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-house infrasound instrumentation: customized, convenient, lower cost

Researchers can benefit from designing and building custom instruments, achieving greater convenience at a lower price. As an example, we present an infrasound logger (named the Gem) designed specifically for campaigns on volcanoes. Unlike commercial alternatives, the Gem is inexpensive, specialized for volcano fieldwork, and user-serviceable. It has a fraction of the per-channel cost of other infrasound systems, and being a single-channel instrument means that sensor cables (which are heavy, bulky, and tangle-prone) are unnecessary. These priorities, along with its small size and light weight, make it suitable in large-N campaigns and in sites with risks to instruments or difficult access. Projects outside of volcano infrasound, including along rivers and in the stratosphere, have also found the Gem useful due to these characteristics. In-house instrument design may be beneficial for other labs as well. Several companies now offer user-friendly electronic components, and open-source software is available for designing circuits and programming firmware. These developments make instrument design accessible to non-engineers in many cases. Custom instrumentation can be especially helpful in small fields (like volcano infrasound) where commercial instruments can be expensive and inconvenient. Therefore, we expect to see the emergence of more custom instruments in the coming years.

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