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Defeating Passive Infrared Sensors

The purpose of this project was to save soldiers' lives. "Improvised explosive devices (IED) are the No. 1 killer of U.S. troops in Iraq and Afghanistan." Insurgents began using Passive Infrared (PIR) sensors to bypass American electronic counter measures developed to defeat radio signal triggered IED (DefenseNews.com, October 29, 2007). I hypothesized that fitting a vehicle with shielding or jamming would make it undetectable to PIR sensors. The experiment involved using a 1/24-scale model car with heat source on a speed controlled mechanical track with PIR sensor. 100 control tests were done to verify controlled variables. Fourteen tests were run to select the best shielding material and five tests were run to select the best jammer. 100 tests each were run using best shielding and jamming materials as independent variables. The data collected did support the original hypothesis. In 100 of 100 tests, the shielding material kept the sensor from going off. Average shield temperature was 0.49°F lower than average background temperature, making the vehicle "invisible" to the sensor. Jamming kept the sensor from going off 76 of 100 times. The average difference between background and jammer temperature was 252.99°F, ~75°F over maximum operating range, "stunning" the sensor. Both shielding and jamming kept the logic processing elements of the sensor from working by presenting unvarying thermal energy. This made the sensor "think" nothing was happening. These findings lead me to believe that PIR triggered roadside bombs in Iraq are preventable, saving soldiers lives.