

## TECHNOLOGY

# Selfies in space

Alexandra Witze examines a book on the techheads behind commercial high-altitude travel.



On 4 October 2004, US test pilot Brian Binnie flew a winged wonder to space and back. The rocket-powered *SpaceShipOne* won a US\$10-million prize for becoming the first commercial spaceplane — a breakthrough meant to herald the birth of the space-tourism industry. A decade later, its successor *SpaceShipTwo* broke apart during a test flight. Co-pilot Michael Alsbury had made a control error, and was killed as a result. The nascent business of take-a-selfie-in-space seemed as far from reality as ever.

Now, in *How to Make a Spaceship*, journalist Julian Guthrie tackles the story of private spaceflight. Readers who want to know about its early days will revel in her charismatic sketches of the space geeks, entrepreneurs and aviation buffs who made *SpaceShipOne*. Those looking for in-depth analysis of how that history relates to today's commercial spaceflight should look elsewhere. Space tourism remains a bucket-list thrill for billionaires, and NASA has adopted private spaceflight only to ferry science equipment, drinking water and extra bin bags up to the International Space Station.

Guthrie's earlier *The Billionaire and the Mechanic* (Grove Press, 2013) dealt with businessman Larry Ellison's obsessive quest to win the America's Cup yachting race. In *How to Make a Spaceship*, she deploys her skill to observe rich, driven enthusiasts racing to get to the edge of space. Despite the

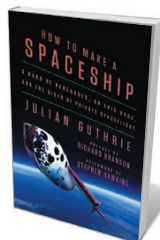
stomach-wrenching microgravity and harsh radiation of space, humans have been pushing to go there since Soviet cosmonaut Yuri Gagarin became the first person to reach orbit in 1961.

First among the motley racers is Peter Diamandis, a serial dreamer who had helped to found a student space-exploration group and an international space university by the time he was 28. He is the kind of technofanatic who tracks how many days he has been alive and is entranced by the fact that the Massachusetts Institute of Technology numbers its buildings instead of naming them. Much of the book revolves around his efforts to jump-start a private space industry. Frustrated by cancelled space missions and hoping to open the final frontier to more than a select cadre of astronauts, Diamandis and a few like-minded techheads gathered in a Colorado mountain cabin in winter 1994. There they hatched the concept of a lucrative award to spur the development of commercial spaceflight. It became known as the

X Prize (see *Nature* **482**, 469; 2012), and Guthrie tracks Diamandis's attempts to find someone to fund it.

In 1996, he got an early boost from backers in St Louis, Missouri — the city whose investors had helped Charles Lindbergh to fly from New York to Paris on the first solo transatlantic flight some 70 years before. Diamandis went on to cobble together for the \$10-million lure. Enter the next group of dreamers — those looking to win the money. Of these, the most technically adept was Burt Rutan, the contrarian aviation designer who recorded many firsts, including building the broad-winged *Voyager* plane that circled the world in 1986 without stopping or refueling. Rutan runs an eclectic company in California's Mojave desert, where engineers and test pilots push the boundaries of flight. Backed by the deep pockets of Microsoft's Paul Allen, Rutan decided to make a bid for the X Prize. He dreamt up the innovative design in which *SpaceShipOne* dropped from a carrier plane, ignited its engines and coasted to the arbitrarily designated point where space begins, 100 kilometres up.

Guthrie's anecdotes illuminate Rutan's environment more than the enigmatic man himself. We glimpse the angst of the spouse left behind as a test pilot soars into the sky in an experimental machine. We hear of the engineer who in February 2003 listened aghast to the news of the space shuttle



**How to Make a Spaceship: A Band of Renegades, and Epic Race, and the Birth of Private Spaceflight**  
JULIAN GUTHRIE  
Penguin: 2016.

Putative spaceplane *Columbia* coming apart, underscoring that lives were at risk. *SpaceShipTwo*, held under carrier plane *WhiteKnightTwo*.

Other colourful characters enter the narrative. They include John Carmack, the video-game designer who founded Armadillo Aerospace in Mesquite, Texas, to shoot for the prize; Steve Bennett, who sent his Starchaser rocket soaring above north-west England; and the Romanian Dumitru Popescu, who as an engineering student recruited his wife to help build rockets in his father-in-law's backyard. More famous names also emerge. Erik Lindbergh recreated his grandfather's flight in a modern plane to cope with the emotional pressure of his family's intense legacy and raise money for the prize. Entrepreneurs Anousheh and Amir Ansari used their personal fortune to sponsor the X Prize (and, eventually, to buy Anousheh a ride to the International Space Station in 2006). British billionaire Richard Branson ensured that an enormous Virgin logo was painted on the side of *SpaceShipOne* so that the television cameras would catch it in the morning light.

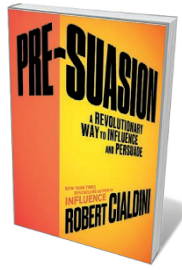
Guthrie sketches the interplay between these personalities as they jostle towards the X Prize deadline of December 2004. In the end, no competitor came close to the scrappy Rutan, who won the purse with two flights five days apart.

What remains unanswered is whether all this geekiness more than a decade ago has truly transformed commercial space-flight. In lieu of contributing to the X Prize, entrepreneur Elon Musk founded SpaceX in Hawthorne, California, which is now ferrying cargo to the space station (and will soon do the same with astronauts, along with aerospace company Boeing). Its competitor Blue Origin, set up by Amazon founder Jeff Bezos, was barely known in 2004 but has since pioneered reusable suborbital rockets that could save costs. There may or may not be a long-term business case for private spaceflight, but at the moment space tourism does not seem to be it.

Ultimately, *How To Make A Spaceship* is about the entrepreneurial work needed to launch such a project; short shrift is given to technical details and subsequent history. The fatal *SpaceShipTwo* accident is relegated to an epilogue, and an engine-test explosion that killed three of Rutan's employees in 2007 is not even mentioned. Yet Branson's Virgin Galactic continues to sell seats on future space flights for a quarter of a million dollars each. It expects to send a re-build of *SpaceShipTwo* into the skies on its first test flights later this year. ■

Alexandra Witze is a correspondent for Nature based in Boulder, Colorado.  
e-mail: witzescience@gmail.com

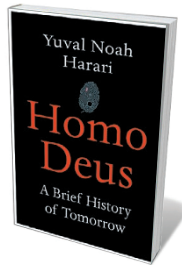
## Books in brief



### Pre-Suasion: A Revolutionary Way to Influence and Persuade

Robert Cialdini SIMON AND SCHUSTER (2016)

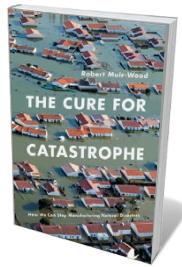
Fittingly, *Influence* (William Morrow, 1984) became one of the most influential studies in behavioural science, a triumph of field research on persuasion and how to resist it by social psychologist Robert Cialdini. Here Cialdini turns the tables, analysing how to harness persuasion by “frontloading” attention and pinpointing patterns of association conducive to change. His trove of findings and case studies covers how our focal points determine who we see as influential, how babies can be “pre-suaded” to be helpful, and how language can become a fulcrum in fraught negotiations.



### Homo Deus: A Brief History of Tomorrow

Yuval Noah Harari HARVILL SECKER (2016)

Historian Yuval Noah Harari's blockbuster *Sapiens* (Harvill Secker, 2014; see *Nature* **512**, 369; 2014) was a trenchant treatise on what he sees as our species' resistible rise to global dominion. In this equally acerbic forecast, Harari argues that the biological paradigm that casts organisms as biochemical algorithms shaped by natural selection could open the way to domination by networked computer algorithms. He opines that, as search engines and social media absorb our life histories and artificial intelligence advances, “dataism” may even make humanity obsolete.



### The Cure for Catastrophe: How We Can Stop Manufacturing Natural Disasters

Robert Muir-Wood ONEWORLD (2016)

From the August earthquake in central Italy to the Fukushima crisis of 2011, multitudes of ‘natural’ disasters are exacerbated by shoddy construction, non-existent preparedness and political inertia. Disaster expert Robert Muir-Wood's study is science in the round, spanning centuries of catastrophes, key figures such as seismologist Charles Richter, forecasting, the intricacies of insurance (multistorey concrete buildings are revealed as “weapons of mass destruction” in a quake) — and a detailed, workable recipe for resilience.



### Revenger

Alastair Reynolds GOLLANCZ (2016)

This latest science-fiction gem by astrophysicist Alastair Reynolds is a pacy space opera set in a far-future universe, where a broken civilization hangs on in a phalanx of artificial worlds. Rebellious teenagers Fura and Adrana join the crew of a solar-sailed vessel, riding the photon winds in search of lost technologies in the galactic deeps. Reynolds makes the human story compelling in a narrative that, spiced with bizarre characters aplenty and propelled by vengeance, smacks intriguingly of everything from Robert Louis Stevenson's *Treasure Island* to *Mad Max*.



### Sun Moon Earth

Tyler Nordgren BASIC (2016)

On 21 August 2017, the United States will experience its first total solar eclipse in 40 years. Astronomer Tyler Nordgren's primer maps essentials for that event, contextualized by a fascinating history that sweeps us from Anaxagoras' explanation of eclipses in the fifth century BC to Arthur Eddington's test of Einstein's theory of general relativity during the May 1919 total eclipse. Nordgren is a wonderful guide to both the science and the sensory thrills, such as the shimmer of Baily's beads or the eerie twilight of totality. [Barbara Kiser](#)