IREC - Hyperion Software Status Report

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1 Work Completed

This section will outline work completed on the system software of the Hyperion payload.

- Inital testing of hardware modules:
  - LSM9DS1 (Accelerometer , Gyroscope, Magnetometer) Sensor
  - BME280 (Pressure, Humidity, Temperature) Sensor
  - CCS811 (TVOC, CO2) Sensor
  - LIS331 (Accelerometer) Sensor
  - RFM_9X LoRa
- Utility functions for hardware modules
  - LSM9DS1 (Accelerometer , Gyroscope, Magnetometer) Sensor
  - BME280 (Pressure, Humidity, Temperature) Sensor
  - CCS811 (TVOC, CO2) Sensor
  - LIS331 (Accelerometer) Sensor
  - RFM_9X LoRa
- Defining a communication protocol for the Hyperion Payload
- Implementing the payload communication protocol
- Creation of a robust execution scheduling queue (Dynamic Scheduling Queue)
- Forked RadioHead library to work with Teensy3.6

- Tested:
  - Communication between RFM_9X modules
  - Communication between RFM_9X modules using the Hyperion payload Protocol
  - The Dynamic Scheduling Queue
  - Communication routines within the the system

2 In Progress / ToDo

This section will outline work that is in progress or will be in the near future.

- Further defining routines within the system
- Implementation of routines regarding:
  - Gathering data from sensors, logging it
  - Transmission of data groups with the Hyperion Protocol
  - Writing the data buffer to the storage card
  - Mission Events (Parachute deployment, Impact damper deployment)
  - Maintaining impact damper pressure
- Testing implemented routines
- Initial testing of the Pressure Transducer
- Utility functions for the Pressure Transducer
- Further optimizing the Hyperion Protocol for low-bandwidth environments
- Testing deployment sensing mechanism
- Testing software with mission event tests (Parachute deployment, Impact damper deployment)
- Readjustment of static priority values within the Dynamic Scheduling Queue.
- Testing of overall system

- Data feeder software for ground station:
  - Software to collect transmissions from payload on a micro-controller
  - Software to collect data over serial from connected micro-controller and feed data to HabNet

3 Links

- The Rochester Institute of Technology Space Exploration Website
  http://spex.rit.edu
- The Rochester Institute of Technology Space Exploration GitHub Page
  https://github.com/RIT-Space-Exploration
- IREC - Hyperion Main Repository (GitHub)
  https://github.com/RIT-Space-Exploration/IREC-Hyperion
- Dynamic Scheduling Queue (GitHub)
  https://github.com/RIT-Space-Exploration/Dynamic-Scheduling-Queue
- Forked RadioHead Library (GitHub)
  https://github.com/RIT-Space-Exploration/RadioHead