



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Tyrone T. Chen	Project Number S0702
Project Title Locating a Moving Object Inside a Fraction of a Motion Sensor Footprint	
Abstract Objectives/Goals The objective is to locate a moving object inside a fraction of a motion sensor footprint by overlapping motion sensor footprints. By doing this, the number of sensors required to achieve a certain resolution can be reduced so that less motion sensors would be required to cover that area. The goal is to cut the cost of covering large areas that need tracking devices. This can be applied to homeland security. Methods/Materials The experiment was carried out by overlapping infrared motion sensor footprints on flat ground in a clear area. The sensors were placed to try to overlap the footprints evenly. If two of the motion sensors were triggered simultaneously, the moving intruder would be in the region of the overlap. This pattern continues for however many motion sensors are added. The experiment was carried out for up to four motion sensors and resulted in eleven different detection zones for the four overlapping sensor footprints. The materials needed for the experiment were four motion sensors, chalk, a tape measure, and a digital camera. Results This research experiment demonstrates that four motion sensors could be used to create eleven different detection zones, where as typically eleven sensors would be used. Conclusions/Discussion As a result of the experiment, I verified that I could overlap motion sensor footprints to reduce the number of sensors required to achieve a certain detection and tracking resolution in an area. Unfortunately, prediction of the size and shape of the footprints and detection zones cannot be accurately predicted for the infrared motion sensors used in the experiment due to the manufacturing inconsistencies and environmental contrast effects.	
Summary Statement The project is about locating a moving object inside a fraction of a motion sensor footprint.	
Help Received Father helped find motion sensors and construct board.	