Simulating Astronautic Information Transfer Through the Implementation of Optical Laser Technology

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In a world increasingly reliant on speedy, wireless data communication, research into new mediums for faster and more reliable data transfer is imperative. As conventional radio-based communication networks are phased out, optical wireless communication (OWC) holds great promise due to its speed, security, and spectral broadness. One particular area of scientific interest is the implementation of OWC in astronautic communications. The goal of this research is to demonstrate the use of visible light communication (VLC) in aerospace communication and information transfer. Researchers created a robot-camera prototype activation system to model a potential application of laser light in these areas. This prototype system enables laser light to activate a robot's movement, as well as the capturing and recording functionality on the camera device. After the system records an image or video, a researcher-built Raspberry Pi-based system can wirelessly transmit the data as laser light. The laser light can then be subsequently decoded back into the transmitted data by the second half of this system. Researchers evaluated the prototype circuit's voltage and current at two transistors to study the effects of the photoresistor's varying resistance under different light conditions. The data collected reflected the amplifying effects of the transistors to control the relay. The prototype demonstrates the prospects optical wireless communication has in astronautic communications, robotics, and research.

Awards Won:
Central Intelligence Agency: First Award: $1000 award