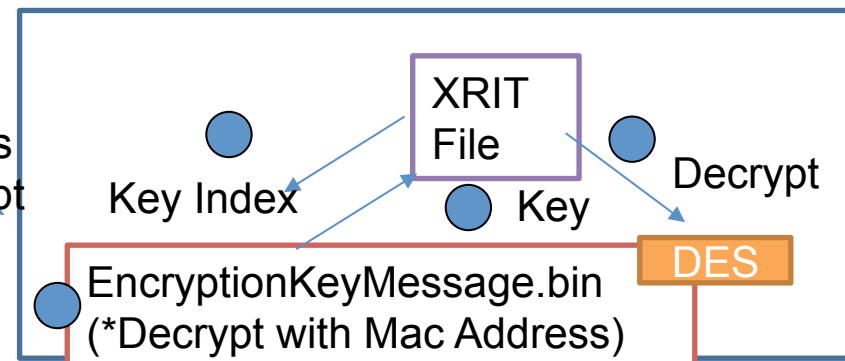


Join NMSC Web site
Registration of receiving station



Encrypted XRIT File

Receive EncryptionKeyMessage.bin by e-mail (*Encrypted)



<MDUS/SDUS User>

4. COMS MI Data Service : Website

The NMSC provides COMS level 1B data of all five channels and level 2 products to users by posting the processed data on NMSC website (

<http://nmsc.kma.go.kr/jsp/eng/contents/main/main.jsp>).

All registered members of the website can log on, search, and download COMS data once the formal request is approved. Here is the list of COMS meteorological products open to users.

Products	Resolution	Period	Start Date of Service
Cloud analysis (cloud type, phase and amount)	4 km	15 min.	1 Apr. 2011
Cloud top pressure/temperature/height (CTP/CTT/CTH)	4 km	15 min.	
Atmospheric Motion Vector (AMV)	64 km	1 hour	
Cloud detection (CD)	4 km	15 min.	
Fog (FOG)	4 km	15 min.	
Aerosol index (AI)	4 km	15 min.	
Sea surface temperature (SST)	4 km	1-, 5-, 10-day composition	10 Aug. 2011
Rain intensity (RI)	4 km	15 min.	
Outgoing longwave radiation (OLR)	4 km	1 day	
Upper tropospheric humidity (UTH)	36 km	15 min.	
Land Surface Temperature(LST)	4 km	15 min.	10 Feb. 2012
Snow and Sea Ice (SSI)	4 km	1 day/8 day	
Total Precipitation (TP)	4 km	15 min.	
Clear Sky Radiance (CSR)	28 km	15 min.	

4. COMS MI Data Service : DCPC-NMSC

NMSC accomplished the construction of DCPC- NMSC and started normal operation on 29th March 2013 for providing COMS MI data as below list

- All five channels level 1B in binary and graphic file format
- Ten level 2 products in binary and graphic file format
 - (1) Cloud detection
 - (2) Land surface temperature
 - (3) Total precipitable water
 - (4) Cloud analysis (cloud top temperature/pressure/height, cloud type, cloud amount, cloud phase, cloud optical thickness)
 - (5) Fog
 - (6) Rainfall Intensity
 - (7) Atmospheric motion vector
 - (8) Sea surface temperature
 - (9) Sea ice/snow cover detection
 - (10) Outgoing longwave radiance

<http://dcpc.nmsc.kma.go.kr>



5. Promotion of COMS MI Data Utilization : Support COMS receiving system

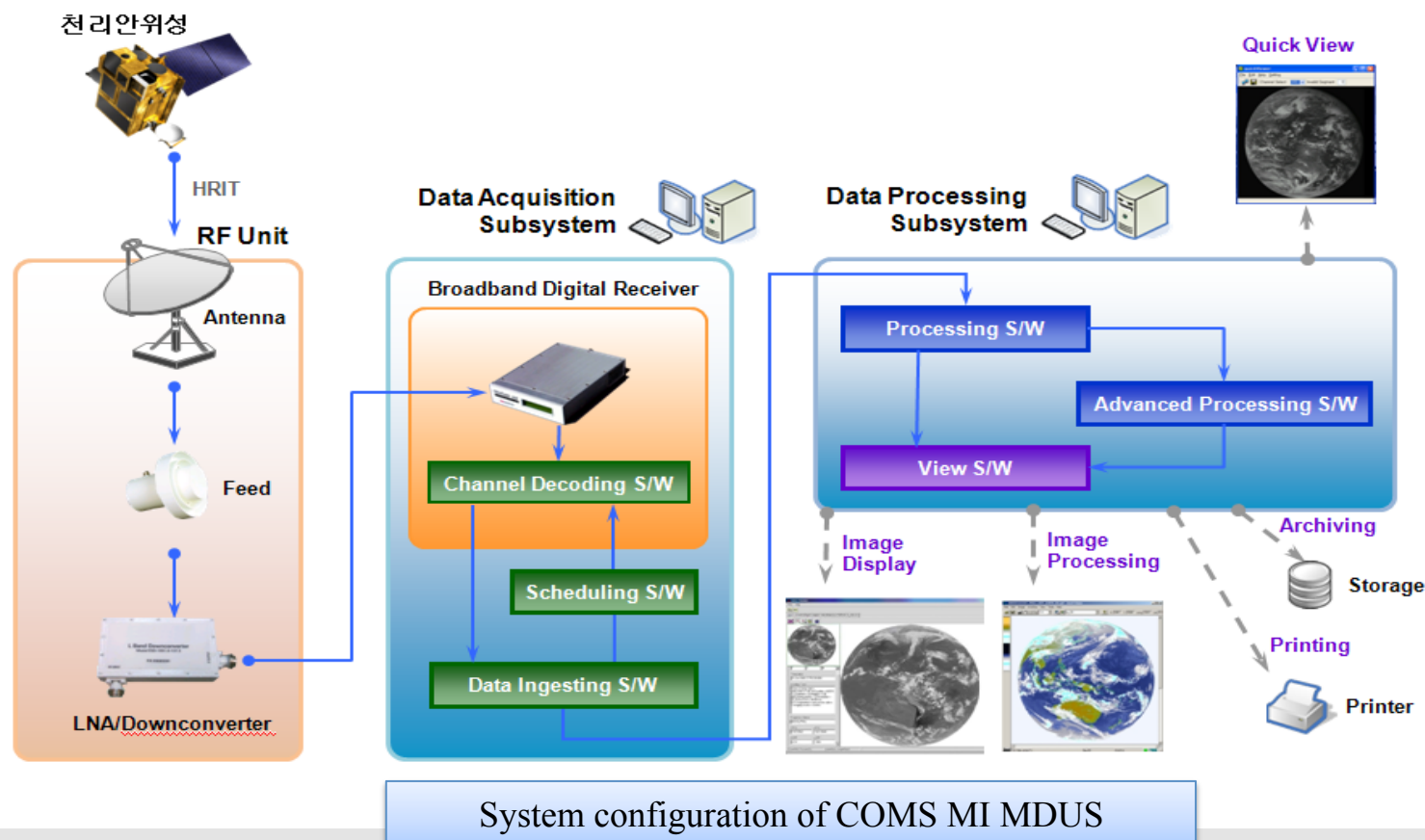
Support MDUS/SDUS installation

-Domestically 9 stations supported by KMA

: Air Force, National Fisheries Research and Develop Institute, Seoul emergency Management Center, etc.

-Internationally 1 station supported by KMA

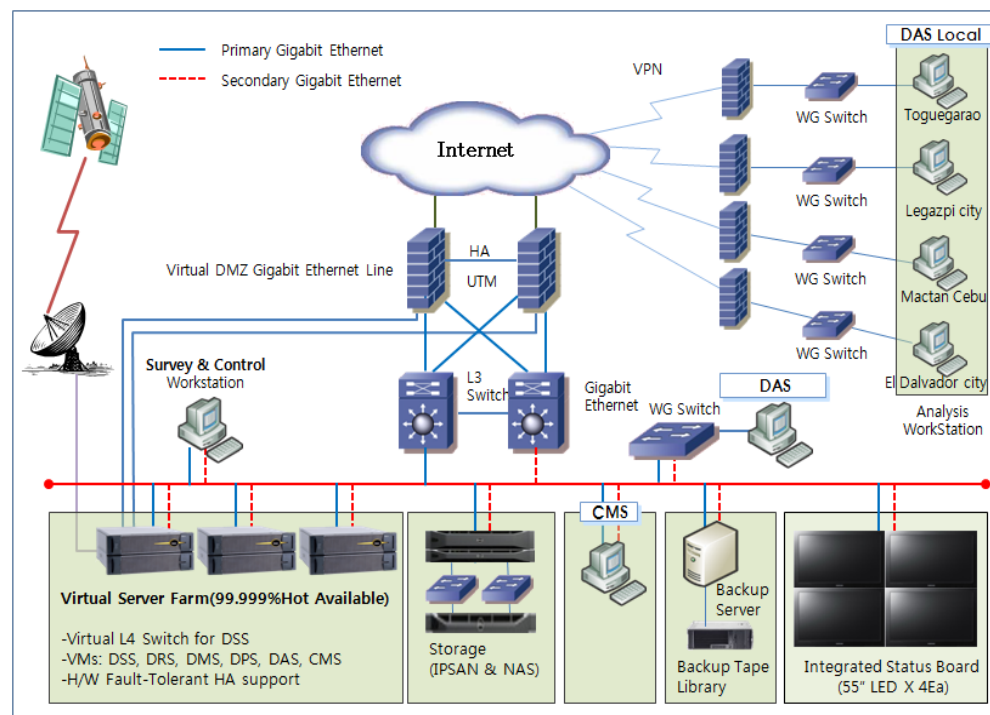
: Sri Lanka meteorological agency



5. Promotion of COMS MI Data Utilization : Support COMS receiving system

Plans of COMS data receiving/analysis system support program for the Philippines as a follow-up project for Sri Lanka accomplished in 2012.

- Funded US \$4M by KOICA(Korea International Cooperation Agency)
- Period : 2013 ~ 2014 (2 years)
- Scope of project
 - Establishment of COMS receiving, processing and analysis system at PAGASA headquarter and only analysis system at 4 local sites
 - Technical Training
 - Dispatch of Korean Experts



Hardware Configuration of COMS receiving, processing and analysis system for PAGASA

6. Summary and Conclusion

NMSC has kept up the systems expertly for data processing and service.

- ◆ Exclusive of the early stage of satellite and ground station operation, and also sun interference effect, COMS MI observation data receiving and processing success rate is almost perfect.
- ◆ Until now, the service success rate of the COMS MI data is over 99.81%.
- ◆ KMA will support COMS receiving, processing systems and education program for the Philippines and plan to extend this project to any other Asian user countries.

☞ **To use the COMS MI data by on-line,**

Access to <http://nmsc.kma.go.kr> or Send E-mail kmasod@korea.kr