

Innovative Research Call 2023 for Explosives and Weapons Detection

Buildings and Areas



HM Government



**METROPOLITAN
POLICE**



**Homeland
Security**

Science and Technology



**NO PHOTOGRAPHY
NO VIDEO RECORDING**



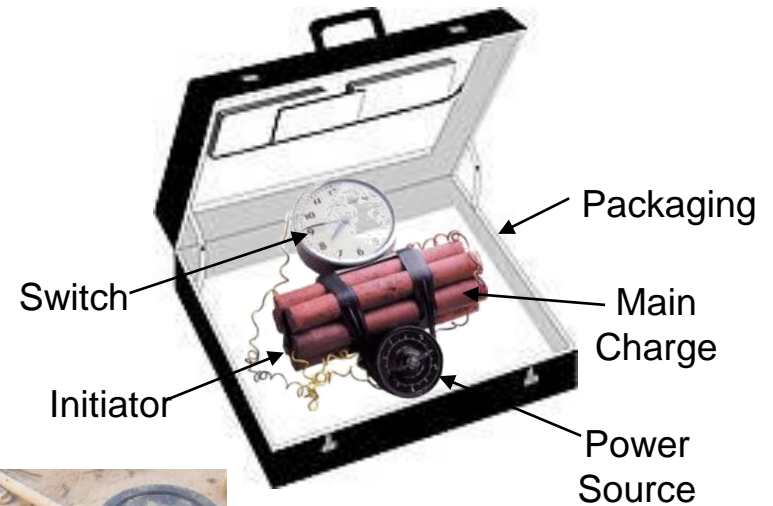
Introduction

- Explosives and weapons detection plays a key role in searching and securing buildings and areas in
 - domestic counter-terrorism (Police)
 - overseas counter-insurgency (Military)
- *Defensive search* primarily focuses on protection against an emplaced IED or concealed weapon
 - eg VIP visitors to a building, soldiers patrolling a route
- *Offensive search* primarily focuses on evidence gathering and depriving adversaries of resources to mount attacks
 - eg locating a weapons cache or terrorist bomb-making equipment



Buildings and Areas Threats

- Improvised Explosive Devices
 - Main charge
 - Conventional explosives
 - Homemade explosives
 - Switch
 - timer, remote control, command wire, victim operated
 - Initiator
 - Detonator
 - Power source
 - Battery, mechanical, chemical
 - Packaging
 - Metallic (shrapnel) and non-metallic
- Grenades
- Mines
- Firearms
- Bladed weapons



Scenario 1

- Party conference search
 - Large, multi-strand security operation
 - Defensive search may cover
 - Primary venue
 - Break-out venues
 - Hotels
 - Routes



- Primary venue – 'Island' site which can be secured

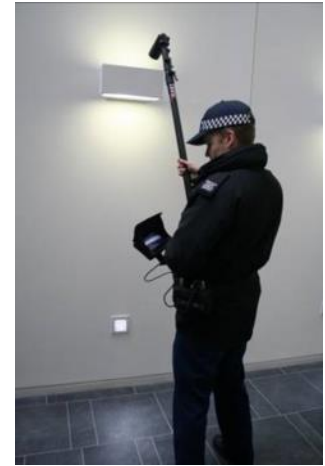
Scenario 2

- Iconic building
 - Large, highly visible security operation
 - Same areas are routinely searched
 - Cannot empty building to conduct full search
 - Ongoing defensive search may cover
 - Building and Grounds
- Island site which can be secured but...
 - Many daily visitors
 - Public, staff, contractors, deliveries, etc
 - Impossible to search all groups of visitors



Scenario 3

- One-off VIP visit to specific location
 - eg PM opens new hospital wing
 - eg Ambassador conducts talks with local leaders
 - Defensive search may cover
 - Primary venue
 - Multiple routes
- Venue is difficult to secure as it needs to continue business as usual



Scenario 4

- Offensive area search looking for an arms hide
 - Could cover a very large physical area
 - Terrain may be UK or overseas and include
 - Fields
 - Wooded areas
 - Gardens
 - Urban areas (including street furniture)
 - Hazardous areas (railways, heights, waterways confined spaces)
 - Extent of potential arms cache may not be known



Scenario 5

- Route Search
 - Could cover a long distance
 - Rural or urban terrain
 - Multiple vulnerable points
 - Speed vs assurance
 - Contingency routes may be in place increasing search requirement



Current Approaches

- Vapour and particulate explosives detection systems
- Search dogs – Explosives and Firearms
- Specialist equipment
 - Void detection and inspection – X-ray techniques
 - Electronic circuitry and wire detection
 - Metal detection
 - Ground penetrating radar
- Manual search and visual inspection
 - Hand tools and visual aids (pole cameras, fibre scopes, etc)



Constraints – Building Search

- May be multiple sites to search over a large area
- Event plans may change at short notice
- Limited time to conduct search
- Resource intensive
- Working buildings require maintenance and services
- Staff (often high turnover)/ visitors with unconfined movement around the estate
- Business as usual often needs to continue during the search phase and event
- Different building materials – brick, concrete, marble, plasterboard, clay, straw
- May need to search covertly



Constraints – Area Search

- Small target and very large search area
- Resource intensive
- Must be carried out in a methodical manner to ensure all areas are searched
- Speed vs assurance (especially for military patrols)
- Difficult to secure perimeter of large search area
- Street furniture and ground type varies
- May need to search covertly
- Equipment must be deployable in a variety of weather conditions



Desired Outcomes

- No 'threat to life' has defeated the security regime
- Any viable threats and false alarms are resolved without causing concern and disruption
- Weapons caches found and secured
- Appropriate assurance of search regime
 - UK typically high assurance required
 - Overseas counter-insurgency dependent on threat
- Business/ patterns of life continue with as little disruption as possible



Buildings and Areas – Summary

- The detection of explosives, improvised explosive devices (including associated electronics) and/or weapons that are located or concealed
 - within a building or its grounds
 - in open areas
 - along a route
- Projects should address one or more of the following
 - improving detection rate
 - increasing the range of threats detectable
 - increasing sampling speed
 - reducing screener burden
 - improving practicality for use in a variety of buildings
- Proposed detection methods for open areas and along routes should allow for
 - a variety of environments, including rural and urban terrain
 - extremes in weather conditions
 - flexibility in the size of area that can be screened

