Thales response to International Trade Committee "UK Freeports" inquiry

Introduction

Thales is a global technology business operating across the Aerospace, Defence, Digital Identity and Security, Space and Transport sectors. In 2017, Thales contributed over £1.7 billion to the UK's GDP, supported over 27,000 direct, indirect and induced jobs and the average productivity of a Thales employee was over 40% higher than the national average. We pride ourselves on bringing high tech jobs that drive balanced, sustainable growth, and contribute to building inclusive economies, and delivering prosperity to people everywhere across the UK.

We believe that Freeports present an opportunity to apply new digital technologies to improve efficiency and take a generational leap over traditional borders and ports.

The supporting infrastructure of the area is vital to the successful development of Freeports. Understanding how to make best use of a wide selection of technologies that could help to deliver a new 'smart border' to optimise security, flow and revenue will be critical.

Creating the smart border

Enrolment and Pre-departure
1. Prior to embarking on a journey, preplanning is undertaken to enrol on the system, logging information such as the manifest and details that can then be captured in a blockchain ledger, capturing uniquely all of the data regarding the cargo – source of components, custom regime and so on. This would become the manifest for the vehicle or container. It would also form part of the declaration, informing the risk assessment.

En route to the Border
2. A layered approach to security can be achieved. Vehicles arriving would be identified with ANPR en route to the border, allowing initial checks to be instigated, for example: is the vehicle on a watch list, are the contents likely to need physical checking etc. The use of AI can provide further layers of security. For example, AI based behaviour analysis. CCTV video analytics can be deployed to check that the number plate matches the vehicle type, if the correct number of people are in it and if the vehicle looks secure. Non-intrusive scanning can be done on the vehicle as it approaches the check point. For containers RFID tags could be scanned or QR codes could be checked optically as the containers are off loaded by cranes.

At the Border
3. For vehicles once at the check point, the number plate is used to pull-up all of the data regarding the journey. The occupant drivers can be checked through automated biometrics such as live face or iris recognition. If all is as expected, then the vehicle can move through the border with minimal interruption. Where a red flag occurs, the vehicle can be pulled over for physical inspection, but this can be at a point before, or after the actual border. For goods there are also additional technologies that can be used. For example, containers can be tagged with GNSS based security solutions. These can be read at the check point and the journey taken by the container checked against what was originally logged. For example, did the ship carrying the container travel on the expected route? Did it enter a country that would not be deemed safe?

Was the container removed from the ship and opened? If so, then the container would be red flagged and removed for physical inspection.

4. Data analysis tools are also available that can, for example, fuse satellite imagery with real-time data, to deliver relevant insights in the tracking of assets, monitoring of maritime activity, and borders.

5. If the goods are to be moved to manufacturing sites or other facilities to add value to form finished products in the Freeport zone then you can apply further layers of security down to the individual part or goods level. Physically Unclonable Functions, can be used to identify an object visually from the imperfections in its surface, people (by the back of their hands) and documents thus enabling a GPS and camera-enabled smartphone to register goods, courier and documentation one side of the border and then verify them on the other side, potentially with no requirement for border presence apart from spot checking. In combination with blockchain, we have demonstrated how a supply chain can be secured, with the aim to eliminate counterfeit goods, improving accountability, and securing components required in critical infrastructure. This enables the tracking of unique parts and items through a Freeport zone and provides assurance that integrity is maintained and the correct tariffs and customs regimes can be applied.

6. In the majority of cases above, many of the technologies to enable this are at high technology readiness and available today (see more below). Some are at proof-of-concept, requiring further work to make them production solutions. Implementing the full solution above is ambitious, so an agile development based approach is needed working in technology sandboxes with partners such as academia and specialist SMEs. We also have to ensure that, as well as addressing an end user need, we are not introducing solutions that do not have a sound business case – this will ensure that we have robust supply chains. In some cases the cost of developing new solutions will only be achieved through export opportunities.

The importance of security

7. The ability to control the security of Freeports and the goods moving in and out is a vital requirement to ensure that illicit activity can be minimised and the correct tariffs applied. Thales are leading experts in securing Critical National Infrastructure protection through both physical, digital and cyber means. The ability to leverage future digital technologies to maximise efficiency and utilise data to provide additional services to operators and users of Freeports will be important to future proof these facilities. This underlying infrastructure must be cyber secure by design.

8. The provision a comprehensive security solution for Freeports will be essential. Thales has developed its Security Digital Platform (SDP) which is a key enabler of next-generation solutions for operators in charge of sensitive site security, urban security and Critical National Infrastructure. Designed to provide 360° coverage of security requirements and makes use of the latest digital technologies approach including cloud architecture, Data analytics Artificial intelligence and Automation. Provision of security as a service should also be considered being able to utilise different financing models to ensure that the latest technologies is used as the Freeport concept develops.

The potential to embrace emerging technologies and innovation

9. With a national programme of Freeports it is possible that a UK hub for developing applicable technologies could be an efficient way to deploy the required systems and capabilities and focus innovation. Technology sandboxes where these next generation capabilities could be tested and integrated would enable the safe and efficient deployment of these at scale in larger more complex facilities. Thales would recommend designated a national centre as a smart port testbed to trial technology and then deploy in larger Freeport zones.

- Some of the emerging technologies that Freeports could take advantage of include:
- **Electronic Submission** of documents and payments.
- **Automatic Number Plate Recognition (ANPR)** – allows the reading of number plates to link vehicles to pre-arrival information. The UK pioneered this technology for security purposes and the application of pattern-of-life through ANPR can provide extra intelligence.
- **Inspection Technology** – implementing non-intrusive solutions that allow vehicles to be checked, on the move, coupled with advanced freight-targeting capabilities.
- **RFID Technologies** – currently implemented in many of the technologies mentioned above as well as on toll roads. New RFID tags can have private identity keys embedded within them that provide banking grade identity assurance, similar to that used on credit cards.
- **Fixed Cameras** – for checking vehicles and monitoring the flow of traffic, as people pass across the border.
- **Distributed Ledger Technologies (e.g. Blockchain)** – could ensure the integrity of manifests from point-to-point by providing a single multi-stakeholder high assurance dataset in order to protect against corrupt practises, drive multi-stakeholder efficiencies, and provide auditable robust evidence. Machine learning methods might feed on datasets rich with information about product safety, public health and business practises – to make robust assessments of the likely risks associated with any given consignment. This technology, along with routes of trust, has the potential to secure supply chain as well as track assets, reducing the impact from counterfeit goods. In support of this Thales has developed SIM cards with embedded 'cold wallets' that can write and sign data securely to a common blockchain ledger of asset movements.
- **Artificial Intelligence** – can provide approaches to help secure borders. In particular anomaly detection, where deviations from the normal can be identified.
- **Global Navigation Satellite System (GNSS) based tracking systems** – these have been used in trials and small scale solutions to track containers, including Geofencing, to indicate when the border has been crossed on moved into a zone of interest. Additional security features can also be added to them to monitor access to the container.
- **Physically Unclonable Functions (PUFs)** – This emergent technology class uses the entropy (randomness) in manufacturing to enable unique asset identification by the natural imperfections implicit in materials. PUFs come in numerous formats, but Thales has invested and is working with two, one which can be used to verify the unique identity of a silicon chip, and the second, which has very broad applicability, is used to identify an object visually from the imperfections in its surface. This later 'visual PUF' is being used in trials to uniquely identify assets, people (by the back of their hands) and documents thus enabling a GPS and camera-enabled smartphone to register goods, courier and documentation one side of the border and then verify them on the other side, potentially with no requirement for border presence apart from spot checking.