***Locating the payload object*:**

NASA already has inventory system [5] based on RfId stickers. And they are in the process of introducing a better way to know the position of each of the objects.

**Problems:**

Range of reliable reading of RfId signal. Finding precise location of the object...

**Solution:**

As already mentioned in the article [4], we would propose to have the set of RfId readers on all the “choking” points, in order to increase reliability. This will enable us to detect whenever the object passes through this “choking” point (airlock between the modules) and the position, in “database”, for this object, will be updated.

This will allow rough estimate of where the object is.

For better estimation we will have to use the drone's on-board RfId reader and apply RToF measurements from different positions of drone in space and again, apply multi-lateration algorithm.

This solution can be done also by doing a “fingerprinting” of the area, by using the stationary RfId tags whose positions are already known, and doing the learning by flying the drone around and taking the measurements, which will be later used in, for example, a “n-nearest neighbours” algorithm.

We could use Free-flyers [4] as scouts and observers, aka flying eyes – drones with smaller dimensions and with RFID readers, ultrasound and video senzors and microphones. They would fly around, scan and oserve the station, and update the info about the position of the object on the station. Free Flyer is supposed to float through a region or a module and send back the data to the asset management/inventory system’s database.These info would be useful for the traffic optimization as well as path prediction.

References:

[1] <http://doc.openrtls.com/OpenRTLS_starterkit.pdf>

[2] <http://stackoverflow.com/questions/14237110/calculate-distance-to-rfid-tag>

[3] <http://www.net.in.tum.de/fileadmin/bibtex/publications/papers/rfid_systech_2008_p2.pdf>

[4] <http://www.rfidjournal.com/articles/view?11633/>

[5] <http://technology.nasa.gov/media/NP-2014-08-1137-HQ_JSC_RFIDInvMngSys_1_Web.pdf>