The MINT project takes a step towards a better environmental air transport system

Lars Lindberg, AVTECH

On June 12th, when Novair flight 392 from Corfu received clearance to fly the Required Navigation Performance (RNP) decent and approach into Stockholm Arlanda runway 01R, a step to more efficient and environmental air transport system was taken.

The flight was part of the Minimum CO2 in TMA (MINT) project which will demonstrate, with the Airbus A321 aircraft operated by Novair, how minimum CO2 emissions can be achieved by optimizing the vertical profile and reducing the distance of the lateral track in the TMA (traffic management area) through the use of Required Navigation Performance with Authorization Required (RNP AR).

To enable the optimized descent profile, accurate descent wind information tailored for the profile and the Flight Management System (FMS) was uplinked to the aircraft before its top of descent.

The data from the onboard flight data recorders has been collected and is being analyzed. Initial results in terms of reduction in CO2 emissions indicate significant reduction in CO2 emissions as well as noise.

“Taking this step from conceptual idea into an operational demonstration is truly a milestone,” said MINT project leader Christer Forsberg, AVTECH. “It has been made possible by a dedicated project team, support by SESAR JU and very importantly a regulatory authority, Transportstyrelsen the Swedish Civil Aviation Authority, who have been engaged,” Forsberg said.

The MINT project is executed in the context of the Atlantic Interoperability Initiative to Reduce Emissions (AIRE). AIRE is an agreement between the European Commission and the FAA which aims to reduce CO2 emissions and accelerate the pace of change by taking advantage of air traffic management best practices and mature technologies. It is expected to accelerate the implementation of environmentally friendly procedures for all phases of flight and to validate the benefits of these improvements. The SESAR Joint Undertaking is responsible for the management of AIRE from a European perspective.

SESAR has as the objective to reduce CO2 emissions by 10% through more efficient operations but also to reduce noise in neighboring areas to the airport. The procedures at Arlanda will take advantage of the aircraft’s RNP AR capability, flying curved segments after the Final Approach Point in order to position the... Cont. on page 2
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noise away from noise sensitive areas.

Today’s partners for Tomorrows Aviation, the MINT consortium, includes leading operators and providers of air and ground system:
• LFV Group – ANSP/Airport operator
• Novair - Airline operator
• Egis Avia – Air Traffic Management Ground system
• Airbus - Airframer
• AVTECH (project leader) – Air system

Besides the consortium members listed above, Thales Avionics, Thales Air Systems, Scandinavian Airlines System (SAS) and GE Aviation are participating in the project Expert Advisory Group.

PBN Perspectives

The Case for PBN

Guenther Matschnigg, IATA

Performance-based Navigation (PBN) presents a great opportunity for airlines, Civil Aviation Authorities (CAAs) and Air Navigation Service Providers (ANSPs). Airlines will see early benefits since most modern aircraft equipped with area navigation (RNAV) are already PBN-capable. PBN simply clarifies how their navigation systems are used and facilitates the operational approval process for operators and CAA’s by providing a limited set of navigation specifications intended for global use. For the ANSP, PBN reduces costs by eliminating the need to purchase and deploy navigation aids for each new route or instrument procedure.

The safety advantage is significant, enabling airports located in the most remote areas of the world to have runway-aligned approaches with horizontal and vertical guidance, without having to install, calibrate and monitor expensive ground-based navigation aids. Moreover, these airports can have a stabilized instrument approach that will allow aircraft to land into the wind, as opposed to a tailwind landing.

Airlines want to quickly adopt PBN for all phases of flight. PBN planning needs to be a joint planning exercise between ANSP and the airspace users. For arrivals and departures, some airports will only need simple RNAV procedures to maximise the benefits, while other locations, such as nearby steep terrain or dense air traffic, may require a more exacting RNP. The most stringent procedures such as RNP Authorization Required (AR) approaches need careful planning as they require significant investment and training.

During the transition period to PBN, the current regional specific area navigation requirements should honor PBN operational approvals that also meet the regional specific criteria. For example, in the European Flight Efficiency Plan there is a provision where all operators that are approved against the PBN criteria for RNAV 1 should be eligible to operate on European P-RNAV routes with no further approval required.

IATA fully supports the early implementation of PBN. Our top priority is the implementation of runway aligned Approaches with Vertical Guidance (APV) for all runways with a Barometric VNAV used for vertical path guidance during the final approach segment. This is fully in line with the ICAO General Assembly resolution A 36-23, which calls on States to implement PBN approaches with vertical guidance for all instrument runway ends by 2016 – with 10% by 2010 and 70% by 2014.

Nevertheless, PBN is our preferred navigation solution for all phases of flight; with the good news being that the safety and business case makes PBN a winning solution for all.

Regulator Corner

PBN Operations in Peru

Raymundo Hurtado, DGAC-Peru

RNP-AR operations began in the aerodrome of Cusco, Peru in May of 2009. This is the successful result of a tripartite project between DGAC, LAN PERU and IATA with the assistance of Naverus. The DGAC had to update their norms and regulations to harmonize them with the requirements of Doc 9613 of ICAO in order to facilitate the operations under this new concept.

The airport of Cusco (10,860’ over mean sea level) is located at the end of a narrow valley surrounded by mountains that reach elevations of 15,500’. For this
reason, the airport has operational limitations that disable the operation when the meteorological conditions are not favorable. In the last 3 years, approximately 200 operations were cancelled or therefore had to be deviated to other airports. With new RNP-AR procedures, the minimum descent altitude will lower from 14,500 FT to 11,800 FT, delays and cancellations will be eliminated almost completely by weather in Cusco. The use of these procedures will avoid the emission of 2.250 tons of CO₂ per year, reducing environmental impact immediately.

As well, the DGAC of Peru is developing their own Action Plan for the implementation of the PBN in their terminal areas and approach. This Plan will be presented to the ICAO South American Regional Office in October of this year, following the PBN Roadmap of the SAM Region. Also, in April, Peru published an Aeronautical Information Circular notifying its intention to implement RNAV 5 in November of 2010.

ANSP Outlook

Green Flight Paths For Airservices As Australia Plans World’s First Nationwide RNP Network

Chris Goater, CANSO

There has been an important development in the global roll-out of PBN techniques since the last issue of ‘Waypoints’. At the CANSO AGM on June 17, Airservices Australia, announced the rollout of RNP procedures across the entire country, at up to 28 major airports, over the next 5 years. The implementation of these procedures, for arrival and departure flight paths, is expected to save 122 million metric tons of CO₂, equating to 39 million kg of aviation fuel per year. These savings are based on the actual flight experience of a trial already running in Brisbane. The new routes thus fully justify their title ‘Green Flight Paths’, and will constitute the world’s first nationwide Performance-based Navigation network.

It is expected that the routes also will reduce noise, and according to Airservices, ‘appropriate collaboration and consultation will occur with all affected stakeholders, including the community, in the development of these environmentally friendly procedures.’

Speaking at the CANSO AGM, Airservices CEO Greg Russell said, “The application of these procedures will allow us to deliver benefits to the aviation industry and the community through improvements in aviation safety and efficiency and environmental impact.”

The contract for the work will be carried out by Naverus, whose CEO Steve Forte said, “Reducing the impact of aircraft on the environment is a priority worldwide for all elements of the aviation industry. We’re looking forward to working with Airservices to roll out this technology and the benefits it can offer.” Naverus, along with Airservices and Qantas, was a partner in the Brisbane trial, which showed that the procedures saved on average 2.6 minutes of flying time, 125kg of fuel and 390kg of CO₂ per flight compared to standard approach procedures into Brisbane Airport.

Operator Insight

Peru: First RNP in Latin America

Piervittorio Farabbi, IATA

On May 22, 2009, a LAN Peru Airbus A319 completed its first scheduled flight with passengers using RNP procedures developed for LAN Peru and DGAC Peru by IATA and its technical partner Naverus. This was the first flight of its kind in South America.

Among the benefits achieved by the procedures are improved safety (minima reduced to 320m down from almost 1,000m), reduced numbers of diversion and cancellation due to adverse weather, better airspace overall set-up (with estimated 3,500 Tons of CO₂ reduction per annum), and overall improved accessibility to a major domestic economic engine (Cusco is the tourist gateway to Machu Pichu).
PBN Fast Facts

First 18 months with RNP deployed at Brisbane resulted in:

- 400,000 kg fuel saved
- 1,100,000 kg CO2 saved
- Reduced flight distances by 17,800 track miles
- Saved 4,200 airborne minutes
- Non-RNP flights gain benefit through less delay derived by RNP traffic

Q&A

Question:
What’s are the differences between RNAV and RNP?

Answer:

The PBN concept encompasses two types of navigation specifications:

RNAV specification: navigation specification based on area navigation that does not include the requirement for on-board performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.

RNP specification: navigation specification based on area navigation that includes the requirement for on-board performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4.

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News Briefs

+ With the delivery of ATC PBN workshop in Khartoum on June 6 – 12, 2009, IATA and Emirates Airlines have completed the first phase of a PBN Implementation at Khartoum International airport in coordination with Sudan CAA. At the end of the workshop, the participants were briefed that due to delays in the provision of radar services, it is no longer possible for a full PBN implementation. Therefore, during first phase of the project, short RNAV 1 STARs will be used when traffic within the TMA permits as transition to RNP APCHs with BaroVNAV developed for both runway ends. The second phase of the implementation project will introduce four full-scale, no restriction RNAV 1 STARs and, finally, in the third implementation phase RNAV SID will be introduced to the same exit points as are currently used by the conventional SIDs.

+ In accordance with PBN implementation roadmap, Airports Authority of India has developed the PBN package for Chennai Airport in addition to those implemented at Mumbai, Delhi and Ahmedabad Airports. The procedures have been designed and finalized in close coordination with airlines, pilots and controllers. The procedures are expected to be implemented in the October AIRAC cycle (October 23, 2009).

+ RNP Availability Forecasting, from Naverus, is now available to operators flying RNP anywhere in the world. Operators who use RNP are required to obtain an RNP availability forecast for intended airports of operation. NRAFS (Naverus RNP Availability Forecasting Service), provides RNP availability forecasting specifically tailored to the equipment on board the operator’s aircraft. NRAFS integrates and correlates the dynamic configuration of the GPS satellite constellation at any given time with terrain features, known satellite outages, specifications of equipment aboard the aircraft and RNP requirements. In this way, NRAFS provides aircraft operators with information they need to dispatch aircraft on RNP flight paths. If you wish to learn more about NRAFS visit: www.naverus.com/nraf

+ The Nigeria Airspace Management Agency (NAMA) has launched a full scale PBN implementation project that will address WGS-84 surveying requirements, RNAV/RNP procedure design and training at 22 international and domestic aerodromes in Nigeria. In taking on such a complex exercise, to be accomplished in accordance with the AFI Region Performance Based Navigation (PBN) Roadmap, NAMA has selected IATA after a competitive bid. The initiative, under the direction of Mr. John Onyegiri, NAMA General Manager SMS, has already started with the initial stakeholders’ consultations and the completion of ATC assessment and site visits at all four major international airports in Abuja, Kano, Lagos and Port Harcourt. NAMA MD Ibrahim Auyo and NCAA DG Dr. Harold Demuren have both met with the IATA Project Team and expressed their unconditional support to this safety-critical initiative.

+ “Keep it simple, think pragmatic, coordinate with ALL stakeholders” highlighted the Approach Procedure with Vertical guidance (APV) workshop held on 11 June 2009 organized ICAO EUR/NAT Office with assistance of the IATA, IFALPA and Eurocontrol in Paris. About 120 participants representing various stakeholders on the international civil aviation arena received an overview of APV with its need for implementation/benefits from ICAO and Eurocontrol followed by the Certification Perspective presented by the European Aviation Safety Agency (EASA). Both IATA and IFALPA fully support global implementation of Performance Based Navigation (PBN) developed by ICAO, as it creates a seamless environment by allowing for harmonised aircrew procedures and interoperability, while achieving a high level of efficiency. During the discussions, the participants of the workshop agreed that an adequate implementation strategy should be based on the recognition of the current onboard capabilities. For this reason, an implementation of an APV should, whenever possible, be twofold: using both Baro/VNAV and augmented GNSS – thus allowing modern airliners to use their onboard equipment and also open the door to other aircraft that could be equipped with SBAS receivers. The workshop concluded that current implementations of approach charts should be renamed in order to support the harmonization process and to avoid misunderstandings in operation. The Workshop was completed by a series of industry presentations describing the current and future aircraft navigation capabilities that could be exploited to the benefit of the whole aviation community. For full story click here.