AeroFIS® Enhancements

Radar Inspection & Analysis AD-RIA

The Powerful Tool for Automatic Radar Analysis

Purpose of the Equipment

The Aerodata Radar Inspection and Analysis system (AD-RIA) is a modern, high efficient tool for Radar calibration.

It provides automatic evaluation of Radar parameters by interfacing data from the ground Radar station in comparison to the aircraft reference position based on Differential GPS (DGPS) technique.

The capability covers Surveillance Radars (ASR, MSSR-SA and SREM) as well as MODE-S Radars in accordance with the latest ICAO requirements of document DOC 8071, Volume III.

Theory of Operation

AD-RIA interfaces the ground Radar via a standardized High Level Data Link Control (HDLC) interface. This interface is a standardized common Radar interface making the inspection independent from the Radar manufacturer and model.

During the radar inspection the system AD-RIA continuously compares the position of the flight inspection aircraft as determined by the Radar against the reference position of the aircraft.

On-board the flight inspection aircraft GPS raw data is recorded by AeroFIS® or an optional portable GPS raw data recorder.

DGPS correction data is calculated from the data received via telemetry from a DGPS Ground Station. In a post flight processing the DGPS correction data is applied to the GPS raw data recording from the air-

craft to determine the reference position of the aircraft. The horizontal accuracy of the reference position is typically better than 2m (95%@200km baseline).

Since no data link between aircraft and DGPS Ground Station is required, any Radar range can be inspected with DGPS accuracy.

AD-RIA Hardware

The AD-RIA equipment is based on the following components:

Operator Station containing:

- Ruggedized evaluation computer with HDLC interface to Radar
- Telemetry modem for receiving DGPS correction data from DGPS Ground Station
- AC power supply
- Audio amplifier and speaker

Accessories containing:

- Telemetry antenna (for reception of DGPS)
- RF-cable
- HDLC interface cable

DGPS Ground Station

- (P)DGPS Ground Stations as provided with AeroFIS®

Airborne GPS Raw Data Recorder:

- AeroFIS® or
- Portable GPS raw data recorder (for any aircraft without AeroFIS® installed)

The Operator Station is typically set up in the Air Traffic Control Centre or in the shelter of the Radar station to be inspected. The equipment is connected to AC power, to the HDLC interface and to the telemetry antenna. The DGPS Ground Station is set up on a reference point in the vicinity of the Operator Station and sends GPS raw data to the Operator Station.

An integrated speaker can be activated for listening to the typical digital telemetry data burst audio for data link diagnosis.

System Overview

Radar Inspection and Analysis Software

The Radar Inspection Software AD-RIA is based on the CAPE software, Aerodata's modern software platform for flight inspection products. Any operator being familiar with AeroFIS® operation can also operate the AD-RIA system.

RADAR Data

The Radar data in the ASTERIX format (CAT 001, 002, 016, 034 or 048) will be read via the HDLC interface and recorded. Based on the transponder code the software filters out and decodes the messages belonging to the specified (flight inspection) aircraft.

Graphical User Interface (GUI)

The evaluation software is equipped with a graphical user interface (GUI). It realizes the configuration and the handling of the software as well as the visualization of the measurement data and the status information.

Facility Data Base

Like in AeroFIS® the antenna position and configuration parameters of every Radar facility to be inspected are stored in the data base.

Recording and Reprocessing

The results are calculated using the airborne recorded GPS raw data, the recorded DGPS correction data and the HDLC Radar data. For data recording and reprocessing the same software will be applied.

RADAR Error Calculation

The following error parameters are calculated as arithmetic average and standard deviation and checked against tolerances:

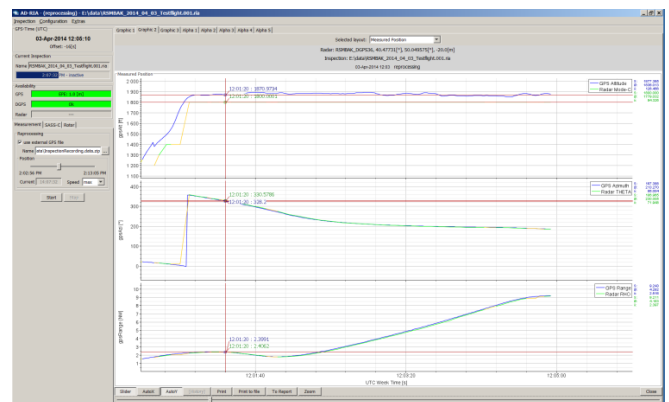- Azimuth / Alignment error
- Distance error
- Altitude error

Radar outages and coverage gaps are detected and highlighted automatically.

Data Representation

The data is displayed in graphical and/or alphanumerical format:
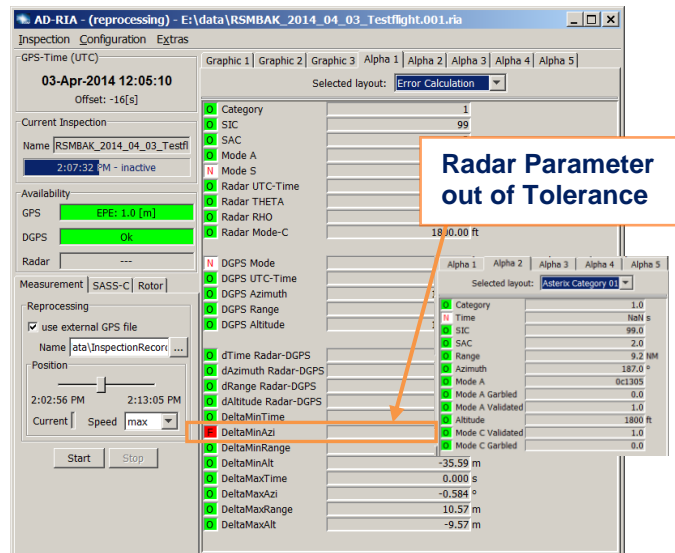
Example: Alphanumeric Data Representation

Example: Graphic Data Representation

AD-RIA: Radar Inspection made easy!

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