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## TIEMS Oslo Conference 22 – 24 October 2012

at

Grand Hotel, Oslo, Norway

on

*Space Weather and Challenges for Modern Society*

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# Final Program

**Monday October 22, 2012**

**08:00 – 09:30** *Registration and Coffee (outside Conference Hall)*

**09:30 - 10:15** **Welcome and Opening**

Chair: Roger Steen, Norwegian Water Resources and Energy Directorate, Norway

**09:30 - 10:15** *“The Authority’s Role and Responsibility in Preparedness”*

Director General Per Sanderud, Norwegian Water Resources and Energy Directorate

*“Statnett and Space Weather Threats - Past, Present and Future”*

Vice President Grid Operations Alf Olaussen, Statnett, Norway

*“Space Weather and the Role of Norway in the Polar Regions”*

Director General Bo Andersen, Norwegian Space Centre, Norway

**10:15 - 12:30** **Introduction to Space Weather**

Chair: Roger Steen, Norwegian Water Resources and Energy Directorate, Norway

**10:15 - 10:45** *“The Stormy Sun - From Kristian Birkeland to Space Weather Hazards”*

Pål Brekke, Senior Advisor at Norwegian Space Centre, Norway

**10:45 - 11:15** *“Focusing International Cooperation on improving Operational Space Weather Services”*

Terry Onsager, Space Weather Prediction Center, NOAA, USA

**11:15 - 11:30** *“European Space Weather Activities within ESA”*

Juha-Pekka Luntama, SSA Space Weather Segment Manager, ESA - European Space Agency, ESAC, Spain

**11:30 - 12:00** *“Space Weather Activities within NASA”*

Joseph M. Davila, Astrophysicist in the Solar Physics Branch at Goddard Space Flight Center in Greenbelt, Maryland, USA

**12:00 – 12:15** *“The European Space Weather COST Action ES0803”*

Anna Belehaki, Head of the Ionospheric Group of the National observatory of Athens (NOA), Greece

**12:15 - 13:30** *Lunch at “Speilsalen” (opposite conference hall) and Poster Viewing*





- 13:30 - 15:00 Stormy Sun - our Current Knowledge**  
Chair: Pål Brekke, *Senior Advisor at Norwegian Space Centre, Norway*
- 13:30 - 14:00 “Coronal Mass Ejections – the Drivers of Space Weather”**  
Rainer Schwenn, *Max-Planck-Institut für Sonnensystemforschung, Germany*
- 14:00 - 14:30 “Solar Storms and Topology: Observed with SDO”**  
Henrik Lundstedt, *Deputy Director, ISES, Swedish Institute of Space Physics, Sweden*
- 14:30 - 15:00 “Solar Activity - Past, Present, Future”**  
Leif Svalgaard, *HEPL, Stanford University, USA*
- 15:00 - 15:30 Coffee and cake (outside conference hall) and Poster Viewing**
- 15:30 – 17:00 Effects on Satellites, Navigation and Telecommunication**  
Chair: Terry Onsager, *Space Weather Prediction Center, NOAA, USA*
- 15:30 - 16:00 “Space Weather Impact on Satellite Navigation and Positioning”**  
Norbert Jakowski, *German Aerospace Center, Institute of Communications and Navigation, Germany*
- 16:00 - 16:30 “Impact of a Geomagnetic Storm on the GNSS-based Positioning Service CPOS”**  
Knut Stanley Jacobsen, *Norwegian Mapping Authority, Norway*
- 16:30 - 17:00 “Space Weather Effects on Communications”**  
Anna Belehaki, *Head of the Ionospheric Group of the National observatory of Athens (NOA), Greece*
- 17:00 - 17:30 “Forecasting the Radiation Belts with SPACECAST to Help Protect Satellites on Orbit”**  
Richard B. Horne, *British Antarctic Survey, UK*
- 17:30 End of the Technical Program first Conference day**  
Information from TIEMS President K. Harald Drager on Reception in City Hall
- 17:45 Leave hotel walking for Oslo City Hall (5 minutes walk)**
- 18:00 – 19:30 Reception at Oslo City Hall, by invitation of Oslo City Government**  
[http://en.wikipedia.org/wiki/Oslo\\_City\\_Hall](http://en.wikipedia.org/wiki/Oslo_City_Hall)





## Tuesday October 23, 2012

- 08:30 - 10:30 Predictions of Solar Storms, Warnings, Preparedness Measures and Response**  
Chair: Peter Wintoft, *Scientist at Swedish Institute of Space Physics, Sweden*
- 08:30 - 08:45 "Introduction on USA Experience – Present Products and Services and Plans for Future Improvements"**  
Terry Onsager, *Space Weather Prediction Center, NOAA, USA*
- 08:45 - 09:00 "The SIDC, a European Space Weather Prediction Center"**  
David Berghmans, E. Robbrecht and R. Van der Linden, *Solar Physics and Space Weather group (SIDC) at the Royal Observatory of Belgium*
- 09:00 - 09:30 "Hazard Assessment and Real-time Simulation of Geomagnetically Induced Currents"**  
David H. Boteler, *Geomagnetic Laboratory, Natural Resources Canada, Canada*
- 09:30 - 10:00 "Space Weather and Critical Infrastructure in the Australian/New Zealand Region"**  
Richard Marshall, *IPS Radio & Space Services, Bureau of Meteorology, Australia*
- 10:00 - 10:30 "Remote Triggering of Energetic Events"**  
Alan Title, *Lockheed Martin Advanced Technology Center, USA*
- 10:30 - 11:00 Coffee (outside conference hall) and Poster Viewing**
- 11:00 – 13:15 Expectations and Effects on Electric Power Supply and Oil and Gas Exploration Activity**  
Chair Alf Olaussen, *Statnett, Norway*
- 11:00 - 11:30 "Reducing Uncertainty – an Electricity Utility's Response to Severe Solar Storms"**  
Trevor Gaunt, *University of Cape Town, South Africa*
- 11:30 - 12:00 "Effects of Geomagnetic Disturbances on the North American Bulk Power System"**  
Mark G. Lauby, John N. Moura and Eric Rollison, *North American Electric Reliability Corporation (NERC), USA*
- 12:00 - 12:30 "Observations and Modeling of GIC in the Chinese Large-Scale High-Voltage Power Networks"**  
Chunming Liu and Yunlong Li, *School of Electric and Electronic Engineering, North China Electric Power University, China*





- 12:30 - 13:00** *"The GB Electricity Transmission Network: Modeling, Monitoring and Mitigation"*  
Andrew Richards, National Grid, UK
- 13:00 - 13:15** *"How to Deal with Geomagnetic Storms in Directional Drilling"*  
Inge Edvardsen, Survey Management, Baker Hughes, Norway
- 13:15 - 14:30** *Lunch in "Speilsalen" (opposite conference hall) and Poster Viewing*
- 14:30 - 16:00** **Industries Preparedness and Protection Measures**  
Chair: Risto Pirjola, Visiting Scientist, Geomagnetic Laboratory, Natural Resources Canada, Finland
- 14:30 - 15:00** *"GIC Experience in Norway, Risk Assessment and Mitigation in View of Existing and Future Transmission System"*  
Trond M. Ohnstad, Section Manager R&D, Projects Division, Statnett, Norway
- 15:00 - 15:30** *"GIC Measurements in Japan"*  
Shinichi Watari, National Institute of Information and Communications Technology, Japan
- 15:30 - 16:00** *"Hydro One GMD Preparedness Plan for Cycle 24"*  
Luis Marti, Special Studies & Professional Development Manager, Transmission Projects Development, Hydro One, Canada
- 16:00 - 16:30** *Coffee and cake (outside conference hall) and Poster Viewing*
- 16:30 - 18:00** **A Super Storm - What can happen and how to prepare for and handle it?**  
Chair: Peter Stauning, Scientist at Danish Meteorological Institute, Denmark
- 16:30 - 17:00** *"A Super Storm - Current Limits of Extreme Space Weather"*  
Edward W. Cliver, Space Vehicles Directorate, Air Force Research Laboratory, USA
- 17:00 - 17:30** *"Consequences of Super Storms on Power Grids – Examination of the March 13, 1989, Magnetic Storm"*  
David H. Boteler, Geomagnetic Laboratory, Natural Resources Canada, Canada
- 17:30** *End of the Technical Program second Conference day*  
Information from TIEMS President K. Harald Drager on Reception Program
- 17:30 - 18:30** *Reception (outside conference hall) starts with Poster Viewing*





**18:30 - 19:30** *Reception continues in conference hall with a Politician's Reflections on Preparedness as an introduction to a Popular Lecture on Northern Light Science and Music Performance by Ellen Sejersted Bødtker*

*"How to think about the Unthinkable without losing your Mind"*

**Odd Einar Dørum**, Norwegian Citizen and Former Norwegian Minister of Justice and Police (2001 – 2005)

*"Space Weather – A Beauty and A Beast"*

**Pål Brekke**, Senior Advisor at Norwegian Space Centre

*Music Performance by Ellen Sejersted Bødtker*

**19:30 - 20:30** *Press Conference*

*Media is invited to attend the reception and ask questions to all keynote speakers, poster presenters and exhibitors*

## Wednesday October 24, 2012

**08:30 - 10:00** *Society's Ability to Withstand Short and Long Term Shut Down of Critical Infrastructure*

**Chair: Bengt Sundelius**, Swedish Civil Contingencies Agency, Sweden

**08:30 – 09:00** *"Critical Infrastructure Protection – Are we willing to try a Disaster?"*

**Sven Ullring**, Former President and CEO of Det norske Veritas (DNV) and Chairman of Governmental Commission on Critical Infrastructure Protection, Norway

**09:00 - 09:30** *"Risk Analysis of Severe Space Weather Events to U.S. Critical Infrastructure"*

**Brandon Wales**, The Department of Homeland Security's Office of Infrastructure Protection, USA

**09:30 – 10:00** *"Estimating the Economic Impact of Disturbances in the U.S. Electric Grid Associated with Geomagnetic Activity"*

**Karel Schrijver & S. D. Mitchell**, Lockheed Martin Advanced Technology Center, USA

**10:00 – 10:30** *"Two Cans of Coca Cola and a Piece of String: Developing Standards for Non Standard Events"*

**Edward Borodzicz**, Professor at Portsmouth Business School, UK

**10:30 - 11:00** *Coffee (outside conference hall) and Poster Viewing*





**11:00 – 12:30 Authorities Handling Strategies and Contentious Level**

Chair: Trond M. Ohnstad, Section Manager R&D, Projects Division, Statnett, Norway

**11:00 - 11:30 “Building Capacity for Preparedness”**

Bengt Sundelius, Swedish Civil Contingencies Agency, Sweden

**11:30 - 12:00 “Preparing the U.S. to Respond to Space Weather Events”**

Gene Fisher, Senior Advisor for Space Weather NOAA National Weather Service, USA

**12:00 - 12:30 “Severe Space Weather NATO Relevance”**

Timothy Cook, U.S. Representative to the NATO Civil-Military Planning Support’s - Industrial Resources and Communications Services Group, committee Work Group Chair

**12:30 - 12:45 “Crisis Management Tools as Common Ground for Space- and Energy Sector”**

Brage W. Johansen, Space & Energy, Norway

**12:45 - 13:15 Poster Presentations**

Chair: K. Harald Drager, TIEMS President

**13:15 - 14:15 Lunch in Palmen Restaurant (besides hotel reception) and Poster Viewing**

**14:15 - 15:00 Poster Presentations**

Chair: K. Harald Drager, TIEMS President

**15:00 - 16:00 Future Developments and Expectations**

Topics to be Address:

- Solar activity
- Developments into a more complex society infrastructure (e.g. power grids, communication)
- General public awareness and education
- Enhancement of science efforts to understand and monitor Space Weather

Chair: Luis Marti, Special Studies & Professional Development Manager, Transmission Projects Development, Hydro One, Canada

**15:00 – 15:30 “Effects of a Super Storm on Vital Satellite Systems, and other Critical Infrastructure - How do we maintain Public Awareness and Improve our Protection?”**

Juha-Pekka Luntama, SSA Space Weather Segment Manager, ESA - European Space Agency, ESAC, Spain

**15:30 – 16:00 “Building Space Weather Preparedness and Resilience in Europe”**

Mike Hapgood, Head of the Space Environment Group, RAL, UK





**16:00 - 16:30** *Coffee and cake (outside conference hall) and Poster Viewing*

**16:30 - 17:00** **Summing Up and Conclusions**  
Chair: K. Harald Drager, *TIEMS President, Norway*

**17:00** *End of Conference*

## POSTERS

(To be viewed at all breaks and presented in plenary Wednesday 24<sup>th</sup> October at 12:45 – 13:15 and 14:15 – 15:00)

- 1. “Nowcast Server for Geomagnetically Induced Currents”**  
Ari Viljanen (1), Eija Tanskanen (1), Yaroslav Sakharov (3), Yury Katkalov (3) and Risto Pirjola (1,2)  
1) *Finnish Meteorological Institute, Helsinki, Finland*  
2) *Natural Resources Canada, Ottawa, Canada*  
3) *Polar Geophysical Institute, Apatity, Russia*
- 2. “Real Time Scintillation Observation in the Norwegian Mapping Authority”**  
Sebastian Schäfer & Knut Stanley Jacobsen  
*Norwegian Mapping Authority, Norway*
- 3. “Measurement of GIC in the Norwegian High Voltage Grid”**  
Øyvind August Rui, Evald Sætre, Trond Ohnstad  
*Statnett SF, Norway*
- 4. “High-voltage Power Grid Disturbances during Geomagnetic Storms”**  
Peter Stauning  
*Danish Meteorological Institute, Denmark*
- 5. “Space Weather Analysis and Novel Browser-based Tools”**  
E.I. Tanskanen (1,2), D. Pitchford (3) and A. Pulkkinen (4)  
(1) *Finnish Meteorological Institute, Space Weather Group, Helsinki, Finland*  
(2) *University of Bergen, Department of Physics and Technology, Norway*  
(3) *SES Engineering, Luxemburg*  
(4) *NASA, Goddard Space Flight Center, Greenbelt, USA*
- 6. “Substorms Zoo - a Browser-based Tool for Research, Teaching and Social Data Analysis”**  
E.I. Tanskanen (1,2)  
(1) *Finnish Meteorological Institute, Helsinki, Finland*  
(2) *University of Bergen, Department of Physics and Technology, Norway*







7. **“Reduction of Vulnerability for Safety-critical GNSS Applications”**  
Brynjar Hansen,  
Norwegian Space Centre, Norway
8. **“New NOAA Data, Products, and Research Safeguarding the Satellite Infrastructure from Space Weather”**  
Green, J.C., W. Denig, J. Rodriguez, T. Onsager, W. Murtagh, R. Rutledge, J. Stankiewicz, J. Kunches, D. Wilkinson  
National Geophysical Data Center, USA
9. **“SuperMAG: The Global Ground Magnetometer Network”**  
Brage Førland<sup>1)</sup> & Jesper Gjerloev<sup>2)</sup>
  - 1) Department of Physics and Technology, University of Bergen, Norway
  - 2) Johns Hopkins University Applied Physics Laboratory, USA
10. **“RWC – Sweden of International Space Environment Service (ISES)”**  
Henrik Lundstedt<sup>1</sup>, Peter Wintoft<sup>1</sup>, Lars Eliasson<sup>2</sup> and Urban Brändström<sup>2</sup>
  - 1) Swedish Institute of Space Physics in Lund, Sweden
  - 2) Swedish Institute of Space Physics in Kiruna, Sweden
11. **“How the Solar Wind Dynamo Affects the two Polar Regions Differently”**  
Jone Peter Reistad, Nikolai Østgaard and Kjellmar Oksavik  
Department of Physics and Technology, University of Bergen, Norway
12. **“Maritime Radio Systems Performances in the High North (MARENOR)”**  
Rico Behlke (1, Beate Kvamstad (2, Erlend Bjørdal (3, Fred Sigernes (4 and Dag Lorentzen (4)
  - (1) Polar Science and Guiding, Longyearbyen, Norway
  - (2) MARINTEK, Trondheim, Norway
  - (3) Electromagnetic Geoservices, Trondheim, Norway
  - (4) University Centre in Svalbard, Longyearbyen, Norway
13. **“New Space Weather Service for Monitoring and Forecasting Regional Ionospheric Perturbations over Australia based on GNSS Techniques”**  
Z.Bouya, M. Terkildsen, M. Francis and R.Marshall  
IPS Radio & Space Services, Bureau of Meteorology Sydney, Australia
14. **“Tromsø Geophysical Observatory: Near Real-time Geomagnetic Data Provider for Space Weather Applications in the European Sector”**  
Magnar G. Johnsen  
Tromsø Geophysical Observatory, University of Tromsø, Norway
15. **“Active Region AR1429 March 2012 -Case Study of Space Weather Consequences”**  
Dave Neudegg and R. Marshall  
IPS Radio and Space Services, Bureau of Meteorology, Sydney, Australia





**16. "AMPERE and GEOSCAN: Utilizing Commercial Space Infrastructure for Disaster Mitigation, Planning and Response"**

Lars Dyrud<sup>1)</sup>, Brian Anderson<sup>1)</sup>, Jonathan Fentzke<sup>1)</sup>, Gary Bust<sup>1)</sup>, Rebecca Bishop<sup>2)</sup>, Paul O'Brien<sup>2)</sup> and Marcin Pilinski<sup>3)</sup>,

1) Johns Hopkins Applied Physics Laboratory, USA

2) The Aerospace Corporation, USA

3) ASTRA, LLC, USA

**17. "In-situ Investigations of SATCOM/GNSS Outage Regions"**

Jøran Moen

Department of Physics, University of Oslo, Norway

**18. "Data Driven Models Forecasting Levels of Geomagnetic Disturbance Related to GIC"**

Peter Wintoft<sup>1)</sup>, Henrik Lundstedt<sup>1)</sup>, Magnus Wik<sup>2)</sup>, and Lars Eliasson<sup>1)</sup>

1) Swedish Institute of Space Physics in Lund, Sweden

2) NeuroSpace, Sweden

## EXHIBITORS

1. [Andøya Rocket Range, Norway](#)

*The Cost-effective Entrance to Space*

On the web: [www.rocketrange.no](http://www.rocketrange.no)

Established in 1962 as Andøya Rocket Range (ARR), the new name Andøya Rocket Range (ARR) was introduced in 2012. ARR provides sounding rocket, balloon and UAS (Unmanned aircraft System) operations from Norway, and is host to a large array of ground based scientific instruments. ARR owns and operates the ALOMAR lidar observatory located on the mountain Ramnan, 380 meters above sea level.

ARR customers and partners include ESA, NASA, JAXA, CNES, DLR as well as a many of universities and research institutions worldwide. As a limited company, ARR is owned 90% by the Ministry of Trade and Industry, and 10% by Kongsberg Defense Systems. ARR is an ISO 9001:2000 certified company. The company's budget for 2012 is about NOK 100 million. The number of employees is 70.

ARR headquarters is located on the island Andøya, two degrees north of the Arctic Circle, in the midst of Northern Norway. The airport at Andøya is capable of handling aircraft of all sizes. There are several convenient daily connections to and from Oslo via Tromsø or Bodø.

