

# **Homeland Security and Academic Research in the UK**

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**20<sup>th</sup> March 2008**

# Who does what?

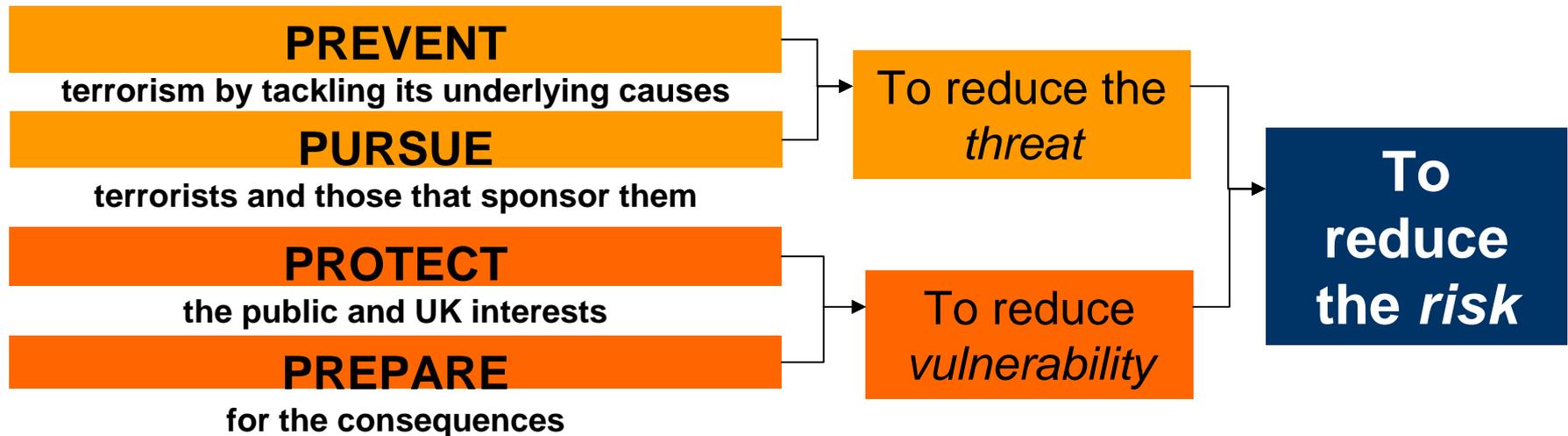
- Home Office leads on Homeland Security – both policy and operational.
- Annual spend on Homeland Security is £2 ¼bn
- Office for Security and Counter-Terrorism has policy lead
  - Overall strategy
  - Legislation
  - Tackling root causes of terrorism
  - Coordination role
  - Research



**Home Office**

# “CONTEST”

- CONTEST: A long-term strategy created in 2003 to counter international terrorism



- Home Office lead, but all Government departments involved, particularly in PREVENT.
- Ministry of Defence engaged in all areas of CONTEST

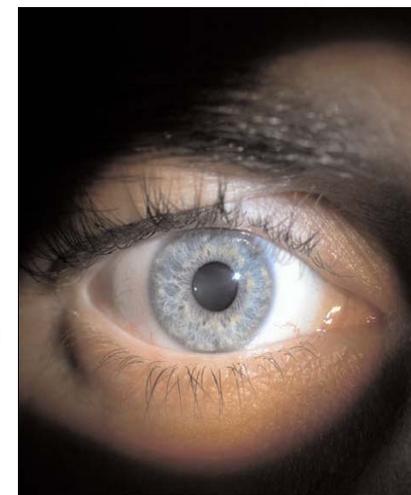
# Who does what?

- Home Office leads on Homeland Security – both research and operational
- Coordinates research from a variety of sources:
- Research Councils
  - Annual spend of c. £40m
  - Crime prevention and detection
  - Radicalisation and social cohesions
  - Sensors, imaging and detection
  - Pandemics, medical research and bioterrorism
  - Biometrics and identification

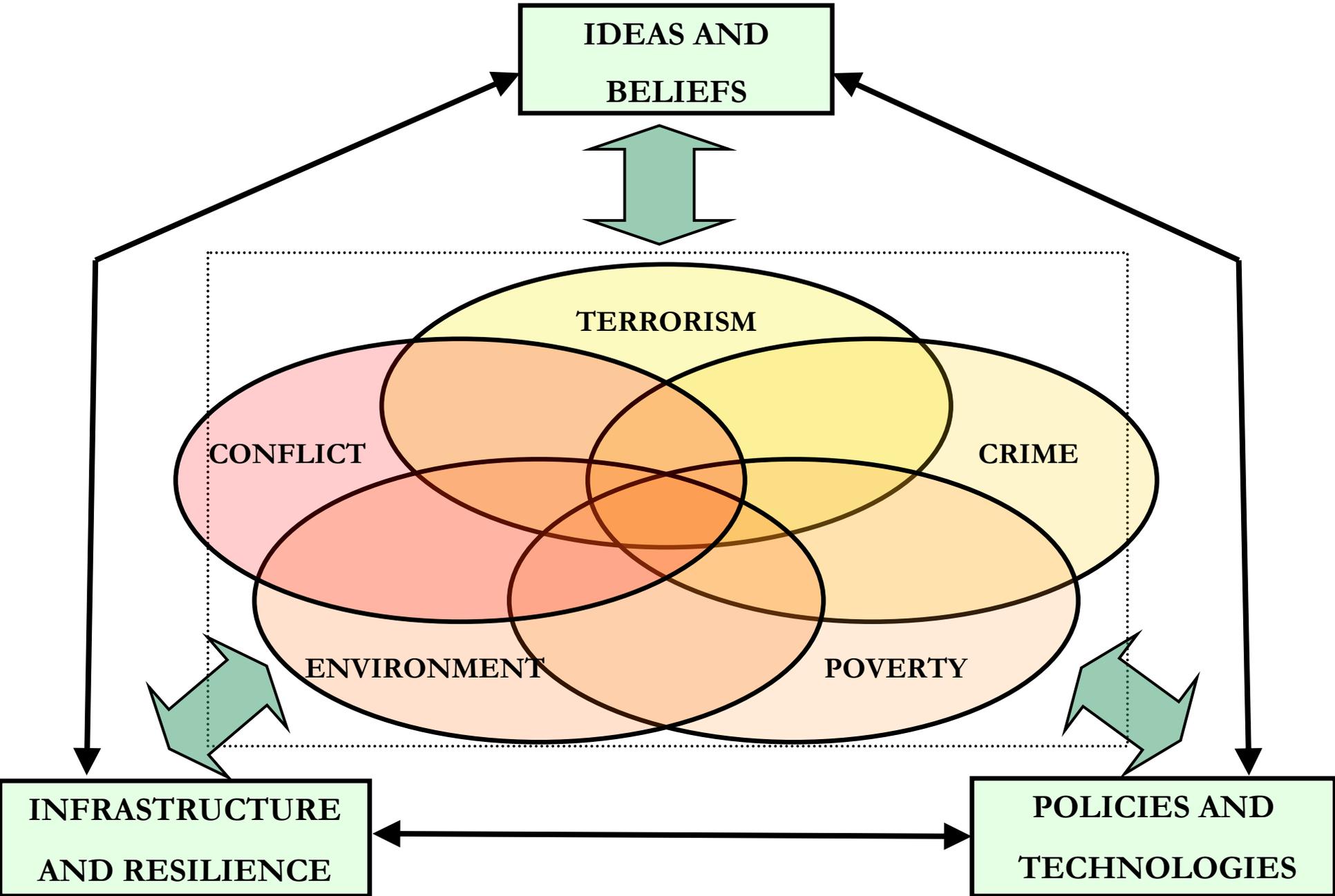


# Who does what?

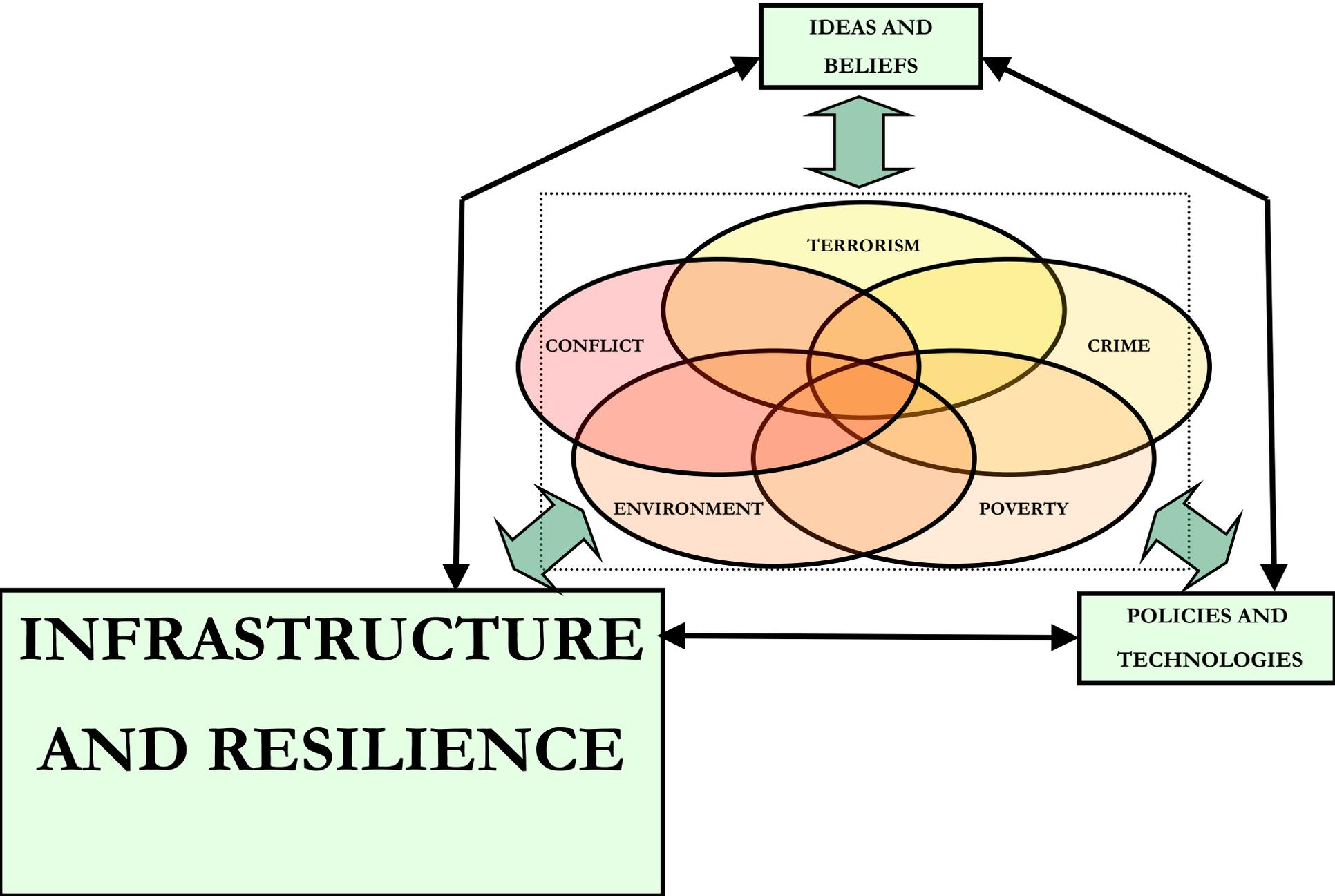
- Home Office internal research
  - Scientific Development Branch
  - R&D through Forensic Science Service
  - CBRN (in addition to Defence spending)
- Defence laboratories
  - Porton Down: CBR research; Counter-Terrorism S&T Centre; (Prevent, Prepare, Protect, Pursue)
  - AWE
  - University/business collaboration
  - Comprehensive advice to range of Government departments



# Research Framework



# Research Framework



# Gamma ray detection

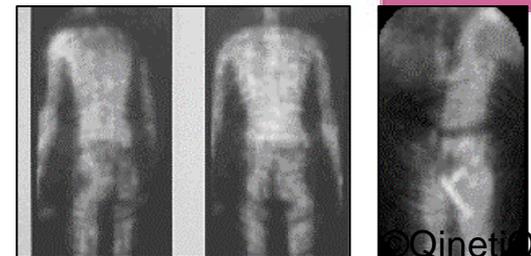
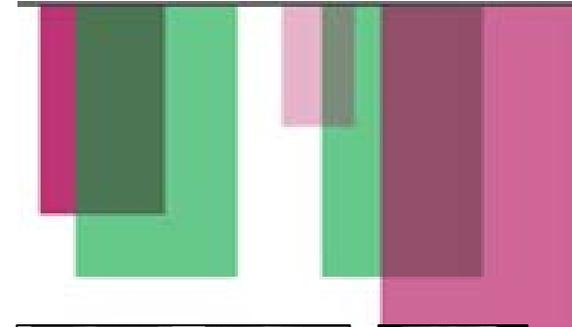
- Requirement for high sensitivity gamma ray detection
- In 2003 UK/US ports began installing 100s of gamma ray detectors at major ports
- Programme Cyclamen will roll this out across the UK
- University of Southampton spin-out, Symetrica, from space research
  - High-sensitivity NaI handheld detectors
  - 2007: \$222m deal with Smiths Detection to supply US DHS

Cyclamen supports the fight against terrorism



# Imaging

- MM-wave imagery
  - Algorithms for Automatic Detection of Weapons, Explosives
  - Model the image formation process
  - Automatic screening
  - Operational and legal guidelines
  - Major players include MoD, Home Office, QinetiQ and academia (Heriot Watt)
- ThruVision – spin-out from Rutherford Appleton Laboratory
  - Entirely passive and non-intrusive terahertz imaging system
  - Reveals explosives, liquids, narcotics, weapons, plastics, ceramics at 25m
  - Commercially available – customers include Canary Wharf and Dubai Mercantile Exchange



**Indoor Scenes**

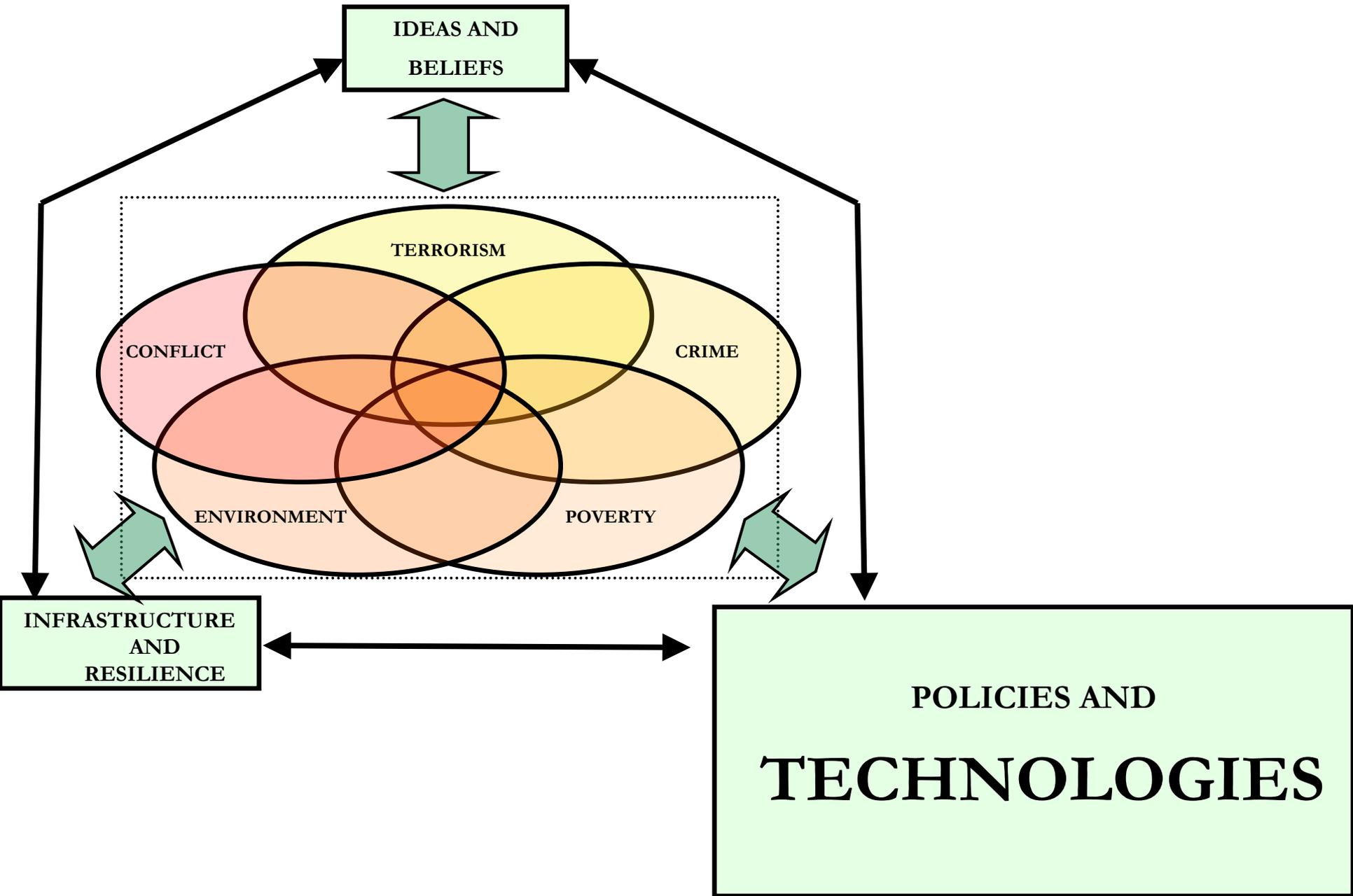


**Outdoor Scenes**



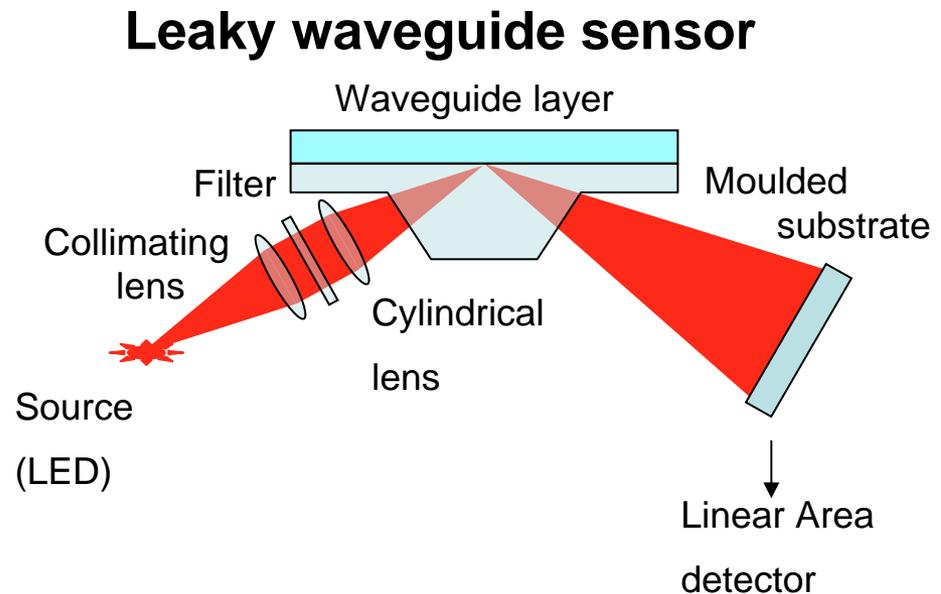
**ThruVision customers**

# Research Framework



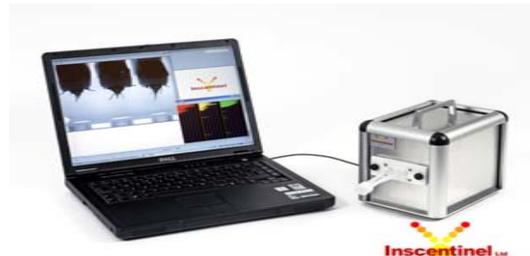
# Optical waveguide biosensors

- Research at Universities of York and Manchester
- Techniques based on plasmon resonance imaging
- Enzyme based colorimetric systems for detecting high explosives and drugs
- Gene for enzymes cloned and expressed in *E. coli*
- High sensitivity and signal to noise ratio
- Funding from Home Office and Defence Laboratories

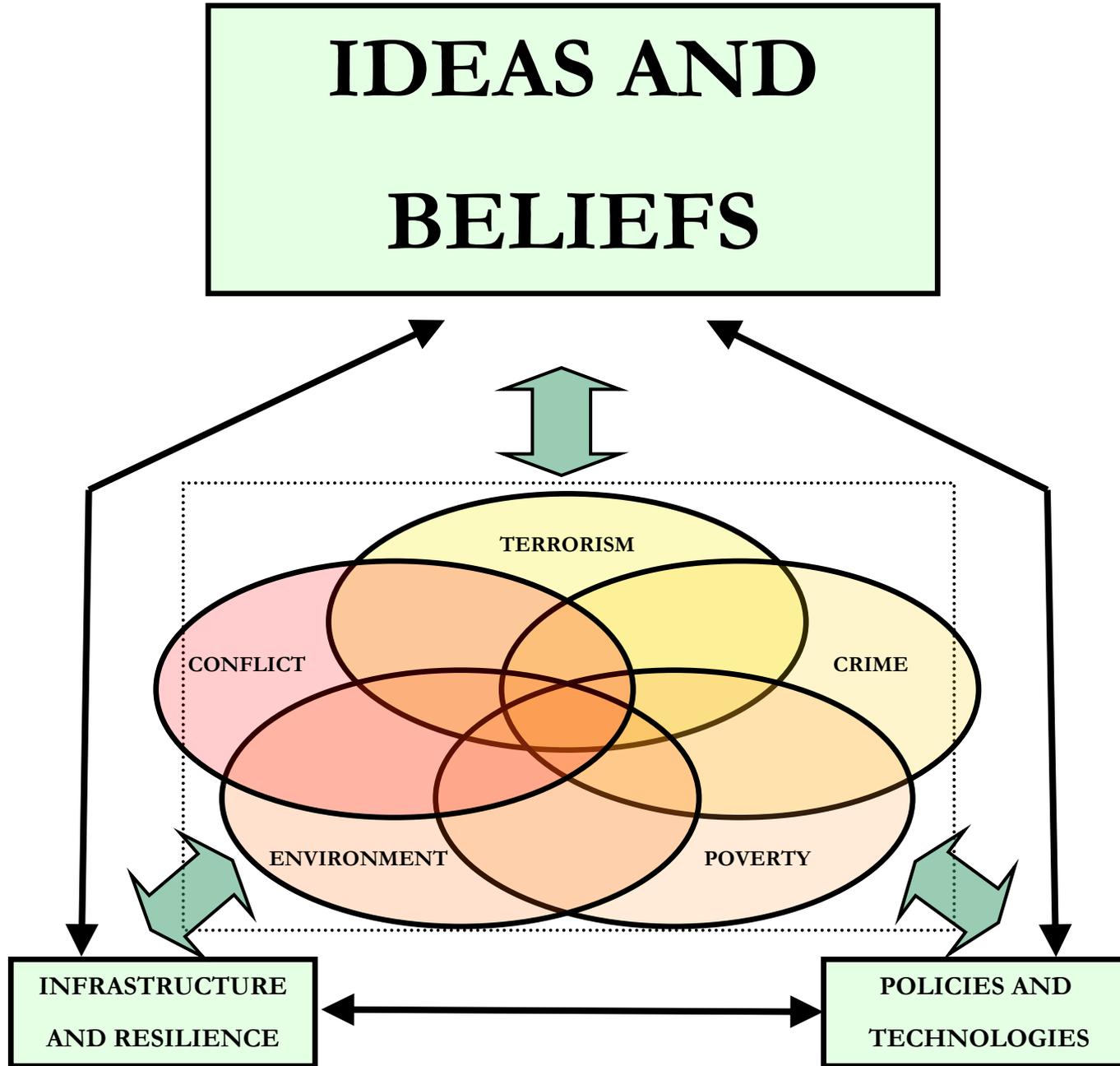


# Parts per trillion detection of TNT

- Well known that insects have a phenomenal ability to detect chemicals
  - Male silkworm moths can detect a few hundred molecules of female moth pheromones from several miles away
- Research at Rothamsted in insect olfaction and behaviour
- Honeybees trained to detect TNT at parts per trillion level
- Spin-out company – Inscentinel Ltd. Yet another example of the surprising applications of scientific research
- Long term potential for application of knowledge to build non-biological sensing systems of comparable sensitivity.



# Research Framework



# Societal perspectives (1)

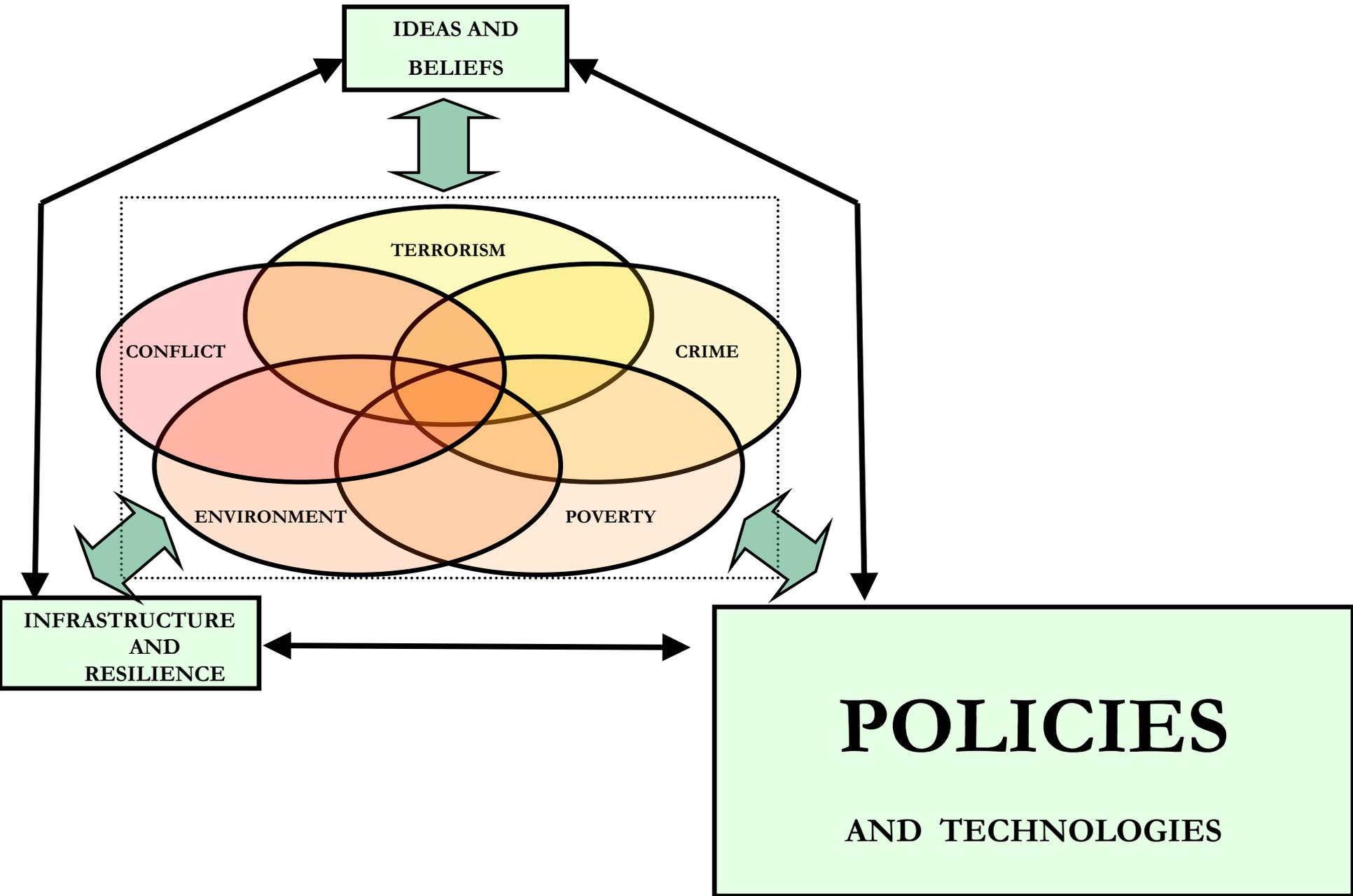


- Effective homeland security research must have two foci:
  - Detection and prevention of threats through technology
  - Addressing of the root causes of threats
- The latter requires the expertise of the social sciences, humanities, behavioural science and economics

# Societal perspectives (2)

- Major programmes in the UK include:
  - Religion and Society (40 projects)
    - Includes projects on extremism, victimisation and community engagement
  - Diasporas, Migration and Identities (50 projects)
  - Radicalisation and Violence (9 projects)
  - New Security Challenges (37 projects)
    - Includes projects on the use and limitations of force, economic and technological determinants of security, radicalisation and political violence

# Research Framework



# Security and openness

- Balancing academic liberty and security considerations.
- ATAS: The Academic Technology Approval Scheme
  - Replaced previous vetting rules in 2007
  - Screening compulsory for all non-EEA post-grad students studying subjects of concern
  - Designed to prevent spread of knowledge that could be used for WMD creation or delivery



# Security and openness

- Research institutions encouraged to adopt responsible policies on researchers
- For example, the Medical Research Council conducts:
  - Robust baseline security screen on all personnel
  - Advanced assessment on staff researching sensitive areas
  - Access control to all units and institutes
- Research Councils operate primarily in the public domain.
- Government departments may impose security classifications for specific contracts and researchers



# Research Framework

