



Remote detection of radioactive sources

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ADS Workshop : Sensing the Defence Requirement,
Edinburgh, 23rd April 2008



Remote detection of radioactive sources



- **Relevant to :-**

- **Radiological safety of personnel and public**

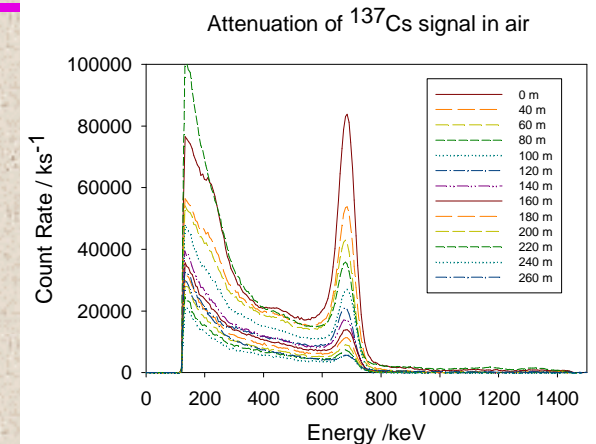
- In natural and built environments
- In operational theatres
- In emergency response
 - Nuclear Reactor accident response
 - Nuclear Weapons accidents

- **CT/CBRN applications**

- Detection and pre-emption of radiological terrorism
- Early/Intermediate and Recovery phases of event response

- **Passive detection using gamma rays**

- Range, energy, air attenuation, field of view
- Static and mobile options
 - Fixed detector : dynamic source (eg portal monitors, static networks)
 - Mobile detector : static source (Airborne, vehicular, portable)
 - Mobile/Mobile ; dynamic networks?



- **Portable systems**

- 10^2 readings hr^{-1}
- 10^3 - 10^4 $\text{m}^2 \text{hr}^{-1}$
- MDL $<10^4$ Bq

- **Carborne (2-3 m agl)**

- 10^2 - 10^3 readings hr^{-1}
- 10^4 - 10^6 $\text{m}^2 \text{hr}^{-1}$ survey rate
- MDL 10^4 - 10^5 Bq

- **Airborne (50-100m agl)**

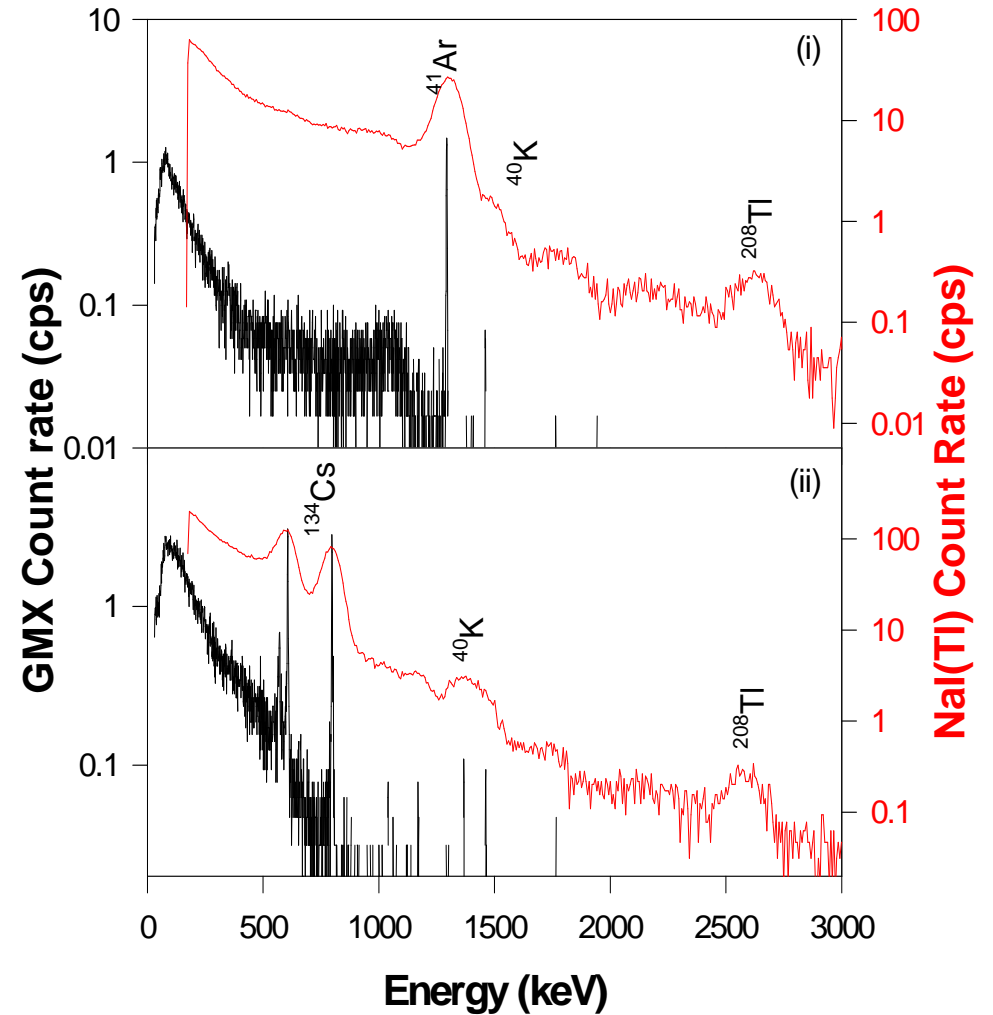
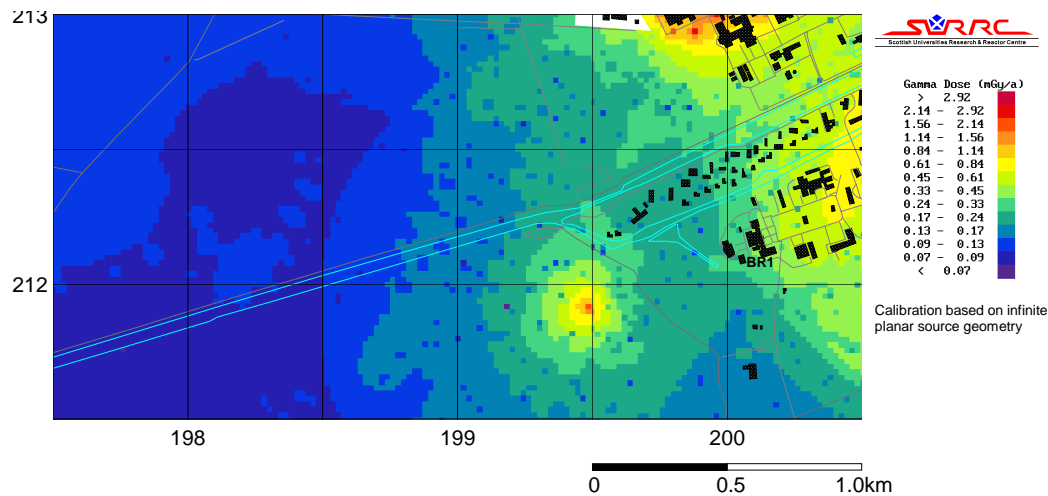
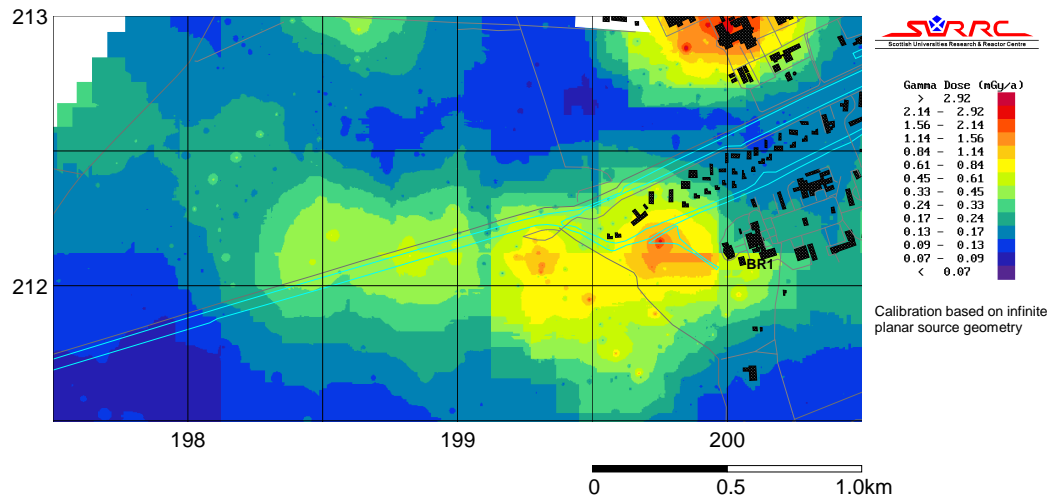
- 10^3 readings hr^{-1}
- 10^7 - 10^8 $\text{m}^2 \text{hr}^{-1}$ survey rate
- MDL 10^5 - 10^6 Bq



SCK-CEN site - Mol



^{41}Ar plume from BR1 reactor – a mobile source!



Experimental plots with ^{134}Cs – a static source



Sensor types and developmental issues



- **High resolution (eg cryogenically cooled Ge detectors)**
 - Excellent energy discrimination
 - Lower detection efficiency
 - More fragile and environmentally sensitive technology
 - High cost
- **Low Resolution (eg High Volume Scintillation spectrometers)**
 - Excellent sensitivity (well suited to AGS and rapid portal work)
 - Lower resolution
 - Robust technology
- **Systems integration issues**
 - Combined systems
 - Versatile deployment platforms
 - Intelligent algorithms
- **Future needs**
 - High band gap semiconductors
 - Availability/size/cost?
- **SUERC's expertise**

