

Enabling Novel Space and Terrestrial Applications Using Transducing Materials

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Transducing materials are being used in many aspects of our daily life serving as actuators, sensors, display, communications and other elements of commercial mechanisms. At JPL, such materials are being used to enable novel space and terrestrial applications. This effort involves mostly the use of piezoelectric, electroactive polymers (EAP), and shape memory alloys (SMA). The piezoelectric based devices and mechanisms that were developed include ultrasonic motors, piezopump, ultrasonic/sonic driller/corer (USDC), whereas the electroactive polymers were used to demonstrate a gripper, wiper, lifter and haptic interfaces. The research involves analytical modeling, experimental corroboration, material characterization and device/mechanism design, construction and demonstration. The effort is multidisciplinary requiring expertise that is complemented through international cooperation. The research team activity will be reviewed in this paper.