In January I was privileged to take a behind-the-scenes look at Copenhagen Airport’s recently introduced ego security portal system. Deployed at all 18 of the facility’s passenger screening lanes, it is currently the largest single ego system in Europe. My tour was led by Johnnie Müller, Copenhagen’s Security Director, and Erik Nelbom, the airport’s Senior Security Advisor. Mr Müller has worked at Copenhagen (IATA: CPH) for almost ten years. He is Vice Chairman of the ACI World Security Committee having previously served as Chairman of the ACI Europe security committee. Mr Nelbom specialises in forward planning and the introduction of new technologies, having joined the airport’s security team in 1989.

**Genesis**

The basic layout of today’s central security operation can be traced back to 2007 when a 16-lane conventional set-up was introduced utilising archway metal detectors and baggage x-ray machines. Mr Müller recalled that a decision was subsequently taken to sensorise the process by adding better high-tech equipment to make the passenger checkpoint as good as it possibly could be. The security team began by developing staff working groups to engage everyone in developing the ‘ideal’ layout.

Mr Müller recalled how the previous checkpoint area was comparatively noisy, had a low ceiling, no windows, and felt “industrial”. The working groups reported that one of the most important requirements for the staff was to feel they and their role were being respected, both by the public and the airport company. This meant having a working environment that was pleasing to the eye; enabled them to see the sun and was noticeably quieter than the existing system.

Though commonplace now, Copenhagen was one of the first airports to introduce an automated tray return system. Not only do they increase efficiency but they also remove the need for screening staff to do the process manually, perhaps hundreds of times per shift, thereby reducing the number of strains and injuries suffered to the back and knees. Mr Müller noted: “We visited a number of airports to see if any of them had a good set-up that we could use. There was a semi-automatic tray system in use at a German airport but we thought it was very noisy, not that efficient and, therefore, unsuitable, so we decided to develop our own version through a research and development programme.”

Looking back, he added: “Our customer service approach [at that time] was poor, not mature, and we needed to change that. We did that in 2007 and everybody loved it.” However, 16 lanes proved to be insufficient and the security checkpoint needed to grow in line with the airport’s expansion plans. Two more lanes, bringing the total to 18, were added in 2015, and 20 are scheduled to be operational by the end of May.

The airport’s first explosive trace detection (ETD) equipment, 30 Itemiser 4DX machines from Morpho Detection, was also introduced last year to meet new EU legislation for the enhanced explosives screening of passengers. Each security lane has a 4DX machine located under a glass plate within a drawer at the composure end for easy use upon ‘alarmed’ bags. The itemiser detects and identifies trace amounts of explosives on many surfaces, including skin, clothing and bags.

“We were able to implement the itemisers into our existing layout very smoothly,” said Mr Müller, adding: “The staff came up with the great idea to put the itemisers under the glass plate where they do not take up much room.”

The next stage was to implement the passenger screening equipment before new EU regulations came into force on September 1, 2015. Mr Müller said the deadline gave the airport plenty of time to prepare, adding: “That [time] allowed us to study the four available options: using a security scanner system, ETD [explosive detection] equipment, EDDs [explosive detection dogs], or employing a much more thorough hand search. Actually, we were able to decide that we would be aiming for security scanners very quickly. That’s because we could...
see that one of the most demanding tasks for a security officer in terms of working environment is performing a hand search."

Over the course of a 12-hour shift he estimated that each security staff member would be required to carry out up to 600 searches. As each involves the security officer bending down and standing back up, there is an obvious impact upon the body and a significant risk of repetitive strain injuries. "We have knee, hip and back injuries occurring from that," said Mr Müller. "If we could avoid those, it would deliver a big improvement."

He explained that the security scanners also enhance the quality of the passenger screening process because it is difficult to conduct a perfect manual hand search...and to conduct them 600 times a day is even tougher. "We knew that by introducing this technology, we could improve the security quality, the staff's working environment and the passengers' overall experience."

The airport's opinion research studies revealed that the two things passengers hate most in passing through a security process is firstly, the physical hand search and, secondly, the manual search of their hand luggage by a 'stranger'. "This," said Mr Müller, "made our decision to buy scanners easy, but the next issue was 'what equipment should we buy?"" With Denmark being a member state of the European Union, investments of this size require an EU-wide tender, which subsequently narrowed the shortlist of potential suppliers down to three. The tender description called for operational testing of the equipment. This determined if it was feasible for use within Copenhagen's checkpoint layout and enabled the staff to decide if it was the best solution.

**Decision parameters**

The security team decided upon a number of key points to determine the suitability of the equipment: the total speed of the process, the false alarm rate, the user friendliness and passenger friendliness. However, Erik Nelbom explained that to analyse the speed of the process properly, it was necessary to sub-divide into two parts; the time a passenger takes to carry out the necessary search movements and the time the computer equipment requires to process an accurate result.

Mr Müller added: "We did the testing and it's fair to say that all of us were very surprised that the qno portal turned out to be the absolute favourite, the one that scored highest in all the different areas."" - Johnnie Müller.

After a conventional divest layout, which has the added bonus of showing the average waiting times in each lane's queue, Copenhagen's qno system requires travellers to walk through a traditional metal detector, used for primary screening, then an 'alarm' tells them to pause on a mat marked with an outline of shoe prints. The outline is positioned directly
alongside a screening wall and, when the passenger stands upon the shoe prints, he or she is required to raise their arms in a 'surrender' position before holding that stance and turning through 360° as the security agent looks on. Within a second or so, the result of the scan is produced. A display monitor, which can be seen by both the passenger and the security agent, uses the same basic outline of a person for every scan. The eeo system then marks the position of any potential threats it finds hidden beneath the passenger's clothing upon the generic 'human' on the screen.

If nothing is found, the screen simply shows the outline of a person walking within a 'green for go' circle.

Mr Nellor added: "We originally thought passengers might not like using the eeo because they have to do the turn but actually, we found they were OK with it. The queuing passengers can watch the people in front of them going through the process and are able to speak to the security agent when they reach the scan position. We have found they prefer [eoo] to passing through a kind of telephone booth [alternative]."

Mr Müller said the false alarm rate eeo delivers is, "significantly less" than the other systems trialled by CPH, and the only minor 'problems' the operators have encountered so far is that areas of the body that are significantly hotter than other parts, such as the forehead or groin, can mistakenly trigger the 'alarm' system. He added that the manufacturer is already studying a solution for this occasional occurrence. One human factor noted by the Copenhagen staff is that some people instead of turning their feet and body smoothly through the 360° turn, have shown a tendency to jump and turn - 90° at a time - until they have completed a full rotation. This inevitably causes the scan to fail and the passenger must do it again. However, Mr Müller pointed out that the speed at which a passenger completes their turn - so long as they do not jump into position - does not affect the eeo's ability to deliver a scan at the first time of asking.

Satisfied with the test results, Copenhagen introduced the Smiths Detection technology across all 18 security lanes before the September deadline.

Publicity

It's no secret that the first-generation millimetre-wave camera technology introduced at airport checkpoints about a decade ago led to a storm of criticism from the media and travelling public over a significant period of time. Many people accepted the alarmist reports circulated about millimetre-wave cameras producing and storing naked images of screened passengers as fact. Despite being untrue, these stories led to a change in how scans are presented to the operator and passenger alike. With this 'history' in mind, Copenhagen invited Denmark's national press to a two-day launch preview enabling journalists to see that no embarrassing images are captured, displayed or stored by the eeo portal. The result, Mr Müller said, is that screening imagery is not an issue at Copenhagen; no negative feedback has been received.

"We showed everyone the process, how we use it, and explained that there's nothing else. There isn't anybody sitting in a room looking at images, we don't have any photos and we cannot store anything. I think that is clear to everyone now."

He emphasised the importance the airport places upon service levels, adding: "Customer service and satisfaction levels are very important to us, and [with the eeo portal] they are much higher now. The dialogue [the eeo system makes] possible between the passenger and the security agent at the checkpoint is very important to the overall flow and efficiency. Some passengers felt lost within an alternative system."

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