Ground Effects Topical Group (GETG) of ESA Space Weather Working Team (SWWT)

Risto Pirjola (FMI, Finland)

Vienna, Austria

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List of present members (in an alphabetical order):

Esko Arajärvi **(Finland)**	esko.arajarvi@iki.fi
David Boteler **(Canada)**	dboteler@nrcan.gc.ca
Ellen Clarke **(UK)**	ecla@bgs.ac.uk
Hans Gleisner **(Denmark)**	hgl@dmi.dk
Pavel Hejda **(Czech Republic)**	ph@ig.cas.cz
Ingmar Kronfeldt **(Sweden)**	ikronfeldt@mac.com
Henrik Lundstedt **(Sweden)**	henrik@lund.irf.se
Allan McKay **(UK)**	aljm@bgs.ac.uk
Marlon Núñez **(Spain)**	mnunez@lcc.uma.es
Risto Pirjola **(Finland)**	risto.pirjola@fmi.fi
Antti Pulkkinen **(Finland/USA)**	antti.pulkkinen@gsfc.nasa.gov
Håkan Swahn **(Sweden)**	hakan.swahn@okg.sydkraft.se
Alan Thomson **(UK)**	awpt@bgs.ac.uk
Larisa Trichtchenko **(Canada)**	ltrichtc@nrcan.gc.ca
Ari Viljanen **(Finland)**	ari.viljanen@fmi.fi
Jürgen Watermann **(Denmark)**	jfw@dmi.dk
Magnus Wik **(Sweden)**	magnus@lund.irf.se
Peter Wintoft **(Sweden)**	peter@lund.irf.se

GETG Web Site

http://www.lund.irf.se/HeliosHome/groundeffectstg.html

-managed by *Magnus Wik* at IRF Lund

Terms of Reference

***Summary*:**

At the Earth's surface, space weather manifests itself as geoelectromagnetic effects. Geomagnetic activity is increased, i.e. the geomagnetic field becomes disturbed, in other words, a geomagnetic storm occurs. The geoelectric field drives currents, called geomagnetically induced currents (GIC), in man-made conductors, such as electric power transmission systems, oil and gas pipelines, telecommunication cables and railway equipment. GIC may cause problems to the systems: transformers can be saturated, pipelines may suffer from enhanced corrosion, and telecommunication and railway systems can experience overvoltage.

***General Activities*:**

- **Modelling the occurrence of geomagnetic variations and geoelectric fields during space weather events**
- **Modelling GIC in electric power systems (discrete earthings)**
- **Modelling GIC in buried pipeline networks (continuous earthing)**
- **Measurements of geomagnetic variations, geoelectric fields and GIC**
- **Development of forecast techniques of GIC based on neural networks or on physical models**
- **Collaboration with power and pipeline industry on GIC research**
- **Advice on and forecast of geomagnetic activity to users, such as oil drilling and prospecting industry and aeromagnetic survey enterprises**

Close connections with WG-3 of COST 724:

- **WP 3300: “Induced Electric Fields”**
  - **WP 3310: “Substratum Conductivity”**
  - **WP 3320: “Telluric Fields”**
  - **WP 3330: “Model Integration” (includes GIC calculation)**
  - **WP 3340: “Storm Effect Records”**

  - **WP 3410: “Database of geomagnetic storm effects on technological systems”**

Recent activities:

- ✍ **Submission of the GREPON-2 pre-proposal to EU FP6 (*Risto, Paul* et al.)**
- ✍ **Collaboration within the ESA SWPP SDA "GIC Simulator / *David* et al."**
  - **Risto's visit to Geolab in Ottawa on Jan. 17 to 29, 2005**
    - **–Modelling of the geoelectric field**
- ✍ **Collaboration within the ESA SWPP SDA "GIC Forecast / *Henrik* et al."**
  - **Risto's visit (= COST 724 STSM) to IRF in Lund on March 16 to 22, 2005**
    - **–Modelling of GIC in the Swedish power grid**
- ✍ ***Antti*'s conclusions from statistical research of d*B*/d*t* on the ground**
  - **statistically similar to uncorrelated white noise => dB/dt (and E and GIC) not possible of being predicted in a deterministic way**

EU FP6 STREP Pre-Proposal (*Risto, Paul* et al.)

- ***NEST INSIGHT*** **area; Call:** ***FP6-2004-NEST-C-1*** **closed on April 13, 2005**
- **Title: "*Geomagnetically Induced Currents (GIC) Risk in the European Power Network*" (*GREPON-2*)**
- **Duration 24 months (about July 2006 to June 2008)**
- **Budget 1860 kEuros (request from EU 960 kEuros)**
- **8 consortium partners (with 186 man-months):**
  - **FMI, Finland**
  - **LPCE/CNRS-Orleans, France** [+ NRCan (Canada), CETP (France)]
  - **IRF-Lund, Sweden**
  - **DMI, Denmark**
  - **BGS-Edinburgh, UK**
  - **University of Sheffield, UK** [+ ANF Energy Solutions (Canada)]
  - **RTE/EDF power company, France**
  - **NGT power company, UK**