

Seismic Isolation Pre-Prototype and Technology Development

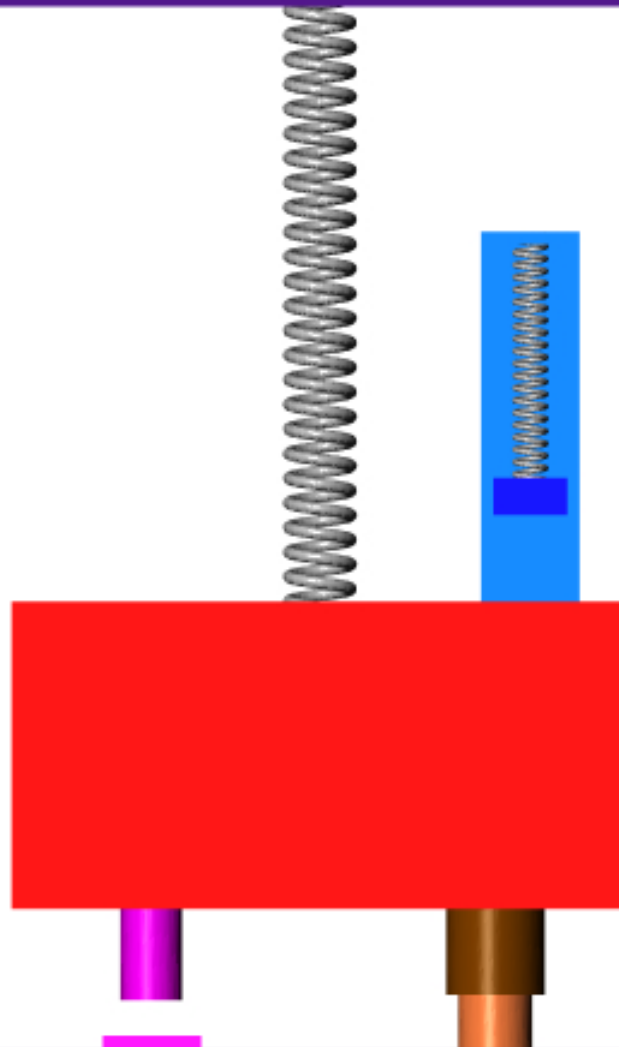
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G. Hammond, C. Hardham, J. How, W.Hua, W. Johnson,
B. Lantz, K. Mason, J. Nichol, S. Richman, J.Rollins,
D. Shoemaker, G. Stapfer, R. Stebbins

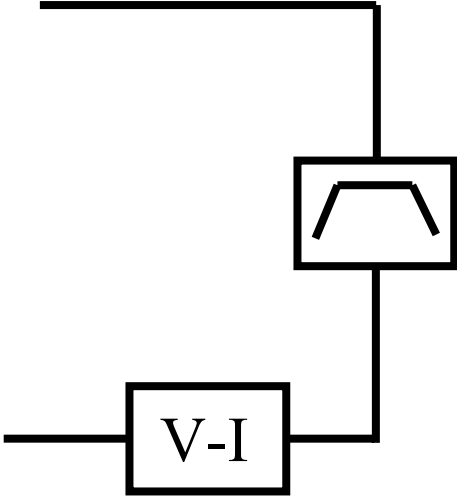
JILA, Louisiana State/LLO, MIT, Stanford

Introduction

- Active Seismic Isolation
 - General Description
 - Sensor Blending
- Pre-Prototype at MIT
 - Mechanical Design
 - Results
- Technology Development
 - Vacuum Compatibility Issues
 - Magnetic Pickup Measurements
- Conclusions

Active Seismic Isolation



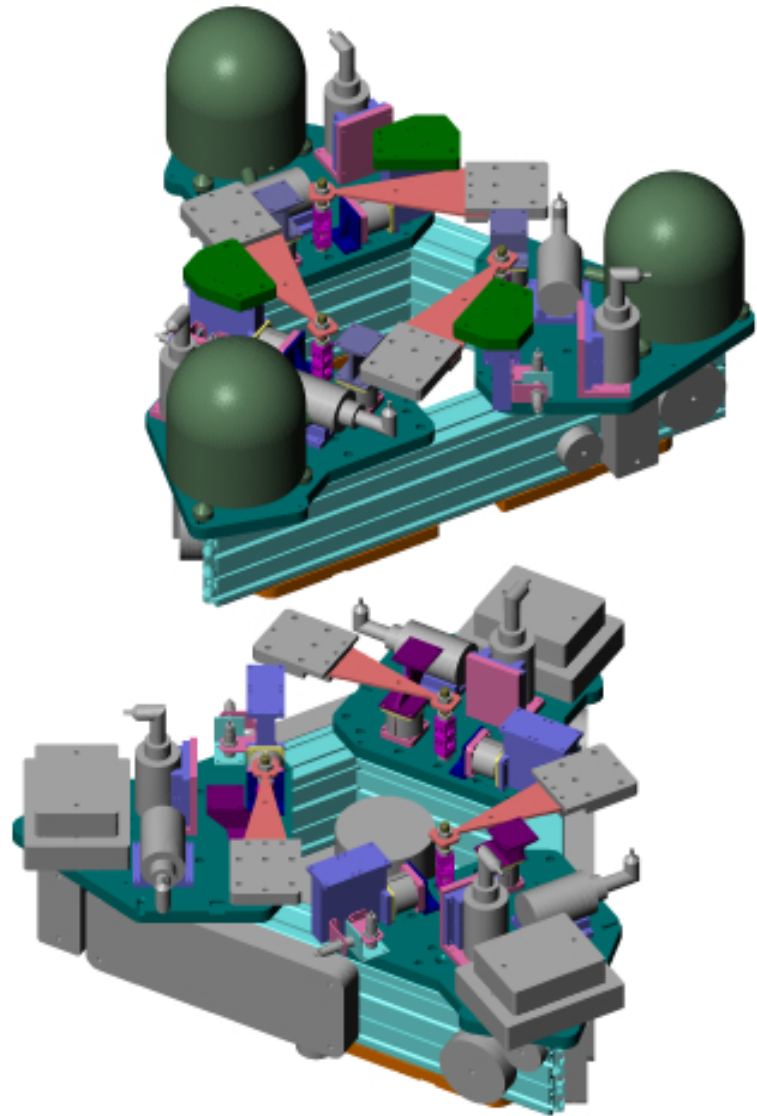
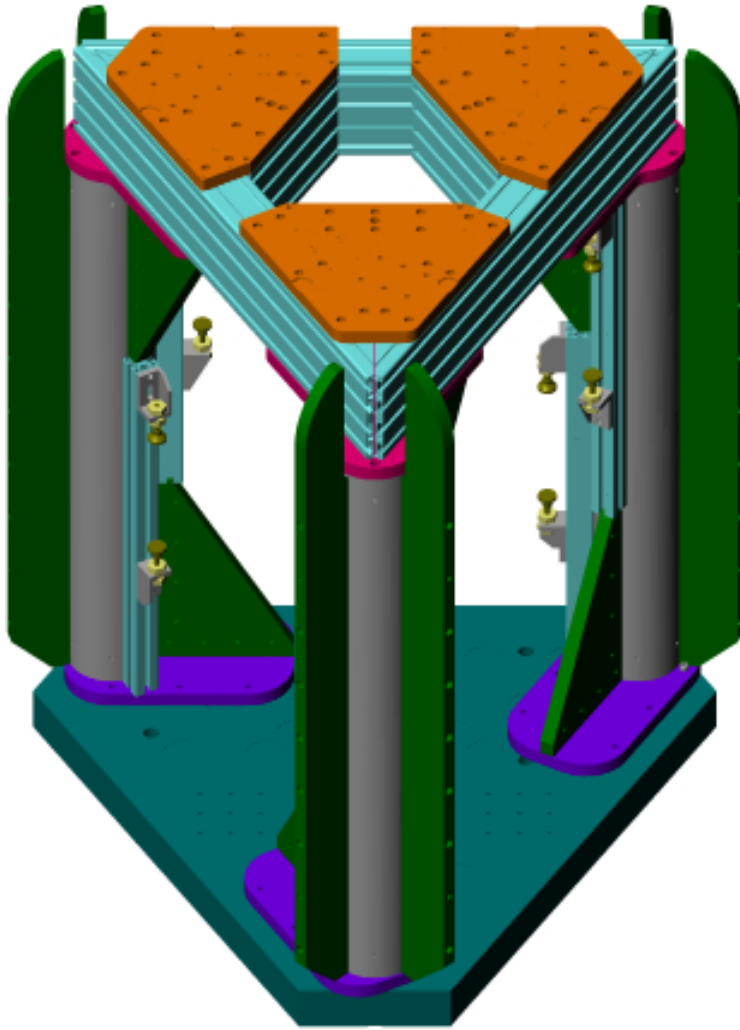




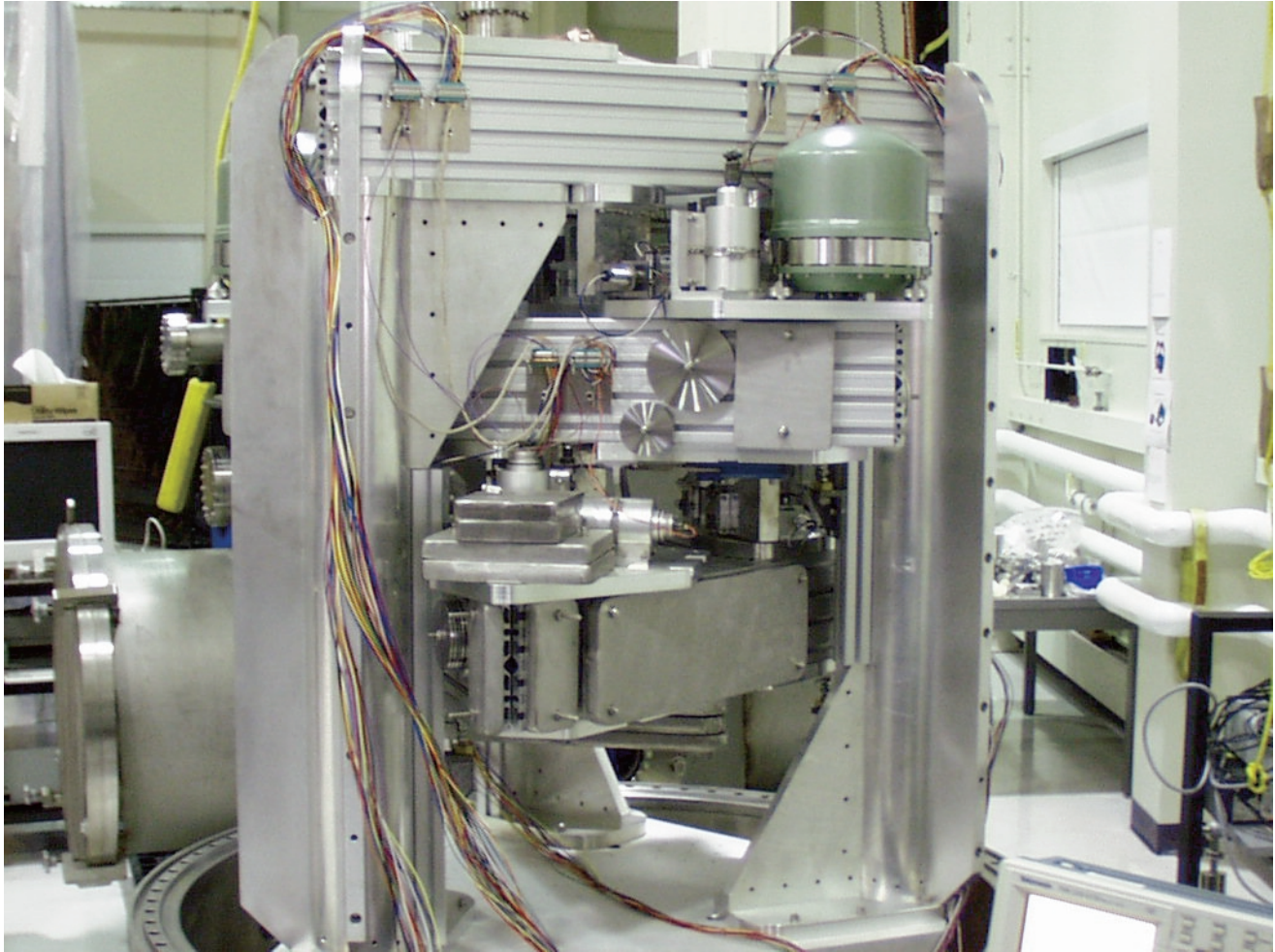
Goals of the Pre-Prototype

- Demonstrate active isolation in 6 degrees of freedom
- Employ sensor blending of commercial sensors
- Demonstrate robust operation
- Provide isolation (20dB) at the microseismic peak
- Provide good isolation (60dB) at 10Hz

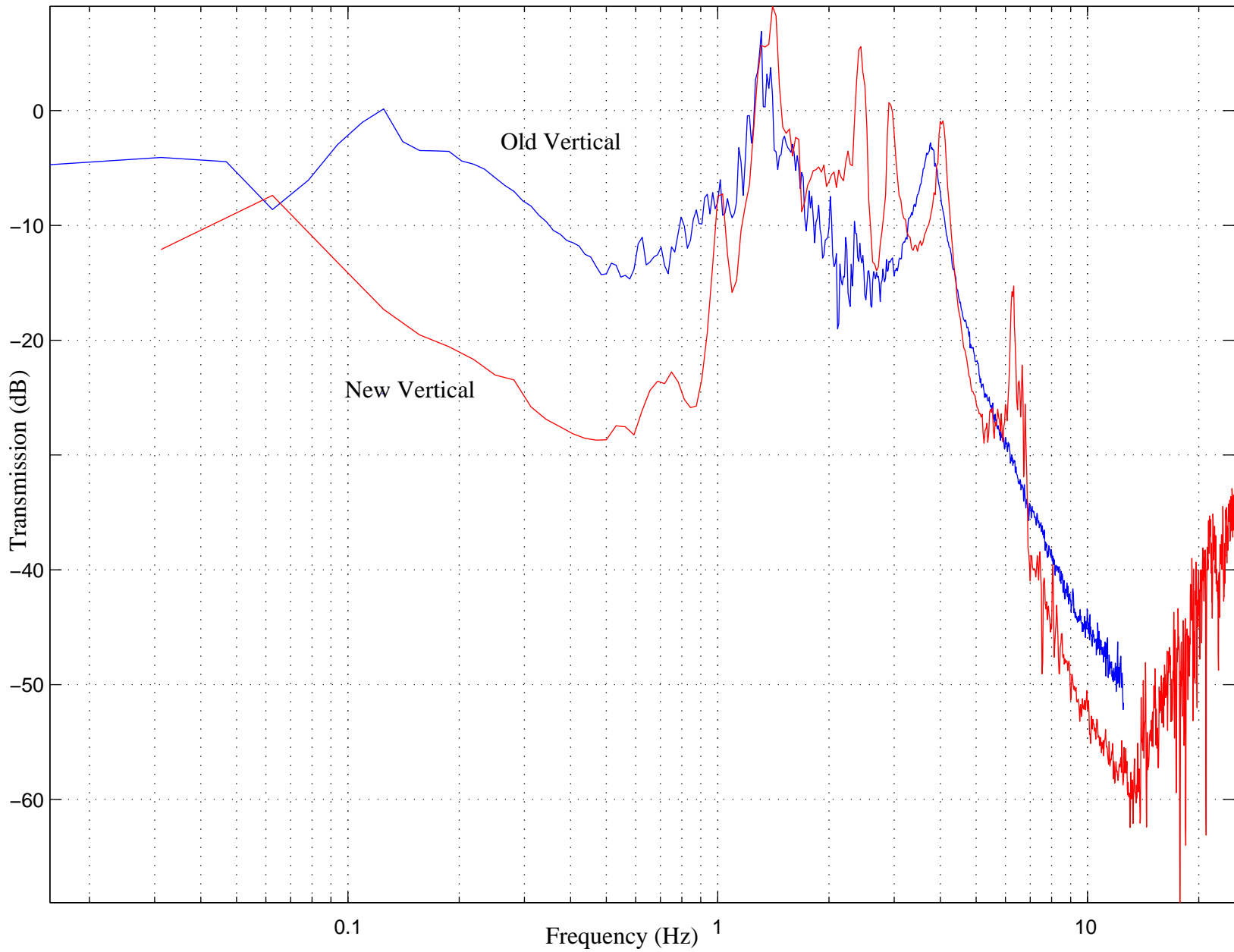
Pre-Prototype CAD Drawings



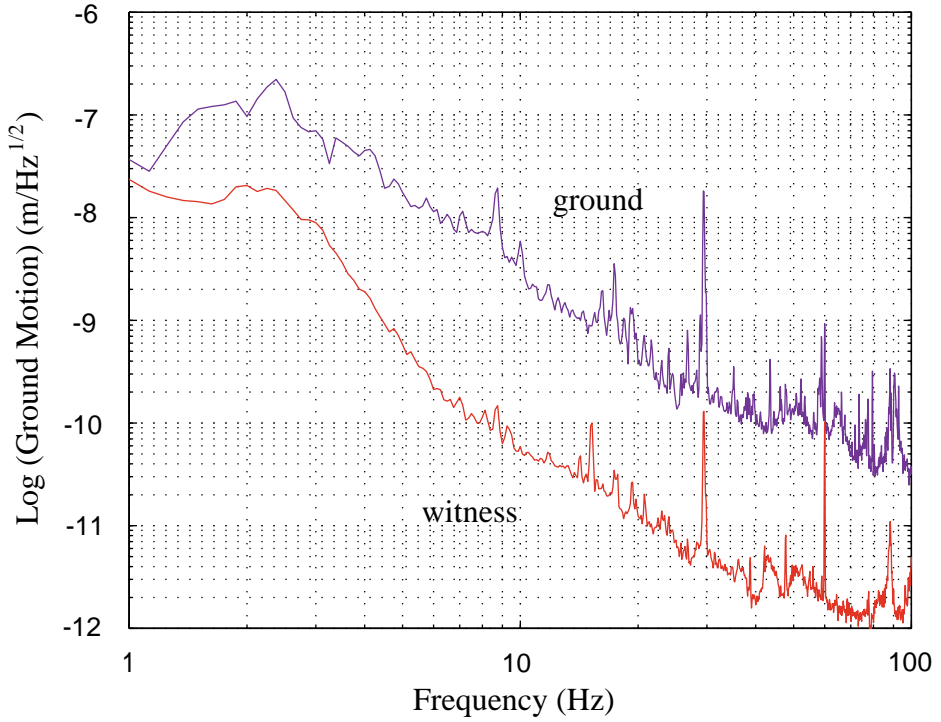
Pre-Prototype at MIT



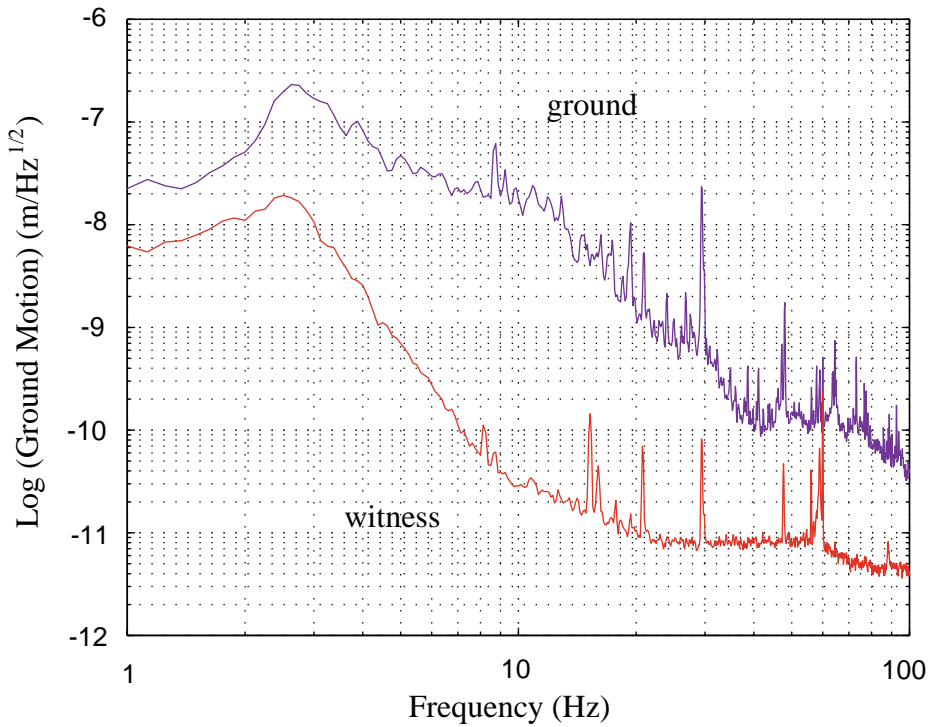
Vertical Seismic Motion



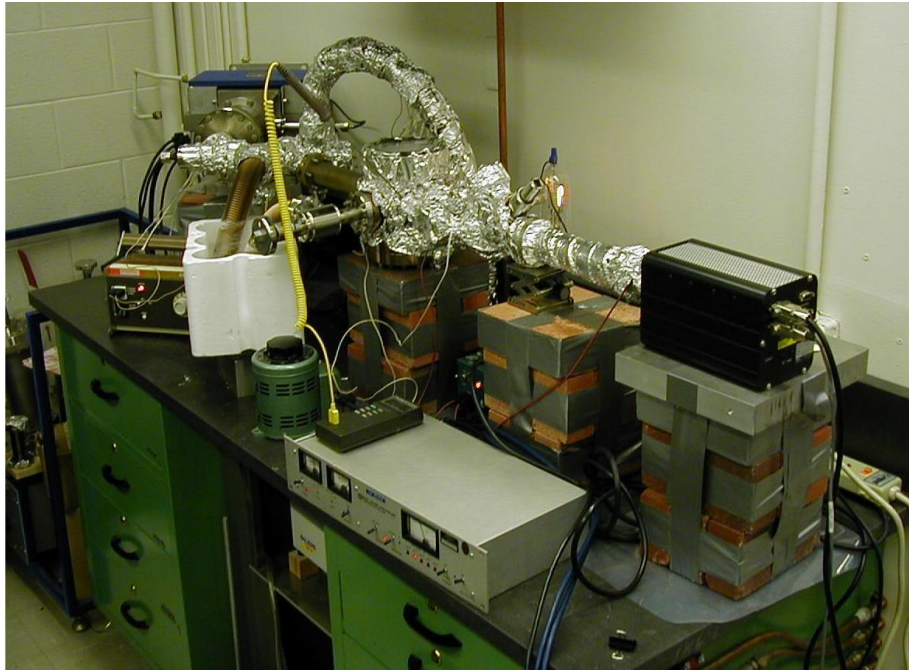
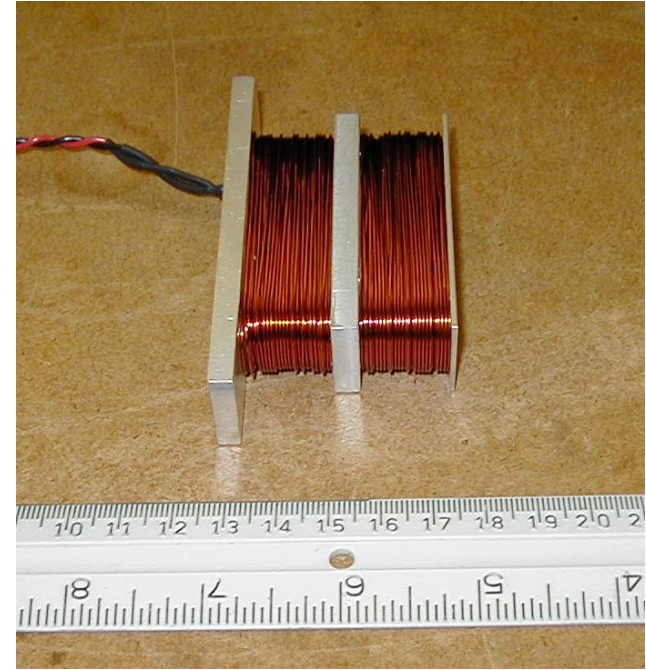
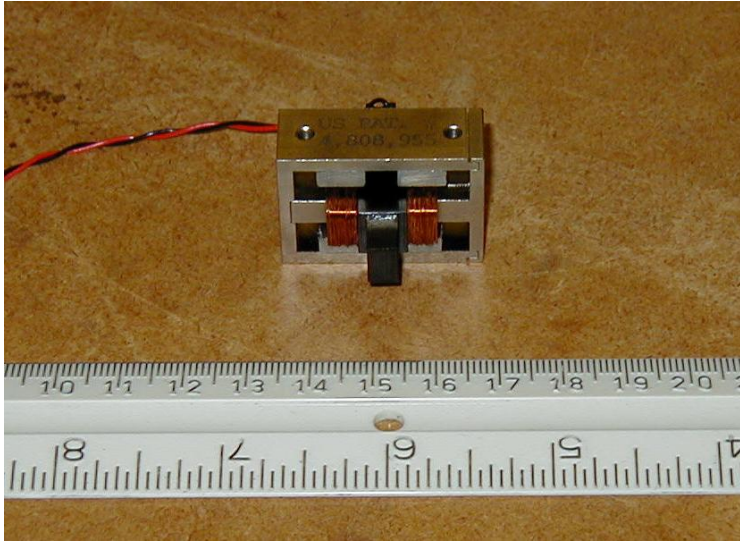
Horizontal Seismic Motion



Vertical Seismic Motion



Technology Development



Conclusions

- All servo loops have been closed with blended sensors
- System has remained locked for several days
- 15dB of vertical isolation at the microseismic peak
- 55dB of vertical isolation and 45dB of horizontal isolation at 10Hz
- Technology development of vacuum compatible actuators and measurements of actuator-geophone coupling are underway