ESSP

AVIATION CONSULTANCY SERVICES

Performance Based Navigation IMPLEMENTATION

ESSP

OPTIMIZE YOUR AIRSPACE

INCREASE YOUR BENEFTIS

ESSP provides different scalable **Service Levels (SL)** according to the required level of depth and specialization, reaching up to Service Level 4, **turnkey PBN implementation**.

Performance based navigation allows aircrafts to fly accurate, flexible and 4D flight paths using the **latest navigation technologies**. Combining Global navigation satellite systems (**GNSS**) and Satellite Based Augmentation Systems (**SBAS**) with conventional navigational aids, PBN offers the **safest and most efficient solution** for all phases of the flight.

The implementation of PBN procedures brings numerous benefits:

Safety

CFIT reduction
Airspace simplicity
Missed approaches decrease

Capacity

Approach minima reduction
Airport accessibility increase

Environment

Emission reduction
Noise footprint improvement

Cost-efficiency

Fuel saving
Delays decrease
Trajectories optimization

Training Catalogue

ESSP's background, knowledge and expertise is put into practice in terms of training through varied classroom courses, to support different types of learners in all transport domains and market segments related to GNSS (Global Navegation Satellite Systems) and CNS (Communications, Navigation and Surveillance).

ESSP facilitates its clients to face upcoming challenges in aviation, focusing in both state-of-art technological as well as in the committed evolutionary aspect of GNSS and CNS.

Our trainings are tailored and scaled in accordance with the needs of the trainees, and include:

- Specifically designed features for technical, operational and management staff.
- Active participation of our subject matter experts and experienced trainers.
- Flexibility to address needs through different modules and training locations.
- Use of state-of-art technological supporting means to complement and put the theory into practice.

ESSP's training curriculum consider the following topic areas:

- **GNSS-related training**
- **GNSS multimodal applications**
- **CNS aviation applications**
- **Airspace and flight procedure design**

GNSS-related training

Global Navigation Satellite Systems: core constellations and augmentations (as SBAS), evolution of the GNSS main concepts.

GNSS Basic	1 DAY
GNSS Advanced	2 DAYS
GNSS receivers	2 DAYS
GNSS and SBAS fundamentals	2 DAYS

GNSS multimodal applications

Main GNSS applications (safety critical and liability critical) in transport domains and market segments as:

Rail	2 DAYS
Maritime	2 DAYS
Agriculture	2 DAYS
Surveying and mapping	2 DAYS
Road	2 DAYS

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CNS aviation applications

PBN: Performance Based Navigation training. All the theory is reinforced with on-board practical sessions in flight simulation (Virtual Reality simulator and physical Flight Simulator Console, based on Mooney Acclaim, both with Garmin 1000).

PBN Basic	1 DAY
PBN Advanced	2 DAYS
PBN for Air Traffic Controllers	2 DAYS
PBN for flight ops personnel	2 DAYS

All these trainings about PBN may be combined with the GNSS-related trainings (see previous page), tailored to the customers' specific needs.

Aeronautical Communications and Surveillance:

Data link communications - Basic	2 DAYS
Data link communications - Advanced	4 DAYS
ADS-B: Automatic Dependant Surveillance - Broadcast	2 DAYS

Flight procedure design and aeronautical data

ASD (Airspace Design), FPD (Flight Procedure Design) and aeronautical data trainings:

Airspace and flight procedure design:

PANS OPS initial training	5 DAYS
PANS OPS advanced training	10 DAYS
Flight procedure design oversight	5 DAYS

Aeronautical data trainings:

eTOD (electronic Terrain and Obstacle Data)	1 DAY
ADQ (Aeronautical Data Quality)	1 DAY

ESSP is certified in ISO 9001, ISO 27001, as well as certified as ANSP by EASA in accordance with Single European Sky rules.

Overall average customer satisfaction score

9.6/10

★★★★½

As of 1st of January 2020

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SL2 PBN feasibility assessment

ESSP relies on its **own PBN feasibility methodology** to evaluate the most **suitable PBN solutions**, as a function of the customer needs, requirements and its operational reality.

This service is intended for decision makers of **ANSPs, airport operators, CAAs** and **NSAs**. ESSP delivers extensive and detailed reports which can be used as guidance and business arguments to move forward into the actual implementation and all benefits that will come from it.

ESSP performs the following activities divided in different subservices for the customer:

- Traffic and fleet CNS assessment
- Conceptual airspace design
- Airport operating minima and MET assessment
- Instrument approach procedure benchmarking assessment
- CBA for aircraft and airport operators

Find more information about the subservices on the reverse!

SL2.1 Traffic and fleet CNS assessment

WHAT To ascertain the rate of aircraft operators to reach by the airport through the implementation of new instrument flight procedures.

HOW The evaluations comprise the NAV-COM-SUR on-board equipment, as well as the AOC readiness.

The following on-board capabilities are taken into account:

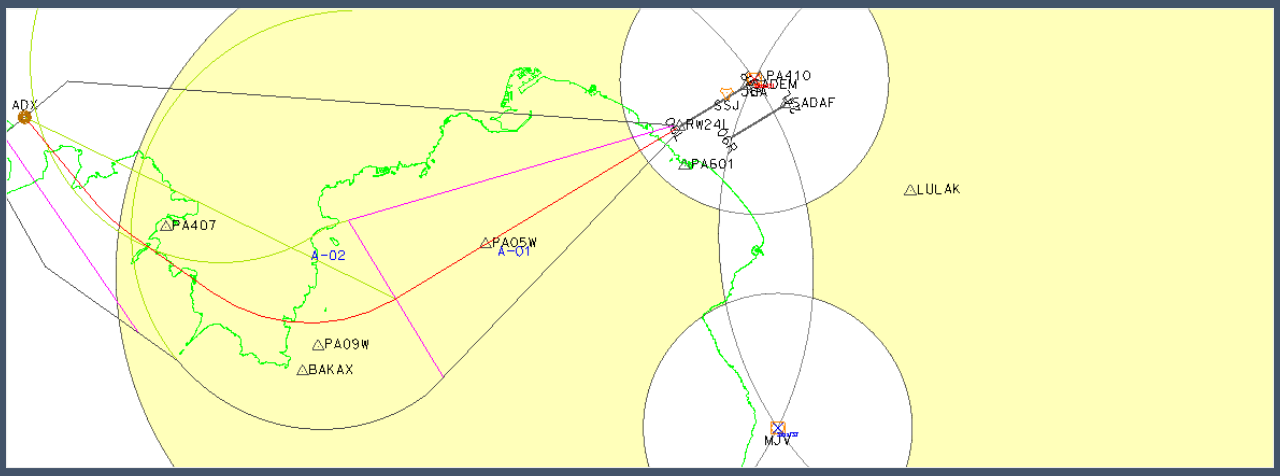
- NAV: conventional and PBN
- COM: conventional and data link – based
- SUR: conventional and ADS-B

SL2.2 Conceptual airspace design

WHAT To evaluate the implementation feasibility in terms of:

- Airspace compatibility
- Obstacle terrain clearance
- Achievable minima
- Annex 14 OLS penetrations

HOW To develop preliminary airspace and procedure design. It includes a proposal accomplishing airspace constrains and other operational user requirements but does not include a complete obstacle assessment.



DME/DME coverage. Conceptual design activity example

SL2.3 Airport operating minima and MET assessment

WHAT To ascertain that the rate of DDC (delays-diversions-cancellations) could have been avoided thanks to lower operating minima.

HOW The evaluation considers the airport's meteorological history data exploitation. Airport operation disruptions are evaluated with regard to MET conditions (VIS/RVR, cloud ceiling).

SL2.4 Instrument approach procedure benchmarking assessment

WHAT To select the instrument approach flight procedures of a network of airports that need to be upgraded.

HOW Undertaking benchmarking analysis for selecting the best candidate scenarios (airport infrastructure+navaids+AOCs).

SL3 PBN pre-implementation

ESSP provides **technical assistance** to ANSPs, CAAs and airport operators, to develop the activities related to a **real PBN implementation**.

This services level includes the design phase and every other activity related to such procedure that will lead to its implementation. These activities are defined and regulated by **ICAO** through different **manuals** with which ESSP's methodology fully complies. ESSP offers its support to execute all these activities, either they are **mandatory** activities and therefore are strictly regulated or **recommended** activities which strength the approval of the procedures to be implemented.

This service is divided **in separated and interconnected** subservices covering all the activities the customer needs or desires to develop for the implementation of PBN procedures.
The subservices are the following:

- SL 3.1 Airspace and flight procedure design
- SL 3.2 GNSS performance & interference assessment
- SL 3.3 Environmental impact assessment
- SL 3.4 Safety assessment

Find more information about the subservices on the reverse!

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SL3.1 Airspace and flight procedure design

ESSP's designers develop the **airspace and flight procedures design** accommodating the new PBN solution into the existing airspace, in accordance with the international standards ICAO PANS-OPS doc 8168, doc 9906 and PBN manual doc 9613.

The design includes both conventional and PBN designs:

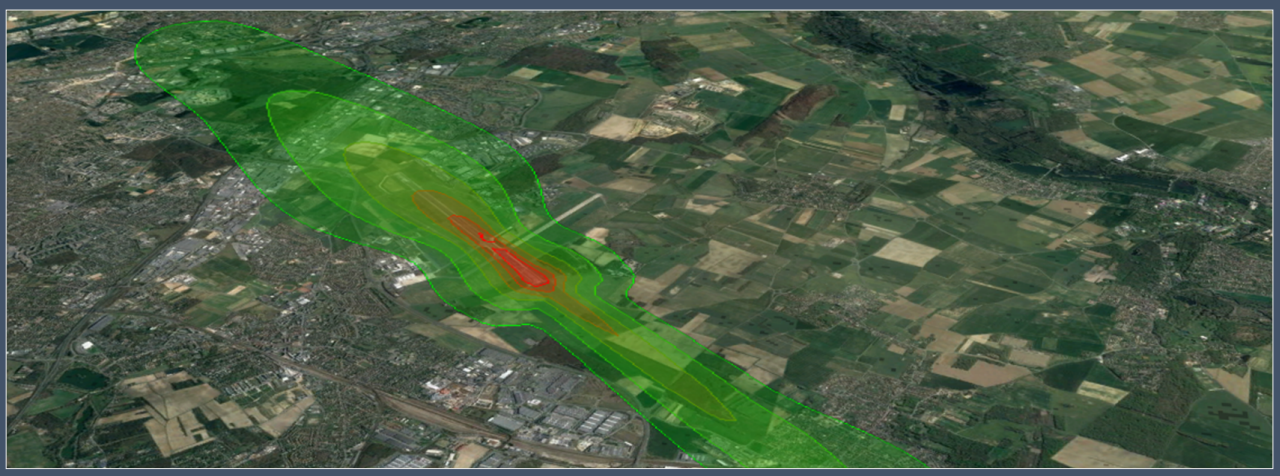
- **Approach** flight procedures and
- **Terminal area** flight procedures
- **Route** designs
- Airspace structures (**CTR/CTA/TMA**)

SL3.2 GNSS performance & interference assessment

These assessments are aimed to verify the suitability of GNSS systems and services to provide the required performance to support the intended implementation of PBN procedures in airports and terminal areas. This subservice includes:

- L1, L2 and L5 bands GNSS performance assessment
- L-Band **interference spectrum** detection
- **Multipath** assessment

The activities are framed in the ground testing/ inspection activities of "site proving" and "initial proof of performance" defined in ICAO doc 8071, ICAO PBN Manual doc 9613, and ICAO Annex 10 Vol. I.



Noise footprint example

SL3.3 Environmental impact assessment

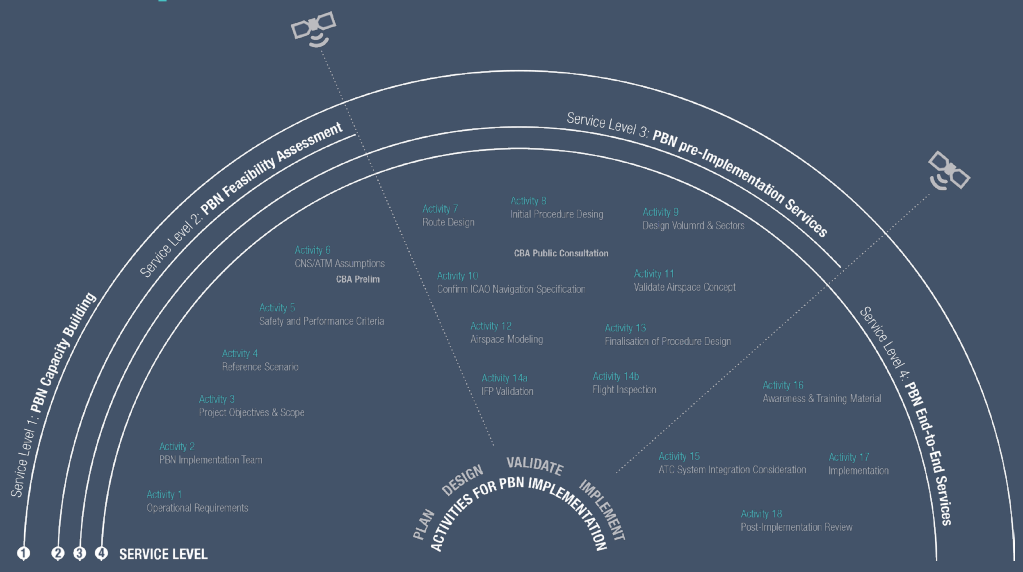
The environmental assessment covers the evaluation of the **aircraft** noise exposure and local **air quality** based on **Eurocontrol's BADA and IMPACT tool**.

The methodology and metrics used in the environmental impact assessments are compliant with ICAO guidance material (ICAO Annex 16, Doc. 10031, Doc 9911) and European directives (EC Directive 49/2002, ECAC-CEAC Doc 029).

SL3.4 Safety assessment

The development and submission of a **safety assessment** to the competent authorities is compulsory from the **regulatory** point of view for all the airspace changes involving a shift from conventional navigation to PBN. The safety assessments are developed according to the ICAO Annex 19 and Single European Sky regulations, applying **Eurocontrol's SAM** methodology and escalating methodologies to **customers' SMS.**

SL4 End to end implementation



ESSP provides the customer with a **turnkey solution towards the PBN implementation**, including the representation and interaction with the relevant authorities in charge of the approval and authorisation of the entry into force of the new flight procedures.

In addition to the Service Level (SL3) activities offered by ESSP, other complementary and mandatory steps are undertaken in order to enable the process of a real and complete implementation. ESSP partners up with its **shareholders**, which are **the most outstanding ANSP in Europe**, to perform some of these activities:

- **Fast & Real – Time Simulation**. Supported by ENAIRE and DSNA
- **Flight Validation**. Supported by DSNA
- **ATS training**. Supported by DSNA
- **GNSS performance and interference assessment**. Supported by ENAIRE
- **Airspace and flight procedure design back-up**[1]. Supported by skyguide

[1] Only for certain countries which could require to be approved for flight procedure design, as UK or Sweden

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WE COMMIT TO SAFE
AND CONNECTED WORLDS

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