

R&S®EVS300 ILS/VOR analyzer

Study substantiates excellent results achieved in highly challenging measurements

In a scientific study, FCS Flight Calibration Services GmbH examined the safety-relevant impact of multipath propagations on the results achieved by the R&S®EVS300 during measurements on instrument landing systems (ILS). The study attests the ILS/VOR analyzer an outstanding suitability for field operation.

R&S®EVS300: mastering the most difficult measuring tasks

Since its market launch in February 2006, the R&S®EVS300 ILS/VOR analyzer (FIG 1) has successfully been employed worldwide for the installation and maintenance of terrestrial flight navigation equipment. The regular calibration of instrument landing systems by ground measurements and flight inspections — an ICAO requirement — decisively requires mastering the peculiarities of measurements in dynamic RF field environments. Such RF fields are characterized by the multipath propagation of ILS signals on airports caused, for example, by reflections from buildings or tail units of modern aircraft. They can produce a falsified demodulation of the useful signal in the ILS receivers, which would cause a deviation of the aircraft from the nominal approach course or glide angle toward the runway.

Dr.-Ing. Jochen Bredemeyer, head of Research & Development at FCS GmbH, therefore examined the safety-relevant

impact of multipath propagations on measurements carried out with the R&S®EVS300 ILS/VOR analyzer. In his scientific study, he investigated both the influence of filter bandwidths in digital signal processing and the behavior of the R&S®EVS300 analyzer's automatic gain control (AGC).

The results are convincing: Owing to its high measuring sensitivity and level stability, the R&S®EVS300 yielded excellently reproducible and accurate measurement results. FIG 2 shows, by way of example, the difference in depth of modulation (DDM) as an ILS control variable during ground measurements along the runway. Here, Dr. Bredemeyer examined the impact of a reflector with limited dimensions and a maximum reflection coefficient of $r = 0.3$. The AGC follows continuously and without discontinuities the minima and maxima of the level variations caused by multipath propagation. This makes the R&S®EVS300 also particularly suitable for measurements involving high level differences as they occur, for example, when driving across the runway in front of the ILS antenna array. FIG 3 documents the low inherent noise of the R&S®EVS300.

As a consequence of the outstanding outcome of the study, FCS GmbH is planning to use the R&S®EVS300 in its two Beech KingAir 350 flight inspection aircraft (FIGs 4 and 5) as a supplement to the existing flight inspection system. Moreover, Rohde & Schwarz and FCS will also cooperate in other fields of T&M technology for terrestrial navigation equipment.

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FIG 1 The R&S®EVS300 ILS/VOR analyzer.



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R&S®EVS300 ILS/VOR analyzer

Its wide range of functions makes the R&S®EVS300 ideal for ILS/VOR/marker beacon measurements on the ground and in the air. Its extremely fast processing of measured data, its remote control capability and its large internal data memory round out the successful design. For detailed information about the R&S®EVS300 see [*]

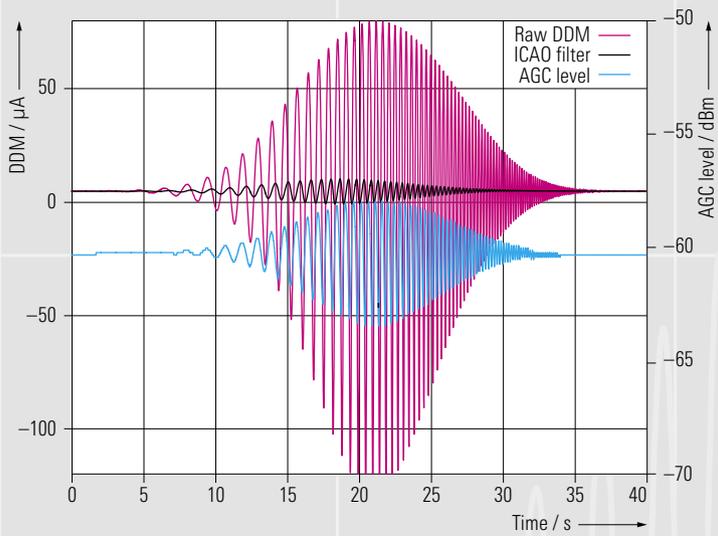


FIG 2 DDM of a synthetic reflection over 200 m at a speed of 60 km/h (reflection coefficient $r = 0.30$).

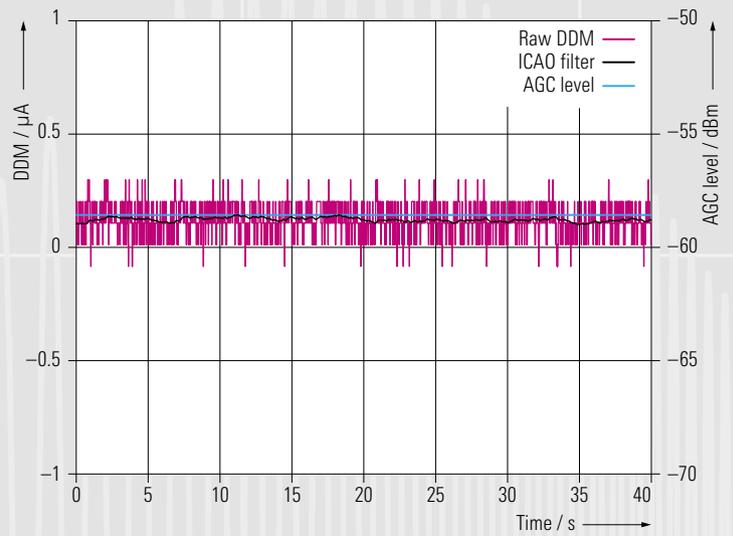


FIG 3 Noise of the DDM with synthetic input signal at the R&S®EVS300 (reflection coefficient $r = 0$, input level < -58 dBm).

FIG 4 Beech KingAir 350 (D-CFMD) flight inspection aircraft.



Courtesy: Claude-Alain Fauser

FIG 5 Part of the flight inspection system in the interior of the flight inspection aircraft.



Courtesy: Claude-Alain Fauser

More information and data sheets at
www.rohde-schwarz.com
 (search term: EVS300)



REFERENCES

[*] R&S®EVS 300 ILS/VOR Analyzer:
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