

US Sponsored R&D

W. E. Farrell

Science Applications International Corporation

Abstract

US Sponsored R&D in sensors for low frequency seismology has languished for a quarter century. Notable work was performed in the 60s and 70s, especially the Dicke invention of capacitive sensing and electrostatic feedback, and the superconducting gravity meter of Goodkind and Prothero. In addition, optical strain meters were developed in the same era. However, before, during and after that time, the greatest level of support was for sensors and systems related to the monitoring of nuclear weapons tests. There was no motivation in these programs to achieve the best possible performance for measurements at frequencies less than .01 Hz. This work culminated with the KS 54000 system. The KS 54000 is widely deployed in the Global Seismic Network, but, mechanically, is not much different from its predecessor, the KS 36000, which dates from the early 1970s. A number of novel instrument concepts have recently been described. Some have arisen in physics and engineering departments (isolators for gravity wave detectors, atomic fountains, micro-machined and solid-state devices). Some of these may have application to low-frequency seismology. At least one micro-machined accelerometer is in commercial production, but it is not likely these can be improved so that the Brownian noise is less than earth noise.