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Developing resilience with digital tower

In the Middle East there is a huge disparity between very small and very large airports. How can digital tower technology enhance the safety and reliability of air traffic management (ATM) facilities ready for changing air traffic demand? Frequentis Middle East Managing Director, Josef Kutschi and Aerosense Digital Tower Expert, Peter Gridling, explain.



s we begin to look towards airspace recovery, we turn our attention back to the modernisation of the ATM system and the benefits for the Middle East. In Saudi Arabia, for example, we consider the huge number of remote airports and the efficiency enhancements that could be gained by rethinking airport tower services. Handling peak traffic for major planned events in the Middle East could also be solved with the same solution.

In contrast to conventional air traffic control towers, remote digital towers (RDT) provide additional support tools for the controller, which create a safety enhancement. Features like augmented reality, automated object detection and virtual safety nets, which all assist the controller in their challenging role. Most importantly, RDT provides locationindependence for air traffic control (ATC) services, something which doesn't exist in a traditional tower.

To give an example, Saudi Arabia has

27 international and domestic airports, not to mention nine military airbases. So we see the benefit of a RDT facility, also called a virtual remote tower centre. This would allow multiple airports to be controlled from the same facility, enhancing both the safety and the availability of ATM services at the remote airports. This set up brings advantages of flexible staffing and ad-hoc allocation of ATM services depending on traffic volume. Single facilities could also be set up as a contingency solution for airports, and two centres can be connected to provide additional resilience to overcome pandemics or events with similar severity. By geographically decoupling ATM services from a location, virtual centres increase agility, capacity and cost-efficiency, while enabling better contingency planning.

RDT for sudden capacity changes

One issue with the wider ATM system today is the lack of flexibility. Flexible and modular digital tower features are key to

managing reduced air traffic now, increased future demand, while preparing us for traffic peaks, and for the next potential crisis.

The virtual centre concept, based on IP tech, will become more important than before, because of its flexibility for contingency situations and general scalability. What we are looking at is a networked solution. which seamlessly integrates the air traffic flow from the airports in the upper airspace, but which is scalable and flexible in terms of resources and traffic load. This allows air navigation service providers (ANSPs) to integrate remote digital tower and approach solutions, therefore adapting to traffic demands in a holistic way.

This solution requires the ability to add and remove controller modules and combine or separate functions. An RDT is designed to manage sudden traffic peaks, making it ideal for annual events like the Haj Islamic Pilgrimage in Saudi Arabia, which draws close to 2.5million people each August. But. in contrast, when we look at the recent and current reduced air traffic levels across the world. ANSPs are still having to run fully staffed towers. This is because one controller is required for tower services and another for approach. With an integrated solution, the tower and the approach module can be combined in times of low traffic volume and separated when traffic increases. Being able to adapt to demand allows for increased business continuity.

Frequentis DFS Aerosense, a joint venture company formed in 2018 between Frequentis and DFS Aviation Services, is focused on providing advanced turnkey remote sensing solutions for ATC across the world to support airports with capacity and growth. At the start of 2020, the company was awarded a contract from the Danish ANSP Naviair to build an integrated Remote Tower centre, including the approach automation solution PRISMA.



The PRISMA approach solution (PRISMA APP), is designed to autonomously process flight plan data and surveillance data for air traffic services (ATS). The APP function includes Safety Net functionality such as short-term conflict detection, area proximity warnings and minimum safe altitude warnings, all designed to assist the ATCO with optimal situational awareness

With additional automated controller tools it is possible to integrate an advanced surface movement guidance and control system (A-SMGCS) into the digital tower environment, to further enhance airport surveillance and controller functionality. An automated tower pad, for example, will intelligently unite information and the appropriate action into a single user interface, allowing increased safety and more efficient taxi, improving airport capacity as a result. The ability to exchange data with other tower modules in real-time, further enhances controllers' workflow allowing them to fully focus on planning and traffic coordination.

Reliability and resilience

The virtualisation of ATC systems empowers air traffic controllers to work from any location, but also to serve any airspace - even beyond national or regional borders. The ability to also combine civil and military ATM services in the same RDT facility also offers its advantages for shared situational awareness, and reduced costs of ownership for contingency management.

As we become more digital, we must consider the potential for cyber-attack. These new safety risks can only be

mitigated if manufacturers and system operators take responsibility for safety and security together. Operational Technology (OT) cyber security measures must simultaneously fulfil dedicated performance and safety requirements. There must be a cyber security and quality of service solution which upgrades the telco network to an ATM-grade network, able to react to changing network demands, ensuring continuous availability and the quality of service between the airport and the Control Centre. The secure integration of solutions to operational environments, and the protection of the systems, can be best achieved by understanding and applying security best practises from both OT and IT worlds in the right places.

With customers on all continents, the Frequentis remote digital tower solution is already widely deployed and used operationally. This integrated combination of tower and approach, allows the user to handle multiple airports from one centralised system, providing automatic and instant coordination between tower and approach systems. With added A-SMGCS and tower automation tools, high throughput airports are able to significantly enhance their airport operations and manage sudden traffic changes safely and efficiently. Frequentis is the only vendor able to provide a fully integrated solution, by having all these components in-house, while DFS provides the vital change and transition process and stakeholder management, key to a successful remote tower project. The extensive experience

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DFS gained when implementing its own

remote tower with Frequentis, created the perfect partnership for complete remote digital tower delivery projects.

To manage the reduced traffic of today, prepare for the recovery, and future capacity crisis, while also staying resilient, we need to look at digitalisation as something we adopt now, to prepare for the next decade.



Josef Kutschi, Managing Director, Frequentis Middle East

Josef has worked in the Middle East for the last 10 years, in various management positions for

satellite communication and ATM industries. Josef joined the Frequentis Group in 2019 as ATM Sales Director, Frequentis Middle East, and was appointed Managing Director for the region in January 2020.



Peter Gridling, Digital **Tower Expert and Vice President Sales Frequentis DFS Aerosense**

Peter graduated with an engineer's degree in computer sciences and has

strong camera and image recognition technology background, including forming a start-up company for image recognition technologies. Peter joined Frequentis in 2016 to support the digital tower team and is now VP Sales for Frequentis DFS Aerosense.

FREQUENTIS DFS AEROSENSE

Frequentis AG and German ANSP DFS Deutsche Flugsicherung GmbH, through its wholly owned subsidiary DFS Aviation Services, formed joint venture FREQUENTIS DFS AEROSENSE in 2018, to deliver turnkey remote tower solutions worldwide

Frequentis contributes the technologies, as well as expertise in developing customised remote tower systems, and its worldwide network of locally represented subsidiaries that can implement remote towers alobally. DFS Aviation Services contributes its operational air traffic management experience in consulting, validation, transition and training, as well as the deep operational experience gained through developing its own remote tower solution.

For more information, visit www.aerosense.solutions