

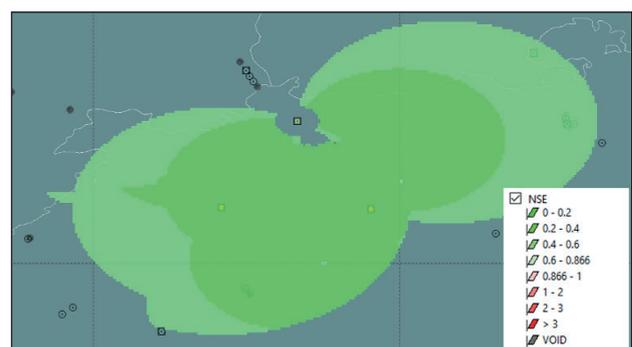
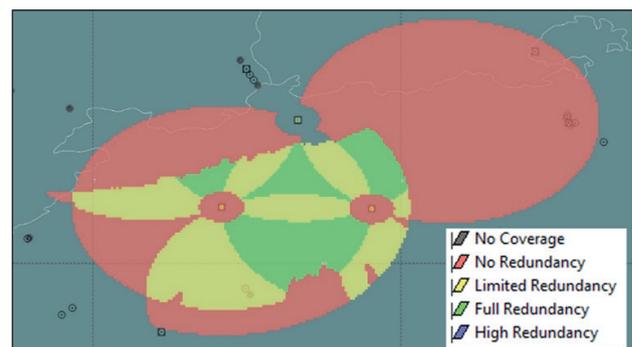
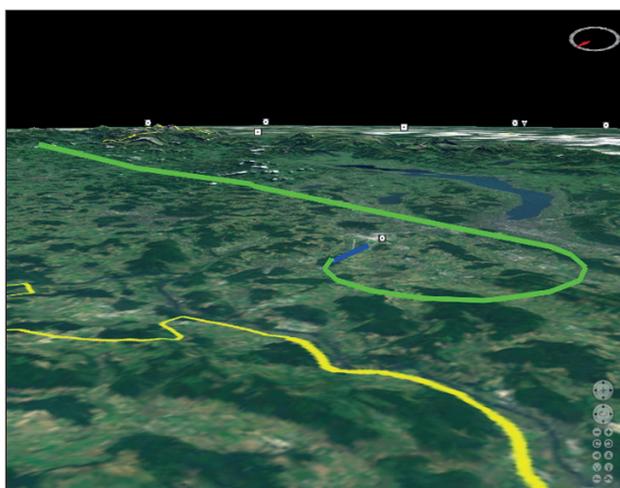
DEMETER Factsheet

Introduction

DEMETER (DistancE Measuring Equipment TracER) is a software tool for navigation infrastructure planning (rationalisation and evolution) in support of Performance-based Navigation (PBN). It allows service providers to determine the minimum reversion navigation infrastructure needed to support RNAV-5, by looking at both DME/DME & VOR/DME coverage and RNAV-1, by looking at DME/DME performance. DEMETER uses a terrain database to determine facility coverage and processes the results by evaluating RNAV criteria in accordance with the ICAO PBN Manual; this integrated database can support multiple formats including DTED Levels 1 & 2 to enable more accurate performance analysis.

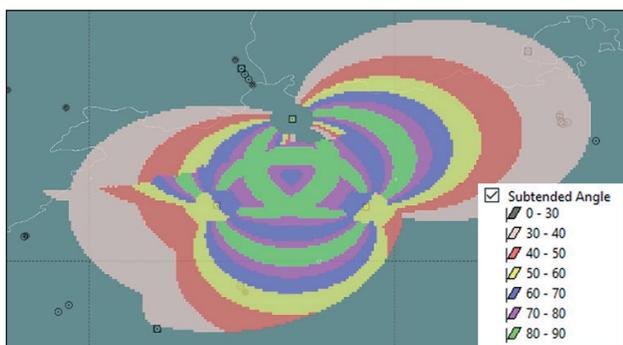
DEMETER is an efficient and effective tool to support the European air navigation service providers (ANSPs) in complying with the PBN Implementation Regulation (EU) 2018/1048 by enabling them to develop GNSS reversion solutions and the identification of an efficient Minimum Operational Network (MON). Furthermore, DEMETER allows simulation results to be visualised in the context of operational requirements that are set by airspace planners and it supports flight inspection planning.

The planning of flight inspection within DEMETER ensures that only the minimum set of DME need to be inspected. Flexible interfaces allow flight inspection results to be imported enabling direct comparison with simulation results. Thus, the software enables the cooperation needed between airspace planners, procedure designers, Navaid engineers and flight inspectors. In addition, a Navaid database allows the exchange of key technical data (not normally contained in AIPs) in a common format between EUROCONTROL and ANSPs



DEMETER ensures harmonised PBN IR implementation in accordance with the EUROCONTROL Guidelines for RNAV 1 Infrastructure Assessment Edition 2.0 (EUROCONTROL-GUID-114), published in July 2021, which have been developed in cooperation with the ICAO Navigation Systems Panel (NSP).

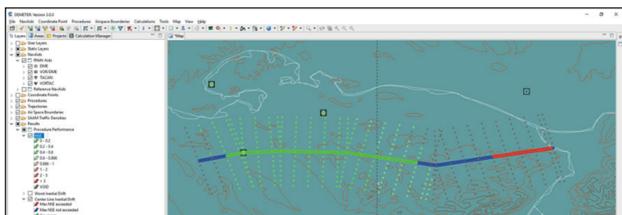
DEMETER can be used by State PBN implementers to establish the most efficient DME-DME infrastructure to provide a ground-based positioning solution as back-up to GNSS. Furthermore, DEMETER can enable an evaluation of Navaid rationalisation potential and the identification of optimisation opportunities in the current infrastructure.



DEMETER has been developed based solely on open source software platforms and development environments such as Eclipse, Java and uDig (User-friendly Desktop Internet GIS). The latest version of this software tool, released in December 2021, is **v 3.1.0**.

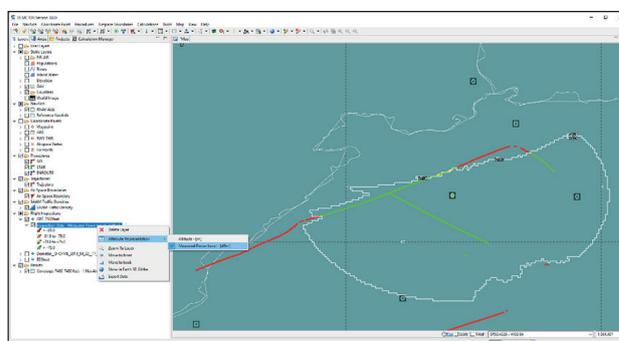
Main features

- Navaid database for VOR, DME, VOR-DME, TACAN, VORTAC and NDB. The database can be updated from AIXM 4.5 and 5.1 formats, ARINC424 data files or from flexible .csv format.
- Import of airspace elements (e.g. coordinate points, SID/STAR procedures, route segments) from EAD snapshot reports.



- Integrated GTOPO30 terrain database with support for high quality DTED levels 1 and 2 and other formats such as: SRTM, ASTER, GeoTiff, ASCII DEM, ARCINFO GRIDS.
- Coverage calculations based on Line-of-Sight, Free Space Path Loss or Diffraction propagation models.

- Co-channel separation checks, including 8dB D/U evaluation.
- DME-DME coverage and performance assessment (available pairs, subtended angle, redundancy and Navigation System Error-NSE). VOR-DME coverage and redundancy assessment.
- SID/STAR procedure definition including the RF legs, DME/DME performance calculation, and individual DME coverage prediction in vertical profile.
- 3D terrain and simulation results visualisation.
- Predefined Flight Inspection data formats as well as a flexible importing interface and pre-processing function allowing direct comparisons between predicted and achieved coverage.



- Estimation of best location for a new DME site that together with the existing navigation infrastructure helps improve the DME-DME signal coverage in a designated area of interest.
- Import and management of SAAM (NEST) Traffic Densities.
- Import of user layers in shapefile, tiff and .kml formats.
- Export of 2D map layers in shapefile and .kml formats.

How to obtain DEMETER

EUROCONTROL stakeholders may obtain access to DEMETER and its associated technical documentation free of charge.

As DEMETER works globally, other interested parties may also request access to the software. The support provided by EUROCONTROL in this case may be limited and users might need to import their own navigation aids data and possibly pay license fees.

Access can be requested by contacting the **DEMETER team** at DEMETER@eurocontrol.int.