

Researchers develop 'anti-noise' panel for quiet aircraft

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Researchers from the University of Twente's CTIT research institute have developed a prototype lightweight panel that uses anti-noise to reduce noise levels inside aircraft. The panels can be used as a replacement for the heavy insulation materials in aircraft fuselages, leading to a significant reduction in fuel consumption. This will make flying not only cheaper, but also more environmentally friendly. The research is being conducted in collaboration with Airbus, TNO, NXP and Merford. Some funding is being provided by the STW Technology Foundation. The researchers expect that the panels can be installed in aircraft in five years' time.

Aircraft fuselages are fitted with heavy insulation to keep interior noise within acceptable limits. Planes need to carry extra fuel for every kilogram of additional weight. Finding ways to save weight is therefore a key concern in the [aviation industry](#). Researchers at the University of Twente are working on lightweight panels that can be used for active noise reduction. The panels measure the sound approaching them and then produce anti-noise that cancels the [incoming sound](#). The result: complete silence in theory, and an enormous reduction of the noise level in practice.

The panels are equipped with plates (actuators) made of a [piezoelectric material](#), which can convert changes in pressure into electricity and vice versa. This material can thus be used as a microphone and speaker in one: the actuators can measure sound (because they convert [sound vibrations](#) into an electrical signal) and produce sound (because the

computer can induce vibrations in the actuators).

Individual control

The project's biggest challenge lies in the adjustment of the various actuators. A central computer system that controls all actuators in the entire aircraft will not work, because of the tremendously complicated calculations and electronics involved. Moreover, a single malfunction could potentially affect all actuators throughout the fuselage. The UT researchers have therefore designed a panel in which the actuators are controlled individually. This prototype panel is now ready for thorough testing. The researchers expect that the panels will be fully developed in five years, and that they can then be deployed in aircraft.

The underlying technology is not only suitable for aviation. It can also be deployed in many other applications, for example in home sound systems as extremely thin subwoofers that can be integrated into walls.

Provided by University of Twente

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