



The next steps for remote digital tower – think BIG

Aerosense Managing Directors, **Christian Weiss** and **Katrin Scheidgen**, talk about digital towers at larger airports, multi remote tower and Artificial Intelligence

Digital and Remote Digital Towers (RDT) are dominating Air Traffic Control (ATC). Operational and cost efficiency are attractive motives for switching to this type of ATC tower, however, although primarily targeted at smaller, regional airports, with low traffic volumes, major benefits can also be leveraged by larger airports.

As global air traffic growth continues, and with it controller workload, changes are required to the way air traffic is managed. A shortage of controllers is already foreseen in the coming decade. “Features and tools which support controllers in their day-to-day tasks are essential if Air Navigation Service Provider’s (ANSPs) are to manage the increased volume of flights while also maintaining safety and increasing performance.”, says Aerosense Managing Director Katrin Scheidgen.

In contrast to conventional air traffic control towers, remote digital towers provide additional support tools for the controller, which create a safety enhancement. Features like augmented reality, automated object detection and virtual

safety nets all assist the controller in their challenging role.

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. Aerosense co-Managing Director, Christian Weiss states that remote virtual towers will be seen at all airports worldwide in the next 15 years, just with different use cases: “This technology is gaining attention all over the world for its ability to enhance tower operations. For bigger airports, RDT will start off as more of a contingency service or a vision enhancement, but the same technology will be there. Major benefits will of course be felt in future when physical towers require replacement because using RDT will become the logical alternative to expensive investments in tower buildings.

Aerosense distinguishes three variants of remote digital tower:

- Remote tower for small and medium capacity airports not only replicates but also enhances the airports view at a remote location, with

additional new enhancement tools such as aircraft and object detection and tracking, as well as information augmentation.

- Virtual tower for enhanced tower operation and contingency can be used to add new functionality to high capacity airports to provide backup services and safety enhancements.
- Airport operations, whereby RDT provides an additional set of eyes, allowing video-based airport apron control, providing a large-scale video panorama, blind spot coverage, position information, augmented information about aircraft status, airport security and perimeter security.

The idea for the cooperation between Frequentis and DFS on RDT began with the successful RT project, carried out by the pair, in Germany. The German airport of Saarbrücken has been digitally controlled from a remote facility 450 kilometres away in Leipzig since 2018. The solution, made up of cameras located at the airport, feeding information to high definition screens in a remote facility, ensures the safe handling of over 15,000 flight movements per year. This is currently the largest airport worldwide where daily operations are

controlled remotely. Two further airports (Erfurt and Dresden) will be added to the same facility in the near future. Katrin Scheidgen explains: “DFS gained a lot of experience in implementing remote towers and sees the change process, stakeholder management, validation, transition and training as crucial topics within such technological projects. It is also important to include the future users of the systems, the ATCOs, early in the project and seriously consider their opinions and evaluation results. The system needs to be accepted and trusted by the controllers to ensure fast implementation and assure a high level of efficiency.”

Other operational references for the Frequentis technology are; Jersey airport in the UK Channel Islands, in place as a contingency system, Iceland to test the technology in extreme weather, Vienna airport for vision enhancement at a large airport, and Brazil as the first remote tower in Latin America. Further ongoing projects in New Zealand and Argentina are additional proof points of the technology’s ability. The ANSP of Denmark, Naviair, has also most recently selected FREQUENTIS DFS AEROSENSE to provide a bespoke digital tower centre, with integrated digital tower and approach system, for its second largest airport, to increase service provision and efficiency.

ADVANCING ARTIFICIAL INTELLIGENCE

Frequentis has been stepping up the introduction of artificial intelligence (AI) functions for its remote towers, including object detection. Christian Weiss added: “We developed the first generation of this [object detection] feature for Saarbrücken Airport in Germany. Saarbrücken uses this functionality operationally and we are now working on the second generation of this function, using the detected object to provide virtual safety nets.”

Virtual safety nets will enhance safety by automatically alerting the controller about safety-relevant situations, e.g. an aircraft occupying the runway.

On top of this, digital towers provide the ability for new and advanced algorithms based on AI to connect all relevant data, including voice, to provide controllers with a much broader range of information in a much more convenient way. This will allow more efficient airport operations.

“Voice Communication is still the most important tool in ATC. Despite all the data processing we are developing, we must not forget to seamlessly integrate voice communication as it is an essential element of every controller workflow.”, says Christian Weiss. “This is especially important for multi-remote-tower scenarios, where up to three airports can be simultaneously controlled by a single controller. SESAR validations on this concept have been successful and received positive feedback from controllers involved in the trials. Research in the industry is now focussing

on this development.” Christian adds.

It has already become clear that seamless integration of all systems from voice communication up to the data and visualisation components is required, to successfully provide multi remote tower services, while maintaining the same safety standards as a conventional tower.

In 2020, Aerosense is planning to introduce the “MosaiX” platform, developed by Frequentis, for all of its system components, from voice communication up to video processing and the air situation display, in order to provide a seamless interface between all systems used by the air traffic controller. The unified platform will also enable the development of a multitude of unique AI and safety features.

MORE TO COME

RDT and digital tower tools have come some way to offering a solution to the increasing controller workload by enhancing visibility and automating functions and workflows. Most importantly, RDT provides location-independence for ATC services, something which didn’t exist in a traditional tower.

As more and more airports around the world

start to notice the benefits that RDT can bring, and trust in the technology sores, the obvious question is “what’s next?”.

Both Christian and Katrin agree that we will see the first multi remote tower centres within the next three to five years. “The ability to provide centralised ATC at a multi-remote facility will allow for controller working environment and flexibility to be improved and increase service provision. If capacity demands of the future are going to be met, while maintaining safety levels, automation, AI and seamless integration are key.”, says Christian Weiss.

With customers on all continents, the Frequentis Remote Digital Tower solution is already widely deployed and used operationally, providing advanced visual surveillance to controllers. This combination also allows the user to handle multiple airports from one centralised system, allowing automatic and instant coordination between tower and approach systems. The change and transition process and stakeholder management are vital to a successful remote tower project and with the extensive experience DFS gained when implementing its own remote tower, the pair become the perfect partnership for a complete remote tower delivery project.

FREQUENTIS DFS AEROSENSE

COMPANY BIO

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 globally. 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.

KATRIN SCHEIDGEN

With a University of Cologne Business Administration Diploma, Katrin began her career in Business Development. In 2008 she entered the aviation world with a role for German ANSP, DFS Deutsche Flugsicherung. Here she found a passion for air traffic management and in 2017 became Head of Business Development & Marketing in DFS subsidiary, DFS Aviation Services. In 2018 she became joint Managing Director of FREQUENTIS DFS AEROSENSE.



CHRISTIAN WEISS

Following his studies at the Vienna University of Technology, Christian Weiss started his career as Managing Director of an e-commerce start-up. Being an aviation enthusiast and private pilot, it seemed a natural next step to move to Frequentis in 2014. Here he worked closely with the CEO and became Director of Strategic Programmes in 2017. In 2018 he became joint Managing Director of FREQUENTIS DFS AEROSENSE.



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