

# Radar Evaluation



Our  
scope of work

# Our Concept of Radar Evaluation

Air traffic is steadily increasing, thus imposing severe demands on the radar systems used for identification or direction of aircraft and plotting of the air traffic situation.

Regular checks are required to ensure that primary radar and secondary radar systems are working in accordance with the specified performance characteristics.

Moreover, they always need to be compliant with national or international requirements.

Similarly, steep supports operators of newly installed radar systems in the very first period of site acceptance testing. With the help of a comprehensive final report, the customer can easily verify fulfilment of all performance requirements.

An objective flight calibration job, conducted by steep, can be helpful not only for operating authorities but also for radar equipment manufacturers. By means of the final report they can certify the performance of their radar system at the stage of commissioning or approval.

## In addition to vendor specific requirements, radar systems of civil aviation are usually tested according to the following regulations and standards:

- ICAO: Doc 8071 – Manual on Testing of Radio Navigation Aids
- ICAO: Annex 10
- Eurocontrol: Radar Surveillance In En Route Airspace And Major Terminal Areas
- Eurocontrol: European Mode S Station Functional Specification
- Eurocontrol: Radar Sensor Performance Analysis

For more than 25 years, steep has been providing checks of the radar systems of the German Air Force (PSR / SSR / Mode S). Regular checks (2-year-cycle) are performed to ensure that the primary and secondary radar systems are up to the specified performance characteristics. These checks consist of an on-site hardware evaluation and a subsequent flight check. Prior to the flight check, individual flight plans are drawn up, covering the special characteristics of each sensor.

Together with our partner FCS GmbH – Flight Calibration Services – several flight checks in military and civilian environment have been performed worldwide during the last years. An aircraft of type Learjet 35A is used for flight calibration because of its outstanding performance at reasonable cost. With the desired minimal cross-section of this aircraft, an evaluation on FL 450 up to the maximum distance of 250 NM is possible.

## The steep Radar Evaluation concept meets all these requirements:

- Low financial and organisational requirements for planning and running the evaluation process
- Minimum staff requirements at the evaluation sites
- Plans can be altered at short notice to meet changed requirements
- Automated processing of the data and standardized evaluation criteria
- Immediate processing of the data and availability of results without delay

# SASS-C: Recording – Analysis – Evaluation

In addition to our proprietary software tools, the standardized software SASS-C by Eurocontrol will be utilized for radar data recording and evaluation. In doing so, different radar specific data formats as well as the common ASTERIX data exchange format can be processed.

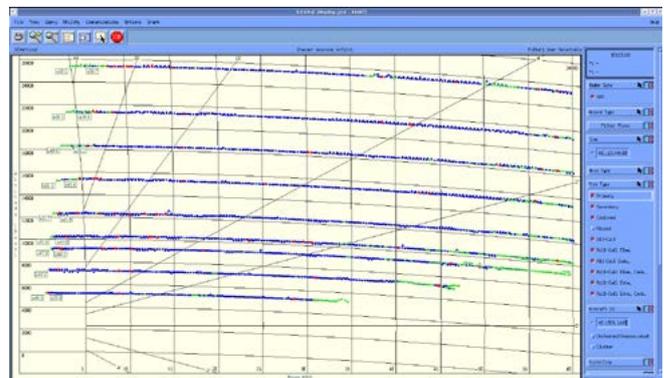
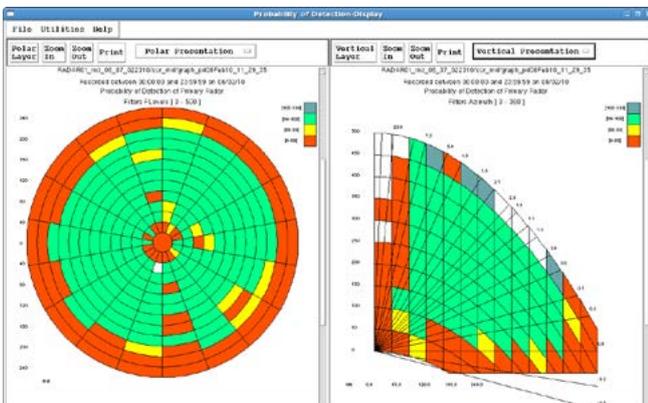
Determination of positional accuracy takes place by means of DGPS assisted reference (WAAS / EGNOS / OmniSTAR). Specially designed algorithms are capable of determining the time stamping behaviour of the radar data extractor.

Our employees regularly take part in trainings at the IANS school by Eurocontrol, in order to always be “upto- date” with the SASS-C software.

Proprietary software tools allow us to make an extensive analysis of radar data sets that are not covered by SASS-C. In the process of analysing data, these tools give us the ability to find errors in the radar data exchange format (e.g. ASTERIX).

## Radar plot analysis generally comprises:

- Positional accuracy in range and azimuth (systematic error and standard deviation) compared with SSR or GPS as a reference
- Probability of detection (Pd) of PSR / SSR / Mode S systems in graphical or tabular representation
- Combination rate / Probability of association (Mode A / C, Mode S)
- Cone of silence evaluation
- Decoding rate (Mode A / C, Mode S)
- False plot analysis
- Plots per scan analysis
- Calculation of the coverage of a sensor based on terrain data (LoS – line of sight / screening)
- Calculation of the radar coverage of several sensors in the network





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