



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Evie Pless	Project Number J0722
Project Title Lunar Communication: Determining Laser Power Needed	
Objectives/Goals 1. To build a laser communicator that transmits a sound signal using a laser beam. 2. To test how far the laser communicator can operate. 3. To calculate the laser power needed for this device to communicate to the moon.	
Abstract Methods/Materials First, I developed and built a simple laser communicator. Using research and my dad's advice I adapted the apparatus to use pulse width modulation. Next, I was able to test the apparatus over increasing distances up to a half mile. In order to estimate how far my device could communicate, I created a simulation based on these distance tests. Lastly, I made some reasonable assumptions, researched a few aspects of lunar communication, and calculated the laser power that would be needed to reach the moon.	
Results I was able to build a laser communicator that operated by means of pulse width modulation. According to my testing and simulation the device can transmit audio signals at least one mile. Calculations show that the laser would have to be 10,000 times more powerful for my current device to communicate to the moon.	
Conclusions/Discussion Communication by means of pulse width modulation in lasers is very reasonable. Even with my lower quality equipment I would only need a 30 watt laser to communicate to the moon. Although radio is the established means of communication in space, laser communication could be used effectively.	
Summary Statement I developed and built a laser communicator, experimented with how far it worked, and calculated the laser power needed for lunar communication.	
Help Received My dad taught me about circuits and engineering. He also talked to me about my project and offered advice. Both of my parents helped edit my written work.	