OBCSW sub-team

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Work that has been defined for the semester

- Experiment tasks
  - Nanoprop:
    - Read gyro values
    - Manual abort
    - Abort based on gyro readings
    - Delays for Nanoprop API
    - FDIR review
    - uint8 datatype fix
    - FDIR test methods
    - TM/TC
    - HK
  - SEUD/Camera
- Semaphores/Mutexes
- Add more TM queues
- LEGS & CUBES tests
- Initialization phase FDIR:
  - Automatic I2C speed adjustments
- Add new TM sources in accordance with M154_035
  - Add parts of the ADCS library HK to the basic HK beacon
- AntS deployment

- Add/remove exectime for TCs
- Define authenticated/troubleshooting TCs
- Remove unused TCs or note that they are unused in the description
- Separate HK interval for realtime/stored
- TM_S160_ADCS_LIB_HK to realtime HK
- Be less dependent on SD card
- Strange macro TC bug (manual memory allocation/bit rotate bug)
- Elveti module improvements

Completed & In Progress tasks/subtasks

- Experiment tasks
  - Nanoprop:
    - Read gyro values
    - Manual abort
    - Abort based on gyro readings
    - Delays for Nanoprop API
    - FDIR review
    - uint8 datatype fix
    - FDIR test methods
    - TM/TC
    - HK
  - SEUD/Camera
- Semaphores/Mutexes
- Add more TM queues
- LEGS & CUBES tests
- Initialization phase FDIR:
  - Automatic I2C speed adjustments
- Add new TM sources in accordance with M154_035:
  - Add parts of the ADCS library HK to the basic HK beacon
- AntS deployment

Assigned to new students:

- Add/remove exectime for TCs
- Define authenticated/troubleshooting TCs
- Remove unused TCs or note that they are unused in the description
- Separate HK interval for realtime/stored
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Nanoprop - manual abort

1. Ground station sends TC with MANUAL_ABORT
2. Nanoprop task checks received TC
3. If it is MANUAL_ABORT, it sets manual_abort internal flag to true
4. Nanoprop aborts at the next FDIR checkpoint

AntS deployment

- Buggy AntS deployment:
  - Deployment gets cancelled the moment it starts
- MR review in progress:
  - Introduces a delay for the deployment
  - Review suggestion: polling status of the antenna while trying to deploy

Nanoprop - pressure reading delay

7.2.2 Pulsing

While the barrier valves support clicking (i.e. opening and closing) at a very high rate, there can be practical limitations on pulsing of the thrusters. A pulse of exhaust propellant is in general in the shape of a steep thrust peak at the instant of firing followed by a tail after the instant of stopping firing. As each pulse is initiated and terminated by separate commands; firing on and firing off, the timing is important for a pulse to be of the right length.

When communicating with the NanoProp module using CSP CAN, there are certain timing uncertainties that will impact the accuracy of pulses when going down to really short pulsing times. By communicating with the NanoProp module using standard I2C (without CSP), the accuracy is better.

When the pulse duration approaches the sampling rate (20 Hz) of telemetry for mass flow, pressure and consumed propellant, accuracy will be reduced. When the tail length after the valve has closed is of the same order of magnitude as the total pulse length, the accuracy in the telemetry will be greatly reduced.

Future work

- Revised altbootcommand
- More intuitive Binary ID to Norflash address mappings
- U-boot watchdog tests
- Delete binaries from SD card via TC
- Remove redundant FRAM bootcounter
- Elveti real time HK visualization
- Unit test coverage report (good to have)