

A short history of the Inyo Force-Balance Vertical and its successors

The idea of designing a force-balance vertical seismometer came originally from Angel Rodriguez, director of OSOP, the Seismic Observatory of Western Panama. In March of 2008, Angel approached a few of us who had been active on the Public Seismic Network's mailing list, PSN-L, with the specifications for an instrument which he believed could be of use in his seismic observatory and perhaps to others in the region.

The instrument he proposed would be a single-axis force-balance vertical design, which hopefully could be built locally in Panama, which was to be characterized by decent performance, simplicity and ease of maintenance in the field. After reviewing the goals for the design, Dave Nelson from Los Angeles visited Terry Brown in Tennessee to discuss mechanical approaches. Terry proposed the first configuration for the instrument and Dave went back to California to work on the electronics and mechanical construction. Brett Nordgren in New Jersey provided the analytical tools required to complete and refine the design and helped to document the instrument. As the design progressed, it was decided that it should be shared, for construction and use by advanced amateurs. So mechanical drawings, schematics, bare circuit boards and a few unique parts were made available to interested builders.

At that time Brett established a private mailing list, FBV-topics, for all those who were interested in the design. This has proved to be very successful for sharing ideas and experiences and has helped to relieve the designers from having to handle some of the more routine questions coming from new builders.

Dave named his first and largest design, the "Inyo" and there are a number in operation at the time of this writing. Three are in California (one is Dave's), one each in Ohio and Alabama, and two are operating in Australia, with one more coming on line there soon. Another in Iowa is also nearing completion, and several others are in earlier stages of construction.

His second instrument, the "Yuma" was somewhat smaller, based on a simpler mechanical design which should be easier to construct by someone having a less-endowed home machine shop. There are presently three of the Yuma models operating. Both the Inyo and Yuma require substantial pressure cases, which were usually mounted on a granite slab.

The third design, the "Napa" is currently in the final stages of prototype testing and is the first design on which we have attempted to make noise PSD measurements. It is also the first to have a self-contained pressure case. A more complete description of the Napa may be found below.