Student satellite almost ready for space

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Building a satellite takes years and costs millions. Well, not always. Nearly one hundred students from all over Europe have been working hard on SSETI Express. From the drawing board to launch in less than one year, all the while keeping costs to a minimum.
Last week a handful of students gathered at ESTEC, in Noordwijk, the Netherlands, to put the finishing touches to the flight model. The nerve-wracking 'final exams' in the space simulators will follow in January – the last hurdle before launch in May 2005.

Sascha Tietz already witnessed the vibration test of the satellite's propulsion system and knows what to expect: "You will see a sixty by sixty by seventy centimetre satellite standing on an enormous vibration table. There will be movement in all directions - nothing will be normal. But still Express will survive. It will be ok out in space, of that I am sure."

The other students are just as confident about the satellite, which is not much bigger than a dishwasher. Inside there are three smaller satellites, each measuring ten cubic centimetres.

As soon as the mother satellite has been released from the launcher, the three smaller 'cubesats' will be deployed.

They are built by universities in Germany, Japan and Norway, and are a premiere according to Philippe Willekens, from ESA's Education Department, never before has a satellite placed other satellites into Earth orbit.

Chat sessions

Like the longer term and larger scale Student Space Education and Technology Initiative (SSETI) mission, European Student Earth Orbiter (ESEO), SSETI Express has been largely designed and built over the Internet.

The students keep each other informed about the latest developments using a special news server and weekly chat sessions. "This is an education project, but it is more than learning via the Internet," believes Sascha. "You do learn, but meanwhile you are also actually doing something, you really are building a satellite."

What started out as a chaotic gathering of up to forty students has evolved into routine structured meetings using a unique chat language. The students use short sentences, getting to the point quickly.

Twice a week the satellite builders hold a virtual meeting under the leadership of Neil Melville and Marie De Cock from ESA.

She is pleased with the renewed enthusiasm from the participants, "The students have been working on SSETI ESEO for four years, but physically there's not much to show for it. Express is intended as a quick version, providing motivation and real hands-on experience of building a satellite."

Once in space, Express will test various parts that will also fly on the ESEO mission. It will also take photos of the Earth, accessible to everyone over the Internet thanks to an open control centre. Once the main mission is completed after three months, Express will serve as a transponder for amateur radio users.

Apprenticeship

Express has been a good apprenticeship for the young engineers. During integration it became apparent that some of the parts weren't compatible. Problems arose because of differing standards between countries.

The 'language' in which the various satellite components communicate also had some compatibility problems.

During the first tests of the main computer the team encountered a crucial communication fault, both in the computer itself, and between the students.

"My message was using 29 characters, Sascha's 11. We hadn't made a clear decision about the standard during one of the chat sessions," explains Renato Krpoun from Switzerland.

During the workshop at ESTEC the students are doing their utmost to get the satellite ready for launch in May 2005.

Parts have been soldered and tested over and over and over again. Austrian student Lars Mehnen has been involved in the project from the start and will stay in Noordwijk for a while to finish his tasks. Despite the long working hours, he remains optimistic, "A satellite is the most complex object you can build as an engineer, a fantastic challenge."

Help

ESA is the main sponsor of SSETI Express, but it is the students themselves who have to make sure the satellite actually leaves the ground. It will take more than late nights in the cleanroom to make it into space though.

The team have recruited two law students from Paris, France, to take care of legal matters. Their tasks include for example arranging customs documentation for parts that have to be delivered from France, via Germany, and eventually in the satellite, on to Russia.

Meanwhile a group of Italian art students are working on Public Relations. They have created a website, arranged photos and written press releases. From next year, business schools in Belgium, France and Switzerland will also become involved in the project, helping with planning, finances and sponsorship.

Sponsorship is very important as SSETI Express is not only built by students, but also has a student budget – preferably for free.

"We don't have money, but we still have to get things done", explains Karl Kaas Laursen from Denmark. "But if you think that means we aren't taken seriously by the space industry, then you would be wrong."

For example, Valkenburg Airport is providing the paintwork and a German glue manufacturer is giving advice about the best adhesives to use.

Sascha: "When we explain what we are doing, and how hard we are working, a lot of companies are prepared to give us a helping hand. They appreciate what we are doing with this project."

The engineers at ESTEC are no exception according to Renato, "You just have to open up the phonebook to the right page for a particular department, and they are ready to help. Sometimes they even have spare parts for us that would otherwise just be gathering dust in a draw."

The SSETI Association was started in June 2003, giving the project greater independence.

The European Space Agency remains the main sponsor and helps where they can, but the SSETI Association makes it easier for the students to find sponsors for the ongoing ESEO project and the future European Student Moon Orbiter (ESMO).

Ultimate place

Many of the students have ambitions that go further than the Moon. After SSETI they will work in the space industry.

Karl: "Space is the ultimate place to send electronics. It could spell the end for your equipment. When they saw the first designs for SSETI, the experts said: that will break, this will explode and the rest will fall off during launch. That's when the challenge started. You want to know if you can build something that can survive anything – the launch and the harsh space environment. SSETI Express will do it, just watch..."

Source: ESA

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