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ALIEN

ALtitude Imaging Entering Near-space

The aim of the ALIEN project is to launch a helium filled meteorological balloon to an altitude of ~30km (100,000ft) above sea level with a payload consisting of a digital camera along with other sensors (currently temperature, perhaps others depending on budget). Throughout the flight, the camera will be taking photos; we hope to obtain pictures of the Earth/space horizon in the same vein as the picture at the bottom of the page.

We have been inspired by the recent launch of such a balloon by a group of students in Spain, along with a multitude of similar launches throughout the world. These launches have been carried out with hardware no more sophisticated than ours. We have affiliated ourselves with the UK High Altitude Society (UKHAS), the members of which have offered their expertise and support at every step of the project. We have also been in touch with members of the Cambridge University Spaceflight programme, who have offered to support us with a launch on their site, including offering free helium to fill the balloon.

The equipment needed for such a launch is surprisingly readily available from online retailers, and is also relatively inexpensive. We have compiled a full hardware list, including links to suppliers, on our page at the UKHAS wiki (http://wiki.ukhas.org.uk/projects:alien). Every piece of hardware has been recommended to us by various members of UKHAS, who have collectively tested them on their dozens of successful missions. Thus, we are confident that our implementation of a balloon payload will be reliable and robust.

The payload will include a relatively simple embedded flight computer, which we will program to operate with a range of on-board devices: a GPS module, a radio transmitter, the camera itself, two temperature sensors (one internal, the other external) and a mobile phone. After being released, the balloon and payload will rise to ~30km above the ground. At this point, it will burst due to expansion and the payload will fall back to earth suspended beneath a parachute. Throughout the voyage, the camera will take photos at regular intervals, and the temperature sensors will make regular measurements. All of this data will be saved inside the payload. Before launch, we will use software made available by the Cambridge University Spaceflight team in order to make a relatively accurate prediction of the final landing position. The payload will also be continuously broadcasting it's GPS coordinates over radio, which we will receive, allowing us to recover it after landing. It also contains a mobile phone, which will be able to send SMS text messages containing coordinates when the balloon is below an altitude of a few thousand feet, allowing us to theoretically recover the balloon using our mobile phones alone (in practice, usage of a phone is much less reliable – this is why we must include radio).

Currently all that is left to arrange is funding for the project. We estimate the total cost of hardware to be less than £200, an insignificant amount considering that it takes NASA many millions to take photos of the curvature of the Earth!

We believe there is much educational value in planning, designing and implementing a project like this. Launching high altitude balloons touches on a wide range of subjects: physics, electronics, engineering and geography to name a few. In order to succeed, we must work as a close team, as well as integrating with other amateur enthusiasts in the field – these are all key skills to develop. Because all but the helium and balloon are reusable, we hope that this will be the first flight of many to come. High altitude ballooning is a domain with huge potential for relatively low costs: some future ideas include video cameras, UV light sensors and atmospheric analysers.

The below picture was taken by Robert Harrison (one of the many helpful souls we have talked to via the UKHAS's chatrooms). It was produced by his ballooning project *Icarus* with similar hardware to ours. As you can see, the results of a project like this are simply amazing, and we hope to match them.