

Axis enables comprehensive integrated security at Mauritius airport.

Mauritius airport extends the value of its new surveillance investment through integration with building management system.



Organization:
Airports of Mauritius Co.
Ltd (AML)

Location:
Mauritius

Industry segment:
Transportation

Application:
Migration to
IP-Surveillance and
integration with
building management

Axis partner:
Grintek



Mauritius airport – history and background

The island of Mauritius lies in the south-west Indian Ocean, about 900 kilometers east of Madagascar and nearly 4,000 kilometers south-west of India. The island covers 2,000 square kilometers and has 1,200,000 inhabitants. Mauritius gained independence from the United Kingdom in 1968, and became the Republic of Mauritius in 1992.

The Republic also includes the islands of St Brandon, Rodrigues and Agalega. Since independence, the Republic's economy has grown 5–6% each year, moving from reliance on sugar cane production to diversification into industrial, financial and tourism sectors.

Plaisance Airport on the island of Mauritius was founded for military purposes by Britain's Royal Air Force in 1941 in the south-east of the island. Commercial flights commenced from 1946 at the location, 50 kilometers south-east of Port Louis, the capital of Mauritius. A new terminal was built in the late sixties and the airport grew with the national airline Air Mauritius which was launched in 1967 and the boom in tourism to the island. The main passenger terminal in use today was built in 1987. The airport was renamed to commemorate Sir Seewoosagur Ramgoolam (SSR), Mauritius's first Prime Minister after independence.

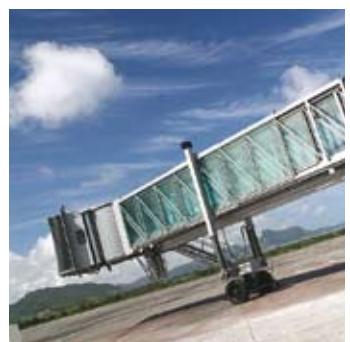
The growth of SSR International Airport

SSR International Airport is owned and managed by Airports of Mauritius Co Ltd (AML), a state-owned company operating under an aerodrome license from the Department of Civil Aviation of the Government of Mauritius. Through AML, the Government of Mauritius wanted a company who could exploit the commercial potential of the airport, and expand to cope with the expected growth in passenger and freight traffic.

AML is responsible for planning and developing airport infrastructure as well as managing and running airport operations. In 1999, AML invested US \$20 million to expand and upgrade the main terminal by an extra 8,500 square meters, adding an extra level to the existing terminal. The ground floor is now for arrivals, while the first floor is for departures.

SSR International Airport handles 2.1 million passengers, 20,000 aircraft movements and over 40,000 tons of cargo each year. It has one runway which handles around 60 aircraft movements per day with flights from 14 airlines including Air Mauritius, Air France, British Airways and Emirates. AML employs 400 people, and has developed a plan to manage the predicted traffic of 3.1 million passengers by 2012, and a doubling of aircraft movements by 2022, as it develops the role of the airport as the hub for the region.

"This project was rare for an IT team to tackle. It is a learning experience that someone in IT rarely gets to touch. In the future we will see more integration and expansion."





Security at SSR International Airport

Security requirements at SSR Airport are laid out and regulated by the Department of Civil Aviation (DCA). Various security bodies operate within the airport - the police, who are responsible for primary access and policing duties, the DCA which issues airport passes, plus other government bodies such as Immigration and Customs. In Mauritius, it is required by law to screen staff, passengers and luggage, provide security in the terminal and airside and put measures in place to control access to any restricted zone.

Controls must also include specific measures for airside security and airport perimeter fencing control and protection of vulnerable points (e.g. power center, water reservoir etc). Airside encompasses the runway, taxiway, apron, hangars and surrounding area, and needs to be highly secured. The key considerations for security at SSR Airport are the safeguarding of the airport operation and protecting assets against acts of unlawful interference.

Building a new IT infrastructure

After the creation of Airports of Mauritius Ltd (AML) in 1999, one of AML's key tasks was to re-develop the airport so it could compete internationally and run on a commercial basis to ultimately generate profit. To help with this endeavor, AML signed a management agreement with British Airports Authority (BAA).

AML also recognized that IT was a key ideology of any international airport. A new IT department was thus

formed within the new business, with the department headed up by a new appointed manager of IT services. The IT infrastructure across the airport as a whole had evolved on an ad hoc basis during the mid-nineties.

Many of the airlines and businesses within the airport had installed their own private IT networks, using their own cables and managing their systems independently. This had resulted in unstructured development, with extensive duplication of cabling and equipment making the management of changes and alterations difficult, with little co-ordination between the different parties.

Such issues were not new to BAA, and to remedy such problems, BAA had implemented a central common-use multipurpose IT and communications infrastructure across its UK airports, and had witnessed that most airports were starting to adopt this model. With this advice, in December 1999 AML went ahead with the design and implementation of a resilient and scalable data network backbone and structured cabling system. As part of its drive to generate revenue, AML proposed charging its tenants for usage of its managed network infrastructure. For many tenants, this shift was not easy to assimilate and it took a long time before gaining full acceptance. The previous chaotic, unplanned approach to IT was replaced with a centrally managed infrastructure controlled by the airport's IT department. The infrastructure has grown to become amongst the biggest and most complex on the island and used by all agencies operating at the airport.

The need for a new surveillance system

The IT department's brief was far reaching. Charged with redeveloping the whole IT infrastructure of the airport there was a need to ensure that IT could keep ahead of the ambitious expansion plans for the SSR International Airport. Its remit extended from managing operational IT at the airport, and unusually, the specific development of IT infrastructure for physical security, including surveillance. The previous CCTV security system was ageing, was entirely analog and provided poor quality black and white images. Following re-development of the terminal in 1999-2000, the system was gradually dismantled and finally turned off.

Starting the search

In 2001, the manager of IT services went ahead to explore the installation of a new CCTV system. Contractors were brought in and the first contractor developed an analog system design which was not taken up. Another demonstrated a system based on network cameras, and its main advantage was that it could use the existing data network. But in 2001, it was decided that the image quality from network cameras available at that time was not comparable to analog cameras of the day. The project was then placed on hold indefinitely.

As a result, the airport operated without a functioning CCTV system which led to the use of extra security personnel. A major disadvantage in this approach was a lack of recorded video evidence of incidents. Pressure built up from the senior management at AML, law enforcement agencies and the airlines for the IT department to address the situation and source a new surveillance system.

Laying down the objectives

In 2003, the surveillance project was re-started and physical objectives were set for the project. The system needed to provide a safe and secure airport environment, but also create the option of revenue generation through delivering security surveillance as a service to companies within the airport. Four key aims were established. First, to improve the security and safety at the airport; second to improve efficiency of operations and standards of service to the travelling public; third to respond more effectively to emergency situations. The final objective, an indication to the direction of the end solution, was to provide monitoring and control facilities to AML and other agencies through a multi-functional computerized management system.

Examining the technology

A detailed brief was developed in-house as it was believed the project could be planned internally without using external consultants. A wide range of research material was used to incorporate the latest IT and security surveillance thinking into the brief. From the outset, the belief was that the new surveillance system had to be IP-based, after the airport had invested in networking and felt that an extensive coax network was a step backwards.

An IP-based solution also met one of the key early objectives, in that the companies and third parties based at the airport would be able to access the system on the shared airport data network. Back in 2003 questions arose about early design network cameras concerning bandwidth usage and image quality. Security managers at the airport perceived that analog camera image quality was better than with a network camera – but as long as images were sent using the data network the IT department was happy to explore generating images through either analog or network cameras.



"Through integration with building management systems, surveillance is helping manage airport operations through flagging up situations across our site. We are now confident our solution is easily scalable to keep up with the pace of our expansion."

Defining an integrated airport management system

The information contained in the tender document also included the provision and integration of a security access control system with the video surveillance system. It outlined the IT infrastructure that would be at the disposal of the winning contractor and focused on the required capabilities of the system.

The required system principles were defined as an efficient system, cost-effective, reliable, and scalable as well as completely fault tolerant. It was to have a wider purpose than just security; it was to be an airport management tool to monitor operations, enabling a quicker, more appropriate response to incidents. It would result in less security staff patrolling the airport, so security could be deployed at targeted incidents. The system would also provide much needed post-event analysis and recording.

The draft tender document was ready in spring 2003, and was offered for consultation across all airport functions. Additional views were incorporated into the

document. It was also decided that it would be useful to integrate the surveillance system with other airport systems such as fire alarms and building management.

Also outlined was the desire to make the system available to off-site users through the airport's WAN (Wide Area Network). An International Expression of Interest was issued in late summer of 2003, which attracted 27 responses. The tender review process reduced the list to two companies and the Letter of Award was issued to the winning contractor, Grintek Ewation Pty in October 2004.

A spokesperson at SSR Airport commented: "Two companies stood out in the tender process, both of the proposed tenders were IP-based; the losing company had an early hybrid IP system. We wanted an open system with open standards, their system featured devices that were proprietary black boxes so you would be more reliant on the supplier if things went wrong. This was not exactly what we were looking for."

System implementation

South-African based Grintek Ewation Pty is majority-owned by Saab Grintek, one of the fifteen business units comprising the Swedish-owned Saab Corporation. Grintek has 35 years experience in the implementation of security systems. The contract awarded was worth 2 million Euros (US \$2.55 million), and the pilot phase began in January 2005.

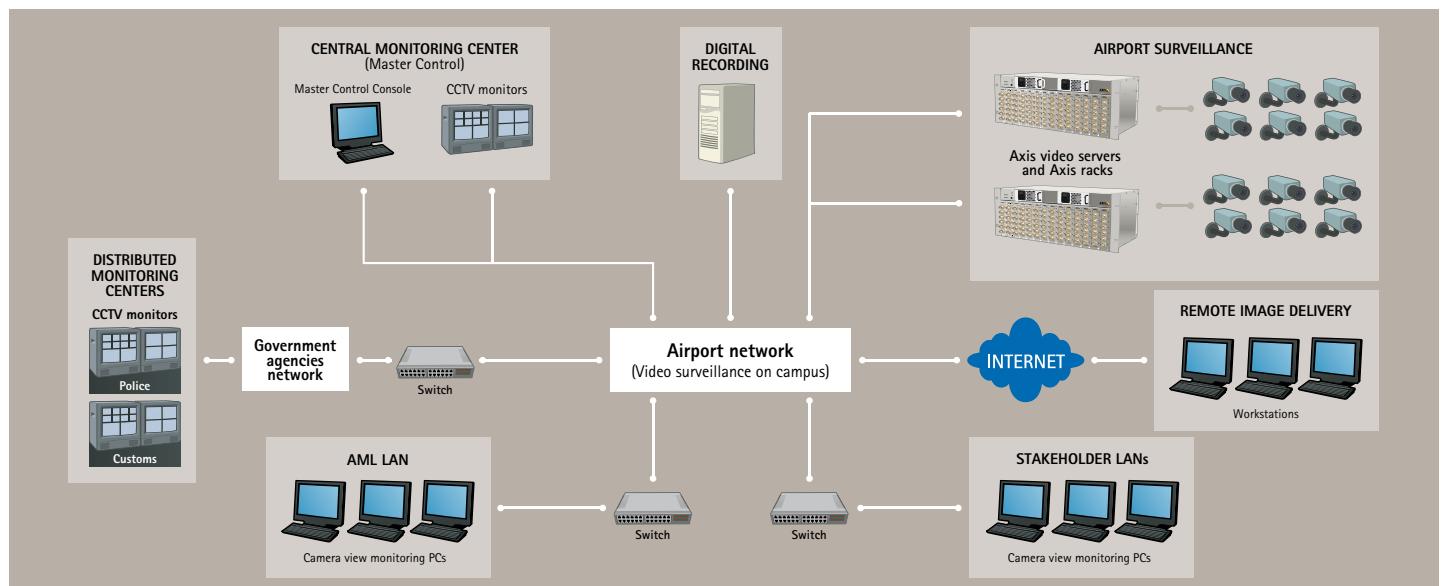
The new system was designed to integrate with Honeywell Electronic Buildings Integrator (EBI) which is built using an open Microsoft Windows platform. This platform integrates into Honeywell's security, life safety, HVAC (heating and ventilation) and building manager systems. Video management is con-

trolled by Honeywell's Digital Video Manager (DVM), a software-based digital surveillance and video management solution, running on a Windows 2000/2003 computer.

Across the airport the plan incorporated 130 fixed analog cameras, 60 dome analog cameras and 10 analog PTZ cameras. To encode the analog signals, the video feeds from the cameras terminated into nine racks of Axis blade video servers located across the airport. By running coax to nine racks, long cable runs from the camera to the control room were avoided, making maintenance and system management easier.

The system specification asked for a solution that could be dramatically expanded. With a possible requirement of 350 cameras by 2011, this approach of routing camera feeds to racks of servers was scalable. The racks incorporate a total of 35 AXIS 2400 4-channel blade video servers, and 70 AXIS 2401 1-channel blade video servers.

The video servers convert the analog input into digitized images. A separate network was recommended by Grintek for added robustness, and to cater for bandwidth limitations.



On-the-ground research pays off

The security staff at SSR Airport tested a wide range of different cameras, both digital and analog. The tests involved environments with varying levels of light. Glare was found to be an issue for cameras based near entrances facing to the outside of the terminal.

A spokesperson at SSR Airport commented: "Our security teams did many tests. For example, as you enter through the terminal doors, the request from the security authorities was the need to identify passengers, so some of the cameras faced these doors. Glare from outside was reflected on the floor and we needed cameras that could cope with this."

Wireless links for remote areas of the airport were considered and a trial established, but the links were abandoned. Prolonged heavy rain is common on the island, and this could cause signal dropout, so cameras in these areas were linked by fiber-optic cable.

Integration enables tighter management of incidents

Honeywell's EBI constantly monitors all building systems, while Honeywell's DVM offers automatic video display and recording of abnormal events across the airport. Numerous fail-safe mechanisms are built into the DVM. If, while recording, a video server receiving the data fails, it automatically switches to a back-up video server, or any other nominated server on the network.

The system allows users to view and record on-demand the output of any camera or to schedule timed recordings. It also allows for automatic video display and recording if motion is recorded within a defined area. As the DVM links in with the wider EBI, controlling fire, access control and HVAC, it will automatically display visuals of individuals who are denied access to a restricted zone or, where a fire alarm is activated, relay an instant picture to help manage these sorts of events at the airport. A practical example of this is when the luggage conveyor belt becomes blocked. Previously an alarm would sound, but this was not flagged up centrally so unless a member of staff was in the vicinity and heard the alarm the problem would go unnoticed. With the DVM, the alarm can be integrated into the EBI system, and the cameras would then show footage pinpointing the exact location of the problem.

Another benefit is the video recording of any incident can be reviewed to help with training and to improve procedures. New members of staff at SSR International Airport are trained using stored video footage to highlight the range of situations that can occur, and to work through a 'best practice' response.

"We are pleased that we were ambitious with our objectives, as we now have a system that delivers benefits for our security and operational teams, is reliable and secure and can be built on for the future."





Speed of image management aids law enforcement agencies

Central monitoring is carried out at the airport's operations control center. The center is set up to display images for all cameras throughout the site. Camera viewing and alarm notification is also controlled through dedicated workstations.

Access to images is quick and simple as the DVM features a powerful search facility with instant retrieval. As the system is designed to record incidents and abnormal events, the recordings stored only show the events, which saves scanning through hours of videotape. At SSR International Airport, high quality video files are quickly sent via DVD or any requested media to the appropriate authorities. The DVM system is also available for use by the police, law enforcement and other relevant third parties, either on-site or at their own off-site offices via the airport's WAN.

Every exported recording is digitally signed to provide authentication of the origin of the recording and proof that the recording has not been tampered with. The system provides an audit trail log. Digital signatures combined with the audit trail enhance the evidential weight given to video files when they are used in legal proceedings.

Building security on sound foundations

The system installed at SSR International Airport in 2005 incorporates many ground-breaking concepts with its reliance on the airport's data network to distribute images as well as the integration with a wide range of airport management systems. Managing the

sheer volume of video footage is now controlled through the Honeywell DVM system, which allows greater targeting, displaying and recording of specific incidents, rather than storing hundreds of hours of routine images which cannot be readily analyzed if an incident does occur.

The airport insisted on developing an infrastructure that would not have to be 'scrapped every five years', and is now looking to expand the system to 350 cameras by 2010. The airport's ambitious expansion master plan running to 2020 also incorporates plans for expansion of the surveillance system in tandem with building management system upgrades.

A spokesperson at SSR Airport commented: "In the future we will see more integration and expansion. We are very happy with Grintek, they are perfect on general integration and hardware, and we had no major difficulties making the system work. One piece of advice – technical people always need someone with a security background to get the feel of the surveillance system from a user perspective. Security people do not visualize in the same way as technical people do – so it is vital to be in touch with both skill sets when building a system of this magnitude".

About Axis Communications

Axis is an IT company offering network video solutions for professional installations. The company is the global market leader in network video, driving the ongoing shift from analog to digital video surveillance. Axis products and solutions focus on security surveillance and remote monitoring, and are based on innovative, open technology platforms.

Axis is a Swedish-based company, operating worldwide with offices in more than 20 countries and cooperating with partners in more than 70 countries. Founded in 1984, Axis is listed on the OMX Nordic Exchange under the ticker AXIS. For more information about Axis, please visit our website at www.axis.com