

## **IoT-platform for data-driven variable acoustics for multifunctional performance spaces**

**Golam Sadeghnia**  
OKTO Acoustics  
[contact@oktoacoustics.io](mailto:contact@oktoacoustics.io)  
[www.oktoacoustics.io](http://www.oktoacoustics.io)

### **ABSTRACT**

Increasingly more venues are used as multifunctional performance spaces, where a variety of musical genres and spoken word is performed. Churches are turned into public meeting houses, museums are used for concerts and lectures, and concertgoers have an increasing awareness of the acoustical qualities of performance spaces. The problem with multifunctional performance spaces is that different types of performances require different low-frequency acoustical profiles, and changes in the interior of these spaces, audience density and distribution have a significant impact in the 500 Hz to 8 kHz bands. Various solutions for variable acoustics have been proposed with predefined fixed settings. However, as of today there is no integrated solution for configuring and validating variable acoustic treatment. We propose a solution based on wireless, fully configurable acoustic panels with variable absorption and diffraction in the 63 Hz to 8 kHz bands. The panels have integrated sensors that communicate with a central model for measuring, calibrating and configuring an assembly of panels for a certain usage. With several panels mounted on adequate surface areas of a performance space, the system allows parametric control of acoustic treatment to offer optimized variable acoustics. Applications for this type of technology range from educational environments, multipurpose auditoria, and cinemas, to parametric acoustics for mixed reality scenarios.