ZX Lidars

Wind speed at light speed

14 Years in the Field: Galetech and the Long View of Lidar

GALETECH
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1 Overview

Across Ireland's hills, coastlines and uplands, wind measurements rarely happen in benign conditions. Atlantic fronts roll in fast, access tracks disappear into bog, and projects evolve quickly. For more than a decade, Galetech Measurement Services has worked in that reality, supporting developers with trusted wind data gathered where it matters most.

Galetech has long played a central role in Ireland’s renewable energy landscape, supporting developers with wind resource campaigns across the full lifecycle of wind development, from greenfield measurement campaigns through to operational performance verification and grid-compliance monitoring. In each case, the requirement is the same: accurate, accepted data delivered reliably in real-world conditions.

Galetech Measurement Services have built their reputation the hard way: by delivering trusted wind measurements, repeatedly, in real Irish conditions – and doing it over long time horizons where “bankable” must mean sustained, supported, and repeatable. Their fourteen-year relationship with ZX Lidars traces the industry's own evolution from early ‘ZephIR-era’ instruments to the fresh new ZX generation, and now to ZX 300e, where independent IEC classification outcomes and grid-operator acceptance are directly reshaping how wind farms are measured and monitored.

What this partnership demonstrates, as told through Galetech’s day-to-day work, is that long-term Lidar performance isn’t about a marketing slogan. It is an operational system: remote power, communications, monitoring discipline, verification auditability, relevant and refined experience, and continuous upgrade pathways that keep a measurement tool credible over years, not months. As a long-standing ZX Trusted Service Provider, Galetech has built its reputation on responsiveness and practicality - deploying measurement campaigns across complex terrain and tight development schedules.

“Our role is simple,” says Kieran Elliott, General Manager at Galetech Measurement Services. “We reduce risk by providing data that our clients can trust and deliver to them in a way that works in the real world.”

There is a particular kind of confidence that only shows up after the fourth winter. It’s one thing to run a wind Lidar for a twelve-month resource campaign; it’s another to keep turning it over site to site, season to season, and all part of a bigger measurement system. In Galetech’s case, that system spans met masts, ground-based Lidar, permanent operational monitoring, and increasingly, SCADA and grid-signal integration.

2 Partnership Forged in the Field

From the earliest ZephIR Lidars through the first ZX 300s and into today's ZX 300e generation, Galetech has worked with every generation of Continuous Wave wind Lidar. Not as a spectator, but as a practitioner - deploying, learning, and delivering projects through each phase of the technology's maturity.

That's why their story works best through a "character" the team knows intimately: unit #304, a veteran in Galetech's fleet and a symbol of what longevity feels like on a windy Monday morning - quietly doing its job, asking only for power, comms, and basic care. The long-term partnership is not simply that Galetech purchased these wind measurement systems; it is that they built a culture around keeping measurement credible for clients and counterparties.

2.1 Unit #304: A Decade of Deployment Across Global Wind Projects

Unit #304 was first deployed in early 2015 and has since become one of the most frequently deployed ground-based Lidar systems within Galetech's measurement fleet. Probably any fleet in the world. Over its operational lifetime the system has supported wind measurement campaigns across Ireland, Europe and Africa, spanning early-stage resource assessment through to operational wind farm monitoring.

That includes measurement campaigns in Kenya, one of which was on the 100MW Kipeto wind farm, Kenya's second-largest wind farm. And in Ireland, #304 was involved in more than 20 measurement campaigns alone.

Figure 1: Unit #304 deployed in Kenya with remote solar PV PSU.

“Unit #304 is a good example of what long-lived measurement equipment becomes over time. After years of deployments the team knows the system inside out. That familiarity means we can rely on it in demanding conditions and move quickly when projects need measurements delivered.

In many ways these systems become trusted colleagues – quietly doing their job and helping deliver data our clients can depend on” commented Kieran Elliott. “That continuity matters. It means today’s campaigns benefit not just from modern hardware, but from more than a decade of operational experience and understanding how Lidars behave in Atlantic storms, upland Irish terrain, and fast-paced development timelines.”

As Kieran Elliott reflects: “We've grown up with the technology. Every generation of Lidar has helped us do things better for our clients, but the core relationship has never changed - trusted measurements, delivered reliably.”

Today, that journey comes full circle. Some of the oldest systems that helped establish Lidar’s role in Irish wind measurement are now being retired and renewed, replaced by next-generation ZX300e platforms. New capabilities, same philosophy. A modern toolset built on foundations laid more than a decade ago.

There is also a strategic nuance here: Galetech also design and install met masts. With a twenty-year track record, they speak the language of IEC compliance, instrumentation, and financial-grade reporting. In practice, this helps them deploy Lidar without starting a met mast argument they don’t need to win because they can use both tools in the right places and justify each to a bank’s engineer and project manager alike.

Figure 2: Unit #304 co-located with a met mast in Kenya.

3 Supporting Irish Wind and beyond – from Development to Operation

As Ireland's wind sector matured, so too did the role of wind Lidar.

3.1 The introduction on permanent Lidar

Early deployments of wind Lidar focused heavily on development campaigns, collecting the high-quality datasets needed to unlock financing and enable confident site design. Over time, new applications emerged as developers and operators recognised the flexibility of remote sensing devices, such as Lidar. Lidars began to support power performance testing, operational diagnostics and increasingly, permanent measurement roles on operating wind farms. This progression represents a natural shift in wind measurement practices, from short-term campaigns toward long-term operational monitoring.

This shift has been particularly visible in Ireland, where transmission system requirements and forecasting accuracy have driven demand for high-quality operational meteorological data. Projects demonstrating Lidar as an alternative to permanent met masts have helped establish new norms for operational wind measurement, with permanently installed systems now accepted for grid and forecasting applications. As grid requirements evolve and forecasting accuracy becomes more critical, permanent Lidar systems are increasingly recognised as part of the operational infrastructure of modern wind farms rather than temporary measurement tools.

From Galetech's experience, the value of permanent Lidar lies in continuity. Once integrated into a wind farm's operational environment, Lidar systems can provide ongoing wind resource monitoring, operational diagnostics and forecasting inputs without the constraints associated with installing permanent met masts. Permanent Lidar is where the industry stopped treating wind measurements as "campaign data" and started treating them as operational infrastructure. In this context, Ireland's grid operator EirGrid's pathway to operational acceptance is concrete. EirGrid documents that in 2020 a trial of the ground-based ZX 300 was run as an alternative to a permanent meteorological mast; EirGrid's approved list now includes the ZX300 and ZX300e.

Figure 3: Drumlins Wind Farm Permanent Lidar.

Figure 4: Tullahennel Wind Farm Permanent Lidar.

3.2 Global experience

While Ireland remains their home market, Galetech's experience extends further afield. International deployments have provided opportunities to apply their measurement expertise in very different environments, including projects in Africa.

Campaigns in regions such as Kenya have introduced new variables - logistics, climate and infrastructure constraints that challenge even experienced teams. Yet these projects reinforce the same core principles: preparation, adaptability and trusted measurement fundamentals.

Unit #304 (ZX 300 wind Lidar) was deployed on the 100 MW Kipeto Wind Farm project in Kenya and introduced new challenges for the team - including remote logistics, environmental conditions and infrastructure constraints. Successfully operating the system required careful preparation, robust communications arrangements and remote monitoring capability to ensure continuous data capture.

Despite the different operating environment, the same fundamental measurement principles applied: reliable instrumentation, disciplined monitoring procedures, and clear verification of data quality. Campaigns such as Kipeto demonstrated that Lidar systems routinely used in European wind development can deliver dependable performance even in markedly different climatic and logistical contexts.

Figure 5: Delivery of wind Lidar Unit #304 to site.

4 Lessons learned

Experience from long-term Lidar deployments has revealed lessons that shape how the technology delivers value in real-world wind farm operations.

4.1 How long-term Lidar performance becomes meaningful for users

Long-lived Lidars and Lidar OEM partnerships matter because they change the economics and speed of decision-making. The instrument becomes a reusable confidence tool, and the service provider becomes the custodian of its credibility.

4.2 Lessons that translate directly into value for developers and operators

Longevity is a system property. The best instrument still fails in practice if communications, power, monitoring and change control are weak. Galetech's own emphasis on remote power packages, continuous monitoring, and asset management shows how longevity is operationalised.

4.3 Upgrade pathways protect trust.

The ZX 300e "Turn-Me-On" enablement for more recent ZX 300 units is important not only commercially but psychologically: it signals continuity for owners and service providers who have invested in the platform.

4.4 Permanent Lidar raises the bar on standardisation

EirGrid explicitly notes that meteorological signals must meet quality criteria over the wind farm's lifetime; that is a service commitment, not something that can be just delivered on a commissioning checklist.

4.5 Operational familiarity matters

Long running Lidar systems build institutional knowledge within measurement teams. Over time this improves deployment efficiency, troubleshooting capability and confidence in the data being delivered to clients.

5 Looking Forward

Few technologies offer such visible continuity as Lidar does. Systems deployed more than a decade ago still shape today's measurement landscape, having supported projects that are now operating assets feeding clean power into national grids.

As older Lidar models transition into next-generation platforms, the story is less about replacement and more about evolution.

Some Lidars have already earned their place in wind measurement folklore. Others are just beginning their careers in the field. Together, they form a continuous thread linking early adoption to modern best practice.

A reminder that in wind measurement - as in wind energy itself - progress is rarely defined by a single breakthrough. More often, it is built on steady evolution, trusted partnerships and technologies like Galetech Measurement Services and ZX Lidars that can stand the test of time.

About Us

In 2003 we released the first commercial wind Lidar, pooling decades of fibre laser research from the science, security and energy industries. Designed specifically for the wind industry our Lidar has paved the way for many of the remote sensing devices seen in the market today. Our original Lidar technology continues to innovate with world firsts such as taking measurements from a wind turbine spinner and being the first to deploy an offshore wind Lidar, both fixed and floating. Our Lidars have also now amassed millions of hours of operation across 15,000+ deployments globally spanning two decades of commercial experience. Some of our proudest achievements are listed below; these are the earliest reported examples that we are aware of from open publications.

2003 - The first wind Lidar to make upwind measurements from a turbine nacelle
2004 - The first and original commercially available Lidar for the wind industry
2004 - The first wind Lidar to investigate the behaviour of turbine wakes
2005 - The first wind Lidar to be deployed offshore on a fixed platform
2007 - The first wind Lidar to take measurements from a turbine spinner
2008 - The first wind Lidar to be signed off against an industry-accepted validation process
2009 - The first wind Lidar to be deployed offshore on a floating platform
2010 - The first wind Lidar to re-finance and re-power a wind farm
2011 - The first wind Lidar to be proven in a wind tunnel
2012 - The first wind Lidar to be used with very short masts and secure project financing
2012 - The first wind Lidar to be accredited for use with no or limited on-site anemometry for project financing by DNV GL
2014 - The largest batch of single-type Lidar verifications against an IEC met mast
2015 - The first Lidar designed specifically for offshore use, with the longest warranty available - 3 years as standard
2016 - The first wind Lidar to support safe lifting on a jack-up vessel
2016 - The first wind Lidar SCADA integrated on operational wind farms in replacement of site met masts
2017 - The first wind Lidar to be installed across a wind farm on a Lidar-per-turbine basis, uniquely mapping wakes across a wind farm
2018 - The first wind Lidar to satisfy all criteria for IEC Classification
2019 - The first wind Lidar to take wind measurements from a drone
2020 - The first wind Lidar to be accepted for bankable energy assessments in complex terrain standalone (without a met mast)
2021 - The first wind Lidar to attract more than £150bn+ of investment into wind energy projects
2022 - The first wind Lidar to be fully integrated into a retrofit wind turbine controller for Lidar Assisted Control
2023 - ZX Lidars moves to Willow End!
2024 - The first wind Lidar with a 5 year warranty and 5 year planned service interval as standard
2025 - The first wind Lidar to achieve 21 - 200m IEC Classification and 300m Performance Verifications

Our Products

ZX300e

Onshore vertical profiling wind Lidar

ZX300M

Floating & platform-mounted vertical profiling wind Lidar

ZXTM

Turbine-mounted horizontal profiling wind Lidar