

# **High-speed noncontact acoustic inspection using acoustic irradiation induced vibration from unmanned aerial vehicle**

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The noncontact acoustic inspection method using laser Doppler vibrometer and acoustic irradiation induced vibration is a method that can be used as an alternative to the hammer method because it uses flexural resonance. Experiments have already been carried out on railway and national highway tunnels, viaducts over 30m, and shotcrete with unevenness in underground cavities, confirming the usefulness of this method. On the other hand, this method has the problem of environmental noise and angular dependence. However, when the sound source is mounted on the UAV, the position of the sound source can be directly opposed to the surface to be measured, and this environmental noise and angle dependency problem is expected to be solved. In addition, since this method does not require a scaffold or an aerial work vehicle, there is a possibility that inspection costs can be reduced and work efficiency can be improved. Therefore, an experiment using a sound source-mounted UAV and a tiled outer wall specimen was performed. From the experimental results, it was clarified that defects within the directivity range of sound waves can be detected even if the UAV fluctuates due to wind. In the future, it will be possible to detect defects with higher accuracy by applying artificial intelligence to the measured waveform.