

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 <ul style="list-style-type: none"> ▪ 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 <ul style="list-style-type: none"> ▪ Risk Thresholds – remember Fukushima ▪ Top events and catastrophic risk <ul style="list-style-type: none"> ○ Integrated risk management and the 'Triple Threat' mitigation synergies ▪ CNI Stakeholder business case development <ul style="list-style-type: none"> ○ Risk Management or Risk Transfer? ○ Quantifying consequences and residual risk ○ 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 <ul style="list-style-type: none"> ○ Top Event – definition ○ Principles for Risk Management

	<ul style="list-style-type: none"> ○ Risk communications to Stakeholders ○ Public Communications ○ Technical solutions and Risk Appetite <p>Dr Sally Leivesley, Managing Director, Newrisk Limited</p>
11:50	Refreshments and networking opportunity
12:10	<p>Estimating the neutron component of extreme Ground Level Events</p> <ul style="list-style-type: none"> ▪ 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 <p>Graeme Taylor, Principal Research Scientist, NPL</p>
12:45	<p>Case study: modelling, testing and simulation – tools to help you plan your protective measures</p> <p>The susceptibility of electronic components:</p> <ul style="list-style-type: none"> - Semiconductor chip manufacturers – design resilience into chips? - Where does responsibility lie? - What hardening has to be done? <p>And...</p> <p>Dr Simon Platt, Senior Lecturer in Electronics, University of Central Lancashire</p> <p>Development of major UK test facility to help you understand and plan your protective measures</p> <p>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</p> <p>Dr Chris Frost, Neutron Irradiation, STFC, Rutherford Appleton Laboratory</p>
13:20	Lunch and networking
14:20	<p>Presenting the Royal Academy of Engineering study into the engineering effects of extreme space weather</p> <p>Keith Ryden, Reader in Space Engineering, University of Surrey</p>
14:55	<p>Protecting the transport built environment - Understanding And Managing Major Emergent Infrastructure Risks</p> <ul style="list-style-type: none"> ▪ 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, Director, Risk Mechanics
15:30	Refreshments and networking
15:45	<p>Quantifying the threat of space weather on earth and the role of the insurance industry</p> <ul style="list-style-type: none"> ▪ Why insurers are interested in space weather ▪ Lloyd's work on space weather ▪ Quantifying the threat of space weather on Earth ▪ Role of insurance industry <p>Neil Smith, Manager, Emerging Risks & Research, Lloyd's of London</p>
16:20	<p>Panel discussion 'Exploring black holes and dark matter – the near infinity of factors in risk events and invisibility of high energy threats' – 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</p> <p>Panel Chair: Prof Mike Hapgood, Head of the Space Environment Group, RAL Space</p> <p>Panel to comprise of speakers from the day</p>
16:45	Seminar Chair's closing remarks
17:00	Close of event