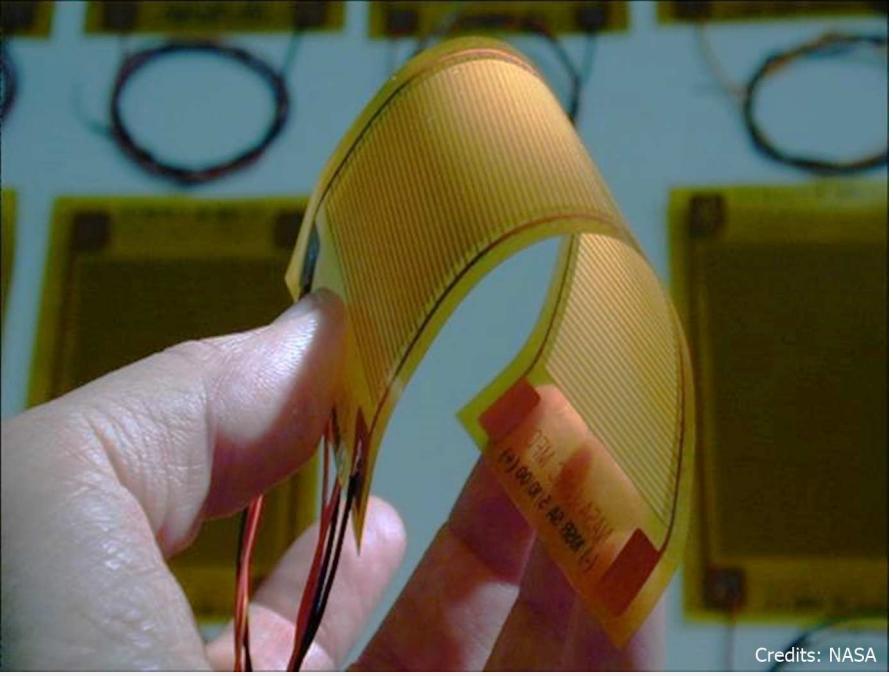


National Aeronautics and Space Administration

Mechanical and Fluid Systems

Macro-Fiber Composite (MFC) Actuator

Macro-fiber composite actuator with interdigitated electrodes

Developed at NASA's Langley Research Center, the Macro-Fiber Composite (MFC) is an innovative, low-cost piezoelectric device designed for controlling vibration, noise, and deflections in composite structural beams and panels. It was created for use on helicopter blades and airplane wings as well as for the shaping of aerospace structures at NASA. The MFC has been internationally recognized for its innovative design, receiving two prestigious R&D 100 awards in 2000, including the R&D Editor's Choice award as one of the 100 most significant technical products of the year. The MFC was also the recipient of the International Forum's prestigious iF Gold award, in Germany, for design excellence in 2004. In March 2007, the MFC was awarded the title of NASA Invention of the Year.

BENEFITS

- Award winning technology
- Simple and repeatable manufacturing process
- Low voltage requirements
- Flexible and durable

APPLICATIONS

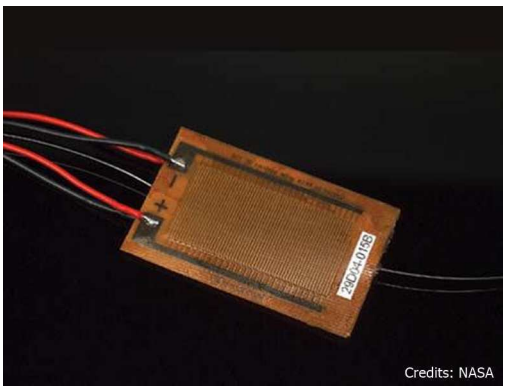
- Sonar
- Range-measuring and fish-finding equipment
- Directional-force and fingerprint sensors
- Flow meters
- Vibration/noise sensing and control

technology solution

THE TECHNOLOGY

The Macro-Fiber Composite (MFC) Actuator is an encapsulated, high-performance, inplane, piezoelectric fiber composite strain device. The MFC actuator consists of rectangular piezoelectric fibers sandwiched between layers of adhesive and electrode polyimide film. MFCs are similar in concept to Active Fiber Composites (AFCs), differing in the use of rectangular piezoelectric "fibers" diced from PZT sheets.

The MFC design incorporates easier-to-handle macrofibers in a simple and repeatable manufacturing process, and places these fibers close to the electrodes to reduce voltage requirements. Thus, the advantages of the fiber's high strain energy, directional actuation, conformability, and durability are retained. When embedded in a surface or attached to flexible structures, the MFC actuator provides distributed, solid-state deflection and vibration control.



MFC

PUBLICATIONS

Patent No: 6,629,341; 7,197,798

More Information

National Aeronautics and Space Administration

The Technology Gateway

Langley Research Center

Mail Stop 151
Hampton, VA 23681
757-864-1178
LARC-DL-technologygateway@mail.nasa.gov

http://technology.nasa.gov/

www.nasa.gov

NP-2015-08-2052-HQ

NASA's Technology Transfer Program pursues the widest possible applications of agency technology to benefit US citizens. Through partnerships and licensing agreements with industry, the program ensures that NASA's investments in pioneering research find secondary uses that benefit the economy, create jobs, and improve quality of life.

LAR-15816-1, LAR-15816-2