BLOCKBUSTER PHYSICS: SCI-FI'S BIGGEST HITS (AND MISSES)

COSMOS

THE SCIENCE OF EVERYTHING

Issue 93

SUMMER OF SCIENCE

+

TIME-MACHINE TREES

One garden, 900 eucalypts

OUR $1M RESCUE ROBOTS

Australia rises to the challenge

INSIDE SCOOP

Ice cream chemistry

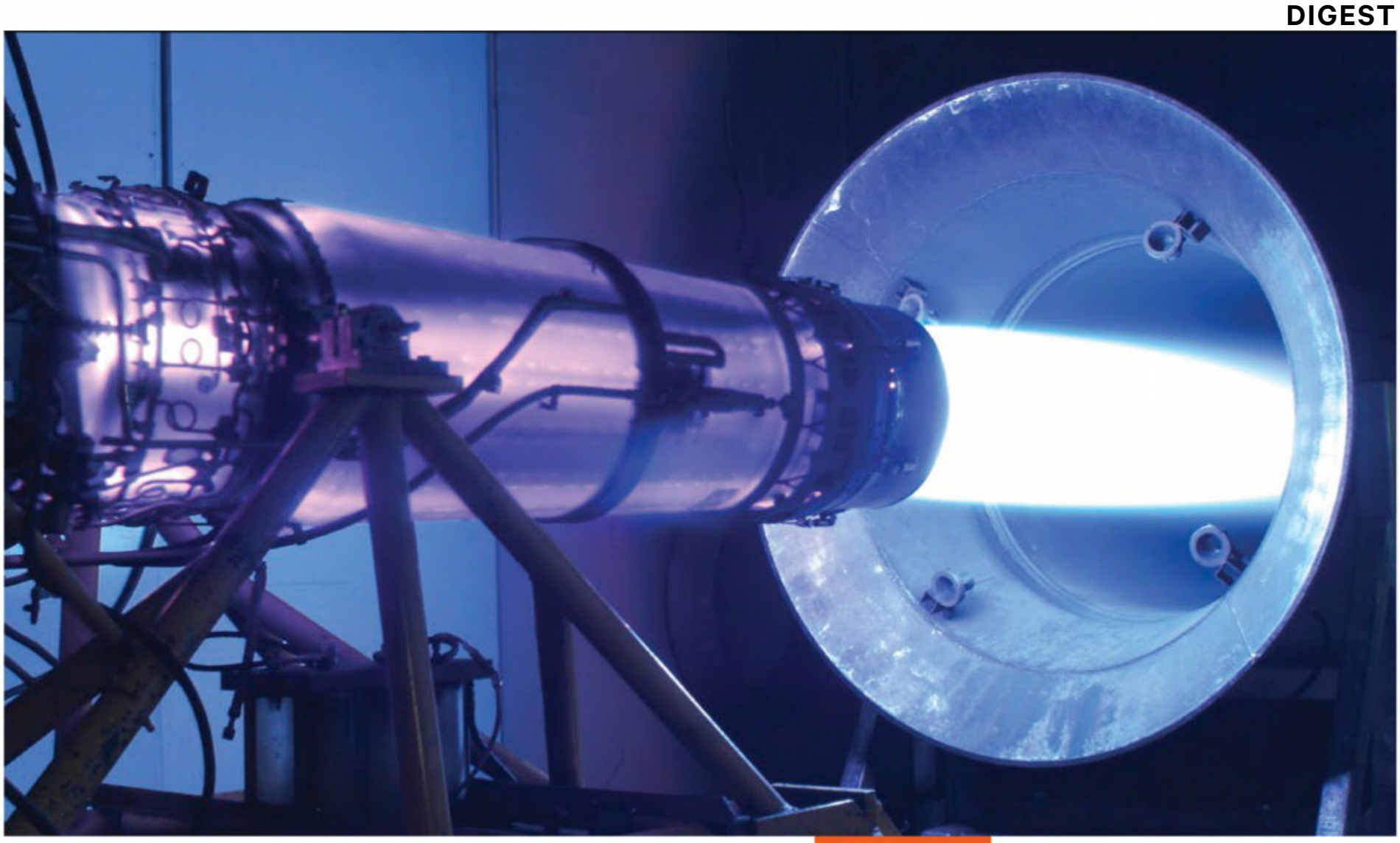
Ri Aus

93

9 771832 522008

AU $15.00 NZ $16.00

ASIMOV MADE REAL? • LIFE ON MARS • MACRO GALLERY • TOOTHPASTE DECONSTRUCTED



TECHNOLOGY

3D printing rocket and satellite parts

A new system will make greener space technology, faster.

The ability to 3D print satellite parts sounds like something out of science fiction, but Swinburne University of Technology is planning to do just that.

The university will install an elaborate 3D-printing system in 2022 that will be able to print a range of different substances – including metals often required in space technology.

"We'll be able to print exotic metals like titanium, certain stainless steels, certain nickel-based alloys – which are used a lot in high-temperature rocket space vehicles – and materials like aluminium alloys," said Andrew Ang, senior research engineer at Swinburne.

The ability to 3D print with these materials will make the manufacturing process less wasteful and more efficient.

"Traditionally, what happens is if you want a titanium part, with all these intricate shapes, you start with a block of titanium – a rectangular block, like an ice block," explains Ang.

"You put it on a milling machine, and you subtract material. That's quite wasteful, and it's also quite time-consuming."

In an additive manufacturing system like their new 3D printer, however, parts are made by spraying small amounts of powderised metal (or other substances) into precise spots, based on a digital model, until the part is complete.

▲ Sophisticated parts for space exploration might in future be 3D printed.

Unlike common commercial 3D printers, the system – called the Titomic TKF1000 – won't use heat or lasers to build components, but a supersonic gas jet.

"It uses what we call kinetic fusion," says Ang. "We feed the metal particles at a very high speed, about the speed of sound, and the particles impact the surface of the target and then fuse to form a three-dimensional object."

The system will also be able to blend materials. "You might want titanium for the first layer and then you might want to have another layer of a different material," he says.

The system will occupy a room roughly the size of a small shipping container, housing the printing nozzles, the powder units, and the computer that controls the device.

Ang says that once installed the printer will be used to print parts for Swinburne's partners in the space industry, as well as experimenting with different blends of materials.

FERTNIG/GETTY IMAGES.