

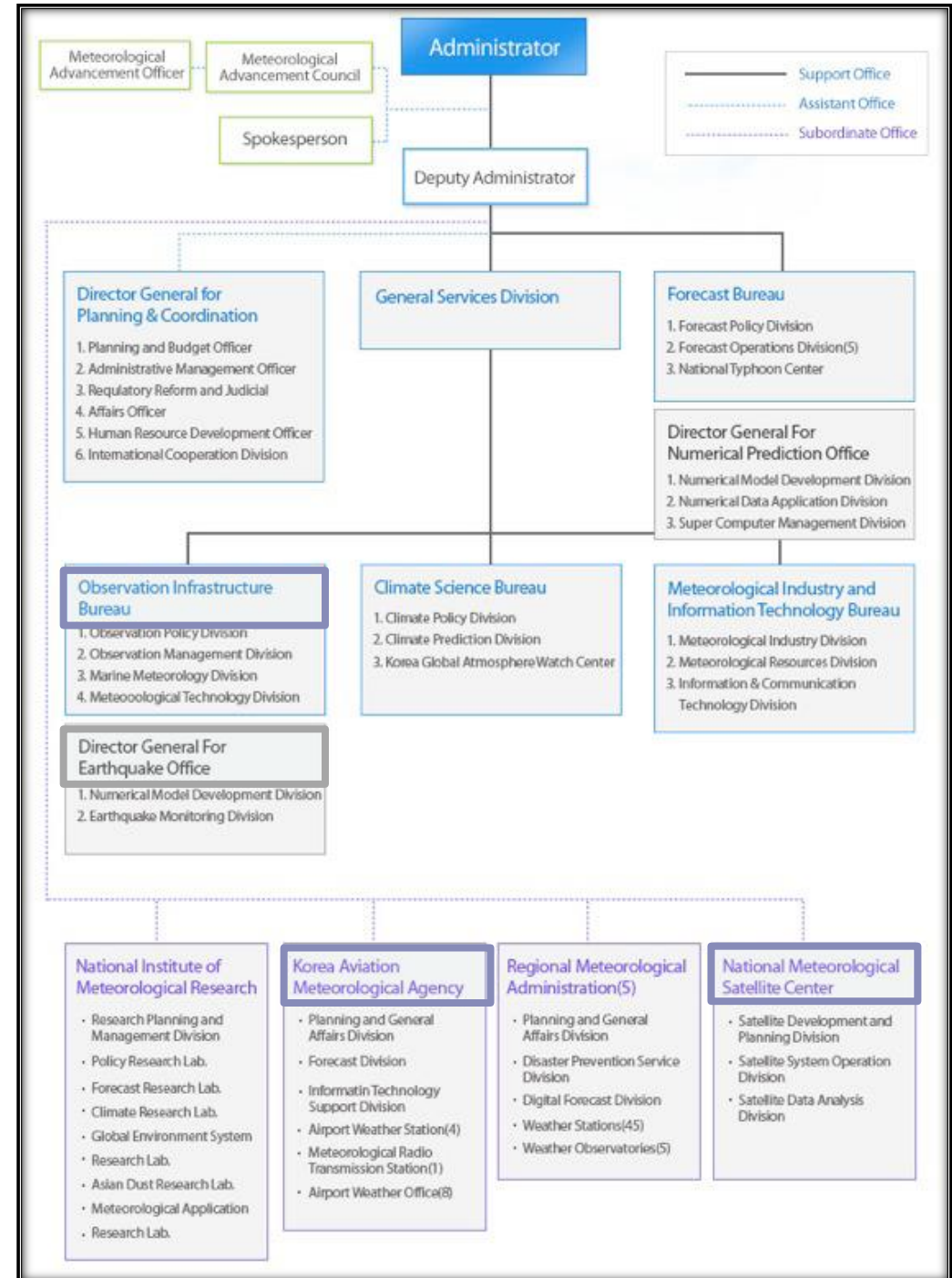
Current Status and Future Plan for Space Weather Services of Korea Meteorological Administration in 2011

Jae-Gwang Won, Dohyeong Kim, Myung Hwan Ahn

Korea Meteorological Administration

Organization of KMA & SWx

- OIB is responsible for establishing the basis of SWx matters, such as law, organization, collaborations, etc.
- NMSC is in charge of most of SWx activities, such R&Ds, public services.
- KAMA is expected to play an part to deliver the SWx information to the aviation relevant customers.



[1] Space Weather Information Utilization

- Ionospheric TEC map service
- Space Weather Monitoring system
- Satellite Environment Monitoring for COMS

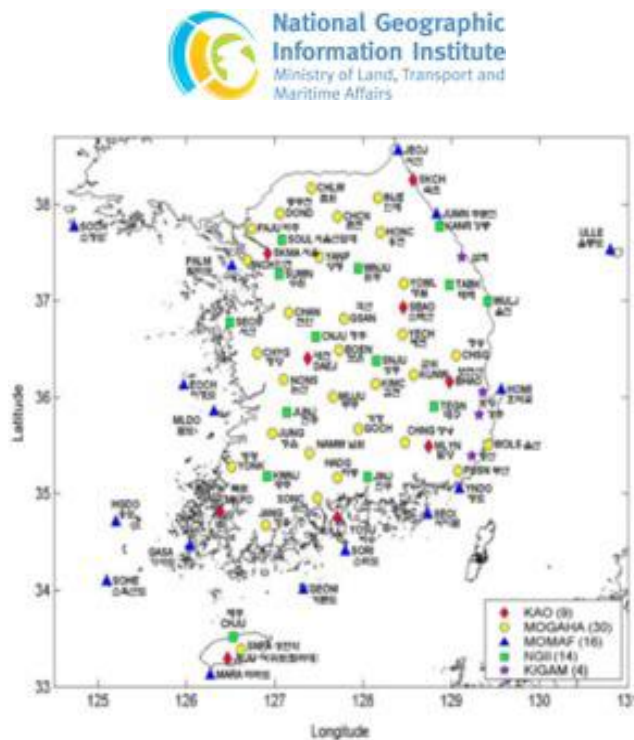
[2] Space Weather Forecasting Model (with KHU)

- Cooperative Research with Academies(Kyung Hee University, 2010-2014)

[3] Instrument for Space Weather Monitoring

- Payload on Korea's 2nd Geostationary Meteorological Satellite

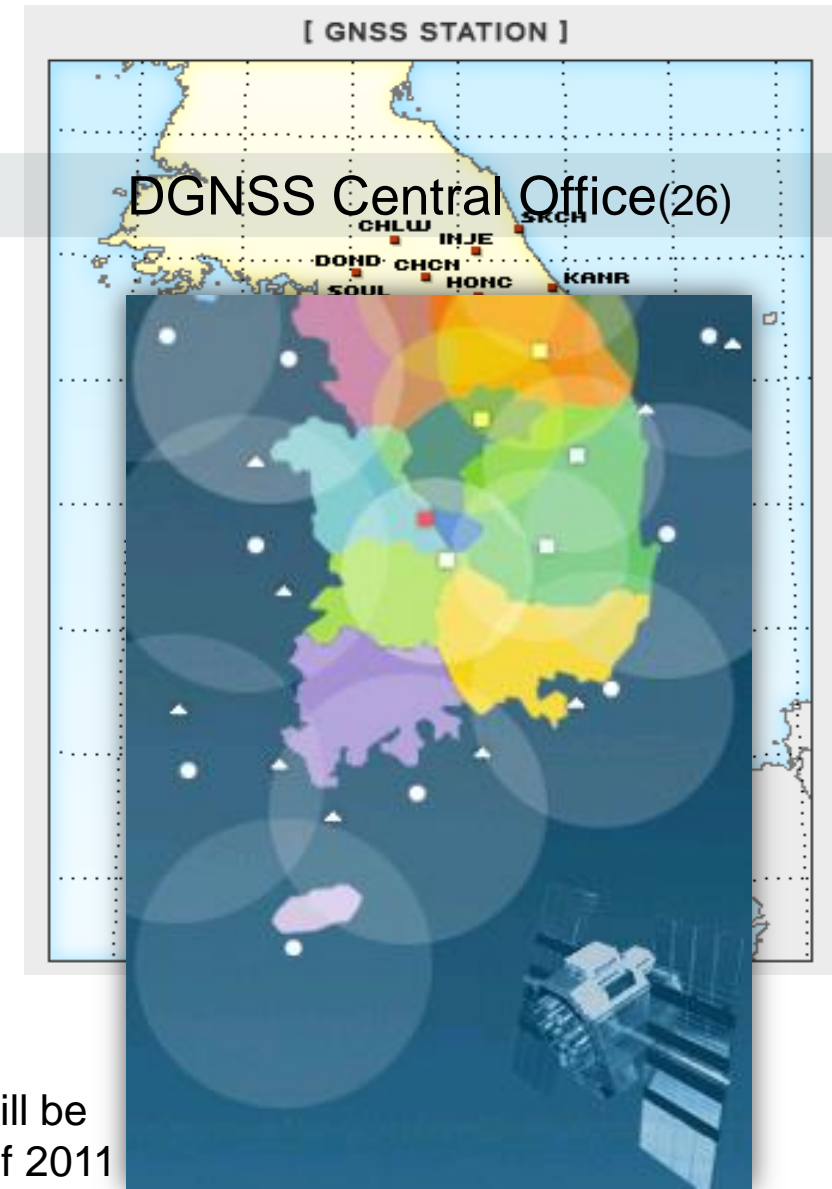
1. Integration system of Korean GNSS/GPS data



NGII – 46 stations



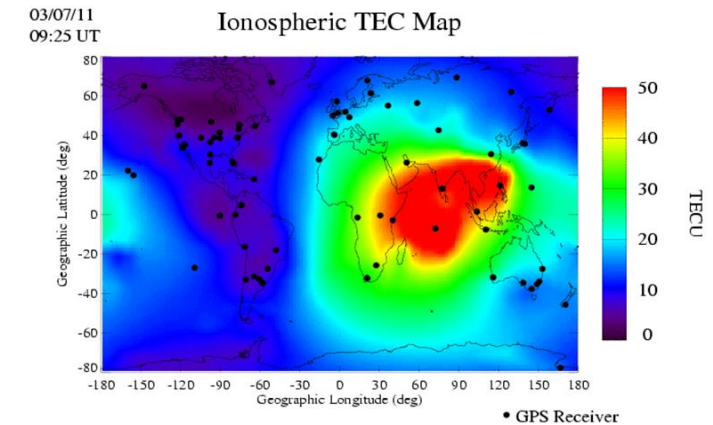
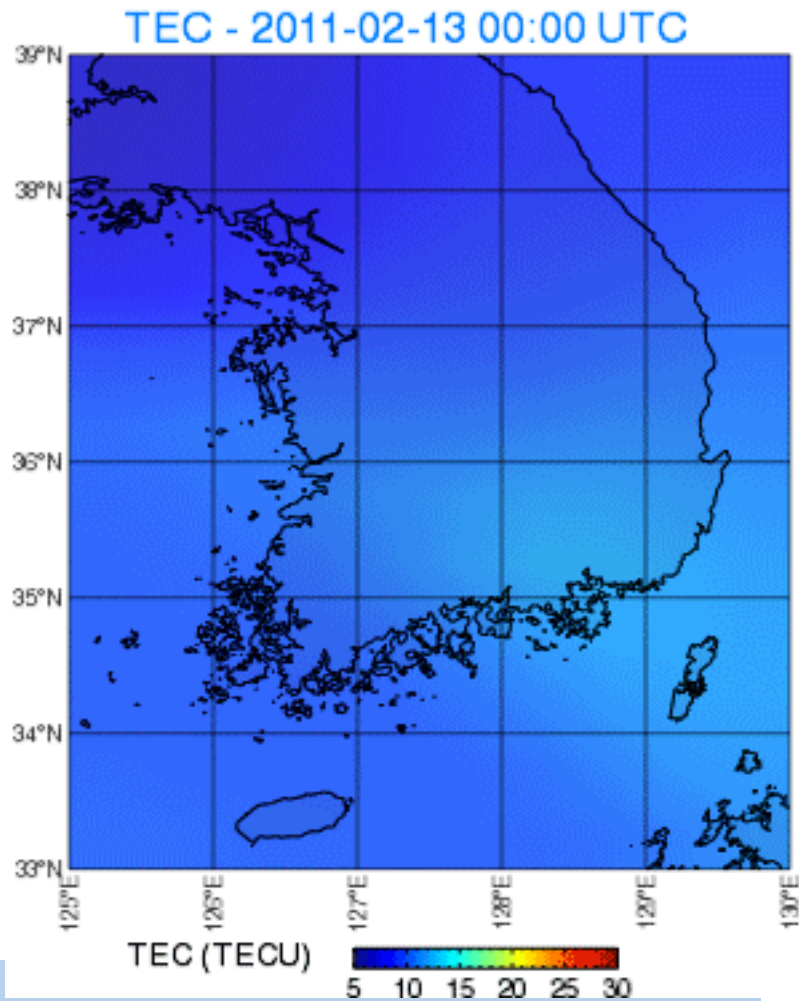
KASI – 9 stations



Over 80 GNSS data will be assembled by the end of 2011

2. Ionospheric TEC map service

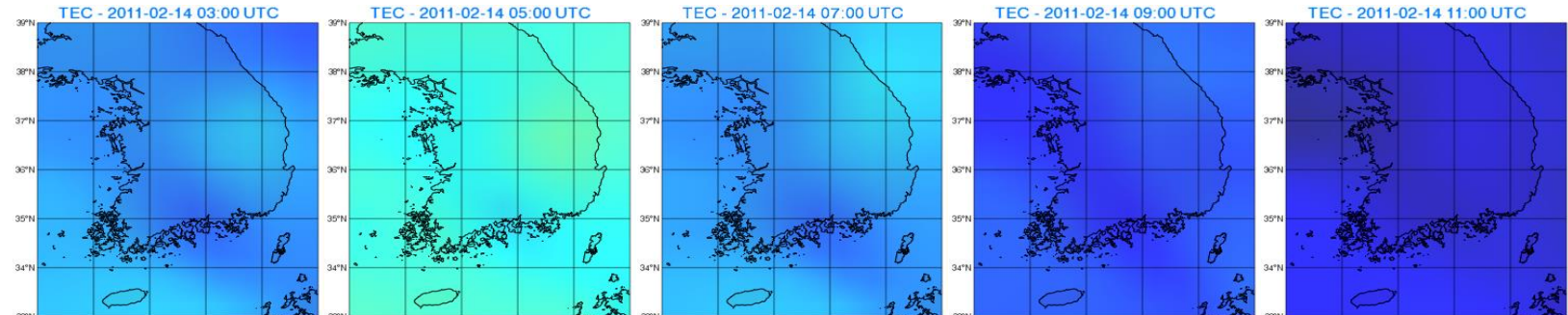
- TEC map service using GNSS data



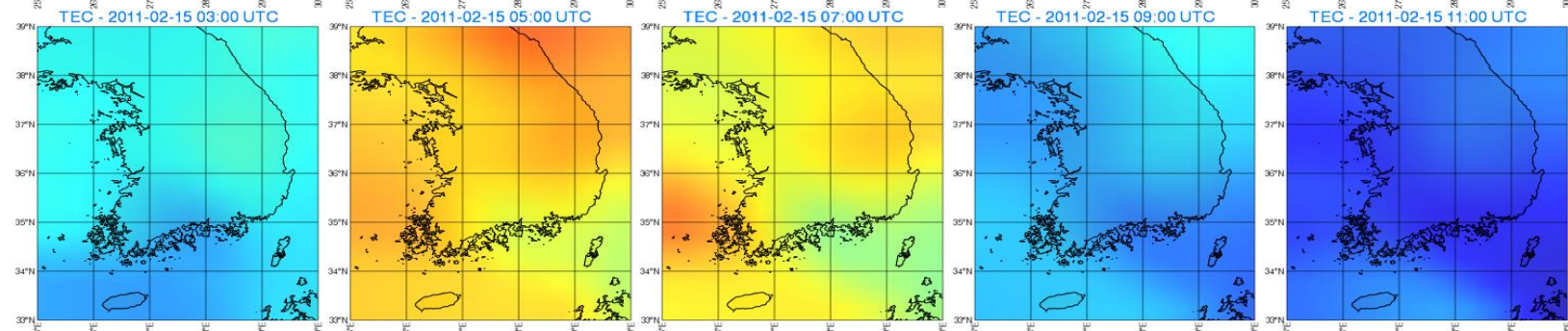
TEC monitoring system
Ex) 2011.02.14 ~2011.02.16

2011 February Solar Flare Event

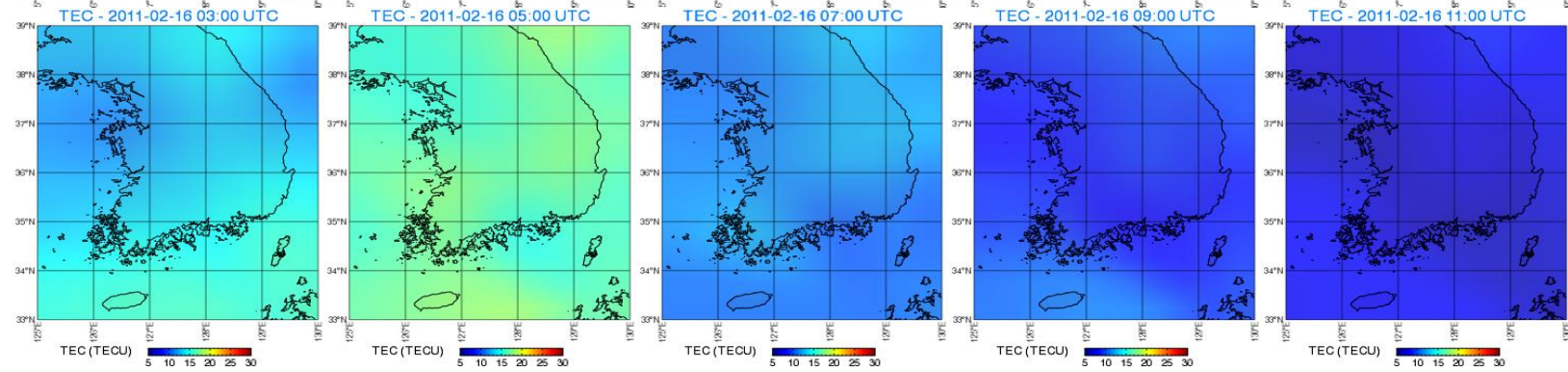
2011.02.14



2011.02.15
(Solar Flare)

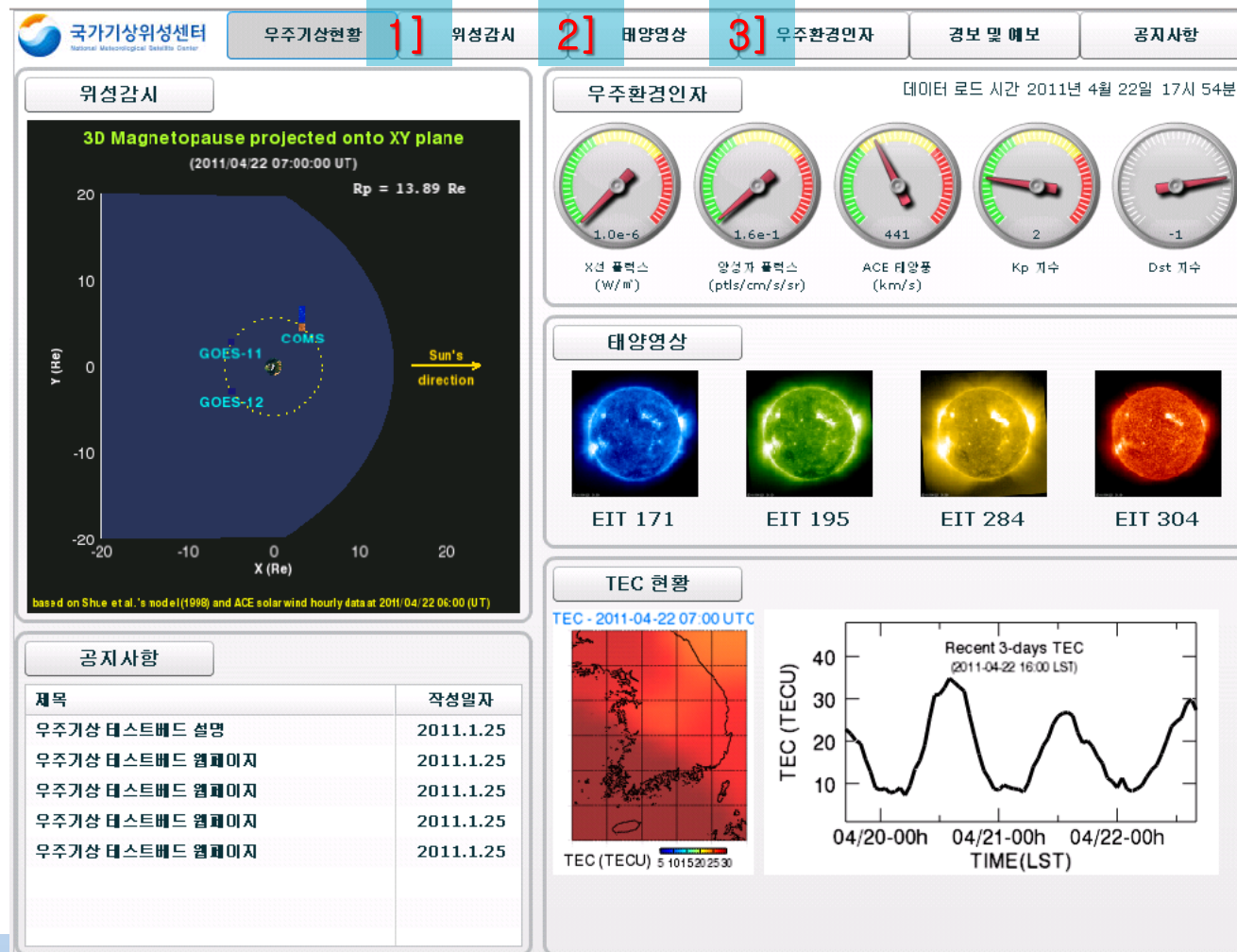


2011.02.16

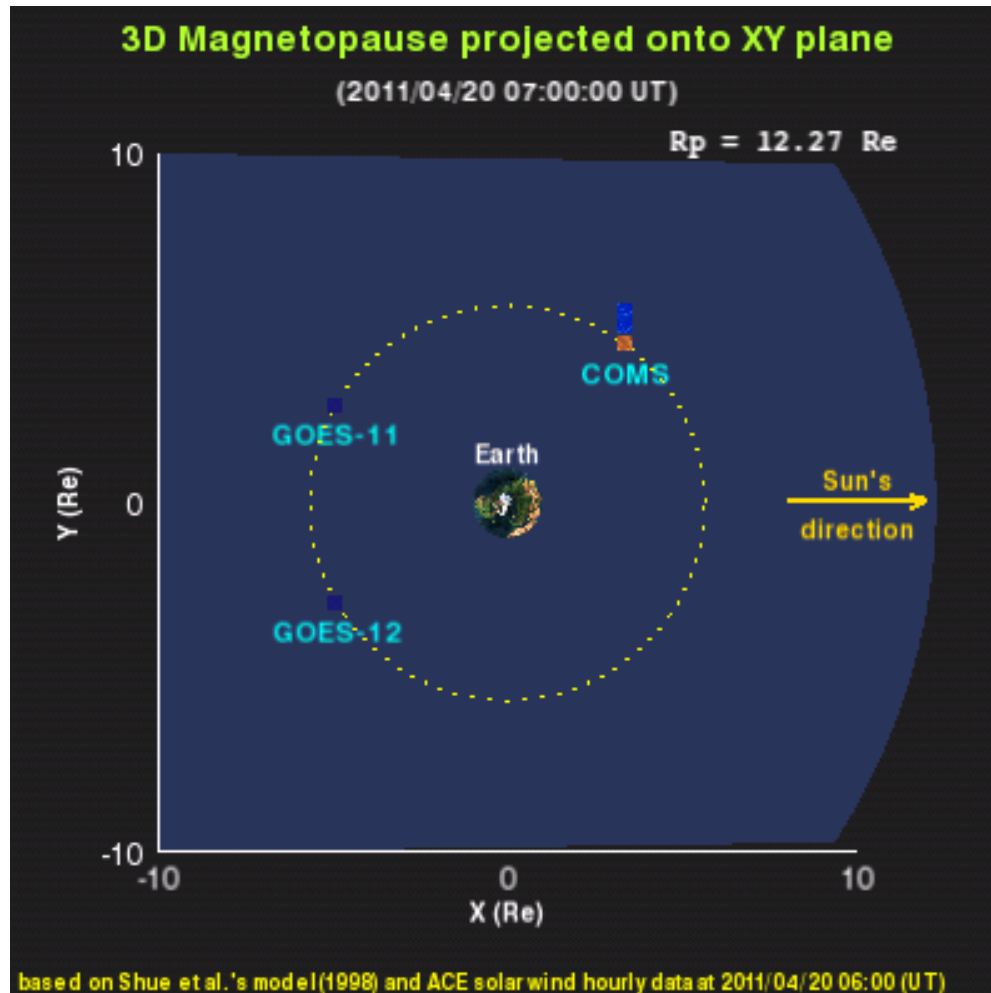


3. Space Weather Testbed system

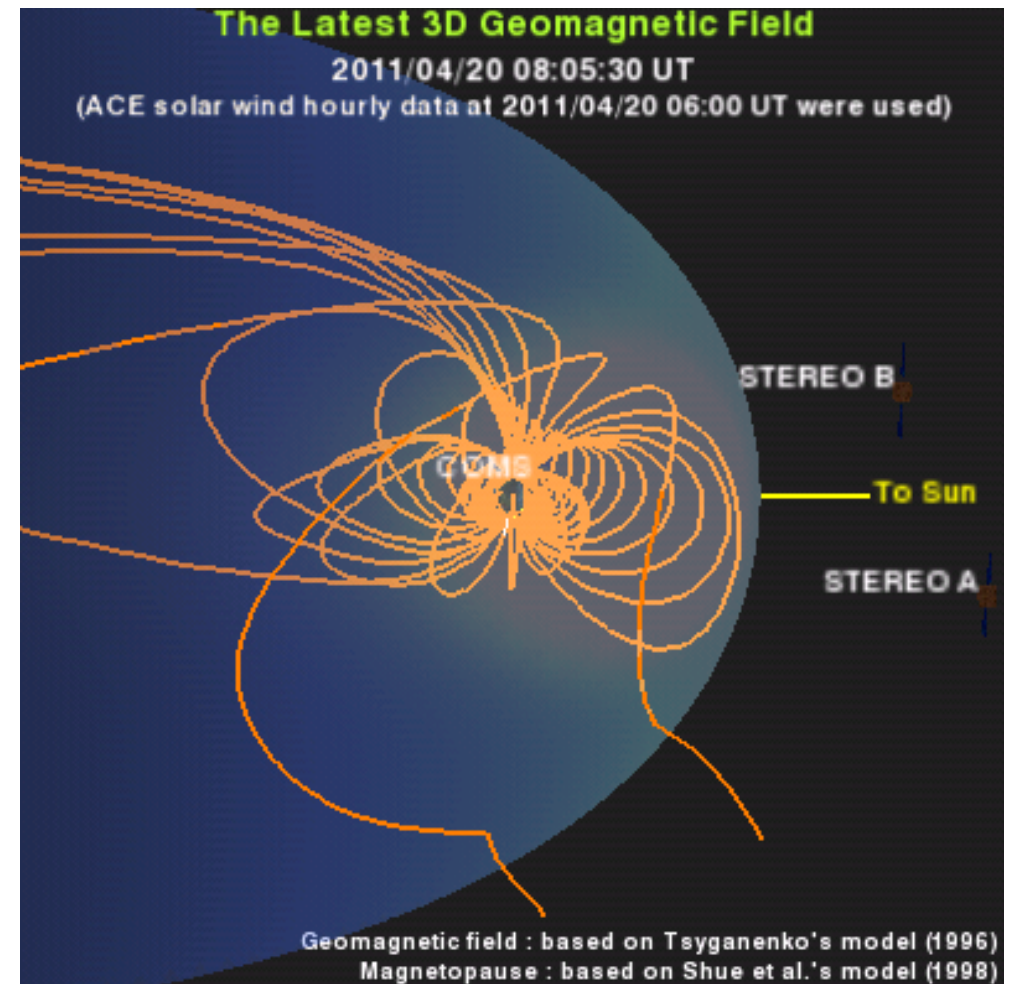
- Build-up Space Weather Data Collection and Testbed system
- Monitoring Space Weather for safe operation of COMS



1] Magnetosphere monitoring for satellite safety

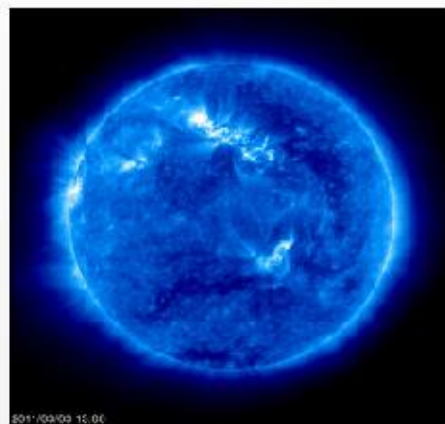


Magnetopause projection and
Position of COMS

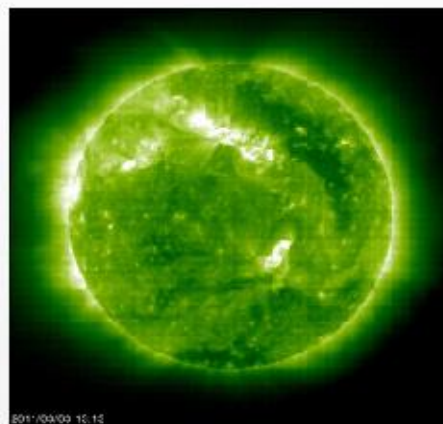


Earth's magnetic field and
Position of COMS

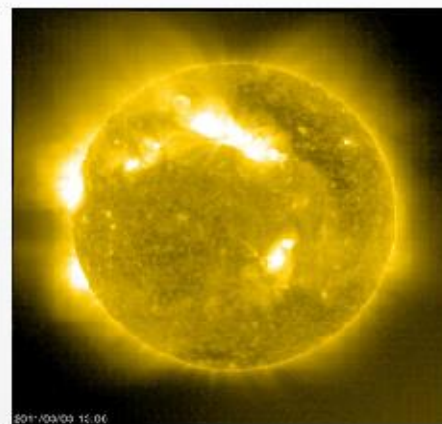
2] near real time Solar Images



EIT 171



EIT 195



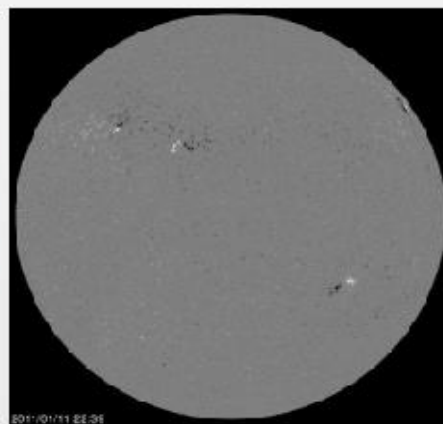
EIT 284



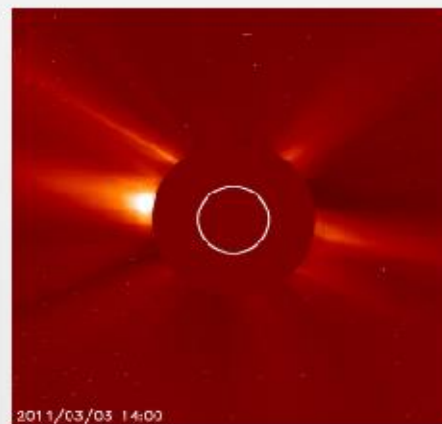
EIT 304



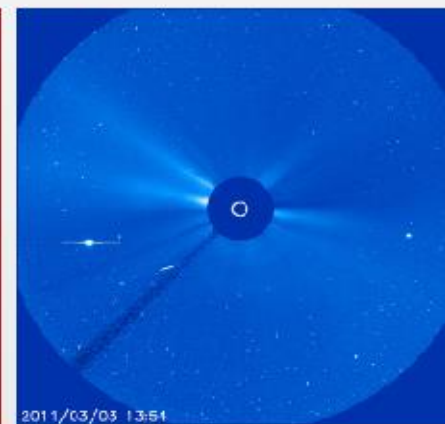
MDI Continuum



MDI Magnetogram



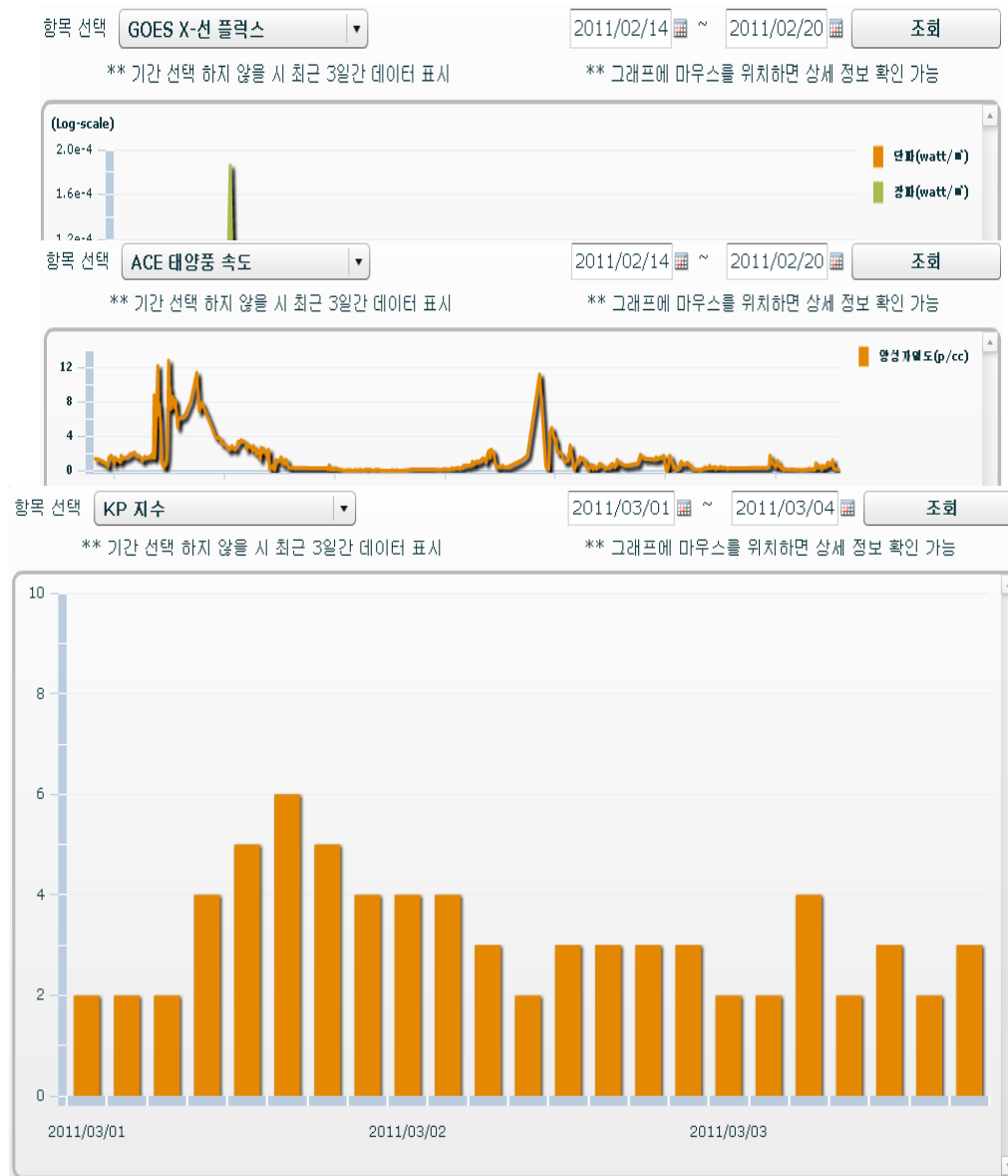
LASCO C2



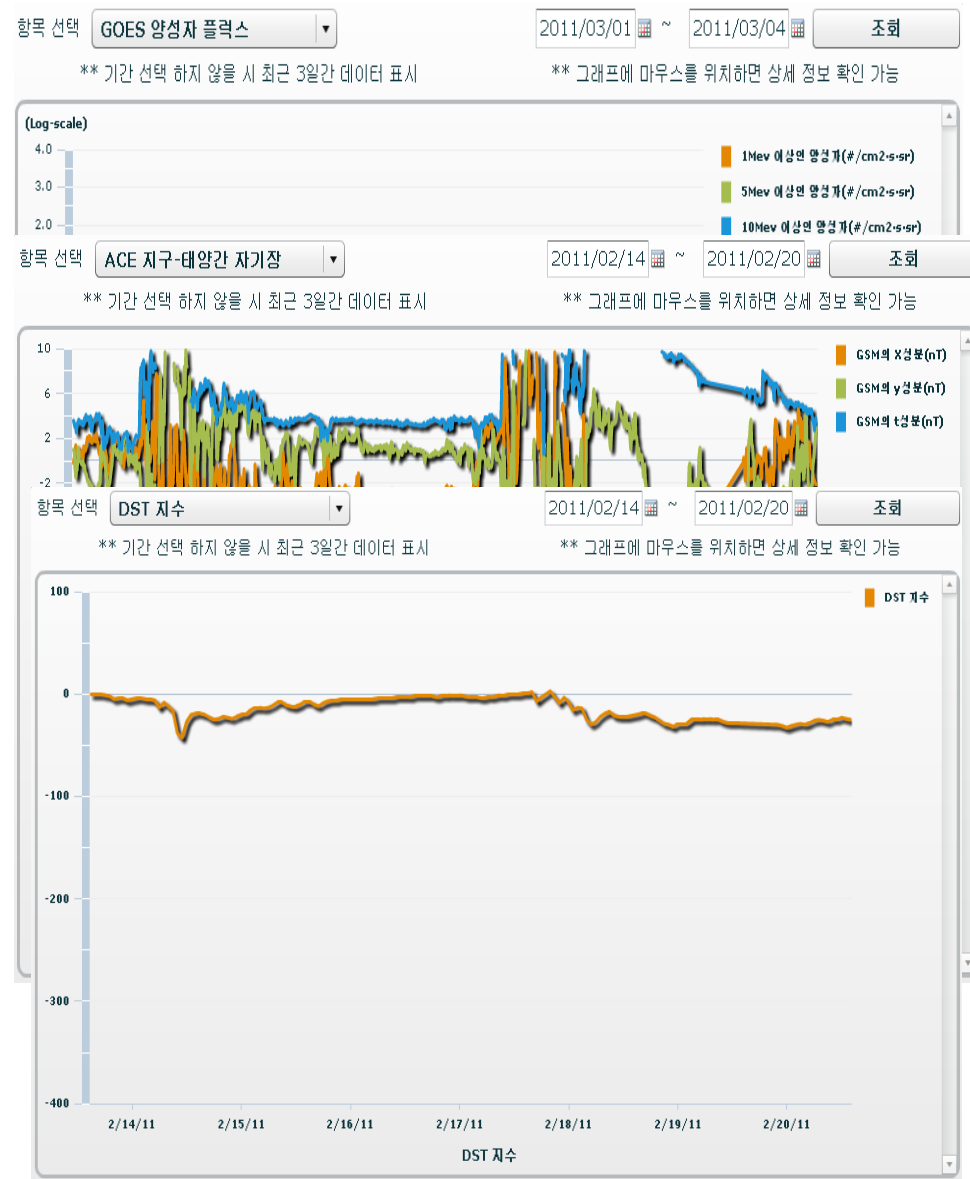
LASCO C3

Solar images

3] SWx variables



Kp index



Dst index

1. Operation of Ionospheric TEC data service

- Distribution of standard formatted TEC data
 - QC/QA for GNSS TEC data
 - Open the testbed system to the public

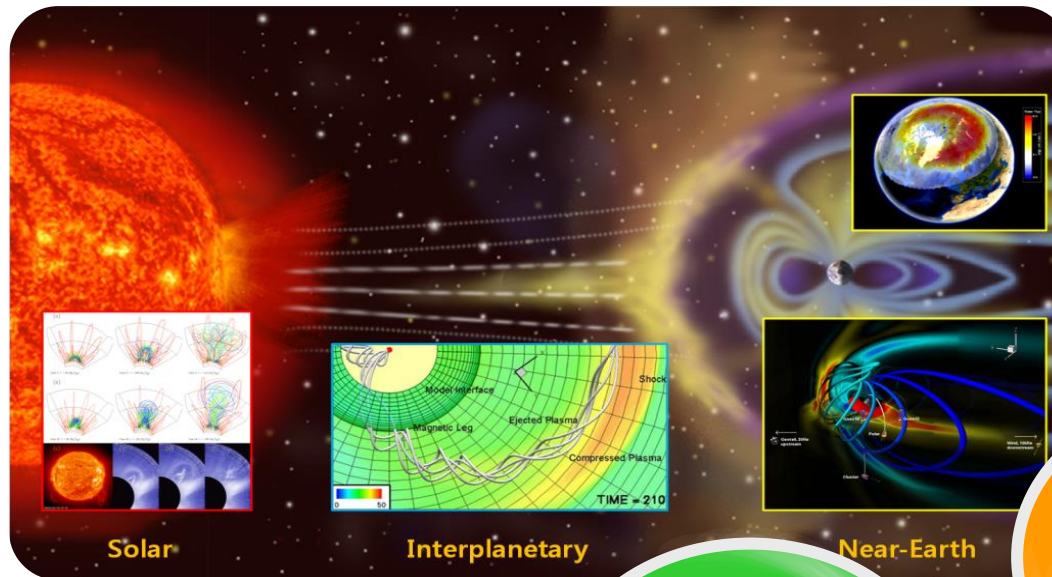
2. Research about 24th Solar Maximum

- Intensity of Solar maximum, predicted effect
- Prepare for Solar activities(Satellite operation, GNSS, Aviation, etc)

3. SWx research for operation of COMS

- Hazard components for satellites
 - To be provided for the domestic satellite operators

SWx Forecasting model



Implement Plan

2010

- Development of SWx Forecasting model

2011

- Solar, Interplanetary, Near-Earth prediction model
- Phenomenological model

SWx Prediction models

2012 – 2013

- Integration of prediction models
- Trial operation and validations of integrated model

Integrated SWx Prediction model

2014

- Operation of Initial integrated model of KMA

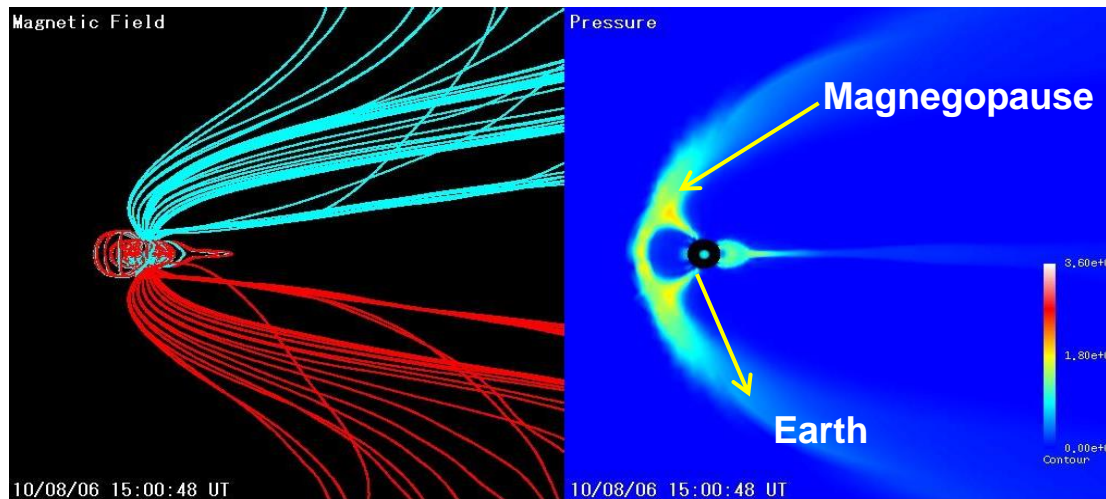
SWx Operation

Magnetopause Prediction

Real time
ACE Data

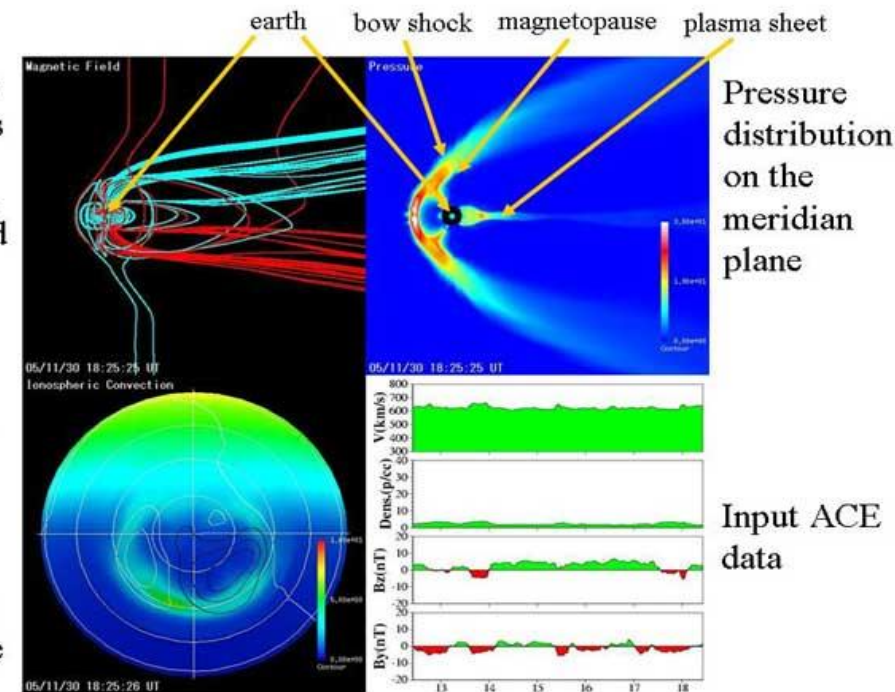
Magnetosphere Simulation

- Structure of Magnetosphere
- Magnetic Field
- Plasma Pressure



Magnetic
field lines
→
Solar wind

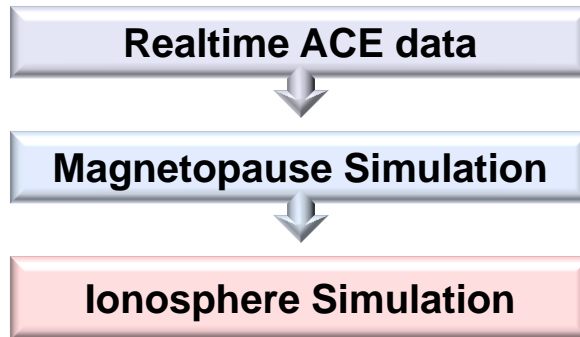
Electric
conductivity
(color) and
potential
(lines)
viewed from
the north pole



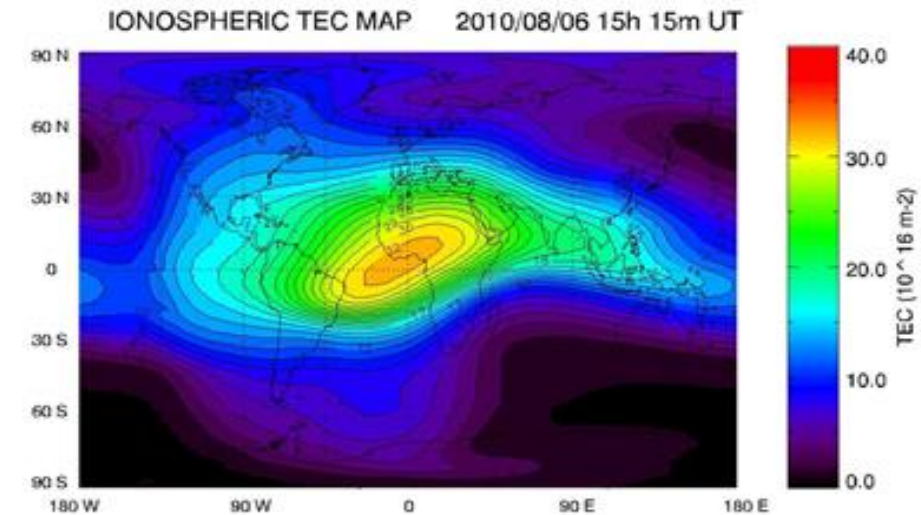
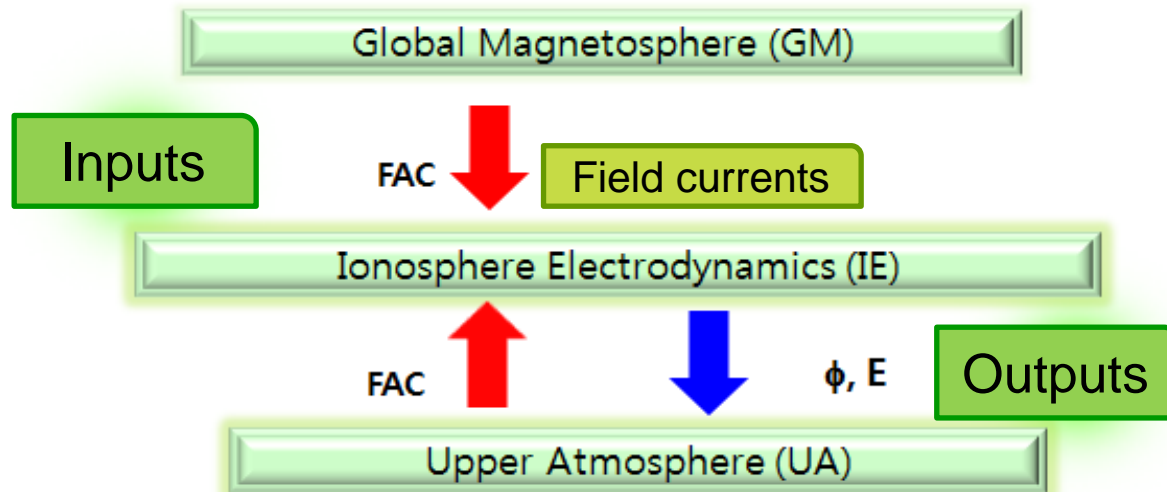
Basis : Solar Wind Simulation in NiCT Model

- Shue model (1998) for magnetopause
- Fok Ring Current model for radiation belt

Ionosphere Prediction



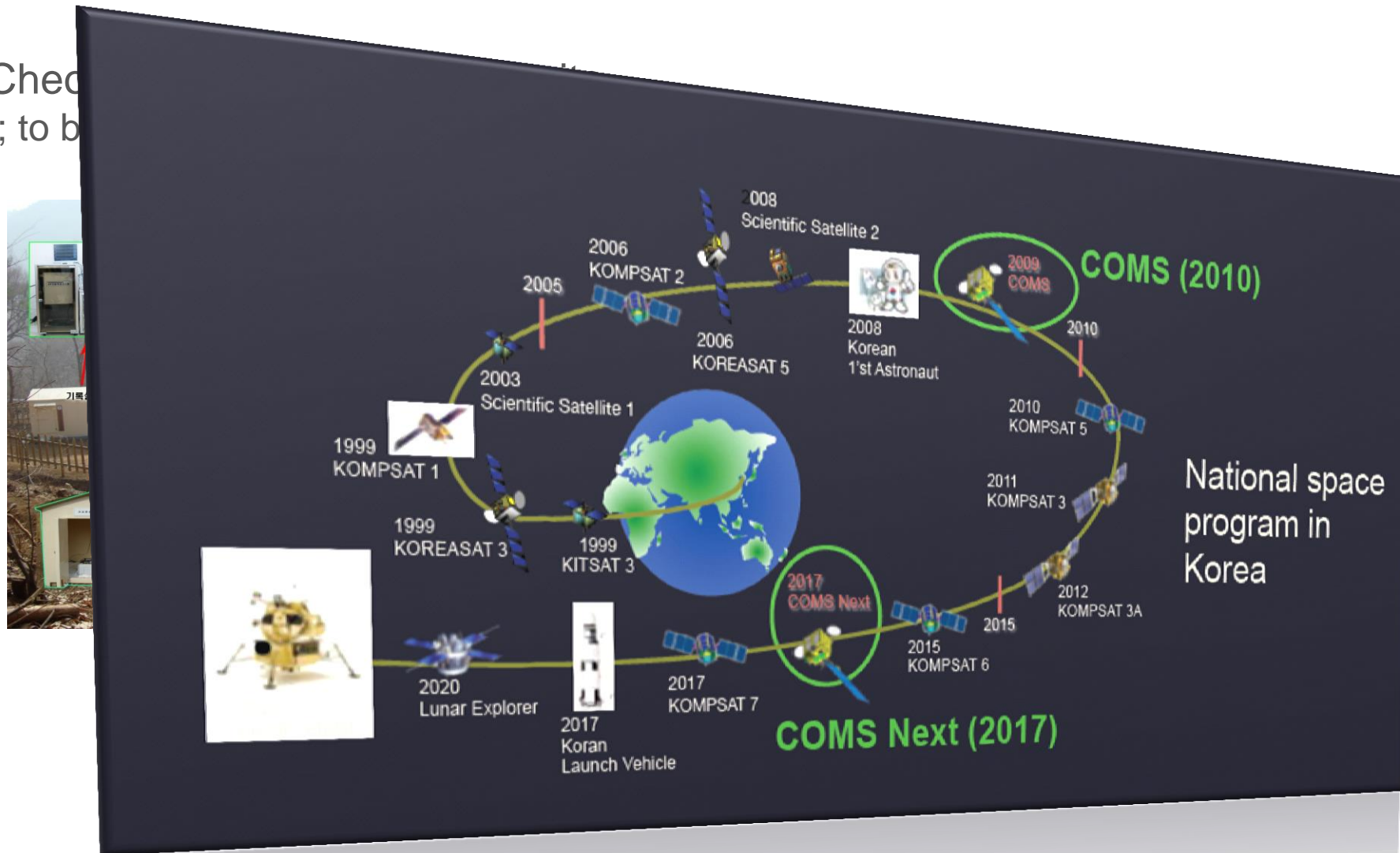
The outputs from magnetopause model will be inputs for the Ionosphere model



Basis : Solar Wind Simulation (SWS) in NiCT
 - CISM TING for Thermosphere and Ionosphere
 - SWMF IE for Ionosphere and Upper Atmosphere

Instruments for SWx Monitoring

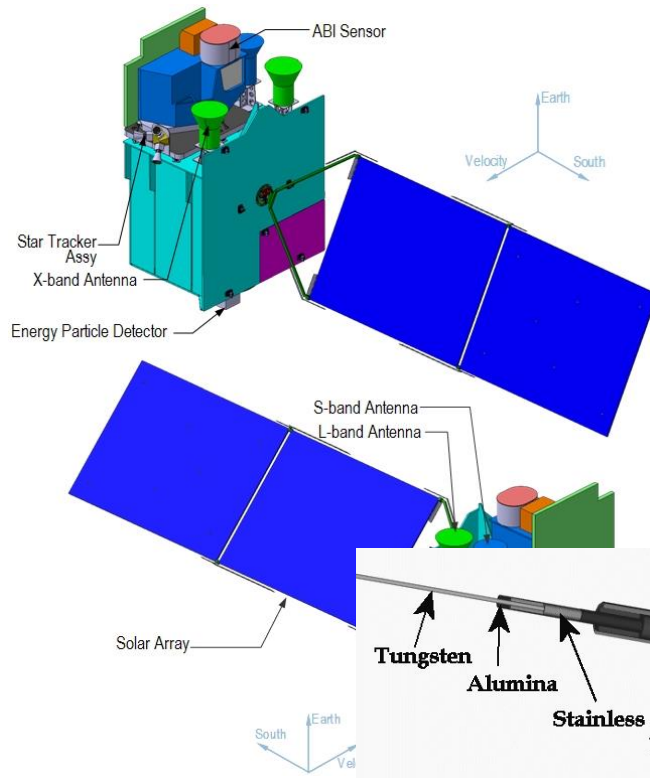
Check
; to b



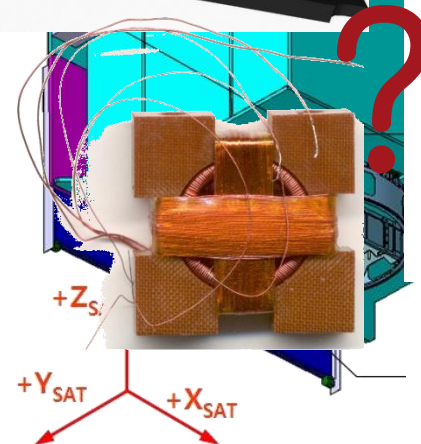
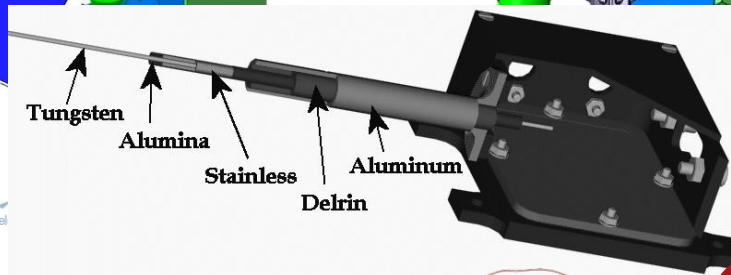
ological Satellite
(ational)

Payload on Geostationary satellite, COMS2 in 2017

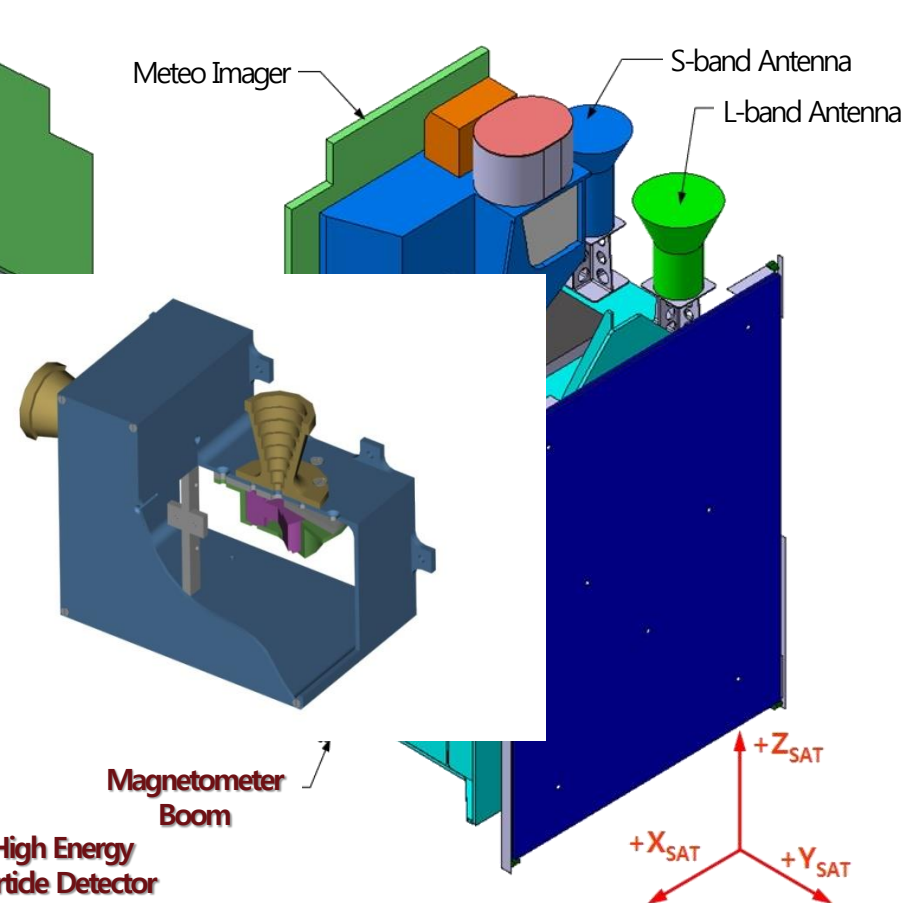
- COMS2-A : Meteorological Mission
- COMS2-B : Ocean and Air Pollution Monitoring



COMS2-A



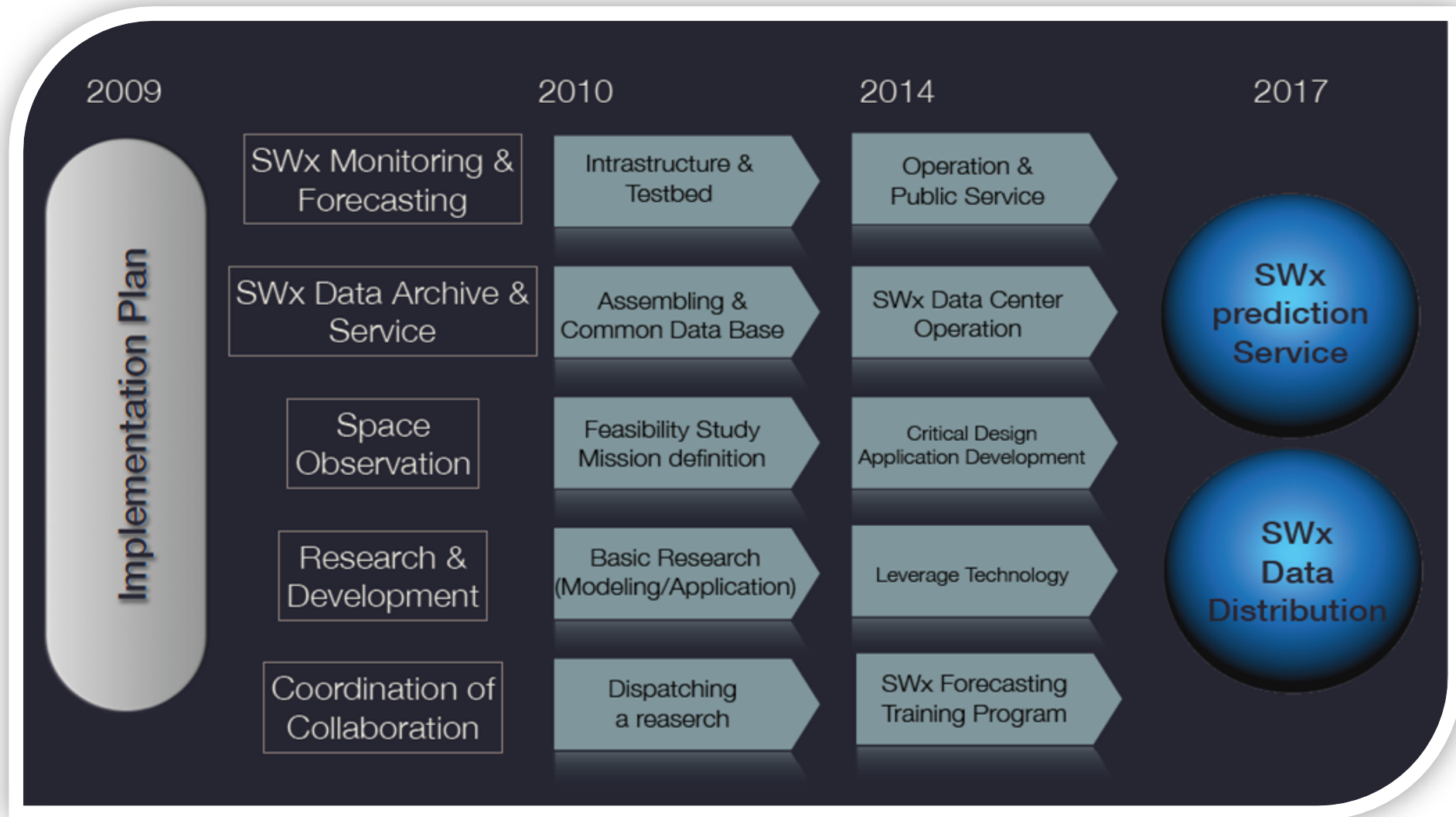
High Energy Particle Detector



Magnetometer Boom

SWx payloads shall be determined through domestic/international survey

Space Weather Roadmap of KMA



- Participating domestic and international collaboration
 - Korean Table for SWx, bilateral cooperation with NOAA & WMO ICTSW
- Capacity building and training staffs

Thank you for attention



기 상 청
국가기상위성센터
National Meteorological Satellite Center