Piezoceramic Ultrasonic Motor Technology

Federal Manufacturing & Technologies

J. S. Burden

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Final Report/CRADA Project Accomplishments Summary

CRADA Number 97KCP1052

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AlliedSignal

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DISCLAIMER

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A. Parties

The project is a relationship between

AlliedSignal FM&T 2000 E 95th Street PO Box 419159 Kansas City, MO 64141-6159	Aerotech Engineering & Research Corporation 3115 West 6th Street, Suite I Lawrence, KS 66049

B. Background

Piezoceramic ultrasonic motors (USM) operate based on the piezoelectric effect of a piezoceramic ring that is excited by electrical signals and generates a traveling surface wave. The traveling surface wave drives a rotor through a toothed stator. These motors have several distinct advantages: low profile, high torque at low speeds, quick response, insensitivity to magnetic fields, non-sparking, quiet operation and efficiency. They are well suited for aerospace and military applications requiring a high quality, high reliability motor. American production manufacturing facilities and processes for these piezo devices do not currently exist.

Aerotech Engineering & Research Corporation has been involved in the development of novel material solutions for sensing, actuation, and structural problems in the aerospace industry. Aerotech has a broad experience pool in the area of design and development of actuators for aerospace applications.

AlliedSignal Federal Manufacturing & Technologies is the leading expertise in the United States for design, performance prediction, fabrication, testing, and application of piezoelectric traveling wave motors.

This CRADA effort combines AlliedSignal's expertise and facilities together with Aerotech's experience in actuator development to improve and characterize processes utilized in the manufacture of piezoceramics for motors, establish criteria for qualifying ceramic materials, and design and fabricate a new motor configuration.