

Extra dimension

3D printing seems an unlikely technology to apply to two-dimensional stamps. Yet Australia has been doing just that for four years, with a range of premium issues

■ Report by Indraneil Das and Genevieve V A Gee

An emerging technology which is taking the world by storm, 3D printing has applications in numerous fields, ranging from industry to medicine.

The process has been used to manufacture aircraft, bridges, guns and clothing, but also human tissue and organs for transplant surgery. It can even make pizza.

But did you know it has also been used to produce stamps?

First impressions

All the 3D-printed stamps produced to date have been issued by Australia Post, as part of its Impressions series of limited-edition philatelic products.

They are reprints of conventionally printed issues, not sold singly but available only in limited-edition packs, and at premium prices.

The stamps are made from a UV-curable polymer resin, using a 3D modelling program that raises certain elements on the design by fifty microns.

The colour is digitally printed by ink jets, with fine details enhanced by firing these at an angle. The finished stamp is cleaned using an alcohol solution, to remove excess resin, before being cured.

Besides being innovative, these stamps are aesthetically pleasing,



ABOVE: 3D printing has an increasingly wide range of applications. Thanks to Australia Post, these now include stamps

and are proving collectable. They have sold out by the philatelic service, and are being offered for high prices on online auction sites.

2018 Silo Art miniature sheet

The first 3D-printed issue was a miniature sheet of four \$1 stamps entitled Silo Art, released on November 5, 2018.

Featuring stunning murals painted on abandoned rural grain towers, the designs had originally

been issued on May 21, in both gummed and self-adhesive guises, and in a premium booklet.

November's special 3D issue, in a limited edition of 150, came in a high-quality wooden box lined with black velvet, with the regular miniature sheet also included.

Australia's silo art movement began in 2015, and is considered the country's largest outdoor art gallery. There are reportedly 54 locations in the Silo Art Trail, stretching across 5,000 miles.

The stamps illustrate murals by different artists in New South Wales, Queensland, Victoria and Western Australia.

2019 Moon Landing cover

The second 3D-printed issue came a year later, on November 1, 2019.

Inspired by the conventional issue marking the 50th anniversary of first landing on the Moon, issued on July 16, it comprised a special souvenir cover with a single \$1 stamp illustrating an astronaut walking on the surface.

Only 250 covers were available,



ABOVE: Australia 2018 Silo Art 3D-printed miniature sheet

with the cachet in gold foil and the postmark in teal-coloured ink. Each came in a velvet-lined folder.

The Apollo 11 mission of July 1969 allowed Neil Armstrong and Buzz Aldrin to become the first humans to walk on the Moon after landing the Lunar Module, *Eagle*, at Tranquillity Base.

The illustration whimsically shows a fully lit planet Earth in the background, with Australia facing the viewer.

2020 Civil Aviation cover

Australia marked 100 years of Civil Aviation by issuing two stamps and a miniature sheet on October 6, 2020.

The \$2.20 higher value, showing a De Havilland DH-50 coming in to land, was then 3D-printed for a special souvenir cover on November 2.

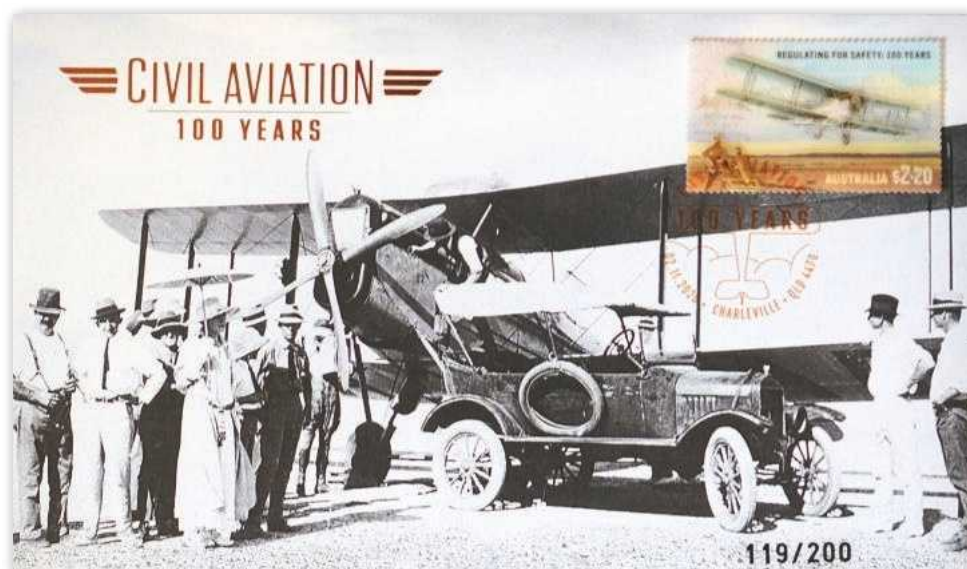
This time the print run was reduced to 200, and the cover, with an archive photograph as its background image and a postmark of Charleville, Queensland, came in a window-type cardboard folder.

The anniversary represents the centenary of the legislation controlling civil aviation, the Air Navigation Act of 1920, rather than of actual flights. The national carrier, Qantas, was founded in 1920 but did not commence operations until the following year.

The image on the stamp dates from 1924, when the first round-Australia flight was completed by a land plane.



ABOVE: Australia 2019 Moon Landing 3D-printed stamp on cover



ABOVE: Australia 2020 Civil Aviation 3D-printed stamp on cover

CLEVER TECHNOLOGY

The world's first 3D printer dates from 1984, when Charles W Hull was awarded a patent in the United States for 'Apparatus for production of three-dimensional objects by stereolithography'.

Essentially his computer-controlled machine created small physical objects by slowly pouring or spraying liquid plastic, building them up layer by layer.

Hull's company, 3D Systems Corporation, released the first commercial 3D printer, the SLA-1, in 1987.

The technology (sometimes called additive manufacturing) has since developed to employ a variety of materials, from resins to metals and ceramics to concrete, and even biological material.

The most common 3D printing process in use today is fused filament fabrication (FFF), which uses a continuous filament of a thermoplastic material.

It promises less material waste and shorter supply chains than other methods of manufacture, as well as the ability to manufacture complex geometrical shapes that would be impossible to create by hand.



3D-PRINTED STAMPS

2021 Sydney Bridge cover

The fourth 3D-printed stamp featured one of Australia's greatest architectural landmarks, the Sydney Harbour Bridge.

Selected from the National Heritage set of three issued on May 10, 2021, the \$1.10 design was reprinted for a special souvenir cover of November 1.

This time the print run was further reduced, to 150, and the cover, with a pictorial postmark struck in white ink, came in a window-type cardboard folder.

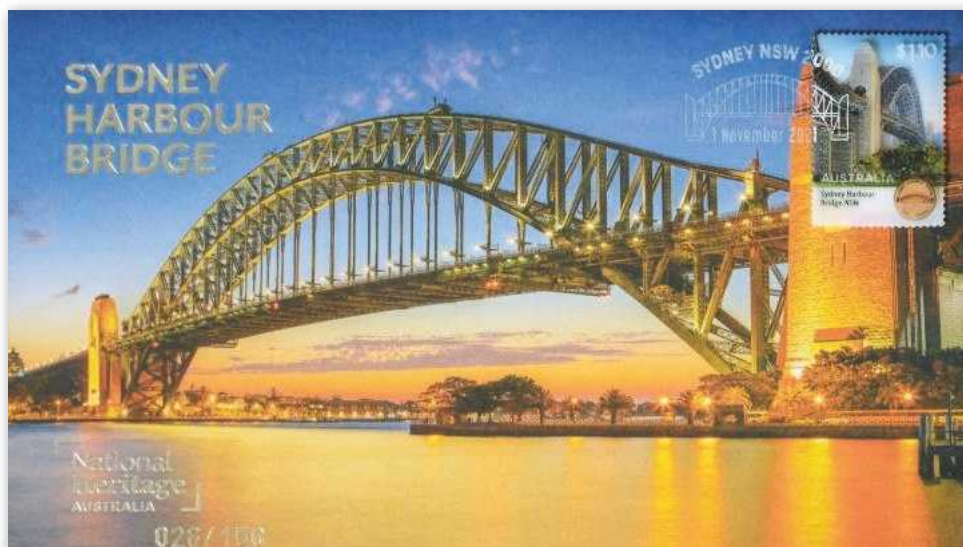
Opened in 1932, the a steel-arch bridge, nicknamed 'the coathanger', spans Sydney Harbour from the central business district to the north shore. It is the tallest steel-arch bridge in the world.

2021 Native Bonsai cover

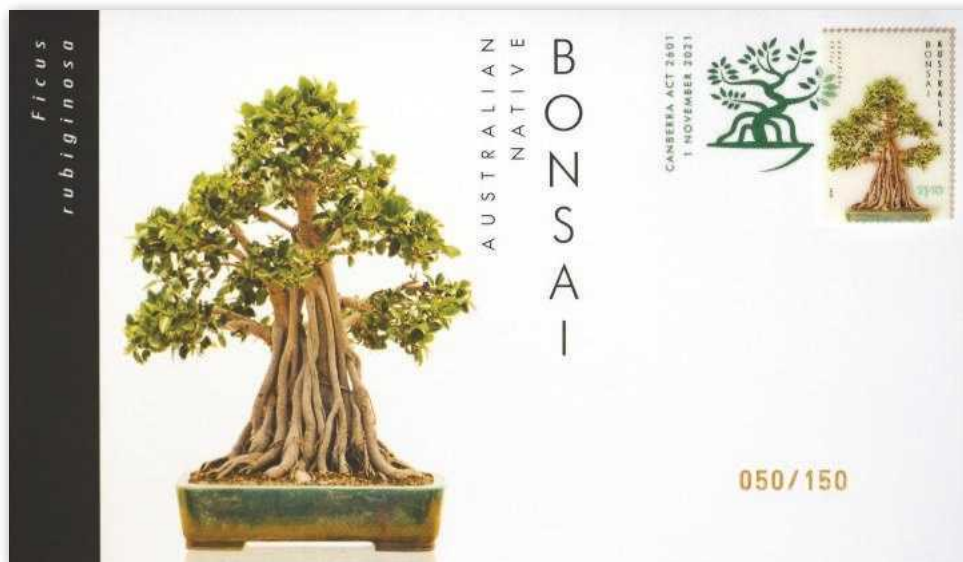
In 2021, for the first time, a second Australian stamp was selected for 3D printing. This was the \$1.00 design from the Native Bonsai set of three issued on July 27, showing a bonsai Australian fig tree.

Like the Sydney Harbour Bridge stamp, it came on a souvenir cover dated November 1, presented in a cardboard window-type folder, and with a print run of 150.

Bonsai (which means 'tray planting') is the traditional Japanese practice of growing miniature trees in pots. A number of Australian native tree species are now used by bonsai growers.



ABOVE: Australia 2021, Sydney Harbour Bridge 3D-printed stamp on cover



STAMP THEME

The first philatelic commemoration of 3D printing was by San Marino, which issued a set of three stamps in March 2015.

Entitled The 3D Printing Revolution, it illustrated the production of food, the creation of complex shapes and a clone of a human head, on values of €0.10, €0.80 and €2.15 respectively.

The set was designed by the American illustrator Andy Rementer, who is best known as the author of *Techno Tuesday*, a comic about the idiosyncrasies of technology.



ABOVE: Australia 2021, Native Bonsai 3D-printed stamp on cover

2022 Peter Brock cover

The 3D-printed stamp for 2022 is a rendition of a \$1.10 value from the King of the Mountain set, issued on October 3, celebrating the career of Australian motorsport legend Peter Brock.

It comes on a cover postmarked on November 1 at Bathurst, New South Wales, featuring a red ink postmark and a gold-foil cachet, and is presented in a high-gloss presentation pack in a limited edition of 150.

The design has a period portrait of Brock and an image of his Holden Torana saloon car at the 1972 Bathurst 500, which saw his inaugural victory in what is Australia's most famous race.

As a reminder that these 3D printings are premium products, the cancelled stamp with a nominal face value of \$1.10 is being sold at \$119.95 (about £67). ■