

Automated operations and control procedures of the experiment OSCAR-QUBE onboard the International Space Station

Sam Bammens

Master of Electronics and ICT Engineering Technology

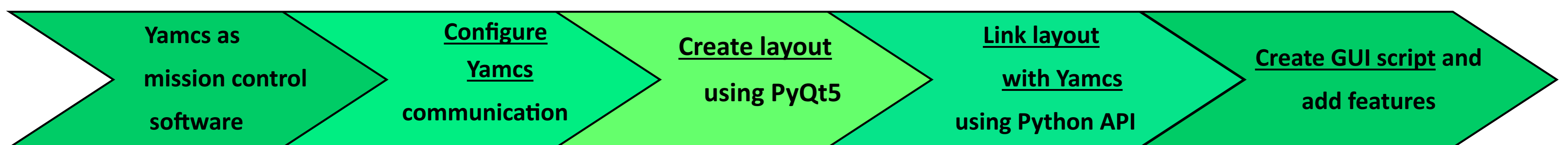
1. Introduction

The OSCAR-QUBE team has created a diamond based quantum magnetometer. This magnetometer is using the new ODMR and PDMR readout methods to monitor the magnetic field. As the project was selected by the European Space Agency (ESA) to fly onboard the International Space Station (ISS), a system had to be created to interface live with the embedded system from the ground during its mission.

2. Objectives

- Handle incoming telemetry packets
- Command the QUBE onboard the ISS
- Provide an intuitive GUI to control the system

Workflow



3. Results

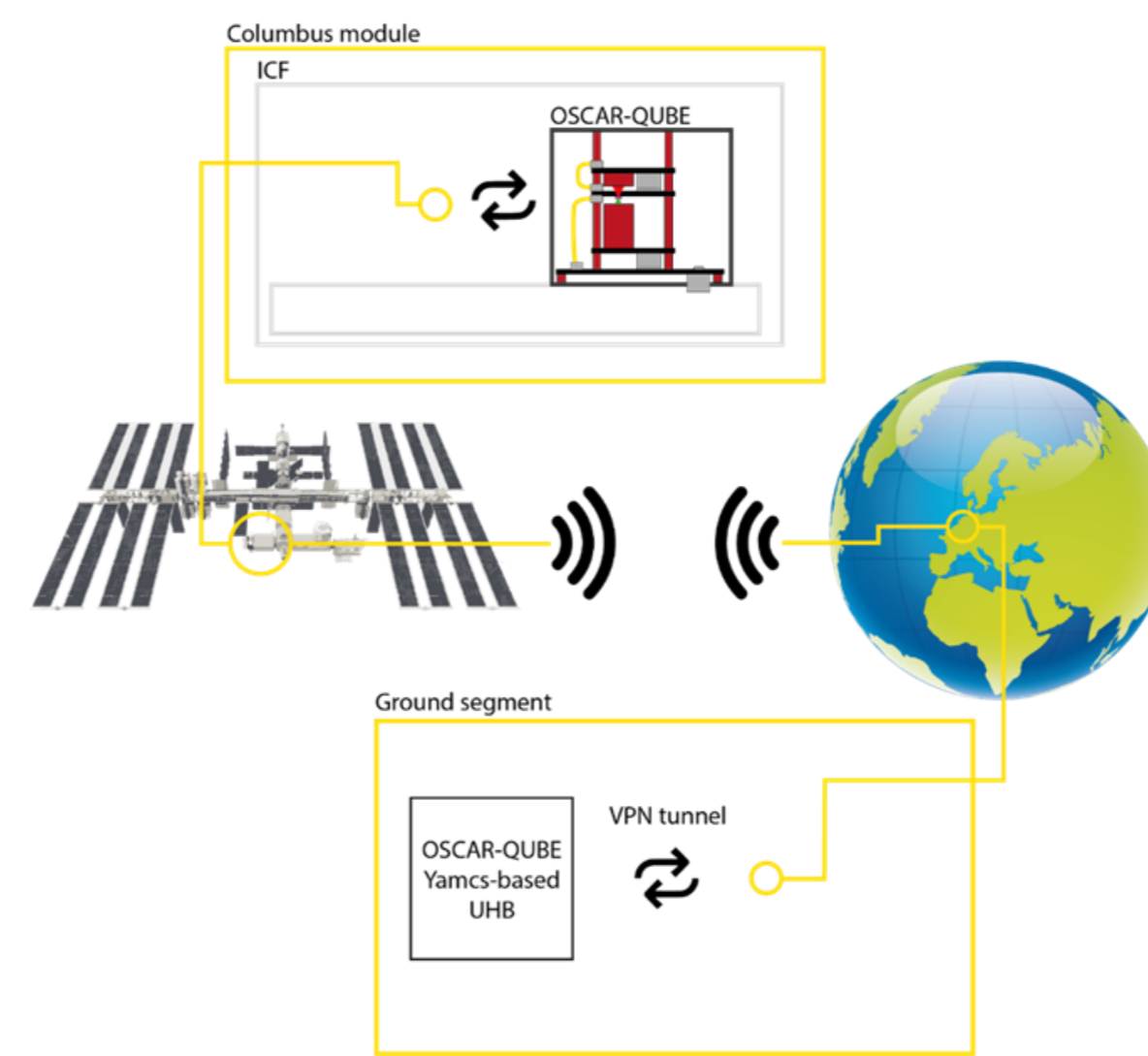


Figure 1: General overview of connection with the QUBE

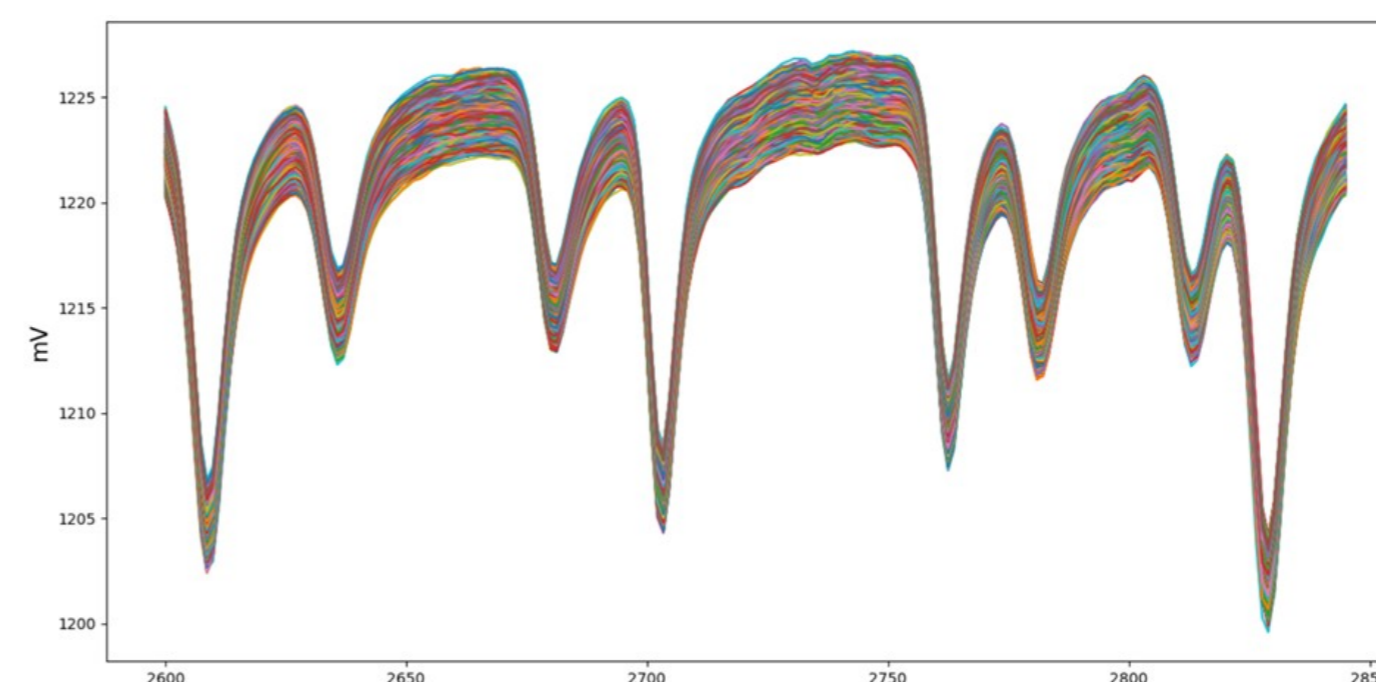


Figure 2: Visualization of captured ODMR data

- A user home base (UHB) was created to interface with the embedded system
- GUI was created using PyQt5 which interfaces with the MCS to operate the QUBE
- The live ODMR data gathered by the QUBE is visualized by the GUI

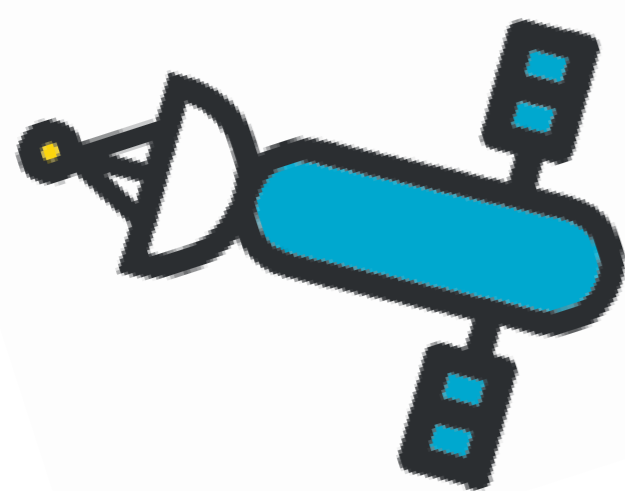


Figure 3: Resulting displays of the GUI



4. Conclusion

The UHB was thoroughly tested on reliability and user experience during its development and the interface test campaign of the system. It was found it fulfilled all the requirements with substantial margins, meaning the **system will be used during the mission.**

Promotor:

Prof. Dr. Milos Nesladek

Co-Promotor:

Prof. Dr. Ir. Ronald Thoelen

Work supervisor:

Ir. Jaroslav Hruby