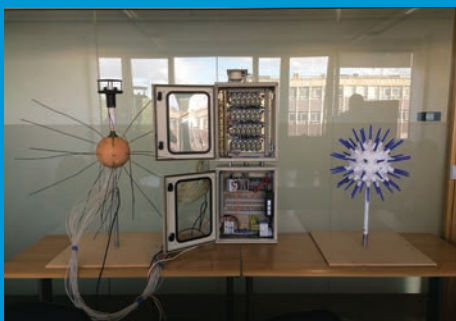
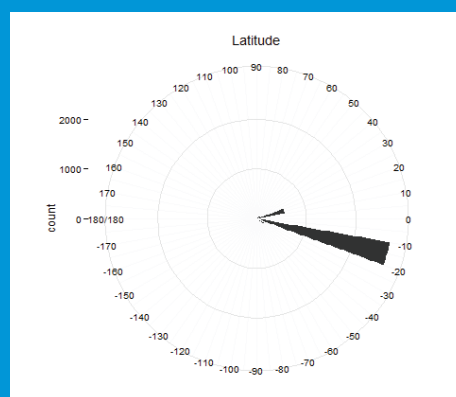
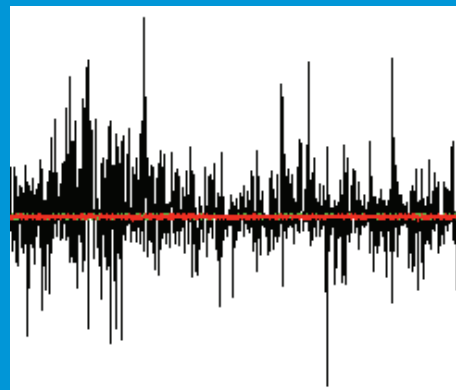
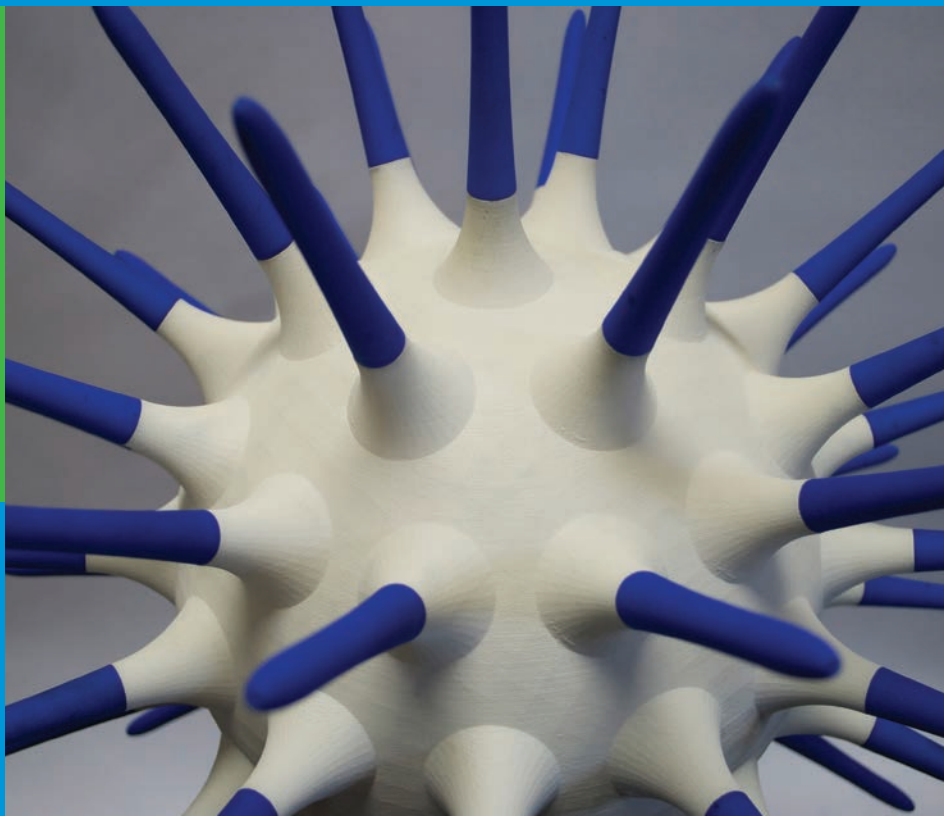


Wind Urchin A 3D Spherical Anemometer



where business meets innovation

New Technology from DIT



Simultaneous measurement of wind speed, direction and turbulence

The Wind Urchin is a novel instrument for the simultaneous measurement of wind speed, direction and turbulence. It is effectively a multi-directional anemometer which uses multiple Pitot tubes incorporated into a unique spherical design to provide simultaneous real-time data on all elements of wind and uniquely

turbulence.

Currently the standard on the market for wind measurement include simple cup anemometers or wind vanes which has existed for hundreds for years. Sonic anemometer technology has recently developed, however these are still limited, particularly in understanding turbulence. There is no instrument on the market which can measure wind turbulence accurately, as wind measurement devices are extremely limited.

The Wind Urchin can sample wind speeds at frequencies up to 3,000Hz, provide superior three dimensional

data on wind speed and direction, and provide an accurate indication of turbulence.

While the device has multiple applications, the current focus is on wind & wave energy generation. The Wind Urchin is potentially a unique resource for the planning, development and on-going monitoring of wind or tidal energy farms. Upon site selection the device can be used to provide more accurate data on wind speed, wind direction and, critically, turbulence at a higher frequency rate of sampling and recording than previously possible.

Applications

Potential future energy gains and the wind loading on equipment and structures may be more accurately assessed. This enhanced accuracy will significantly help wind developers, operators and investors to predict returns, as well as help engineers maximise efficiency in turbine speed and placement.

The Wind Urchin is a device which has the potential to revolutionise how accurately wind can be monitored and measured. Applications include:

- Enhanced site evaluation, planning, development and monitoring capability for wind farms and tidal energy farms
- Superior meteorological data collection and analysis
- Urban planning applications for civil and mechanical engineers
- Improved data for decision-making in aviation to enhance efficiency and safety
- Road safety

Opportunity

Research indicates that the miscalculation of wind as a resource is a very real issue world-wide. Variance of up to 30% has been documented based expected to actual outputs of wind energy.

A small error in wind resource assessment can have a huge impact, as the power produced by a wind turbine varies with the cube of the wind speed. Many Wind farms are underperforming their pre-construction energy yield estimates by at least 10%. For example with an installed capacity of 500GW and with an average cost per unit of 10 cent on the market this equates to an annual loss of €5 billion to investors.

An installed capacity of 40GW is being developed annually, this means that approximately 30,000 new sites are being developed annually worldwide. Presently installed capacity means that there are also an estimated 285,000 sites worldwide.

Advantages

The Wind Urchin presents a number of advantages over existing wind measure devices:

- **Improved Data Accuracy** – greater accuracy of wind data, including fluid speed, fluid direction and turbulence
- **3-D Capability** – data can be measured and illustrated in three dimensions
- **Sampling Frequency** – a greater number of samples can be taken within a specified timeframe
- **Robust Design** – the device is engineered to be durable, and can be manufactured using a range of materials, including stainless steel
- **Low Maintenance** – the design has no moving parts, therefore maintenance is low, and the effects of rain, frost, snow, dust, or sunshine significantly reduced
- **Wide Measurement Range** – wind speeds from 0-250 m/sec can

“This enhanced accuracy will significantly help wind developers, operators and investors to predict returns, as well as help engineers maximise efficiency in turbine speed and placement”

be measured with a certified level of accuracy to less than 0.05% Full Scale Output (FSO)

- **Ease of Manufacturing** – because the device is based on an innovation in the design concept it can be easily manufactured at scale

Stage of Development

The Wind Urchin has been developed by researchers from DIT's Energy Resource Group supported by funding from Enterprise Ireland.

The technology is capable of demonstration in the field, and a second stage commercial prototype has been developed. Further development work may be required to scale the technology for additional applications.

The device is patent-pending. The design specifications and software are protected as secret know-how.

Research on applications for the technology is on-going. DIT is currently seeking expressions of interest from potential business partners interested in commercialising the technology via licensing or development of a new spin-out company.

DIT Hothouse Technology Transfer Office

Dublin Institute of Technology,

Aungier St, Dublin 2

+353 1 402 7179 hothouse@dit.ie

www.dit.ie/hothouse



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