

NATIONAL INSTITUTE OF AEROSPACE TECHNOLOGY TRANSFER & COMMERCIALIZATION HUB



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Featured Technology: 17390-1

Status: Open for Licensing

ADVANCED HIGH PERFORMANCE HORIZONTAL PIEZOELECTRIC HYBRID SYNTHETIC JET ACTUATOR (ASJA-H)

The advanced high performance horizontal piezoelectric hybrid synthetic jet actuator (ASJA-H) is a synthetic jet actuator with three dimensional walls synergistically cooperating with each other, utilizing the positive and negative strains in different direction of the electroactive materials. The deformations of the three dimensional walls of the ASJA-H are hybrid in order to obtain maximum changes of the jet reservoir volume and the diameter of the jet orifice. For each cycle, the change of reservoir volume of the ASJA-H is 3 to 5 times greater than a conventional synthetic jet actuator with only one active component, which is a negative strain-based bottom piezoelectric diaphragm. This enhances the mass flow rate so that it is many times greater than a conventional synthetic jet actuator.

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Simultaneously, the reduction of the orifice diameter (inlet/outlet) produces a higher performance than a conventional synthetic jet actuator because the three-dimensional active motion of the device walls.

The ASJA-H is thin enough to install into the rotorcraft blades or airfoils of a fixed-wing aircraft.

Meet the Inventor

Dr. Tian-Bing Xu

NIA Research
Scientist



A valued member of NIA since 2003, Dr. Xu received his Ph.D. in Materials, from Penn State University in May 2002. Dr. Xu's dissertation was "Development of electromechanical devices based on newly developed electroactive P(VDF-TrFE) polymer." He received his M.S. in Electrical engineering from Penn State University in August 1999 and A Diploma in Physics from Shandong University, P.R. China in July 1987. From 1987 – 1995, Dr Xu was the Engineer and Associate Director of Ion Beam Laboratory, for the Institute of Physics, Chinese Academy of Science, Beijing, P.R. China. From 1997 – 2001, he was a Graduate Research Assistant for the Materials Research Laboratory. From 2001 – 2002, he was employed as a staff scientist at ICASE, NASA Langley Research Center, Hampton, VA.

Dr. Xu specializes in research in the following areas: Smart structures: Smart materials: and Nano smart materials and structures.

