



ADVISORY CIRCULAR

UCAA-AC-MET011

DECEMBER 2022

GUIDANCE ON SITING AND MAINTAINING WIND SENSORS AT AERODROMES

1.0 PURPOSE

- 1.1 The purpose of this Advisory Circular is to guide the Meteorological Service Provider (MSP) on requirements for siting and maintenance of wind sensors at aerodromes.
- 1.2 This guidance further establishes the siting criteria to be used in the selection of suitable site locations for both manual and automated weather observing systems that provide weather information at aerodromes.

2.0 REFERENCES

- 2.1.1 Regulation 21, 22 and Schedule 3 of the Civil Aviation (Meteorological Services for Air Navigation) Regulations, 2022.
- 2.2 ICAO DOC. 8896; Manual of Aeronautical Meteorological Practice.

3.0 GUIDANCE AND PROCEDURES

3.1 General

- 3.1.1 This guidance describes the requirements for siting of weather sensors at aerodromes to provide information representative of conditions at the aerodrome, along the runway and within the vicinity of the aerodrome in accordance with criteria set out in Regulations 21 and 22 of the Civil Aviation (Meteorological Services for Air Navigation) Regulations, 2022.
- 3.1.2 The guidance also ensures that all meteorological instrumentation installed at an aerodrome is sited at locations that do not infringe the obstacle limitation surfaces as well as future planned limitation surfaces. For instance, planned additional runways and taxiways should be put into consideration when siting locations for the sensors.
- 3.1.3 Considerations should be taken to ensure that when weather sensors are installed at aerodromes, the sensors should be able to provide reliable information desired to support flight and aerodrome operations. It should be noted that sometimes the desired locations may not be available due to operational safety reasons and in such circumstances, compromises may have to be considered to select alternative locations that may not critically compromise the quality of information and operations. If this occurs, it must be understood that the alternative location must still allow the sensors to provide accurate weather information.

3.2 Requirements for Siting Wind Sensors

The MSP should ensure that:

- 3.2.1 operational requirement for mean surface wind direction and speed are observed and reported to represent conditions above the entire runway.
- 3.2.2 the observations for mean surface wind and speed are made using the most suitable instruments with regular maintenance and calibration
- 3.2.3 when an integrated network is used, the network should include a sufficient number of sensors for the collection, processing, display and recording of weather data.
- 3.2.4 the number and location of weather sensors should be based on the size of the aerodrome, the complexity of the terrain and other features of the aerodrome (e.g., the number and types of runways). In addition to the number of sensors, the total sensor network design should be based on types and frequency of operations and the degree of automation necessary for the reporting and recording of relevant surface wind information at different locations around the aerodrome.
- 3.2.4 in choosing the sites for instruments at aerodromes, considerations for obstacle restrictions should be considered and meteorological instruments such as anemometers, ceilometers and transmissometers/forward-scatter meters may constitute “obstacles”. Therefore, the installation of such instruments within obstacle limitation surfaces should be avoided.
- 3.2.5 when selecting sites for installation of meteorological instruments, should consider the transitional surfaces which limit obstacle height along the side of the runway, with reference to runway width, strip width and slope of the transitional surfaces.
- 3.2.6 *Figure 1* below demonstrates a cross-section of obstacle limitation surface or the transitional surfaces and recommended positions closest to the runway at which various meteorological instruments may be located without infringing the transitional surfaces. Unless there are exceptional local circumstances, **NO** meteorological instruments should infringe the obstacle limitation surface. Where the MSP requirements for representative meteorological observations demands installations within obstacle limitation surface, instruments could be installed closer to the runway, however, the sensor support must be frangible, lighted and preferably shielded by an existing essential navigation aid.

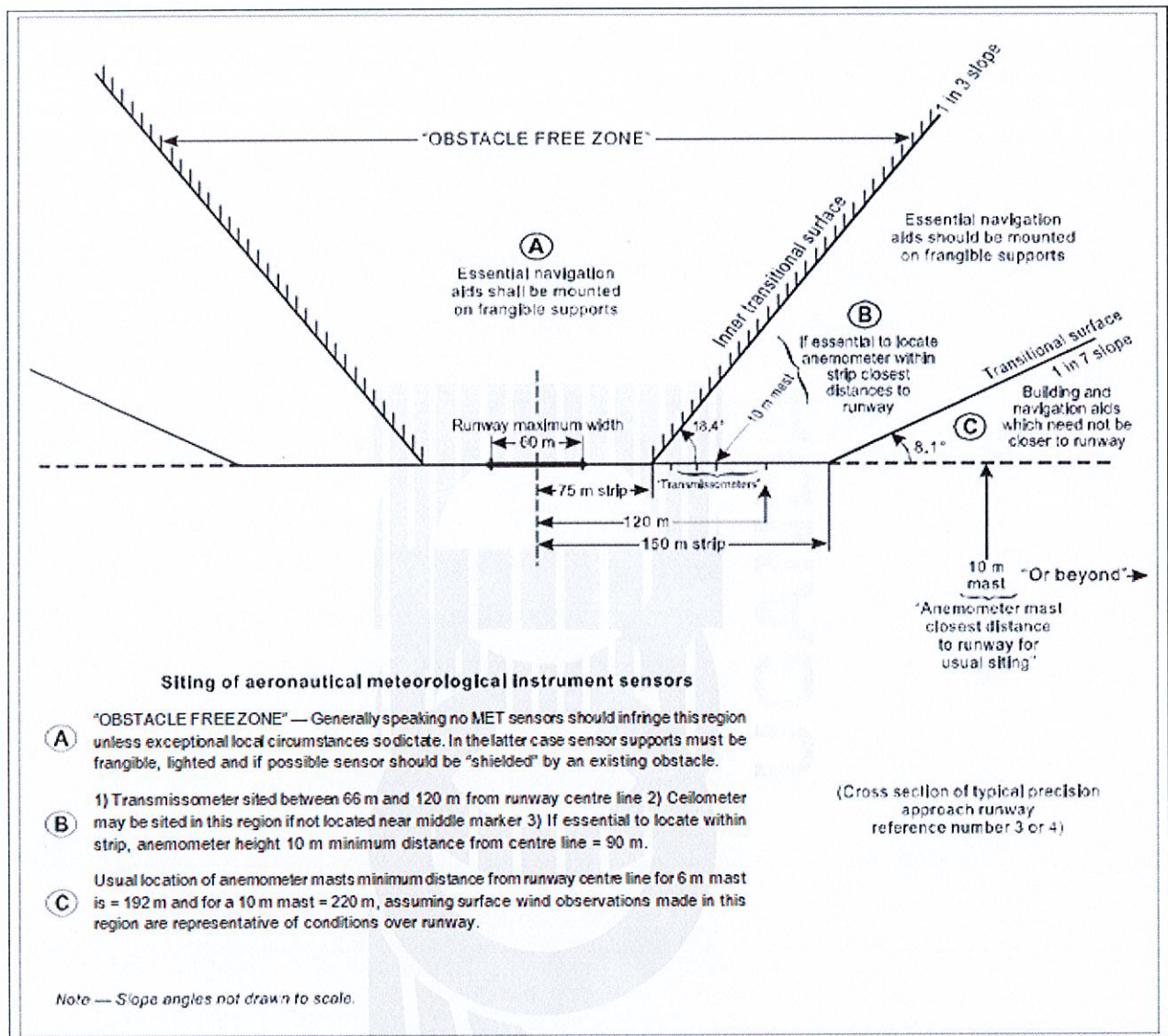


Figure 1: Cross-section of Obstacle Limitation Surface

3.2.7 From *Figure 1* above, the obstacle restrictions dictate that wind sensors are located at a considerable distance from the runway. Some of the essential sensors may be sited in zone B such as the anemometer at height of 10m but with minimum distance of 90m from the runway centre line. When the wind sensors are sited within zone B, the sensors should give the best practicable indication of conditions along the runway and touchdown zones. At aerodromes where topography or prevalent conditions cause significant differences in surface wind at various sections of the runway, additional sensors should be provided.

3.2.8 The MSP should consider the requirement of vertical placement of wind sensors at 10m above the runway in view of compatibility with synoptic and climatological practices.

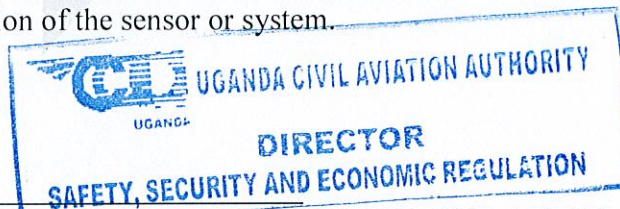
3.2.9 The MSP should ensure that wind sensors are placed at the permitted locations along the runway that are relatively undisturbed by surrounding terrain and buildings. Where there are obstructions like buildings or vegetation that may considerably affect the surface wind, the rule of at least 10 times the obstruction height should be satisfied in all directions. The MSP should

note that when it is difficult to find suitable open terrain where the rule of at least 10 times the obstruction height is satisfied in all directions, it may be necessary to locate a frangible and illuminated mast within the obstacle clearance area, preferably “shielded” by an existing essential navigation aid.

- 3.2.10 Before installation of sensors, a detailed study should be taken to determine the number of sensors required and their location under different wind conditions expected around the aerodrome. However, if the aerodrome has homogeneous wind conditions, one strategically sited sensor may be sufficient.
- 3.2.11 Installation of wind sensors close to the runway should be avoided, since anemometers located close to runways and taxiways may be affected by aircraft engine exhaust and thereby give a false indication of a wind gust.

3.3 Maintenance and Calibration of Wind Sensors at Aerodromes

- 3.3.1 A maintenance programme including and calibration of all installed sensors at the aerodrome should be established. Once the sensors are installed, it is essential to take into account the procedures and resources required to undertake maintenance and calibration needed to keep the system operating at the required level of availability and accuracy.
- 3.3.2 Following installation of the sensors, scheduled checks must be established as a regular routine to ensure the provision of continuous data of acceptable quality and these checks may include:
 - 3.2.2.1 Checks of all system components, i.e. sensors, cables, signal conditioning and data-processing devices, displays and recorders, by use of signal substitutes as prescribed by the system designer;
 - 3.2.2.2 Sensor sensitivity and bearing friction checks as recommended by the manufacturer.
 - 3.2.2.3 Inspection of field installations for physical damage, wind vane/windsock orientation and anemometer zero level
 - 3.2.2.4 Inspection and maintenance of recorders and displays, if applicable, for the detection and prevention of faults; and
 - 3.2.2.5 Periodic checks to ensure that exposure of sensors is not impaired by new buildings or other new installations, by the growth of trees or shrubs, etc
- 3.3.3 Corrective action will be required if system/sensor information does not demonstrate valid data. This may include removal of the sensor, correction of whatever is adversely affecting the sensor or relocation of the sensor or system.



DIRECTOR SAFETY, SECURITY AND ECONOMIC REGULATION