


Knowledge Exchange Seminar Series (KESS)

...is a forum that encourages debate on a wide range of research findings, with the overall aim of promoting evidence-based policy and law-making within Northern Ireland



Geoforensics and Illegal Waste

- **Avoidance of Landfill Tax - £250 million cost to NI**
<http://www.newsletter.co.uk/news/northern-ireland-news/clearing-illegal-dumps-could-cost-more-than-250m-1-5756941>
- **Each year - €36 million cost to NI (20%) and Irish (80%)**
economy http://www.impartialreporter.com/news/13853430.The_pound_600_000_costs_to_public_to_remove_illegal_waste_from_Border_farm/
- **€10 million to Italian economy**
(<http://www.havocscope.com/tag/illegal-dumping/>)
- **€200 million globally, estimated 50,000 lives lost (mainly children):**
<http://www.theguardian.com/environment/2015/may/12/up-to-90-of-worlds-electronic-waste-is-illegally-dumped-says-un>
- **Cost to human health, environment, loss of income (metal, plastic)**
- **World-wide problem – easier to bury than recycle, easier to ship than recycle**

<https://www.gov.uk/government/publications/excise-notice-ift1-a-general-guide-to-landfill-tax/excise-notice-ift1-a-general-guide-to-landfill-tax#rates-of-tax>

How can geology assist in the investigation into illegally-buried waste?

First, by understanding ground conditions to assist the search – exclude areas, **find the target.**

Second, assist in assessing how much is there and what it may be.

Third, by excluding suspects from all possible locations and understanding what happened, when and how.



Find the Target: Integration of Imagery and GIS for Screening

Landuse

Surface and Solid Geology

Mineral Location Database

Local Authority Landfill
Database


Access Roads

Visibility

Predictive Modelling – Risk
Assessment



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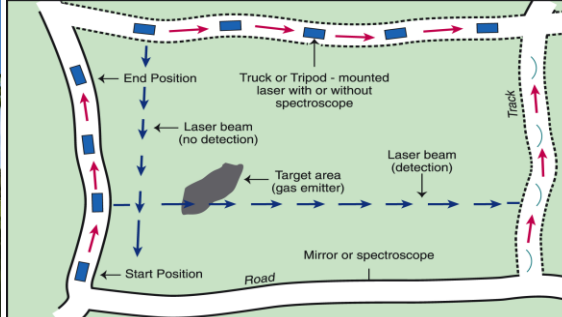


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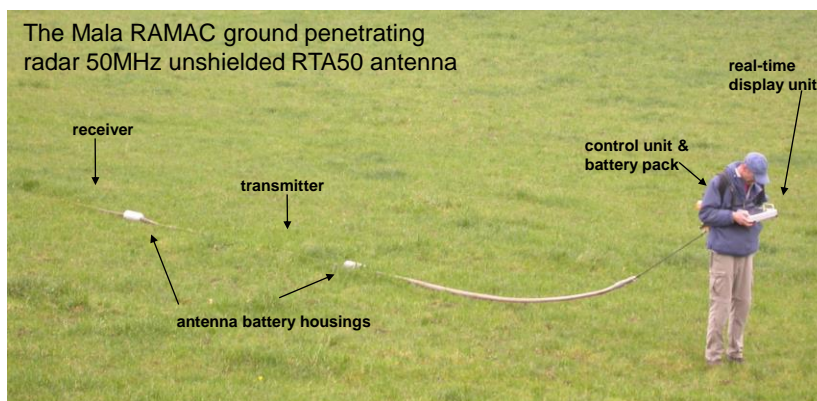
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Case Studies: conjunctive use of geophysical methods

The Mala RAMAC ground penetrating radar 50MHz unshielded RTA50 antenna



Ruffell, A. & Kulesa, B. 2009. Applications of Geophysical Techniques in Identifying Illegally-buried Toxic Waste. *Environmental Forensics*, **10**, 196-207

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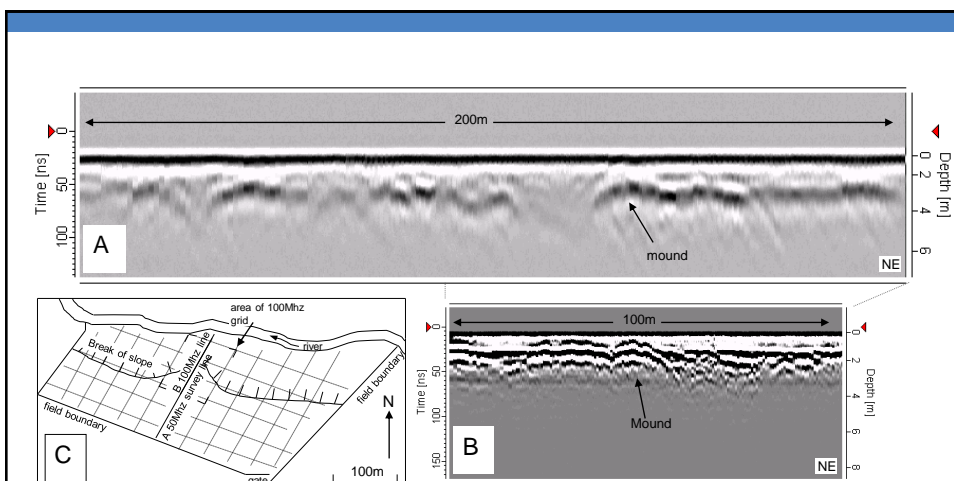
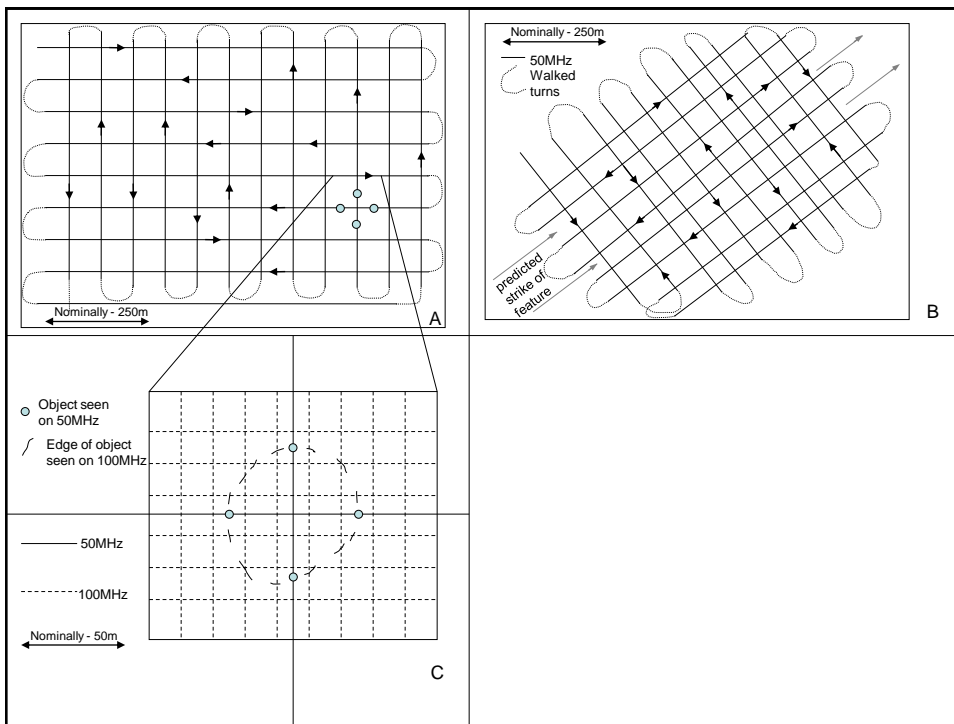
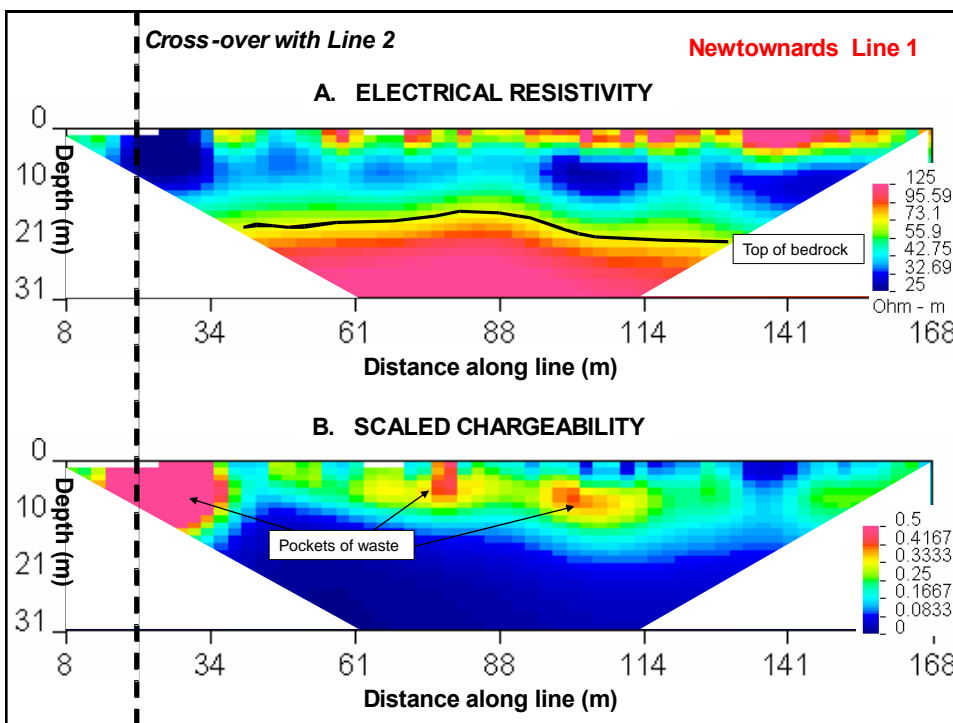
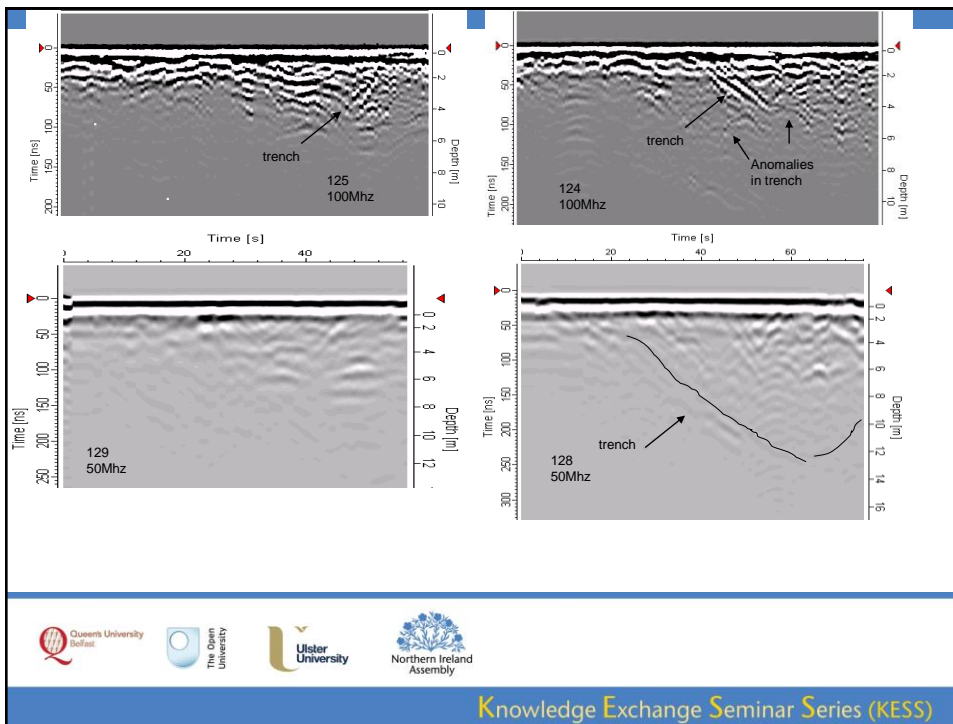
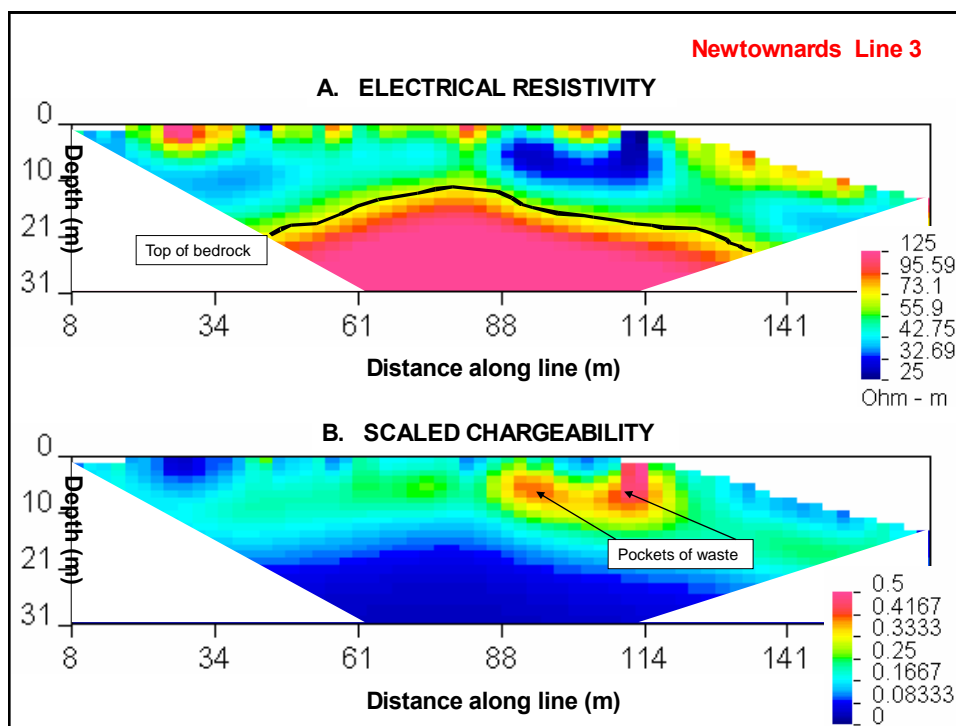


Fig. 3







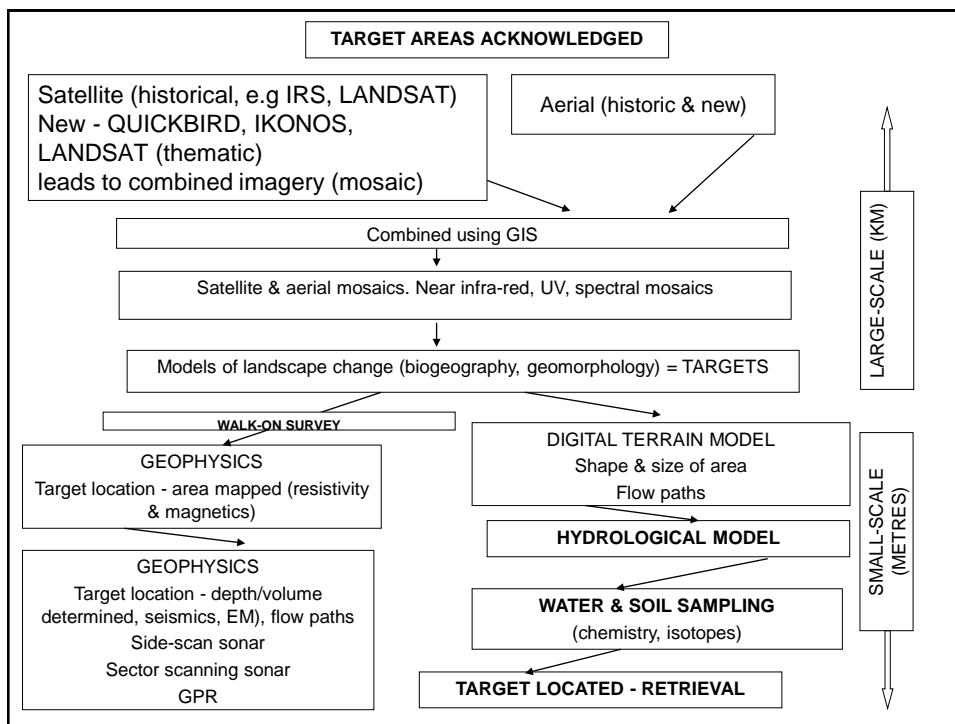
Talk Structure

Macro-scale (find the target)– general on remote sensing (satellite imagery, air photographs, drones)

Medium-scale (define the target)– geophysics: illegally buried waste case study

Micro-scale (assist the legal process) – geological evidence: windfarm case study





Summary
Geological Society of London (GSL) Forensic Geoscience Group (FGG)
International Union of Geological Sciences (IUGS) Initiative on Forensic Geology (IFG)

The collage features several images: a blue helicopter with 'GNEAU' and 'POLICE' markings; a crime scene with a skull and 'CRIME SCENE DO NOT ENTER' tape; a knife, a shovel, and a tire tread; a dog sniffing the ground; and a person in a white protective suit sampling soil.

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IUGS – Initiative on Forensic Geology: training

Bogota, Colombia 2008

Brisbane, Australia, 2012

Brazil & Moscow 2013

Sicily, 2015

(Abu Dhabi, November 2015 and more..)



Northern Ireland
Assembly



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