Session 2. National Activity

2015.3.3
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Report of Space Weather Expert Group Under UN COPUOS

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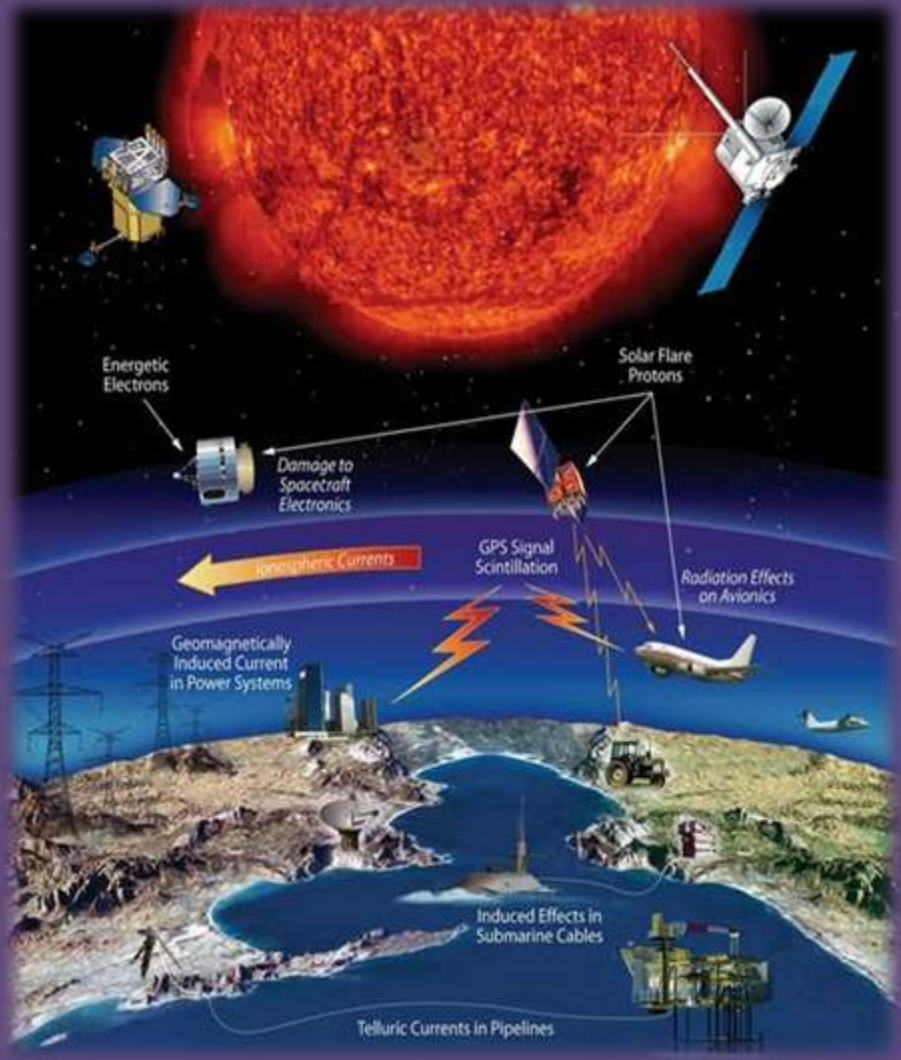
Objectives of Space Weather Expert Group
  Scope and Work Plan
Output of Expert Group
  Report, Guidelines and Recommendations
New Expert Group for Space Weather

Space Weather has a wide range of impacts on terrestrial and space-based infrastructure.

International co-ordination and collaboration is critical for ***long-term sustainability of outer space activities*** (LTOSA).



UN COPUOS established a program for the long-term sustainability of outer space activities (LTOSA) at its fifty-fourth session, in 2011.

Four Expert groups formed to provide input to UN Working Group for LTOSA:

(a) Sustainable space utilization supporting sustainable development on Earth (expert group A);
(b) Space debris, space operations and tools to support collaborative space situational awareness (expert group B);
(c) Space weather (expert group C);
(d) Regulatory regimes and guidance for actors in the space arena (expert group D)

Report from Expert Group C presented here.

Expert Group C:

Objectives

1. The ***first objective*** of the SWEG is to **produce a report** on global space weather efforts, including a synopsis of the state of the art understanding of space weather phenomena and impacts on space and terrestrial infrastructure.

2. The ***second objective*** of the SWEG is to **provide a list of guidelines** that member states could adopt on a voluntary basis that would mitigate the effects of space weather.

Scope and work plan

The scope of the EG is set forth in the Terms of Reference for the Working Group on Long-Term Sustainability of Space Activity; i.e.

1) Collection, sharing, and dissemination of data, models, and forecasts;
2) Capabilities to provide a comprehensive and sustainable network of sources of key data in order to observe and measure phenomena related to space weather in real or near-real time;
3) Open sharing of established practices and guidelines to mitigate the impact of space weather phenomena on operational space systems; and
4) Coordination among States on ground-based and space-based space weather observations in order to safeguard space activities.

Time line (event history)

Year	2012			2013		2014	
Month	2	6	10	2	6	2	6
Space Weather Expert Group Meeting	△	△	△ (IAC)	△	△	△	△
Expert Group Report and Best Practice Guideline	*Out Line*	*1-st draft*	*2-nd draft*	*Final Draft*	*Review*	*Final Report*	*Submit*

Contribution to the Report and Guidelines of Long Term Sustainability of Outer Space Activity (LTSOSA)Working Group

3. Outline of Expert group report and guidelines

(A/AC.105/C.1/2014/CRP.13, UN COPUOS, 2014)

i) Chap.1 Executive summary

ii) Chap.2 Introduction

iii) Chap.3 Identification of risks from space weather

iv) Chap.4 Current practices and procedures

- Observations, models, tools for space weather prediction,
- Comprehensive network space weather services,
- Engineering approaches to mitigate space environment effects,

v) Chap.5 Coordination among States on data and services to safeguard space activities

vi) Chap.6 Guidelines for space actors

- Recommended guidelines for the long-term sustainability of space activities.

4. Proposed Space Weather Guidelines for the Long-Term Sustainability of Outer Space Activity

1) Space actors, member states and their national and international agencies, should ***support and promote the collection, sharing, inter-calibration and dissemination of critical space weather data.***

2) Member States and their national and international agencies should ***support and promote further coordinated development of advanced space weather models and forecast tools in support of identified user needs.***

Proposed Guidelines (cont.)

3) Member States and their national and international agencies should ***support and promote the sharing and dissemination of space weather model outputs and forecasts.***

4) Member States and their national and international agencies should ***support and promote the collection, sharing, dissemination and access to information relating best practices for mitigating the effects of space weather on ground- and space-based systems and related risk assessments*.**

Proposed Guidelines (cont.)

5) Member States and their national and international agencies should ***promote the education, training and capacity building required for a sustainable global space weather capability.***

Implementation and Future Activities

Relies of efforts in members states – illustrate with activities in Japan.

Coordination through future Expert Group on Space Weather through UN COPUOS permanent space weather agenda item (approved Feb. 2015) and other relevant bodies.

Basic research of space weather science

satellite (JAXA)

Solar Radio Obs.
(Tohoku Univ.)

Solar Observatory
(Kyoto Univ.)

HF radio radar
(Nagoya Univ.
NIPR, NICT)

Solar Wind Obs.
(Nagoya Univ.)

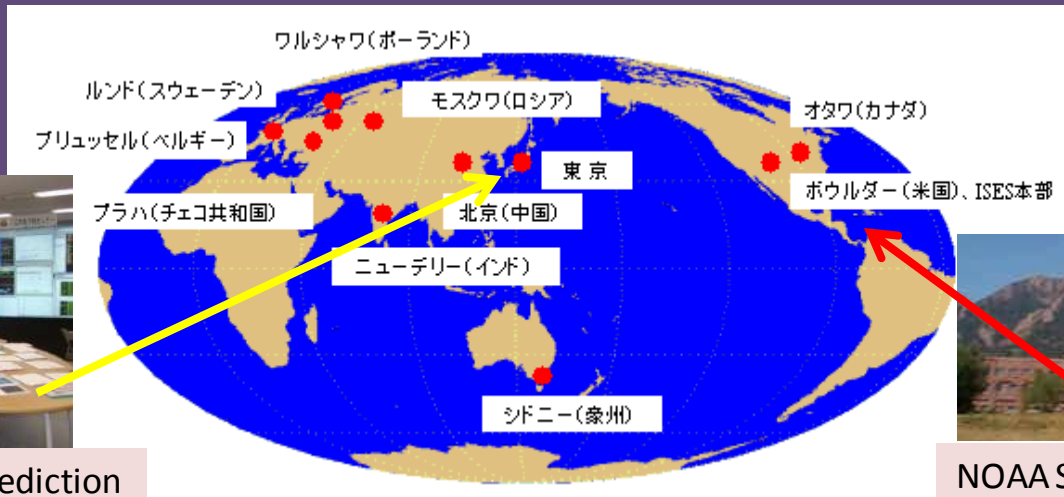
Heliograph (NAOJ)

Magnetometer
chain (Kyushu Univ.)

Recent efforts to achieve better space weather forecasts by International Space Environment Services

ISES

Space Weather Prediction Center in Tokyo (NICT)

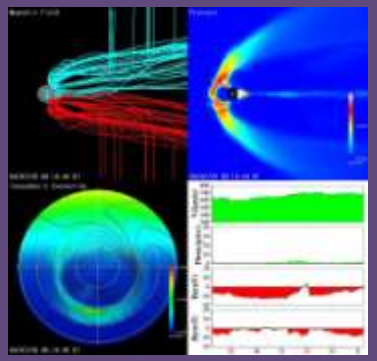


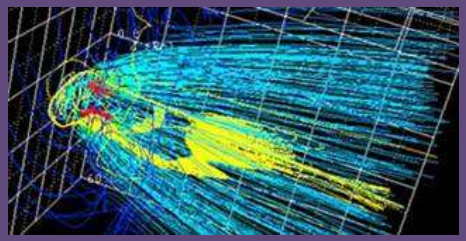
Prediction Items
- Solar activity
- Solar protons
- Magnetic activity

NOAA Space Weather Prediction Center in Boulder (ISES HQ)

Real time simulation of space weather

Satellite Data Reception

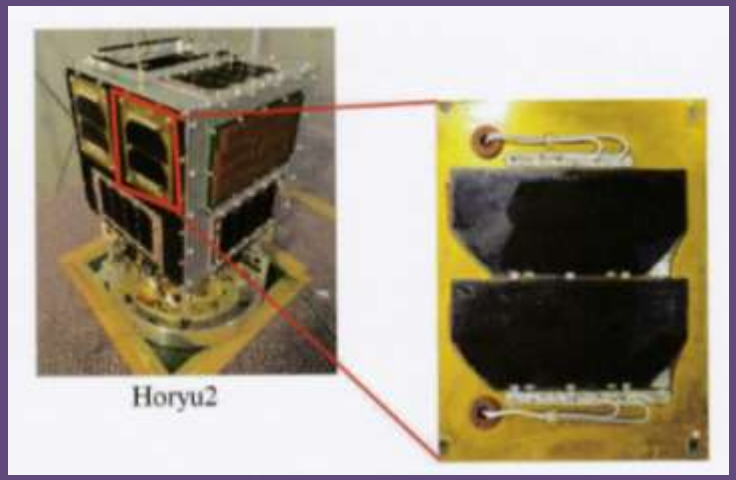




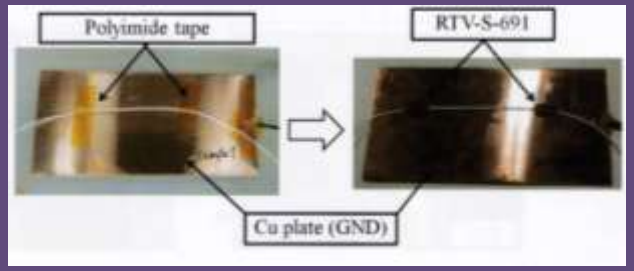
Simulation of aurora storm

Engineering approach for mitigating the impact of space Weather

Laboratory of Space Environment Interaction Engineering, Kyushu Institute of Technology performs charging experiment on board JAXA HTV and KIT Horyu2.



KIT is also developing new technology to avoid spacecraft charging.



Capacity building for the education of young people

International Center for Space Weather Science and Education
Kyushu University
(former Space Environment Research Center)

ICSWSE

Magnetometer installation and training

Daily space weather forecast

ISWI & MAGDAS School in Indonesia

1st and 2nd Batch- Capacity Building

Expert Group C Proposed Recommendations:

1: **Develop a basis for the coordination of ground and space based infrastructure** to ensure the long term continuity of critical space weather observations.

2: Provide a mechanism for the coordination of ground and space based infrastructure to ensure the long term continuity of critical space weather observations.

Action: New UN Expert Group on Space Weather

Approved by UN COPOUS in Feb. 2015 – reports to permanent Space Weather Agenda item.

Objectives and work plan, which will be submitted to the coming STSC in Feb. 2016.

Mandate:"Promote awareness, provide guidance, and enable communication and cooperation in space weather related activities among Member States and related national and international organisations."

Work Plan: Forum for International Coordination and Promote Implementation.

Solicit Participation in New UN Expert Group on Space Weather

e.g., How ISWI and related activities should be organised in context of new Expert Group?

Rapporteur: Dr. Ian Mann (*imann@ualberta.ca*)

Work Plan:

1. Examine LTS Expert Group C on space weather(A/AC.105/C.1/2014/CRP.15)), COSPAR-ILWS Roadmap team "Understanding Space Weather to Shield Society", and related information. The group will examine the guidelines, recommendations and best practices to identify mechanisms to promote their implementation, including an assessment of prioritization. [year 1]
2. Complete an inventory of relevant United Nations organisations, including the World Meteorological Organisation (WMO) and International Civil Aviation Authority (ICAO) and others, and those within Member States and national and international organisations. Identify and assess their role in the global space weather effort, promote coordination and communication between them, and ensure that the efforts of STSC are complementary. [years 1-2]
3. Recognizing the impacts of space weather, the group will promote increased and expanded member State involvement in providing space weather monitoring, from the ground and in space, and in developing, advancing, and sharing and delivering space weather services. [years 2-4]
4. The group will report yearly to the STSC on its progress, on important issues which have been identified, and where specific action is recommended. The group will also make a recommendation for its continuing and future work plan.