

Laboratory 09 SR
October 20, 2010

Introduction

The purpose of this experiment was to measure the speed of sound by measuring the flight time for an echo. This laboratory experiment was carried out as a whole class in which every individual had a role to play. There were four different locations where we based our measurements upon. These four locations are shown in the table below.

Equipment

- Wood clappers
- Stopwatches
- Distance measuring equipment
- Decent weather
- Calculator

Procedure

This experiment consisted of six different tasks: a clapper, distance measurer, timer, counter, recorder, and listeners. The clapper was the instructor himself. Several students volunteered to do the other tasks and the rest were recorders and listeners. Those who volunteered to be the distance measurer based their measurement from four different locations. The first one was from the tree passed the benches up to Building A. The second one headed from across the main road up to Building B. The third one was from the parking lot at the state huts up to the faculty building, and the last one was from the SSSP building to the Gym. These are the steps that were taken during this outdoor experiment:

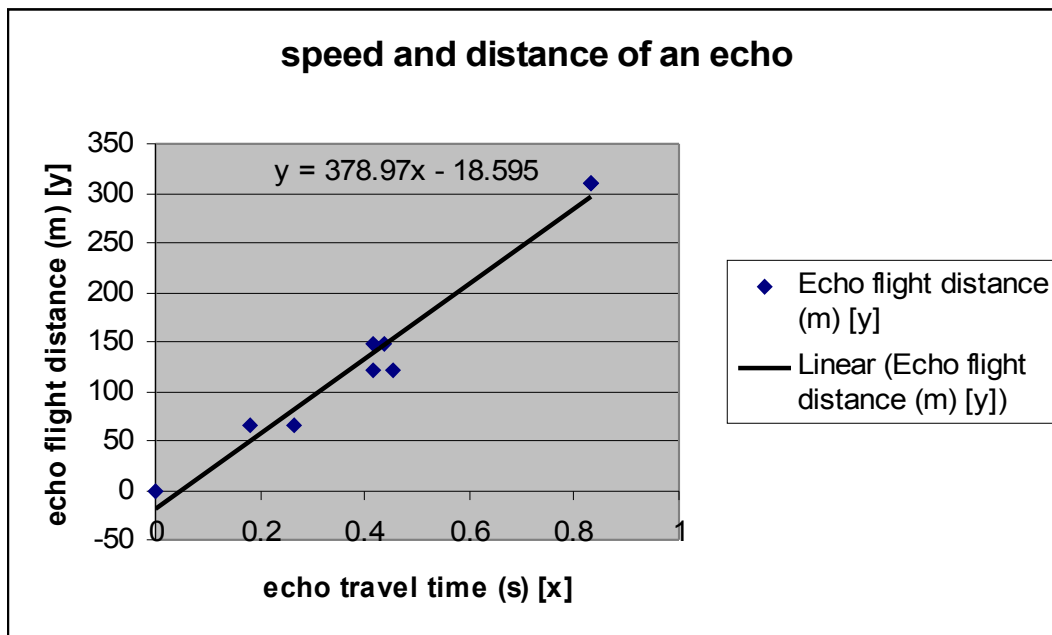
1. Measured the distance to an echoing surface that was at least 50 meters or more away.
2. The clapper clapped along with the echo while the listeners used hand signals to indicate whether the clapper was too slow or too fast.
3. The timer started stopwatch when there was unity between the clap and the echo.
4. The counter counted the number of claps.

5. Timer stopped stopwatch after duration of ten seconds.
6. Recorded the number of claps made and distance data.

Data Table

Location on campus	Duration (s)	Claps	Time for one clap (echo travel time) (s) [x]	Echo flight distance (m) [y]
Building A	10	23	0.435	147
Building A	10	24	0.417	147
Building B	10	22	0.455	122
Building B	10	24	0.417	122
Faculty	10	38	0.263	65
Faculty	10	55	0.182	65
Gym	10	12	0.833	309
Gym	10	12	0.833	309

Graph



Analysis

- This graph shows that there is a mathematical relationship between the time and the distance.
- This relationship is linear.
- The slope as shown in the equation above is 378.97.
- The intercept is -18.595.
- The speed of sound traveled varies depending on how slow or fast the distance measurer took to get to and from each given location.

- The dry bulb temperature was 30°C.
- The wet bulb temperature was 27 °C.
- Relative humidity is 79%.

Conclusion

Based on my experience, this outdoor experiment has a lot of work to do. Instead of just clapping and timing, the major requirement of this study was to take long walks in order to get the exact distance. According to my own observation, the times traveled for every location differ. This is because two people are required to measure the just one location. With two people on duty, each one has his or her own speed rate to travel. Therefore, the results came out with the same distance with different speeds.