



AIRPORT PBN APPROACHES: OVERCOMING THE CHALLENGES, REAPING THE BENEFITS

Skyguide, the provider of air navigation services for Switzerland and adjacent parts of neighbouring countries, brings its expertise in implementing Performance Based Navigation (PBN) approach procedures to the UK after having successfully completed and received its certification from the UK's Civil Aviation Authority beginning of this year.



The International Civil Aviation Organization (ICAO) has urged that by the end of 2016 all States should have plans in place to implement Performance Based Navigation (PBN) approach procedures with vertical guidance for all instrument runway ends, either as the primary approach or as a back-up for precision approaches. By applying Area Navigation (RNAV) and Required Navigation Performance (RNP) specifications, PBN allows for the introduction of flexible routes and terminal procedures which help reduce airspace congestion, provide aircraft operators with fuel-saving approaches - reducing the impact of aviation on the environment - and maintaining safe, all-weather operations. They provide airports, air navigation service providers (ANSPs) and aircraft operators with greater safety, flexibility and better operating returns.

But each airport is different, requiring expert knowledge in all aspects of design, engineering and certification. Some airports sit within a highly complex airspace area and the new procedures and designs will have to be developed in close consultation with neighbouring stakeholders. Others are looking for new flexible approaches which will minimise the impact of aircraft operations on local communities. While other airports have niche customers, such as helicopter operators, requiring experience in developing specialist instrument flight procedures.

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Skyguide has completed over 30 projects worldwide to re-design airport airspace and implement PBN procedures, from major international hubs wanting to maximise their runway capacity to smaller, privately owned airports seeking to attract new customers and improve their service offerings to their current customer base.

“Airports need to stay up-to-date, reduce costs - especially ground infrastructure costs – and increase their accessibility for all customers; if there is competition between airports, aircraft operators will tend to prefer the airport with the best, safest, fuel-saving procedures,” says Laurent Delétraz, Senior Manager Business Development at skyguide.

According to Laurent the cost of acquiring a new CAT I ILS can range from €1 million to €2 million and sometimes can be even more, with substantial subsequent flight inspection and maintenance costs. In contrast, a PBN-based series of approach procedures can be installed for typically as little as €50,000 – maintenance and support charges are virtually zero for the next five years.

Skyguide offers airport customers with a specialist expertise in airspace design, procedure design and regulatory compliance (see “skyguide: our unique experience”). Over the last few years its team of airspace designers and engineering support staff has helped airports develop new flexible approach procedures in some of the most challenging locations in the world.

Case study Geneva: Complex airspace, high terrain, adverse weather and an urgent need to optimise scarce runway resources

Geneva airport is one of the most challenging airports in the world for designers of new airspace procedures. Surrounded by high terrain and close to the airspace borders of France, Germany and Italy – and within a complex airspace where aircraft are descending to and ascending from Zurich, Basle and Lyon airports – one of the airport’s main priorities has been to maximise the capacity of its single runway.

In 2015 the airport handled 15.8 million passengers (up 4% over 2014) but has plans to eventually manage 25 million passengers. Because of the topographical constraints the airport cannot add additional runways so in 2013 decided to implement PBN approaches at both ends of the runway -- one end of which is equipped with a CAT II/III ILS - to increase the resilience of the airport in all weathers. While heavy snowfall in Winter 2015 the ILS temporarily failed and the airport had to resort to non-precision approaches at a time of peak demand, severely cutting capacity.

The PBN approaches and airspace redesign developed and implemented by skyguide has minimised the potential of an ILS failure, ensuring the airport can remain fully operation all year round.

“It involved working with many different stakeholders,” says Laurent Delétraz, “including those based outside Switzerland. Because there was a legacy system in place we had to design the new approaches so they would be entirely consistent with legacy procedures. We were also able to use the expertise of our colleagues so we could combine the capacity and resilience enhancing features of the airspace re-design to complement work to develop airport collaborative decision-making (A-CDM), increasing the efficiency and capacity of the airport without having to add concrete or terminal space.”



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Case study Stockholm Skavsta: Higher traffic volumes, lower environmental footprint to meet ambitious airport business targets

In January 2016 the owners of Stockholm's Skavsta airport asked skyguide to improve airspace design and introduce a Performance Based Navigation (PBN) approach to increase access to the airport for its customers – including airlines Wizz Air and Ryanair – while reducing the environmental impact of the airport on the local community.

The airport - the largest privately owned airport in the country - is equipped with a single CAT I ILS but wanted to ensure precision approaches would be available at both runway ends for the fast-growing facility. In 2015 1.79 million passengers used the airport, an increase of 9.3% over 2014 and airport owners have ambitious growth targets.

The airspace around the airport is complex; Skavsta is Stockholm's third largest airport with the major hub Arlanda and the Bromma city centre airport relatively close by.

"The airport asked us to develop a curved Required Navigation Performance Authorization Required (RNP AR) procedure," says Laurent Delétraz, "but after discussions with our experts we realised that the RNP-AR approach may not be the best solution to the airport's requirements after all. Instead, we proposed to redesign the arrivals routes to link them more efficiently with the final approach, so they could be used by all aircraft operators. This has meant that the volume of traffic using this standard terminal arrival route (STARS) procedure will be much greater than originally envisaged and by introducing PBN approaches linked to the STARS redesign it will provide a very efficient system for all airspace users."

The redesign work began in early 2016 and the new routes, following certification by the safety regulator, the Swedish Transport Agency, should come into operation by the end of 2016.

Company profile

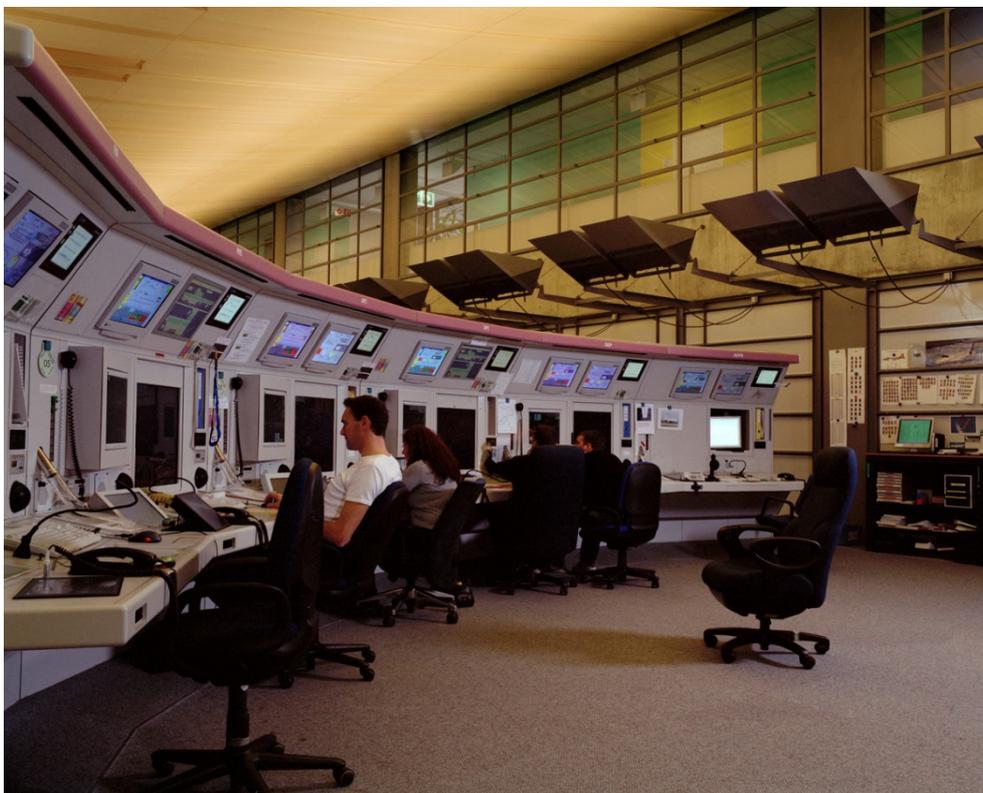
Skyguide swiss air navigation services ltd. has 1,500 employees with over 560 civil and military air traffic controllers. Over 300 engineers, technicians and IT experts are responsible for the development and maintenance of complex technical installations and facilities. Operators of aeronautical data manage the necessary information to assure a smooth continuation of air traffic. Other experts are in charge of planning and development. In addition, there's the administrative staff and the numerous instructors at the skyguide training centre, responsible for training operational personnel.

Skyguide is an expert at providing procedures for air navigation services – aircraft operations (PAN-OPS) and airspace analysis and design to airports of many different sizes and business profiles. Its team of airspace designers, engineers and consultants have extensive experience in exploiting new technologies and procedures to optimise safety, cost-efficiency, reliability, accessibility and environmental impact – not just in the initial study phase but as a process of continual collaboration to ensure operational procedures meet the current and future operational and commercial requirements of the customer.



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Areas of expertise include:

- Review of existing procedures and airspace structure to comply with current regulations and design of new instrument flight procedures based on conventional or performance based navigation including RNP approaches, LNAV, LNAV/VNAV, LPV/LPV CAT I-200, RNP-AR
- GBAS-GLS
- Terminal airspace design including SIDS and STARs RNAV/RNP
- Helicopter IFR solutions – RNP 0.3 in all phases of flight and RNP approach point-in-space

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