

Biral

HSS VISIBILITY SENSORS



FAA, CAA approved

Very low maintenance

2% maximum error

Runway Visual Range

www.biral.com



Adverse weather can be dangerous and costly

If you are responsible for airport safety you will have considered the weather conditions which cause you problems.

SNOW and ICE

Aircraft movements on frozen or freezing surfaces can be dangerous and, when temperatures drop, runways ice up much quicker than surrounding surfaces such as fields or grass. Flight operations are further restricted with the build up of snow (or sand) so knowing how fast the snow is accumulating and being able to detect freezing precipitation is an advantage when deciding on appropriate and timely action.

FOG

Fog can occur in patches at hard to see locations or blind spots away from the tower without any previous warning. Knowing the visibility at these locations is a definite advantage.

SAND

Sand or dust storms can blow across large stretches of ground near a runway at astonishing speed and very suddenly cause a dangerous situation for take off and landings in near zero visibility.

Airfield Management Costs

Providing 24/7 operational weather support on airports is a tough challenge, both economically and conceptually.

Traditionally the best means of getting a full picture of the weather is with trained human observers or by using automated weather instruments such as transmissometers. However, there are many issues associated with this, not least the high costs of staff and equipment. A more cost effective solution is to use FAA and CAA approved Forward Scatter Meters (FSMs) for automated weather measurements. Following changes in airport guidelines, FSM technology can now also be used instead of expensive transmissometers for some Runway Visual Range (RVR) systems.

Significant benefits can be achieved by using FSMs allowing you to take effective and timely action in rapidly changing conditions.

- weather effects may be very local to one end of a runway so using 3 FSM sensors along each runway instead of one central unit is a very cost effective method of ensuring that sudden fog patches are swiftly identified.

- when visibility is poor due to fog, snow or sand the difference between an accurate visibility measurement and an inaccurate one may mean that an airport can operate for a longer time, so safely maximising revenue.

- detailed present weather data (both precipitation and visibility) keeps pilots and ATC better informed. On small airfields where it is not always possible to have complex instrumentation it is especially useful.

- using FSMs to back up and augment existing AWOS installations makes good financial sense and improves safety.

The accurate HSS Forward Scatter Meter



Biral HSS forward scatter meters make good financial sense with minimal maintenance costs compared to larger more expensive systems

Biral HSS sensors provide an accurate solution

So how do you keep up to date with weather conditions allowing you to respond quickly and effectively? With the Biral HSS forward scatter meters.

Biral HSS sensors are typically installed beside or between runways and measure the present weather (the current visibility and precipitation ie fog, haze, snow, rain, sand and other related parameters).

This real-time METAR weather data is transmitted to the Air Traffic Control (ATC) centre and / or the airfield Meteorological Office. It can also be transmitted to a national weather service centre for further analysis and forecasting needs.

The HSS sensors provide reliable, consistently accurate information day and night for many years. The metalwork is robust enough to withstand the aggressive conditions near runways, including the corrosive effects of film residues from engine blasts.

In addition the freezing rain and snow data can help with decisions on de-icer spraying, sanding and snow removal.

Present weather data is now also being used to assist in forecasting conditions of wind gusts and wind shear.

Standard system installations

The HSS sensors are ideal for single installations (CAT I) or multiple locations on multiple runways (CAT II and III). They are sited at locations where visibility and present weather information is needed to improve airport safety and for instrumented Runway Visual Range.

The sensors are installed as near to the runway as possible in order to measure the visibility which the pilots will experience. The location of the sensor depends on the type and size of the airfield (see typical installations on the next page).

For RVR measurements you need:

- Visibility sensor (Biral HSS)
- Ambient light sensor (Biral ALS)

The RVR value is derived using three values, the visibility measurement, the ambient light measurement and the intensity setting of the runway lights.

Low running costs

The Biral HSS sensors come with a 2 year warranty and require very little maintenance. There are no consumables so running costs are kept to a minimum.

The only maintenance required is to clean the optical windows once every 3-6 months using a normal clean cloth and some water. The sensors even provide information on how dirty the windows are so that you can prepare for the maintenance and only clean the unit when it is absolutely necessary, thereby eliminating any fixed or regular scheduled maintenance.



The optional
Ambient Light Sensor
is used for RVR



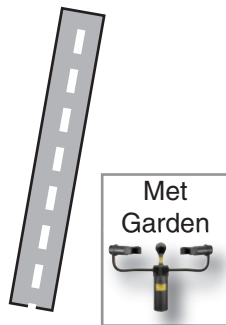


Each of these installations is less expensive than a single transmissometer installation

Installation 1

A single sensor for a small airfield not needing RVR.

The sensor is located in the airfield 'meteorological garden' and the data is only used to provide local users with information about current conditions (a METAR report).



Installation 2

A basic RVR installation with one sensor installed at the middle point of the runway.

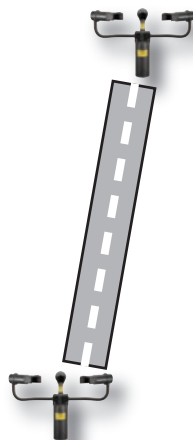
This provides accurate information regardless of which end of the runway is used to take off and land.



Installation 3

A more extensive RVR configuration with two sensors, one at each end of the runway.

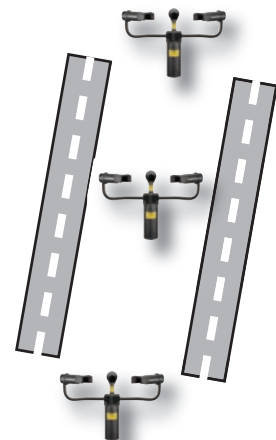
This ensures that local visibility and weather effects at both ends of the runway are accurately identified, providing more information on runways used in both directions.



Installation 4

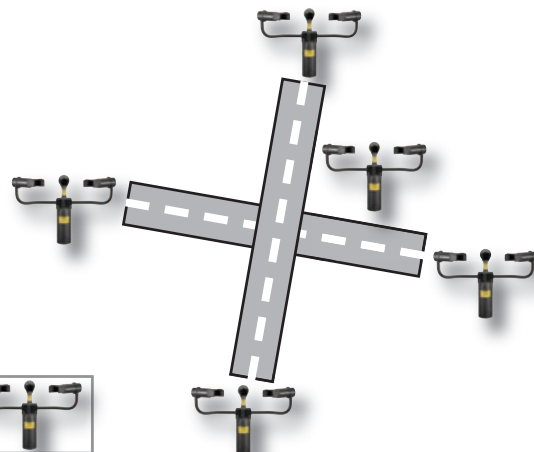
The highest RVR configuration with 3 sensors along the runway, one at each end and one in the middle.

This ensures absolute coverage when flights must continue down to the lowest visibility limits at very large or important airports.



Installation 5

For airports where the runways are not parallel or there are large distances between the ends of the runway multiple sensor sites may be needed. These are along the same lines as the other layouts but with sensors at each end of each runway as well as one near the middle and in some cases even one additional unit at the meteorological garden.





Transmissometers and FSMs

Transmissometers are still considered the reference systems for visibility on airports but have some distinct limitations:

- very high initial purchase cost (10 - 20 times more than a FSM)
- extensive weekly maintenance costs
- limited to a maximum of 2 km range
- unlike FSMs, transmissometers are affected by shifting ground in active seismic regions

For this reason a combination of transmissometer and forward scatter meters is desired, or at suitable airports only forward scatter meters may be required. FSM technology can save significant amounts of money in both the short and long term without sacrificing measurement quality, accuracy and reliability.

Reliable Consistent, Results

Biral HSS visibility and present weather sensors have been used in all weather conditions and locations around the world. They have been in operation for nearly 30 years in harsh environments and are trusted by professionals and scientists when measurements matter.

The HSS sensors provide reliable and consistently accurate weather information from the runway location. This allows you to supplement weather forecasts with real time observations allowing you to make timely decisions with regards to changing operational flight capacity limits, de-icer spraying and sanding or snow / sand removal from runways

and associated surfaces. This can result in more satisfied and less stressed airport staff, and customers can enjoy a safer and happier journey experience and continue to use your airport time and again.

Advanced Measurement Concepts

Due to several advanced concepts the HSS sensors are superior to competitors for accuracy of measurements and correct identification of conditions. They provide:

- a measurement concept that is valid in both rain and snow conditions
- a system that is not affected by reflections from any nearby surface in rain or snow or from approaching airplane headlights
- a system that is robust enough to withstand the aggressive near runway location for many years without spare parts or consumables
- a system that avoids reading signals from external sources
- a system that is unaffected by vibrations of the mounting mast

Useful facts about Biral HSS sensors for airport use

Features	HSS VPF-710	HSS VPF-730
Specific RVR range available plus extended range for METAR	●	●
2% maximum error at 2 km range	●	●
3% maximum repeatability error between sensors	●	●
Quick response to changes in weather (10 seconds)	●	●
Automated reports output every minute	●	●
User adjustable reporting period (10 seconds to 5 minutes averaging time)	●	●
Measurements valid both day and night in all weather conditions	●	●
Fog or reductions from heavy precipitation reported in 10 m ranges for accurate reporting of RVR (range 0-2100 m)	●	●
Measures dust, smoke or sand restrictions to visibility	●	●
PRESENT WEATHER SPECIFIC		
Measures present weather (snow, freezing rain, rain, drizzle, fog, smoke, sand)		●
Reports precipitation details such as accumulation amounts and intensity		●
Provides Drop Size Distribution (DSD) (in 320 bins)		●
Measures particle diameters (from 0.16 mm to 20 mm)		●
Measures particle speeds (0 to 20 m/s)		●
OPERATIONAL		
Indicates when maintenance is required	●	●
Remains functional and accurate when maintenance is indicated	●	●
Indicates when no longer safe to operate (outside tolerance)	●	●
Time needed to perform maintenance is 10 minutes	●	●
Trusted history of almost 30 years with proven reliability	●	●
Does not require any spare parts or consumables	●	●
Has appropriate approvals (FAA, CAA)	●	●
Sensor can be calibrated by trained user if needed	●	●
Yearly calibration recommended	●	●
Sensor not affected by headlights or other nearby light sources	●	●
Operating status monitored and reported for quality control	●	●
Sensor is used for airport weather and RVR systems internationally	●	●

E. & O. E. Ref: Airports_02/11



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