

Jane's AIRPORT REVIEW

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The view from afar: remote control moves closer to reality

Air navigation service providers are taking advantage of cameras, radars and sensors for virtual visualisation of aircraft movement and flight data

■ Searidge's IntelliDAR video sensors overlook a runway at Ottawa International Airport in Canada.



Searidge: 1354775

Providing air traffic control service without an airport tower sounds implausible, but that is exactly what some air navigation service providers (ANSPs) expect to see in the near term.

LFV in Sweden has demonstrated the concept for the last two years at a test facility at Ängelholm Airport. In the UK, NATS has created a Virtual Contingency Facility (VCF) for London Heathrow as a remote back-up facility away from the airfield. The VCF would maintain operations at Heathrow at up to 70 per cent capacity if the main control tower were disrupted. The VCF features systems identical to that of the main tower and provides air traffic coverage out to 20 n miles from the gates. In Germany, DFS received a remote tower procedure certificate from the national reg-

ulator in 2007. While the NATS and DFS concepts are already certified, LFV expects to certify a facility in northern Sweden in 2011, paving the way for the concept to be deployed elsewhere.

LFV is working in partnership with Saab to market the Remotely Operated Tower (ROT). The concept relies on high-definition cameras, in addition to conventional navigational aids, to replicate a conventional tower in an environment remote from the airfield. The customer can select the level of required surveillance, along with such data as weather, runway visual range and airfield lighting status, to be displayed to the controller. Saab has started to combine camera data with radar returns to test the tracking capability of the video technology.

In addition to two sites in Sweden, at Örnsköldsvik and Sundsvall airports, Saab is supplying Aus-

tralia with an ROT later this year. Airservices Australia has selected a small airfield and remote control centre to carry out operational tests on a 24-hour basis. The facility will make use of some legacy equipment and new optical surveillance sensors to enhance services currently available. By using commercial off-the-shelf equipment where possible, capital costs are kept to a minimum.

Saab Sales Manager, Air Traffic Management Per Ahl says: "We are not changing the operational rules, so it is no different for the pilot. We can move the controller from the tower and operate from a remote centre. We are starting to demonstrate that it is possible to mimic what you have today using cameras." In an environment such as Australia, where many airports have no aerodrome services at all, there are many safety bene-

fits. Even at airports where advisory services are available, adding surveillance data can enhance safety. "Many ANSPs provide services at regional and city airports, and are under mounting pressure to reduce operating costs," says Ahl. "With this technology, they can employ city controllers but still provide operational services at remote airports." Saab and LFV expect to announce other ANSP customers shortly.

Meanwhile German ANSP DFS, which began studying remote towers a decade ago, is moving from the planning to pre-operational phase. DFS installed video sensors supplied by Canadian company Searidge Technologies for pre-operational validation at Cologne Airport in 2009, along with a simulation and testbed system at the DFS in Langen.

A taxiway at Cologne was obscured from view following construction of a FedEx warehouse, and the video sensor offers tower controllers a visual check, in addition to the opportunity to identify and locate surface traffic. DFS intends to demonstrate that Searidge's IntelliDAR technology can fulfil the international requirements for an advanced surface movement and ground control system non-cooperative sensor.

Detlef Schulz-Rueckert, head of systems and technical services for DFS' business unit tower, explains: "The technology has the capability to be an additional sensor in a complex airport like Frankfurt or Munich, supplementing information provided by primary radar and multilateration. We call this a gap-filler solution." At less than a tenth the cost of primary radar, this is an important application.

"We are using the cameras operationally today," he continues, "but only as video stream and pre-operational as [an] additional non-co-operative sensor. By the end of 2010 we expect to use the cameras at Cologne to supply Asterix position information, so the controller sees all movements covered by radar and video in one synthetic surveillance display. We are working on certification of this process shortly."

Schulz-Rueckert adds: "The next application is to use the Asterix data calculated from video stream to build up a stand-alone synthetic airport vision display for the controller. ... The controller could use the video information for normal observation as well as for abnormal situations. The software behind the video sensor system calculates position information and should give alerts in case of abnormal situations. That could be the key for remote air traffic control at small aerodromes."

DFS provides air traffic services for all international airports in Germany. Over the next five years, it has plans to develop a centre that will pro-

vide remote tower services for as many as six international airports, offering more efficient services with equal or improved safety levels. "The technology is available; the last key has been to replace direct vision looking out of windows," Schulz-Rueckert notes, adding: "The video information includes weather conditions, abnormal situations and emergencies. Primary radar cannot see fire, for example."

Meanwhile, based on pre-operational work at Cologne, DFS is preparing to support distance tower services at Munich Airport for the third runway, which is likely to go into operation in 2013. The distance tower capability could replace construction of a second control tower at a fraction of the cost.

DFS is also considering the concept for the airport's ramp control tower operations. "Our next goal is to develop the capability to identify and label targets at the airfield by linking the video with flight plan data," Schulz-Rueckert says. "We want to operate [at] the same capacity as the visual operated environment, maybe better, since the tower can be 2 km to 4 km from the runway."

DFS is preparing to enhance the contingency facility at Frankfurt. According to Schulz-Rueckert, "At Frankfurt we plan to implement [an environment] a similar to Heathrow but with added video information for the controllers. Here, we are involving the camera simply to enhance the surveillance information already provided by primary radar and multilateration. From an operational point of view, the controller cannot see out of windows, but a separate display will provide a view of the airport and control area. Like a pilot, the controller has then the option to follow visual or instrumental procedures. This is a paradigm shift for the tower controller, which is more like en route control. We want to install this as soon as possible."

Nav Canada established a testbed at Ottawa International Airport in 2009 using Searidge IntelliDAR video streaming and multilateration sensors supplied by Sensis Corporation, in addition to the airport's surface movement radar. In early 2010, the service provider began a 12-month trial comparing output from these sensors, and by mid-2011 expects to have an idea of the capability of video streaming. "It is premature to see it as a surface movement radar replacement," says John Fekkes, director of business development. "We are doing a detailed study with our controllers and engineers in a real air traffic environment. Based on the outcome, we will determine what the different uses could be."

Nav Canada provides remote advisory services at some 40 airports across Canada and believes the

technology could improve safety performance and efficiency. It is also studying ways to link the video with flight-plan data in order to provide tracking information from the non-co-operative sensor. "We are working on a new level of integration," says Fekkes. "The technology is maturing - for example, the ability to compress video. We are going through rigorous testing in co-operation with our regulator, Transport Canada."

Like DFS, Nav Canada is looking at several options. In addition to augmenting surveillance at busy airports where the data can be fused with other sources, like local radar and multilateration, video could be used to enhance the provision of air traffic services remotely. "For example, we provide remote aerodrome advisory services into London Ontario. If you had cameras there, the operator would have another level of comfort, another level of service," says Fekkes.

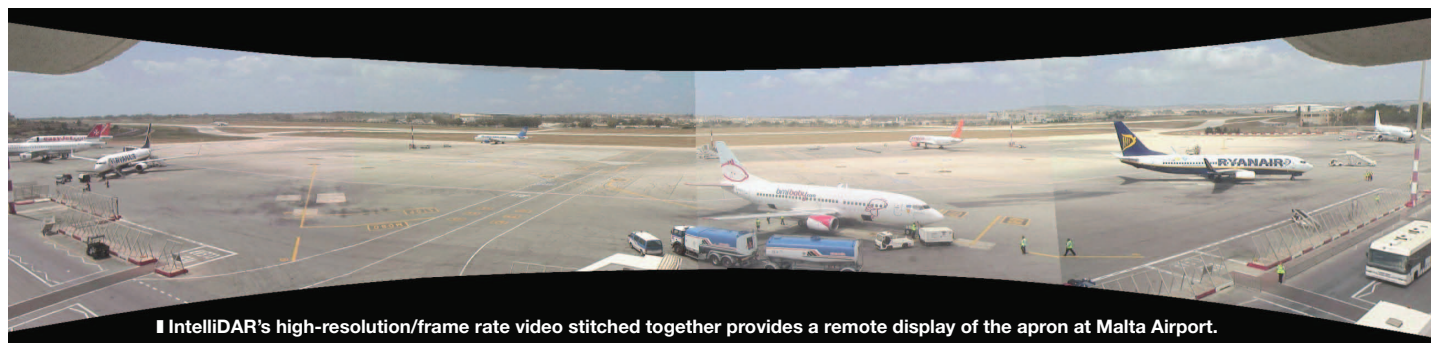
Some of the findings will be deployed as part of the common tower platform being developed by Nav Canada and Sensis, known as the Integrated Tower Automation Suite (INTAS). Sensis is due to install the first integrated controller workstation in Australia in 2011 under Airservices' national tower modernisation programme. Nav Canada then plans to roll out INTAS across Canada as its next generation tower solution.

Searidge is also working with Massachusetts Institute of Technology's Lincoln Laboratory on a surveillance research program commissioned by the Federal Aviation Administration (FAA) to develop a Staffed NextGen Tower (SNT). The study is looking at surveillance technology to replace conventional out-of-the-window views, and to enable development of a modernized, expanded tower service in the United States. A demonstration system has been installed at Dallas Fort Worth that includes a network of fixed cameras and computer vision techniques to augment surface surveillance. The FAA is keen to see if SNT could allow for cost-effective expansion of services to a larger number of airports and reduce tower construction costs.

The FAA plans to make an initial investment decision regarding further SNT development during 2011. With at least two other service providers expecting to certify alternative surveillance technology within the same timeframe, the concept could well move from demonstration to implementation phase within the next 12 months. *Jenny Beechener*

Searidge Technologies

tel: +1.866.799.1555
email: info@searidgetech.com
visit us at www.searidgetech.com



IntelliDAR's high-resolution/frame rate video stitched together provides a remote display of the apron at Malta Airport.

Searidge: 1354776