



Department for Transport Challenge Areas

Challenge Area	What this needs to enable
Aviation Hold Baggage Screening Screening of large densely packed bags (such as aviation hold baggage or cruise ship passenger baggage) relies on Explosive Detection Systems (EDS) to identify explosive threats. Evolving threat methodologies, novel concealment techniques and improvised explosive or incendiary devices can present challenges to existing screening approaches resulting in large numbers of false positive alarms which require further investigation by other means. Innovative technologies and methods are needed to improve the detection rate of Improvised Explosive Devices (IED), Improvised Incendiary Devices (IID) and threat-relevant components within hold baggage while maintaining operational efficiency by minimising the false positive rate of the screening system.	Reliable identification of IEDs, IIDs and threat-relevant components that enhances existing EDS screening capability, improves detection of complex and emerging threats, reduces operator uncertainty and maintains efficient baggage processing.
Detection of explosive threats in Complex Freight and Large Loads Screening large, densely packed or complex transport loads, such as HGV trailers, large, palletised cargo or vehicles, remains challenging where threats may be concealed within cluttered environments or represented in complex X-ray imagery. Current approaches rely on combinations of EDS, X-ray imaging, manual search and specialist capabilities, which can be resource intensive, costly, difficult to scale and demanding for operators to interpret consistently. Evolving threat methodologies, novel concealment techniques and improvised explosive or incendiary devices create a need for innovative, deployable approaches that improve the reliable detection and identification of IEDs, IIDs, malicious items and threat-relevant components while supporting efficient passenger baggage and freight operations.	Reliable, scalable detection of explosive and malicious threats in complex transport loads and imagery while reducing operator burden, maintaining throughput and supporting deployment across diverse transport environments.
Low divestment walk-through people and bag screening	High-throughput screening of people and accompanying bags that reliably detects



Existing screening approaches often require passengers to divest items of clothing and belongings for separate inspection at checkpoints. There is a need for innovative screening solutions that enable the simultaneous inspection of people and small carried or pulled bags, whilst maintaining passenger flow and minimising the need for divestment. Solutions should be suitable for deployment in transport environments at which the passenger passes through semi-controlled areas such as ticketing, document checks or queueing systems.	explosives, explosive devices and weapons whilst minimising passenger divestment, reducing checkpoint friction and maintaining operational flow.
Security situational awareness sensor integration with autonomous and robotic platforms Airports, stations and other transport hubs are increasingly deploying autonomous and robotic systems, such as floor-cleaning, inspection and maintenance devices as part of routine operations. These platforms may present an opportunity to host sensing equipment which can be used to gather information and improve security situational awareness across large areas without the need for dedicated patrols or fixed infrastructure.	Deployable methods for integrating security sensing capabilities onto autonomous and robotic platforms to enhance situational awareness across transport environments.
Passenger Screening – Alarm Resolution Screening of passengers in airports currently employs Security Scanners (SSc) commonly referred to as body scanners. These checkpoints deploy millimetre Wave anomaly detection as a primary screening method for threats, which provide limited information regarding the composition, properties or nature of the material responsible for the alarm. Resolution methods often include hand searches or trace detection swabs (such as explosive trace detection (ETD)), or the subsequent divestment of clothing/footwear to be screened by CT x-ray machines.	Rapid and reliable resolution of passenger screening alarms, reducing the need for intrusive secondary searches and passenger divestment whilst improving operator confidence, maintaining checkpoint throughput and enhancing the passenger experience without compromising security outcomes.