P.I.P.S. - An Inexpensive Patient Indoor Positioning System

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With the growing number of baby boomers retiring daily, and the aging population needing more specialized care, long term care facilities are having a difficult time keeping up to the demand. Our tech-savvy population now has higher expectations as consumers and for the facilities they inhabit. Technology will have a tremendous impact on the way seniors live because it can aid in providing cost effective ways for health care directors to provide efficient health care to their clients in nursing homes or care facilities. The purpose of my project was to design and create a low cost, real time patient indoor positioning system using ultrawide band (UWB) with full remote management capabilities using the Internet of Things (IoT). My product was developed using the prototype methodology. A total of 8 prototypes with several variations were created. My final prototype consists of 1 TAG that includes patient vital sensors, 3 ANCHORS each including environmental sensors, a communication module using WIFI, and an online webserver. In my final prototype, I observed that I was accurately able to calculate positioning to a 25cm accuracy, receive patient vitals, and receive environment data. The final prototype proved to be a success, however two challenges persist, one being the overall size of the TAG, which needs to be reduced, and the data being sent over the internet requires encryption. In conclusion, I was able to create a low cost alternative which met all my engineering and product goals.

Awards Won: