

Vaisala AviMet® Low-Level Windshear Alert System

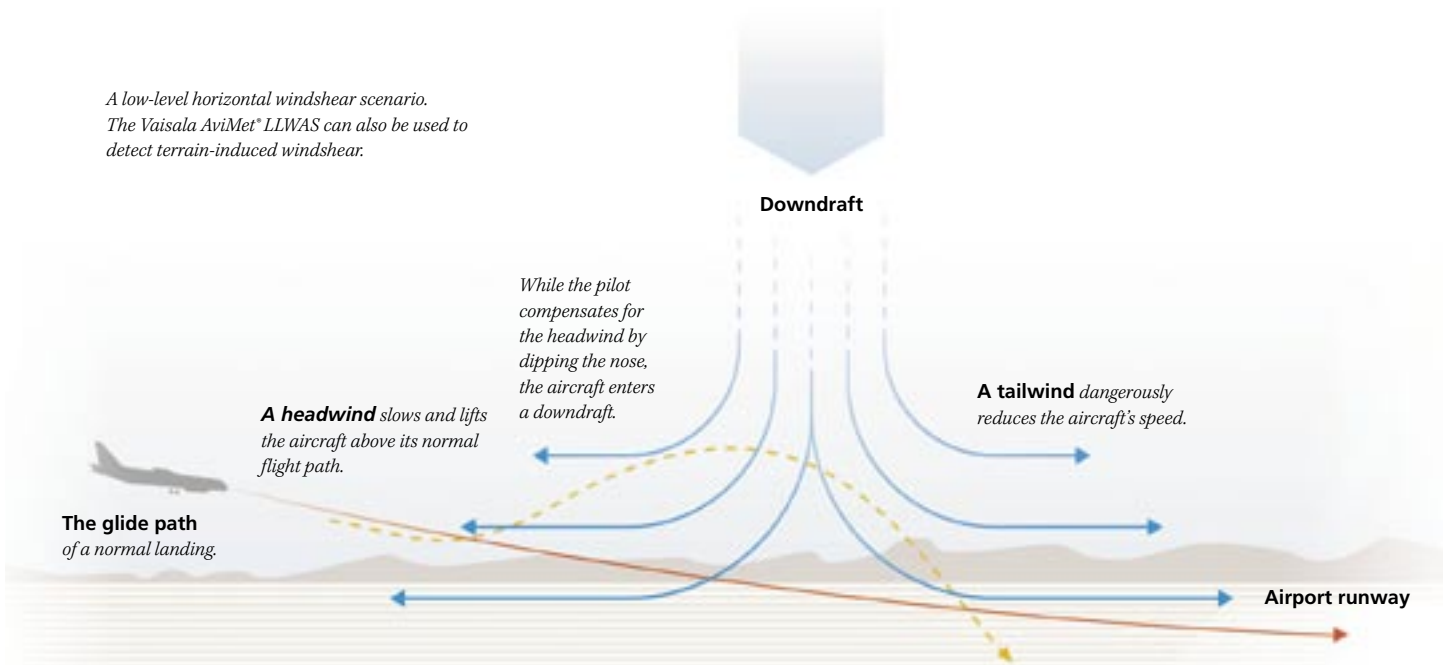


An investment in safety and
operating efficiency

For the early detection of low-level, horizontal windshear

Low-level windshear is a hazard to aircraft during take-off and final approach. Microbursts are the greatest danger. With a Vaisala AviMet® Low-Level Windshear Alert System in place, ATC personnel can warn pilots when low-level windshear penetrates the runway corridors so they can take appropriate evasive action. At airports that are known to experience low-level horizontal windshear, the AviMet® LLWAS can be fundamental to improving safety and operating efficiency.

*A low-level horizontal windshear scenario.
The Vaisala AviMet® LLWAS can also be used to
detect terrain-induced windshear.*



The Vaisala AviMet® Low-Level Windshear Alert System is a ground-based system that simultaneously:

- Detects low-level windshear and microburst events in the runway corridors;
- Gives visual and audio alerts on windshear and microburst events to ATC and other airport personnel.

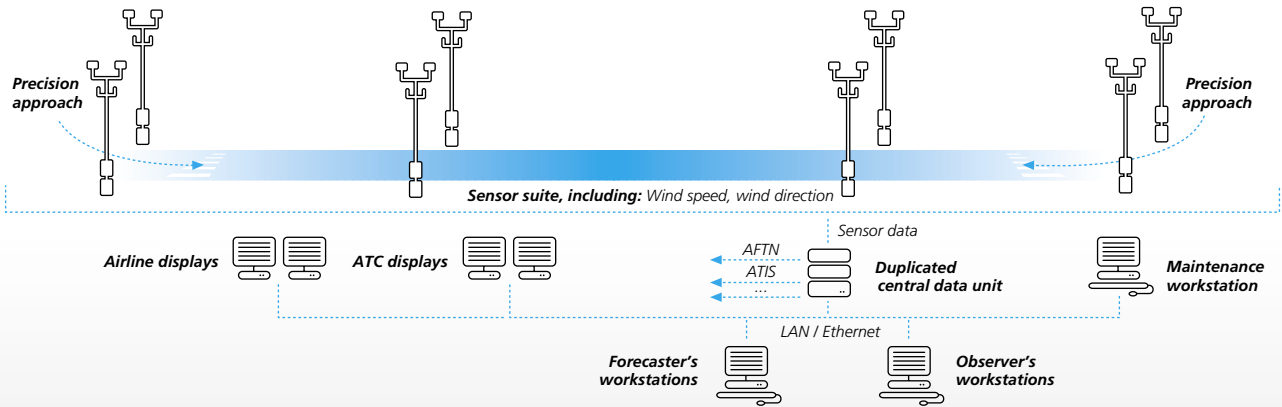
As the first step in the installation of a low-level windshear alert system, we strongly recommend that a detailed

site survey be carried out by Vaisala experts. Every airport is unique: wind sensor mix and placement will depend on the number and orientation of runways and the terrain.

Placing the wind sensors

The Vaisala AviMet® LLWAS constantly retrieves wind data from an array of wind sensors that are placed along the runway. The wind sensors are sited and aligned in keeping with guidelines developed by the Lincoln Laboratory

of the Massachusetts Institute of Technology (MIT) and National Center for Atmospheric Research (NCAR) for the Federal Aviation Administration (FAA). A typical LLWAS sensor suite will include a radio modem and a Vaisala Ultrasonic Wind Sensor. After extensive testing, the U.S. FAA has contracted with Vaisala for the delivery of ultrasonic wind sensors to the eleven major airports currently equipped with a Phase-3 LLWAS.



A typical Vaisala AviMet® LLWAS consists of the field sensors, central data unit(s), communication interfaces and different workstation types.

Data retrieval, processing and distribution

A typical Vaisala AviMet® LLWAS will also comprise a central display unit (CDU) and workstation displays.

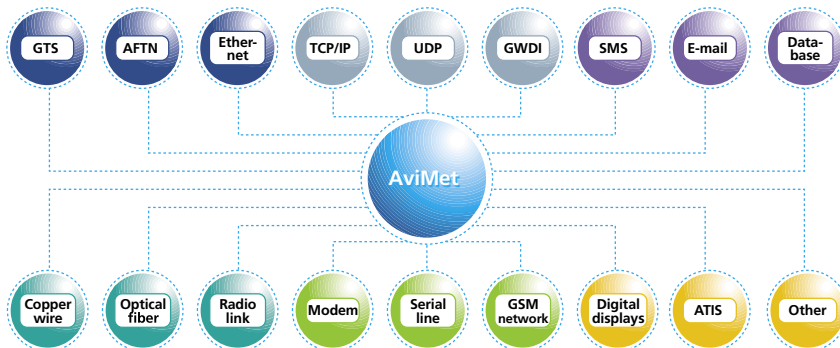
The CDUs can easily be duplicated for hot stand-by redundancy. Workstation displays and wind sensors can be added at any time to expand the detection area. The wind speed and direction data is retrieved from the wind sensors by means of radio links or landlines.

Using one or two central data units (CDUs), the low-level windshear alert system processes the wind data using the Phase-3 windshear

algorithm. If the threshold values for windshear and microburst events are exceeded, the system generates alerts and warnings. These alerts and warnings are conveyed, in clear and concise numerical and/or graphical form, to one or more workstations used by air traffic controllers, weather observers/forecasters and maintenance personnel.



For each touchdown zone, the Vaisala AviMet® LLWAS alert screen displays the threshold windshear alerts and wind speed and direction. It also displays the center field wind speed and direction and system status.



Communication standards are always met through multiple communication outputs.

Advance warning: the key to better safety

When windshear penetrates the airport, the Vaisala AviMet® LLWAS gives ATC personnel enough advance warning to adjust approach patterns and taxiing queues. Delays in arrivals and departures are shortened or prevented altogether thanks to:

- Timely detection of windshear in runway corridor
- Timely identification of microbursts
- Accurate estimation of headwind loss or gain associated with windshear
- Accurate localization of where windshear will be encountered
- Probability of microburst detection better than 90% Probability of false alerts under 10% .

Phase-3 windshear algorithm

Vaisala is an accredited licensee of the Phase-3 windshear algorithm and can prove compliance with Phase-3 performance. The Phase-3 windshear algorithm was developed for the U.S. Federal Aviation Administration

(FAA) by the National Center for Atmospheric Research (NCAR) and patented by the University Corporation for Atmospheric Research Foundation (UCAR).

Vaisala AviMet® technology platform

Vaisala AviMet® is a total aviation weather management solution that bridges the gap between weather and aviation operations. It brings weather information to those who need it, when they need it and in the optimal format for their specific use.

Vaisala AviMet comprises of the technology platform, services, and a growing set of end-user applications ranging from ATC to de-icing applications. In addition to Vaisala AviMet LLWAS, other major systems based on the platform are: Vaisala AviMet® Automated Weather Observing System and Vaisala AviMet® Runway Visual Range System.

The LLWAS and RVR systems can be easily upgraded to a full-scale AviMet AWOS system. They can also be fully integrated into an existing Vaisala AviMet AWOS.



CASE | Changi International Airport, Singapore

Singapore's Changi International Airport, one of the most modern airports in the world, is an important hub for air travel in South East Asia. As an enhancement to airport operations, a Vaisala Low-Level Windshear Alert System was installed at Changi in 2002. The system comprises 13 wind sensors sited along the two main runways, a fully redundant central data unit, and displays for ATC personnel and meteorological observers. Windshear alert information is also made available on ATC radar screens.



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