

wood.

Galion G6000

Product Guide



Galion G6000

Enhanced technology

The Galion Lidar product range has been developed by consulting & engineering company Wood. With over 15 years' experience of operating Galion in onshore and offshore wind energy applications, we have used our knowledge to design, develop and manufacture a new scanning lidar device.



Pulsed Doppler Lidar

Galion G6000 is our latest model of pulsed Doppler lidar for wind energy applications. Using the highly versatile all-sky 3D scanning abilities, the G6000 includes significant enhancements to improve the enduser experience and bring added value to projects.

Flexibility

Retaining the flexibility to easily vary multiple scan configurations, G6000 allows for the implementation of well-established remote sensing techniques and measurement methods suitable for any lidar use case.

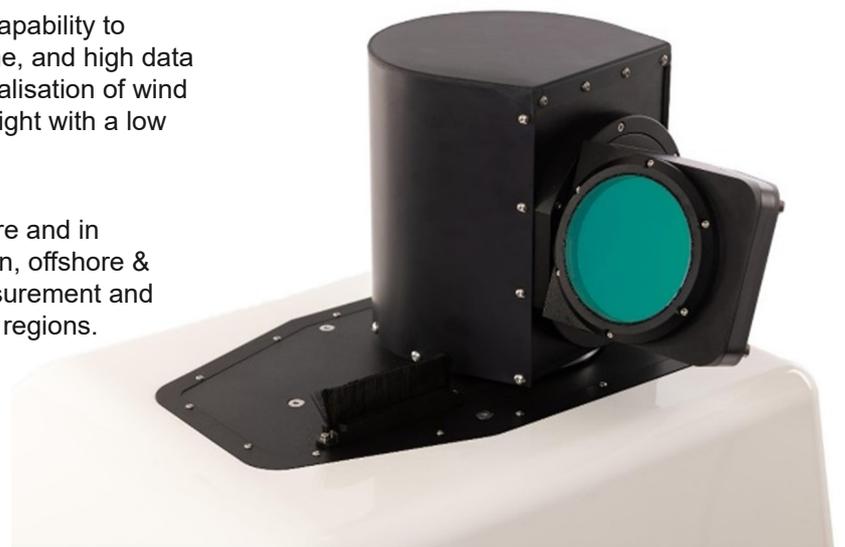
Applications

G6000 can be used in multiple pre- and post-construction application such as: wind resource assessment from a single deployment location to measure across an entire project site; offshore power performance testing (PPT) in compliance with IEC 61400-50-2:2022 and IEC 61400-50-3:2022 standards; and nacelle deployment for wake measurement of a single or multiple wind turbines.

Versatility

The Galion G6000 has an increased range capability to 6,000 m, faster scan and data acquisition time, and high data availability providing versatile all-sky 3D visualisation of wind flow. The lidar device is compact and lightweight with a low power consumption.

The G6000 is suitable for deployment offshore and in extreme climates, scanning in complex terrain, offshore & onshore scanning, and is well suited to measurement and visualisation of wind turbine inflow and wake regions.



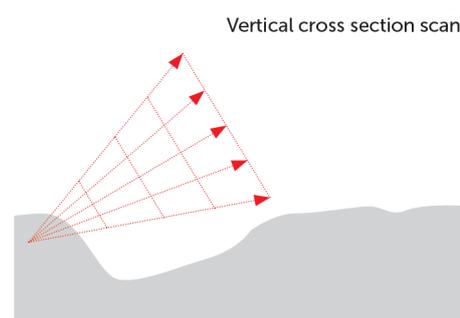
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Full project lifecycle capability

The Galion G6000 can support every stage of your project.

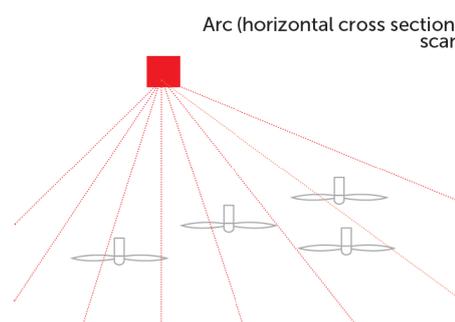
Pre-construction use cases

- Feasibility studies
- Wind resource assessment
- Site suitability and classification
- Site layout and optimisation
- Wind flow model validation
- Complex flow and terrain evaluation



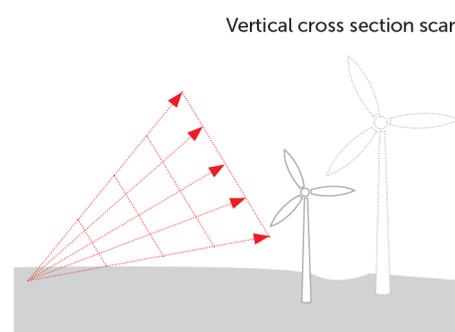
Post-construction use cases:

- Power performance testing (PPT)
- Wake and induction zone measurement and model validation
- Performance optimisation & benchmarking
- Operational energy yield assessment
- Operation and maintenance
- Yaw misalignment detection



Research and development

- Wind farm blockage effect and wind turbine wake studies
- Wind farm control and optimization
- Atmospheric science
- Multiple lidar setup, dual and triple lidar systems



Product support

Galion is supported by the expertise of Wood's clean energy consultancy and affiliates. Our Galion team is integrated within our globally respected, multi-disciplinary clean energy consultancy with a reputation for engineering and technical excellence, professionalism, integrity and responsiveness. Wood provides advice on clean energy projects from small off-grid power systems in remote locations to some of the world's largest clean energy developments, with capacities of many thousands of MW, across all terrains and environments.

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G6000 specification

Category	Specification
Physical Specification	
Galion dimensions (L x W x H)	820 mm × 500 mm × 900 mm
Weight (Galion only)	90 kg
Weight (PSU only)	20 kg
Weight (packed flight case)	195 ± 5 kg
Flight case dimensions (L x W x H)	1200 mm × 800 mm × 1200 mm
Operational Characteristics	
Max acquisition range (RMaxA)	7,470 m (with a 30 m range gate length)
Max operational range (RMaxO ₈₀)	6,000 m
Range gate length	30 m to 120 m (in 1 m increments)
Accumulation time	0.1 s to 3.0 s (2,000 to 60,000 pulses)
Doppler accuracy	± <0.1 m/s
Operating ambient temperature range	-30 to +40 °C
Inclinometer accuracy	± 0.03 °
Scanner pointing accuracy	± 0.05 to 0.1 °
Azimuth rotation range	360 °
Elevation rotation range	-15 to +195 °
Scanner rotation speed	45 °/s
Power Specification	
DC Voltage	24 ± 1.0 V
DC Current	PSU fuse rating: 20 A, Max draw: 17 A
Power draw	Nominal: 150 ± 10 W Maximum (full heating/cooling): 400 ± 10 W
Laser Specification	
Laser safety class	Class 1M
Wavelength	1550 nm ± 0.1%
Pulse width (FWHM)	200 ns (± 10%) or 30 m
Pulse repetition frequency	20 kHz
Pulse power	250 mW (± 10%)
Laser-case temperature range	+10 to +50 °C
Sample frequency (spatial resolution)	180 MHz or 0.83 metres
Max LOS velocity	69.75 m/s
Data Storage	
OS Drive (C:\)	512 GB M.2 NVME SSD
Data drive (D:\)	2 TB 2.5" SATA HDD
Backup drive (E:\)	2 TB 2.5" SATA HDD

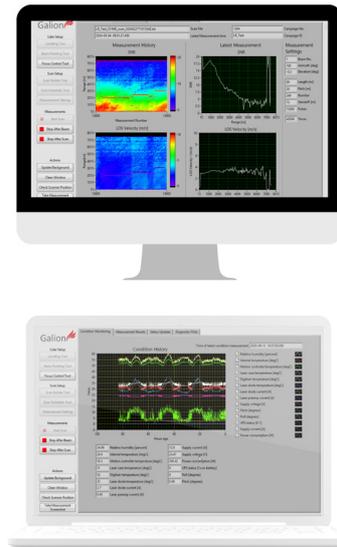
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Galion software

Operation of the Galion G6000 is facilitated through dedicated software.

Galion software features

- GUI allowing quick and simple commissioning of the Galion and visualization of real-time spectral and Line-Of-Sight Doppler wind velocity data.
- Tools to aid Galion alignment and levelling; Tools for scan geometry design, creation of scan schedules, and measurement settings configuration.
- Access to condition data such as temperatures, humidity, voltages.
- Display of historical and real-time Line-Of-Sight Doppler data, with detailed scan geometry and measurement campaign settings.
- Monitoring of historical events and actions since data acquisition began.



Galion Toolbox

The Galion Toolbox is a dynamic software application designed specifically to facilitate data processing for the G6000.

The Galion Toolbox has been developed to process collected lidar point measurements to produce a time series of wind speed and wind direction data for all measurement points.

The Galion Toolbox provides 2D horizontal and vertical wind field flow maps facilitating visualisation of the wind flow.

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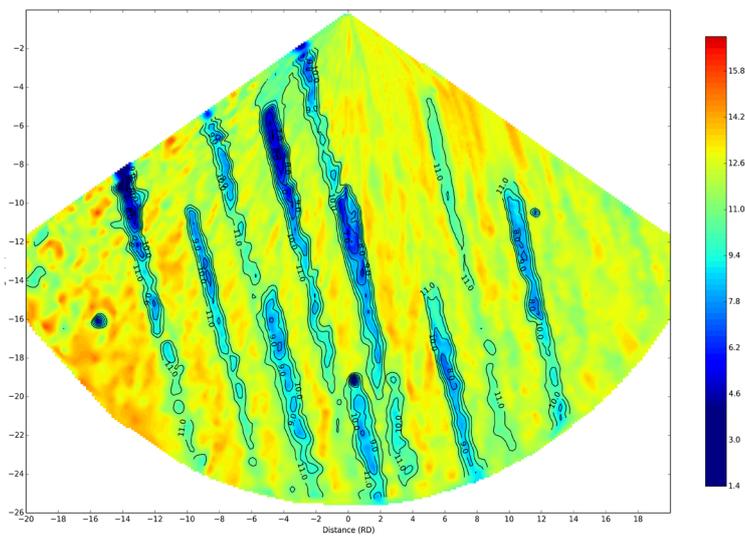
Diverse superior scanning lidar technology

The G6000 supports a wide range of lidar use cases and wind energy measurement campaigns.

Horizontal arc scanning

Fast & long range arc scanning with high spatial & temporal resolution provides detailed measurements and visualisation of wind velocity within wind farms.

Remote measurement of wind characteristics is possible with ground or wind turbine nacelle based G6000. The lidar provides the basis for successful measurements for use cases such as wind resource assessment, complex flow and terrain evaluation and research & development projects such as wind farm blockage effect and wind turbine wake studies.

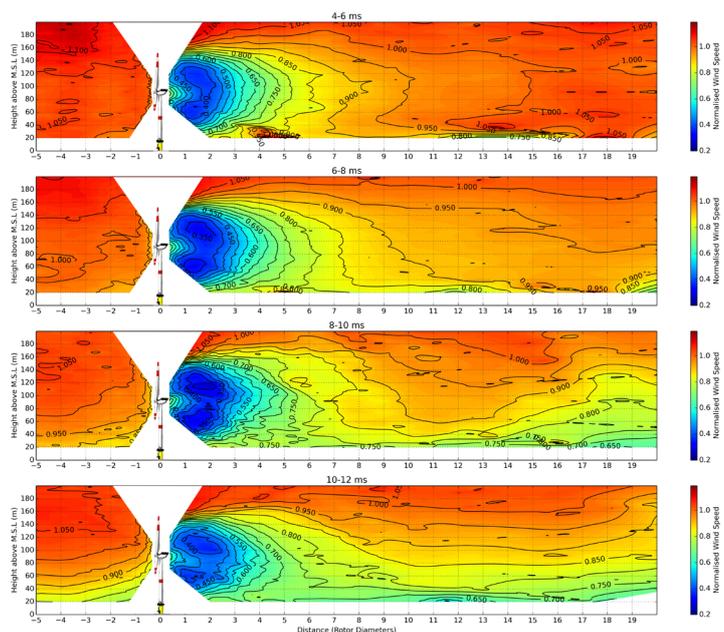


Vertical arc scanning

Vertical scanning provides detailed measurements and visualisation of wind velocities and wind shear profiles within wind farms.

A ground or wind turbine nacelle based G6000 will provide wind velocity measurements at multiple height intervals.

The G6000 facilitates scanning in complex terrain, offshore & onshore situations. The G6000 provides versatile all-sky 3D visualisation of the wind flow.



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Pulsed lidar technology

The G6000 pulsed lidar technology provides accurate and precise measurements for wind industry applications, and in combination with the high data availability ensures bankable measurements for all wind industry projects.

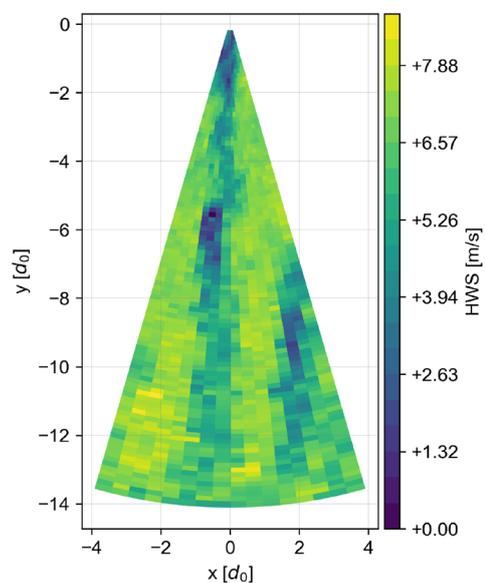
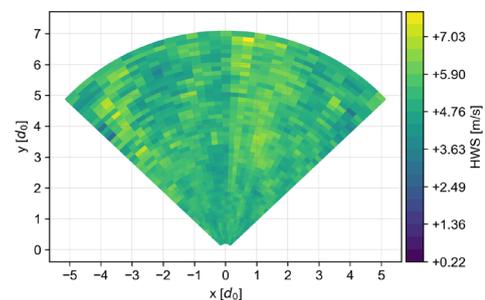
Wind turbine nacelle based G6000 arc scanning

The versatile scanning lidar technology of the G6000 facilitates a wide range of single and multiple scanning patterns to maximise wind flow coverage.

The lidar's 6 km acquisition range, high scan speed and improved data availability provides high wind speed and wind direction measurement accuracy across the wind field in all wind shear and turbulence conditions.

The G6000 provides detailed information of large-scale and local wind flow conditions, for use in performance optimisation & benchmarking, wind farm control and optimization.

The G6000 supports measurement of wind turbine induction zones and wakes, enabling assessment of the wind farm blockage effect.



Wood Clean Energy

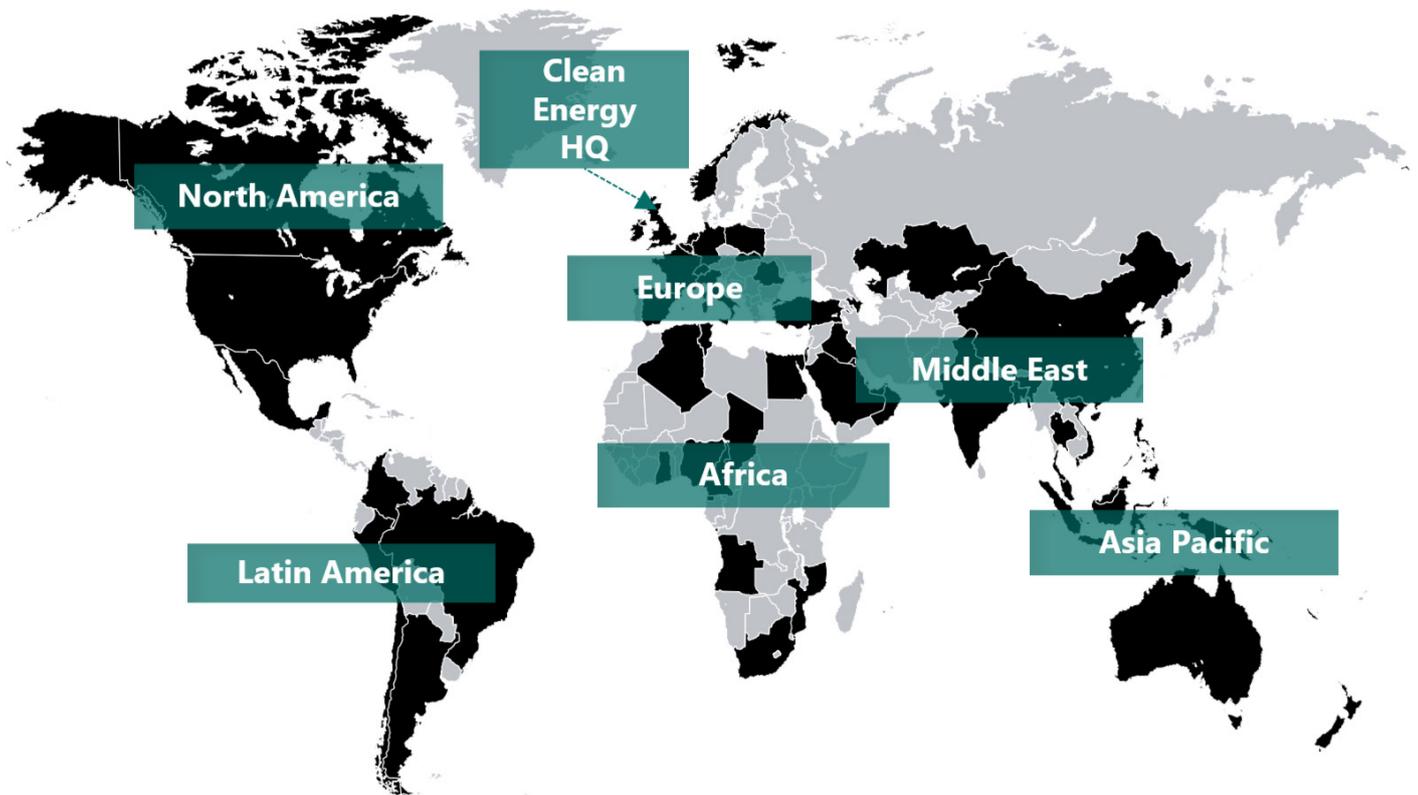
In-depth knowledge & experience

Wood has a proven track record in turnkey delivery of lidar purchase, rental and measurement campaign projects.

Wood personnel have in-depth knowledge of lidar gained through the development and manufacturing of Galion and direct involvement in numerous lidar measurement campaigns, and contributions to the international standards and guidelines for wind energy lidar applications. Wood has extensive scanning lidar measurement experience since 2008, including onshore and offshore applications.

Wood has made contributions to the international standards and guidelines for wind energy lidar applications. Wood's calibration and measurement procedures are audited annually by UKAS as part of Wood's ISO/IEC 17025:2005 accreditation for power performance testing.

Wood has a global reach with over 400 offices worldwide, and a track record establishing long term delivery relationships with key clients.



For further information please go to: