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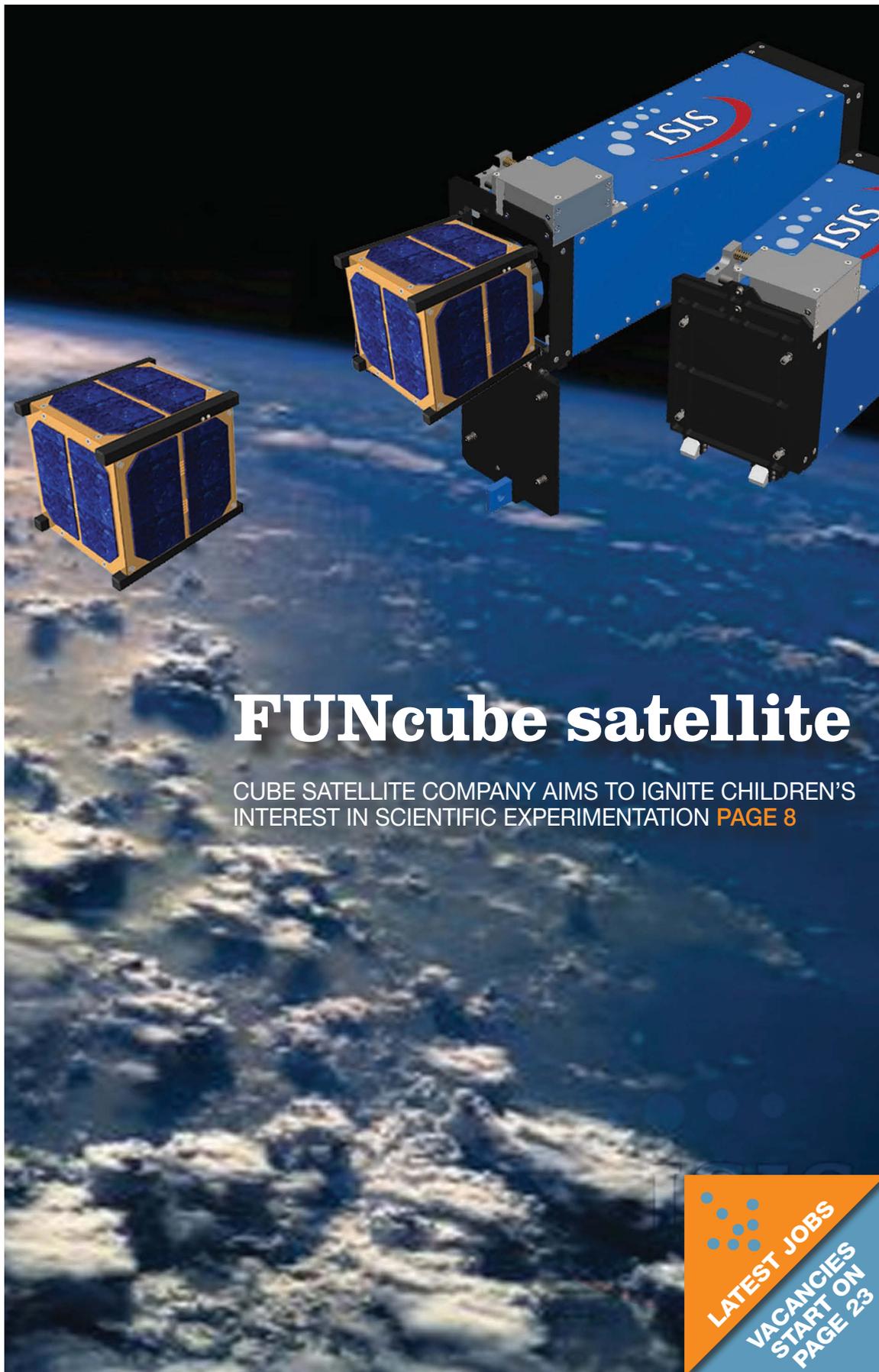
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FUNcube satellite will encourage school children to carry out scientific experiments, writes **Steve Bush**

Bringing FUN back to the classroom

Radio ham organisation AMSAT-UK has announced an amateur satellite project called FUNcube, aimed at primary and secondary school pupils.

"It is the only satellite we know of designed to encourage children," project leader Graham Shirville told *EW*.

On board will be a 145MHz telemetry beacon that will provide a strong signal for pupils to receive, and will support educational science, technology, engineering and maths initiatives.

"It is planned to develop a simple receiver board that can be connected to the USB port of a laptop to display telemetry in an interesting way," said AMSAT. "The satellite will contain four materials science experiments, from which the school students can receive telemetry data that they can compare to the results they obtained from similar reference experiments in the classroom."

It will also tie-up with GB4FUN, a van fitted out with educational demonstrations of communication technology that visits schools.

FUNcube will measure 10cm x 10cm x 10cm and weigh under 1kg. "It is the smallest-ever satellite to carry such a sophisticated communications payload," claims AMSAT.

This is by no means the first amateur satellite. Across the globe "amateur satellites have been every mass from 9kg to 350kg", said Shirville.

UK radio hams put together OSCAR 7, which is still operating after 27 years in orbit.

Cube sats were first defined by California academics as a low-cost way into space.

According to Shirville, there are more than 20 in orbit so far, mostly from universities. All are 10cm x 10cm in cross section, and either 10cm, 20cm or 30cm long.

They are deployed by a standard spring-loaded mechanism attached to the launcher that can throw out three 10cm cubes, one 30cm 'cube' or a combination of 10cm and 20cm satellites.

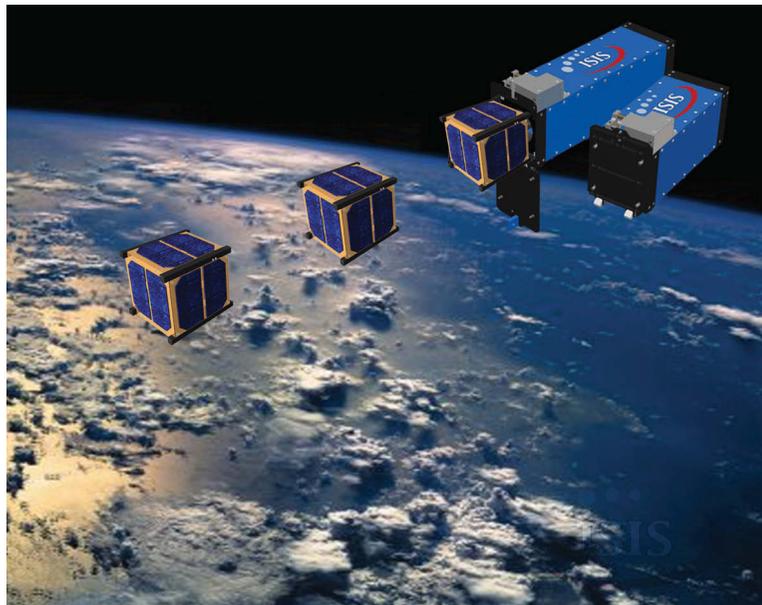
FUNcube will be built in collaboration with Delft University of Technology spin-out Innovative Solutions in Space (ISIS).

"ISIS will provide the chassis, solar cells, electrical power system, and the deployable antennas," project leader Graham Shirville told *EW*. "Our team will provide the transponder board, and the communications and control board." ISIS will then complete integration and verification.

The intention is to put the satellite into a sun synchronous low earth orbit 600km to 700km up "using one of the many launch opportunities that exist for Cubesat missions", claims AMSAT.

Small satellites tend to be tucked away on launchers alongside their primary payload instead of ballast weights.

FUNcube will support educational science, technology, engineering and maths initiatives



FUNcube is designed to display telemetry in a way that will appeal to children

Or they are included on test firings when the chance of failure is higher and owners of expensive satellites are less willing to take the risk.

"Fifteen to 30 years ago, we got virtually free flights," said Shirville. "As space rockets have got more reliable, things have got more difficult."

FUNcube will be ready for launch in October 2010.

"There are still possibilities of almost-free launches for this size of satellite on launcher early flights," said Shirville.

The European Space Agency's forthcoming Vega launcher will have test flights at about the right time.

"We will make a decision by the end of the year, and if none [cheap flights] are available, we will go out and buy a launch," said Shirville.

FUNcube has initial funding from the charity Radio Communications Foundation.

"We have enough money to get it flight-ready – it is expected to be around E50,000.

RCF is providing a large proportion of that, AMSAT-UK is providing the rest.

If a commercial launch has to be bought, this will add another E50,000.

AMSAT-UK has 350 individual members and is one of 20 or so such groups worldwide.

As well as OSCAR 7, it has provided hardware satellites over four decades including SSETI Express in 2005.

"We are presently involved with the development of hardware and software for a number of satellite projects including the European Student Earth Orbiter (ESEO), P3E, SUITSAT2, the Columbus module on the ISS and also the GENSO Ground station network," said AMSAT.

RCF was set up in 2003 with cash from an anonymous donor to fund efforts to "bring the wonders of radio into the classrooms, universities and any other public place where hands-on demonstrations can influence understanding". ●

AMSAT-UK
www.uk.amsat.org

Radio Communications Foundation
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GB4FUN
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