# Non-intrusive Turbomachinery Blade Vibration Detection and Monitoring System using Casing Unsteady Pressure Sensors Array

**This non-intrusive blade vibration monitoring system uses existing casing pressure sensor arrays to detect pressure waves associated with blade vibration, offering a lower-cost and more efficient solution for gas turbine engines.**

Rotor forced response vibration is a leading cause of premature blade failure. Traditional methods for monitoring turbomachinery blade vibration, such as strain gauges and blade tip timing, feature high implementation cost.

Researchers at Purdue University have developed a non-intrusive turbomachinery blade vibration detection and monitoring system using casing unsteady pressure sensor arrays. This technology detects the pressure waves associated with blade vibration. Since pressure sensor arrays are already included in most research and commercial gas turbine engines for other purposes, this new method can measure and monitor blade vibration at the same time, providing a lower cost and more efficient solution.

**Advantages**:

-Lower Cost

-Non-intrusive

Potential Applications:

-Gas Turbine Engines

Related Publications: Leng, Y., and Key, N. L. (February 20, 2020). "Utilization of Fast Response Pressure Measurements to Non-Intrusively Monitor Blade Vibration in Axial Compressors." ASME. J. Turbomach. March 2020; 142(3):

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