FPSAT
Flight Procedure Satellite Analysis Tool

FPSAT is able to perform virtual flight inspections in order to check the flyability of RNAV procedures, the coverage and accuracy provided by the navigational aids infrastructure along the whole of a procedure’s trajectory and to identify any electromagnetic interference that may affect navigational aid performance.

Virtual flight inspections of RNAV procedures may also be used to verify and optimize:
- The obstacle environment in the vicinity of the procedure
- The ARINC 424 coding of the procedure by fixing the geometry of the waypoint/nominal track
- Weather (wind and temperature) conditions

These activities are required for the ground validation of RNAV flight procedures by ICAO Docs 8168, 8071 and 9906.

FPSAT is a pre/post processor that enables procedure specialists to:
- Check how the Flight Management System (FMS) will fly the coded procedure by comparing the nominal trajectory and the simulated trajectory taking into account:
  - ARINC path and termination (and related attributes)
  - Type of aircraft as per BADA files
  - Kinematic constraints
  - Weather constraints
Verify GNSS (global navigation satellite system) signal in space performance (GPS, SBAS, GBAS) along a trajectory
Assess the signal continuity, coverage and couples availability of DME/DME navigation along a trajectory
Visualize Air Traffic Services (ATS) related geographic data, perform diagnostics and check the results for their functionality
Review procedures to optimize navigation performance, cost and environmental impact

Main Features

Automatically load complex SID, STAR and approach data into the procedure design graphic environment without any manual typing
Load data from different sources e.g. IDS AirNav FPDAM and/or IDS AirNav EMACS
3D visualization of terrain/image information
3D visualization of aircraft trajectory (nominal and simulated) and RNP tunnel
Out of the Window view with animation along a trajectory
Detailed graphics of the horizontal/vertical/altitude/speed/aircraft attitude
Full reporting functions on the performed analysis

Navigation Aids

FPSAT covers the need to verify the availability and usability of navaids (satellite and ground based signals) along a flight path:
For a given realistic aircraft attitude
For a specific aircraft category
For different takeoff loads and weather conditions
Considering the variability of the GPS constellation
For different types of GPS augmentation
Taking into account changes in the electromagnetic environment due to interaction with potential sources of interference

Post Processing

FPSAT’s analysis capability for FMS, DME and GNSS Post-Processing covers:
ARINC 424 compliancy check
Selection of different aircraft types
Performance analysis according to weight, bank angle and speed
Weather and atmospheric conditions

DME/DME Post-Processing covers:
Number of available and usable DMEs and DME pairs
Critical DMEs
Local continuity
Min and max Position Estimation Error

GNSS Post-Processing:
Performs Signal In Space Required Navigation Performance (SIS RNP) checks along a flight path
Visualizes detectable, monitored (SBAS) and usable satellites
Calculates Navigation System Error (NSE) and Horizontal and Vertical Position Errors (HPE, VPE)
Calculates and plots Horizontal and Vertical Protection Levels (HPL, VPL)
GBAS analysis