

TECHNOLOGY Structural Actuation and Sensing through Directional Attachment

OVERVIEW

For a number of years, researchers have attempted to develop a real-time sensor/actuator for the aerospace and aeronautic industries. However, the previous attempts have not been successful in coupling the actuator/sensor in such a way that its behavior is anisotropic; a requirement for real-time control of the substrate. Intelligent actuation devices being tested today are incapable of, for example, imparting a torsional force on a substrate.

Researchers at the University of Maryland, Department of Aerospace Engineering and the Center for Rotorcraft Research have developed a directionally attached actuator/sensor. This device, when embedded, for example, in the rotor of a helicopter, has the capability to dampen vibration, increase lift and prevent stall-out. The device consists of the placement of piezoelectric crystals in a defined and preferentially attached or embedded, array on the substrate of choice. The crystals have the capability to detect perturbations in the substrate (rotor) and through an applied electrical current, twist the structure, bend the structure or dampen vibration in the structure. The University has identified applications in the aerospace industry, including vibration suppression in space trusses and in the aeronautical industry for use on rotorcraft and fixed-wing airplanes.

U.S. Patent No. 5,440,193 CONTACT INFO

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Additional Information

INSTITUTION University of Maryland, College Park

PATENT STATUS

A U.S. patent, # 5,440,193, has issued

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EXTERNAL RESOURCES

UM-89-012