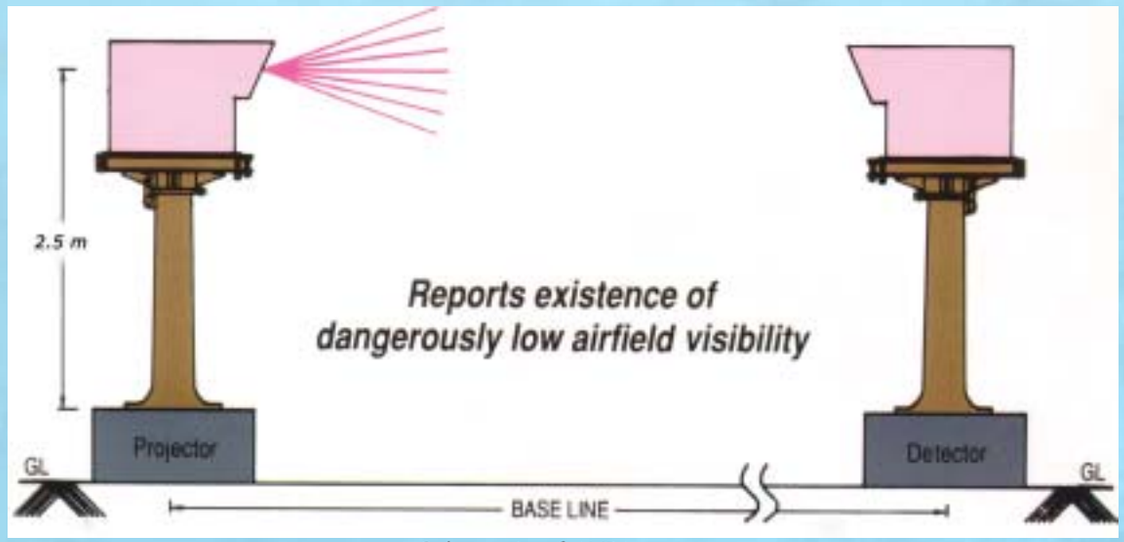
The Automatic Visual Range Assessor MK2



Schematic of AVRA system

In modern flying operations, aircraft are instrumentally guided till they approach the landing zone. The pilot thereafter commences his landing approach almost immediately. If, after committing his aircraft to land, the pilot finds that the visibility is too low for a safe touchdown, he will have only a few seconds to initiate corrections and regain altitude. This involves the execution of a delicate and potentially dangerous manoeuvre by a heavy aircraft travelling at nearly 100 meters per second. Economic imperatives, on the other hand, forbid frequent unscheduled diversions based on unduly pessimistic reports of visibility. It is clear, therefore, that to satisfy the requirements of safe, yet reasonably economic flying operations, accurate quantitative reports of runway visibility are required.

The need for an automated system

Manual assessment of visibility is liable to subjective errors arising from factors like the health of the observer, his fatigue, his experience and so on. Hence it is important to have objective measurements made by reliable, fast-acting instruments.

Quantitative calculations of the meteorological visibility (MV) and runway visual range (RVR) are made from Koschmieder's and Allard's equations respectively. These equations are applied using data obtained at the runway as inputs. Instrumented real-time measurement, calculation and reports of these two quantities eliminate human error.

Features of the AVRA MK2 system

- Double-beam system imparts laboratory quality stability to the transmissometer.
- Single light emitter for both baselines (for Cat III options) enhances reliability. Innovative optics ensure no shadowing of long baseline by second baseline detector.
- High-speed lamp modulation eliminates aliasing errors.
- Digital data transmission (either by cable or VHF) from the runway to the CPU ensures high noise immunity.
- Fine quantization of background luminance makes digitization errors negligible.
- Software hysteresis built in to reduce flicker of readings.
- Provision for remote slave displays of RVR and MV.

Operational specifications of AVRA MK2

Baseline

AVRA MK 2A: Cats I & II operations : Single baseline150 m
AVRA MK 2B: Cats I , II & III A,B,C, : Dual baseline150m & 20m
AVRA MK2M2: Cats I , II & III A,B,C, : Multifield station system

- Upgrading of MK 2A to 2B may be easily done by retrofitting the 20 m baseline at a later date if required.

Reporting ranges

With single baseline (Cat II) : 150m<MV<10km
150m<RVR<3000m

With dual baseline (Cat IIIC) : 0m<MV<10 km
0m<RVR<3000m

- Step size and accuracies for MV and RVR.
- Satisfies ICAO recommendations.
- MV/RVR updating period : 15 seconds.

System specifications

Input power supply

- 180 V to 270 V, 50 Hz, single phase (110V option provided on request).
- Facility for interfacing with other sensors provided.

Data transfer

Either via wires or through VHF radio, at a single spot frequency between 134 and 174 MHz, specified by and cleared for the customer who will obtain frequency allotment and all necessary clearances.

Display devices

- At computer: 7-segment LED displays and video monitor.
- Remote unit: video monitors/7-segment LED displays.

Hard copy outputs

- Strip chart recorder.
- Inkjet and laser printers.

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