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SPACE

The Human Story

TIM PEAKE

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Tim Peake is a British astronaut. Tim completed his 186-day Principia mission to the International Space Station with the European Space Agency when he landed back on Earth on 18 June 2016.

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The Human Story

TIM PEAKE



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'If I have seen further [than others], it is by standing on the shoulders of giants.'

Sir Isaac Newton, 1675

To all the giants, who keep searching for answers.

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INTRODUCTION

On 14 December 1972, at the end of a seven-and-a-quarter-hour shift, Eugene Cernan lifted his foot onto the bottom rung of the Lunar Module's short aluminium ladder and began to haul himself up. He had thought hard about what he would say at this moment, knowing what it signified.

'We leave as we came,' he began, his voice crackly and breathy over the intercom, 'and God willing, as we shall return, with peace and hope for all mankind. As I take these last steps from the surface for some time to come, I'd just like to record that America's challenge of today has forged man's destiny of tomorrow. God speed the crew of Apollo 17.'

Cernan had been camped on the Moon for nearly three days at this point, and he would be there for a little while yet. Once inside the module, with the hatch secured and their dust-covered spacesuits and oxygen packs removed and stowed, he and his colleague, Harrison 'Jack' Schmitt, still had a long and complicated list of preparations and pre-flight checks to complete, not to mention a scheduled eight-hour sleep to fit in – their last spell of rest in the tiny metal container which had been their shelter a quarter of a million miles from home.

Eventually, though, it was time to go. On the ground at Mission

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Control in Houston, amid the banks of screens and the plumes of cigarette smoke, the usual atmosphere of taut concentration was mixed on this occasion with something more poignant. To the disappointment, frustration and even outright dismay of nearly everyone at NASA, there would be no more government funding for the Apollo lunar programme beyond this mission. After a hectic three-and-a-half-year period in which America had landed six pairs of astronauts on the surface of the Moon, the plug had been pulled. When Apollo 17's lozenge-shaped capsule eventually descended into the Pacific Ocean under its three red and white striped parachutes, it would also be bringing down the curtain on human lunar exploration. When, if ever, that curtain would go up again, nobody knew. With calculated irony, Mission Control chose to rouse Cernan and Harrison from their slumbers by piping into the module the sound of the Carpenters singing 'We've Only Just Begun'.

'Now,' Cernan said, when the checks were done, 'let's get off.'

He entered the Proceed code into the on-board computer, the ascent engine ignited, and, in a flash of light, the module lifted off the surface and rose into lunar orbit. And with that, the astronaut who would be known for the rest of his life as 'the last man on the Moon' began to make his way back to Earth, and the most astonishing chapter to date in the story of human exploration came to an end.

Now come forward fifty years, to 11 December 2022. Half a century to the day since Cernan and Schmitt landed on the Moon (and a little under six years since Cernan's death at the age of eighty-two), another tiny cone-shaped spacecraft floats down from the sky under three striped parachutes and drops into the Pacific Ocean, this time just west of Baja California, where the waiting USS *Portland* moves in to begin the recovery process.

This is the conclusion of the Artemis I mission. For those whose

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Greek mythology is a little rusty, Artemis was the twin sister of Apollo, and that capsule now bobbing in the water is just back from a 1.3 million-mile voyage in deep space, including six days on a distant retrograde orbit of the Moon and two lunar fly-bys, passing just 80 miles above the Moon's surface. Amid temperatures rising to 2,700°C, it has just plummeted back into the Earth's atmosphere at a speed in excess of 24,000mph, before those parachutes opened to break the capsule's fall and eventually bring it floating down to the water at a more sedate 20mph.

In the Commander's seat: Captain Moonikin Campos. On either side of him: Helga and Zohar. The Captain is a male-bodied mannequin named after Arturo Campos, the NASA engineer who played a major role in the rescue from disaster of Apollo 13.* Helga and Zohar are female-bodied model torsos, named by the German and Israeli space agencies respectively. Also on board: a small plastic Snoopy and, flying the flag for the European Space Agency, who are also involved in this multi-national project, a model of Shaun the Sheep.

No humans, then. But that's for next time. The follow-up mission, Artemis II, scheduled at the time of writing to launch in late 2024, won't land on the Moon either, but it will attempt a final trial journey with four astronauts on board, much as in May 1969 Apollo 10 (with, incidentally, Eugene Cernan in its crew) closed to within 9 miles of the Moon's surface for one last recce before Neil Armstrong's Apollo 11 went all the way and

* Mannequin, Moonikin . . . you'll see what they did there. Mannequins have a distinguished and perhaps under-celebrated role in the history of spaceflight. Later in this book we'll meet Ivan Ivanovich, who nervelessly tested Russia's Vostok capsule before Yuri Gagarin flew in it. Ivanovich was so eerily lifelike that he had to have the word 'MAKET' – 'DUMMY' – inserted under his visor so that no one would confuse him with the real thing.

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landed. And then, all being well, the path will be laid for Artemis III to take humans to the surface, possibly in this decade.

At which point, Eugene Cernan will be posthumously relieved of the title he never wanted to hold by the next man on the Moon – who, incidentally, will most likely be a woman.

I was only eight months old when Cernan left the Moon in 1972, and if the moment made little impression on me at the time that's because I was rather more concentrated on a project closer to home, namely how to get upright on my legs. Later in childhood, though, I would feel the lasting resonance of that whole set of Apollo missions, as so many of us did and continue to do. I was by no means a space nut early in my life: I was more fascinated by things that flew closer to the ground, like helicopters. Nevertheless, like so many kids my age, I clicked together my LEGO Saturn V rocket and launch tower and thought with awe about Neil Armstrong and his 'one giant leap for mankind'. Even after the Apollo programme was shut down, the crackle and beep of astronauts calling down to Earth from space were as much a part of the soundtrack of a seventies childhood as ABBA songs and Scooby Doo's snigger. Time and again you would be confronted by the scale of the Apollo project's audacity and experience its capacity to pull you up short and cause you to catch your breath, a capacity it retains even now, half a century later.

Years further on, while training as an ESA astronaut, I would be afforded the privilege of working at the Johnson Space Center in Houston, where, inevitably, spaceflight's pioneering past was never far away. I would get to tour the preserved Apollo-era Mission Control room – and discover that it still smells of cigarette smoke. And I would be taken on a familiarisation visit to Cape Canaveral, and be shown round NASA's Vehicle Assembly building, which rises like some kind of monster out of the Florida scrub – 525 feet tall and spread over 8 acres, the largest

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single-storey construction in the world, a building so vast that it routinely defeats attempts to photograph it. At one point on my visit I was taken up in the lift to the top of an Ares rocket, which was then being prepared. The rocket was just over 300 feet tall and reaching its summit took a while. Looking up, I realised that was only just over halfway to the ceiling.*

It was impossible to spend time in those places and not be made powerfully aware of the Apollo legacy. It was all around you. Similarly, I would come to feel the presence, too, of the Russian pioneers, who during the 'Space Race' of the 1950s and 1960s beat the Americans to so many spaceflight landmarks – first functioning satellite, first man in space, first woman in space, first spacewalk, first three-person crew in space – if not, ultimately, to the Moon. My journey to the International Space Station was on a Russian Soyuz rocket launched from Baikonur in Kazakhstan, where Yuri Gagarin's history-making journey began, and every astronaut who flies from there pays a series of tributes to Gagarin before they depart. I laid red carnations on Cosmonauts Avenue outside the wall of the Kremlin in Moscow, where Gagarin's ashes reside. I paused in Star City to sign the visitors book in Gagarin's old office, preserved as he left it. I got my hair cut two days before the launch, as Gagarin did, and signed my name on the door of my room at the Cosmonauts Hotel, just like Gagarin. And on the shuttle bus to the launch pad, and by now fully suited, I nevertheless got out to unbutton myself and take part in the ceremonial bladder-emptying by the bus's rear right wheel – because, yes, that's what Gagarin did, caught short on that morning in April

* That Ares 1-X rocket was a prototype, and was launched a couple of months after I saw it, in 2009, on a sub-orbital test. It was part of the President Bush-era Constellation programme which was intended to develop two rockets – an Ares 1 to carry the Orion spacecraft and an Ares V to carry cargo. But the programme was cancelled in 2010 so in the end I saw the first and last Ares 1.

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1961. At a ceremonial breakfast on the morning of my departure from Star City for Kazakhstan in 2015, I had found my hand being energetically shaken by Alexei Leonov, then eighty-one years old, Gagarin's colleague, the first man to walk in space, and who very nearly lost his life while doing so. (We'll come to that story.)*

Later, as a flown astronaut, in a development that my childhood self would have found entirely implausible, I got to meet and spend time with some of those Apollo astronauts – with Buzz Aldrin, Charlie Duke, Al Worden, Walt Cunningham, Harrison Schmitt and Rusty Schweickart. Indeed, once, at a space convention in Zurich, I knew the completely withering experience of being obliged to do a public speech in front of a selection of Moonwalkers.

Tough crowd.

What with one thing and another, the Apollo programme has resonated loudly throughout my life. But I never had that experience which people who were old enough at the time speak of: the experience of looking up at the Moon, during a mission, across that vast distance, and knowing that, at that actual moment, humans were up there, on that utterly separate surface. That, people will tell you, brings the full magnitude of it home. The curtain is about to go up again, though, and soon I and a whole new generation will get to gaze up into the sky and finally know what that sensation feels like.

'Those steps up that ladder, they were tough to make,' Eugene Cernan later said. He had taken a moment to look back over his shoulder where he could see the Moon's mountains and, beyond them, the Earth. 'I didn't want to go up. I wanted to stay a while.'

* Alexei Leonov died in 2019, aged eighty-five. He was the longest surviving of Russia's original draft of Voskhod cosmonauts.

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Cernan and Schmitt spent seventy-five hours on the Moon, the longest of all the Apollo stays, and were out on the surface for over twenty-two hours, in three separate excursions. As with the two Apollo landings before them, he and Schmitt had access to the Lunar Rover Vehicle, NASA's Moon-ready golf buggy. At one point they were 4.7 miles away from the safety of the module, at which time they were arguably as remote and as exposed as any human explorers had ever been.* They discovered orange-coloured pieces in the soil which proved to be beads of volcanic glass, sprayed as lava from the Moon's core in a fire fountain which probably happened 3.5 billion years ago, and they brought back samples that directly altered our understanding of the Moon's formation. Cernan did not, as frequently related afterwards, scratch his daughter's initials into a rock which he and Harrison had examined in the Taurus-Littrow valley – a huge split slab, the size of a house, which they named Tracy's Rock. But he often wished afterwards that he had done so, and said as much to his colleague Al Bean, who flew on Apollo 12 and also walked on the Moon. And Bean, who took up art on his return to Earth, duly painted a picture which showed the valley in carefully accurate detail, but with additional graffiti, 'TRACY', putting the record straight for his colleague.

But Cernan was acutely aware for the rest of his life that everything he achieved on the Moon's surface was owed to the mistakes and successes of the Apollo missions before his, and of the Gemini missions before that, one of which Cernan had flown, and the Mercury missions before that. Accordingly, he recognised that, in

* Rovings in the Rover were inevitably limited, not just by battery power, but by oxygen supply. After all, if the thing broke down, they were going to have to walk back. Hence the carefully calculated 'Walkback Limit'. Still, Cernan and Schmitt were able to venture almost 2 miles further than anybody had ever gone before them.

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order to assume its full value, his achievement and that of the Apollo programme as a whole needed to become part of a continuum of exploration. It needed to lead somewhere.

Or to quote the rocket scientist Werner von Braun: 'To make a one-night stand on the Moon and go there no more would be as senseless as building a railroad and then making only one trip from New York to Los Angeles.'

Yet Apollo 17 became a book end. Cernan's frustration was evident at a panel event he took part in for the mission's fortieth anniversary in 2012. 'We busted that door to the future open,' he told the audience, his emotion audible. 'We busted it open for those walking in our footsteps to go on through it. And here we are four decades later and we can't even get an American into space on an American piece of hardware.'

Finally, though, the story can be picked up again, the thread pulled through. At the time of writing, six Artemis flights have been proposed and the second or third of the landing missions could well contain a European astronaut, trained by the European Space Agency. Among the proposed projects is the creation of a permanent base at Shackleton Crater at the Moon's South Pole, perhaps as soon as 2030. And beyond that we can seriously begin to contemplate the launching of crewed missions to Mars, followed by the creation of safe habitats there. Mars, by the way, is around 140 million miles away. In just a handful of years we could be sending people so far that the Earth becomes no brighter than any other star in the distance.

All in all, we stand on the brink of what will almost certainly be the most adventurous and exciting decade yet in the history of spaceflight. So it seems like a good time to be familiarising ourselves with the people at the heart of that business – to be looking back and looking forward, and considering what it has taken historically to do an astronaut's work, and what it's going to take this

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time. In the pages that follow, I'm going to dig deep into some of the hundreds of amazing stories from spaceflight's history – stories of courage and grave risk, of the overcoming of seemingly insuperable odds, of seat-of-the-pants innovation, and just occasionally downright lunacy. I'll contemplate, for example, the consequences of sandwich smuggling on a long-haul space mission, and consider the part played by a domestic bathtub in the original emergency evacuation plans for Russian cosmonauts in the Voskhod programme. I'll recount spacewalks which went wrong and spacewalks which went spectacularly right – not least Bruce McCandless's astonishing, untethered outing from the Space Shuttle in 1984, pictured on the jacket of this book, a feat of solo daring which fills even other spacewalkers with awe. I'll explore incidents which best reveal the stresses and strains of the job, its risks and its challenges, its moments of anxiety and its passages of pure joy. And I'll use those stories to try to track the changing nature, character and motives of the astronaut, along with the changing natures, characters and motives of some of the other key figures who have made the history of spaceflight happen.

In what ways will the Artemis astronauts be the identical twins of their Apollo predecessors, and in what ways will they be different kinds of people altogether? How much has changed, over these fifty years, about the ways astronauts are trained, and about what is expected of them, both professionally and publicly? How much has altered about what are felt to be the basic qualifications for the job and the required psychological profile? Tom Wolfe's book about the Mercury astronauts, America's first official draft of space pilots, immortalised the phrase 'the right stuff' to describe the attributes needed to embrace the prospect of blasting out of the Earth's atmosphere for a while and then re-entering it at 24,000mph, with all that journey's inevitable dangers and uncertainties. That phrase has dominated the perception of the

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astronaut's character type ever since – perhaps misleadingly and unhelpfully from time to time. What form did that 'right stuff' actually take, back in those fabled first days of spaceflight, how did the 'right stuff' evolve over the years, and what will we consider to be the 'right stuff' this time?

Because some things, clearly, have moved on. Spaceflight in the era of Mercury, Gemini and Apollo was exclusively male and exclusively white, yet neither of those things will be true of the diverse crew that is set to fly on Artemis II – Reid Wiseman, Victor Glover, Christina Koch and Jeremy Hansen. How much credence should we still grant the stereotypical image of the US astronaut corps of the 1960s – preternaturally unflappable military pilots with buzz cuts and rangy grins, gliding around Cocoa Beach in convertible Corvettes? Equally, how much should we trust the standard image of the first draft of Russian cosmonauts, smilingly playing tennis in woollen tracksuits during their downtime? And how fully do those received images represent the subsequent Space Shuttle crews and ISS crews, and the crews who will soon be venturing to the Moon?

Within a couple of weeks of their return to Earth, Cernan and Schmitt, along with Ronald Evans, the third member of their crew, who had piloted Apollo 17's Command Module, were standing in a gale of cheers at the Super Bowl, waving from an open-top car as it processed slowly round the Los Angeles Coliseum behind a flag-draped flat-bed truck bearing the heat-seared capsule from which they had recently crawled. Like all the returning Apollo crews, they were instantly projected and celebrated as national heroes and international stars – superhumans who had faced down fear, coped with vast amounts of technical complexity under pressure, and gone further than all humankind before them.

They stood forever afterwards in the full glare of what they had achieved, and it grew hard for the rest of us to look behind that

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and see them as the products of their backgrounds, their working environments, of politics and day-to-day life, as people with families and flaws – as human, ultimately. So this book is partly an attempt to restore astronauts to their context, to flesh out their stories – to bring them back to Earth, in a sense, though not by any means to diminish them in the process. On the contrary, I'm convinced that, by taking this approach to the history, we arrive at an even greater and richer respect for these people and what they did.

We're now in an age of privately funded space missions, with companies such as SpaceX, Virgin Galactic, Blue Origin and Axiom Space, an age in which we more and more blithely speak of sub- and low-orbit space tourism. Down the years, among the earliest space-bound pilots – and later, as we shall see, among the Shuttle crews and ISS teams – the notion of casual participation in spaceflight with minimal training has tended to generate some dismissive (and, of course, self-protective) muttering.

Then again, when you think about it, the chief concern of most passengers on long-haul airline flights these days is probably what movie they're going to watch and when the food trolley is coming round – a prospect which might have startled and possibly even irked the pioneer aviators all those years ago who risked their lives in the air to make long-distance flight a possibility. So perhaps we are merely seeing the early stages of that story being repeated in space.

In any case, my subject in this book is not the developing business of private spaceflight with the investment of tech billionaires – as interesting as that tale is – but the astronauts whose pioneering adventures have brought space tourism into view and made it plausible in the first place.

Along the way, I'll be in the fortunate position of being able to bring some of my own experiences as a member of the global corps

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of flown astronauts. Even now, this far into the history of spaceflight, there are not that many of us – 628 as I write. I'm also proud to be a member of the smaller group – about a third of that number – who have walked in space and who have discovered what it's like to be separated from that ultra-hostile yet strangely alluring environment by the thickness of a visor. But my main desire here is not to tell my own story, which I have done elsewhere. It's to tell the story of the astronaut species, and its evolution.

With spaceflight, the human story is where inspiration truly takes hold for the rest of us, looking on. Yes, we could choose to send an uncrewed craft to the Moon and it could get there more easily than a crewed craft and certainly more safely. It might even take better pictures when it's up there. But somehow only when a human has travelled that journey and seen it through human eyes, and come back and told us about it, human to human, do we feel a visceral connection with that journey – a connection strong enough to inspire us. It's that human connection with space that astronauts have been offering us since 1961, when Gagarin became the first human to break beyond Earth's gravity. It's that connection which the crews of the Space Shuttle and the ISS have offered in the meantime. And it's that human connection which the astronauts aboard Artemis II and beyond will once again supply for us as lunar exploration recommences, once more altering the known horizon and challenging our sense of the possible.

No disrespect to Helga, Zohar and Captain Moonikin Campos, of course, and their courageous and noble work on Artemis I, but it has always meant so much more when there were humans on board. This is the story of those humans.

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CHAPTER ONE

GETTING THE JOB

> 'How did one get to be an astronaut? For that matter, just what the hell *was* an astronaut?'
>
> – Eugene Cernan, *The Last Man on the Moon*

1. THE FIRST OF THEIR KIND

It's 2.00 p.m. on 9 April 1959, and seven men in a mix of grey and dark suits, two with bow-ties, are sitting in a row behind a long, narrow, cloth-covered table dotted with microphones and ashtrays, looking out calmly but slightly warily at the audience in front of them – 200 jostling news reporters and photographers packed into a building just a short walk from the White House in Washington DC. The room is overstuffed and already uncomfortably hot.

Close behind these seated men is a pleated curtain, to which has been attached the logo of America's recently formed National Aeronautics and Space Administration. Off to the side of that, hanging from a pole, is the flag of the United States, and beyond that, stuck to the wall, is a schoolroom-style poster of the Sun and Earth. A plastic model of a rocket and another, on a larger scale, of the capsule at its tip have been stood against the front of the table, where, leaning backwards slightly, they can't help but look a bit underwhelming – a decorative afterthought.

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We are in Dolley Madison House, NASA's federal office. To be exact, we are in what was once this house's ballroom, where in the early nineteenth century Dolley Madison, then America's First Lady, famous for wearing turbans and pearls, threw lavish parties and dances and served her guests pink ice cream, but where now NASA's first Administrator, Dr T. Keith Glennan, stands a little stiffly at a lectern and gets this over-subscribed press conference underway.

'Ladies and gentlemen,' Glennan says, 'today we are introducing to you and the world these seven men who have been selected to begin training for orbital spaceflight.'

We are about to meet (Glennan informs the room) a group of exceptional individuals who have demonstrated 'to scientists and medics alike' their 'superb adaptability' for this unprecedented mission.

'Which of these men will be the first to orbit the Earth, I cannot tell you,' he continues, heading off the reporters' obvious first question. 'He won't know himself until the day of the flight.' Before then, two years of training lie ahead, 'during which our urgent goal is to subject these gentlemen to every stress, every unusual environment they will experience in that flight.'

And then comes the big reveal – the release to the world of information which has been guarded so closely that, in an abundance of caution, each of the successful candidates was instructed to check into their hotel the previous evening under a supplied pseudonym (the hotel manager's name), and knew nothing about the identities of the other six until this morning when they met.

'It is my pleasure to introduce to you – and I consider it a very real honour, gentlemen – from your right . . .'

As Glennan reads out their names, each man rises from his chair and stands, hands behind his back or laced self-consciously in front of him.

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'Malcolm S. Carpenter . . . Leroy G. Cooper . . . John H. Glenn Jr . . . Virgil I. Grissom . . . Walter M. Schirra Jr . . . Alan B. Shepard Jr . . . Donald K. Slayton . . . the nation's Mercury astronauts.'

There is a burst of applause, and Eugene Cernan's question at the top of this chapter suddenly has an answer of sorts. What is an astronaut? *This* is an astronaut.

The questions from the press are just beginning, though, and the very first of them, called out by a reporter in the pack, seems to catch everyone at the table slightly by surprise.

'I would like to ask Lieutenant Carpenter if his wife has had anything to say about this, and/or his four children.'

Carpenter, who to the extent that he expected anything on this occasion has mostly been preparing himself for questions about the mission or perhaps about his own professional background and military record, seems a little thrown. Nevertheless he leans towards the nearest microphone and replies, 'They are all as enthusiastic about the program as I am.'

With that he sits back again.

'How about the others?' asks the reporter. 'Same question.'

'Suppose we go down the line, one, two, three, on that,' suggests Walter T. Bonney, NASA's Director of the Office of Public Information, who is coordinating the Q&A session.

'The question is, has your good lady and have your children had anything to say about this?'

Donald 'Deke' Slayton would later recall this moment in his autobiography. 'Somebody asked if our wives were behind us,' he wrote. 'Six of us said "Sure", as if that had ever been a real consideration. Glenn piped up with a damn speech about God and family and destiny. We all looked at him, then at each other.'

In fact, Lieutenant Colonel Glenn, who is one of those in a bow-tie, would get onto the subject of God and destiny – and also the place in American legend of the Wright Brothers – during

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some of his other answers in the conference, but not during his response to this one, which is, nonetheless, smoothly delivered.

'I don't think any of us could really go on with something like this if we didn't have pretty good backing at home, really,' Glenn says, a natural ease under public questioning immediately evident. 'My wife's attitude towards this has been the same as it has been all along through all my flying. If it is what I want to do she is behind it, and the kids are too, a hundred per cent.'

'My wife feels the same way, or of course I wouldn't be here,' says Captain Grissom. 'She is with me all the way. The boys are too little to realise what is going on yet, but I am sure they will feel the same way.'

Then it's Lieutenant Commander Schirra's turn. 'My wife has agreed that the professional opinions are mine, the career is mine, and we also have a family life that we like,' he says. 'This is part of the agreement.'

The room silently absorbs this robust declaration.

'I have no problems at home,' says Lieutenant Commander Shepard. 'My family is in complete agreement.'

Shepard's crispness generates a tension-dispersing laugh.

'I can say what the other gentlemen have said,' says Captain Slayton. 'What I do is pretty much my business, profession-wise. My wife goes along with it.'

Family support solidly confirmed, discussion moves on to the issue of cigarettes.

'I notice that the three gentlemen on our left have been smoking,' says a reporter.

Indeed, during the preamble, while Dr Glennan was hymning their 'superb adaptability', Slayton, Schirra and Shepard casually lit up. The cigarettes are still between their fingers.

'I wonder,' the reporter continues, 'what they are going to do for a cigarette when they get up there.'

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Bonney, who has spent the Q&A session so far taking shallow drags on his own cigarette, turns this question over to Dr W. R. 'Randy' Lovelace, Chairman of the NASA Special Advisory Committee on Life Science and the man who has been responsible for coordinating the medical testing of the candidates.

'I think they're pretty mature men and we'll leave it up to them in large part,' Lovelace replies. 'Of course, we have a few months for an indoctrination programme . . .' he adds, to muted laughter.

In which case, what about drugs? In the course of the unprecedented flight that lies ahead of them, with its immense and even, as yet, unidentified challenges, will the gentlemen be using stimulants to combat fatigue – injections or pills?

Bonney refers this question to Brigadier General Donald D. Flickinger, Assistant Chairman of the Life Science committee.

'Specifically, no,' Flickinger replies. 'We won't resort to any pep pills . . . We will have no need to have artificial stimulation. They have their own built-in governing factor which is quite adequate.'

Blessedly for the Seven, other questions from the floor have less spin on them.

'Could we have the present home addresses of these men?'

They certainly can.

Scott Carpenter: '11911 Timmy Lane, Garden Grove, California.'

Gus Grissom: 'Presently my home is 280 Green Valley Drive, Enon, Ohio.'

Al Shepard: 'My family and I presently reside at 109 Brandon Road, Virginia Beach, Virginia . . .'

With the exception of Glenn, who has charmingly introduced himself as 'the lonesome Marine in this outfit', the group seem raw in this context, slightly uncomfortable in their civilian dress (although that could be the heat), a little exposed in the glare, definitely under-rehearsed – short of media training, we might

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automatically think now. When asked to make sense of space travel and his own ambitions, Slayton almost seems to shrug.

'We've gone about as far as we can on this globe,' he says, 'and we've got to start looking around a bit. We have to go somewhere and that's all that's left.'

That's all that's left: it's not the most resounding of clarion calls for a new age of exploration beyond Earth's bounds, maybe. But Slayton, the veteran of Second World War combat missions over the Balkans and Japan, had never claimed that he was born to write poetry about this mission.

Nor did he ever claim he was ready for this press conference. All that fighter jet experience behind him, and yet . . . 'I've never seen anything like it before or since,' Slayton later wrote. 'It was just a frenzy of light bulbs and questions.'

Even as that frenzy rages, the reporters are poring over the press kits they have been issued with, looking for links, connections, the common threads. All of the Mercury Seven are military test pilots. Three are from the Air Force, three from the Navy and one from the Marines. Is there anything in those proportions? It was just the way it fell out, say NASA. They are all in their thirties – ranging from Cooper, thirty-two, to Glenn, thirty-seven. They are all either eldest or only sons. Three of them are named after their fathers. They are all married with children. They are all Protestant. (The press conference will ask them all about their church-going, and all will say they regularly attend.)

And, as Brigadier General Flickinger made clear, they all have 'their own built-in governing factor' – whatever one of those is.

Also, every one of them has an IQ at least 10 per cent higher than 'any of us here' – at least, according to the Brigadier General. This detail about the super-intelligence of their husbands is, apparently, complete news to their wives, who will joke about it to each other afterwards.

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Not that Rene Carpenter, Trudy Cooper, Annie Glenn, Betty Grissom, Jo Schirra, Louise Shepard and Marge Slayton are in Washington right now. They are all at home with their children, where the press will soon be streaming over their front lawns and knocking on their doors, because, whether it's their 'business' or not, and whether they like it or not, those partners are bound up in this story now and will very shortly discover how tightly.

But anyway, were there any significant patterns here? Any runes to be read? There had to be, didn't there? The reporters in that room in Washington focus in, looking for the unifying characteristics, the things that made these men what they surely must be – quintessentially American, the Wright Brothers in a new, improved, physically ideal form. They must be this, because the times demand it: America, and perhaps the entirety of the western world at this moment in history, is looking for heroes, and however they might feel about it themselves, the Mercury Seven are going to supply them.

'Could I ask for a show of hands,' asks a reporter, 'of how many are confident that they will come back from outer space?'

Each of the Seven immediately raises a hand, except for Glenn and Schirra. Those two raise both their hands.

II. THE RACE FOR THE SKIES

Carpenter, Cooper, Glenn, Grissom, Schirra, Shepard, Slayton . . . Eugene Cernan later wrote, 'Every military pilot in America wished his name was on that little list.' Was that strictly true, though? Clearly, notwithstanding the awkward questions, many military pilots will have looked on enviously at that crowded room in Washington, watching their fellow servicemen get transported from obscurity to international fame in the pop of a flashbulb.

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Yet it was equally clear that there were pilots who, at this point in history, took a dimmer view of this supposedly exciting new opportunity in aviation – who remained unclear about what it entailed, unsure about the kind of flying it might involve, unsure about whether what it involved would even *qualify* as flying, let alone the kind of flying befitting the dignity of an elite military test pilot with 1,500 hours or more in his log book.

After all, hadn't American attempts to guide a rocket-launched capsule into space thus far been crewed exclusively by . . . monkeys? Was it for this that these men, the finest of their military generation, had spent years putting their lives on the line in fighter jets? To step into a place vacated by . . . monkeys?

And, even more disconcertingly, hadn't precisely none of those monkeys yet come back alive?

One pilot definitely had some reservations. Any claim implying universal awe for the Mercury Seven and their proposed mission needs to be weighed against the caustic scepticism of Chuck Yeager, military test pilot and American aviation hero – the first pilot anywhere in the world to break the sound barrier. The requirements for Mercury astronaut qualification, as set by NASA, included an engineering degree, and Yeager, who joined the Army at eighteen, wouldn't have been eligible, even supposing he had wanted to be, which it seems he did not.

At any rate, taken aside somewhere and asked – by no means for the only time – whether he was sad not to be among those entrusted to fly a Mercury capsule, Yeager shook his head.

'It doesn't really require a pilot,' he explained. 'And, besides, you'd have to sweep the monkey crap off the seat before you could sit down.'*

* Yeager made his record-breaking assault on the sound barrier on 14 October 1947 in a Bell X-1 experimental aircraft, at a height of 45,000 feet. Despite his

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In April 1959, then, even amid the hype and hoop-la and the sense of a dawning new era for human exploration, it remained a real question: were these seven men in suits at that table in Washington swiftly bound for astonishing new heights in aviation? Or had they just signed on the line for a job that could only lead them down a short road to mockery and/or death?

Yet there was another way to frame America's first astronaut recruitment process: as a call to serve the United States in an hour of need – literally, a call-up. And that at least was something every military pilot in America, including Yeager, would have been able to recognise and respond to.

Getting a human into space had become a matter of national urgency, dramatically, on 4 October 1957, when the communist Soviet Union successfully launched the first orbital satellite, Sputnik 1. For three long and dismaying weeks – at least from an American point of view – Sputnik's silver ball and spidery antennae circled the globe, gleefully broadcasting radio signals down to Earth, until its battery power ran out and it fell back into the atmosphere and burned up.

Coolly dismissed by the White House as 'no surprise', this game-changing breakthrough nevertheless sent the United States, governors and public alike, into a froth of anxiety and self-examination. The future President, Senator Lyndon B. Johnson, wrung his hands: 'The Soviets have beaten us at our own game – daring, scientific advances in the atomic age.' The Democrat Governor of Michigan, G. Mennen Williams, was so incensed he broke out in rhyme:

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early contempt for the 'spam in a can' Mercury guys, in 1962 he agreed to run the US Air Force's Aerospace Research Pilot School which trained astronauts for NASA.

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Oh little Sputnik, flying high
With made-in-Moscow beep,
You tell the world it's a Commie sky
And Uncle Sam's asleep.

If the Russians could casually buzz America with a satellite, its radio signal hauntingly trackable on the ground from California to Long Island, with what else might they shortly be able to target American towns and cities – 'like kids dropping rocks on the cars from freeway overpasses', as Johnson put it? Had the USSR just served notice of an intention to colonise the heavens? It very much looked like it, and Johnson and Williams weren't by any means the only people in America wondering how this could have been allowed to happen.

Just a month later, the Soviet Union launched Sputnik 2, this time with a dog on board. Laika – literally 'Barker' – whom press releases romantically insisted was a stray from the streets of Moscow, became the first animal to orbit the Earth, categorically proving that a living, breathing creature could survive the trauma of a rocket launch and the effects of low gravity and increased radiation beyond the limits of the atmosphere – genuinely pioneering and useful work for which she would be garlanded with medals of honour and statues.

Not that Laika lived to tell the tale, though – and nor was there ever any expectation that she would. While the Soviet scientists had evidently leapt ahead with a method for getting heavy objects into space, they were still some way from solving the other half of the puzzle: how to bring them back. Laika had flown on a one-way ticket.

Nevertheless, the Soviet government could announce to the world another entirely successful mission, including the humane sacrifice of that heroic dog by controlled euthanasia just before

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her six-day supply of oxygen ran out. Not until 2002 would a contending version of events emerge in which Laika had in fact died of overheating somewhere within five and seven hours of launching. But nobody needed to be troubled with that detail at the time. The headline was: the Soviet Union was now right on the brink of getting a human into space.

They were certainly closer to it than the United States were. Thus far, American attempts to develop rockets big enough and reliable enough to transport objects beyond the reach of Earth's gravity had been stalked by failure, to the extent that the project had become a running joke – a national humiliation, even. The Atlas rocket, originally a long-range missile delivery system, on which up-scaling efforts had been concentrated, was tested three times in 1957 and only on the third of those occasions did it manage not to blow up on the launch pad. In 1958, the year after Sputnik, only eight of the Atlas rocket's fourteen test launches were successful, and some of those were deemed to be only 'partly successful', in the sense that the rocket did some of the things it was intended to do, but not all of them. Needless to say, when it came to rockets, not least ones intended eventually to bear human crews into space and bring them back again, 'partly successful about half the time' wasn't really going to cut it.

Meanwhile, the US Air Force had been scrambled to run a project called Man-In-Space-Soonest, known as MISS – surely one of the most unfortunate acronyms ever adopted by a military organisation, and certainly a barn-door target for satirists and headline writers, who could snigger about MISSed deadlines and things being a bit hit or MISS.* Nine highly experienced pilots

* Once MISS had successfully put a man in orbit, there was a plan for a MISS-2, using a heavier, longer-duration capsule, where MISS stood for Man-In-Space-Sophisticated. That's possibly even worse than Man-In-Space-Soonest.

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at Edwards Air Force Base in California had been deployed to explore the possibility of orbital flight by all methods available. One of those pilots was a certain Neil A. Armstrong. Yet the project was cancelled after less than two months, in August 1958.

What did for MISS so quickly was not that clunky acronym, as it happened, but a decision to entirely re-strategise America's space effort. Putting a person in space was now officially a top priority, and the project was going to need more oomph than MISS alone could provide.

Even so, President Eisenhower's White House was keenly aware that, in the context of Cold War tensions and the already galloping nuclear arms race, the announcement by the United States of a newly expanded space programme, run by the Air Force, would only look, from Moscow, inflammatory. More prudent, surely, to remove this space mission from military control and entrust it instead to a separate, civilian organisation, nominally focused on science and research and thereby sending less aggressive signals.

So, the President's Science Advisory Committee was folded into the National Advisory Committee for Aeronautics, which was itself, coincidentally, originally a catch-up operation, founded during the First World War to address the fact that the US was lagging behind Europe in aircraft technology. But now, in this new blend, it became NASA, which opened for business in Washington on 1 October 1958. And naturally, NASA's immediate and primary focus was to be on getting the first humans into orbit – and returning them safely – via what now had the title 'Project Mercury'.

And, obviously, Project Mercury was going to need . . . well, what, actually, were they going to call them? NASA's Space Task Group seem to have thought quite hard about this. T. Keith Glennan considered 'astronaut' – from the Greek, meaning 'sailor of the stars' – to be the best job title to give these incoming employees.

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Astronauts had been figuring in works of science fiction for at least thirty years at this point, and an English writer called Percy Greg had named a spacecraft 'Astronaut' in a novel called *Across the Zodiac* as long ago as 1880. It had a zing to it and it would be a companion for the already common pilot variant 'aeronaut'.

But Hugh Dryden, Glennan's deputy, felt that might be stretching things. Sailor of the stars? The nearest star to Earth is Proxima Centauri, which is about 4.25 light years away, or, in other words, getting on for 25.2 trillion miles. Nobody, not even in Russia, was seriously contemplating sailing a person that far any time soon.* Wouldn't 'astronaut' invite the accusation of hubris?

Dryden proposed the term 'cosmonaut' instead, which, implying 'sailor of the cosmos', seemed to him a more accurate job description (it would, of course, become the chosen term of the frequently more literal Soviet space programme). However, Glennan, and the spirit of poetic licence, carried the day. Ignoring the possible suggestion of over-reach, these fresh appointments would be astronauts, and a new category of professional explorer, and also a new category of civil servant, was born.

The next question facing NASA was: how do you recruit for a job that has never been filled or even, in the world beyond sci-fi, heard of up to now? Where do you seek your candidates for a role for which so many of the parameters have yet to be established?

Mindful that this was meant to be first and foremost a civilian project, NASA initially contemplated reaching out to the ranks of America's amateur explorers, to mountaineers and parachutists, scuba divers and potholers, hikers and wild swimmers,

* Logically, it would take four and a quarter years to get there, but only if you could find some way to travel at the speed of light. Otherwise you're probably looking at a journey time in the region of 40,000 years. You'd definitely want to pack snacks.

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outward-bound types who were up for an outdoor challenge during their weekends and might plausibly bite NASA's hand off for a spot of Earth-orbiting if it were on offer. This was a notion with, clearly, inclusivity on its side, not to mention media-friendly romance and storytelling. 'This time last month he was an amateur kayaker – now he's going to space!'

One problem, though: with the net cast so wide, how many applications were NASA going to end up having to sift through? And what kind of elaborate system would they need to devise to check the CVs of these outdoor enthusiasts, to ensure that they had actually climbed the mountains they said they had climbed, and clambered into the potholes they said they had clambered into? How much time would this take, and how much money would it cost?

Meanwhile, there was a section of the American workforce right under NASA's nose with a promisingly appropriate skillset and attitude by training, moreover with full service and medical records to hand, including exact, independently witnessed data on their flying experience down to the last minute. For all the President's understandable Cold War sensitivities, and the appeal of diversity and romance, it was clear that it would be simpler by far to restrict the astronaut drafting process exclusively to the military, and perhaps even more narrowly (and cost-effectively) than that: to military test pilots.

On the negative side, that approach would immediately put women out of the running. Women in the US were barred at this point from military flight training, and had been so since 1944 and the end of the Women's Airforce Service Pilots programme, a wartime contingency. It would also happen to put Neil Armstrong out of the running. Armstrong could very easily have moved over to the Mercury Project from the now defunct MISS

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