BY JOHN ADAMS

Air Side

ADT Security has installed major Sensormatic brand Electronic Article Surveillance (EAS) retail security systems at multiple sites in 4 major airports around Australia for duty free retailer, the Nuance Group. The installation incorporates Sensormatic's new Floor-Max under floor / concealed EAS system, and represents the first time EAS has been used in such a large application in an air side at airports.

RETAIL security is a major challenge for end users and integrators. A successful retail environment is built around giving customers a powerful retail experience – that means a close encounter with the items they want to purchase. But by its very nature security applications are restrictive. The typical layered security system if taken to its natural end would lock retail items inside displays protected by electronic detection and surveillance systems. The merchandise would be safe but there would be no sales.

What all this means is that any EAS application is a search for balance in the clash between accessible retail display and the principles of security. But there's more to this story than that. These Nuance Group stores carry a range of portable high value items including fragrances, alcohol, cigarettes, electronics and other luxury goods – all of these are prime targets for thieves.

Making things more challenging still, the Nuance Group's duty free stores aren't bundled up on Main St with a ceiling, 4 walls and restricted access points lending themselves perfectly to typical EAS applications. Instead these stores are in major Australian airports – and they're not all in classic retail environments. The biggest of them sprawls across hundreds of square metres of open terminal smack in the entry and exit thoroughfares of Australia's largest airport. It has no ceilings, no walls and no single entry and exit points.

Logically at airports, passenger thoroughfare is the central function and the Nuance Group's retail

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security needs take second place to the airports' demand for efficient passenger movement. And we're not talking about just a few passengers. At major Australian airports multiple large aircraft arrive at the same time. In all, around 15,000 passengers pass through Sydney Airport each day and all must go through the Nuance Group's stores. If you can visualise 200 or 300 shoppers pouring through a retail environment simultaneously in a stream constantly replenished by the arrival of new flights then you're starting to get the picture.

And there are additional challenges. Some of the stores are air-side and because a Radio Frequency (RF) system forms the heart of some EAS solutions, there's the potential for interference and false alarms. For this reason RF EAS technology has long been avoided on the sterile side of airport terminals and why in a world first, ADT's Sensormatic Floor-Max was ultimately acquired to provide a solution.

Finally and most significantly, there are inevitable administrative hurdles to overcome in an airport. Airports are secure and highly regulated environments. You can't just tear up floors, start drilling or installing structures in open areas of airport terminals without going through a lengthy process of assessment and approval from regulatory bodies. In fact you can't even turn up airside with a screwdriver without being processed correctly or accompanied at all times. For the Nuance Group and ADT Security, all these issues represented major challenges that had to be overcome before and during multiple installations in 4 major airports simultaneously.

Integral to the Nuance Group's successful applications of EAS in Australia's airports is Richard Airth, the company's national loss prevention manager. A former police inspector, Airth has a diverse background in retail security going back 2 decades and he has worked in both the U.S. and Hong Kong. Not surprisingly, Airth was involved in pioneering applications of early EAS systems in both countries.

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Now based in Australia, Airth had the full backing of a supportive senior management team at the Nuance Group and he worked closely with ADT Security's regional retail Sensormatic sales manager, Michael Day. Typical of sales people supporting boutique technologies, Day is half engineer, half system designer. Once fired up, Day talks like he eats EAS for breakfast. The joint enthusiasm of Airth and Day for their systems is readily apparent.

ADMINISTRATIVE CHALLENGES

Before we get to the heart of this application it's important to map out its geographical scope. It helps to think of Nuance Group's EAS systems as forming a nebulous whole. Each system is a solution unto itself with a networked diagnostic and management platform welding all the systems together. But while elements are networked to a central location for basic monitoring and diagnostics, other functions must be handled in stores by specially trained sales teams. EAS is not like access control or video surveillance where you can drive the bus from the back seat. EAS demands instant staff response and this imperative is reflected in the system design.

The Nuance Group has multiple stores at Perth Airport, Brisbane Airport, Sydney Airport and Melbourne Airport, and EAS systems and supporting video surveillance systems have been installed in all of them. Melbourne Airport has 3 EAS deployments completed with 2 to go, while Brisbane has 2 very large installations completed. In Sydney there are 8 sites, with 6 completed including 2 huge departure stores and there are 2 arrival stores in the process of being completed. Typically, arrival and departure stores are the biggies with smaller satellite stores located throughout terminals.

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Taking the vast nature of this EAS integration into account, the difficulties and challenges of the Nuance Group's installations are clear to see.

"While elements of the actual installation were difficult, the greatest challenge of all was feeling a way through the administrative pathways required for approval, with each admin channel changing depending on which part of which site and on which site the installation teams were working," Airth says.

"For example, one of the things we wanted at Sydney Airport was EAS pedestals at cash points and along the public walkway in our big store located on the departure route on the air side of the international B Terminal," Airth says.

Airth explains that because of the different groups influencing the airport environment, the solutions reached are unique to each site. That makes design more complicated because each solution has to be created and then recreated to suit the needs and wants of different sites and different administrative authorities.

ADT Security's Michael Day agrees negotiating shared space was a key challenge.

"If you take Sydney Airport as an example, certainly the major element of complexity with this installation is that while the Nuance Group leases retail space in the terminal, the central thoroughfare is SACL territory," Day explains.

"While it appears you're in the midst of the store, you're not – instead you're on Sydney Airport Corp land and it's only when you get off the walkway that you get into the Nuance Group store," Day says.

"Obviously SACL is concerned about its thoroughfares so when it came time to install cabling, the proximity to those thoroughfares and the need to take cable underneath them created issues for all concerned."

Day says airports are unique in the multiple regulatory bodies whose provisions must be adhered to.

UNIQUE SYSTEM DESIGN

Just what is EAS? It's Electronic Article Surveillance – a technology solution in which tags are attached to items and a series of perimeter RF loops are linked to a central controller to report alarms generated by movement of tags that are not deactivated.

Without getting completely enmeshed in the technical, it's worth understanding that EAS tags comprise magnetostrictive, ferromagnetic amorphous metal and a strip of a magnetically semi-hard metallic strip functioning as a biasing magnet.

EAS Pedestals and concealed loops dish up tonal bursts at about 58 kHz which is the resonance frequency of the amorphous strips. In the presence of these loops the strips are magnetized and vibrate longitudinally. This vibration generates an AC voltage in the receiver antenna at a frequency the loop is tuned to receive, generating an alarm.

According to the manufacturer, significant benefits of Sensormatic AM technology offers versus RF include: Infinite width protection as determined by the retailer and/or structural requirements with visible antenna configurations, and up to 60 feet or more with concealed antenna configurations.

Sensormatic says its technology also has the highest deactivation reliability available, small labels one-quarter the footprint of RF technologies, virtually no false alarms and no body shielding. Sensormatic also supports integrated source tagging and offers a variety of labels and hard tag solutions for every retail sector.

Clearly then, EAS is a mature and well sorted technology but there's no question the Nuance Group and ADT Security broke new ground with this installation. Both Airth and Day maintain the EAS systems they've created in high traffic areas at major airports are unique from a retail perspective. And they're right.

"Generally in retail environments there's a 'box' representing a store with 4 walls and we protect that box with an alarm, some cameras and an EAS system," Day explains. "

"But Brisbane Airport is a perfect example of the unique, open EAS systems we've created," Day explains. "In Brisbane there's a huge kidney shaped retail floor in the middle of the terminal and when you're in it the only way you can tell you've reached the end of the store is the EAS perimeter installed there.

"These stores are completely open," he says. "There are gateways into the retail area from the floor but essentially they're wide open and that was one of the complexities for Richard and the Nuance Group and something we had to overcome together.

"There are very wide egresses at departure and that means big numbers of people walking into and out of these environments – there are huge passenger numbers at peak times."

According to Day, the Nuance Group's applications are completely different to the usual retail EAS model.

"It's the combination of Sensormatic's new Floor-Max concealed systems and the Ultra·Max pedestal

"If you can visualise 200 or 300 shoppers pouring through a retail environment simultaneously in a stream constantly replenished by the arrival of multiple new flights then you're starting to get the picture"

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systems in a departures environment in the sterile side of the airport with huge numbers of people moving through – that's the uniqueness of the systems we put into these airports," Day explains.

"There are no department stores in the world in which systems of this type and complexity contend with such large numbers of customers. In the planning stages I thought if it hasn't been done in an airport maybe there's an application where the system had been taken out of closed store environments and installed in open mall areas with huge throughputs of customers that we could look at but nobody had done such an installation," says Day.

"This is an EAS thoroughfare system in an area that's not owned or leased by the store – it's really very special. When I first spoke to Richard my initial reaction was - you want to do what? It is simply unprecedented. The entire departure traffic of Sydney and Melbourne airports goes through Nuance's stores every day – in Brisbane it's probably 90 percent of the traffic moving through. That's on departure as well as arrival."

Airth says the open nature of the stores has led to confusion at times.

"We found people walking right through one of our stores and going into an adjacent Virgin Records outlet to pay for their liquor – in another instance customers went over to Customs and tried to pay there," he explains. "What this illustrates is the importance of effective EAS in these sorts of unique retail applications."

Airth says the nature of the EAS systems installed for the Nuance Group is driven by the style and size of the company's stores.

"We have such huge stores we needed an alternative to the pedestal style of system – operationally and aesthetically. These demands called for something different," Airth explains.

"Just at the time we were looking for a solution, ADT came forward with its new concealed system, Floor-Max, which is a shallow bury concealed system. This was very good for us as we weren't raising our floors very much – it's been perfect for the job.

"With Brisbane being such a huge, open store we couldn't put pedestals everywhere because of visual clutter," Airth says. "Michael came up with the idea of using Floor-Max and putting in a significant concealed system instead. The completed system incorporates pedestal and concealed EAS points.

"Importantly for us, the presence of an EAS pedestal gives us a deterrent factor so we needed pedestals as well as concealed units."

Airth says an advantage of Floor-Max is that it does not restrict passengers heading through the terminals.

"You may have 3 jumbos and an A380s land at virtually the same time," Airth explains. "That's a lot of people who may have been on an aircraft for up to 14 hours and want to get home. It's a challenge from the point of view of security and retail. With such large numbers of travelers coming through you can't protect a store with security officers – you need a tagging system.

ALARM GENERATION

Airth says one of the reasons the Nuance Group is the first retailer in the world to use EAS Floor-Max systems in an airport's sterile environment is because of the frequency of alarm signals and the unrelated frequencies in that environment. The secret is tuning each system to suit the environment in which it's installed.

Day agrees.

"Something else to take into account in terms of response is false alarms given that the systems live in environments with a lot of strong RFI signals. These are systems that look for a frequency coming back towards them in order to alarm, so any near frequency may generate an alarm," he explains.

"In this case an environmental signal running on 58kHz can generate an alarm – whether it's a lighting transformer or whatever it might be. Some systems are designed to tune themselves down to avoid false alarming in the event of environmental noise that is in its area but not moving. Of course this means the system is less sensitive and covers less area. Tapping in remotely and tuning remotely we can get around this.

"There are also issues relating to the sounding of alarms in the sterile area," Day says. "You can't just have sirens and strobes going off in a high security airport environment – that had to be taken into account during the design of the system.

Airth says an issue for any EAS system and the staff responding to it is the size and open nature of the protected areas.

"This demands a creative alarm signalling solution and what Michael has done is introduce different sounds for different areas so staff know where to

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look in the event of an event."

Day agrees that alarm signalling in such big spaces was challenging.

"This was something we tripped over – we hadn't really experienced it before. In a typical retail store things are far easier – there's an entry and exit point and an alarm draws your attention to that one area," he explains.

"But in these Nuance applications staff could be in the middle of a 360-degree retail space with no doors and no walls. Which way do you look and how do you react to an alarm tone? It really is very hard to recognize where an alarm has come from.

"We've countered this with a visual alarm and different audible alarms designed so staff within the stores become familiar with the tone of their area's alarm."

According to Airth, any EAS solution is only as effective as the staff who manage it.

"If staff don't react it's meaningless and we take a lot of time training staff in how to manage a situation in which a customer has to be told their bag has set of an alarm including ways in which to respond to that," Airth says.

"Our method is to ask for a receipt and if there isn't one, to offer to sell the item to the customer and that's a technique we've found works very well."

SYSTEM INSTALLATION

According to Airth, the installation of the systems had difficulties that varied between the sites. Brisbane Airport was green field allowing EAS to be installed during the building process, but other locations were already built meaning significant under floor retrofitting had to take place in an environment that was running at full capacity.

Nuance Group's national loss prevention manager, Richard Airth

"There are significant physical demands for such an install," Airth explains. "If you need to do core holing when installing devices you have to make sure you're not breaking into some secure area underneath. You have to groove the floor for wiring and the slab has to be capable of taking the cut needed to chase the wiring through the site."

Day says Floor-Max was an ideal solution in Nuance Group applications.

"Floor-Max allowed us to just lay cable – previously you were laying electronics in the floor – literally you were burying a pedestal under the floor," Day explains.

"The excavation to do that is 50mm deep while Floor-Max is a loop of cable in a figure-8 with a chase depth of only 12mm."

Day says direct burial demands installation during construction or the system has to be chased into the floor.

"With existing stores you have to cable chase and cable chasing is tough. It has to be approved. Cable goes in through the grout line of tiles and then is buried again and while this sounds easy it's difficult and time consuming.

"A big advantage of a green field site like Brisbane Airport is that we can put in our floor system by laying out cables - the floor builders then come along and direct bury them. With an EAS system it's much easier to rough in before the store is completed.

"Even this is a tricky process and we worked closely with retail designer manager Sam Cassaniti of the Nuance Group so the EAS system and the store designs worked effectively," Day explains. "With buried systems you have to get the installation right first time."

Day says existing systems in many sites made the Nuance Group's integration more challenging.

"Sydney Airport is a good example," Day says. "There are no plans and the only way to understand a system is to manually trace it by hand. When you consider the mass of legacy electronic equipment installed at an airport that's not an easy thing to do.

Despite the difficulties, Day says the Nuance Group integration has been highly enjoyable.

"CCTV and alarm installation in retail environments is relatively straightforward – you put in sensors and you put in cameras covering the usual fields of view," Day explains. "But an EAS solution installed in 4 different airports is left field and it pushes the boundaries in a global sense – it has taken us out of what we've been doing and that creates opportunities.

"For me what was exciting was the fact that a large conglomerate was prepared to stretch itself," he says. "Other companies might have looked at the product specs and said 'where has this been done before - show me some photos' but ADT Security and the Nuance Group were prepared to go a step further."

According to Day, Airth's experience in Hong Kong and the U.S. were beneficial in that he brought new ideas to the table.

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"It's actually not common for us to be working with a security professional like Richard – we certainly fed off his expertise and experience and the resulting Sensormatic EAS solution is something we're all really proud of."

Airth is also pleased with the Nuance Group's new EAS systems.

"From my point of view since I joined the company 12 months ago management has come to appreciate the importance of EAS and they've partnered with me enthusiastically and that has meant I've been able to work closely with Michael and ADT Security to get the best systems in our stores – these systems will grow, too.

"The departure store at Terminal B at Sydney International Airport will become the biggest store of its kind in Australasia in 2009 – it will quadruple in size."

But the key to an effective security solution is not just a unique application of technology. The system has to pay for itself and it has to go on saving its owner money. Measured against this yardstick how do the Nuance Group's EAS systems fare?

"As it stands this installation is excellent," Airth says. "The system works, everyone is happy and we've reduced shrinkage by over 50 percent in the first year – obviously we are delighted with that."

"As it stands this highly complicated installation has worked well. The system works, everyone is happy and we've reduced shrinkage by over 50 per cent in the first year – we are delighted with that"