

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Open Space: Participatory Space Education and Outreach (8)

Author: Mr. Shaun Whitehead
Scoutek Ltd, United Kingdom, shaun@creationeer.co.uk

THUMBSAT AND THUMBNET - TINY SATELLITES, HUGE RESULTS

Abstract

At the moment, space is elitist. It doesn't need to be. ThumbSat and ThumbNet aim to change things.

ThumbSat is the smallest practical satellite that can carry out a broad range of useful science. It is no larger than a human thumb. It is not a kit, it's a service. Building a kit is reinventing the wheel, real space progress will be driven by building new payloads and experiments. With no satellite to build, the experimenter is free to focus on the important part - the experiment, and ThumbSat can even assist with that. The service includes launch to orbit, permits, licenses and data download.

The goal of ThumbSat is to place projects into orbit with the minimum of fuss, within a few months, and at prices that make it accessible to schools and even amateur experimenters. Of course, satellites need to deliver data, and a tiny satellite can't transmit at huge data rates, so a widespread network of robust, easily-deployed and automated satellite receiving stations is required. That's ThumbNet.

Using common, off the shelf components and careful design choices, ThumbNet Tracking stations are cheap enough that they can be donated by ThumbSat to around 250 suitable schools, organizations and individuals globally. Each station grabs a small piece of data from a ThumbSat and sends it to a central server, where the pieces are reassembled like a jigsaw puzzle. Global coverage is required, so volunteers have been recruited from large land-locked cities to tiny islands amid huge oceans.

Communities and high schools in remote locations such as Christmas Island and Sao Tome Principe have the same opportunity to educate their students with access to hands-on hardware, information and services that previously were only available to large, well connected universities. However, it's not just about science and education. There is a social aspect, uniting communities around the globe in one project.

For much of the time, any one ThumbNet station will not have a ThumbSat in range. During these periods, the school, student or scientist can use the ThumbNet hardware to perform any manner of space and radio experiments. Education and outreach is key. Hardware designs, software, electrical and mechanical parts have been made available for study on the ThumbSat website. Students are encouraged to provide feedback and create new or replacement ThumbNet station parts using 3D printers, encouraging creative, technical and social skills.