

Space Trek

Meet these teenage girls in South Africa building a space satellite

Do you have what it takes to build a space satellite? That was the challenge put to a group of 30 school girls in South Africa in early 2016, as they took part in MEDO Space Trek, a week long boot camp that teaches young women to build a Cricket Satellite.

The challenge of space

“Everything was one big challenge to me,” said Pheobyn Filander. “At school, when we do physics we don’t do practicals like this.” Her co-Space Trekker Nwabisa Sitole agrees: “We were challenged to build robots, to learn how to solder and to put little components together. Saturday was launching day, so we didn’t have time to relax.”

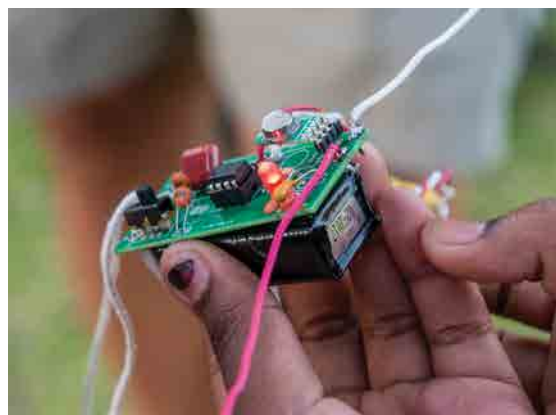
Engineers from the local Cape Peninsula University taught the girls the basics of satellite science, while teachers were on hand to offer motivational support. “The first few days were theory,” said Ayesha Salie. “We got to learn all about the components and the technical skills, like soldering, that we needed to build the satellite.”

The mini-satellites built by the girls were carried four miles into air by helium weather balloons, measuring the air temperature as they went. “The thing that measures the temperature is a special kind of technology called a thermistor. As the temperature rises or decreases, the rate that it resists current changes,” explained Brittany Bull. Before the balloon bursts, the data is beamed from the Cricket Satellite (so-called because it looks like the insect) to a ground station.

MEDO an organization which promotes economic development in South Africa.



Two Space Trekkers get some practice at soldering electronic components.



The electronic payload which the Space Trekkers sent high into the atmosphere.

SA satellite

But this was just the first stage of the girls' space endeavour. Later this year MEDO will launch a full scale space satellite from the Mohave desert in California— and they get to decide what it will do. “The satellite will monitor agriculture on the continent, trees and plants, biodiversity. A satellite that spots crop yield losses would really help our economy,” said Brittany. Last year South Africa suffered its worst drought since records began, resulting in widespread crop loss.

A satellite is simply a small object moving around a bigger object in a path we call an orbit: the Moon is a natural satellite of the Earth, while the Earth is a satellite of the Sun. There are two main types of artificial satellite, with very different uses. A geostationary satellite moves at exactly the same speed as the Earth's rotation. By doing so it stays at a fixed point above the Earth's surface, and so is used to bounce signals between opposite sides of Earth. Communication satellites, transmitting TV and internet signals, are usually geostationary.

Polar satellites, however, will cross both the north and south poles, scanning the Earth several times every day. Because of this polar satellites are good for mapping the Earth (and for spying on people). The MEDO space satellite will be put into a polar orbit, so that it scans across Africa every 90 minutes, travelling at an incredible 18,000 miles an hour.



The Space Trekkers use an oscilloscope to test their circuitry before launch.

The world's first artificial satellite, called Sputnik I, was launched in 1957 by the Soviet Union during the 'space race' against the United States. While political competition spurred this investment in space exploration, both sides reaped economic rewards - for every \$1 that NASA spends it generates \$7 for the economy.

Economic benefits

Judi Sandrock, the CEO of MEDO, wants Space Trek to do the same for South Africa's economy. “What the programme and the satellite is all about, is to inspire so that we have more people doing well in Science and Maths at school not only to become engineers, but teachers and a whole array of other professions.” In South Africa, only 5.5 per cent of pupils pass Science with more than 60 per cent, making it very difficult for them to continue studying these subjects at university.



The payload was carried up by a helium-filled weather balloon.

While science and technology are cornerstones of sustainable development, the benefits are often one-sided. In the UK, women only make up 13% of the workforce in Science Technology Engineering and Mathematics (STEM). “In most societies there is still the stigma whereby women are the homemakers and are supposed to do ‘feminine’ things such as housekeeping or teaching,” said Brittany. “Most of the time people think science and engineering are jobs for males,” Phoebyn added. “But I like quantum physics and satellite engineering. Space Trek opened my eyes; I can succeed in science and technology as a woman.”

Thomas Lewton is a science film-maker and journalist travelling in southern Africa.

Look here!

Watch the MEDO Space Trek launch:
<https://vimeo.com/151614850>