

# SHEARSCOUT®



METEOROLOGY

## SHEARSCOUT®

Low level wind shear and microbursts pose a serious threat to aircraft during take-off and landing. With the implementation of ShearScout®, air traffic control staff can warn pilots of low and medium altitude wind shear events occurring within the runway corridor and protect against sudden and dangerous deviations from the intended flight path. With the right meteorological sensor network, ShearScout® can monitor all flight relevant airspace in the vicinity of the airport to provide continuous, reliable and accurate protection from adverse weather conditions.

ShearScout® is a turn-key solution for wind shear detection combining one or more of the following meteorological sensors:

- LLWAS
- Weather Radar
- Doppler Lidar

## ALL WEATHER CONDITION GROUND MONITORING: SHEARSCOUT®SONIC

ShearScout®Sonic is a ground-based LLWAS system designed to contribute strongly towards the safety, regularity and efficiency of air navigation in changing wind conditions.

ShearScout®Sonic automatically:

- Detects low altitude wind shear events and microbursts within the take-off and approach sectors
- Calculates location and strength of airport windshifts
- Provides immediate alerts when dangerous low level wind shear conditions or microbursts exist

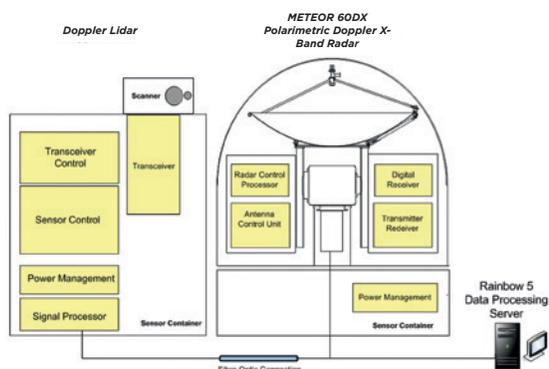
## THE PHASE-3 LLWAS ALGORITHM

ShearScout®Sonic captures wind data from a series of ultrasonic wind sensors or AWOS located along the runway and glide slope. The sensors are sited ideally at least 1 km from the centerline of the runway. ShearScout®Sonic is fully scalable so that additional sensors can be installed at any time. Wind information is transferred to a dual hot-backup server by radio link, where it is processed using the Phase-3 wind shear algorithm. The algorithm was developed for the FAA by the National Center for Atmospheric Research (NCAR). The intellectual property for the Phase-3 LLWAS algorithm is owned by NCAR's parent organization University Corporation for Atmospheric Research (UCAR) and currently serves over 100 airports in the US, Europe and Asia. LEONARDO Germany is a UCAR licensed company.

## ALL WEATHER CONDITION DETECTION: SHEARSCOUT®3D

ShearScout®3D combines dual polarized Doppler radar and Doppler Lidar technologies to issue alerts of runway orientated shear and adverse weather in wet and dry conditions. The state-of-the art polarimetric Doppler Weather Radar System METEOR 60DX detects and monitors shear wind phenomena along the glide slope in wet conditions. The METEOR 60DX offers the traditional benefits of weather radar such as continuous, three dimensional scanning of the atmosphere surrounding the airport. Dual polarization introduces advanced functionality such as echo classification (e.g. rain, hail, snow). The physical constraints of radar limit its ability to detect wind phenomena in dry weather conditions.

Pilot reports testify the occurrence of wind shear in clear air. To detect wind gains and losses in these conditions ShearScout®3D incorporates a Doppler Lidar system. Lidar (Light Detection and Ranging) is similar to radar, but uses much shorter wavelengths, which are reflected by aerosol particles that occur naturally in the atmosphere. As a result Lidar is able to accurately measure wind phenomena in clear air conditions. In wet conditions, however, Lidar suffers rapid attenuation as the ray of light is absorbed by particles of water in the air. ShearScout®3D takes advantage of the strengths of both systems and runs in a harmonized mode to cover identical areas of the atmosphere around the glide path. Weather information is processed by LEONARDO Germany GmbH's sensor data processing software Rainbow®5. Alerts are displayed in RainScout - a touchscreen based meteorological situation display. Seamless integration with ShearScout® Sonic may also be provided.



## GAPLESS, ALL LEVEL DETECTION

The combination of different sensors overcomes gaps in coverage of single sensors caused by blockage, clutter, lack of sensitivity or inability to monitor both low and high altitudes in wet and dry conditions.

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## RELIABILITY

Integration increases the probability of low level wind shear detection and reduces false alarm rates.

## SIMPLICITY

In an already information-rich ATC environment, integration reduces the complexity of interpreting data from a number of sources by combining the most accurate data in a single, easy-to-read touchscreen display. The meteorological situation display RainScout® provides runway oriented text and graphical alert messages. RainScout® supports animation, zoom, GIS underlay and sensor integration.

## DATA PROCESSING

ShearScout® incorporates Rainbow®5 for the processing and generation of runway oriented shear warnings and alerts on adverse weather conditions. Rainbow®5 is the world-wide leading sensor data processing software and has been installed in more than 50 countries. Rainbow®5 provides state-of-the-art algorithms, data fusion capabilities (Radar, Lidar, LLWAS) as well as cutting-edge nowcasting capabilities.

The ShearScout® solution offers:

- Base wind profiling and processing of horizontal wind fields
- Glide slope monitoring and detection of wind hazards along approach and departure corridors
- Wind shear quantification of runway oriented speed loss / gain
- Runway oriented alerts for shear, microbursts and severe weather in general
- Airport airspace monitoring and feature detection (storm structure analysis, di- and con-vergence detection)
- Sand storm detection
- Echo classification (rain, hail, biological scatterers, etc.)
- Protected area alerts
- Data export (Asterix CAT008)

## INTEGRATION

With almost 50 years of experience in radar meteorology, LEONARDO Germany is the only supplier capable of delivering a solution for the detection of wind shear in all weather conditions and seamless integration of wind shear and other Doppler radar related data from all third party weather radars.