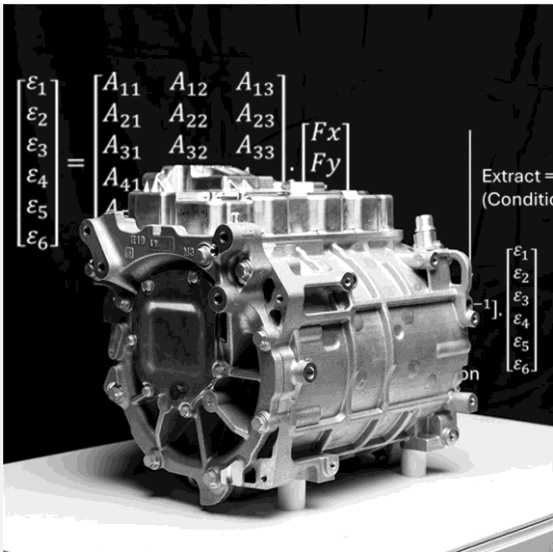
Unmatched accuracy in force reconstruction with Dragonfly®

The Challenge

Inverse methods are used in both design and operation to reconstruct underlying forces from structural responses, especially when **direct measurements are impractical**. This approach relies on two key steps : **calibration and operation**.

During calibration, measured responses can be weak due to structural stiffness, particularly when applied forces are distant from measurement points. To optimize sensor placement, **Finite Element Modeling** (FEM) helps identify locations with the **highest strain or acceleration**.

Traditional methods, such as accelerometers, struggle with force correlation and low sensitivity in **the low-frequency domain**. Foil strain sensors suffer from noise, leading to force reconstruction errors. As a result, more sensors are often required, increasing both setup cost and complexity.



1 **Sensor sensitivity is critical**

The sensor sensitivity and **signal to noise ratio** need to be maximized during calibration phase

2 **Sensor range limitation**

To accurately capture the structure response both during calibration—where responses can be weak—and at higher levels during operation, a sensor with a **wide dynamic range is essential**.

3 **Acceleration inapropriate**

Accelerometers are sensitive but **acceleration is not proportional to the forces** in the structure.

ViBRATEC | worms

We asked
VIBRATEC

What is the key benefit of using Dragonfly ?

“Our latest use case, which involved extremely **low strain amplitudes**, could only be successfully addressed thanks to the **Dragonfly®** sensors from Wormsensing.”

Hugo Siwiak
VIBRATION EXPERT

Breaking Point

Recent industrial methodologies simulate transfer paths in multi-component assemblies, requiring **individual measurement** of forces at system interfaces—whether acting as source components or passive receptors—following ISO 20270 standards. Achieving high-quality datasets in this context demands **ultrasensitive sensing** with very low noise and high electromagnetic field (EMF) protection.

1000x

HIGHER SENTIVITY TO CAPTURE THE **FINEST DEFORMATION**, ENSURING UNPARALLELED **ACCURACY** IN STRAIN MEASUREMENT.

↓ See how **Dragonfly®** transforms the Inverse method data collection

worms

The Solution

Dragonfly® is a revolutionary strain sensor that offers **1000x the resolution of traditional gauges**, enabling high accuracy, low noise, high immunity to EMF, greatintegrability and frequency bandwith making it the **perfect fit** for Force estimation in Inverse Methods.

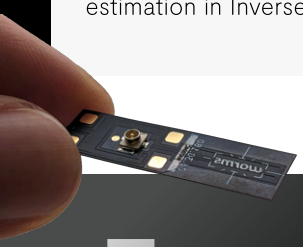
KEY FEATURES

SENSITIVITY
1000X — MORE SENSITIVE THAN TRADITIONAL SENSORS

SIGNAL TO NOISE RATIO
>120dB — EXTREMELY LOW NOISE LEVEL

MEASUREMENT RANGE
±3000µm/m — ABOVE STEEL PLASTICITY

INTEGRATION
PLUG & PLAY — VOLTAGE, CHARGE, IEPE STANDARD



1 Precision

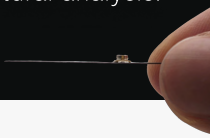
1000x more sensitive than strain gauges, Dragonfly® ensures **unmatched accuracy** in every calibration.

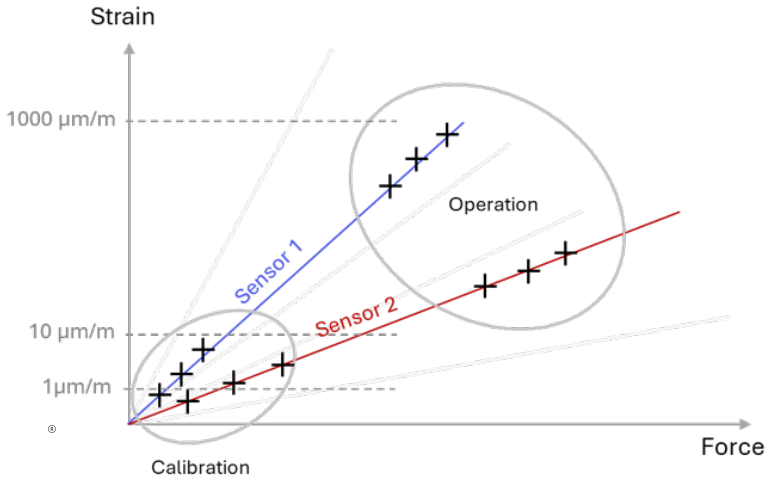
2 Versatility

Captures both **micro-deformations and large-scale** shifts with seamless adaptability to any measurement need.

3 Force correlation

Measures strain with absolute precision, providing a direct reading of **applied forces** for a clearer structural analysis.





Dragonfly revolutionizes inverse methodologies by offering **ultra-high resolution** measurements during calibration while maintaining the ability to capture **high-amplitude responses during operation**, thanks to its large measuring range.

Its end-to-end shielding, exceptional sensitivity, and high signal-to-noise ratio set it apart from traditional foil strain gauges, **ensuring superior measurement quality**.

In contrast to acceleration-based methodologies, which exhibit weak responses at low frequencies, strain-based measurements provide a **more reliable correlation with applied forces**, making them the preferred choice for accurate force reconstruction.

Dragonfly®'s versatility extends to numerous other fields.

Wind Turbines | Automotive | Infrastructures/Bridges | Transportation

and many more applications...

About us

Wormsensing is at the forefront of **advanced sensing technology**, providing high-precision solutions for aerospace, defense, and high-performance industries. With a commitment to cutting-edge precision and sustainability

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