

# Korea's Activities to Support Disaster Response Capacity in Asia

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# Korea's ODA Projects

KMA commits itself to supporting developing countries particularly vulnerable to natural disasters by conducting a variety of Official Development Assistance (ODA) projects. KMI, an affiliate of KMA, is in charge of implementing ODA projects in partner countries.

## ODA Partner Countries





# **| Meteorological ODA Projects**

## Background


# Needs for Automated Observation System in Mongolia

In 2016 Mongolia has 330 observation station. Among them 189 site was still manually operated. Modernization for manual station was required to improve quality and timely observation which is essential for taking appropriate measures for climate change.



## Background

# PM of Mongolia requested automated observation system

  
МОНГОЛ УЛСЫН ЗАСГИЙН ГАЗРЫН ХЭРЭГЖҮҮЛЭГЧ АГЕНТЛАГ  
**ЦАГ УУР, ОРЧНЫ  
ШИНЖИЛГЭЭНИЙ ГАЗАР**  
15160 Улаанбаатар хот,  
Чингэлтэй дүүрэг, Жуулчны гудамж 5,  
Утас: 26-65-62, Факс: (976-11) 32-65-92,  
E-mail: meteoagency@magiconat.mn

2016.02.26 № 11107  
танай \_\_\_\_\_-ны № \_\_\_\_\_-т


Төслийн тухай.

БНСУ-ын Ерөнхий сайд Хван Гё Ан 2015 оны 12 дугаар сарын 15-17-нд Монгол улсад албан ёсны айлчлал хийх үеэр Монгол улсын Ерөнхий сайд Ч.Сайханбилэг Цаг уурын ажиглалтын автомат станцын сүлжээг Монгол улсад байгуулах талаар хүсэлт тавьсан билээ.

Энэхүү хүсэлтийг ажил хэрэг болгохыг дэмжиж БНСУ-ын Цаг уурын байгууллага манай талд төслийн баримт бичгийг боловсруулан 2 дугаар сарын 29-ны дотор БНСУ-ын Элчин сайдын ямаар дамжуулан ирүүлэхийг хүссэн захидал ирүүлсэн ба 2016 онд төслийн судалгааг хийж 2017 оноос эхлэн уг төслийг хэрэгжүүлж эхлэх боломжтой болсоныг мэдэгдлээ.

Иймд тус газраас "Монгол орны байгалийн гамшигт үзэгдлийг урьдчилан мэдээлэх, эртнээс сэрэмжлүүлэх цаг уурын ажиглалтын автомат станцын сүлжээ байгуулах" төслийн баримт бичгийг монгол, англи хэл дээр боловсруулан үүгээр хүргүүлж байна. Хүлээн авч танилцан дэмжлэг үзүүлэхийг хүсье.

Хүндэтгэсэн,

ДАРГА  Д.ЦОГТ-ОЧИР

RECEIVED  
16.2.26

Director General of NAMEM\*\* and Ch.Saikhanbileg\*, Prime Minister of Mongolia, requested Korea to support for installation of automatic weather observation system(AWS) in Mongolia (2015 Dec.)

\* Korea-Mongolia Prime Minister Dialogue(2015)

\*\* Korea- Mongolia High Level meeting(2015)

NAMEM officially requested support of the project by submitting PCP through Korean Embassy in Mongolia. (2016. Feb.)



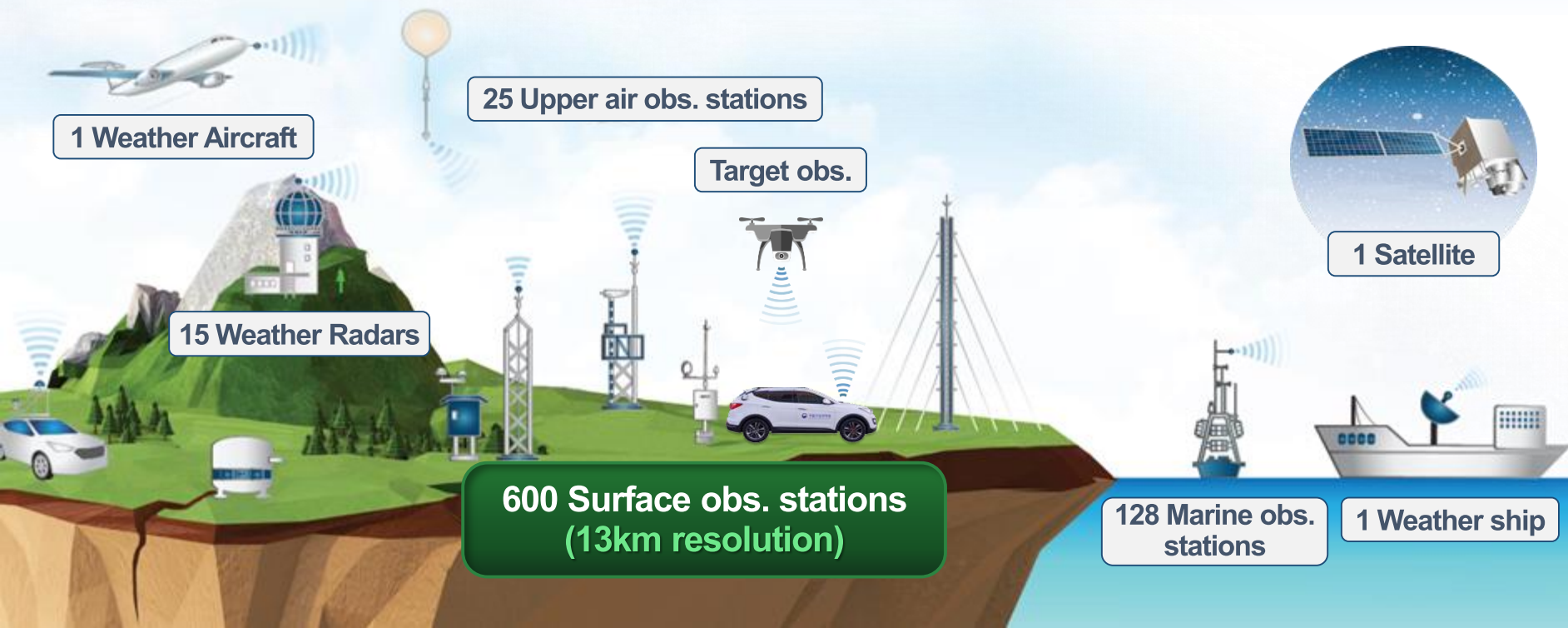
# High Resolution Weather Observation System

Based on Korea's experience in operation and management of automatic weather observation system, KMA and KMI provide technical assistance for Mongolia

## Korea's weather observation network

**The world's No.1 density** surface observation network

Surface observation network is **4.3 times denser** than WMO recommendation



# Installation of the Automatic Weather Observation System in Mongolia

The project aims to improve response capacity to natural disasters and reduce damage to residents by building a **real-time meteorological observation system** in Mongolia.

## Project Summary

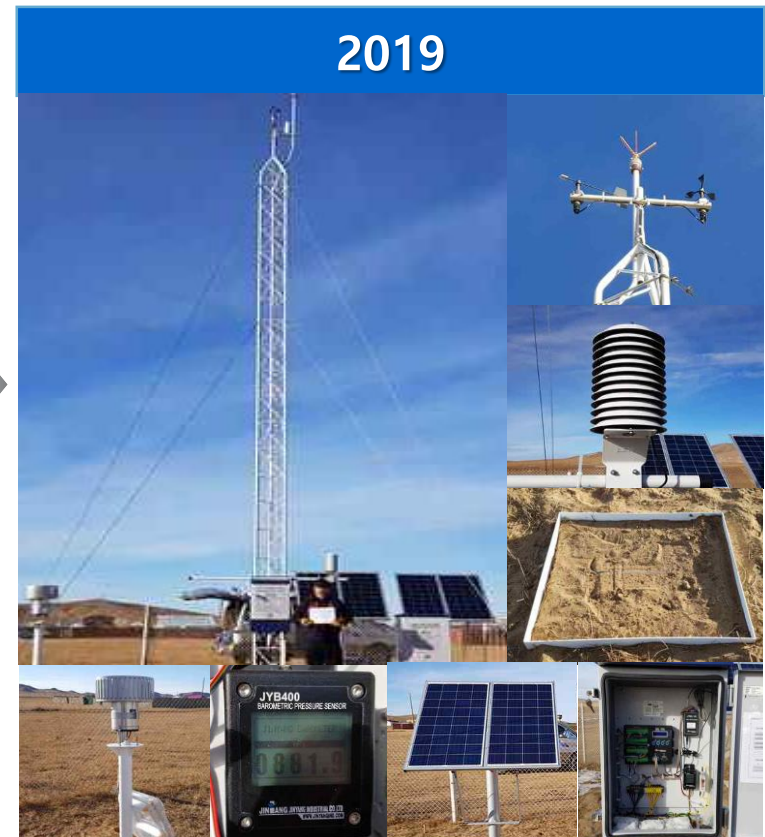
- **Period/ Budget** : 2017-2019 (3 years) / 4 M USD
- **Country/Partner** : Mongolia / NAMEM
- **Target Location** : Ulaanbaatar, Tuv, Bulgan, Arkhangai
- **Project Activities**
  - Installation of Automatic Weather Station(32 sites)
  - Installation of analyzing, displaying and monitoring system of meteorological information in Mongolia
  - Capability building of staffs in NAMEM by invitational training



Installation of the Automatic Weather Observation System in Mongolia

# Automatic Weather Observation System

The project contributed to enhance response capacity and **efficiency of natural disaster monitoring** by installing real-time automated meteorological observation system



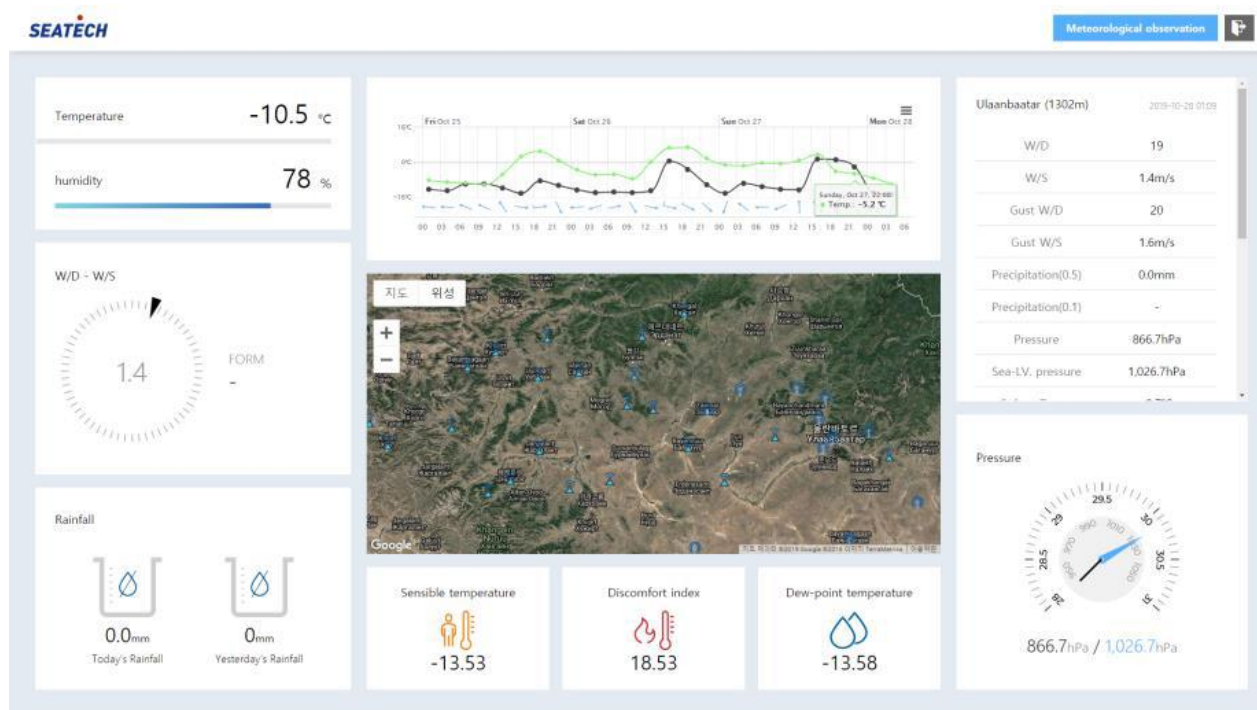


## Installation of the Automatic Weather Observation System in Mongolia

# Integrated Data System

The project also provided **integrated data collection and display system** which include not only 32 AWSs installed by KMA but also NAMEM's existing 330 observation stations.

### Observation data collection, analysis and display system



The screenshot displays the ST-IDP (Integrated Display Program) login interface. The interface is dark blue with white text and buttons. It includes the following elements:

- Logos:** South Korean and Mongolian flags.
- ST-IDP:** Integrated Display Program.
- Input Fields:** ID and Password.
- Buttons:** LOGIN and SIGN UP.
- Checkboxes:** ID Remember (checked).
- Footer:** ST-LAU and Copyrights © SEATECH. All rights reserved.

# Installation of the Automatic Weather Observation System in Mongolia

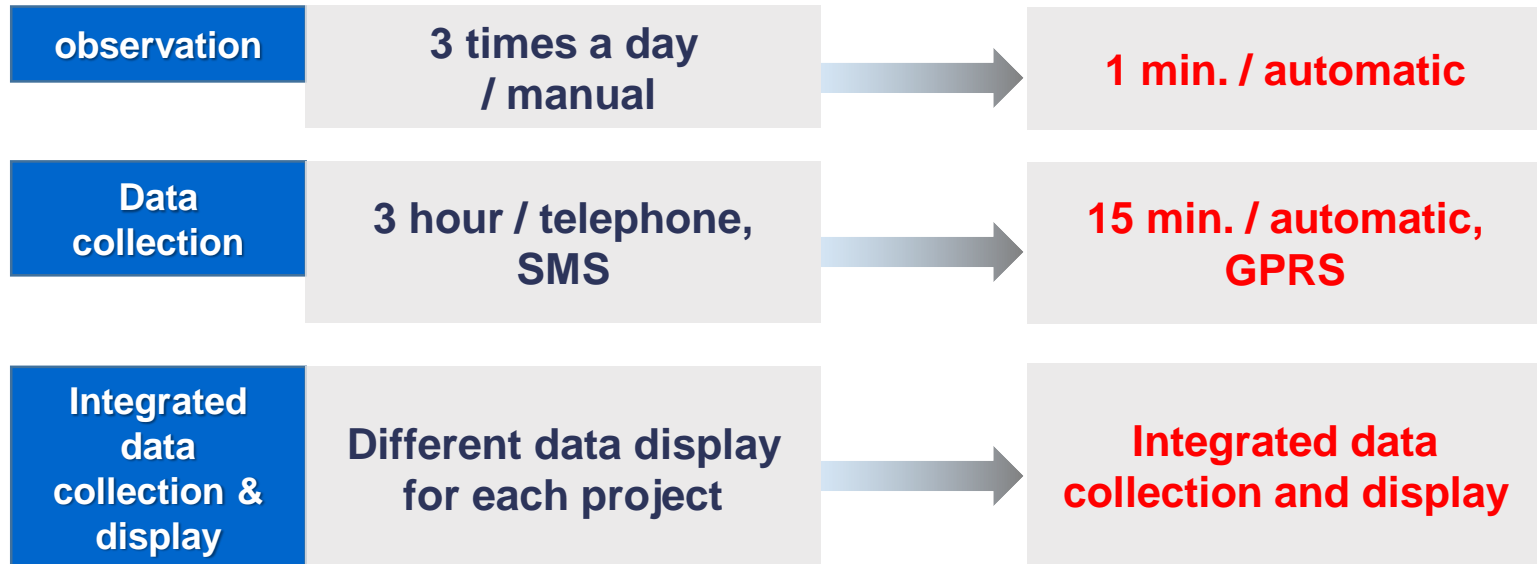
## Capacity Building

35 staffs in NAMEM improved natural disaster monitoring capacity through invitational trainings and long-term training of trainer (TOT) program.

### Invitational training for system operation and maintenance



# Improved Efficiency in Weather Observation



**Enhanced weather forecasting and disaster preparedness and response capacity of NAMEM**





Background

## Needs for Remote Observation in Cambodia

Cambodia has only one meteorological radar and still much of its territory does not have enough observation station. Satellite observation which could cover whole territory is cost efficient and effective way to secure decent weather observation data for Cambodia.

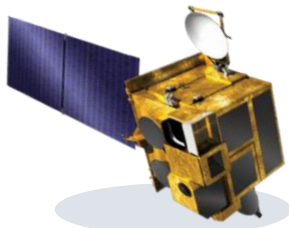


# GEO-KOMPSAT-2A(GK2A)

Korea launched the GK2A Satellite in 2018 as a next generation geostationary meteorological satellite after the COMs. It performs meteorological and space weather observation task

## COMS

Launched in June, 2010



- 1 **Communication** Payload
- 2 **Ocean** Payload
- 3 **Meteorological** Payload

## GK2A Satellite

Taking over  
the role of the  
COMS

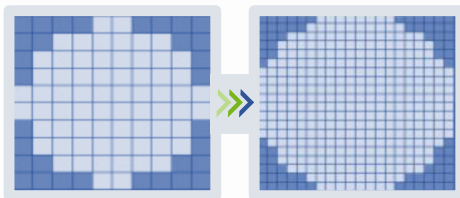


### Basic Specification

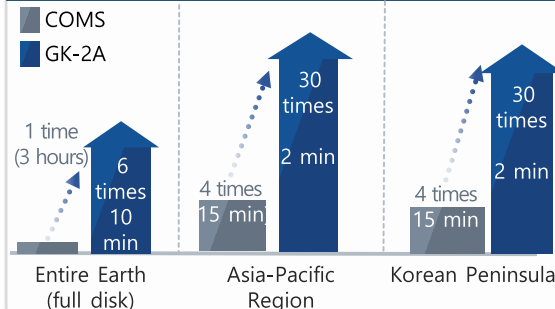
<b>Payload</b>	Meteorological payload, space weather payload	<b>No. of Channels</b>	16 channels, 3 types of space weather channels
<b>Weight</b>	2,849kg	<b>Lifespan</b>	10 years

### Improvement of spatial resolution

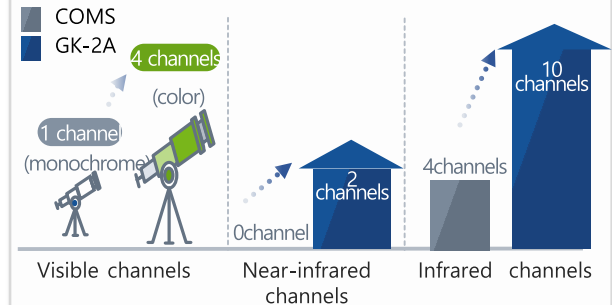
Visible 1km ▶▶ 0.5km    Infrared 4km ▶▶ 2km



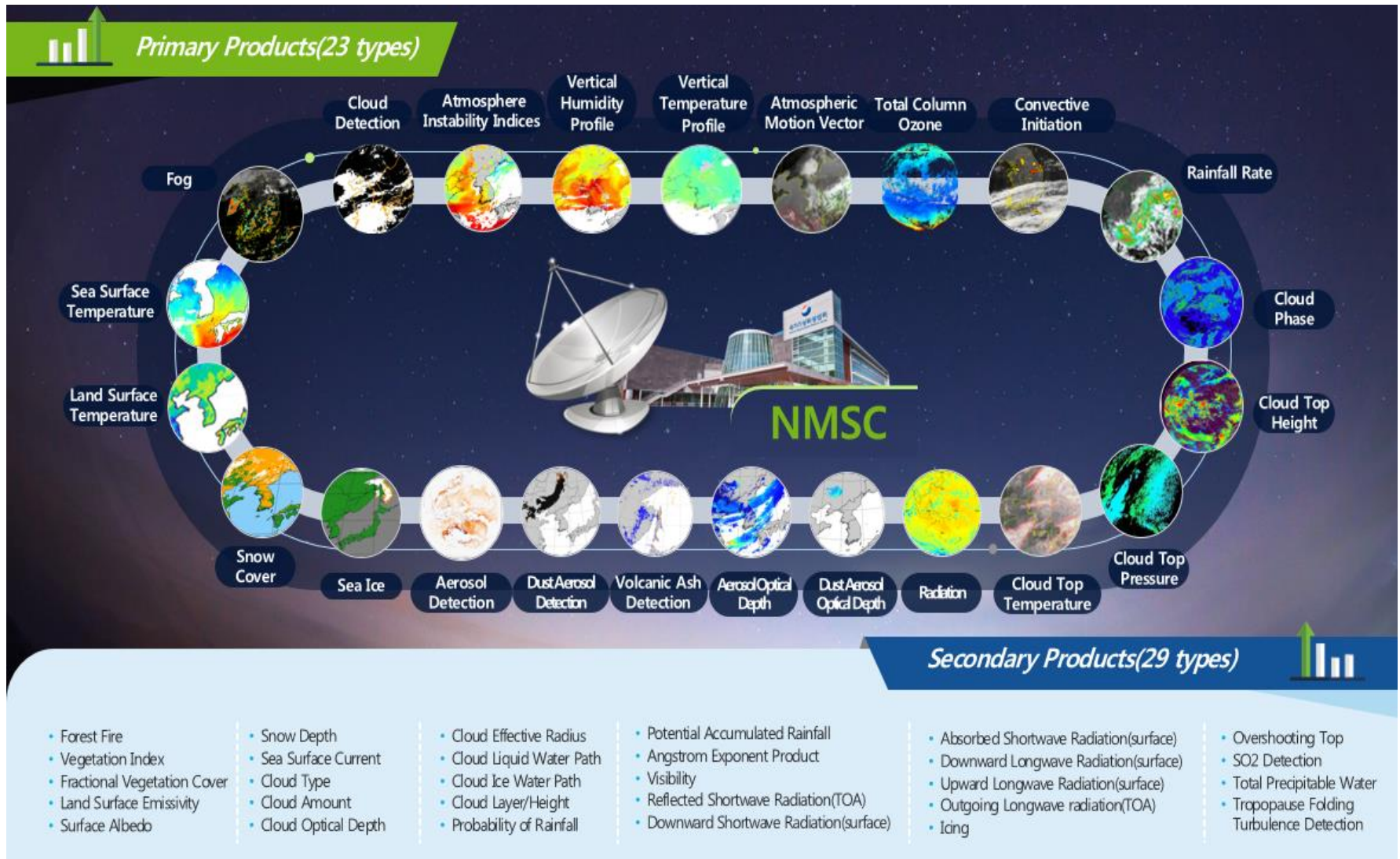
### Increase of observation frequency



### Increase of the number of channels

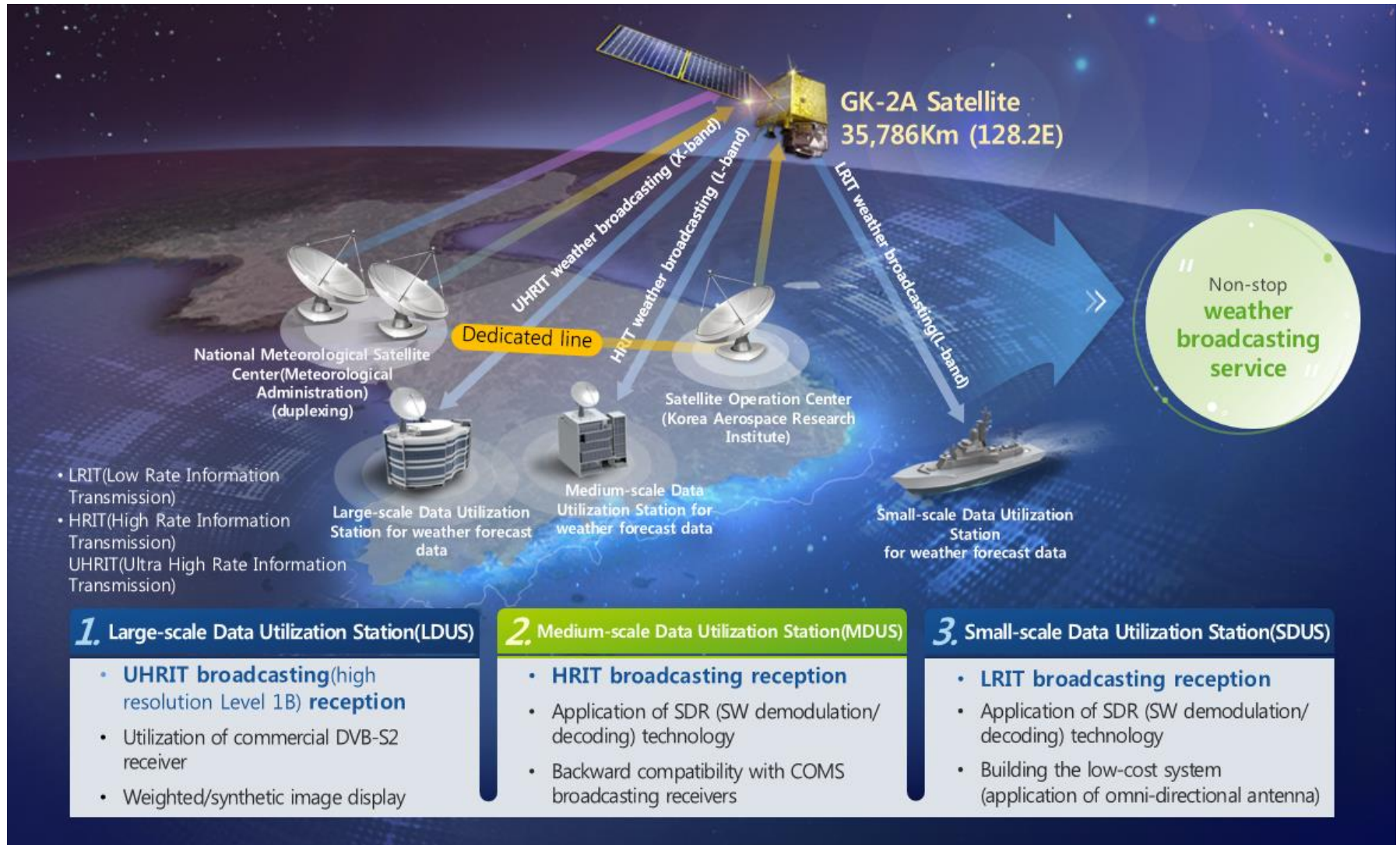


# GEO-KOMPSAT-2A





# GEO-KOMPSAT-2A



# Support of the GEO-KOMPSAT-2A Receiving and Analysis System in Cambodia

The project aims to improve responses to natural disasters and reduce damage to residents by building a meteorological satellite, GK2A receiving and analysis system in Cambodia.

## Project Summary

- **Period/ Budget :** 2020-2023 (3 years) / 3 M USD
- **Country/Partner:** Cambodia / DOM, MOWRAM
- **Target Location:** DOM HQ, Phnom Penh
- **Project Activities**
  - Installation of GK2A receiving and analysis system
  - Investigation of the meteorological status and relevant Infrastructure for meteorological satellite utilization in Cambodia
  - Capability building of staffs in MOWRAM by invitational training






# Technical Survey

For customized system design KMI conducted technical survey on the current status of DOM's satellite data utilization, candidate sites, infrastructure such as electricity, internet connection, etc.

## Online & Off-line Technical Survey (2020~21)



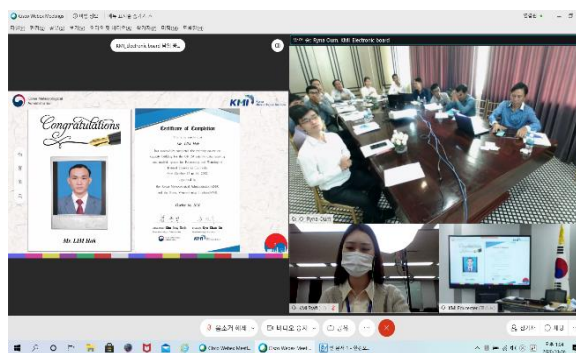
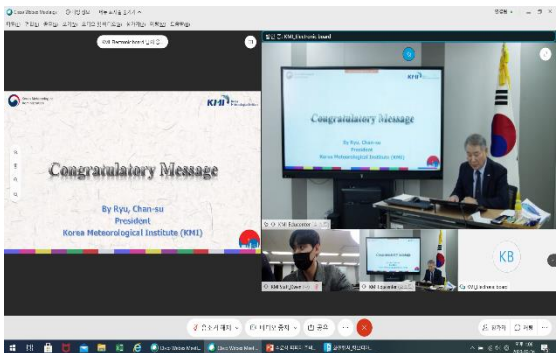
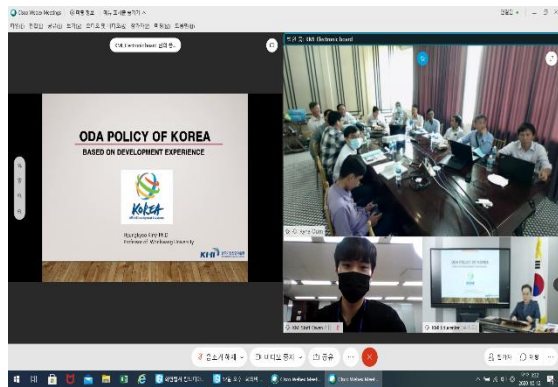
Cambodia Satellite Questions		
No.	Subject	Questions
1	Installation of antenna at parking lot	<ul style="list-style-type: none"><li>Trees and obstacles surround the antenna need to be removed if they disturb data receiving.</li><li>Is the candidate installation site for antenna (blue area) over 8m x 8m?</li><li>Part of parking (black area) lot could be torn down for the antenna installation.</li></ul> <p>The installation of antenna at parking lot is OK.</p>
2	Construction for electricity and telecommunication	<ul style="list-style-type: none"><li>It is required that the line (the electricity, telecommunication, etc) which covers from the antenna to the situation room should be constructed inside of the building (yellow line).</li><li>The electricity and telecommunication line can be installed in yellow line, but the installation service fee are not covered by MOVRAM.</li><li>How did you do the construction work for the electricity and the telecommunication line when installing Himawari?</li></ul> <p>The Himawari installation: first expert from japan come and check then they pay for electricity company installation.</p> <p>We'd like to set up an electricity and communication line inside the building. Please let me know if it's possible (please refer to the picture).</p> <p>Yes You can set up both line inside the building.</p> 
3	Situation Room	<ul style="list-style-type: none"><li>Please provide height of the situation room on the third floor.</li></ul> <p>The height of the room is 2,60 m.</p>
4	Electricity, Telecommunications	<ul style="list-style-type: none"><li>Power requirements: Total power(25kw), Antenna voltage (380v), Other servers and storage(220v).</li><li>25kw of electricity is required to build the system. Is it possible for DOM to secure this power? And how much is the power supply of DOM HQ building?</li></ul>

# Support of the GK-2A Receiving and Analysis System in Cambodia

## Capacity Building

Due to COVID 19, on-line training was conducted for 13 staffs in DOM to improve understanding on meteorological satellite system operation and utilization.

### Online Training for System Operation (Oct 12-16, 2020)



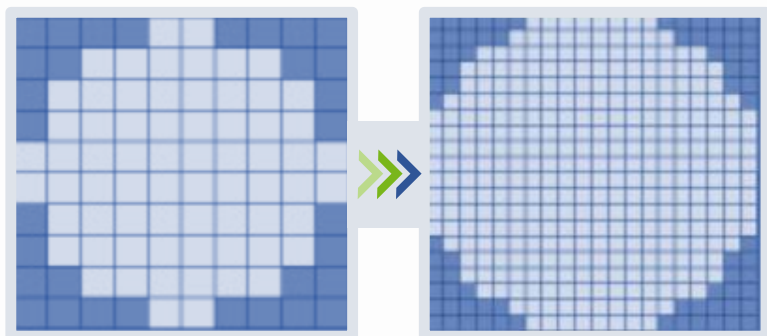
# Improvement in Observation Capacity

The project will improve weather and climate monitoring and forecasting capacity of DOM by providing remote observation system such as GK2A receiving and analysis system.

## Improvement of Spatial Resolution

Visible 1km ►► 0.5km

Infrared 4km ►► 2km

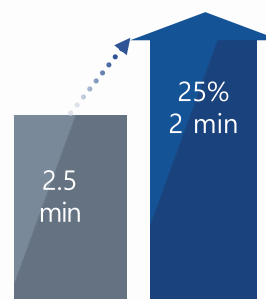


## Increase of Observation Performance

Existing satellite data

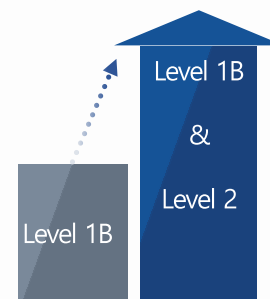
GK-2A

### Observation Frequency



Asia-Pacific Region

### Type of Data



**Enhanced Disaster Response Capacity of DOM**



Background

# Needs for Typhoon Response in Lao PDR

Laos has an average of 150,000 victims from typhoons each year.

In 2018 typhoon Son-Tinh and Bebinca damaged \$147 million and made \$ 224 million of production loss.





# Enhanced Severe Weather Response Utilizing an Integrated Typhoon Monitoring and Forecasting Platform in Lao PDR

The project aims to enhance response capacity to typhoon hazards, reduce economic damage, and improve safety of people in Lao PDR by monitoring and forecasting typhoons with Typhoon Operation System (TOS).

## Project Summary

- **Period/ Budget** : 2020-2023 (4 years) / 3.4 M USD
- **Country/Partner** : Lao PDR / DMH, MONRE
- **Target Location**: DOM HQ, Phnom Penh
- **Project Activities**
  - Investigation of the meteorological status and relevant infrastructure for integrated typhoon monitoring and forecasting platform in Lao PDR
  - Installation of TOS and GK2A receiving and analysis system at DMH
  - Capability building of staffs in DMH by invitational training



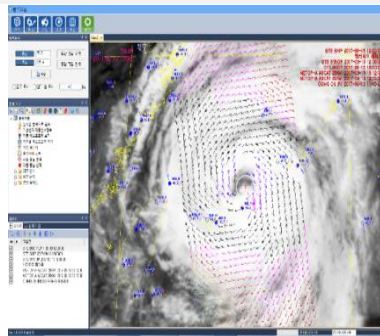
## Enhanced Severe Weather Response utilizing an integrated Typhoon Monitoring and Forecasting Platform in Lao PDR

# Typhoon Operation System

TOS is an integrated platform for typhoon monitoring, analysis and forecasting which developed and introduced by KMA in 2018.

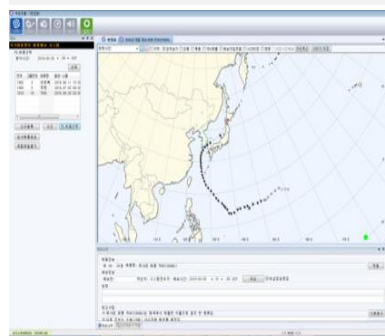
### Module and Function of TOS

#### Analysis Module



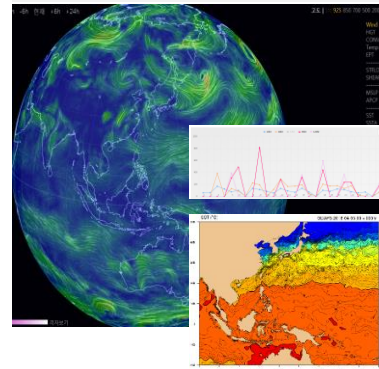
Aggregate observation data  
Real-time analysis  
→ Forecast initial value

#### Forecast Module



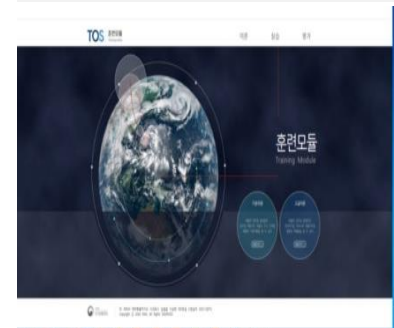
Refer to ensemble model predictions  
Produce curved forecast track

#### Statistics Module



Administrate statistical information  
Monitor TC genesis, intensification & decay  
Auto alarming record-breaking events

#### Training Module



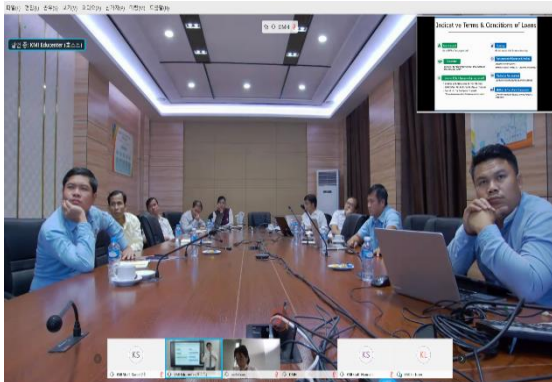
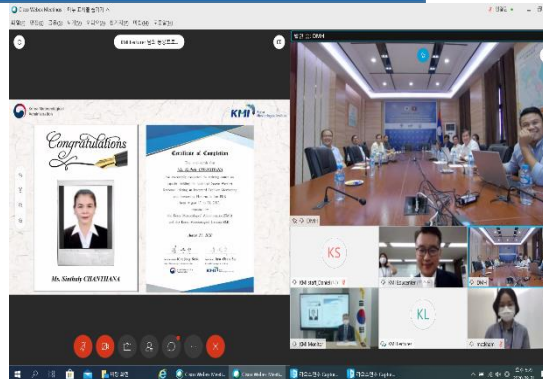
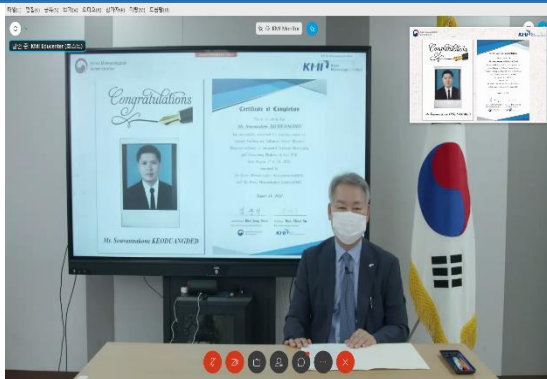
Theory-Case bilateral training  
Register training TC case at forecast operation

# Enhanced Severe Weather Response utilizing an integrated Typhoon Monitoring and Forecasting Platform in Lao PDR: Implementation Status

## Capacity Building

Due to COVID 19, on-line training was conducted for 9 staffs in DMH to improve understanding on TOS and weather observation system.

### Online Training for System Operation (Aug 17-21, 2020)



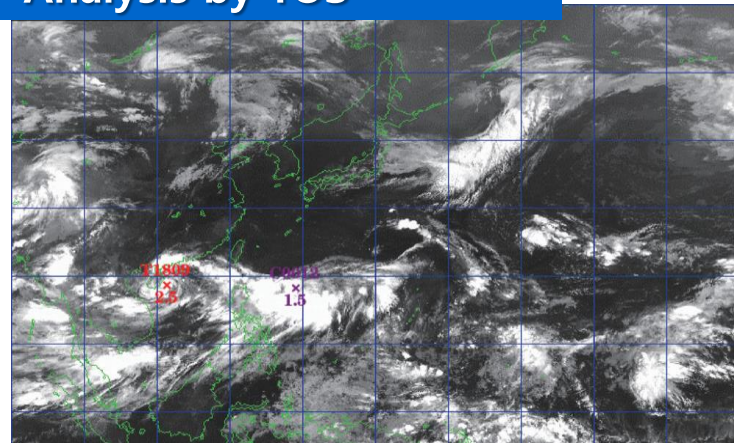
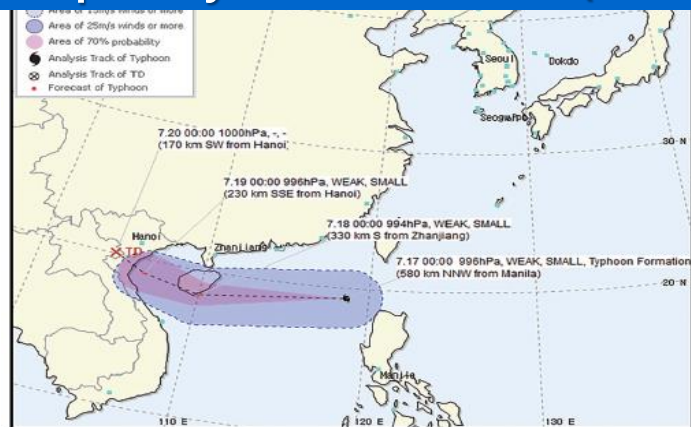


Enhanced Severe Weather Response utilizing an integrated Typhoon Monitoring and Forecasting Platform in Lao PDR: Expected Outcome

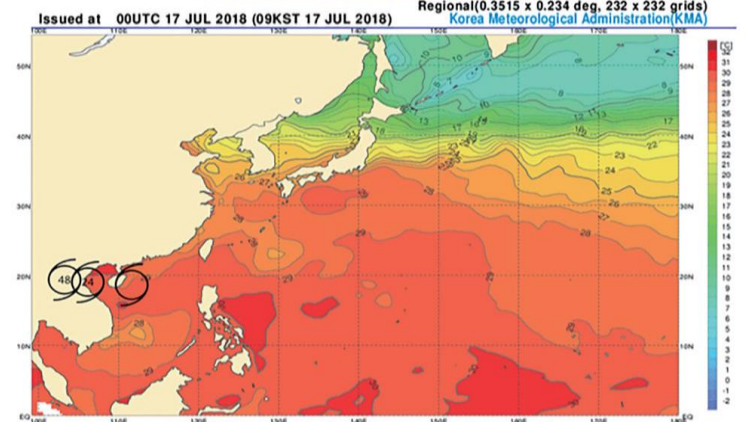
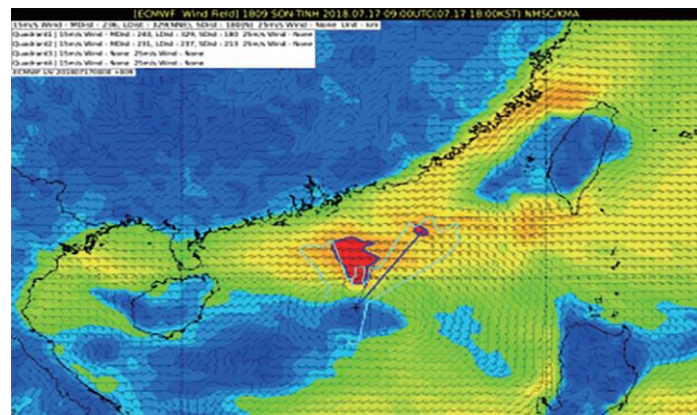
# Enhanced Extreme Weather Response Capacity

Through the project DMH will have real time typhoon monitoring, analysis, and forecasting capacity. It will be critical to prevent social-economic damages by typhoon.

## Tropical cyclone 'SON-TIHN(2018)' Analysis by TOS



The Analysis of Sea Surface Temperature







# **| Pipeline Projects**

### Philippines

- **Project title:** Improving disaster management governance capacity in Cambodia by using integrated meteorological solution based on Geostationary-satellite
- **Period/ Budget :** 2023-2027 (5years) / 10 M USD
- **Country:** Cambodia
- **Partner:** MOWRAM, NCDM
- **Contents**
  - Technical training for meteorological disaster management
  - Installation of Disaster information delivery system
  - Forecasting and Early warning Technology transfer
  - Establishing Interagency Coordination platform
  - Training on improving disaster response awareness



### Mongolia

- **Project title:** Installation of Integrated System for Meteorological Observation Data in Mongolia
- **Period/ Budget :** 2022-2025 (4years) / 3.7 M USD
- **Country:** Mongolia
- **Partner:** NAMEM
- **Contents**
  - Installation of 20 Automatic Weather Stations
  - Installation of 1 upper air observation station(Radiosonde)
  - Installation of Integrated system for Meteorological observation data
  - Technical training for managing Meteorological observation data



# Lesson Learned & Challenges

## Project design reflecting needs of partner country to secure the sustainability

More accurate technical survey required in advance for project design considering partner countries climate, existing infrastructures, and their culture.

## Post-management need to be considered from the planning stage

Effort to secure financial and human resources required for O&M need to be made from the early stage considering internal process of partner country.

## Country ownership is the key for the successful implementation

How actively partner country involve and cooperate to the project affects project outcome. Project design must consider the ownership of the country.



# Lesson Learned & Challenges

## Limitation of technical oriented project

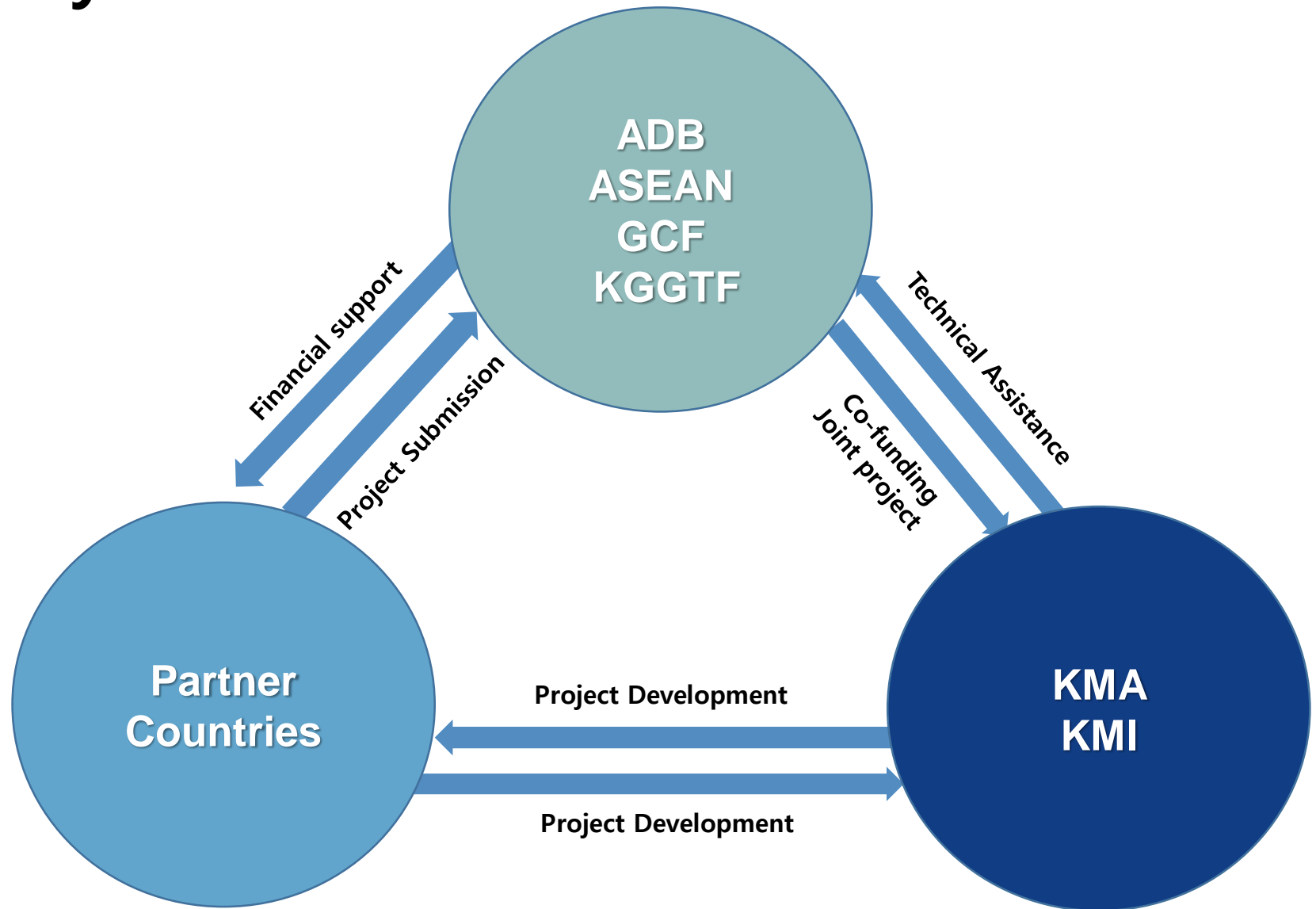
Due to the nature of the organization, KMA and KMI are focusing on technical solution. Thus, it is hard to address an end user's benefit in project design.

## Hard to address multi-sectoral issues only with meteorological solutions

Since weather and climate is critical in various sector such as agriculture, water resources, renewable energy, we need greater umbrella which could cover these issues and coordinate various stakeholders.


## Need for cooperation and collaboration among international communities

# Way forward





# THANK YOU



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