‘Fly a Rocket!’ group descriptions

The groups are described in this document.

Group A: Rocket physics

This group focuses on going further into the world of rocket physics and its related themes, and is strongly based on simulations. Normally the group starts with building model rockets which are launched during the week. After the model rockets are built, the students run a commercially available simulation programme called RockSim (3 DOF), which gives the students loads of parameters from the planned flight. The student rockets are then modeled in RockSim and further simulated in OpenRocket (open source, 6 DOF), and the students analyse the data. After launch, the students compare the simulated data with the data obtained from the rocket launch. Some students, depending on their educational level, also write a simulation programme from scratch and compare this to the results obtained from other simulated data. The group also has the responsibility of setting up a hybrid motor demonstration, which they will then show to the other students.

Group B: Experiment

This group focuses on how to decode the different sensors onboard a payload, and will make about half of the sensors on the rocket. The group learns how analog to digital converters (ADC) work, how the sensors are encoded, and in which order. As they are getting data through the telemetry systems, it is also possible for them to read and interpret the data in real-time. This group will also prepare a MATLAB script that they will give the other groups when analysing the data. Experiment groups are going to study the spin of the rocket by using different sensors onboard.

Group C: Payload

The payload group will make the other half of the sensors on the rocket, and will have the responsibility of assembling the rocket itself and mounting all the payloads in the rocket. The students will be manning the payload manager station and controlling the ground support equipment during the rocket campaign. In order to prepare them for this, the students will get a thorough introduction to all the working parts in the payload, including the encoder and transmitter.

Group D: Telemetry

It is very important, during a rocket launch, to get good quality signals from the rocket back to the ground for subsequent analysis. Telemetry is responsible for the verification of the main telemetry, as well as setting up the NAROM telemetry station prior to the launch. The telemetry students will become experts on what happens between when the signals are sampled by the encoder to when they arrive at the computers, ready for the Experimenters group to store them and proceed with further analysis.

Group E: Science

The content of the Science group is heavily dependent on the interest of the students. Generally, the content involves the general physics surrounding the rocket flight, the atmosphere, and the physics that a rocket can measure. The group will run a fluid simulation of flow around the rocket. They will also be responsible for a weather balloon release one or two days prior to launching the student rocket, in order to measure the atmospheric conditions expected on the day of the launch.