

# *Exploration Remote Sensing*

## **The 20th Annual Meeting of the Geological Remote Sensing Group (GRSG) 15-17 December 2009**

**The Geological Society of London  
Burlington House, Piccadilly, London W1J 0BG**

### Meeting Programme

**Monday 14 December** – Icebreaker, 6:00pm, Captains Cabin, Upstairs, 4-7 Norris Street SW1Y 4RJ

**Tuesday 15 December** – The Geological Society, Burlington House, Piccadilly W1J 0BG

8:30am **Registration Opens**

9:15 **Welcome and Opening Remarks** - Dan Taranik, GRSG Chairman, Anglo American plc

9:30 **Mineral Exploration I** - Fred Kruse, University of Nevada Reno

11:00 Coffee and Tea

11:30 **Oil, Gas and Energy** - Richard Evers, Shell Exploration and Production

1:00 Lunch

2:00 **Geological Mapping I** - Luke Bateson, British Geological Survey

3:30 Coffee and Tea

4:00 **Commercial Systems I** - Gareth Crisford, ITT Visual Information Solutions

5:00 **GRSG Annual Meeting, Student and Lifetime Awards** - Dan Taranik, GRSG Chairman

6:00 **Wine Reception and Anniversary Cake** – The Geological Society, ends 7:30pm

**Wednesday 16 December** - The Geological Society, Burlington House, Piccadilly W1J 0BG

8:30am **Registration Opens**

9:25 **Welcome and Opening Remarks** - Dan Taranik, GRSG Chairman, Anglo American plc

9:30 **Commercial Systems II** – Tara Byrnes, GeoEye

11:00 Coffee and Tea

11:30 **Planetary, Environment and Risk** - Gareth Morgan, Imperial College

1:00 Lunch

2:00 **Geological Mapping II** - Jason Manning, ARUP

3:30 Coffee and Tea

4:00 **Mineral Exploration II** - Jim Taranik, University of Nevada Reno

5:30 End of Programme

7:00 **20th Anniversary Dinner** - New China Restaurant, 48 Gerrard Street, Chinatown W1D 5Q

**Thursday 17 December** - The Linnean Society, Burlington House, Piccadilly W1J 0BF  
(on Piccadilly across the arched entryway to The Geological Society)

9:15am **Registration Opens**

10:00 **Welcome and Opening Remarks** - Dan Taranik, GRSG Chairman, Anglo American plc

10:05 **EARSeL TIR Special Interest Group** – History, Goals, Community, Chris Hecker, ITC

10:20 **Thermal Infrared for Exploration** - Dan Taranik, Anglo American plc

12:00 Lunch

1:00 **Field & Lab TIR Spectroscopy** - Stuart Marsh, British Geological Survey

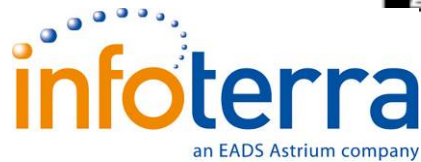
2:30 Coffee and Tea

3:00 **Airborne TIR Systems** – Chris Hecker, ITC Enschede

4:30 End of Programme

5:00 **Afterglow** - Captains Cabin, 4-7 Norris Street SW1Y 4RJ, upstairs reserved

# Thank you GRSG 2009 Annual Meeting Corporate Sponsors!



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## Detailed Agenda

**Tuesday, 15 December** - - The Geological Society, Burlington House, Piccadilly W1J 0BG

8:30am **Registration Opens**

9:20 **Welcome and Opening Remarks**

Dan Taranik, GRSG Chairman, Anglo American plc, UK  
([dtaranik@angloamerican.co.uk](mailto:dtaranik@angloamerican.co.uk))

9:30 **Mineral Exploration I**

Session Chair Fred Kruse, University of Nevada, Reno, USA ([fruse@unr.edu](mailto:fruse@unr.edu))

9:30 – 9:50 ***Evaluation of Full-Range Hyperspectral Image Data for Detection and Mapping of Rock and Soil Materials in Arid Environments***, J. V. Taranik, Z. Aslett, T. Morken, L. Huebner, F. A. Kruse and D. Riley, Arthur Brant Laboratory for Exploration Geophysics, Department of Geological Sciences and Engineering, University of Nevada, Reno, USA ([jtaranik@unr.edu](mailto:jtaranik@unr.edu))

9:50 – 10:10 ***Remote Sensing Exploration of Volta and Keta Basins, Ghana***, Colm J Jordan<sup>1</sup>, John Carney<sup>1</sup>, Chris Thomas<sup>2</sup> and Paul Turner<sup>1</sup> <sup>1</sup>British Geological Survey, Kingsley Dunham Centre Keyworth, Nottingham, NG12 5GG, UK ([cjj@bgs.ac.uk](mailto:cjj@bgs.ac.uk)) <sup>2</sup> British Geological Survey, Edinburgh, Scotland

10:10 – 10:30 ***Linking Remote Sensing imagery to Mineral Systems Analysis through Structural Geology Modelling***, Kloppenburg et al., Midland Valley Exploration, UK ([armelle@mve.com](mailto:armelle@mve.com))

10:30 – 10:50 ***Lithological Mapping with ASTER Imagery Using ENVI Logical Operator Formulae***, Michael A. Brown, Mappa Mundi, UK ([brown\\_micky@hotmail.com](mailto:brown_micky@hotmail.com))

10:50 – 11:00 Mineral Exploration Q&A

11:00 **Coffee and Tea**

11:30 **Oil, Gas and Energy**

Session Chair Richard Eyers, Shell Exploration and Production, The Netherlands  
([Richard.Eyers@shell.com](mailto:Richard.Eyers@shell.com))

11:30 – 11:50 ***Spectral Remote Sensing of Onshore Hydrocarbon Seepage, Zagros Oil Field, Iran***, Sanaz Salati<sup>1</sup>, Freek van der Meer<sup>1</sup>, Frank van Ruitenbeek<sup>1</sup>, and Majid.H.Tangestani<sup>2,1</sup> Department of Earth Systems Analysis, International Institute of Geo-information Science and Earth Observation (ITC), PO Box, 7500 AA, Enschede, The Netherlands, Department of Earth Science, Shiraz University, Shiraz, Iran ([salati@itc.nl](mailto:salati@itc.nl))

11:50 – 12:10 ***Alteration as a Hydrocarbon Exploration Tool: Remote Sensing at Lisbon Valley Revisited***, Cynthia Dacre, MDA Federal, Inc., John L. Berry, John Berry Associates, and David Coulter, Overhill Imaging and Cartography LLC, USA

[\(jlassoc@flash.net\)](mailto:jlassoc@flash.net)

12:10 – 12:30 ***Satellite Monitoring of Ice Conditions in the Oil and Gas Industry***, Kim Partington, Polar Imaging Limited, UK ([kim.partington@polarimaging.co.uk](mailto:kim.partington@polarimaging.co.uk))

12:30 – 12:50 ***Time Series Analysis of Surface Deformation for Oil and Gas Production by SAR-Interferometry: A Case History***, T. Onuma, K. Okada, Y. Kannari, & T. Nishidai, JGI Inc, Japan ([nishidai@jgi.co.jp](mailto:nishidai@jgi.co.jp))

12:50 – 1:00 Oil, Gas and Energy Q&A

1:00 **Lunch**

2:00 **Geological Mapping I**

Session Chair Luke Bateson, British Geological Survey, UK ([lbateson@bgs.ac.uk](mailto:lbateson@bgs.ac.uk))

2:00 – 2:20 ***Spatial distribution of alteration minerals in La Josefina epithermal deposit, Deseado Massif, Southern Argentina***, Raúl Pablo Andrada de Palomera<sup>1/2</sup>, Frank van Ruitenbeek<sup>1</sup>, Freek van der Meer<sup>1</sup>, Martin Hale<sup>1</sup> and Raúl Fernández<sup>3</sup>,  
<sup>1</sup> Department of Earth Systems Analysis, International Institute of Geo - Information Science and Earth Observation (ITC), Enschede, The Netherlands. ([andradadepalomera@itc.nl](mailto:andradadepalomera@itc.nl)), <sup>2</sup> Fomicruz S.E., Santa Cruz Argentina, <sup>3</sup> Instituto de Recursos Minerales, La Plata, Argentina

2 :20 – 2 :40 ***Improvement on LANDSAT Lithologic Classification Using Rule-based Systems***, Na Li\*, Michaela Frei\* & Wladyslaw Altermann+, \*Dept. Earth & Environmental Sci., LMU, Luisenstr 37, 80333 München, ([lina780505@126.com](mailto:lina780505@126.com)), +Dept. Geology, University of Pretoria, Pretoria, South Africa ([wlady.altermann@up.ac.za](mailto:wlady.altermann@up.ac.za))

2:40 – 3:00 ***Mapping Medusae Fossae Formation outlier materials in the southern highlands***, S. K. Harrison, M. R. Balme, A. Hagermann, J. B. Murray and J.-P. Muller ([S.K.Harrison@open.ac.uk](mailto:S.K.Harrison@open.ac.uk))

3:00 – 3:20 ***Variable Geology Projects – One Mapping Approach***, Bernd Schulte, Tilmann Jenett, Antje Lehmann. GAF AG, Munich, Germany. ([bernd.schulte@gaf.de](mailto:bernd.schulte@gaf.de))

3:20 – 3:30 Geological Mapping Q&A

3:30 **Coffee and Tea**

4:00 **Commercial Systems I**

Session Chair Gareth Crisford, ITT Visual Information Solutions, UK ([gcrisford@ittvis.com](mailto:gcrisford@ittvis.com))

4:00 – 4:20 ***Sensors and Applications: A Current and Future Perspective***, Charlotte Bishop, Fugro NPA Limited, UK ([c.bishop@fugro-npa.com](mailto:c.bishop@fugro-npa.com))

4:20 – 4:40 ***Improving Remote Geological Mapping Using Image Segmentation in ENVI EX***, Clive Farquhar, ITT Visual Information Solutions, UK ([cfarquhar@ittvis.com](mailto:cfarquhar@ittvis.com))

- 4:40 – 5:00 ***HyLogging: Emerging Core Logging Technologies Heading to Operational Uptake***, Melissa Quigley, CSIRO, Australia ([Melissa.Quigley@csiro.au](mailto:Melissa.Quigley@csiro.au))
- 5:00 – 5:10 Commercial Systems Q&A
- 5:10 – 5:30 **GRSG Annual Meeting** – Student and Lifetime Achievement Awards, Membership, Finance, Newsletter, Website, Q&A, 2010 meeting. Dan Taranik, GRSG Chairman
- 5:30 **Wine Reception and Anniversary Cake**

**Wednesday, 16 December** - The Geological Society, Burlington House, Piccadilly W1J 0BG

- 8:30 **Registration Opens**
- 9:25 **Day 2 Welcome and Opening Remarks**  
Dan Taranik, GRSG Chairman, Anglo American plc, UK  
([dtaranik@angloamerican.co.uk](mailto:dtaranik@angloamerican.co.uk))
- 9:30 **Commercial Systems II**  
Session Chair Tara Byrnes, GeoEye, USA ([Byrnes.Tara@geoeye.com](mailto:Byrnes.Tara@geoeye.com))
- 9:30 – 9:50 ***High Resolution Satellite: Current Offerings, Future Plans and Industry Trends***, Tara Byrnes, GeoEye, USA ([Byrnes.Tara@geoeye.com](mailto:Byrnes.Tara@geoeye.com))
- 9:50 – 10:10 ***High Resolution Broad-Spectrum Imaging from Space***, Gary Crews, Spatial Energy, USA ([gcrews@spatialenergy.com](mailto:gcrews@spatialenergy.com))
- 10:10 – 10:30 ***Geology in the Cloud***, Andy Garratt, ERDAS, UK ([andy.garratt@erdas.com](mailto:andy.garratt@erdas.com))
- 10:30 – 10:50 ***Achieving LiDAR-like DEM Accuracy and Resolution with a Geophysical Stereo Satellite Elevation Processing System***, Gerry Mitchell, Photosat, Canada  
([gerry@photosat.ca](mailto:gerry@photosat.ca)) (Note: poster also included)
- Poster: ***Design of Optics for Capturing High Resolution Images Incorporating NANO Satellites***, Rishitosh Kumar Sinha, SRM University Chennai India  
([rishismice@gmail.com](mailto:rishismice@gmail.com))
- 10:50 – 11:00 Commercial Systems Q&A
- 11:00 **Coffee and Tea**
- 11:30 **Planetary, Environment and Risk**  
Session Chair Gareth Morgan, Imperial College, UK  
([gareth.morgan04@imperial.ac.uk](mailto:gareth.morgan04@imperial.ac.uk))
- 11:30 – 11:50 ***Monitoring Acid Mine Drainage Influences on Water Bodies on Lignite Mining Lakes in Central Germany Using Airborne Hyperspectral CASI Data***, Cornelia Glaesser, Martin Luther University, Institute of Geosciences, Halle,

Germany ([cornelia.glaesser@geo.uni-halle.de](mailto:cornelia.glaesser@geo.uni-halle.de))

11:50 – 12:10 ***Remote Detection of Geo, Bio, and Physical Parameters for the Analysis of Mass Movements Along the Xiangxi River a Tributary of the Yangtze River***, Frei Michaela<sup>1</sup>, Xia Ye<sup>2</sup> and Kaufmann Hermann<sup>1,2</sup>, <sup>1</sup>Geowissenschaften, Universität Potsdam; <sup>2</sup>Helmholtz-Zentrum Potsdam, Deutsches GeoForschungsZentrum, Potsdam, Germany ([mfrei@gfz-potsdam.de](mailto:mfrei@gfz-potsdam.de))

12:10 – 12:30 ***Processing Omega Hyperspectral Imagery for Mineral Mapping of the Nili Fossae Area on Mars***, W.H. Bakker<sup>1</sup>, F.J.A. van Ruitenbeek<sup>1</sup> and H.M.A. van der Werff<sup>1</sup>, <sup>1</sup>Department of Earth Systems Analysis, International Institute of Geo-information Science and Earth Observation (ITC), Enschede, the Netherlands ([bakker@itc.nl](mailto:bakker@itc.nl))

12:30 – 12:50 ***Remote Sensing of the Internal Layering of the North Polar Layered Deposits on Mars***, Nanna B. Karlsson, University of Hull / British Antarctic Survey Jack Holt, University of Texas at Austin, USA, David Rippin, University of Hull Robert Bingham, British Antarctic Survey (now: University of Aberdeen), UK ([N.B.Karlsson@2006.hull.ac.uk](mailto:N.B.Karlsson@2006.hull.ac.uk))

Poster ***Spectroradiometric Mineral Mapping at the Teutschenthal Potash Salt Mining (Central Germany)***, Michael Denk, Cornelia Gläßer, Andràs Jung and Daniel Schwefel, Martin Luther University Halle-Wittenberg Institute of Geosciences, Department of Remote Sensing and Cartography, Halle, Germany, ([Cornelia.glaesser@geo.uni-halle.de](mailto:Cornelia.glaesser@geo.uni-halle.de))

12:50 – 1:00 Planetary, Environment and Risk Q&A

1:00 **Lunch**

2:00 **Geological Mapping II**

Session Chair Jason Manning, Arup, UK ([Jason.Manning@arup.com](mailto:Jason.Manning@arup.com))

2:00 – 2:20 ***Detailed Lithological Mapping Using Airborne LiDAR and Airborne Multispectral Imagery: Application to Troodos Ophiolite, Cyprus***, Stephen Grebby<sup>1</sup>, Dickson Cunningham<sup>1</sup>, Jonathan Naden<sup>2</sup>, Kevin Tansey<sup>3</sup> <sup>1</sup>Department of Geology, University of Leicester, UK, <sup>2</sup>British Geological Survey, Keyworth, Nottingham UK, <sup>3</sup>Department of Geography, University of Leicester, UK ([srg11@leicester.ac.uk](mailto:srg11@leicester.ac.uk))

2 :20 – 2 :40 ***The use of Multispectral Imagery and Airborne Geophysics in Mapping Geology of Western Burkina Faso***, Václav Metelka<sup>1</sup> ([v.metelka@gmail.com](mailto:v.metelka@gmail.com)), Lenka Baratoux<sup>2</sup>, Mark Jessell<sup>2</sup>, Jérôme Ganne<sup>2</sup>, Séta Naba<sup>3</sup>, <sup>1</sup> LMTG, Université Paul Sabatier, Toulouse, France, Charles University in Prague, Czech Republic Geological Survey, Czech Republic, <sup>2</sup> Université Paul Sabatier, France, <sup>3</sup> Université Ouagadougou, Burkina Faso

2:40 – 3:00 ***Reducing Exploration Risk: Developing 3-D Models in Yemen by Defining Regional Structure, Fault Style, Horizon Mapping and Migration Pathways***, Dan Brown, Aline Bertran and Mike Oehlers, Fugro NPA Ltd, Edenbridge, Kent, UK ([d.brown@fugro-npa.com](mailto:d.brown@fugro-npa.com))

- 3:00 – 3:20 ***Fracture Systems in Fault Related Folds, Zagros Fold Belt, Southern Iran***, Robert Barnes & Ken McClay, Royal Holloway University of London, UK ([r.barnes@es.rhul.ac.uk](mailto:r.barnes@es.rhul.ac.uk))
- 3:20 – 3:30 Geological Mapping Q&A
- 3:30 **Coffee and Tea**
- 4:00 **Mineral Exploration II**  
Session Chair Jim Taranik, University of Nevada ([jtaranik@mines.unr.edu](mailto:jtaranik@mines.unr.edu))
- 4:00 – 4:20 ***Mineral Mapping Using VNIR/SWIR Spectroscopy at Outcrop, Drill Core, and Prospect Scales***, Fred Kruse et al., University of Nevada, Reno, USA ([fkruise@unr.edu](mailto:fkruise@unr.edu))
- 4:20 – 4:40 ***Hyperspectral Analysis of Drill Core for Understanding Hydrothermal Systems and Providing Vectors to Mineralisation***, Bob Agar, AGARRS, Australia ([bagar@agarss.com.au](mailto:bagar@agarss.com.au))
- 4:40 – 5:00 ***Core Imaging Spectral Geology, Examples from Columbia***, Paul Linton, AngloGold-Ashanti, South Africa ([PLinton@AngloGoldAshanti.com](mailto:PLinton@AngloGoldAshanti.com))
- 5:00 – 5:20 ***Remote Sensing: It's Not Only About Satellites; Exploration Examples from the Platinum Perspective***, Jim Crotty, Anglo Platinum, South Africa ([JimC@Angloplat.com](mailto:JimC@Angloplat.com))
- 5:20 – 5:40 ***Characterization and Reconstruction of a Dissected Epithermal System from Airborne Hyperspectral Data - Los Chimberos, Chile***, Dave Coulter, Overhill Imaging and Cartography LLC, USA ([dwc@overhill-imaging.com](mailto:dwc@overhill-imaging.com))
- 5:40 – 5:50 Mineral Exploration Q&A
- 7:00 **Anniversary Dinner** – New China Restaurant, 48 Gerrard Street, Chinatown W1D 5Q

**Thursday, 17 December** - The Linnean Society, Burlington House, Piccadilly W1J 0BF  
(on Piccadilly across the arched entryway to The Geological Society)

- 9:15 **Registration Opens**
- 10:00 **Day 3 Welcome and Opening Remarks**, Dan Taranik, GRSG Chairman, Anglo American plc, UK ([dtaranik@angloamerican.co.uk](mailto:dtaranik@angloamerican.co.uk))
- 10:05 **EARSeL TIR Special Interest Group – History, Goals, and Community and Tasks**, Claudia Kuenzer, DLR, Germany, Chris Hecker, ITC Enschede, The Netherlands ([hecker@itc.nl](mailto:hecker@itc.nl))
- 10:20 **Thermal Infrared for Exploration**  
Session Chair Dan Taranik, Anglo American plc, UK ([dtaranik@angloamerican.co.uk](mailto:dtaranik@angloamerican.co.uk))

- 10:40 – 11:00 ***Mapping Epithermal Gold Deposits on the Island of Milos, Greece Using an Integrated Spectral Reflectance and Spectral Emissivity Dataset***, Dr G. Ferrier, Department of Geography, University of Hull, UK ([g.ferrier@hull.ac.uk](mailto:g.ferrier@hull.ac.uk)) Dr A. Ganas, Institute of Geodynamics, National Observatory of Athens, Greece
- 11:00 – 11:20 ***Use of Night-Time Thermal Infrared (NTIR) for Mineral Exploration: Examples with ASTER and other Satellite Data***, Victoria Stamoulis, Chrysoar Exploration, Australia ([vicki.stamoulis@gmail.com](mailto:vicki.stamoulis@gmail.com))
- 11:20 – 11:40 ***Rapid Characterisation of Athabasca Oil Sand Properties from Hyperspectral Near-Infrared and Thermal Infrared Reflectance Spectra Using Derivative Gaussian Wavelets***, B. Rivard<sup>1</sup>, J. Feng<sup>1</sup>, D. Lyder<sup>2</sup>, A. Gallie<sup>3</sup>, and E. Cloutis<sup>4</sup>, <sup>1</sup>Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, Canada, <sup>2</sup>Alberta Environment, Edmonton, Canada, <sup>3</sup>Department of Geology, Laurentian University, Sudbury, Canada, <sup>4</sup>Department of Geography, University of Winnipeg, Winnipeg, Canada ([benoit.rivard@ualberta.ca](mailto:benoit.rivard@ualberta.ca))
- 11:40 – 11:50 Exploration TIR Q&A
- 12:00 **Lunch**
- 1:00 **Field and Laboratory TIR Spectroscopy**  
Session Chair Stuart Marsh, British Geological Survey, UK ([shm@bgs.ac.uk](mailto:shm@bgs.ac.uk))
- 1:00-1:20 ***Emissivity Measurements with a Portable FTIR Spectrometer***, Thomas Smith and Martin Wooster, Department of Geography, King's College London, UK ([thomas.smith@kcl.ac.uk](mailto:thomas.smith@kcl.ac.uk) , [martin.wooster@kcl.ac.uk](mailto:martin.wooster@kcl.ac.uk))
- 1:20-1:40 ***Infrared Spectral Characterisation of Volcanic Rocks During Preview Project Validation, Campaign on Mt Teide (Canary Islands, Spain) on September 2007, Subtitle: In-situ Emissivity Measurement and Satellite Thermal Map***, Stefania Amici, Buongiorno M.F, Corradini S., and Merucci L., Istituto Nazionale di Geofisica e Vulcanologia, Rome, Italy ([amici@ingv.it](mailto:amici@ingv.it))
- 1:40 – 2:00 ***Longwave Infrared Imaging of Drillcore: Is it Possible and Practical?***  
Phil Harris, Anglo American South Africa, South Africa ([pjharris@angloamerican.co.za](mailto:pjharris@angloamerican.co.za))
- 2:00-2:30 ***Thermal Infrared Characterisation of Geological Samples Including a Demonstration of a “Movable” Spectrometer Setup for Field Use***, Chris Hecker, ITC Enschede, The Netherlands ([hecker@itc.nl](mailto:hecker@itc.nl))
- 2:30 **Coffee and Tea**
- 3:00 **Airborne TIR Systems**  
Session Chair Chris Hecker, ITC Enschede, The Netherlands ([hecker@itc.nl](mailto:hecker@itc.nl))
- 3:00 - 3:20 ***Late-season Day/Night Airborne Thermal Hyperspectral Imagery Acquisition Campaign over Dinosaur Provincial Park, Alberta***, Jason Howse

and Stephen Achal, ITRES, Calgary, Canada ([jhowse@itres.com](mailto:jhowse@itres.com),  
[sachal@itres.com](mailto:sachal@itres.com))

3:20 - 3:40 ***On Using SEBASS as a Mineral Exploration Tool***, Nielson Schulenburg, Dean N. Riley, Peter N. Kupferman, Gregg P. Bryant, The Aerospace Corporation, Virginia, USA ([Nielson.W.Schulenburg@aero.org](mailto:Nielson.W.Schulenburg@aero.org))

3:40 – 4:00 ***National Environmental Research Council (NERC) Review of its Current and Future Airborne Thermal Capability***, Danny Donoghue, Durham University UK, Stuart Marsh, British Geological Survey UK, Doreen Boyd, Nottingham University UK ([danny.donoghue@durham.ac.uk](mailto:danny.donoghue@durham.ac.uk), [shm@bgs.ac.uk](mailto:shm@bgs.ac.uk), [Doreen.boyd@nottingham.ac.uk](mailto:Doreen.boyd@nottingham.ac.uk))

4:00 – 4:10 Airborne TIR Q&A

5:00 **Afterglow** – Captains Cabin, 4-7 Norris Street SW1Y 4RJ, upstairs reserved

## EVENT LOCATION MAP

