

# Current Activities of CoE-Korea and NMSC/KMA

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## Activities of CoE-Korea(2016~2017)



RTC-Korea (in Seoul)



Meteorological Human Resources Development Institute(MHRDI)

CoE-Korea (in Jincheon-Gun)



National Meteorological Satellite Center(NMSC)

### ❖ International training course through the support of KOICA (Korea International Cooperation Agency).

- Title** : Improvement of Meteorological Satellite Data Analysis and Application Capacity
- Objectives** : To enhance understanding on the COMS and GK-2A and their derived products to support better monitoring and forecasting of high impact weather
- Contents** : COMS data processing and products, satellite imagery interpretation, Application of GEO and LEO satellite data, GK-2A satellite, Culture experiences and Field trips, Country reports, Workshop for Action plan
- 1st stage(2016)** : 10. Oct - 2. Nov (24days), NMSC, 22 forecasters or meteorologists from 14 countries (Bangladesh, Bhutan, Cambodia, Indonesia, Laos, Mongolia, Myanmar, Nepal, Philippines, Solomon Islands, Sri Lanka, Timor-Leste, Uzbekistan, Vietnam)
- 2nd stage(2017)** : 29. Oct - 24. Nov(27days),MHRDI, 17 forecasters or meteorologists from 10 country (Bangladesh, Cambodia, Laos, Mongolia, Myanmar, Peru, Philippine, Solomon Islands, Sri Lanka, Timor-Leste, Ukraine, Vietnam)
- Survey** : Achievement (100%), Overall Satisfaction(93%), Lecture Evaluation(90%)



### ❖ Host Capacity building and Training events for Next Generation Satellite during(AOMSUC-7)

- Period/Place** : 21-22 Oct. 2016 / NMSC
- 4 Sessions** : CSPP-LEO & CSPP-LEO Satellite Data and Products using HYDRA from USA  
Satellite-based Rapidly Development Thunderstorm Detection and tracking techniques(KMA, CMA, JMA, BoM)  
Satellite Image Analysis & Practice using NMSC's Cloud Analysis System
- Participants** : 64 persons from 30 countries from RAIL and RAV regions



## Activities of CoE-Korea(2017~2018)

### ❖ Bilateral Collaboration between CoE-Korea and CoE-Australia

- Mutual visits of trainers on satellite image analysis biennially

| Exchange trainers                     | Periods         | Activities  | 2017 (NMSC Activities) | 2018 (BMTC Activities) |
|---------------------------------------|-----------------|---|------------------------|------------------------|
| 2016 Mr. Bodo Zeschke visited to NMSC | 17-28 Oct       | • Contribute to KMA's International training course for developing countries<br>• Contribute to 2day's training events of AOMSUC-7                    |                        |                        |
| 2017 Ms. Hyesook Park visited to BMTC | 12-20 May       | • Contribute to the BoM's Graduate Diploma in Meteorology Course<br>• RFG weather discussion jointly<br>• Discussion for "End-to-End User Case Study" |                        |                        |
| 2018 Mr. Bodo Zeschke Visited to KMA  | 27 May - 3 June | • 3 days' training for KMA forecasters<br>• Interactive training methods(Socratic)  |                        |                        |

- Sharing results of satellite analysis and new technologies using various satellites
- Sharing imagery to develop standard products for GK-2A and Himawari-8 for the region

### ❖ Joint Regional Focus Group(RFG) Meeting With CoE-Australia since 2016

| Year | Date/Time                  | Title of Discussions   | 2017 | 2018 |
|------|----------------------------|--|------|------|
| 2016 | 2 Aug<br>02:30-03:00UTC    | - Weather and Forecast Discussion (Mr. Bodo Zeschke, BMTC/BoM)<br>- Dust detection methods using various satellite products and their limitations (Dr. Hye-Sook Park, NMSC/KMA) (download)   |      |      |
| 2017 | 13 Dec<br>01:30-02:30UTC   | - Activities of the Korea Regional Training Centre and the VLab Centre of Excellence (Dr. Hye-Sook Park, NMSC/KMA) (download)<br>- Trial of a short "end to end" case study as preferred by forecasters, incorporating training on the effective use of Himawari-8 data (Mr. Bodo Zeschke, BMTC/BoM)   |      |      |
| 2018 | 18 April<br>01:30-02:30UTC | - Improvement in the detection of snow covered areas using Natural Colour RGB images (Mr. Yun Bok Lee, NMSC/KMA) (download)<br>- Tropical Cyclone Debbie at landfall time: comparing various Himawari-8 satellite products and associated observations and NWP products (Mr. Bodo Zeschke, BMTC/BoM)<br>- Rapidly developing thunderstorm using various satellite products (Dr. Hye Sook Park, NMSC/KMA) (download)<br>- Impact of 10 minute Himawari-8 imagery on nowcasting at the Australian Bureau of Meteorology (Mr. Bodo Zeschke, BMTC/BoM)<br>- A high flow cloud case from Korea comparing a number of Himawari-8 and COMS products (Dr. Hye-Sook Park, NMSC/KMA) (download)<br>- Analysis of a Mesoscale Convective Complex in the South China Sea (Mr. Bodo Zeschke, BMTC/BoM)<br>- Satellite-based Total Cloud Cover retrieval to support automatic cloud amount measurement (Dr. Geun-Hyun Ryu, NMSC/KMA) (download)<br>- An Australian Squall Line case study: applying some RGB products from the RGB Expert and Developers Workshop (Mr. Bodo Zeschke, BMTC/BoM) |      |      |

\* Pdf file can be downloaded at <http://nmsc.kma.go.kr/html/homepage/en/ver2/static/selectStaticPage.do?view=activities.training.VLabCoE-KoreaMain>

\* The recordings of RFG meeting are on the webpage at <http://www.virtuallab.bom.gov.au/archive/regional-focus-group-recordings/>

### ❖ 3days' Advanced Satellite Meteorology Course by invited foreign trainers

|              | 2016  | 2017   | 2018   |
|--------------|---|--|--|
| Periods      | 18~20 Apr   | 29~31 May  | 30 May~1 June  |
| Trainers     | Elisabeth J. Carlton<br>Helen M. Caughey  |  | Bodo I. Zeschke  |
| Organization | Met College   |  | CoE-Australia  |
| Trainees     | 42  | 27   | 20   |
| Contents     | • Development theory in satellite imagery interpretation<br>• Conceptual models of Cyclogenesis<br>• Introduction of RGB products<br>• Case Studies I~III | • PV and WV image analysis<br>• WV channels of Himawari-8 interpretation<br>• Detection and monitoring of convection based on artificial intelligence<br>• Fog detection using RGB images<br>• Various ways for verifying NWP forecasts using Satellite data | • Emerging Cloud head<br>• 1- Emerging Cloud head<br>• 2- Emerging Cloud head<br>• 3- Emerging Cloud head<br>• 4- Emerging Cloud head<br>• 5- Emerging Cloud head<br>• 6- Emerging Cloud head<br>• 7- Emerging Cloud head<br>• 8- Emerging Cloud head<br>• 9- Emerging Cloud head<br>• 10- Emerging Cloud head<br>• 11- Emerging Cloud head<br>• 12- Emerging Cloud head<br>• 13- Emerging Cloud head<br>• 14- Emerging Cloud head<br>• 15- Emerging Cloud head<br>• 16- Emerging Cloud head<br>• 17- Emerging Cloud head<br>• 18- Emerging Cloud head<br>• 19- Emerging Cloud head<br>• 20- Emerging Cloud head<br>• 21- Emerging Cloud head<br>• 22- Emerging Cloud head<br>• 23- Emerging Cloud head<br>• 24- Emerging Cloud head<br>• 25- Emerging Cloud head<br>• 26- Emerging Cloud head<br>• 27- Emerging Cloud head<br>• 28- Emerging Cloud head<br>• 29- Emerging Cloud head<br>• 30- Emerging Cloud head<br>• 31- Emerging Cloud head<br>• 32- Emerging Cloud head<br>• 33- Emerging Cloud head<br>• 34- Emerging Cloud head<br>• 35- Emerging Cloud head<br>• 36- Emerging Cloud head<br>• 37- Emerging Cloud head<br>• 38- Emerging Cloud head<br>• 39- Emerging Cloud head<br>• 40- Emerging Cloud head<br>• 41- Emerging Cloud head<br>• 42- Emerging Cloud head |

### ❖ Summer Camp of COMS meteorological Satellite to secure future human resources

| Year       | Period         | Participants | Related fields  | Methods   |
|------------|----------------|--------------|---|---|
| 2016 (6th) | 28 June-1 July | 30           | Meteorology, environment, physics, earth science, oceanography, geography, etc. | Lectures, practice, science exhibition, recreation, Counseling exam etc |
| 2017 (7th) | 22-25 August   | 17           |   |   |
| 2018 (8th) | 26-29 June     | 30           |   |   |

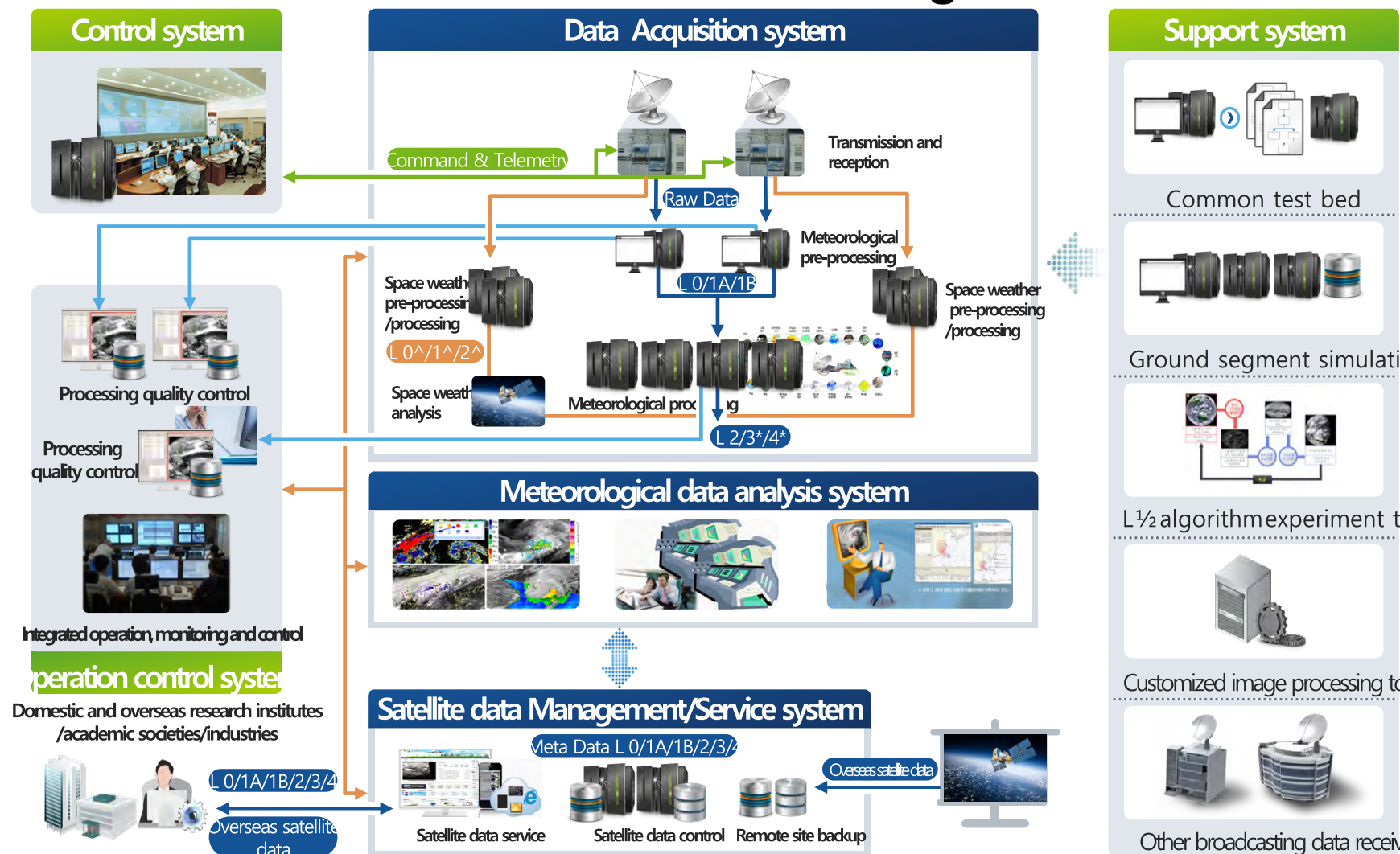
### ❖ Development Education Materials of Satellite Meteorology for Public users

- Title** : Meteorological Satellite easy to understand composed of 5 stories
- Format** : Animation
- Language** : Korean
- Duration** : 3~5 min
- Shared** through Youtube



## Ground Segment of GK-2A

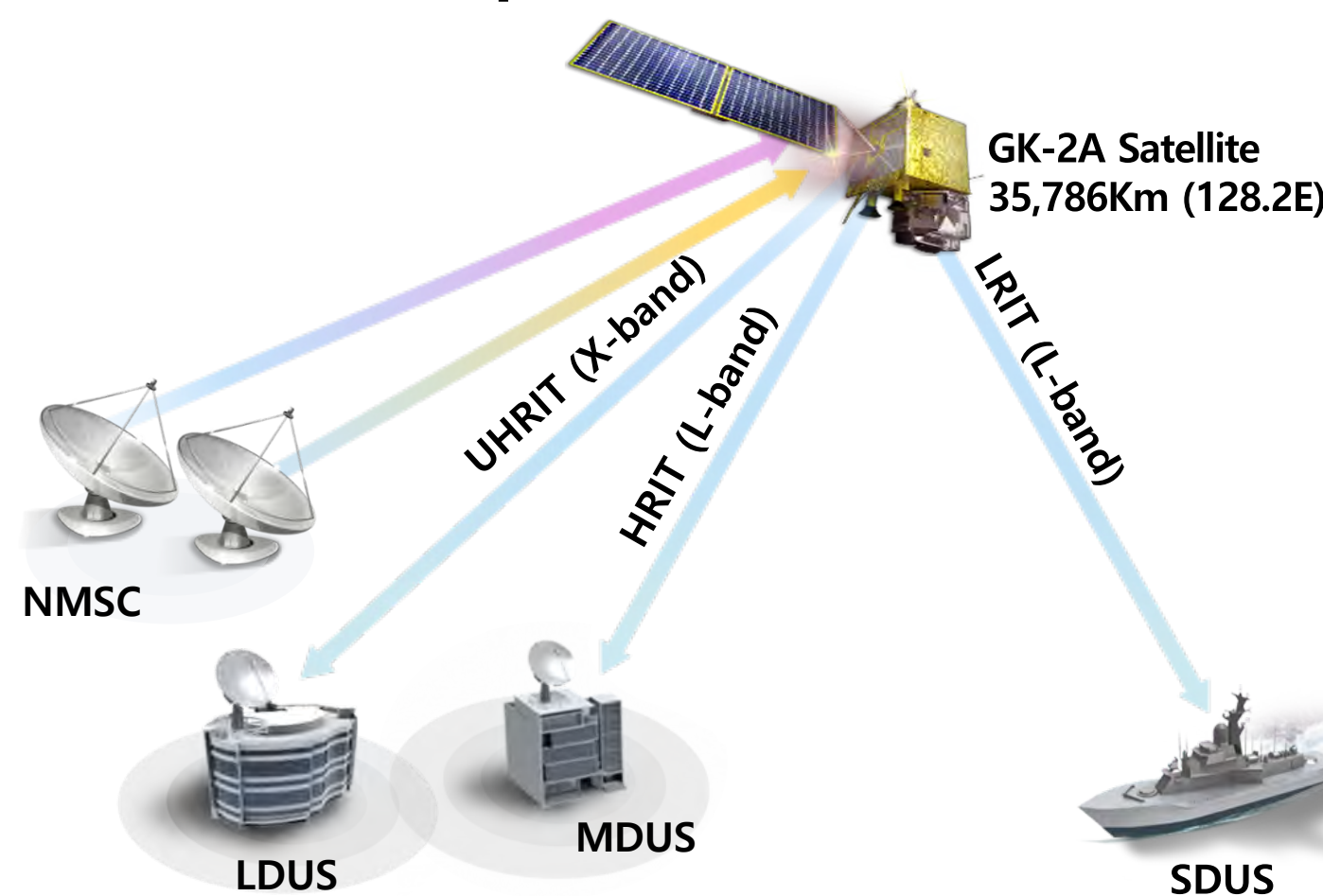
### ❖ Functional Structure of the Ground Segment



#### ➤ Major Features

- Secure the operating stability and reinforce the data conservation system through system diversification and Triplexed data storage system
- Enhance maintenance performance by implementing support systems such as test bed and simulator etc.

### ❖ Data service plan GK-2A : Broadcasting and Landline service



#### ➤ GK-2A data Service via Satellite

- Broadcast to L/M/SDUS(Large/Medium/Small-scale Data Utilization Stations)
- Format : U/H/LRIT(Ultra High/High/Low Rate Information Transmission)

#### ➤ Service via Landline

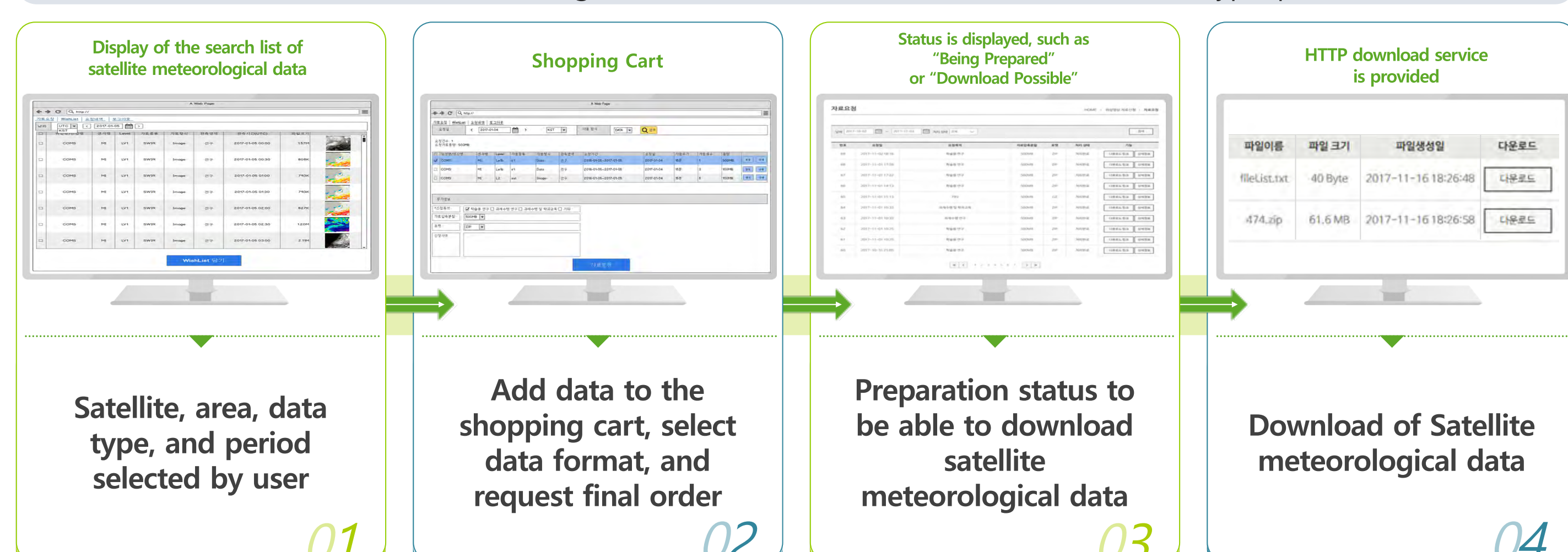
- [Website] KMA/NMSC Homepage, DCPC-NMSC (open to registered users)
- [FTP] Access to NMSC FTP server (open to organization with MOU)

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

### ❖ Internet Service of Satellite Meteorological Data

- Various satellite meteorological data services(such as searching, displaying, or downloading) can be provided on the website of the National Meteorological Satellite Center.

Customized satellite data service allowing the users to select a kind of satellite, area, data type, period, and data format



## Geo-KOMPSAT 2A Products

### ❖ GK-2A Meteorological Products

|                         | Scene & Surface Analysis (13) | Cloud & Precipitation (14) | Aerosol & Radiation (14)          | Atmospheric condition & Aviation (11) |
|-------------------------|-------------------------------|----------------------------|-----------------------------------|---------------------------------------|
| Primary Products (23)   | Cloud detection               | Cloud Top Temperature      | Aerosol Detection                 | Atmospheric Motion Vector             |
|                         | Snow Cover                    | Cloud Top Pressure         | Aerosol Optical Depth             | Vertical Temperature Profile          |
|                         | Sea Ice Cover                 | Cloud Top Height           | Asian Dust Detection              | Vertical Moisture Profile             |
|                         | Fog                           | Cloud Phase                | Asian Dust Optical Depth          | Stability Index                       |
|                         | Sea Surface Temperature       | Rainfall Rate              | Volcanic Ash Detection and Height | Convective Initiation                 |
|                         | Land Surface Temperature      |                            | Radiance                          | Total Ozone                           |
|                         | Surface Emissivity            | Cloud Type                 | Aerosol Particle Size             | Total Precipitable Water              |
|                         | Surface Albedo                | Cloud Amount               | Visibility                        | Tropopause Folding Turbulence         |
|                         | Fire Detection                | Cloud Optical Depth        | Downward SW Radiation (SFC)       | SO <sub>2</sub> Detection             |
|                         | Vegetation Index              | Cloud Effective Radius     | Reflected SW Radiation (TOA)      | Overshooting Top Detection            |
| Secondary Products (29) | Vegetation Green Fraction     | Cloud Liquid Water Path    | Absorbed SW Radiation (SFC)       | Aircraft Icing                        |
|                         | Snow Depth                    | Cloud Ice Water Path       | Upward LW Radiation (TOA)         |                                       |
|                         | Ocean Current                 | Cloud Layer/Height         | Downward LW Radiation (SFC)       |                                       |
|                         |                               | Rainfall Potential         | Upward LW Radiation (SFC)         |                                       |
|                         |                               | Probability of Rainfall    |                                   |                                       |

- KMA/NMSC has developed the algorithms for meteorological products, which will be derived from GK-2A AMI observations, in cooperation with domestic Academia and the Electronic and Telecommunications Research Institute (ETRI) since November 2014.
- Before launch, GK-2A AMI products will be continuously validated with in-situ and reference satellite data, and compared to the products of foreign agencies through intercomparison studies with the international working groups such as Winds, Clouds, and Precipitations.
- After launch, we are going to do scientific evaluations of the product maturity during in-orbit test period.
- And then, we will service the products operationally from 2nd half of 2019.

### ❖ GK-2A L2 Examples

