

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)  
Advanced Systems, Technologies, and Innovations for Human Spaceflight (7)

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PRECISION REAL TIME LOCATION SYSTEM FOR ASTRONAUTS: A SMART SYSTEM TO  
LOCATE ASSETS IN SPACE HABITATS

**Abstract**

Nowadays astronaut's activities in space include spacewalks at the ISS, experiments, test of technology, maintenance of station equipment, among other activities. The most of those operations may include use of tools, parts or assemblies which represents a day to day challenge to the crew that works in space conditions and in a scientific habitat, mainly because of the timing and precision required. In the next years space habitats will become the new space stations and the activities and operations will be made there with new conditions but with the same timing and precision required. Accordingly, real time tracking and locating assets like tools in space habitats could be an important support for optimizing astronaut's operations.

This paper presents the integration and implementation in a prototype of a Smart System to Locate Assets in Space Habitats, based on three key technologies: Real Time Location System, Voice Recognition and Augmented Reality, enabled by Internet of Things and Artificial Intelligence; considering technical requirements of each technology and environment conditions.

Real Time Location Systems (RTLS) allows tracking of assets to an exact, precise location. Now with the increasing use of technologies like Internet of Things (IoT), miniaturization, smart devices and sensors, RTLS is being used in different industries: Healthcare, Transportation and Logistics, Manufacturing and Construction which makes them more productive and efficient.

The Precision Based RTLS uses tags or sensors located on every asset and determine its location by trilateration, or measuring distance of a tag from at least three readers or beacons (fixed reference points). Precision Based RTLS is implemented through Radio Frequency technology.

Other technology that is increasingly used is the Artificial Intelligence (AI) where we have many applications, and one of those applications is the Voice Recognition which converts analog signals to digital, through machine learning users can indicate instructions to the System.

The Augmented Reality (AR) allows the interaction of digital information with the real world through superimposed data over user's view interface, which allows get more information of an activity in real time with free hands in most of cases.

With the prototype of the Smart System to Locate Assets in Space Habitats, the user can indicate the name of an asset, which has an attached sensor, then the RTLS should locate the real time position of the asset and send the information of the location to be showed on the Augmented Reality device.