Raymetrics 3D Scanning Lidar

(Model Type: LR111-ESS-D200)

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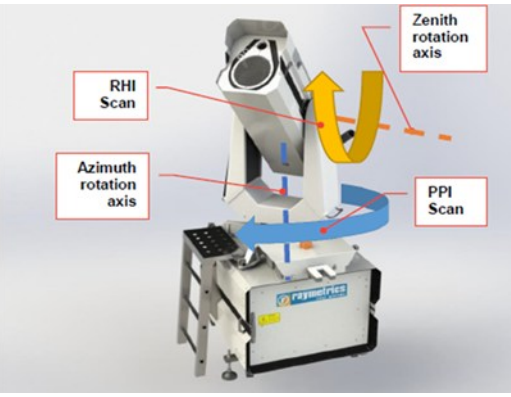
Technical Characteristics

Hardware summary

- Laser Generator: Nd: YAG
- Laser energy: 12mJ per pulse at 355nm, Laser Class IV. With a DPSS laser or 30mJ at 355nm with a FL laser
- Main Telescope Diameter: 200 mm.
- Spatial Resolution: 3.75m
- FWHM Bandwidth: around 0.5nm per wavelength
- Temporal Resolution: 1 sec single shot; 10 second multiple acquisition mode (user selectable upwards)
- Transmitter consists of 2 subunits: Laser and beam expanders – reflective mirrors. These units are integrated into the LIDAR system and arrive fully pre-configured.
- Laser ON Warning light: This light is on when main power line is connected, and turn-on key is in "I" position.
- Co-polar and Cross-polar channel detection at 355nm for particle discrimination. 387nm Raman Channel.
- Equipped with 3 channel receiver (1 Back-scatter, 1 Depolarization, 1 Raman)
- Equipped with Wavelength Separation Unit for parallel polarization 355nm and cross polarization 355nm.
- Wavelength detection: 355nm co-polar and for particle discrimination: 355nm cross-polar.
- 3D Scanning Range: Azimuth: 0^0-360^0, Zenith: +6 up to - 90^0
- 3D Scanning head unit programmable of rotation angle, step, vertical/horizontal combination, and each program file can be saved for reload.
- Eye-Safe laser base on IEC60825-1:2014 standards.
- LIDAR systems come equipped with a fully integrated industrial grade computer within the Control Unit. The PC features robust mechanical design and has a high level of reliability. All LIDAR sub-components (e.g. laser, DAU, etc) can be controlled from this computer.
- UPS with automatic safe shutdown on loss of power and automatic re-start on power resumption
- Climate control: Air Conditioning units for both LIDAR Head and Control Unit.
- Dimensions Approx. 1.8 m x 1.0 m x 1.0 m (HxWxD)
- Weight: Approx. 350 kg; Environmental tolerance: -10 to $+35^0$C
- Power: 220V, 50Hz (standard domestic power supply). Peak current: 25 Amps



1. Emission

- Type of Laser: **Nd: YAG, DPSS or FL**
- Emission wavelengths: **355 nm**
- Laser energy: **~12mJ at 355nm with DPSS or 30mJ at 355nm with FL laser**
- Repetition Rate: **20Hz**
- Beam divergence: **< 0.15 mrad**

2. Detection

- Telescope diameter: **200 mm**
- Channels:
  - **Elastic: 355nm**
  - **Linear depolarization: 355nm**
  - **Raman channel at 387nm**
- Spectral bandwidth of channels: **0.5 nm**
- Detectors: **PMT**
- Depolarization calibration: **Δ90 calibration using motorized λ/2 waveplate**
- Waveplate position unidirectional repeatability: **0.002°**
- Full overlap range: **200 m**
- Raw signal range: **> 60 km**
- Data acquisition mode: **Analogue and Photon counting**
- Range resolution: 3.75 m
- 3D Scanning Range: Azimuth: 0^0-360^0, Zenith: +6 up to - 90^0

3. Measurement scheduling and data products

- Computer: **Integrated industrial computer for operation and data storage**
- Connectivity: **Ethernet or Wi-Fi**
- Scheduling: **Flexible scheduling software allows setting up complex measurement schedules (e.g. day/night measurements, weekly measurement, 24/7 measurements etc.)**
- Data transfer: **Automatic uploading of measurement data to FTP server**
- Data processing software**: Included software to manually perform pre-processing, depolarization calibration, and aerosol optical property retrieval.**
- Automatic data processing

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- Visualization **Web-based browser of measurement archive**

4. The lidar is following EARLINET / ACTRIS Quality Assurance procedures

Automated Quality Assurance tests:

- Automated dark signal measurements
- Manual telecover test
- Automated Δ90 depolarization calibration
- Motorized alignment

• **ACTRIS QA:**

- Datasheets for all optical components are provided to academic customers
- Characterized lidar depolarization effects (G, H, and K parameters)2
- Zero-bin tests report
- PMT dead-time characterization
- Integrated camera for alignment monitoring

• **Other**:

- Motorized alignment
- External camera for system monitoring
- Rain sensor

5. Consumption and power requirements

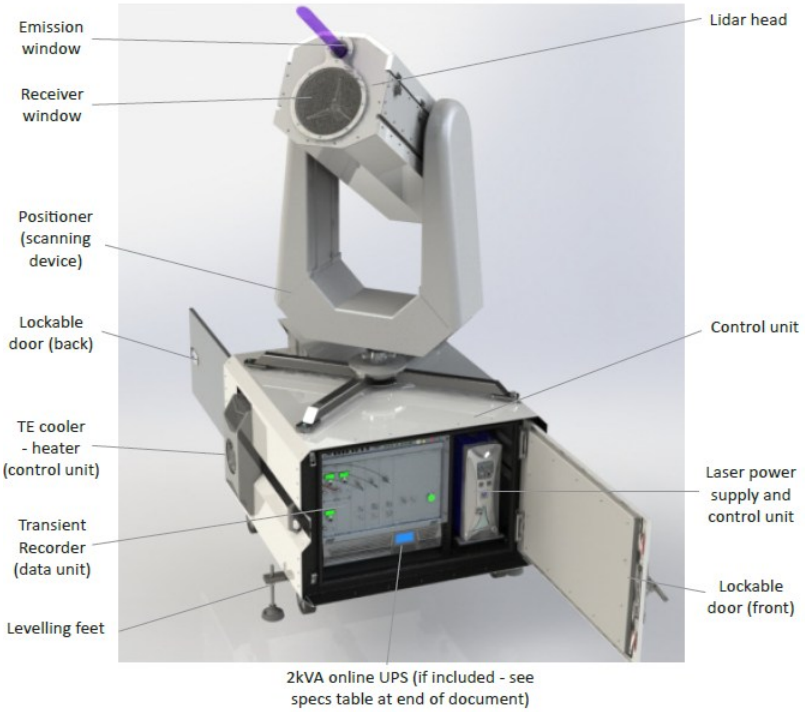
- Electricity system: **220-230 VAC / 50 Hz**
- Max. consumption: **< 2.5 kW**
- Peak Current: **< 25Amps**
- UPS: **Yes**[1]

6. Operating environmental conditions

- Temperature: **-10ºC – +35ºC** [2]
- Relative humidity: **0%-100%**

[1] Used to safely shutdown the lidar system.

[2] The power supply must be always on for the climate control to operate normally.

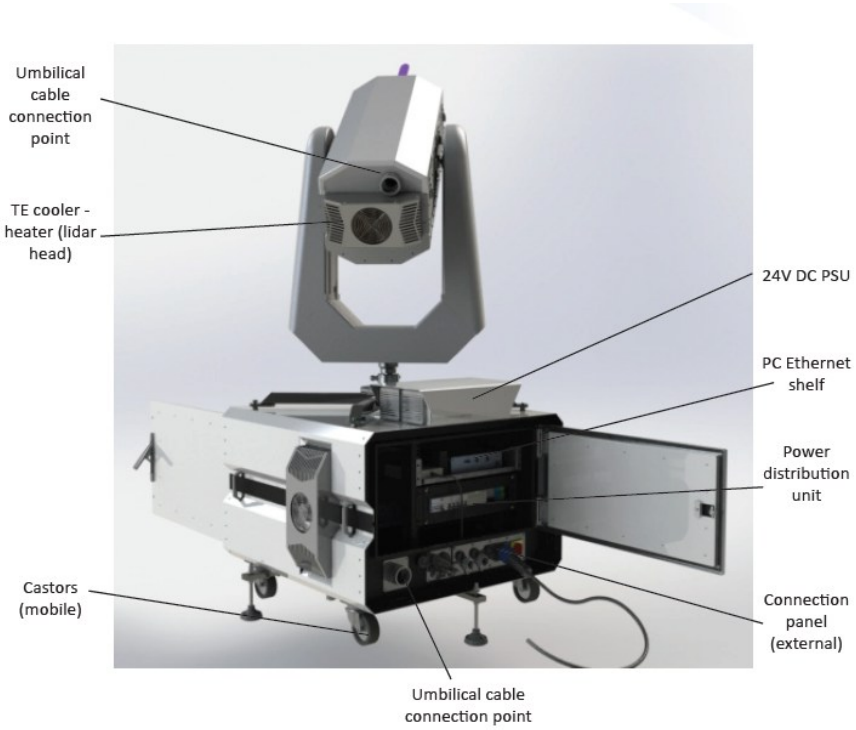


7. System Storage conditions:

- Temperature: **+5ºC – +40 ºC**[4]
- Relative humidity: **0% –80%**

8. Physical characteristics of the equipment

- Total weight**: ~350kg**
- Approx. dimensions: **1800 mm height × 1000 mm width × 1000 mm depth**



9. General Terms:

- Delivery: **approx**. **8 months**
- Warranty: **12 months**
- Spares and consumables are not included
- Installation and commissioning at the place of delivery by trained personnel from Raymetrics
- Annual Maintenance contracts available upon request

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