The initial concept has been improved by forming a shallow pyramid structure so that hail is encouraged to bounce away from the sensor so as not to be counted more than once. The sloped surface also discourages water from collecting. Additionally, the final prototype version includes a mounting box for the piezoelectric ceramic disc, which is offset from the pyramid apex, thus helping to reduce non-uniform response (see Figure 2).

The frequency spectra from a single raindrop impact and a single ice ball impact have been compared. The most notable feature of the frequency resonant peaks is the ratio of the 5.2 kHz to 3.1 kHz components. In the case of a raindrop, this ratio is very small. But in the case of an ice ball, the ratio is roughly one third. This frequency signature of ice balls should provide a robust method for discriminating raindrops from hailstones.

Considering that hail size distributions (HSDs) and fall rates are roughly 1 percent that of rainfall, hailstone sizes range from a few tenths of a centimeter to several centimeters. There may be considerable size overlap between large rain and small hail. As hail occurs infrequently at KSC, the ideal HSD measurement sensor needs to have a collection area roughly 100 times greater than a raindrop-size distribution sensor or disdrometer. The sensitivity should be such that it can detect and count very small hail in the midst of intense rainfall consisting of large raindrop sizes. The dynamic range and durability should allow measurement of the largest hail sizes, and the operation and calibration strategy should consider the infrequent occurrence of hail fall over the KSC area.

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