

Appendix 1.1 Specifications for the Supply of Visibility Sensors and Ancillaries

References to Campbell Scientific CS120A Visibility Sensor and Campbell Scientific CF350-Cell215 Data loggers identify a technical benchmark only and shall be read as “or equivalent”. Sensors must be capable of interfacing with Met Éireann’s existing communications infrastructure. Note that data/SIM cards are outside the scope of this RFT. Bidders are asked to quote:

- A. For the Visibility Sensor and Data Logger as a complete, ready to install unit, including sensors, data loggers, enclosure, fixing hardware, software, etc, that are available for their respective VS units, and any optional attachments, that offer additional functionality over their basic systems.
- B. For The Visibility Sensor and enclosure and accessories as detailed at B above, except for the data logger.

The purchasing authority may decide to establish a contract for A or B above with various options from the winning bidder.

	Essential Requirements
E1.	Each unit shall comprise a complete forward-scatter visibility sensor, cellular data logger, manufacturer-required sensor power supply and heater components, mounting hardware, specified sensor-to-existing-logger cables/connectors, antenna system and all necessary interconnections and other sensor ancillaries identified in the pricing schedule. System to be mounted in an outdoor lockable enclosure with mounting accessories included. Note-the purchaser may decide to purchase the units without the data logger as per option B above.
E2.	The sensor assembly and supplied ancillaries shall be pre-configured and pre-tested to minimise site work. Tenderers shall state expected installation time, tools, personnel and site prerequisites.
E3	Any supplied enclosure shall be suitable for the published coastal/maritime exposure, with minimum IP66 protection when assembled or demonstrated equivalent protection. Include weatherproof cable glands, corrosion-resistant fixings, cable restraint and condensation management where applicable. The protection rating of the bare enclosure alone shall not constitute proof of assembled protection.
E4	Supply the electrical components required to operate the visibility sensor and its specified heaters from the site supply of 230 V AC, 50 Hz, single phase (nominal tolerance $\pm 10\%$), including applicable conversion, fusing and protection. State normal/peak power demand and heater load. No battery or charging equipment shall be supplied; uninterrupted operation during a mains outage is not required.
E5	Include sensor-side interconnection cables, connectors, power and communications termination details, earthing and surge protection as appropriate to the agreed supply boundary.
E6	Factory-test each supplied sensor and ancillary assembly before delivery. Provide the serial-number register, factory/calibration certificates, labelled connection details, installation instructions, electrical drawings and test evidence. Editable DWG or DXF drawings and corresponding PDFs shall be supplied for any bespoke mounts, enclosures and wiring assemblies.
E7	Provide the sensor interface specification and any sensor-side configuration required for connection to the Authority’s existing dataloggers. Loading or altering the Authority’s logger programs is outside the base supply unless specifically included as a priced option

	approved by the Authority. Demonstrate the specified sensor serial output at factory acceptance.
E8	The supplied sensor shall provide the specified MOR values, diagnostic information, fault indicators and messages at its physical communications interface. Declare the protocol, baud rate, parity, wiring/pinout and required configuration. A supplier-provided adapter may be proposed and separately identified where native compatibility is unavailable.
E9	All supplied equipment shall comply with applicable EU and Irish product, electrical and electromagnetic-compatibility requirements. Provide declarations of conformity and identify standards applicable to the delivered configuration.
E10	The supplied sensors and ancillaries shall have a minimum two-year warranty from acceptance, with exclusions and repair arrangements clearly identified.
E11	Following restoration of site power, the sensor shall restart without intervention, restore its approved configuration and resume valid MOR/status output in the time specified in the acceptance schedule. No battery autonomy or battery-backed data retention is required.
E12	Include sensor-specific firmware, configuration software, cables/drivers and licences necessary for installation, operation, diagnostics and maintenance. No datalogger option-no software or hardware is required under this clause.
E13	Supply supported sensor firmware maintenance and corrective updates during the agreed support period, with procedures, release notes, compatibility information and safe recovery/rollback instructions.
E14	Document accessible sensor status, health, configuration, calibration and diagnostic interfaces, including the distinction between locally accessible and externally communicated values.
E15	Include specialised installation/service tools and software essential for the supplied sensors. The quantity and pricing of any field calibration/check device shall be specified separately under P7.
E16	Each sensor shall have a documented, traceable calibration chain and a serial-number-specific certificate stating the reference method, applicable calibration mode, date and uncertainty. The supplier shall identify any limitations of comparison against reference transmissometers and provide calibration verification procedures.
Performance Requirements	
P1	Environmental performance: the sensor shall operate from -25 °C to +60 °C and meet minimum IP66 or provide equivalent demonstrated protection for the specified maritime environment. Include evidence for exposed components.
P2	Condensation and icing prevention: describe optical heating, hood/dew-heater control, water management, operating limitations, power requirements and maintenance under maritime exposure.
P3	Reliability: state the sensor MTBF, evidence basis, operating conditions and failure definition.
P4	Calibration and maintenance intervals: provide recommended intervals for cleaning, inspection, field checks and full recalibration, including the assumed coastal exposure, equipment needed and downtime.
P5	Sensor health: describe available optical contamination measurements, correction limits, contamination warnings, diagnostics and fault reporting. Any automatic compensation shall be limited to the manufacturer's validated range.
P6	Maintainability: permit field replacement of a complete calibrated sensor or manufacturer-approved replaceable modules. Describe tools, exchange procedure, configuration/calibration restoration, spare arrangements and estimated mean time to repair (MTTR).

P7	Calibration equipment: identify a compatible field visibility calibration/check device and attachment kit, with traceable certification, recertification interval and limitations. Price devices separately.
P8	Optional functionality: list separately priced accessories and enhancements, declaring impacts on power, existing logger integration, firmware, calibration, training and maintenance. Mandatory requirements shall not depend on an unpriced option.
P9	Maritime mounting: supply corrosion-resistant supports and fittings suitable for the specified pole or railing locations. Declare materials, compatible dimensions, fastening methods and available corrosion-test evidence.
	Measurement Accuracy and Precision
M1	The sensor shall report Meteorological Optical Range (MOR) from 5 m through 75,000 m with resolution 1 m or better. Any capability to report up to 100,000 m shall be declared separately, with its measurement-accuracy limitations. The tenderer shall distinguish numerical reporting range from validated measurement range and specify over-range behaviour.
M2	Required MOR accuracy shall be no worse than $\pm 8\%$ for 5–<600 m, $\pm 10\%$ for 600–<10,000 m, $\pm 15\%$ for 10,000–<15,000 m and $\pm 20\%$ for 15,000–75,000 m. The tenderer shall state reference method, statistical confidence/conditions and uncertainty supporting these claims.
M3	MOR shall be determined by a forward-scatter method. Tenderers shall declare the nominal scattering angle and demonstrate that the offered optical geometry meets the specified performance requirements; a fixed 42–45° angle is not mandated.
M4	The sensor shall detect or otherwise reliably flag conditions in which partial or complete blockage of transmitter and/or receiver optics could cause invalid or misleadingly high MOR outputs. Declare detection limitations, indications and recovery behaviour.
M5	Detail sensor alarm and diagnostic functions, including optical faults, contamination, heating faults, data invalidity, calibration/configuration errors and power interruptions where detectable; describe available status bits and codes.
M6	Describe design measures against water, salt, insects and other contamination of the optical path, including shield or hood geometry, lens orientation, heater provision and cleaning requirements.
M7	State internal sample/update rates, supported MOR averaging intervals, response time and how missing or invalid observations affect reported values.
M8	Declare optical-contamination monitoring and compensation behaviour, threshold settings, correction limits and output validity when optics exceed the supported contamination range.
M9	Details of three references for the of supply of similar equipment to parties other than Met Éireann in the past three (3) years. Equipment must have been supplied and working in a similar outdoor environment to that experienced in Ireland. Contact details only are required at this stage; the contracting authority reserves the right to contact these referees.
M10	Describe any visibility-related SYNOP-coded output, identifying code tables and the component that generates it. Present-weather SYNOP classification is not mandatory for a visibility-only sensor unless separately specified.
M11	Specify the local sensor communication interfaces, including RS-232 connection, connector/pinout, supported baud/parity settings, configuration tools, diagnostics and supported laptop maintenance procedure.

	Support.
S1	State the committed sensor-support period, repair route, spare-parts availability and firmware support arrangements.
S2	Describe scope and exclusions of the two-year warranty and available extension options.
S3	Detail access to technical support during Irish office hours, response arrangements and escalation contacts.
S4	Provide sensor and accessory delivery lead times, including lead times for spare and replacement units.
	Documentation
D1	All documentation shall be in English.
D2	Provide searchable PDF documentation, and editable files for project-specific engineering documents where applicable.
D3	Update supplied manuals and configuration documents when applicable hardware or sensor firmware changes.
D4	Supply the complete sensor installation and maintenance guide, sensor-to-existing-logger RS-232 wiring/pinout and electrical requirements, operating/configuration/calibration instructions, sensor firmware-update and recovery procedure, detailed message/data-format definitions and diagnostics, drawings in PDF and DWG/DXF for bespoke assemblies, and the serial-number-specific calibration certificates. The tenderer shall distinguish documentation supplied at tender stage from final as-built documentation.
	Environmental
E1	Explain delivery, packaging, spare-part and end-of-life take-back/recycling arrangements for the equipment supplied. Address applicable WEEE Directive 2012/19/EU, RoHS Directive 2011/65/EU, REACH Regulation (EC) No 1907/2006 and Packaging Regulation (EU) 2025/40 (subject to relevant transitional provisions and Irish implementation). Battery-specific obligations do not form part of the contracted supply because batteries are excluded.
E2	Describe the supplier's sustainability, carbon-emission reduction and hazardous-waste minimisation commitments relevant to delivery and lifecycle maintenance of the proposed sensors.
E3	Guarantee the availability of critical sensor replacement parts or complete replacement sensor units for at least 10 years from purchase, subject to a clearly stated support/obsolescence policy. Provide a declaration, key-part list and price/adjustment basis.
	Social Responsibility
SR1	Provide contract-relevant information about inclusive employment, fair work practices, supply-chain labour/human-rights protections and measurable community or skills benefits. Any evaluation shall be governed by the published procurement criteria.