



IRMS

- a new type of evidence

Sean Doyle

The Forensic Explosives Laboratory

The Forensic Explosives Laboratory

- Headed by Dr Maurice Marshall
- ca. 50 Staff in three teams
 - 1 OPERATIONS 2 RESEARCH 3 SUPPORT
- Centrally funded by the UK Home Office
 - a national resource available to all UK mainland police forces, HMG, and other bona fide customers
- Licensed explosives facility
- 15 + instrumental techniques
- Direct access to complementary expertise
- '24 7' service with agreed performance targets
- ISO 17025 QMS, UKAS accredited methods, CRFP registration

EPSRC

UK Environmental & Physical Sciences RC

UK Government *Foresight* - Crime Prevention Panel

- dedicated funding stream for S&T application to crime reduction recommended
- EPSRC identified as one source of funding
- EPSRC call for Forensic Network proposals answered
- Network funded and established
- EPSRC shortly to announce a call for crime prevention and detection technologies proposal

IRMS & Explosives

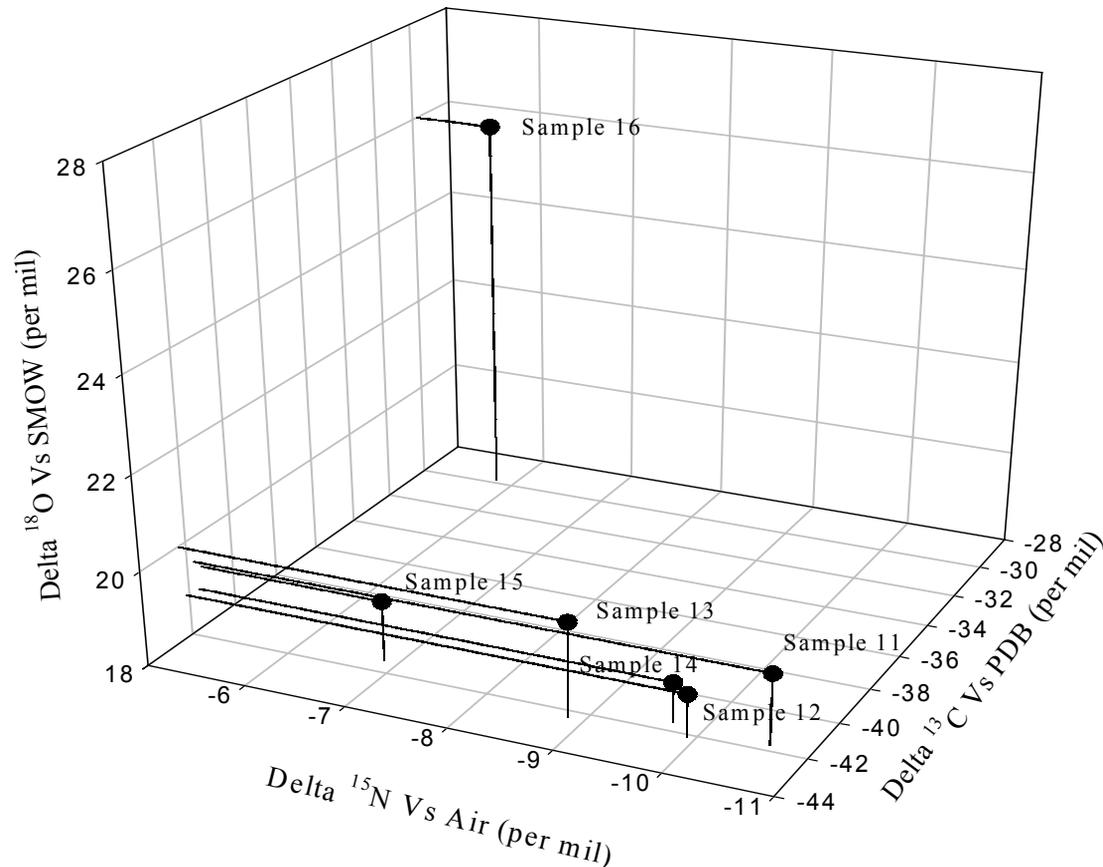
- Potential recognised in the early '90s
- First reported explosives application 1996, Finnegan MAT applications, Bremen
- 1999 FEL commenced three year Home Office funded project with PRIS (CI) and Iso Analytical (C, N, O and S)
- 2002 FEL now has a suite of methods for the elements of explosives significance
- 2003 FEL to take delivery of CF/DI IRMS - funded by the Home Office

Three Year Project - HO funded bulk explosives C, N, O, S and CI

- Yr 1 Proof of concept by PDZ Europa using EA CF for C and N in commercial and improvised low and high explosives.
- Yr 2 S method developed by Iso Analytical, CI by PRIS, Successful blind study of the military high explosive PE4
- Yr 3 Batch variation study, O method developed by Iso Analytical, and validation of the CI methods

IRMS Potential – ‘DNA ?’

- RDX – same origin and different history



Validation

a process of determining the performance characteristics of a method and ensuring they are *suitable for the use to which the method is to be put* (LGC VAM Initiative)

IRMS Validation

- Proof of concept
- Method development
- Publication in a peer reviewed journal
- UKAS accreditation

Validation

the use to which IRMS is to be put

- Providing analytical results to be used as evidence
- Evidence must be relevant and of probative value
- RDX (a) and RDX (b)
 - are from the same batch
 - are from different batches but from the same starting materials
 - are from different starting materials

Global dimension - consequences

In high profile terrorist or organised crime trials...

- Evidence tendered in the jurisdictions of the developed world is likely to be contested by the most skilled lawyers
 - get it right first time
- International collaboration is essential from the outset
 - the task demands it

IRMS Validation

- Proof of concept
- Method development
- Publication in a peer reviewed journal
 - in the US *Daubert v Merrel Dow* has relaxed this requirement at the Federal Level
 - in UK jurisdictions *Preece v HM Advocate* still stands
- UKAS accreditation

ADD

- FORENSIC Validation
 - for the purpose of providing relevant evidence of probative value

Forensic validation

How might this degree of validation be achieved?

- Awareness of past mistakes
- Involving all stake holders
 - researchers
 - developers
 - policy makers
 - instrument manufacturers
 - practitioners
 - investigators
 - lawyers

Forensic Evidence as Intelligence

Proactive use for crime prevention/reduction

- Existing Databases
 - Fingerprints
 - DNA
- Stable Light Isotope Ratio Databases
 - Raw materials
 - Intermediates
 - Commercial Products
 - Improvised Products

Forensic Intelligence Data Base Population - How?

- clear understanding of the requirements of end users
- internationally agreed standard methods for data acquisition - ASCLD, ENFSI and SMANZFL involvement
- avoid duplication of effort - huge task, ill afforded
- global task allocation & burden sharing
 - data acquisition, database population, secure access and data sharing

The Next Steps I (RECOMMENDATIONS)

- End users to help identify R&D needs
- Policy units to reflect on the likely precision
 - faster DI on line processing
 - more precise CF 0.05‰ at 1s impact on crime reduction and prevention - economic effects
- Instrument manufacturers to reflect on intelligence and volume crime demanding high through put and
- Researchers to consider trace requirement - improved sensitivity
 - GC C IRMS 10ng
- Practitioners to consider maximising benefit – to do list

The Next Steps II (OUTCOMES)

The FIRMS Network

- Conference proceedings
- Quarterly news letter
- Establish and maintain an on-line forum
- Provide workshop for key stakeholders within 6 months
- Strategy document – outcome of Conference & Workshop
- Identify and facilitate research priorities
- Secure funding for 2nd conference in Yr 4
- Final EPSRC Report

Acknowledgements

FEL IRMS Project Team

- Dr Mark Stroud and Dianne Wakelin - initial team
- Dr Alison Beardah and Dr Susan Phillips - current

FEL IRMS Network

- Lorna Philp - administration

also

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and Prof Max Coleman at PRIS

Any questions?

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