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# Science Focus

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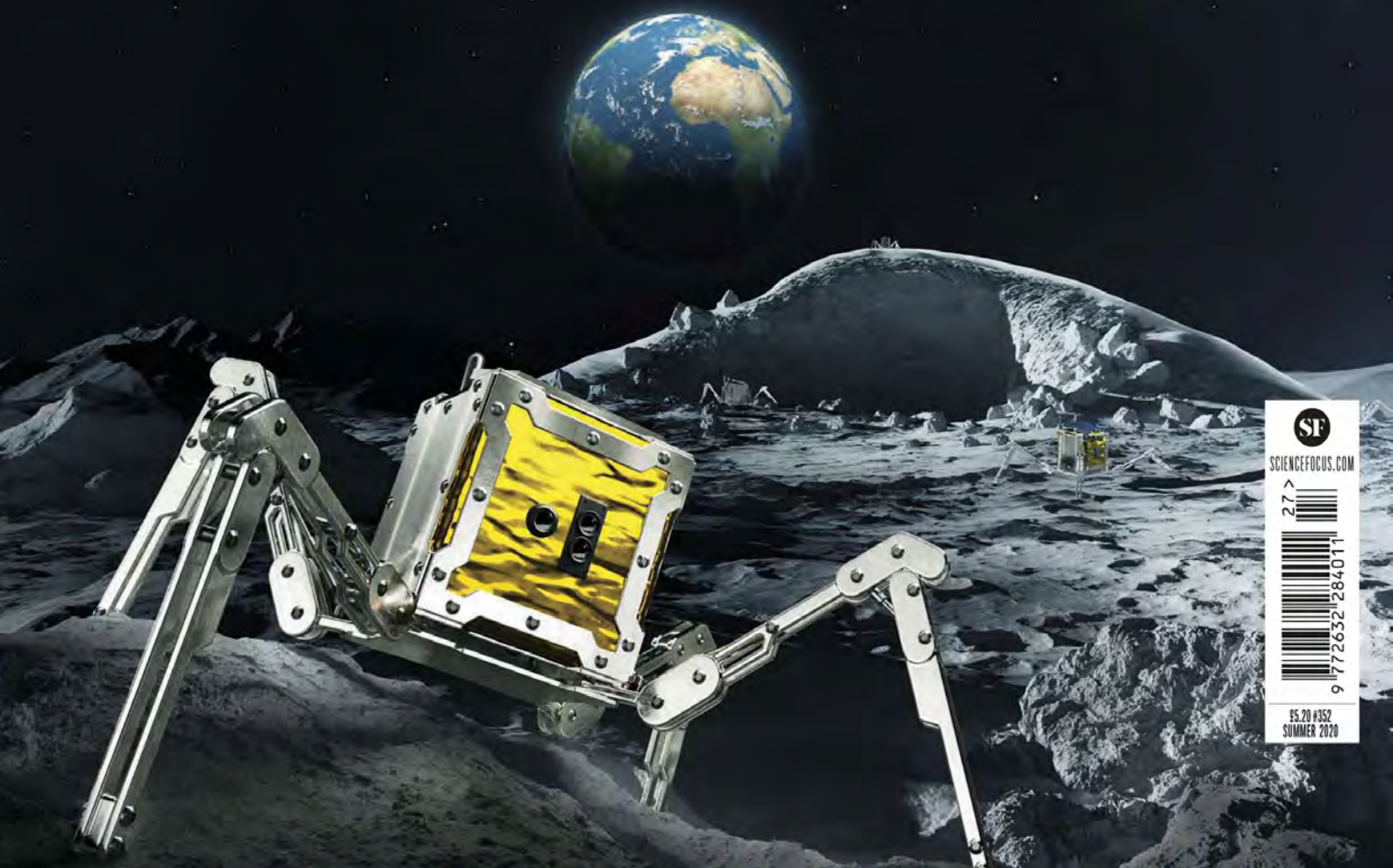
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**IN THIS ISSUE** **SpaceX Starship** — **Michael Mosley** — **COVID-19**  
What experts think about Elon Musk's 100-person spaceship | How his routine keeps him healthy and well | Why are more people from BAME backgrounds dying?



**Gary Martin** space expert

**Horizons**

**What will the future of private space travel look like?**

**In the past, national space agencies have built and launched the craft that carried people into space. Recently, we saw a private company, SpaceX, launch American astronauts to the International Space Station (ISS) for the first time, ushering in a new era of private space travel**

**HOW BIG A CHANGE IS THIS IN THE WAY WE WILL EXPLORE SPACE?**

We're starting a whole new chapter in humanity's quest to move off this planet, to actually start things we've seen in science fiction. The SpaceX launch, although it was still bought by government funds, is a huge change. It's something I've been waiting for all my career. Before, only governments had the kind of money, could take the liability, and actually had permission to go into space and explore this frontier. Now we've got a commercial company that has shown it can take an astronaut up to space into low Earth orbit.

**WHAT KIND OF POSSIBILITIES DOES THIS OPEN UP?**

There are a couple of private space station companies out there [Axiom Space and Bigelow Aerospace, who are both working on modules for the ISS] but until now you had no way to get

there, because you would have had to get a government to sell you a seat. But the governments have other priorities and seats are precious. Now, SpaceX could sell you a trip to your private space station. And if all these countries are going to the Moon, there are a number of companies that are interested in providing communications around the Moon, providing resources and fuel and water and power. There are all kinds of economic possibilities in the next couple of decades that are now empowered. This is very exciting; this is a milestone that we will look back on and say, "This is when it started; this is when it really took off."

**HOW DO YOU SEE PRIVATE SPACE TRAVEL OPENING UP THE EXPLORATION OF THE SOLAR SYSTEM?**

At the beginning of the internet, you would never ever think of what a role it plays in our entire world right now. This is what I believe space is going to be like. So how do you start that? Well, this is where governments absolutely do work. It was NASA putting so much money into SpaceX that allowed it to have the capability to take humans into space. Now, SpaceX can amortise that investment to give anyone a ride, if they pay the price. And that's the difference, the government would never have that capability, they're not going to become an operational activity. But SpaceX is a private company that has motivations to do private things in space.

In Luxembourg, we looked at the places you could make money in space. Well, it's very expensive to take things from the Earth and use them in space. So, if you assume that governments are going to the Moon, everything you want for civilisation

SpaceX's Starship could take up to 100 people to the Moon



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**“At Moon bases, you’re going to be doing science, but you’ll also want to have a beer at night, or have a pizza”**

SPACEX



you're going to have to make in space at some point. At Moon bases, you're going to want to be out there doing science, exploring or having tourism, but you're also going to want to have a beer at night, you're going to want to have a pizza, you're going to want a comfortable, safe room. All of these materials and things and ideas have to be constructed by people in businesses. So the business opportunities at some point, maybe two decades or so from now, are actually limitless. Once there's a foothold of people on the Moon, then people will be going to Mars. We'll learn how to live safely, we'll learn how to do things in space. There's a lot to learn, and there are a lot of business opportunities in learning those things.

**HOW MANY COMPANIES AROUND THE WORLD DO YOU ESTIMATE ARE BUILDING**

**LAUNCHERS, EITHER FOR HUMANS OR SMALLER ROBOTIC CRAFT?**

Every day I read a number of clippings to try to stay current and I'll tell you, there's a new launcher system proposed every week.

There are launcher systems all over the world in many, many countries, mostly those are to put things in low Earth orbit. The countries that can launch people are China, Russia and the US. India is working towards that capability. In the commercial role, only SpaceX has launched people into orbit, in addition there are only a few other US companies working to develop that capability: Blue Origin, Sierra Nevada, and Boeing. It's only a handful, but you wouldn't expect there to be a lot [of companies] until there's a lot going on and then people will rush to the marketplace. Think about it, if you're

a country, let's say you're a Middle Eastern country with a lot of money, in a few years you could automatically go into the space age by just buying a private space station and buying tickets to get there from SpaceX. Now you're a country that went from no human spaceflight to your own space station. Because you can buy it.

**SPACEX HAS SOME PRETTY WILD PLANS, INCLUDING A STARSHIP DESIGN WHICH THE COMPANY IS REPORTED TO BE PRIORITISING IN ORDER TO CARRY UP TO 100 PEOPLE TO THE MOON OR MARS. HOW SERIOUSLY SHOULD WE BE TAKING THESE PROPOSALS?**

If you look at *Star Wars* movies and you look at *Star Trek*, whatever these inventive writers envision for the future, it gives the real engineers something to aim for – and some of it comes true. So, in a way, Elon Musk [SpaceX's CEO] is setting a vision, and engineers, like myself, all want to do exciting things. And so whether 100 people are going to be going to Mars anytime soon, that may or may not happen. But there are a lot of engineers and a lot of people who want to dedicate their lives to doing something exciting, that is different and that has never been done before. And so he energises amazing people who have already shown the amazing things they're able to do in space and he's got their creativity working.

**GARY MARTIN**

*Gary Martin is the vice president for North American operations at the International Space University. He was formerly a senior advisor to the Luxembourg Space Agency, and director of partnerships at NASA's Ames Research Center.*  
*Interviewed by Dr Stuart Clark*