1. Registration “SWx Disaster” on National Disaster Profile
2. Long-term management plan for SWx disaster (2012)
3. SWx disaster Guidelines (2012)
4. SWx disaster management Manual (2013)
Introduction

- Space Weather Disaster: The disaster related to radio frequency due to Electro-magnetic field change in the interplanetary space. (Defined by Radio ACT, SWx disaster Manual)

<table>
<thead>
<tr>
<th>Cause of threat</th>
<th>Cases of damages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flare</td>
<td>X-ray, Solar Particle, CME</td>
</tr>
<tr>
<td>Disturbance</td>
<td>Geomagnetic Field &amp; Ionospheric Disturbance</td>
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<tr>
<td>Earth’s Environment</td>
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<tr>
<td></td>
<td>X-ray</td>
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<td></td>
<td>HF radio blackout, GPS Error</td>
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<tr>
<td></td>
<td>Solar Particles</td>
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<td></td>
<td>Loss of Satellite, Enable to use Polar route</td>
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<td>G</td>
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<td></td>
<td>Damage to Power Grid</td>
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</tbody>
</table>
Korean Gov’t Preparation

**Long-term management plan for SWx disaster (’12)**

- ✔ Five-year Plan (2012–15)
- ✔ Total Budget: 14 million $
- ✔ Vision: Safety Korea without space weather disaster

**SWx disaster Guidelines (’12)**

- ✔ Describes possible damages from SWx
- ✔ Suggests example actions to minimize damages

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Provide SWx information with speed & accurate

Construct response system against SWx Disaster

Spread SWx information to the public

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- Enforcement
- Forecasting & Alert Service
- 24/7 monitoring system
- Development SWx models

- Building response system
- Set up cooperative system in gov’t level
- Education SWx to the public
- Enhancement int’l cooperation
Korean Gov’t Preparation

**SWx disaster management Manual (Feb. 2013)**

- by Presidential directive-228
  *National fundamental directive to manage to disaster*
- The only & Official plan of the Korean government

- **Total Management for SWx : MSIP**
  (Ministry of Science, ICT & future Planning)

- **Define SWx disaster Alert & Manager**
  - Moderate: Radio-based Team
  - Strong: Radio-policy Dept.
  - Severe: Vice-Minister of MSIP
  - Extreme: Minister of MSIP

- Define Ministries as industrial sectors.

- **Roles & Missions**
  - MSIP: Total Control & Management
    - Issue a SWx disaster alert
  - Min. of National Defense: Military operations
  - Min. of Trade, Industry & Energy: Power Grid
  - Min. of Land, Infrastructure and Transport: Aviation
  - Min. of Oceans and Fisheries: Monitoring GPS error
  - Korean Meteorological administration: Forecasting & Warning on Climate, weather & Meteorological Satellite
Korean Gov’t Preparation

Response System in Gov’t level

President

National Emergency Management Committee (Prime Minister)

Ministry of Science, ICT and Future Planning

Korean Space Weather Center

SWx Disaster response Training

☑ Annual Preparation to response SWx Disaster
☑ 22 agencies (33 people)
# Korea Space Programme (GEO)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Satellite in Orbit</th>
<th>Operator</th>
<th>Location</th>
<th>Launch date</th>
<th>Environmental payload and status</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Pacific</td>
<td>COMS</td>
<td>KMA, KIOST</td>
<td>128.2°E</td>
<td>26/06/2010</td>
<td>5-channel VIS/IR Meteorological Imager (MI), Geost. Ocean Colour Imager (GOCI) Direct Broadcast via HRIT/LRIT</td>
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<tr>
<td></td>
<td>GEO-KOMPSAT-2A</td>
<td>KMA</td>
<td>128.2°E</td>
<td>2017</td>
<td>Advanced Meteorological Imager (AMI), Space Environmental monitoring payload Direct broadcast via HRIT/LRIT</td>
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<tr>
<td></td>
<td>GEO-KOMPSAT-2B</td>
<td>MOF(Ministry of Oceans and Fisheries), ME(Ministry of Environment)</td>
<td>128.2°E</td>
<td>2018</td>
<td>Advanced Geostationary Ocean Colour Imager(GOCI-II), Geostationary Environmental Monitoring Spectrometer(GEMS)</td>
</tr>
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## The Schedule for GEO-KOMPSAT-2A and 2B program

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- COMS (Operational)
- Geo-KOMPSAT-2A (Operational)
- Geo-KOMPSAT-2B (Operational)
# Korea Space Programme (GEO)

## Sensor Requirements

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Requirements</th>
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</table>
| **Medium energy Particle Detector** | - Electron energy range: 50keV ~ 2 MeV  
|                                  | - Angular Resolution (pitch angle): 30° at least                  |
| **Magnetometer**                 | - Measurement range: ± 350nT (in 3 axes)  
|                                  | - Uncertainty: 1nT at least (on orbit)                            |
| **Satellite Charging Monitor**   | - Current range: ± 3pA/cm²  
|                                  | - Measurement resolution: 0.01pA/cm²                              |
**Korea Space Programme (LEO)**

- **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

- **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

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

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

**Plan research 2012-2014**

- Secure a budget 2013-2014

- Satellite development 2015-2019

- Launch /Utilization 2020-
Ground-based observation system
- Solar Flare Telescope (SOFT) located at Bohyun Mountain (1995)
  - Including white light, H-alpha observing system, vector magnetogram (VMG) and longitudinal magnetogram (LVM)
- Korean Solar Radio Burst Locator (KSRBL, 2009)
  - A single dish radio spectrograph with freq. range of 0.5 – 18 GHz
- e-CALLISTO developed as a part of IHY 2007 activity

Space-based observation system
- SDO data center established (2010)
KSWC, wants grow up with ICTSW

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Korean Space Weather Center (www.spaceweather.go.kr)