

## A new age of space exploration is beginning

Jul 18th 2019 THE ECONOMIST

*The moment when, 50 years ago, Neil Armstrong planted his foot on the surface of the Moon inspired awe, pride and wonder around the world. This newspaper argued that “man, from this day on, can go wheresoever in the universe his mind wills and his ingenuity contrives...to the planets, sooner rather than later, man is now certain to go.” But no. The Moon landing was an aberration, a goal achieved not as an end in itself but as a means of signalling America’s extraordinary capabilities. That point, once made, required no remaking. Only 571 people have been into orbit; and since 1972 no one has ventured much farther into space than Des Moines is from Chicago.*

The next 50 years will look very different. Falling costs, new technologies, Chinese and Indian ambitions, and a new generation of entrepreneurs promise a bold era of space development. It will almost certainly involve tourism for the rich and better communications networks for all; in the long run it might involve mineral exploitation and even mass transportation. Space will become ever more like an extension of Earth—an arena for firms and private individuals, not just governments. But for this promise to be fulfilled the world needs to create a system of laws to govern the heavens—both in peacetime and, should it come to that, in war.

The development of space thus far has been focused on facilitating activity down below—mainly satellite communications for broadcasting and navigation. Now two things are changing. First, geopolitics is stoking a new push to send humans beyond the shallows of low-Earth orbit. China plans to land people on the Moon by 2035. President Donald Trump’s administration wants Americans to be back there by 2024. Falling costs make this showing off more affordable than before. Apollo cost hundreds of billions of dollars (in today’s money). Now tens of billions are the ticket price.

Second, the private sector has come of age. Between 1958 and 2009 almost all of the spending in space was by state agencies, mainly NASA and the Pentagon. In the past decade private investment has risen to an annual average of \$2bn a year, or 15% of the total, and it is set to increase further. SpaceX, Elon Musk’s rocket firm, made 21 successful satellite launches last year and is valued at \$33bn. Jeff Bezos, the founder of Amazon, sells off \$1bn-worth of his shares in the company each year to pay for Blue Origin, a space venture. Virgin Galactic plans to go public this year at a valuation of \$1.5bn. As well as capital and ideas, the private sector provides much greater efficiency. According to nasa, developing SpaceX’s Falcon rockets would have cost the agency \$4bn; it cost SpaceX a tenth of that.

At a time when Earth faces grim news on climate change, slow growth and fraught politics, space might seem to offer a surprising reason for optimism. But it is neither a panacea nor a bolthole. And to realise its promise, a big problem has to be resolved and a dangerous risk avoided. The big problem is developing the rule of law (see International section). The Outer Space Treaty of 1967 declares space to be “the province of all mankind” and forbids claims of sovereignty. That leaves lots of room for interpretation. America says private firms can develop space-based resources; international law is ambiguous.

America, China and India are rapidly increasing their destructive capabilities: blinding military satellites with lasers, jamming their signals to Earth or even blowing them up, causing debris to scatter across the cosmos. They are also turning their armed forces spaceward. Mr Trump plans to set up a Space Force, the first new branch of the armed forces since the air force was created in 1947. On the eve of the annual Bastille Day military parade on July 14th Emmanuel Macron, France’s president, also announced the formation of a new space command.

It is a mistake to promote space as a romanticised Wild West, an anarchic frontier where humanity can throw off its fetters and rediscover its destiny. For space to fulfil its promise governance is required. At a time when the world cannot agree on rules for the terrestrial trade of steel bars and soyabeans that may seem like a big ask. But without it the potential of all that lies beyond Earth will at best wait another 50 years to be fulfilled. At worst space could add to Earth’s problems.