

RNAV FI System AD-RNAV

A Portable Solution for Procedure Flight checks and Radar Calibration

The AD-RNAV is fully capable of inspecting RNAV/RNP procedures, SBAS (LPV) Approaches and Radars. This solution with minor aircraft modification converts nearly each Aircraft into a Procedure Flight Inspection Aircraft for all kind of GNSS based procedures and Radar.

The minimum number of interfaces and compact design makes the AD-RNAV able to be used as an Add-On to an existing Flight Inspection System or as a Stand-Alone solution as loose equipment in a multi-role aircraft.



Figure 1: AD- RNAV System

Components of the AD-RNAV

The key components of the AD-RNAV are:

- Equipment Case
- Display Computer



Figure 2: Equipment Case

Equipment Case

The Equipment Case is a small ruggedized portable housing containing the Data Acquisition-, Real-time- and Positioning-Module. It provides a power interface and all data interfaces to the aircraft navigation sensors (e.g. GPS/FMS).

Positioning Module

The Equipment Case integrates a Multi GNSS Receiver with 120 channels.

The Multi GNSS receiver is capable of receiving and processing the following signals:

- GPS (L1,L2C,L5)
- GLONASS (L1,L2)
- BeiDou/Compass (B1,B2)
- Galileo (E1,E5a,E5b)
- SBAS (EGNOS/WAAS/GAGAN)
- Wide Area Differential GPS
- Phase Differential GPS (optional)



Figure 3: AD-GNSS Receiver

Real-Time Module

The Real-time Module controls the Data Acquisition Module and the Positioning Module. It provides precisely time-stamped reference position data and sensor data with 10Hz to the Display Computer where it is analyzed by the AD-RNAV Flight Inspection Software.

Display Computer

The Display Computer of the AD-RNAV is a high-end, ruggedized, portable Laptop computer:

- Pentium Core i5 or i7 ≥ 2,66 GHz
- Solid State Disc ≥ 60 GB
- Memory ≥ 4 GB
- Display = Full HD



Figure 4: AD-RNAV Display Computer

The Display Computer with its comfortable Graphical User Interface (GUI) is the front end to the Flight Inspector. Via keyboard and touchpad (or mouse) the flight inspector can set-up the system in a windows look-and-feel manner; all modules of the system (Real-Time Module, Positioning Module and Data Acquisition Module) are fully remote controlled by the Display Computer.

AD-RNAV Flight Inspection Software

General features of the Aerodata RNAV Flight Inspection Software:

- Easy-to-learn user interface
- 10Hz data recording in office-compatible data format
- Interface to standard office software packages
- Full replay functionality
- Menu, keyboard and dedicated function key operation
- Automatic report generation
- Electronic Flight Instrument System (EFIS)
- Fully compatible to AD-AFIS series

Printing of graphics, alphanumeric windows and reports can easily be done in-flight on the printer of the existing Flight Inspection System or post-flight on any office printer in full color.

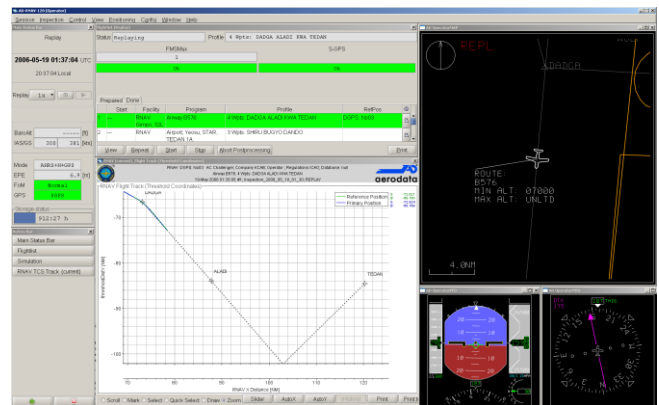


Figure 5: RNAV Main Display

The AD-RNAV Flight Inspection Software allows evaluating the following parameters:

- Waypoint accuracy
- Bearing accuracy
- Distance accuracy
- Navigation Sensor Error (NSE)
- V-NAV performance
- SBAS integrity, coverage and interference
- For the primary and secondary SBAS satellite(s):
 - o SBAS PRN being tracked
 - o Signal-to-Noise Ratio (SNR)
 - o Elevation
 - o Azimuth
- GNSS integrity
 - o DOP, HPL, VPL, HIL, HPL, ...
 - o Signal-to-Noise Ratio (SNR)
 - o Elevation
 - o Azimuth
- GNSS interference
- Flyability
- Radar coverage and accuracy checks
- Receiver Autonomous Integrity Monitoring (RAIM)
- Approach lighting systems

Numerous RNAV-specific graphics and alphanumeric windows with suitable parameter compilation are available and may be opened and viewed simultaneously:

AeroFIS[®] Enhancements

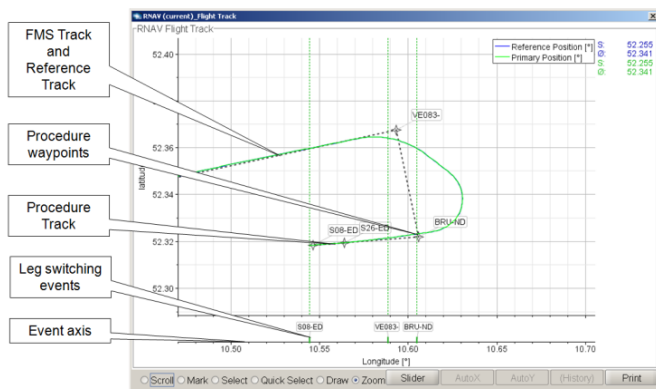


Figure 6: RNAV Flight Track Graphic

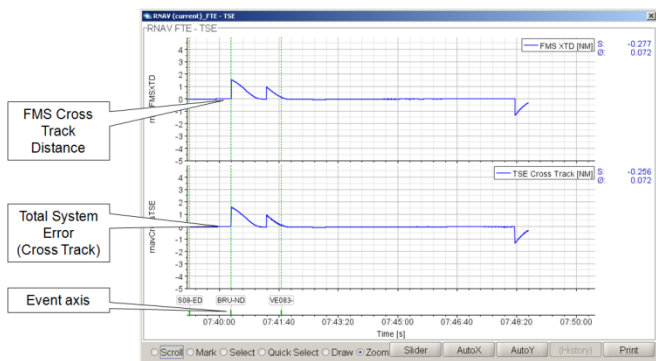


Figure 7: RNAV Navigation Errors (NSE/TSE)

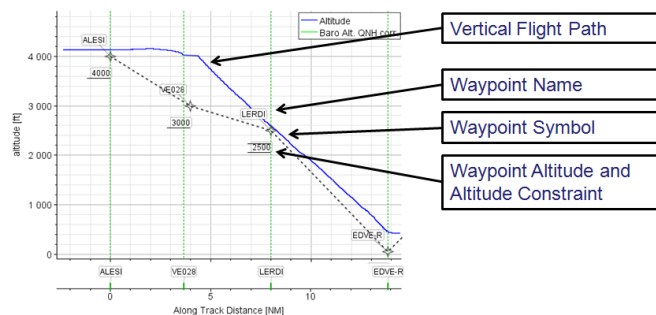


Figure 8: V-NAV Evaluation

The RNAV Flight Inspection Software provides GNSS trace recording and visualization.

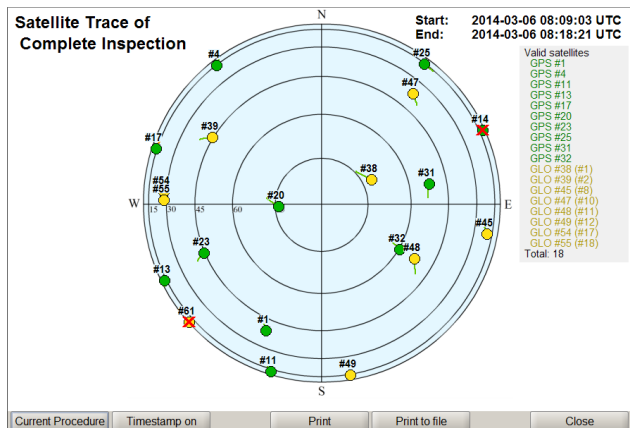


Figure 9: Multi GNSS Constellation

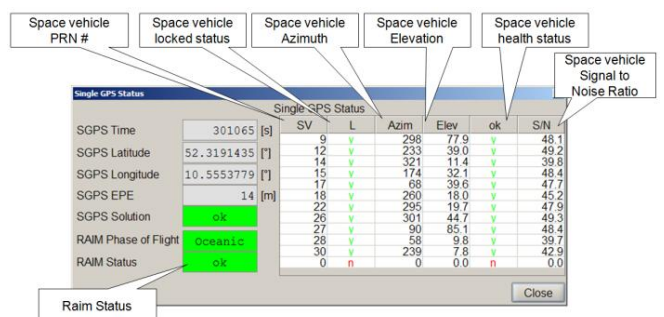


Figure 10: Detailed GNSS Information

Automatic FMS Database Import and Verification

ARINC 424 coded databases can be imported in the RNAV Flight Inspection Software. This allows direct import of coded databases from the procedure designer. Furthermore automatic import avoids manual data input which is highly fault-prone. Nevertheless manual database input is also possible.

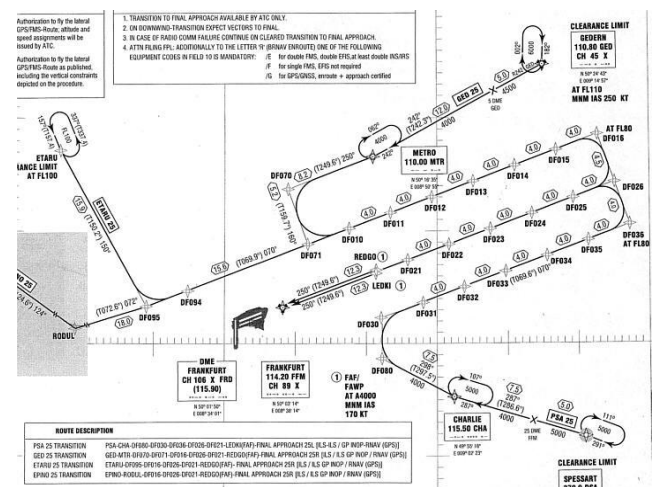


Figure 11: Example P-RNAV Procedure

AeroFIS® Enhancements

The RNAV Flight Inspection System reads the currently selected Database from the FMS, respectively the FMS flight plan to compare the selection with the imported ARINC 424 database.

This verification can be performed on ground or in flight prior to the flight check of the procedure under inspection.

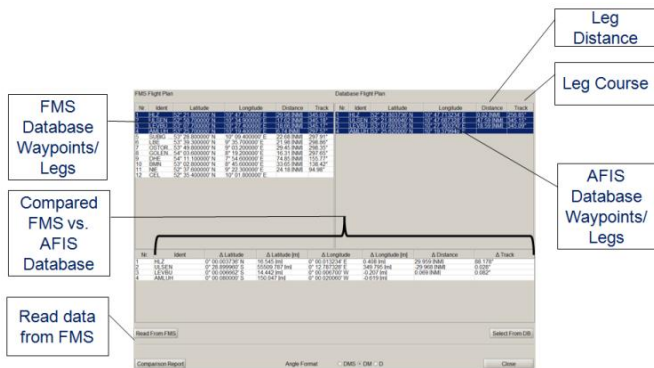


Figure 12: Automatic FMS Database Verification

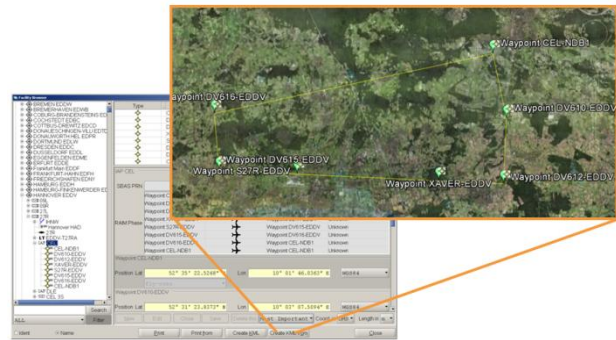
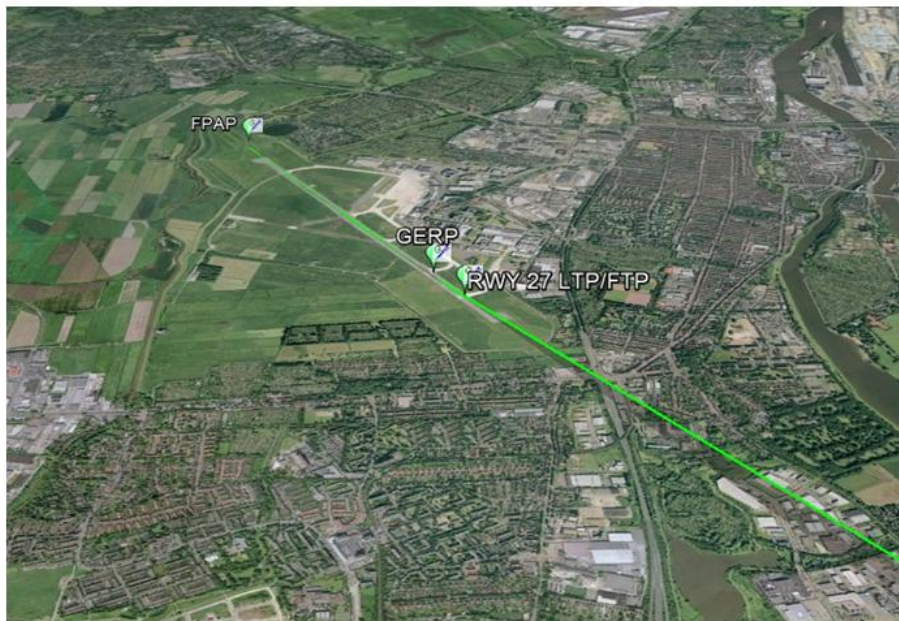


Figure 14: Procedure Visualization

The Solution for your Multi Role Aircraft

Nearly every aircraft can be modified to include the AD-RNAV System, stand alone or as add-on to your existing Flight Inspection System. Various options for the AD-RNAV system exist. Please contact Aerodata product support for details.



FAS data is imported in AFIS facility database for validation of:

- LTP height
- LTP position
- Flight path alignment with runway
- TCH
- Vertical Path Angle (VPA)
- CRC checksum

Navigation Database Visualization

The RNAV Flight Inspection Software is able to export the navigation database to standard applications like Google Earth for fully comprehensive visualization.

Visualization of the FAS data blocks allows easy pre-flight inspection checks for SBAS (LPV) approaches.

AD-RNAV:

Your access to the future!

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