

Local Vertical Wind Profiler	 <b>IAEA</b> International Atomic Energy Agency	IAEA Specification Dated 2023-07-03
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## SPECIFICATION

### Local Vertical Wind Profiler

#### 1. Scope

This specification describes the requirements for a Local Vertical Wind Profiler, a wind speed, wind direction and turbulence indicator vertical profiler on-line measurement device for a Nuclear Power Plant, hereinafter referred to as “the System”. The System will be used by the South Ukraine Nuclear Power Plant (SUNPP) and the Khmelnytskyi Nuclear Power Plant (KhNPP) for measuring the vertical profile of wind speed and direction in the lower atmosphere.

#### 2. Applicable Documents

The following documents shall be applicable for this Specification to the extent specified hereinafter:

[IAEA GSR Part 3](#)

[IAEA GSR Part 7](#)

[IAEA GSG-9](#)

[IAEA SSG-35](#)

[IAEA NG-T-3.7 \(Rev. 1\)](#)

In the event of conflict between the documents listed above and the content of this Specification, the content of this Specification shall take precedence to the extent of the conflict.

#### 3. Definitions, Acronyms, and Abbreviations

The following definitions, acronyms, and abbreviations shall apply throughout this Specification unless defined otherwise hereinafter:

LIDAR	Light Detection and Ranging
LASER	Light amplification by the stimulated emission of radiation.
GSR	General Safety Requirements
GSG	General Safety Guide
NG	Nuclear Guide
NPP	Nuclear Power Plant
CE	European conformity

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## 4. Requirements

### 4.1. Functional and Performance Requirements

The System shall meet the following functional and performance requirements:

The System shall:

- 4.1.1. Be based on high frequency light pulses, i.e. LIDAR technology;
- 4.1.2. The application of the System shall be for operational values of environmental conditions related to atmospheric dispersion conditions, related normal operation authorized discharges and potential accidental releases of radioactive material;
- 4.1.3. Collect, store and transmit data on-line;
- 4.1.4. The resolution of the System shall be at a single spot, i.e., on-site, and with multiple vertical levels within a fixed height range, i.e., up to a height of approximately 300 m;
- 4.1.5. Measure atmospheric wind and turbulence vertical profile (locally) from 30 to 300 m height (+/- 10m);
- 4.1.6. Provide multiple heights measurement (within the range indicated in 4.4.1);
- 4.1.7. Provide instantaneous and averaged results (from 5 s or less to 10 mins);
- 4.1.8. Have data storage capacity;
- 4.1.9. Perform measurements based on light pulse at high frequency;
- 4.1.10. Have low nominal power consumption (~ 50-60 W or lower);
- 4.1.11. Be compatible with alternate power sources to ensure operation under energy interruptions;
- 4.1.12. Provide alternative communication channels for on-line data transmission (cable, cellular, others);
- 4.1.13. Have PC/Laptop based software for control, reading and presentation of data;
- 4.1.14. Be easy to install, with installation specifications to be provided by Contractor to the End-User;
- 4.1.15. Be of reduced dimensions;
- 4.1.16. Be of reduced weight;
- 4.1.17. Be provided with means to ensure operation during rainy and snowy conditions;
- 4.1.18. Be provided with sufficient weather protection features to ensure continuous operation;
- 4.1.19. Be of low maintenance requirements; and
- 4.1.20. Include fixation straps to avoid displacements by strong winds or other external events.

### 4.2. Technical Requirements

The System shall meet the following technical requirements:

- 4.2.1. Wind direction range, 0-360 degrees;
- 4.2.2. Speed accuracy 0.3 m/s or less;
- 4.2.3. Speed uncertainty 0.6 to 3 %;
- 4.2.4. Direction accuracy 2.5 degrees or less;

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- 4.2.5. Communication options LAN, USB, Router, Wi-Fi;
- 4.2.6. Environmental Protection IP54-67, depending the component;
- 4.2.7. Operation humidity %: non condensing;
- 4.2.8. Rain protection: mechanical;
- 4.2.9. Snow protection: Passive surface protection; active heating; mechanical, 24 VDC, including transformer;
- 4.2.10. Shocks and vibration protection, no lower than ISTA/FEDEX 6B;
- 4.2.11. Consumption: ~ 50-60 W or lower, 170-200 w with active heating (for winter conditions);
- 4.2.12. Temperature range: -30 to +50 degrees Centigrade;
- 4.2.13. Dimensions no larger than 60 x 60 x 60 cm (L, W, H);
- 4.2.14. Measurement device weight 50 to 95 kg, with all the accessories;
- 4.2.15. Dimension of snow protection no larger than 80 x 80 x 80 cm;
- 4.2.16. Additional weight due to snow protection no heavier than 15 kg extra;
- 4.2.17. Operational power to be provided by End User (100-240 VC 50/60 Hz); and
- 4.2.18. Emergency power to be provided by the End User; possible options: solar panels, batteries, small generators.

## 5. Marking

The System shall have all safety markings in English language according to CE.

## 6. Packing

The System, for the shipment to the End-User, shall be packed in accordance with international standards that are applicable for the shipment of this kind of equipment.

## 7. Quality Requirements

- 7.1. The System shall be manufactured, shipped and include instruction for installations in accordance with the Contractor's ISO quality assurance system or an equivalent quality assurance system.
- 7.2. The System shall meet Laser beams safety compliance 1M Class.
- 7.3. The Contractor shall document the compliance with this quality assurance system.

## 8. Testing and Acceptance

The System, prior to shipment, shall be tested for conformance with manufacturer's performance specifications and the minimum requirements specified herein.

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The System, after installation, shall be tested remotely by the Contractor, with assistance and participation of with the End-User to demonstrate that the performance meets the manufacturer's performance specifications and the minimum requirements specified herein as determined by the IAEA and the End-User.

The results of the testing shall be documented by the Contractor in an acceptance protocol that shall be signed by the End-User.

## 9. Installation and Training

The Contractor shall deliver the System 'ready to install and use'.

The Contractor shall provide written instructions to the End-User to perform the site evaluation by the Contractor necessary to define the exact location of the System and assist the End-User remotely as required to perform such evaluation.

The Contractor shall provide written instructions to the End-User to install the System and assist the End-User remotely as required to perform such installation.

The Contractor shall provide a minimum of two (2) days remote training for up to three staff of the End-User in the operation and maintenance of the System after the installation of the System.

## 10. Warranty and Support

The System set shall be supplied with a comprehensive warranty, valid for one (1) year from date of the Acceptance Protocol signed by the End-User;

The Contractor shall identify any routine or preventative support and maintenance plan that is appropriate for the End-User;

The Contractor shall provide remote technical support for operation and minor maintenances required for a duration of one (1) year.

## 11. Deliverable Data Items

The Contractor shall provide two complete sets of operation and maintenance manuals and technical drawings in the English language.

The Contractor shall provide written instructions for the site evaluation in English Language

The Contractor shall provide written detailed specifications for emergency power supply to be provided by the End-User in English language.

All the mentioned deliverable items shall be in an electronic format, both in pdf format and MS Word format, to allow the End User use of automatic translation tools available in the Web free of charge, as necessary.