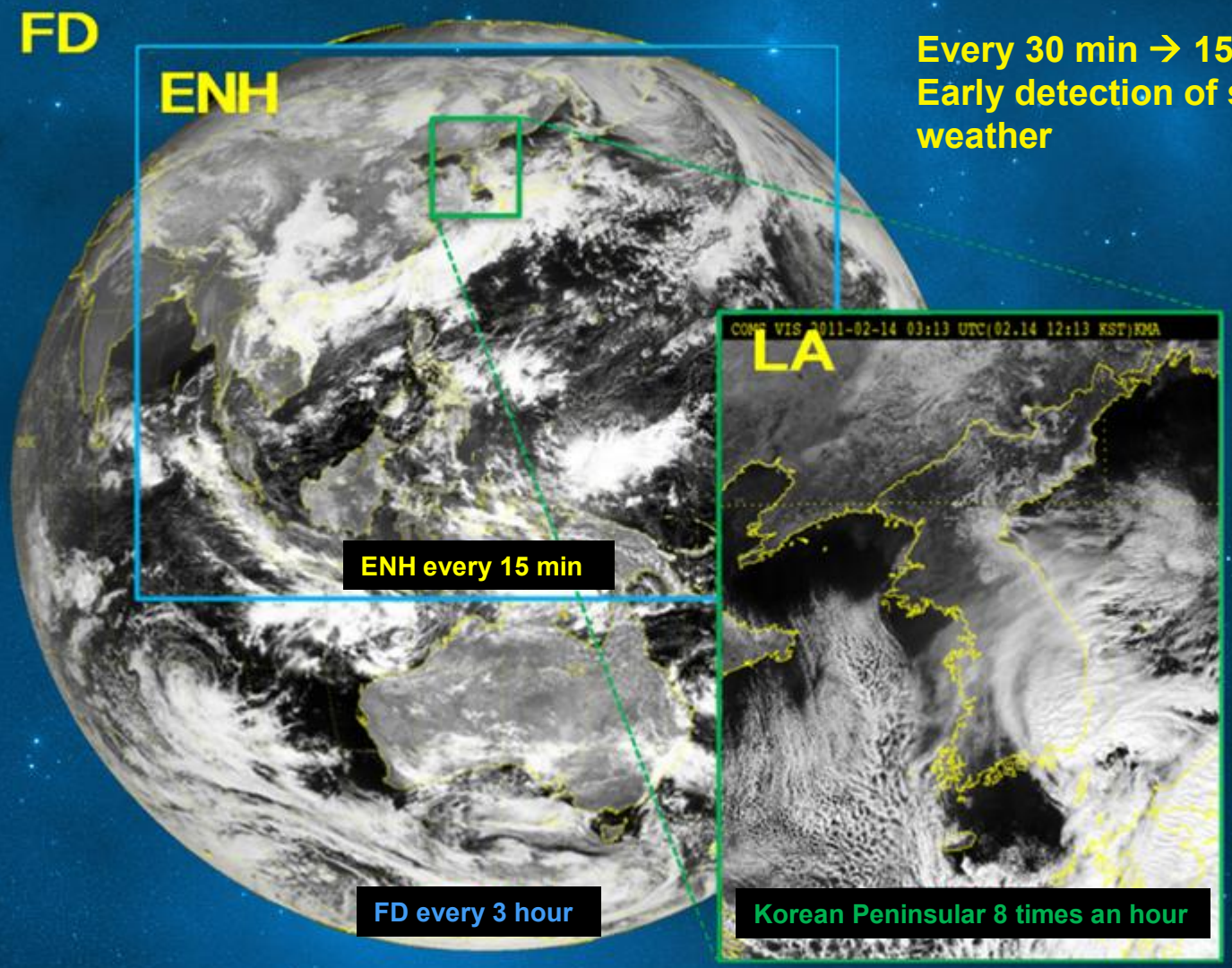
Satellite Programme of KMA

Korea Meteorological Administration
National Meteorological Satellite Center

Status of COMS

Observation Schedule for COMS

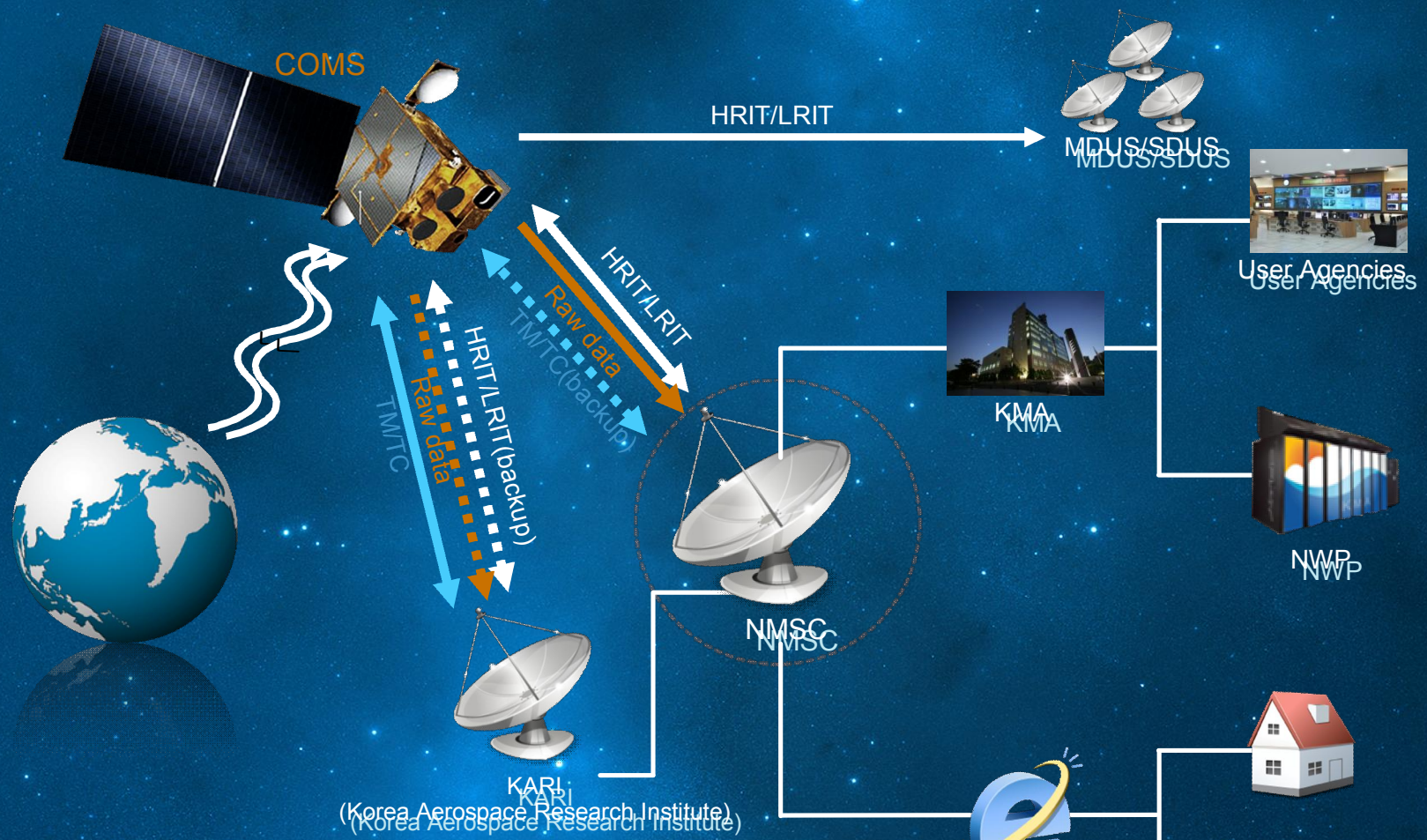
국가기상위성센터
National Meteorological Satellite Center



Every 30 min → 15 min
Early detection of severe weather

COMS VIS 2011. 2. 14 02:45 UTC[02. 14 11:45 KST] KMA

COMS Ground Segment



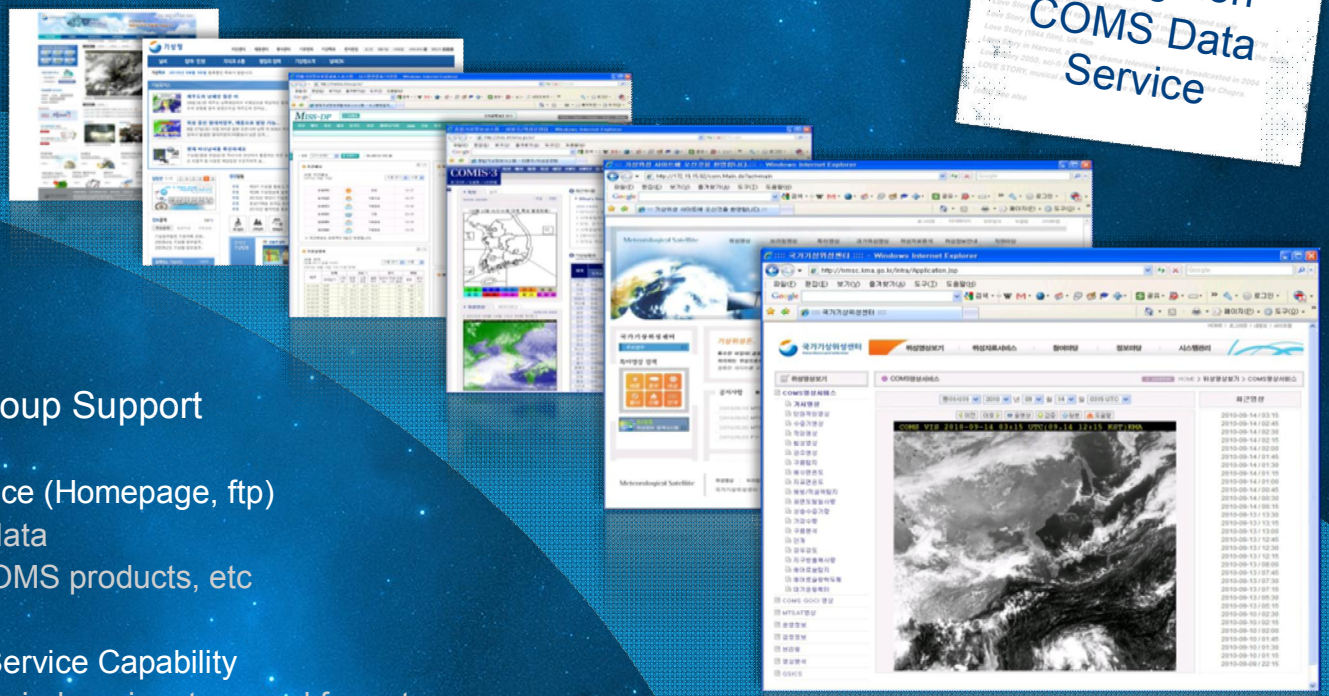
HRIT (High Rate Information Transmission)
LRIT (Low Rate Information Transmission)

COMS Data Service (via ground network)

국가기상위성센터
National Meteorological Satellite Center

- Internal/Cooperation Organization : Intranet, Comprehensive WIS*, Disaster Prevention WIS*
- General Public : KMA Homepage
- Expert Group : NMSC Homepage

Strengthen COMS Data Service



Strengthening the Expert Group Support

- Hierarchical Satellite Data Service (Homepage, ftp)
  - Level 1B, HRIT/LRIT format data
  - Cloud and analysis image, COMS products, etc
- Improvement of Satellite Data Service Capability
  - Enable to select for various period, region, type and format
- Enhancement of easy utilization of data
  - Provision of data conversion program
  - Provision of data quality information, algorithm technical document, data user's guide, etc
  - Satellite data processing/analysis software development and support

*WIS : WMO(World Meteorological Organization) Information System

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Project for supporting developing countries

Project name : Construction of receiving and analysis system of COMS data

Target country : Sri Lanka

Budget/Period : 2 million dollars(2010~2012)

Contents : construction of receiving and analysis system(H/W, S/W), technological support, training

Expansion to Asia-Pacific countries such as Vietnam, Philippines, etc.

TUESDAY, NOVEMBER 2, 2010 Daily News

Top weather forecast technology from S Korea

The Government of the Republic of Korea recently announced the "Development of COMS (Communications, Ocean and Meteorological Satellite) Data Receiving/Analysis System in Sri Lanka" as part of the East Asia Climate Partnership.

The project will be carried out by Korea's grant aid organization, Korea International Cooperation Agency (KOICA) and technically supported by Korea Meteorological Administration (KMA).

KOICA signed a Record of discussions with the Disaster Management Minister on October 21.

The project aims to assist in building Sri Lanka's meteorological monitoring and forecast infrastructure, enhance workforce capacity in the related fields ultimately minimizing the damage caused by weather related natural disasters. By increasing forecast technology, loss of life and property in areas ravished by natural disasters every year will decline while quality of life for those most vulnerable to climate disasters is expected to increase.

The project will develop a COMS Data Receiving/Analysis System tailored to Sri Lanka's needs. The data will be transmitted from the Korean COMS, which is operated by KMA, launched this June. Along with the data receiving and analysis system, KOICA will also provide the equipment and workforce training necessary for the successful and effective utilization of the system.

Productivity in the aviation industry, agriculture and fishing industries is expected to increase as they benefit from accurate meteorological data. Moreover, the project is anticipated to contribute to poverty alleviation as damage and loss from natural disasters is abated.

In addition to the COMS project, KOICA and the Sri Lanka Sustainable Energy Authority will begin installation of a 500kW scale grid-connected solar power plant in Hambantota Baruthankanda to resolve electricity supply issues.

KOICA head-office Climate Change and Environment Team Team Leader, Song Min-Hyeon, KOICA office Sri Lanka Resident Representative Cho, Sang-Woo, National Meteorological Satellite Centre, Korea Satellite Operation Division Assistant Director Lee Bong-Ju, G-Solution Co President Kim Tae-Hoon with Meteorology Department Director General G B Samarasinghe and Disaster Management Ministry Secretary S M Mohamed after signing the agreement.

Utilization of COMS data

COMS Product

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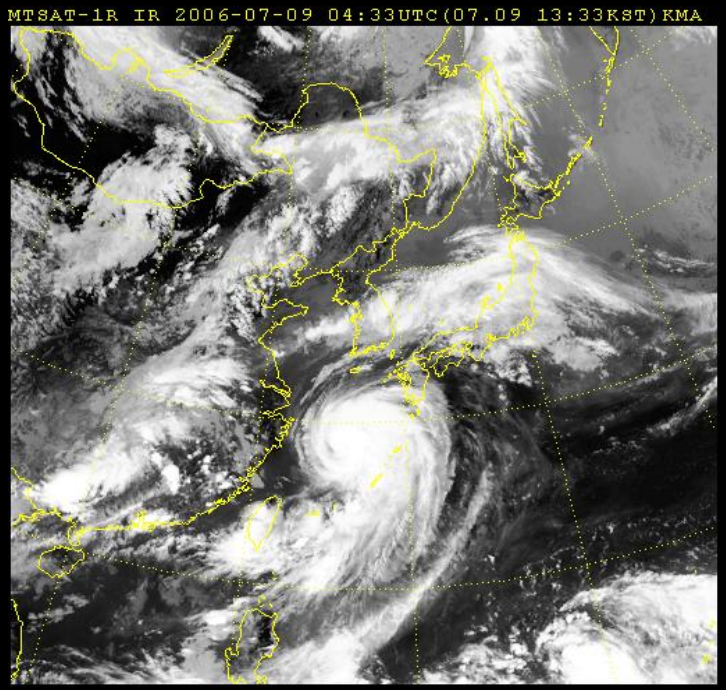
National Meteorological Satellite Center

16 Baseline Products : Development (2003-2010) and operation (2011~)

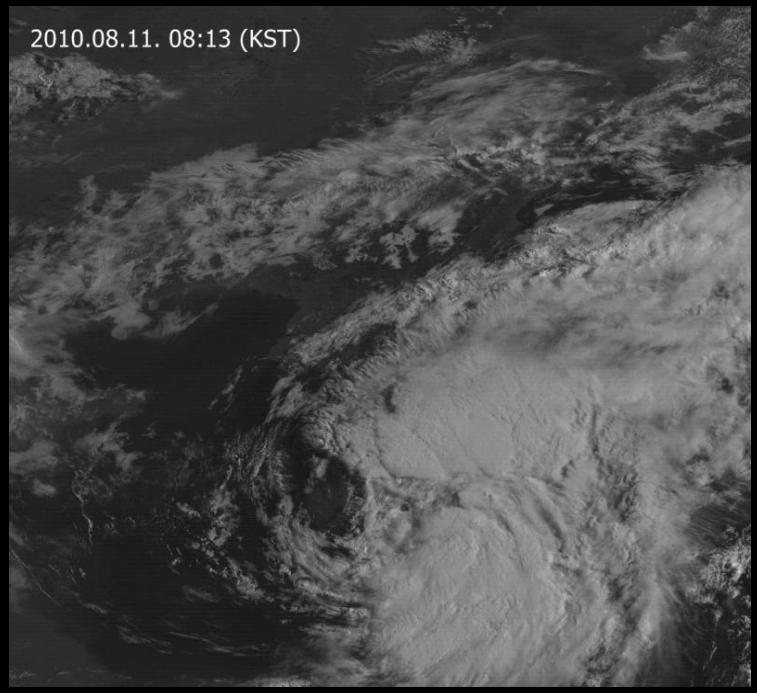
Nowcasting & Short-range Forecasting

COMS 8min image over Korea

30 minute intervals (previous)



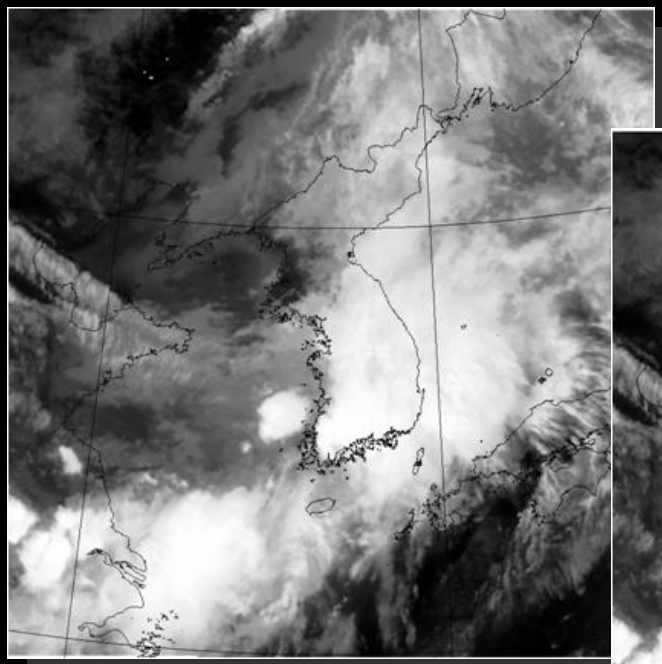
8 minute interval (Now)



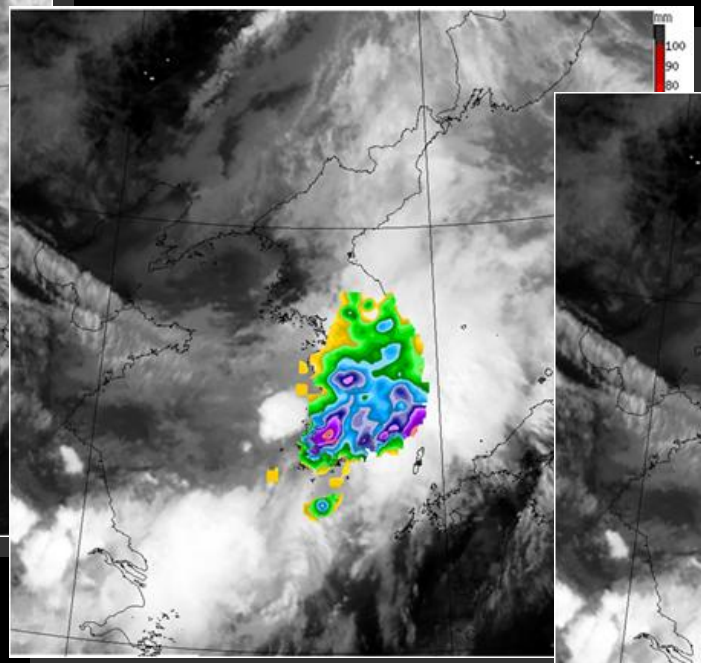
Available for analysis of intensity, center and trend of small rapid developing clouds when a typhoon approaching Korea

Nowcasting & Short-range Forecasting

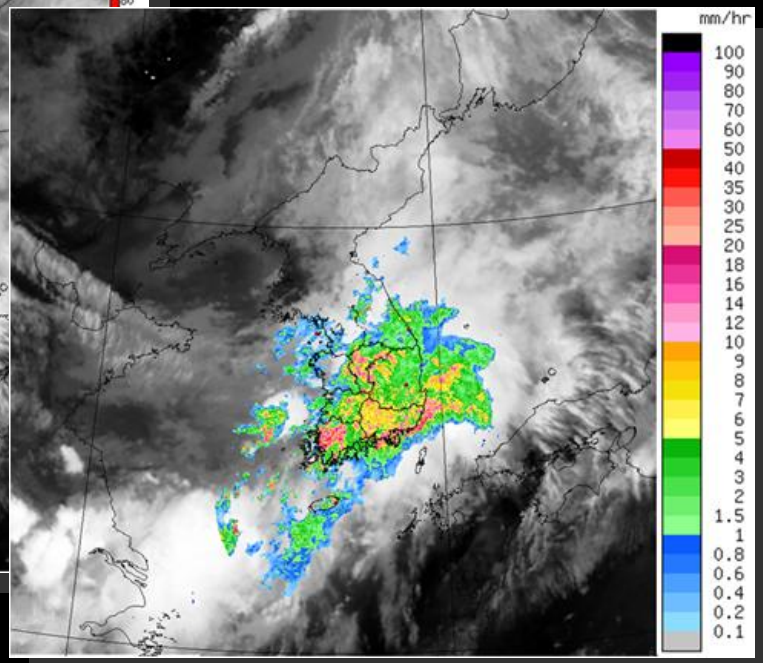
Integration between COMS and Ground observations



Infrared image

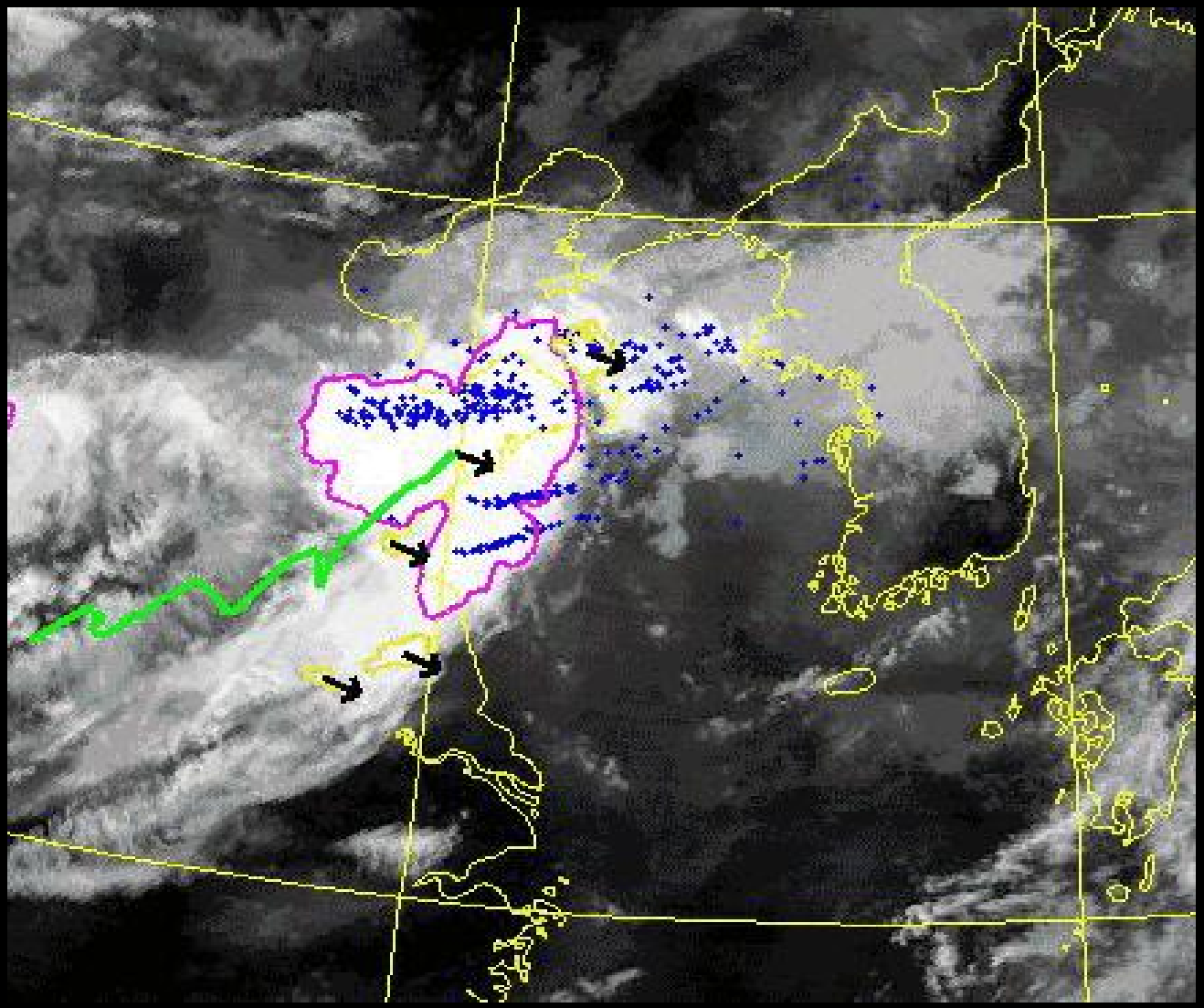


Infrared+AWS



Infrared+radar

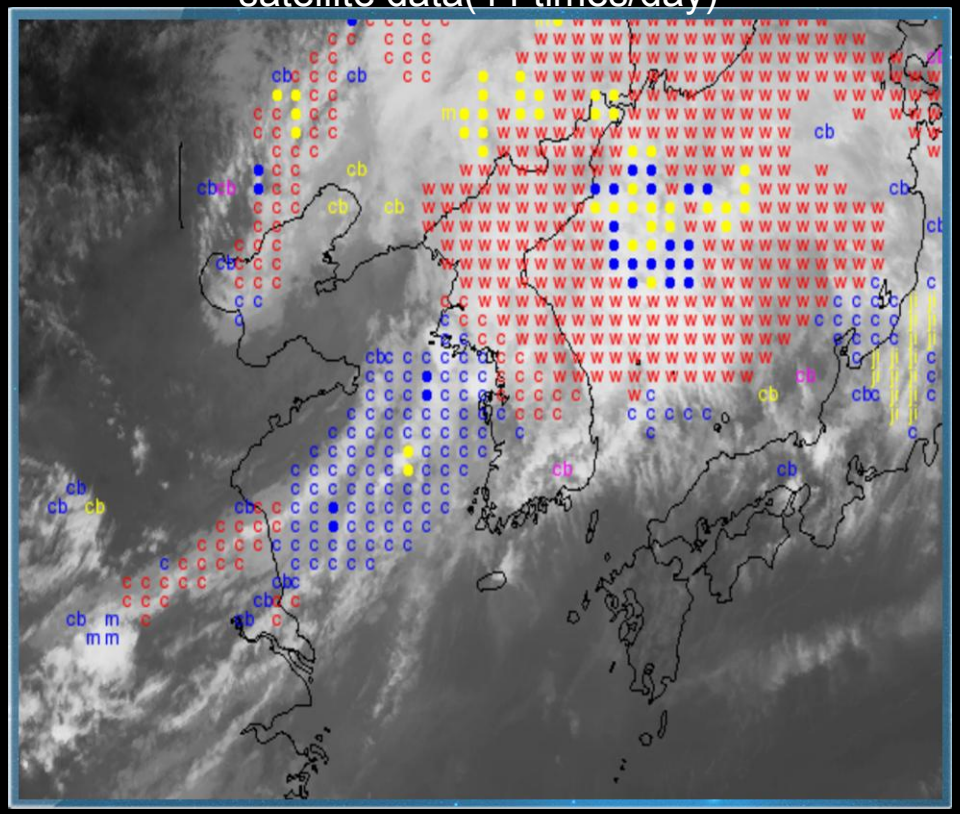
Nowcasting & Short-range Forecasting



Detecting and tracking of convective clouds

Mephanalysis information

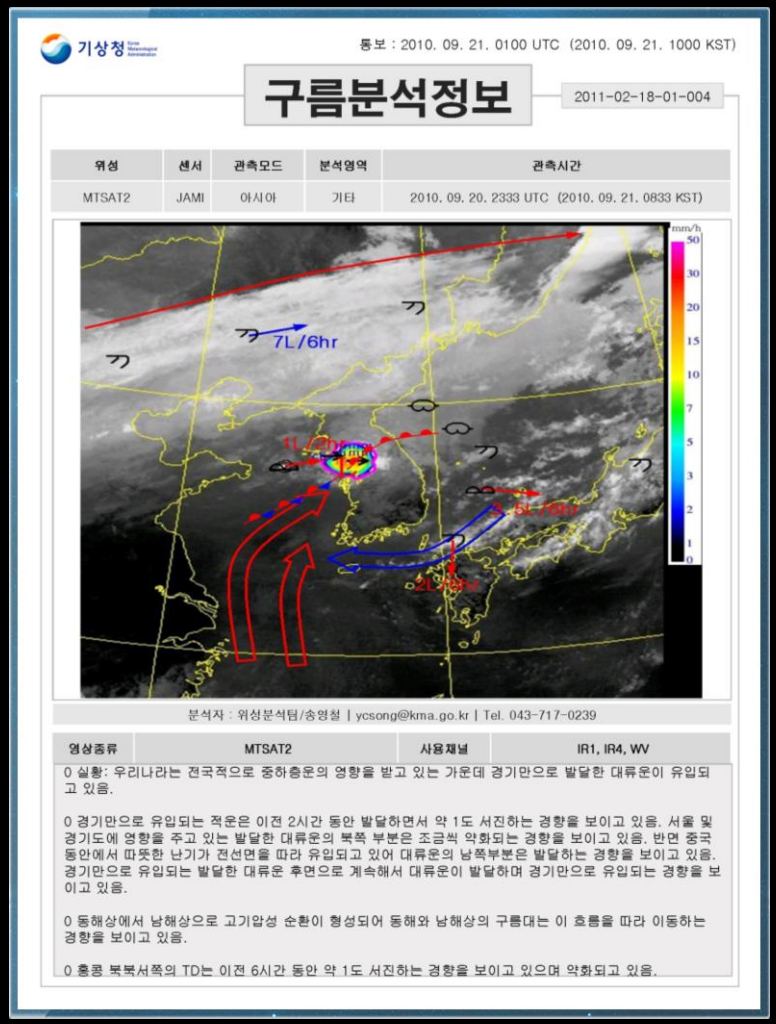
Automatic interpretation information of satellite data(44 times/day)



C : Cold front
W : Warm front
cb : cumulonimbus
M : Mesoscale convective system
● : convective sell

ji : front strengthening by jet
ec : intensified cumulus
z : cold move
dl : dry air injection

Regular 4/day, severe weather 8/day



기상청

통보 : 2010. 09. 21. 0100 UTC (2010. 09. 21. 1000 KST)

구름분석정보

2011-02-18-01-004

위성	센서	관측모드	분석영역	관측시간
MTSAT2	JAMI	아시아	기타	2010. 09. 20. 2333 UTC (2010. 09. 21. 0833 KST)

분석자 : 위성분석팀/송영청 | ycsong@kma.go.kr | Tel. 043-717-0239

영상종류	MTSAT2	사용채널	IR1, IR4, WV

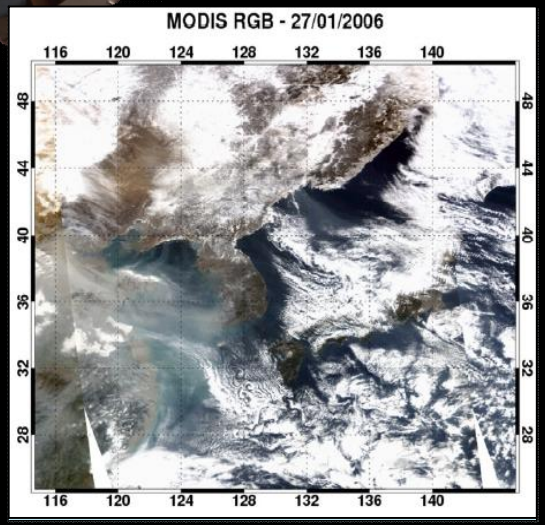
0 실황: 우리나라는 전국적으로 중하층운의 영향을 받고 있는 가운데 경기만으로 발달한 대류운이 유입되고 있음.

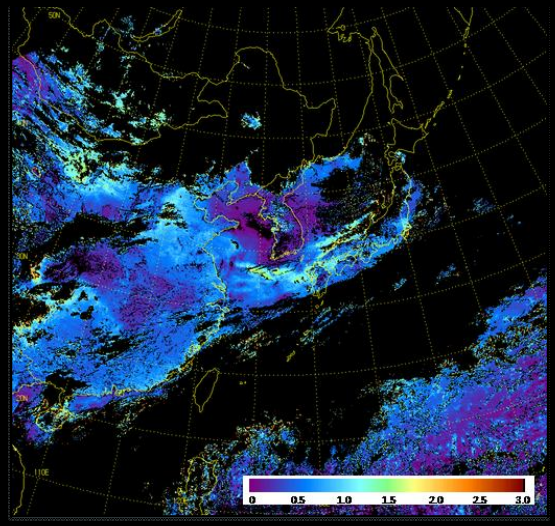
0 경기만으로 유입되는 적운은 이전 2시간 동안 발달하면서 약 1도 서진하는 경향을 보이고 있음. 서울 및 경기도에 영향을 주고 있는 발달한 대류운의 북쪽 부분은 조금씩 약화되는 경향을 보이고 있음. 반면 중국 동안에서 따뜻한 난기가 전선면을 따라 유입되고 있어 대류운의 남쪽부분은 발달하는 경향을 보이고 있음. 경기만으로 유입되는 발달한 대류운 후면으로 계속해서 대류운이 발달하며 경기만으로 유입되는 경향을 보이고 있음.

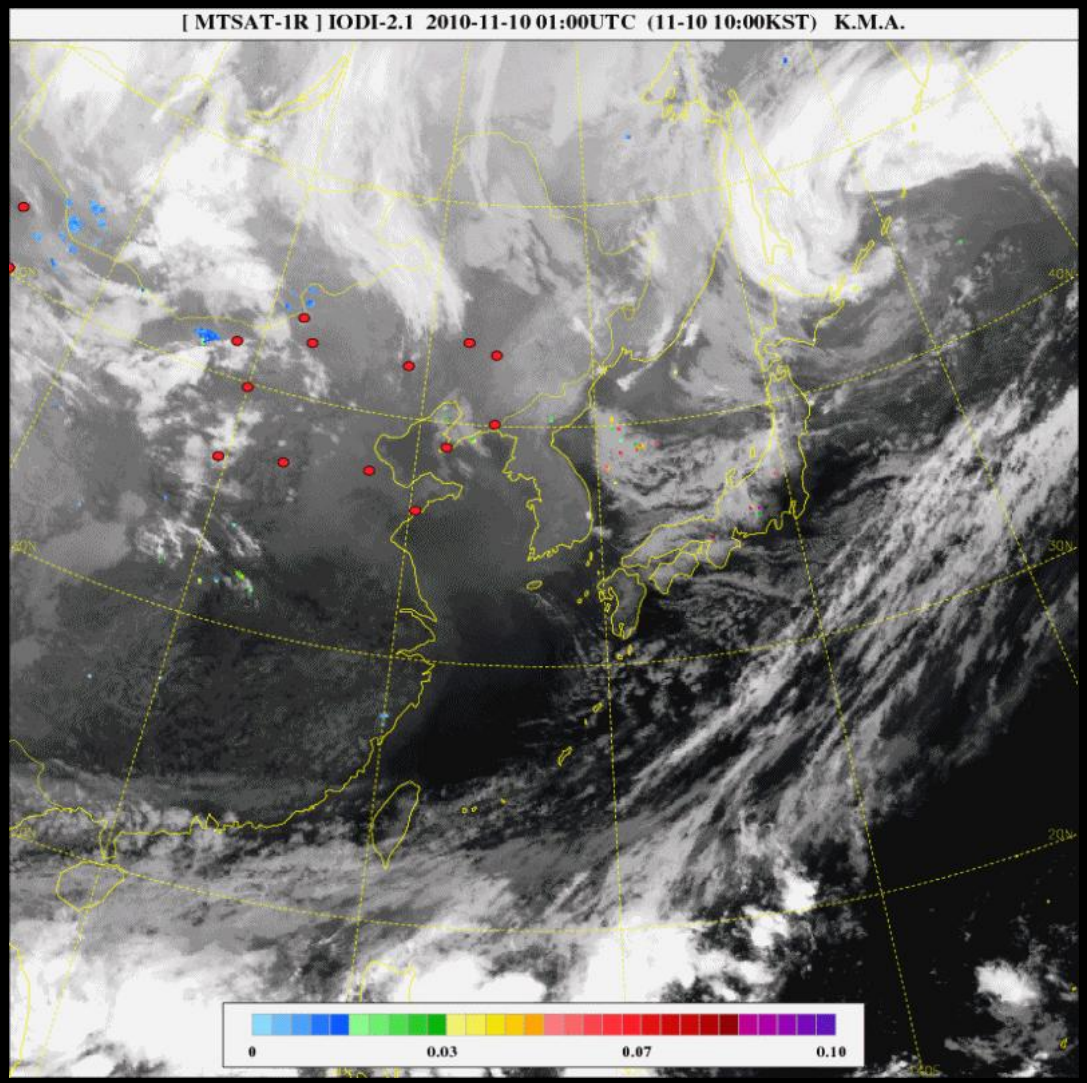
0 동해상에서 남해상으로 고기압성 순환이 형성되어 동해와 남해상의 구름대는 이 흐름을 따라 이동하는 경향을 보이고 있음.

0 홍콩 북북서쪽의 TD는 이전 6시간 동안 약 1도 서진하는 경향을 보이고 있으며 약화되고 있음.

Asian dust







Yellow dust distribution/Intensity/Moving direction/Optical depth

Space Weather Observation and Prediction

- Installment of GNSS* Space Weather Application System
- Development of prediction model for the space weather
- Development of space weather sensor for Geo-KOMPSAT-2A
- Construction of monitoring system for space weather including solar maximum in 2013

*GNSS : Global Navigation Satellite System

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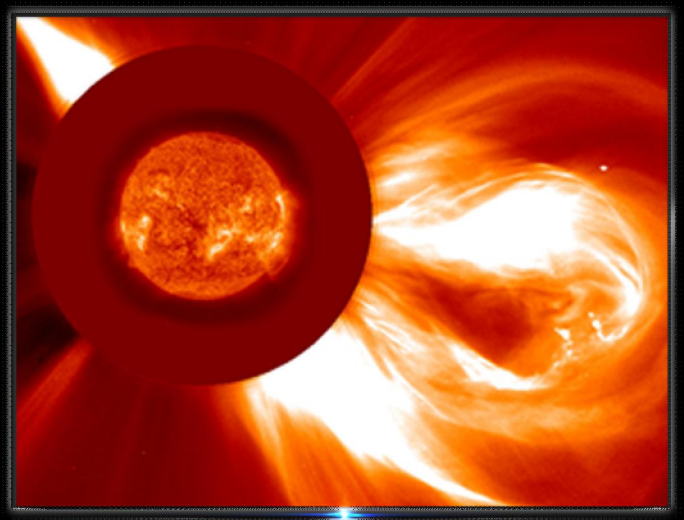


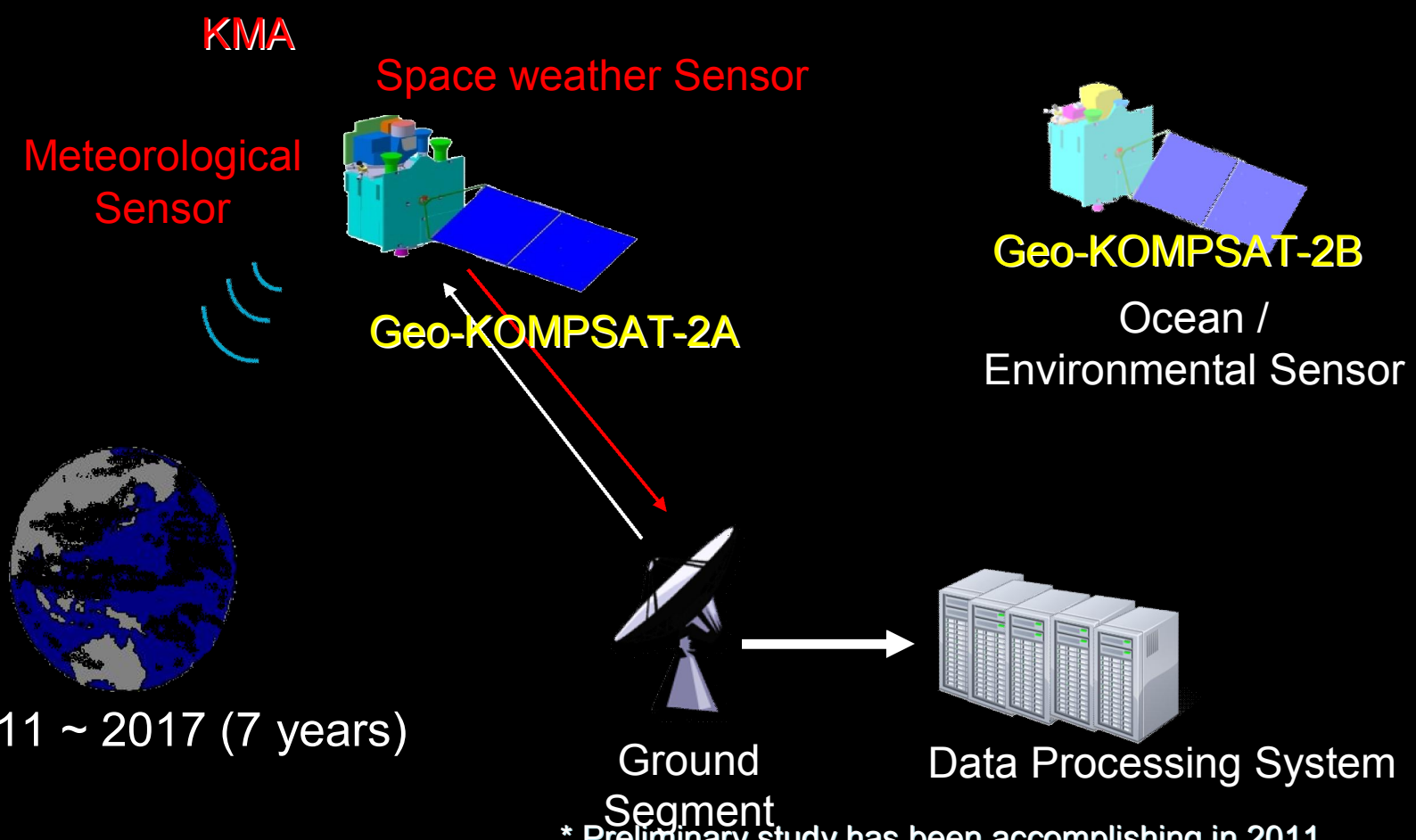
Geo-KOMPSAT-2A

Development of Geo-KOMPSAT-2A

- Object
  - Obtaining a geostationary meteorological satellite for continuous monitoring of meteorological phenomena
  - Development of follow-on satellite for succession of COMS mission
- Mission
  - Continuing the COMS Meteorological Mission
  - Improving the Severe Weather Monitoring
    - Higher frequency of observation
    - Retrieving the atmospheric structure (pseudo-sounding)
  - Improving the support of the NWP model
    - Efficient data assimilation system
  - Intensifying the environment & climate monitoring
    - Various surface information retrieval
    - Air pollution monitoring
    - Establishing long-term observation data

Geo-KOMPSAT-2 Program

→ One for the next generation Meteorological Imager
→ The other for the Ocean and Atmospheric Trace Gas monitoring

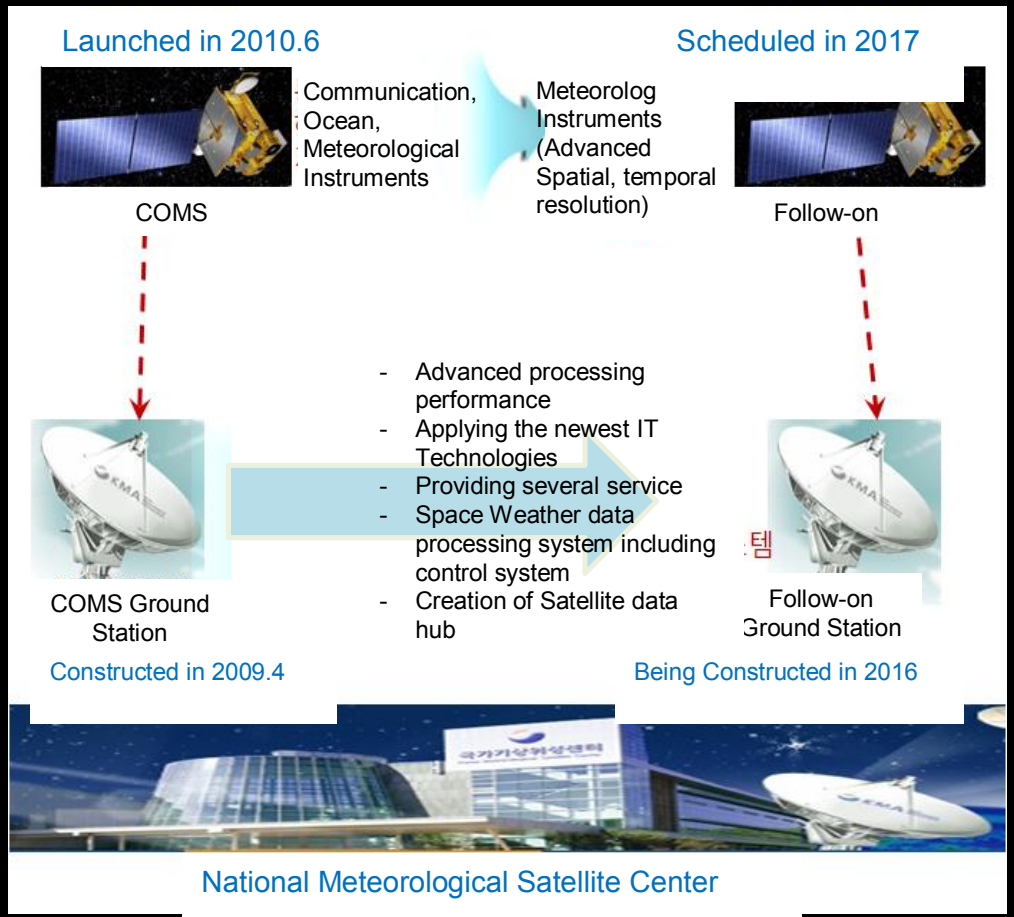


* Preliminary study has been accomplishing in 2011

Ground Segment

Ground System development and Construction

- Receiving, Processing, analysis and Archiving service of meteorological and space weather data
- Accomplishing satellite control mission



Preliminary study in 2011 and **feasibility study in 2012** for ground system

Milestone for the Geo-KOMPSAT-2A

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PAYLOAD AND SATELLITE

Satellite bus design and Review → Integrate Module → Satellite system integration → Launch/IOT/Operation

Analysis of system requirements | System design | Preliminary design | Critical design | Instrument Integration and test | System Integration and test | Prepare to launch | launch / IOT | Satellite operation

Start | SDR & I/F Review | PDR & I/F Review | CDR | IRR | I instrument delivery | TRR | PSR | Launch

2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | Operation/utilization /service

DATA RECEIVING AND PROCESSING SYSTEM

System requirements /Standards creation | Preliminary design | Critical design | System implementation | Install /Testing | Training operator | Launch | Supporting operation

SATELLITE CONTROL SYSTEM

Review and analysis of requirements/standards/design | Selection of TTC and RF production companies | Integration and install TTC system | Install control S/W and interface testing | Training operator

DATA PROCESSING SYSTEM

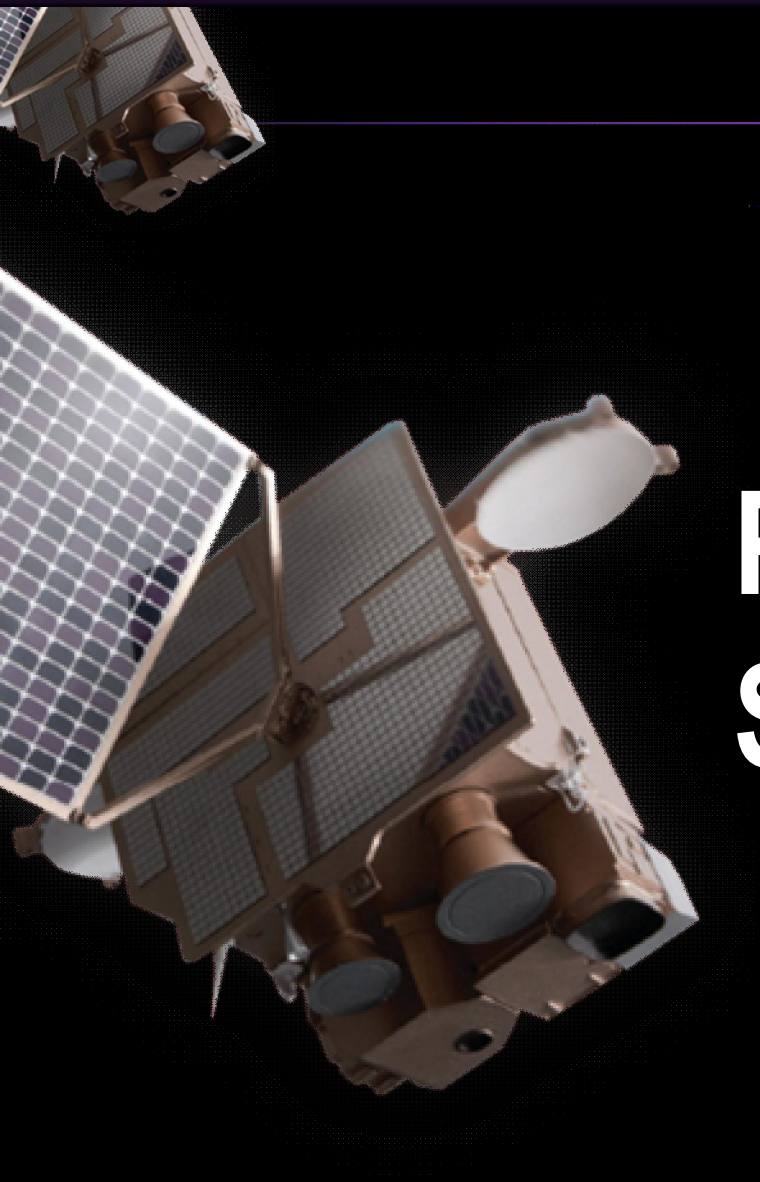
2012: -Algorithm concept design
2013: -Critical design
2014: -Construction of Algorithm original form
2015: -Improve algorithm -Complete processing system
2016: -verify and improve algorithm
2017: -verify and improve -site operation

DATA MANAGEMENT AND SERVICE SYSTEM

2013: -analysis of user requirements -set up system requirements -Preliminary/critical design
2014: -Create system -Verify system
2015 ~ 2018: -test operation and complement

Future Plan

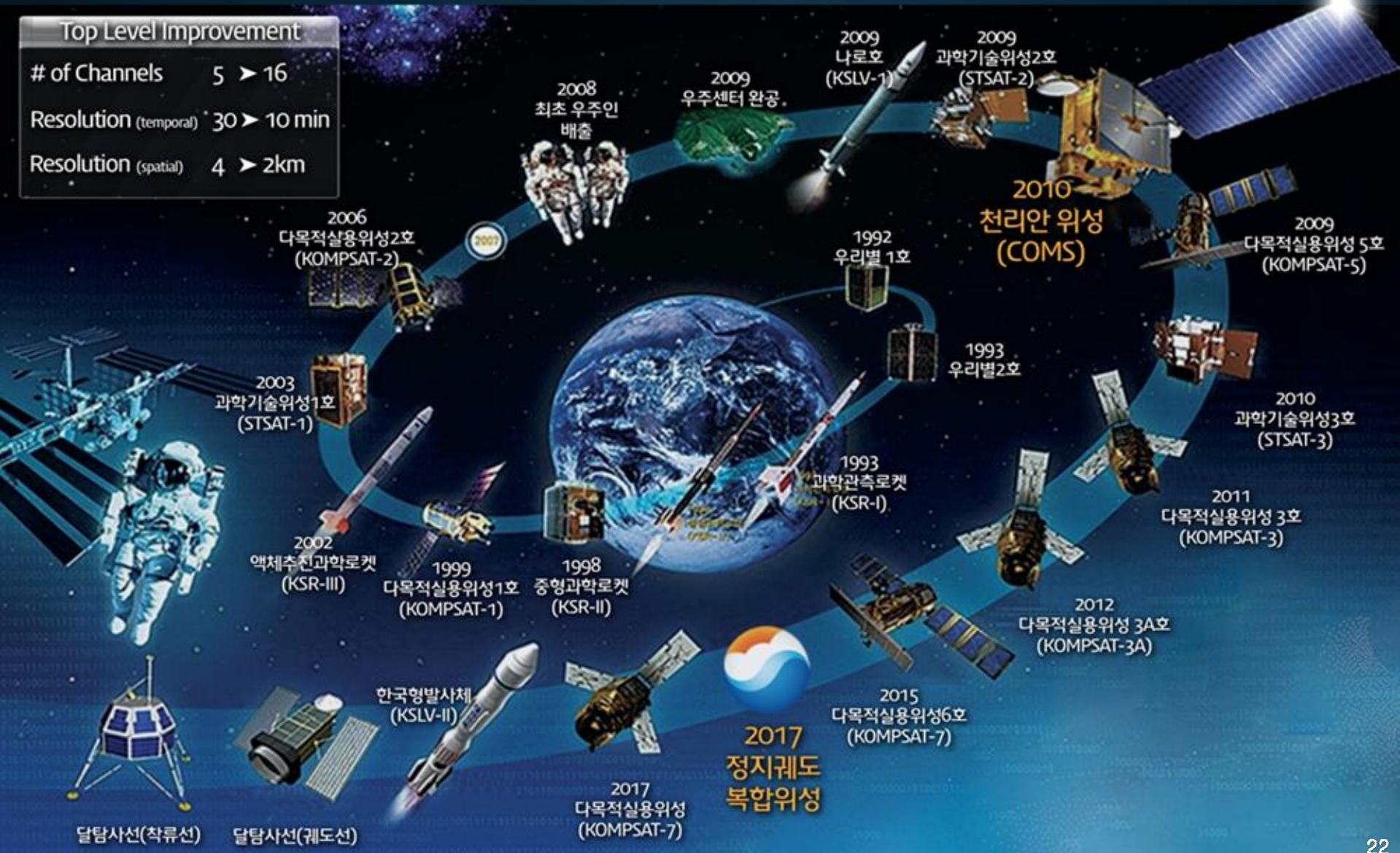
- Development of the GEO-KOMPSAT-2A
  - Completion of RFP for GEO-KOMPSAT-2A (‘12. 4)
  - ***Contract award*** with selected company (’12.10)
  - System Requirement Review(‘13) and Critical Design Review(‘14)
  - Delivery of meteorological and space weather payloads(‘15)
  - Pre-Shipment Review(‘16) and launch(‘17)
- Development of the Ground Segment (2016)
  - Comprehensive Ground station for operation, satellite control, etc.
- Development of data processing system(2017)
  - Developing meteorological product for climate, environmental disaster prevention etc.



Plan for LEO Satellite

National Space Development Plan

Development of the geostationary multi-purpose satellite based on the National Space Development Plan.
Next Meteorological Satellite is planned to be launched in 2017 time frame



LEO Meteorological Satellite

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LEO satellite operation

Observation in all-weather conditions

Generating numerical model input data
(Cloud, land surface, Ocean, Construction of Atmosphere data)

Monitoring Climate change factor
(sea ice, stratospheric and tropospheric temperature, water cycle factor)

Standard observation of weather factor
(heavy rain, typhoon precipitation, snow cover, strong wind)

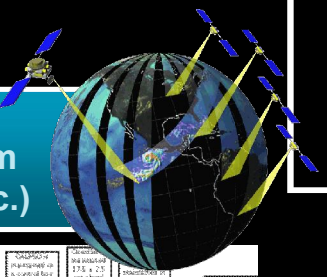
- Improve weather forecast accuracy

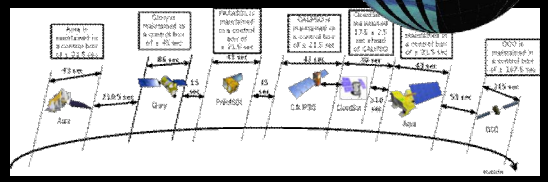
- Standard monitoring of severe weather
- Water control for preparing disaster

- Understanding climate change
- Managing future water resources
- Preparing future climate

- Advanced country of weather observation-contribution to international society, improving global positioning

International Satellite Program (A-train, GPM, etc.)





Mutual complement
Synergy effect

COMS + LEO satellite joint operation system

LEO satellite development timeline

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Plan research 2012

Generic technology research
- LEO meteorological satellite instruments technology research
- LEO meteorological satellite development mid-long term loadmap
- International technology development cooperation research

Secure a budget 2013-2014

Secure a budget for LEO satellite
- Political and technical validity
- Economical validity and analysis of benefits
- Surveying industrial ripple effects and proposing the way of improving manpower

Satellite development 2015-2019

Development of the LEO meteorological satellite
- Developing instruments of the LEO satellite
- Satellite bus, system integration and developing testing technique
- Ground segments development and secure a image quality technique

Launch /Utilization 2020-

Application of data Utilization plan
- Apply to weather, climate, earthquake, volcano, disaster, etc.
- Data utilization research for global water/climate, etc.
- Supply standard input data of numerical model

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Korea Meteorological Administration
Thank you!