

# Implementation plan for space weather operation by Korea Meteorological Administration

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- Motivation
- Preliminary research on implementation plan for SWx operation by KMA
- Roadmap of implementation plan
- Ongoing Activities for SWx operation by KMA
- Issues

# Overview

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- What does KMA prepare the SWx operation for ?
- How does KMA make implementation plan for SWx operation?
- What is the implementation plan of SWx operation by KMA?

What does KMA prepare  
the SWx operation for ?



# Motivation

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- The Relevance of SWx to Meteorological services (WMO, 2008)
  - SWx relevance to the observing function
    - SCOPE of integrating SWx and meteorological observations
  - SWx relevance to the delivery of meteorological services
    - SCOPE for integrated services
- SWx operation is urgently required in Korea for KMA to be prepared for launching and operating Communication, Oceanic and Meteorological Satellite (COMS) scheduled in 1st half 2010
- Recently, space weather is increasingly being considered as an extension of terrestrial weather.



COMS



The Potential role of WMO in Space Weather (2008)

How does KMA make  
implementation plan for SWx  
operation?





Strong

Observation and public service infrastructure and experiences



Weak

No organization or resources allocated to SWx operation until 2008



Opportunities

SWx operation with public service responding to emerging needs of various customers



Threatening

Late Comers in SWx communities

## Preliminary research for Implementation plan



Collaborative works  
(2009)

ANALYSIS

WORKSHOP

POTENTIAL ROLE

PANEL DISCUSSION

PLANNING

DOCUMENTATION





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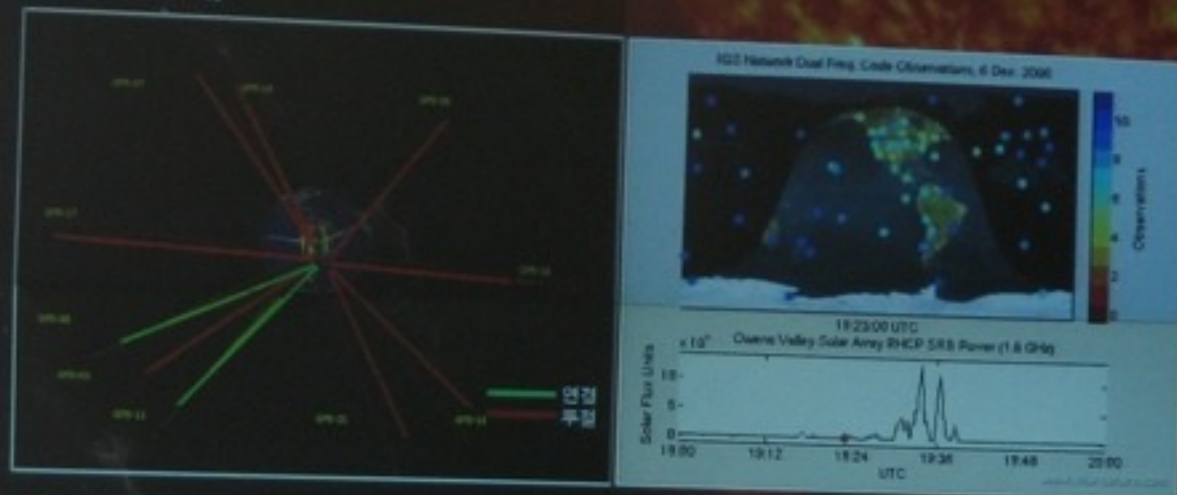
# Analysis

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- Internal Circumstances
  - MT vision 2040
  - organization and resources
  - Infrastructure of public service (forecast, nowcast, severe weather alert)
- Current status and plans in SWx activities by relevant organizations in Korea
- International collaboration activities for SWx operation

# 무기체계에 미치는 영향(계속)

## ■ GPS 체계



- GPS 신호 굴절 및 잡음비 증가로 GPS 위성 신호 두절 및 영향 사례
  - ➔ 2개의 위성을 제외하고 신호 두절 (1996년 10월, 남아메리카)
  - ➔ GPS 신호 수신율 저하로 인한 GPS 위성 수: 4개
  - ➔ GPS 신호 수신율 저하로 인한 GPS 위성 수: 2개 (12월)

출처: 연구소(AFRL)/Cornell University

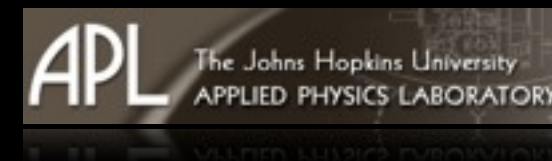




# Workshop

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- During the preliminary research period, workshop was held at KMA to promote the basic understandings of SWx phenomena and to share the information of SWx activities by the relevant organization in Korea.
- It consists of 3 sessions :
  - Invited talk by SWx researchers
  - Presentation for introduction of SWx activities from relevant organization
  - Panel discussion about the coordination of collaboration among SWx related organization.



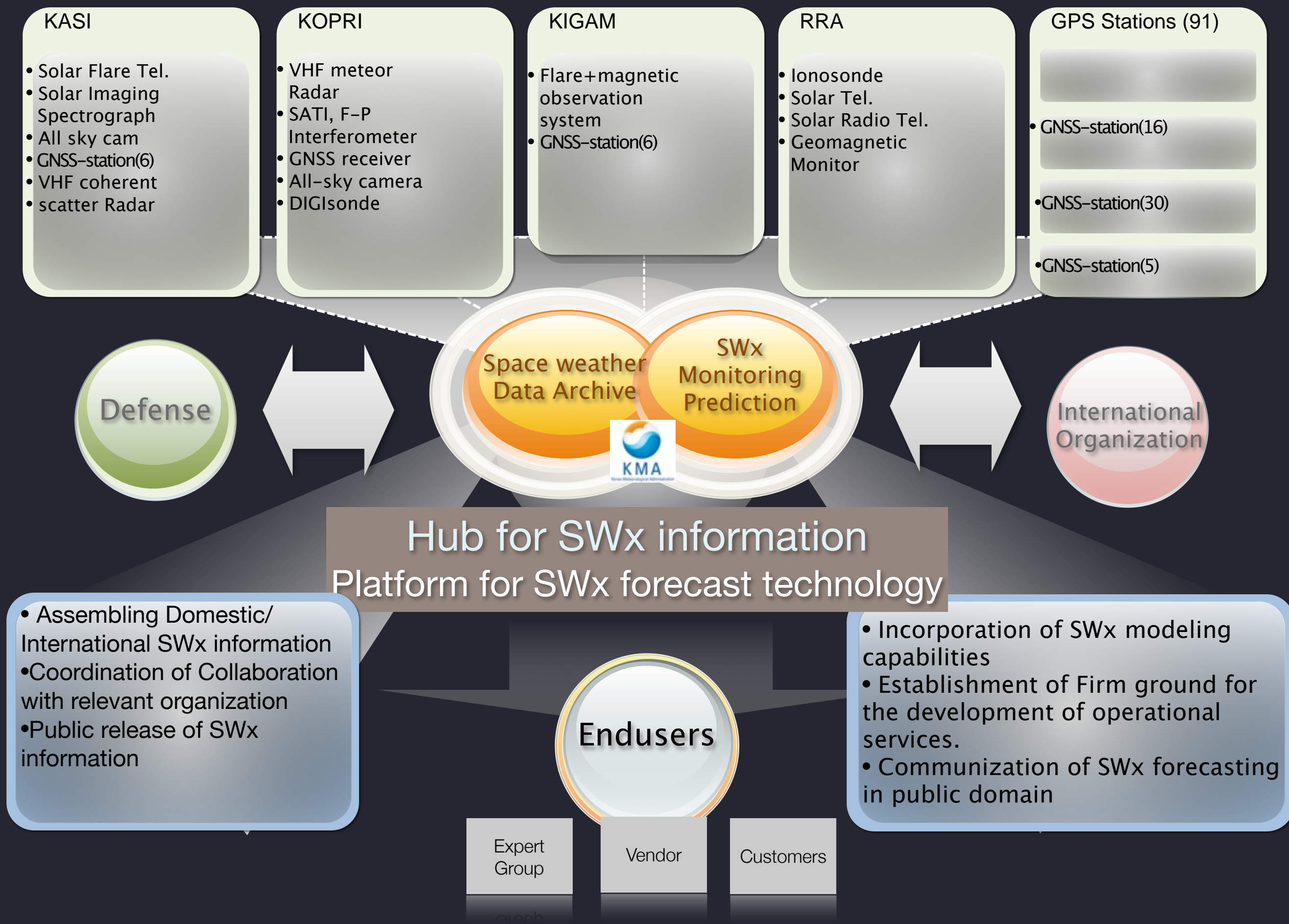
# Summary of Panel Discussion

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- Participants from almost all SWx-related organization in Korea shared their current status and position with each other.
- Panels and participants basically reach consensus on the need for coordination of collaboration in Korea, for instance, SWx council which represents all the SWx related organization. However, the concrete way on framing the collaboration remains pending issue.
- All the SWx relevant organization should try to make an effort to increase public awareness of the need for SWx activities in Korea.

What is the  
implementation plan of  
SWx operation by KMA?

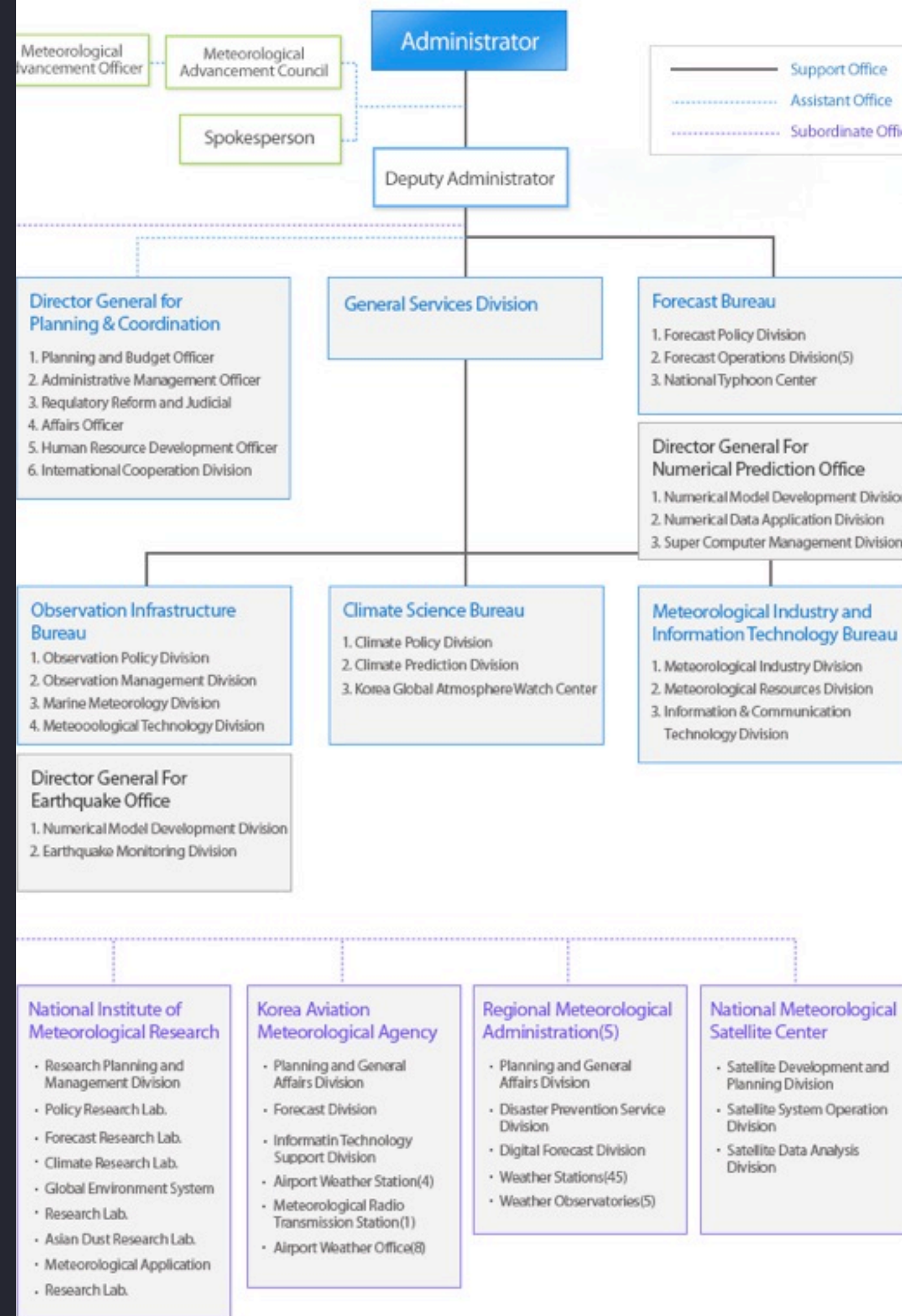






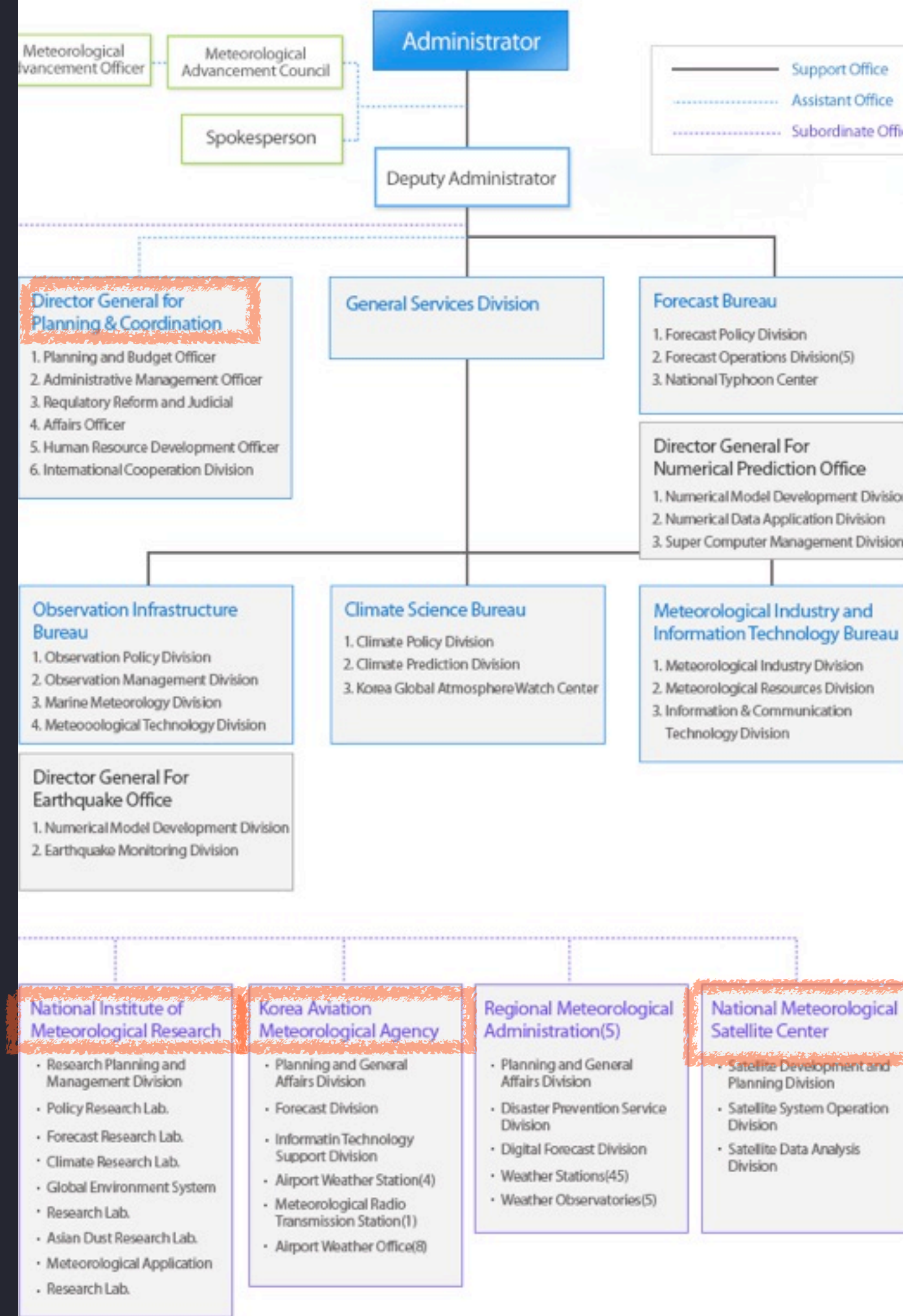
# Organization of KMA

- The coordination of plan is carried out by Director general for Planning & Coordination
- Currently SWx operation planned is assigned to Korea Meteorological Satellite Center
- The Korean Aviation Meteorological agency is expected to play an part to deliver the SWx information to the aviation relevant customers.
- National institute of Meteorological research plays a part to support SWx research activities.



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# Roadmap

2009

2010

2014

2017

Implementation Plan

SWx Monitoring &  
Forecasting

Infrastructure &  
Testbed

Operation &  
Public Service

SWx Data Archive &  
Service

Assembling &  
Common Data Base

SWx Data Center  
Operation

Space  
Observation

Feasibility Study  
Mission definition

Critical Design  
Application Development

Research &  
Development

Basic Research  
(Modeling/Application)

Leverage Technology

Coordination of  
Collaboration

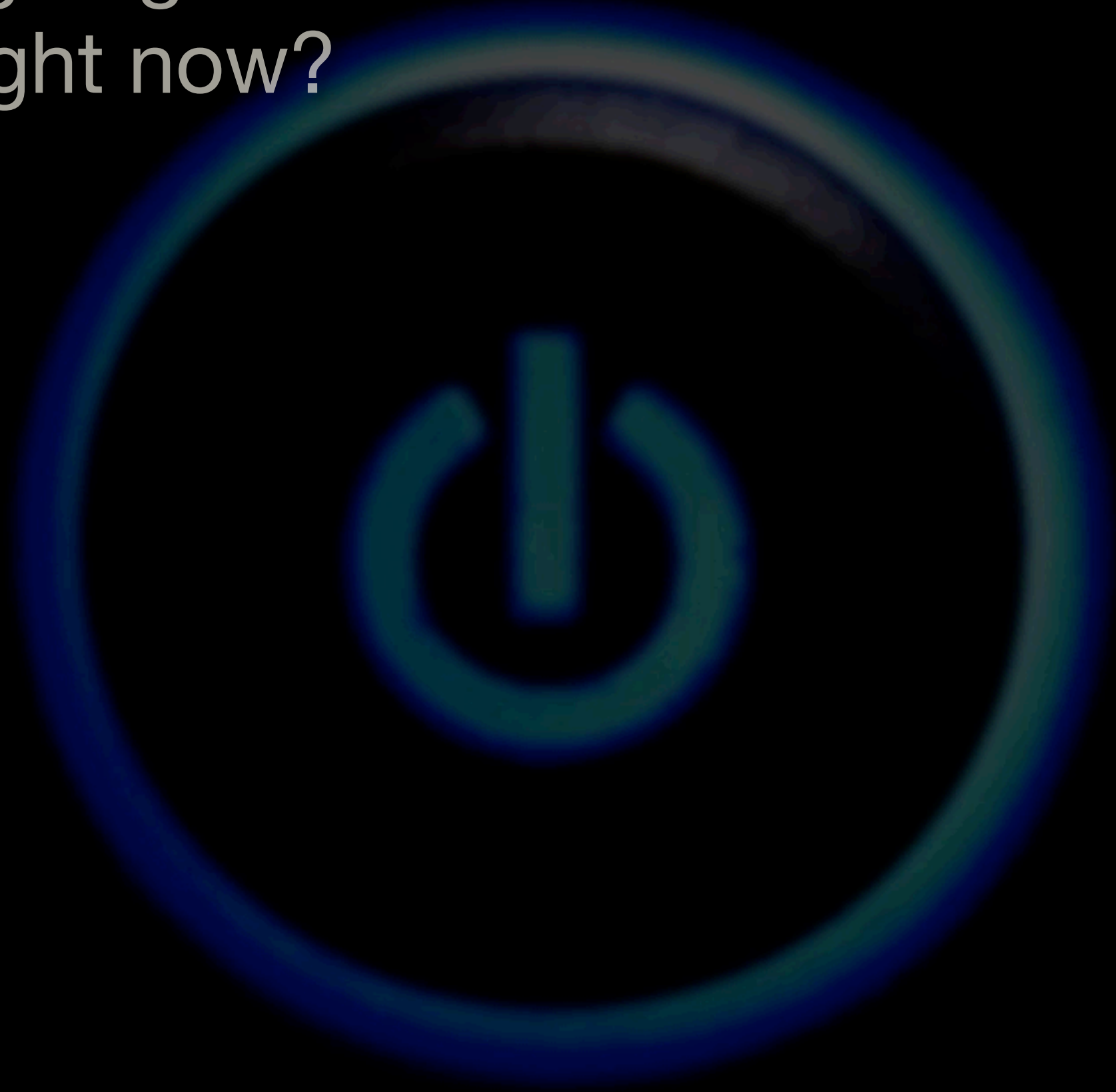
Dispatching  
a reaserch

SWx Forecasting  
Training Program

**SWx  
prediction  
Service**

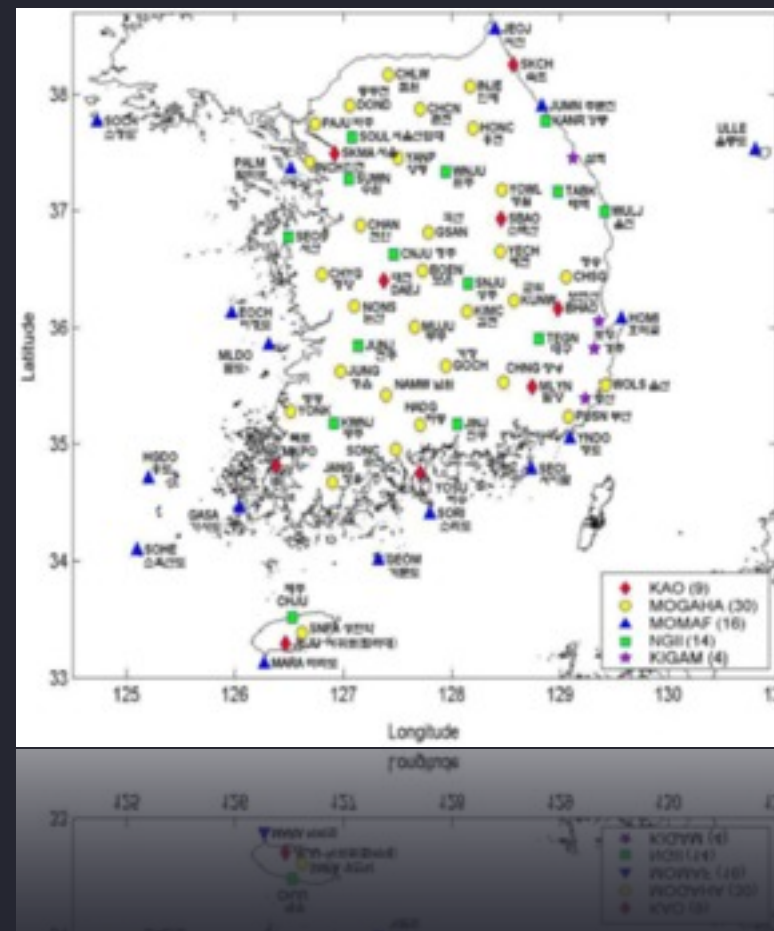
**SWx  
Data  
Distribution**

What is going on in KMA  
right now?



# Ongoing activities in 2010 -1

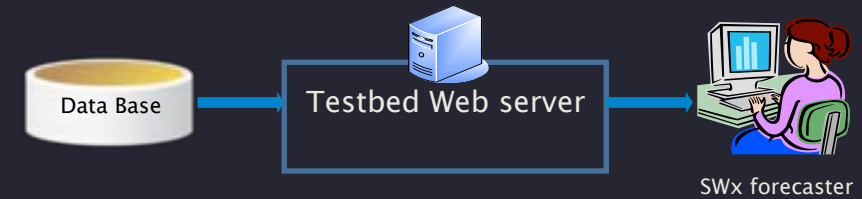
- KMA has launched a 4 year project for **integration of GNSS data** from nation-wide GNSS stations.
- The targeted number of **stations for integration is 91 stations** from KASI and National Geographic Information Institute (NGII) to get regional TEC map with approximately  $1^{\circ} \times 1^{\circ}$  spatial resolution.
- The TEC and the precipitable amount will be derived **aiming at being archived and distributed to users in real-time basis** with 30min cadency.



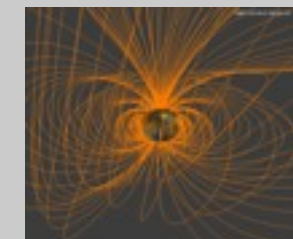
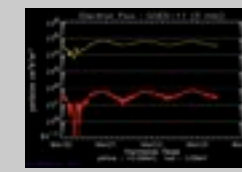
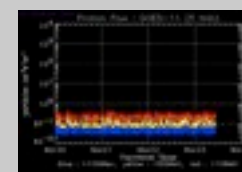
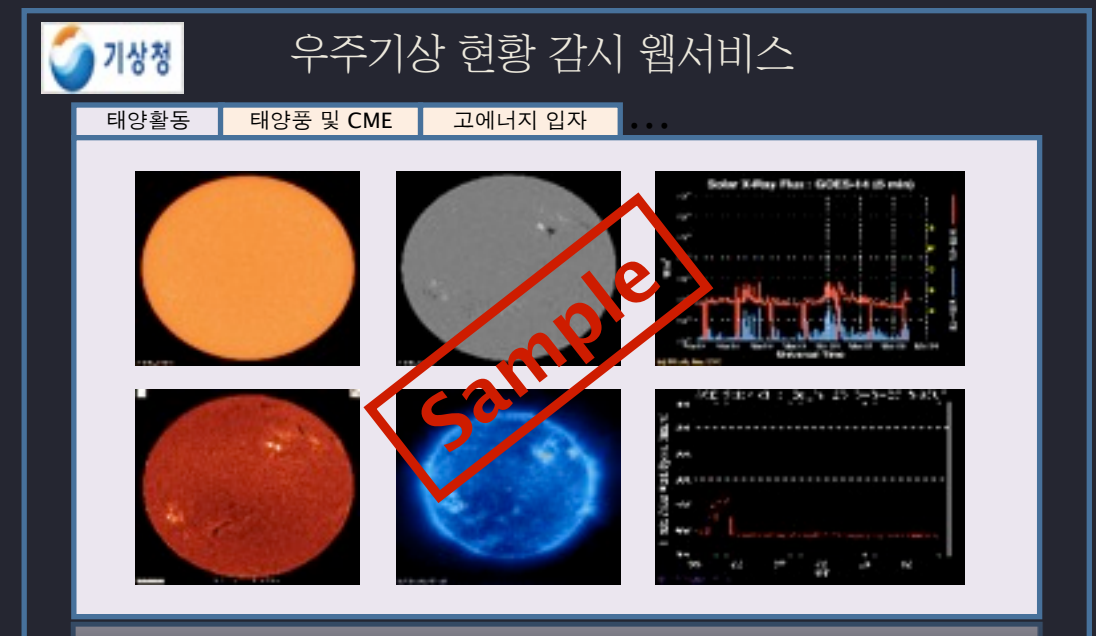
TEC with integration of GPS  
stations in Korea

# Ongoing activities in 2010 -2

- The development of space weather monitoring test bed is launched.
- The objective of the project is the trial operation after launching and operating KMA's meteorological Geo-stationary satellite.
- Applications of real-time monitoring data and incorporating modeling capabilities from the SWx research communities will be tested and challenged to assure to help a successful mission.



구축될 웹 기반 인터페이스의 예제

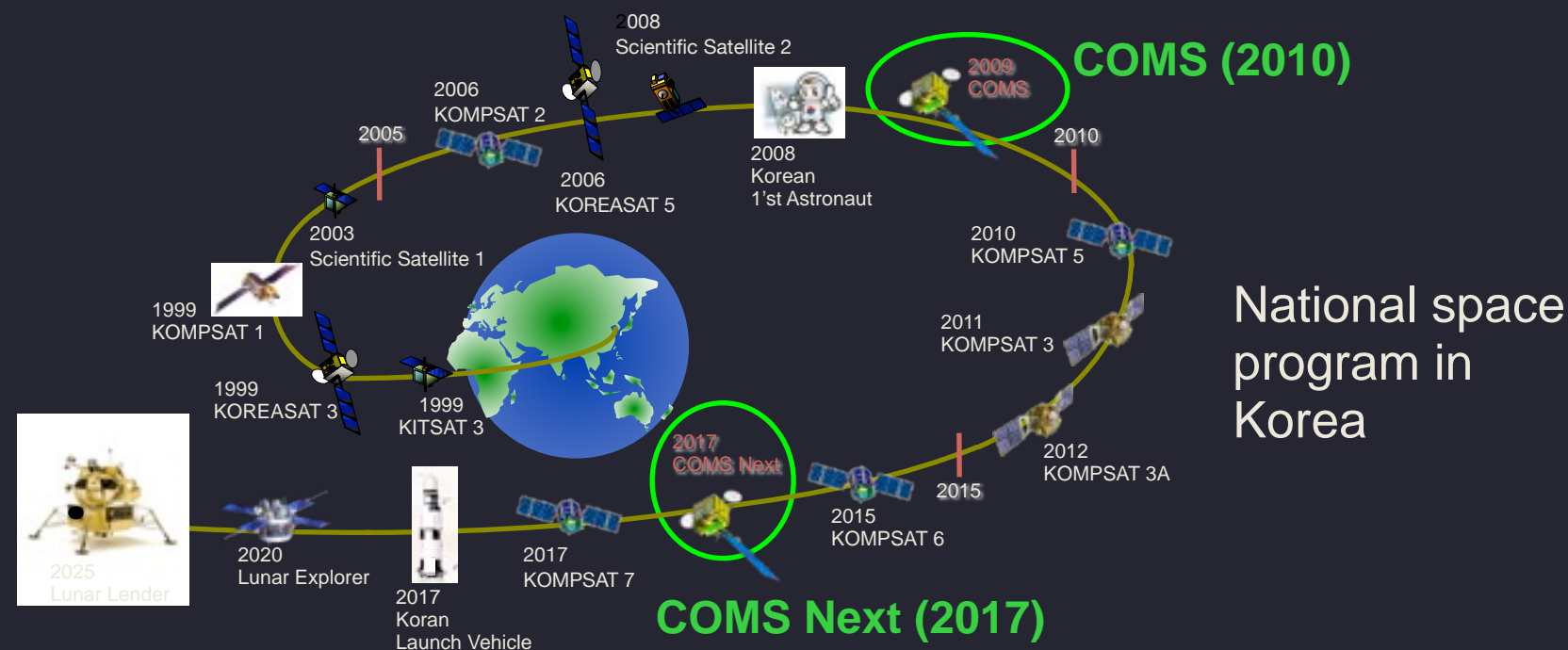


High energy particle and geomagnetic field

Testbed for SWx monitoring  
system



# Ongoing activities in 2010 -3



- The preliminary and feasibility study for meteorological mission of the follow-on satellite was finished in 2007 and 2008, respectively.
- COMS follow-on satellite program is scheduled to begin in 2011, and to be launched in 2017.
- KMA is planning to develop the payload for space weather as well as the high performance MI of the next generation satellite is now actively on proceeding.

# Summary

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- KMA has established the implementation plan for space weather operation carrying out preliminary research in collaboration with research communities.
- The implementation roadmap of the operation was planned considering the coordination of the activities and the time-lines of launching COMS & designing COMS-follow-on.
- In 2010, 1st year of implementation, KMA is actively on the way to perform the action items according to the implementation plan.









**KMA and relevant organizations in Korea are on the way to make their best efforts to coordinate to enhance collaboration.**



