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, highly efficient tool for radar calibration and inspection of multilateration (MLAT) systems.

It provides automatic evaluation of radar/MLAT parameters by interfacing data from the surveillance ground station and compares it 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 and MLAT systems according EUROCAE ED-142 and ED-117A.

Radar Inspection & Analysis AD-RIA

Theory of Operation

AD-RIA interfaces the ground radar via a standardized High Level Data Link Control (HDLC) interface or TCP/IP. These are standardized common radar interfaces making the inspection independent from the Radar manufacturer and model. Together with the radar data, the DGPS correction data received via telemetry from a ground station is recorded. Onboard the flight inspection aircraft, GPS raw data is recorded by AeroFIS® or an optional portable GPS raw data recorder.

During the radar/MLAT inspection, the system AD-RIA continuously compares the position of the flight inspection aircraft as determined by the radar/MLAT against the reference position of the aircraft, which is calculated from the GPS raw data and the correction data. It provides a statistical evaluation and reports according ED-142 and ED-117A.

Instead of this DGPS solution, the SBAS system can be used as position reference.

The horizontal accuracy of the reference position is typically better than 2 m (95% @ 200 km DGPS base line or SBAS).

Optionally a SATCOM or ADS-B out data-link can be installed for real time data transfer.

Flight Inspection Aircraft

GPS Raw Data Recording
(AeroFIS)

Radar Station

Aircraft Recording (GPS Raw Data)

Post Flight Processing at AD-RIA

**AD-RIA
Operator Station**

PDGPS Ground Station
Telemetry Link

GPS Antenna

Radar Data Interface/Recording
Mode A, C and S
(ASTERIX)

Automatic Radar Evaluation

Radar Inspection & Analysis AD-RIA

AD-RIA Hardware

Operator Station containing:

- Ruggedized evaluation computer with HDLC and TCP/IP interface to radar

- Telemetry modem for receiving DGPS correction data from DGPS ground station

- Audio amplifier and speaker

- Optional for real time evaluation:

  - Interface to SATCOM

  - Interface to ADS-B receiver

DGPS Ground Station (provided with AeroFIS®)

Airborne GPS Raw Data Recorder:

- AeroFIS® or

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

- Optional for real-time evaluation:

  - SAT communication

  - ADS-B out Mode S transponder

The Operator Station is typically set up in the air traffic control center or in the shelter of the radar station to be inspected. The equipment is connected to AC power, to the Radar network and to the data link. A DGPS Ground Station can be placed on a reference point in the vicinity of the Operator Station and sends GPS raw data to the Operator Station.

For diagnostic purposes, the integrated speaker can make the typical digital telemetry data burst audible.

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/MLAT Data

Target Reports and Service Messages in ASTERIX format for monoradar (Cat001, 002, 016, 034 or 048), MLAT (Cat019, 020) and ADS-B (Cat021) will be read via the HDLC or TCP/IP interface and recorded. Based on the transponder code, the software filters and decodes the messages belonging to the specified (flight inspection) aircraft.
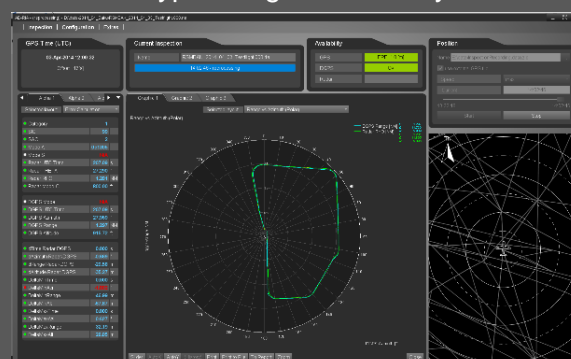
Radar Inspection & Analysis AD-RIA

Facility Data Base

Like in AeroFIS®, the antenna position and configuration parameters of every radar facility to be inspected are stored in the database.

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:
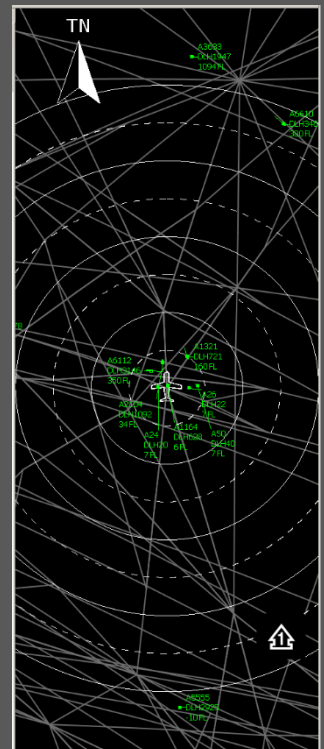
- Azimuth / alignment error

- 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. A map will show the situation in air space, ground facilities and airways.

	Alpha 1	Alpha 2	Alp ▶ ▼
Selected layout:	Error Calculation		▾

● Category	1	
● SIC	99	
● SAC	2	
● Mode A	0c1305	
● Mode S	N/A	
● Radar UTC-Time	207.09	s
● Radar THETA	27.290	°
● Radar RHO	1.281	NM
● Radar Mode-C	800.00	ft
● DGPS Mode	N/A	
● DGPS UTC-Time	207.09	s
● DGPS Azimuth	27.959	°
● DGPS Range	1.297	NM
● DGPS Altitude	915.72	ft
● dTime Radar-DGPS	0.000	s
● dAzimuth Radar-DGPS	-0.669	°
● dRange Radar-DGPS	-29.58	m
● dAltitude Radar-DGPS	-35.27	m
● DeltaMinTime	0.000	s
● DeltaMinAzi	-1.902	°
● DeltaMinRange	-46.99	m
● DeltaMinAlt	-67.87	m
● DeltaMaxTime	0.000	s
● DeltaMaxAzi	-0.627	°
● DeltaMaxRange	32.19	m
● DeltaMaxAlt	28.05	m

We keep you on the best path!