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TEAM IMPULSE

CanSats in Europe

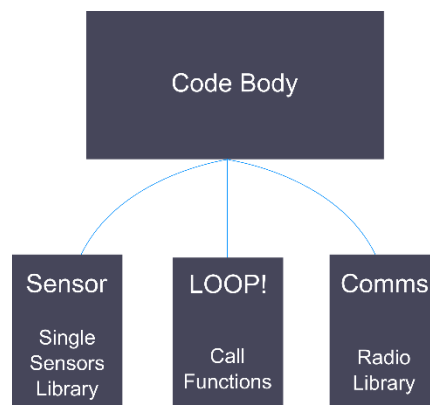
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Electronics

Progress on the electronics front has been relatively strong, with assembly of the second revision of the PCB complete with the exception of the radio module, which was successfully tested on the previous revision. For this prototyping revision, the decision has been made to use stackable headers for almost all of the pins on the Teensy microprocessor board; this means that, when the board is superseded, the (relatively) expensive Teensy board may easily be removed and installed in the new board; also, should the Teensy fail for any reason, it may be removed without damage to the underlying board. This increases the board thickness to 15mm (approx.), however this is acceptable bearing in mind the hardware constraints. The base station electronics are not yet designed, however it is anticipated that they will use an Arduino-based board wired directly to a LoRa radio module, an arrangement which reduces costs to an absolute minimum and keeps complexity low, aiding troubleshooting.

Software

Progress has been less rapid on the software and firmware side. The team has now decided to produce a user interface for the base station using C#, GTK# and the Mono/.NET framework, expecting to build for Mac OSX. This is still in its very early stages, and may still be subject to change. The rover firmware remains under development; code for the MS5637 digital barometer and thermometer has been successfully tested. The code for motor control (which may use a PID loop or a somewhat refined system of bang-bang control; this is still dependent on the outcome of testing) is being produced this week. Abstraction of key functionality to libraries has been decided upon as a method for ensuring that the code is maintainable and readable. This is critical in order for the manual error checking which is planned for the first months of 2015 to succeed. The diagram below shows the intended structure of the rover firmware.



Mechanical Design

The next iteration of mechanical design is currently in the final production stages, aided significantly by extensive use of CAD/CAM. More information on this section will be included in the final report.

Sponsorship

PCBTrain, a British PCB manufacturer, has very kindly agreed to sponsor Team Impulse by providing free boards. This is an invaluable contribution which will make it significantly easier to fall within the budget set aside. The team is also approaching an electronics supplier with the goal of obtaining sponsorship for the few parts which are yet to be acquired.

Outreach

The outreach programme continues to run successfully; a team YouTube account is being set up and videos looking into outreach will be posted there where possible. The team's Twitter account remains active and is used relatively regularly. A cake sale was recently conducted, with the twin goals of raising funds and spreading knowledge of the CanSat programme; this was run in collaboration with the team that St Paul's is entering into the beginners' CanSat competition. This team raised approximately £80, serving a number of people and raising the profile of CanSat in the school. A talk was also given to the Engineering Society recently, by William, Yuki and Euan. The team expects to conduct several further outreach events before the launch date. The website is still being updated and maintained, with the recent addition of the Files section to aid the sharing of reports with the public for outreach purposes.

New Member

The team has gained a new member, Igor Timofeev, who applied to join after attending the Engineering Society talk mentioned above. He is writing the motor control code and may be assisting with data analysis.