



CHILDREN OF APOLLO

Inspired as children by the Moon missions, a new breed of entrepreneur is bringing the dreams of youth and business smarts to the next frontier.

STORY *Wilson da Silva*

JAY CONEY/SPL



Earthrise: the iconic photograph of our home planet as seen by the Apollo 8 astronauts.

NASA



Left to right: James A. Lovell Jr., William A. Anders and Frank Borman — the first humans to orbit the Moon.

NASA

“I want to go to the Moon in my lifetime. I want to see my grandchildren go to the more interesting moons of Jupiter and Saturn. So we’d better hurry!”

IT WAS CHRISTMAS EVE 1968. Three men — Frank Borman, James Lovell and William Anders — were coasting 100 km above the Moon, the first astronauts to ever circle it. From inside their tiny Apollo 8 command capsule, they pointed a TV camera toward Earth, showing millions of viewers back home what no one had ever seen before. They snapped a famous picture — *Earthrise* — of our blue world ascending above the lunar horizon. And then they read aloud the story of creation according to the Book of Genesis.

Back home, a record TV audience was watching. When transmission ended 17 minutes later, an announcer broke the reverie to breathlessly report that Juan Trippe, the founder of Pan American — one of the world’s largest airlines at the time — had announced that Pan Am would start taking reservations for commercial passenger flights to the Moon.

The next day, *The New York Times* reported that Pan Am had been deluged with inquiries and had established a First Moon Flights Club — effectively, a glorified waiting list for space tourists. Within days, Trans-World Airlines followed suit.

It wasn’t just Apollo fever, although there was a lot of that at the time. People took the news seriously because Trippe was a visionary — he believed flying was to be enjoyed and did more than anyone else to make air travel affordable. He pioneered economy ‘tourist class’ seats in his planes, angering competitors and leading to Pan Am being banned from landing at many airports — including all those in Great Britain.

So, instead, he flew to other destinations, traffic boomed and, eventually, the airline cartel yielded. He introduced cut-price fares, like a US\$275 ticket from New York to London, about half the going rate of the day (but still around A\$2,260 in today’s money — which, given a one-way trip these days can be purchased for less than A\$400, goes to show how much air travel has fallen in price).

He convinced Boeing to design and build planes more than double the size of what was then the industry standard — the 707. What we now know as 747 Jumbo Jets were built because Trippe believed volume would bring costs down. “If you build it, I’ll buy it,” Trippe told Boeing’s chief executive, Bill Allen. “If you buy it,” replied Allen, “I’ll build it.”

“My kind of guys,” wrote Richard Branson in a 1998 profile of Trippe for *Time* magazine. These days the British billionaire is himself an airline tycoon, tweaking the nose of competitors with cut-price flights



An artist's impression of SpaceShipOne in re-entry mode.

PHOTOLIBRARY

and eyebrow-raising on-board services like bars, beauty therapists and massages. He too was once captured by the excitement of Apollo and believed that the age of space travel for everyone would soon arrive.

But the futuristic vision Trippe dangled in front of the young Branson and millions of other impressionable children of the 1960s didn’t come to pass as they had anticipated. There were no Pan Am shuttles rocketing up to spinning space hotels orbiting the Earth (as envisaged in the film *2001: A Space Odyssey*), no vacations on the Moon with shiny spacesuits and lunar buggies. So, when Branson and his generation grew up, it was clear that, if they wanted to see a future of holidays in space, they would have to build it themselves.

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NOWHERE IS THE excitement at the prospect of ‘space travel for everyone’ more palpable today than in Silicon Valley. The 1980s tech boom and the 1990s Internet bubble spawned scores of freshly-minted billionaire geeks with stacks of money and big ambitions. Behind every billionaire are thousands of millionaires on the rise, themselves followed by ambitious computer engineers with stock options and hopes of riding the next tech boom to stupendous wealth. And a lot of them want their very own piece of space.

“Apollo was never designed to open up space — it was designed to make us look like the biggest, baddest kid on the block,” thundered Rick Tumlinson, co-founder of the Space Frontier Foundation, to a packed audience of computer professionals at a San Diego conference in May 2006. “I grew up on the dream of Apollo, flipping on the TV

Entrepreneurs with stars in their eyes: (left to right) Paul Allen, Burt Rutan and Richard Branson celebrate SpaceShipOne’s second successful test flight.



AFP

and watching Captain Kirk [of *Star Trek*],” he reminisced. “I felt if he could do it, I could do it. You roll all of this together and you say, ‘Wow — I could be part of this!’”

After his boisterous and lengthy address, trailed by a round of hearty applause, an attendee reached the microphone on the floor of the ballroom. “Mr Tumlinson, I salute you! And, we get it! There are a thousand scientists and engineers here, and they’re all pushing the envelope and pushing electrons! Thank you for sharing the dream with us!” Another round of affirming applause.

Tumlinson and his audience are in good company. The list of tech alumni turned space junkies includes Microsoft co-founder Paul Allen, Amazon.com founder Jeff Bezos, PayPal founder Elon Musk, and the creator of the *Doom* and *Quake* computer games, John Carmack, to name a few. Others, like motel property tycoon Robert Bigelow, see a new beachhead for business. All have sunk millions into creating start-up companies to exploit space as the next high frontier of commerce.

The common element between them is that they were starry-eyed kids when the Moon landings were beamed live into their homes. They grew up with *Star Trek* on television and *2001* in the cinemas. To them, Apollo was the beginning of a future they would own.

But the dream faltered. No one has left Earth’s orbit since 1972, when *WaterShip Down* was hitting the bookshelves, *The Godfather* premiered in cinemas and Elvis was on tour. Since then, ‘space travel’ has mostly involved taking glorified rocket trucks like the shuttle for a swing around the planetary block. The once adventurous U.S. space agency NASA — formed to prove that a creative, risk-taking capitalist democracy could beat lumbering socialist command economies like Russia and China — has itself become a monolithic bureaucracy.

“I want to go to the Moon in my lifetime,” Burt Rutan, a maverick aircraft designer, told another conference of space enthusiasts in Los Angeles in May this year. “I want to see my grandchildren go to the more interesting moons of Jupiter and Saturn. Now, I’m 63 — I’ve got another good 20 years in me. So we’d better hurry up!” Rutan has already fired the starting gun. With a reported US\$20 million of Paul



In the not-so-distant future, you could spend your holidays in a zero-gravity hotel.

PHOTOLIBRARY

>> Allen's money, he has managed to do what only three other big state-funded national agencies have ever done: send a man into space. In 2004, three manned spaceflights were made from the Mojave Desert of California by his small aircraft company, Scaled Composites. The spacecraft used in these flights featured a radical new tilt-wing design that Rutan had developed, which allowed the craft to take off like a plane, rocket into space and then land on a runway.

Known as *SpaceShipOne* and capable of carrying three passengers, it became the first non-government spacecraft in history. It is now displayed in Washington's Smithsonian Air & Space Museum next to the Wright brothers' *Flyer I* and the U.S. Air Force's *X-1*, the first plane to break the sound barrier. That's because its achievement is equally stupendous. Until that day in June 2004, there were only two ways of returning from space: using either heavy titanium heat shields to keep a capsule from burning up on re-entry, or lightweight ceramic tiles like those on the space shuttle.

But Rutan had discovered something the multi-billion dollar space agencies of the United States, Russia and China had not in nearly 50 years of the space race: a cheap and completely aerodynamic solution to re-entry. He did it using a plastic spaceplane made of carbon-fibre-reinforced plastic — a kind of souped-up surfboard fibreglass.

This is where Richard Branson comes in. The long-haired school drop-out billionaire has bought the rights to Rutan's technology and established Virgin Galactic, a commercial spaceliner service that can make anyone an astronaut for less than the price of a second-hand 14-metre motor yacht. According to the company, at the time of writing

some 38,000 people from 126 countries have put down deposits for a seat on one of the spaceliners, with more than 100 paying in advance to secure a ticket when flights begin in 2008 — among them five Australians (including the author).

The new craft will be based on *SpaceShipOne* but will be much bigger, capable of carrying six passengers and two pilots. It will be lifted into the air by a motherplane holding the spaceplane strapped underneath. Once at the right altitude — around 17 km above Earth — the spaceplane will detach, the on-board rocket engine will fire and, 90 seconds later, the spaceplane will be in zero gravity some 120 km above Earth. Wearing no spacesuits, passengers will drift around the cabin weightless, seeing the curvature of the Earth outside their windows; doing something very few in all of human history have done. After 14 minutes in space, the craft will begin re-entry, and passengers will briefly experience up to five times normal gravity before the craft lands like a plane on a runway.

The spacecraft will not be capable of reaching Earth orbit — it can only travel one-tenth of the speed needed to sustain an orbit (27,400 km/h) — nor will it be able to reach the International Space Station, which is located at an altitude of 360 km. But both Branson and Rutan are keen to see if the technology can be stretched to intercontinental flights, allowing travel from New York to Tokyo or Sydney to London in a couple of hours. Although such flights would be prohibitively expensive for the average consumer, there may well be a niche market of super-charged executives with little time and somewhere else to be, or celebrities and supermodels looking for an ego trip.



Amazon.com billionaire and space entrepreneur Jeff Bezos.



Elon Musk has invested \$100 million in his start-up company, SpaceX.

Biographer Robert Spector believes Jeff Bezos' life goal is to "amass enough of a personal fortune to build his own space station".

BRANSON HAD BEEN scouting to invest in a commercial space travel opportunity for years and registered the name 'Virgin Galactic' back in 1991. He has committed US\$250 million to the space venture and ordered five spaceplanes and two airborne launchers from the company that Rutan and Allen have jointly established to design the spaceplanes. The U.S. state of New Mexico has committed a further US\$225 million to build a spaceport north of Las Cruces.

"We're about to embark on a wonderful adventure. We're going where no one has gone before," Branson told a press conference in New Mexico in December 2005. "There's no model to follow, nothing to copy."

Another Internet entrepreneur to throw his hat into the ring is the Amazon.com billionaire Jeff Bezos, who has established Blue Origin in Seattle. The company is developing a sub-orbital vehicle that can take off and land vertically and carry three passengers into space, based on technology similar to that used for the experimental *Delta Clipper DC-X*, abandoned by NASA in 1996. Bezos is secretive about developments, but has said that unmanned test flights are expected in 2007. Bezos is also coy about his cash contribution to date, but there have been reports that his company has a 20-year plan to develop near-Earth space, not just with sub-orbital tourist flights but also hotels, cargo haulage and even space colonies.

Bezos has long had a fascination with space, dreaming of travelling there ever since watching the Apollo missions. "The only reason I'm interested in space is because NASA inspired me when I was five years old," he admits. As a teenager, he won a trip to NASA's Marshall Space Flight Centre in Alabama by writing an essay on the effect of zero



Space X's Falcon 1 vehicle on its launch pad.

gravity on flies. As a high school graduate in 1982, he told *The Miami Herald* that he hoped one day to put space hotels, amusement parks and yachts in orbit. His biographer Robert Spector believes Bezos' life goal is to "amass enough of a personal fortune to build his own space station".

One big-time space investor who has been open about his cash commitment is Elon Musk, co-founder of the PayPal online billing system. He has poured US\$100 million into his start-up, Space Exploration Technologies Corp (or SpaceX). Based in California, with a launch site in the Marshall Islands, SpaceX has developed a new class of expendable rockets and has already sold 11 commercial cargo launches to various clients. And in August 2006, SpaceX landed a US\$278 million contract from NASA to develop a prototype cargo resupply vessel that can service the International Space Station. But Musk is also planning to build passenger spacecraft and has entered America's Space Prize, which is offering US\$50 million to the first U.S. company to put five people into Earth orbit twice within 60 days.

Such prizes have a history of spurring on innovation. In 1913, Britain's *Daily Mail* offered £10,000 to anyone who could fly across the Atlantic non-stop. British aviators John Alcock and Arthur Brown finally achieved this in June 1919, setting off from Newfoundland in Canada and landing in a bog in Ireland a day later. It took another seven >>

Since 2001, the cash-strapped Russian space agency Roskosmos has been offering flights to the International Space Station on its Soyuz capsules.

>> years for someone to claim the US\$25,000 Orteig Prize, which would go to the first person to fly non-stop from New York to Paris: Charles Lindbergh claimed it when he made the trip solo in his single-engine aircraft, the *Spirit of St Louis*. By then, there were hundreds of airlines flying routes around the world. Two of these were Australia's Qantas and the Dutch carrier KLM, which continue to operate today.

In a similar way, Rutan's development of *SpaceShipOne* can be attributed, in part, to the US\$10 million Ansari X-Prize, offered to anyone who could launch a vehicle that could carry three people into space twice within two weeks. With core funding from Allen, now a part-owner of the spaceplane technology, Rutan was able to devise a solution and carry off the bounty.

Then there's Rocketplane Kistler of Oklahoma City, which is building a spaceplane that will offer sub-orbital flights in a converted Learjet with a rocket engine, giving passengers four minutes of weightlessness; it is scheduled to begin flights in 2008. Like SpaceX, the company also recently won a US\$222 million NASA contract to develop a prototype cargo resupply vehicle for the space station by 2010. The two prototypes will compete for NASA's favour.

The smallest rocket company is Armadillo Aerospace, a 10-person research team in Texas, which is in the process of developing a computer-controlled liquid oxygen/ethanol rocket that can take off and land vertically. Led and funded by John Carmack, the video games whiz, it has ambitions to build a safe and reliable craft capable of taking a payload of 90 kg to a 100 km altitude.

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FOR THOSE WHO cannot wait, and who just happen to have US\$20 million to spare, there is the option of hiring government-run spacecraft. Since 2001, the cash-strapped Russian space agency Roskosmos has been offering flights to the International Space Station aboard its tried-and-true Soyuz capsules. No futuristic comfort though: passengers train like a real astronaut for six months and are then strapped into a tiny capsule atop a thunderous rocket. Not the most glamorous way to fly, but certainly reliable.

On the up-side, you get to wear a spacesuit and spend a few days in zero gravity. The flights are offered by Space Adventures, a U.S. space travel company that has already sent four 'cosmonaut tourists' into space, the latest being the self-made Iranian-American communications entrepreneur Anousheh Ansari, who became the first female space tourist as well as the first Iranian in space.

Ansari, together with her brother-in-law Amir, donated the money that helped establish the X-Prize won by Rutan. She's the founder of the U.S. company Telecom Technologies and recently formed a partnership with Space Adventures and Russia's Federal Space Agency to create a fleet of sub-orbital vehicles for commercial passenger travel.

For its part, Space Adventures has added an extra package for the aspiring 'cashonauts': 90-minute spacewalks, using Russian spacesuits, for an extra US\$15 million and an additional month's



On 18 September 2006, the Soyuz TMA-9 spacecraft blasted off, bound for the International Space Station. On-board was American businesswoman Anousheh Ansari, pictured above, the world's first female space tourist.



training. And for those with really large bank accounts, the company has begun offering the maximum tourist adventure: a six-day flight around the Moon. Using modified Russian technology, a passenger would experience what the three men aboard Apollo 8 did. The cost? A cool US\$100 million. No takers so far.

But for a lot less than that, in the not-so-distant future, you could spend a week in a zero-gravity hotel. Bigelow Aerospace of Las Vegas is pioneering an expandable orbital space station design that has experts sitting up and taking notice. With sole rights to commercialise NASA inflatable module technology (more durable than rigid modules), the company successfully launched a test module aboard a Russian rocket in July this year. Company founder Robert Bigelow, who also established the Budget Suites hotel chain, has reportedly set aside US\$500 million to develop the venture.

Most of the children of Apollo are focussing on joy flights because that's what other starry-eyed baby boomers — like them, inspired by the Moon program — really want to do. A study by an aerospace industry consulting firm, Futron, contracted by the New Mexico government, estimates that there will be more than 2,000 commercial space travellers a year by 2013. It estimates that commercial space flights could boost the state's economy by more than US\$750 million a year by 2020, creating more than 3,500 new jobs, from aerospace manufacturing to tourism services.

Branson is also bullish. Virgin Galactic estimates it could be launching between 7,000 and 15,000 passengers a year into sub-

orbital jaunts — which is why the company has ordered five spacecraft. It has calculated that it needs to fly only 5,000 passengers over a five-year period to be profitable, after which prices may start to come down. Currently, their starting price is US\$200,000.

But it's not just about joy flights and holidays in space. Today's space entrepreneurs see a huge market in launching satellites for communications and remote sensing. Then there's the opportunity to slowly take over the launch and space station resupply work of bureaucratic space agencies and large aerospace contractors, the latter having lost creative momentum and grown slow while living off fat government contracts. These lean and hungry start-ups see themselves 'doing space' faster, cheaper and more efficiently than ever before.

Ultimately, the advances will trickle down to all of us and change air travel forever. One day, sub-orbital travel will be commonplace, and you will be able to board a flight that will take you from Sydney to London in two hours. It will take off from a runway like a regular plane, rise above the clouds, roar into sub-orbital space and, mere hours later, begin descending to land on a runway at Heathrow in London.

It's a world that's probably closer than most people think. In the next 20 years, we are likely to see a boom in the development of the high frontier of space. And like the flowering of progress that gave birth to the airline industry in the 1920s, the age of commercial space travel will be created by the private sector. ✈️

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