

Nonconfidential Summary Disclosure



UM 8460: LAMBDIS for Non-Destructive Testing and Quality Control

THE TECHNOLOGY

The National Center for Physical Acoustics (NCPA) at the University of Mississippi invented the LAMBDIS (Laser Multi-beam Differential Interferometric Sensor), a novel sensor capable of standoff simultaneous vibration measurement at multiple points of an object. LAMBDIS provides high sensitivity measurements of vibration fields of objects, while having low sensitivity to the whole body motion of the object, or the sensor itself. The LAMBDIS overcomes the drawbacks of LDV's, ESPI, and Shearography, allowing for high sensitivity measurements in noisy environments from an unstable or moving platform on moving or stationary objects.

Unlike Multibeam LDV's which measure object velocity relative to the instrument itself, the LAMBDIS measures the relative velocity between points on the object and creates a deformation gradient of the object's surface, which can be used to reveal imperfections. Further, the LAMBDIS does not require reference beams or stable platforms as it automatically accounts for environmental vibration by analyzing the Doppler shift of all measurement points using different signal processing techniques.

The LAMBDIS system is scalable through adjustable laser strength and arrays. As a result, the LAMBDIS is incorporable into portable designs and applicable for both large and small-scale uses.

Market opportunities for LAMBDIS include nondestructive testing, damage and corrosion detection, noise source identification, structural health monitoring, full-field vibration analysis, measurements of dynamic strain and stress, and biomedical applications.

COMPETITIVE ADVANTAGE

While LDV's can provide remote vibration measurements with a high sensitivity and accuracy, these measurements are also easily affected by environmental vibration. As a result, LDV's have limited applications and are usually restricted to measuring stationary objects at a relatively short distance off of a stable platform in a quiet environment.

The LAMBDIS provides LDV quality measurements without the need for a stable platform or a stationary object by accounting and eliminating environmental vibration from the measurement. As a result, the LAMBDIS is perfect for use in nondestructive testing applications in noisy environments and on moving objects.

DEVELOPMENT POTENTIAL

Seeking partners for proof-of-concept and validation testing.

PATENT STATUS

U.S. 10,429,171 and Patent Pending Europe

PRINCIPAL INVESTIGATOR(S)

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KEYWORDS

Nondestructive Testing, Quality Control, Vibration Measurement, Vibration Imaging, Interferometry, Laser Doppler Vibrometry (LDV), Deformation Gradient



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