The Institution of Engineering and Technology

Seminar on Solar Storms

Building a business case to protect and prepare ground based infrastructure against geomagnetic storms

30 April 2013 | IET London: Savoy Place

www.theiet.org/solar-storms #IETstorms

PROGRAMME

09:30	**Registration and refreshments**
10:00	**Keynote and Seminar Chair's welcome and introduction** Prof Mike Hapgood, Head of the Space Environment Group, **RAL Space**
	Keynote Address
10:05	**Risks posed to ground based infrastructure by CMEs – exploring how we can achieve a reasonable estimate of event magnitude against probability** Do we have that data now and if not what research is required on what timescale? Looking at the hazard posed by effects of solar storms on today's sophisticated technologies and on our critical national infrastructure Can solar radiation cause sufficient disruption to be a major issue for industry and society as a whole? What are the likelihoods? Prof Mike Hapgood, Head of the Space Environment Group, **RAL Space**
	What is the scale of the threat Solar Storms pose?
10:40	**Ground based system vulnerabilities - insights from studying the space weather impact on power grids** ▪ Measuring, modelling and prediction of the rapid changes in the magnetic field that are caused by solar storms ▪ Extreme event analyses, based on geomagnetic variation data, and estimation of the scale of 1:100 and 1:200 years events on the system ▪ Reviewing how and where historical solar storms have impacted the National Grid ▪ Discussing the role of ground conductivity and how the UK differs in this respect from other high latitude countries ▪ Identifying the gaps: similarities and differences between the electrical transmission system and other grounded conducting technologies Dr Alan Thomson, Head of Geomagnetism, **The British Geological Survey**
11:15	**Effects of solar storms (ElectroMagnetic Pulse EMP) on system critical control devices** **CNI and Solar Storms: Integrating Risk Mitigation** **Case Examples - Water and Communications** ▪ Risk Thresholds – remember Fukushima ▪ Top events and catastrophic risk o Integrated risk management and the 'Triple Threat' mitigation synergies ▪ CNI Stakeholder business case development o Risk Management or Risk Transfer? o Quantifying consequences and residual risk o Quantifying mitigation options ▪ Media and scientific communications ▪ Psychology of public response ▪ Confounding factors in Solar Events – 'End of World', Terrorism, State Sponsored Cyber Attacks ▪ CNI Solutions Summary o Top Event – definition o Principles for Risk Management

	o Risk communications to Stakeholders o Public Communications o Technical solutions and Risk Appetite Dr Sally Leivesley, Managing Director, **Newrisk Limited**
11:50	**Refreshments and networking opportunity**
12:10	**Estimating the neutron component of extreme Ground Level Events** ▪ Assessing the scale of a ground level event / work on nuclear reactors with DECC and EDF Energy ▪ Modelling to estimate ground-level neutron fluences (and fluence rates) out to a 1/10,000 year probability of occurrence ▪ Exploring effects of extreme ground level events on nuclear reactor controls and other digital control systems Graeme Taylor, Principal Research Scientist, **NPL**
12:45	**Case study: modelling, testing and simulation – tools to help you plan your protective measures** **The susceptibility of electronic components:** - Semiconductor chip manufacturers – design resilience into chips? - Where does responsibility lie? - What hardening has to be done? And… Dr Simon Platt, Senior Lecturer in Electronics, **University of Central Lancashire** **Development of major UK test facility to help you understand and plan your protective measures** Electronic device and system resilience test facility - to help you determine the resilience and where the neutron (and muon) risks are to critical ground and aerospace control and communications systems Dr Chris Frost, Neutron Irradiation, STFC, **Rutherford Appleton Laboratory**
13:20	**Lunch and networking**
14:20	**Presenting the Royal Academy of Engineering study into the engineering effects of extreme space weather** Keith Ryden, Reader in Space Engineering, **University of Surrey**
14:55	**Protecting the transport built environment -** **Understanding And Managing Major Emergent Infrastructure Risks** ▪ Understanding the increase vulnerabilities of our infrastructure systems to risk(s) posed by man-made and natural hazards ▪ Defining cascading risk to determine and develop reasonable responses. ▪ Interdependency issues ▪ Risk management strategies and means of assessment that may support a better understanding are introduced and reviewed ▪ Observing the potential impact of solar storms on transport systems, particularly in view of their interdependency are made

	Dr James Kimmance, Head of Risk Management, **Parsons Brinkerhoff**
15:30	Refreshments and networking
15:45	**Assessing the bigger risk and resilience picture - Insuring and financial readiness for solar storms** ▪ Sharing how the insurance industry are working with engineering experts to develop and offer insurance solutions ▪ Determining the costs of insuring assets and a comparison in the built environment of protecting and hardening Versus designing in protection Neil Smith, Manager, Emerging Risks & Research, **Lloyd's of London**
16:20	**Panel discussion 'Exploring 'Black Swan Territory' – supplying the facts you need to help build your business case in preparation for solar storms – a summary of the day to reveal next steps for asset owners and operators**
16:45	**Seminar Chair's closing remarks**
17:00	**Close of event**