

XMAN is optimising

Acting today for a sustainable tomorrow



As the skies begin to fill up again, climate change has become the greatest challenge for aviation. We look at how Skyguide and Frequentis Orthogon are acting in partnership for sustainable air traffic management

XMAN is optimising arrival flow and cutting aircraft holding to reduce fuel burn and CO₂ emissions

Since the International Air Transport Association (IATA) set a net-zero carbon emissions target of 2050 in October 2021, the industry has been working to establish how to reduce aviation's CO₂ footprint while ensuring that a world keen to get back in the air is accommodated. Willie Walsh, IATA's director general, said it was about the collective efforts of everyone in the entire aviation value chain.

Aviation stakeholder priorities have changed to focus more heavily on digitalisation rather than infrastructure expansion at airports. Digitalisation is also rapidly extending to air navigation services, providing new ways of making air traffic management (ATM) both safer and more efficient.

Efficient arrival management

Reducing fuel consumption and greenhouse gas emissions in air traffic requires close coordination with various

stakeholders, particularly in getting aircraft to their destination more directly. For this reason, Skyguide has developed a network of direct flight routes over Switzerland. In addition, Skyguide is implementing optimised en-route and approach procedures as well as continuous descent operations to reduce noise, fuel consumption and CO₂ emissions.

The arrival management system (AMAN) from Frequentis supports air traffic controllers (ATCOs) at Skyguide with the planning and management of all inbound traffic to Zurich airport. The AMAN helps to optimise the traffic flow, to reduce the workload of ATCOs and make the most out of the airport's capacity resources.

The Frequentis Orthogon AMAN celebrates its 20th anniversary this year with Skyguide being the first air navigation service provider (ANSP) to deploy the solution in 2001. ATCOs at numerous airports, including London Heathrow, Hong Kong, Istanbul, Oslo,

Singapore and Toronto currently work with the system to manage arrivals in the most efficient and environmentally friendly way. In October 2021, it even received the prestigious ATM Maverick Award in the sustainability category, thanks to more than one million tonnes of CO₂ emission savings, globally, within its two decades of operations.

Frequentis Orthogon recently supported Skyguide in performing cross-border arrival management trials. The so-called XSTREAM project, performed within the Single European Sky ATM Research (SESAR) programme, demonstrated the benefits of the delivery of target times and time-to-lose/gain advisories from the arrival management system to upstream control units, so that action can be taken early enough to have even more meaningful effects.

Cross-border arrival management, also known as XMAN, is optimising the arrival flow and cutting the aircraft's holding time at airports by adapting

their cruising speed while still in the airspace of adjacent control centres, often several hundred kilometres away from the airport. This reduces fuel burn and CO₂ emissions. Less airborne congestion in terminal areas also contributes to improving operational safety by reducing the workload of pilots and ATCOs and limiting noise.

Innovation philosophy

Through pioneering programmes, such as the Virtual Centre programme, Skyguide's innovation philosophy actively contributes to improving the energy efficiency of ATM. The Virtual Centre is a technological innovation that aims to transform the existing ATM systems into a location-independent service based on a Service-Oriented Architecture (SOA). This has received prestigious awards, such as the SESAR Award 2017 and the ATM Award 2019 in the Enabling Technology category.

Frequentis Orthogon currently deploys its Orthogon 4D (O4D) Trajectory Prediction as a service within the Virtual Centre programme. The key objective of the project is to provide the trajectory prediction in a service-oriented environment, enabling clients, such as the AMAN, to utilise this service, opening up the potential for more cost-effective deployments of ATM solutions, including new and innovative tools.

The utilisation of modern software architecture principles is the technical cornerstone of the project. It includes in

particular the embedding into a Service-Oriented Architecture (for example through differentiation between an integration and a service component) or the interface developments based on industry standards, such as the Flight Information Exchange Model (FIXM).

The challenges addressed by the Virtual Centre in Switzerland are a reflection of the challenges on a global level, in particular regarding the need for ANSPs to be able to adapt their capacity to traffic demand. Expected benefits also include increased cost efficiency achieved through the standardisation of systems and increased agility to implement new ATM functionalities, enabling even more efficient flight profiles.

Outlook

As IATA's Walsh said, it is about all aviation stakeholders working together on the same goals for green aviation. Even from a broader perspective, close collaboration on international and national levels is important, also utilising know-how from industries outside of the aviation sector. In Switzerland, the "Exemplary Energy and Climate" initiative, incepted in 2013, has a number of actors on board, aiming for ambitious energy efficiency targets and closely monitoring their success. Sharing experiences with other pioneering companies in the energy-efficient virtualisation domain plays a key role on the path towards a more modern and sustainable future in ATM. **ATM**

The arrival management system helps to optimise air traffic flow to reduce air traffic controllers' workload and make the most of the airport's capacity resources



About...



ALEX BRISTOL, CEO, SKYGUIDE

Alex started his ATM career as a Heathrow approach controller, and spent 18 years with NATS, managing various operational units. He then moved to Switzerland in 2011 as COO at Skyguide, taking over the role of CEO in 2017.



FRANK KÖHNE, MD, FREQUENTIS ORTHOGON

Frank joined the aviation industry as an air traffic control engineer and continued his career at Lufthansa Operations and Traffic Control for the three Berlin airports. In 1991, he joined Orthogon and became managing director in 2009. Reliability and trust, sustainability, innovation and safety have always been Frank's firm principles for successfully running the business.

SKYGUIDE/ FREQUENTIS ORTHOGON

Swiss ANSP Skyguide and ATM optimisation leader Frequentis Orthogon work together on improved operations for efficient arrival management, as well as on new technologies in the framework of Skyguide's Virtual Centre programme. The companies maintain a long-term and successful relationship, initiated more than two decades ago. Frequentis acquired air traffic optimisation specialist Orthogon in 2021. The company was founded in 1987 and is based in Bremen. It specialises in traffic optimisation, flow management and visualisation solutions for ATM, ATC and airports.