European security trials embrace data fusion

Faro in Portugal became the second European airport to trial a concept called the Total Airport Security Solution (TASS)

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Faro is a small airport with seasonal peaks and troughs of traffic. Most of the 5.67 million passengers using the airport in 2012 arrived on budget carriers between June and September. It was chosen partly as a contrast to the other two airports chosen to host field tests and proof-of-concept demonstrations of the Total Airport Security Solution (TASS) – Heathrow in the United Kingdom and Athens International in Greece (the Athens test is due in November 2013). TASS was developed by an EU-funded consortium of 19 organisations spearheaded by the Israeli arm of US-based Verint Systems. The system, said Gideon Hazzani, Verint’s TASS co-ordinator, uses airports’ existing security systems and sensors, and fuses the information and data gathered from those systems into a single web-based portal that can be accessed and shared by all airport security bodies.

In the case of Faro, these bodies include the Public Safety Police, the Border and Immigration Office, the National Republican Guard, and the airport’s own security staff. Isabel Oliveira, head of investment, development, and special technology projects for national airport operator Aeroportos de Portugal (ANA), emphasised the importance of sharing security-critical data: “Airport security is not the exclusive responsibility of the airport; it has to involve all entities responsible for national security, from the police to customs ... and each has its own system and its own database.”

TASS is a EUR14 million (USD18 million), four-year project funded by the European Union’s Seventh Framework Programme for research (with investment to date of EUR9 million). However, TASS remains a project in development and at least until the four-year experimental phase is completed in March 2014 it will not be installed in any airport full time. Oliveira believes it could eventually prove useful to airports of all shapes and sizes. When asked whether any of the airports under ANA management would adopt TASS, she responded: “The concept is appealing; we are very excited by it and interested in it. It makes sense.” She added that TASS could even be applied in other environments “that entail high levels of security”, such as bus stations and nuclear plants.

Among the organisations assisting Verint in TASS are the Israeli office of global professional service and accountancy firm Ernst & Young (acting as project administrator); UK-based wireless specialists Red-M; France-based computer software company Real Fusio; Trinity College Dublin; Elbit Systems subsidiary ELSEC; and scanning equipment manufacturer Rapiscan Systems.

The technologies embedded in the TASS system are not yet mature enough for full operational deployment, but they promise to deliver significant enhancements to airport and aviation security. TASS aims to provide “a comprehensive airport security solution through real-time, accurate situational awareness of all airport facilities and surroundings”, according to a project briefing note. Such a powerful system is not only useful, it would have been valuable in the past, Oliveira told *Janes*’s, “In hindsight, looking back at many incidents that have happened, it is understood that if there had been an integration of information, it would have been clearer that there was a very large and imminent risk,” she argued.

Oliveira noted that while the system is not cheap, it is cost-effective. Prices for installing the system vary from EUR500,000 to a few million euros. “It depends on the airport’s size and system configuration/customisation. It can vary,” noted Hazzani.

Airport security costs are a given anyway, said Oliveira: “Nowadays, airport security is increasingly costly for member states of the European Union as airports have become prime targets for situations of attack. Given these growing threats, airport security is a concern.”

TASS’s ability to consolidate information is useful on the terminal management level too. Francisco Gomes, security manager at Faro since 2004, noted: “We have various structures of information but nothing is integrated. That is the great advantage of this system. It brings together everything that is happening, as it happens, in real time, so we can respond to possible threats in real time.”

TASS monitors the entire airport – landside
and airside — providing comprehensive, concurrent intelligence, and situational awareness that aims to detect emerging security threats and expedite an instant response. The system divides airport security control management into eight key segments — people, facilities, airplanes, baggage, cargo, vehicles, environment, and cyberspace — fusing them together to find correlations and anomalies among data in these subjects, seeking to pinpoint threats through real-time analysis. TASS can create a comprehensive complete threat picture and set of alerts for airport authorities, hopefully allowing them to neutralise a threat before it strikes. This information is shared and configured in such a way as to help airport security authorities to immediately assess and determine the best ways to react.

"For example, a stolen vehicle with a fake licence plate is detected by one of the authorities. At the same time something happens in another area of the airport involving baggage. And then we pick up on an intruder jumping over a fence. All this is controlled by different entities. Each one has a risk but if we bring all of those warnings together, that level of risk increases. It is necessary that the information is brought together at the right time," said Oliveira.

One of the most impressive features demonstrated in the field test in May 2013 is the practical delivery and manipulation of this data through a set of video screens in one room, similar to a closed-circuit television (CCTV) control centre.

Another benefit is that TASS adds capabilities without adding to the workload of airport directors — it enhances airport security while managers continue their duties as normal, said Oliveira. "This system will not change the way airports work. What it will do is ensure higher levels of security at lower costs."

Adaptability assessments

TASS’s adaptability is being assessed by tests at three airports of different size, physical dimension, and operational tempo. Faro’s role is to demonstrate how the system works in "a small, private airport, with a lot of tourists and seasonal movement", Oliveira explained.

Trials at Heathrow Terminal 5 (T5) in 2012 were the first to test how the data fusion system performed in a major international hub. Multiple CCTV cameras, facial-recognition systems, vehicle license-plate recognition machines, radio frequency identification equipment, and chemical detectors were installed. An unmanned ground vehicle was even integrated with TASS at T5 — the BAE Systems vehicle included a sensor payload to collect samples and send video from the scene.

The trial period included the 2012 Olympic Games, when Heathrow was under peak pressure. It tested responses to a multipoint terrorist attack, including a chemical attack inside the terminal building, two suicide bombers at the terminal building, a car bomb on the terminal forecourt (outdoors), and gunmen hidden in a sealed cargo delivery truck.

Trials of TASS will continue at T5 until the project finishes in March 2014. More sensors and cameras will be added to realise the full potential of the system. The prototype installation includes dozens of fixed and mobile sensors and cameras for 24-hour monitoring of defined areas in T5. Heathrow Airport Holdings (formerly BAA), the operator of Heathrow, helped to develop the human-machine interface for interpretation by a single operator at a control room near T5. Facial recognition technology was supplied by Omniperception, and Acero Swedish ICT developed and integrated more than 35 sensor systems for indoor airflow and temperature, motion detection, chemical gas sensors and water contamination detection.

Faro’s test used TASS to help manage a security alert involving a simulated airside luggage bomb emergency. It addressed a possible situation where an airport employee was paid by a terrorist organisation to place a suitcase containing a bomb on one of the aircraft parked on the apron. The flight had been flagged as high-risk because of the profile of its passengers. The employee had a valid ID badge, enabling him to access restricted areas and use airport vehicles.
Right: This unmanned vehicle from BAE Systems was used at the Heathrow TASS trial to collect samples and send video footage to the human-machine interface.

A medium-sized European airport will host TASS tests in November 2013. The field trial at Athens will involve “liquids that could contaminate the environment, which is a very hard area to detect”, Oliveira noted. “We are trying to show that in these three airports, with different technological solutions and different procedures, there are clear advantages to fusing information.”

She emphasised: “TASS aims to prove that we do not need to spend more money on new solutions or new technologies every time there is a new risk; but if we can merge information and join up databases, work together, then we can increase security.”

Results to date have been positive. “We have managed to prove that the concept offers clear advantages. We have managed to prove that it is possible to implement it with some ease. But there are a few bureaucracies that still need work.”

“This is a project of investigation. This is a project of development. But it is more a project of development than it is of investigation, and we have proved it is possible.”

A number of the Information systems at Faro were networked in preparation for the TASS field test. The event showed how security forces can intervene quickly, and helped demonstrate how to identify and locate such an attacker while launching a contingency plan swiftly.

Hazzani said he was “very happy” with the way the field test went in Faro: “The end-users’ feedback is very positive about the concept and the system.”

Any improvements to Faro’s operations are welcome during its busy summer period when demand spikes. “What this system will also allow us to do is find the very small percentage, the 1% or 0.5% of passengers who are problematic and let us know who they are,” Gomes explained.

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**TASS work packages**

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<th>Work package</th>
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<td>Establish the end-user requirements for TASS; prioritise solutions/technologies that should be deployed or developed. Requirements to be based on current and future airport risk profile</td>
<td>Athens International Airport</td>
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<td>WP2</td>
<td>Develop operational scenarios for TASS, taking current conditions as the baseline. Include human factors and social implications of TASS to ensure that ethical issues (including privacy) and operational requirements are met</td>
<td>Trinity College Dublin</td>
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<td>WP3</td>
<td>Develop system architecture to support seamless integration and full operation of TASS components. Design the human-machine interface</td>
<td>GMV Skysoft</td>
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<td>WP4</td>
<td>Proof of concept and trials. Test data collection before full system consolidation</td>
<td>Verint</td>
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<td>WP5</td>
<td>Consolidate and develop data collection tools. Set up broadband wireless connection and networking</td>
<td>Verint</td>
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<td>WP6</td>
<td>Develop software components for data fusion and mediation. Include new algorithms that combine data from different sensors</td>
<td>Vitrocet</td>
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<td>WP7</td>
<td>Define and develop command, control and communication TASS portal, based on common multipurpose web service layer plus 2-D and 3-D GIS application</td>
<td>GMV</td>
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<td>WP8</td>
<td>Integration, validation and verification</td>
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<td>WP9</td>
<td>Field tests at Faro, Athens and Heathrow International airports</td>
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<td>WP10</td>
<td>Supporting activities – disseminate project findings to airport community. Investigate possible avenues of further research or practical implementation</td>
<td>Rapiscan</td>
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<td>WP11</td>
<td>Monitor the ethical framework of TASS, and manage any issues that arise on privacy, data protection, and access to sensitive information</td>
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<td>WP12</td>
<td>Overall management</td>
<td>Ernst &amp; Young</td>
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Source: TASS partners