DEVELOPMENT OF MICROSEISMOMETERS FOR SPACE APPLICATIONS

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The National Aeronautics and Space Administration is developing a suite of miniature seismometers and accelerometers for planetary and microgravity science. "l'he Center for Space Microelectronics l'ethnology at the Jet Propulsion Laboratory is using a combination of micromachining and novel transducer electronics to produce an ultra-sensitive instrument in a robust, compact, and low-power package. Prototype instruments have been built incorporating a bulk micromachined single-crystalline silicon spri rig,. An extreme] y semi t ive symmetric ultra--high--frequency capacit ive transducer is used to measure the displacement of the proof mass. The present generation of JPL seismometers based on this technology have been field tested, and have shown excellent performance compared to high- quality terrestrial in struments. Further development will incorporate a fully integrated silicon suspension and proof mass to maximize the stability of the structure and electrostatic feedback for recentering of the proof mass. The fully packaged instrument will contain four sensor heads for overdeterminat ion of the acceleration vector at the nano-g level.