

Measuring the Speed of Sound in Near Space

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An ultrasonic range-finder, typically used to measure distance using pulses of sound travelling through air at a known speed, can be used instead to find the speed of sound when bounced off a target a fixed distance from the transmitter. Measuring the speed of sound is a neat addition to making “basic” measurements in near-space of temperature, pressure, etc, and this experiment is conceptually accessible to young college students as well as pre-college students. An Arduino Ping ultrasonic range finder aimed at a fixed target was integrated into a high-altitude balloon payload to measure the speed of sound from ground level up to about 100,000 feet in altitude. Although the device has been reliable in ground tests, it has been surprisingly difficult to collect good data with this hardware through an entire high-altitude balloon flight. This may be due to the rangefinder’s sensitivity to the wide range of temperature, pressure, cosmic radiation, and vibration experienced during a weather balloon flight. This poster will document the evolution of our designs for this experimental payload, as well report on the status of our data collection attempts and conclusions to date.



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