SAMPLE

Cosmic Explorers: Astronauts

Life in Zero Gravity

Aira Astralis

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Contents

Introduction

Chapter 01: The Making of a Profession

Chapter 02: Selection

Chapter 03: Training

Chapter 04: The First Generation

Chapter 05: The Moon Landings

Chapter 06: The Station Era Begins

Chapter 07: The Shuttle Years

Chapter 08: The International Station

Chapter 09: The Body in Space

Chapter 10: The Mind in Space

Chapter 11: The Spacewalk

Chapter 12: New Programs and Private Crews

Chapter 13: What Astronauts Actually Do

Chapter 14: The Road Back Out

Conclusion

This free sample contains the Introduction and Chapter 1. The complete book contains the full contents above.

Introduction

The word astronaut comes from Greek roots meaning star sailor, and like most good names it is both a description and a hope. The people who carry it today are not sailors of the stars in any literal sense; they orbit a few hundred kilometers above the Earth, a distance that would be a long drive on the ground, and the nearest star remains tens of thousands of years beyond any voyage they will make. But the name captures the profession's essence: humans who leave the planet on purpose, ride machinery of extraordinary power and fragility, and work in a place that was never meant for them.

It is a small profession. In more than six decades of human spaceflight, fewer than seven hundred people have crossed the threshold of space, and the great majority have done so in orbit around the Earth. Against the backdrop of eight billion people, that number makes the astronaut corps one of the most selective groups in existence, and it makes the profession's history unusually personal: nearly every individual who has flown is named, studied, and in some cases famous, and the events of the field are the events of individual lives.

The smallness of the club is not an accident of ambition but an accident of physics and money. Launching a human into orbit costs, in fuel and hardware and risk, more than almost any other activity humans undertake, and the return on that cost has to be argued flight by flight. The space agencies of the world therefore choose their astronauts the way universities choose professors and airlines choose pilots at once: for proven skill, for health, for temperament, and for the ability to keep performing when everything is strange, dangerous, and watched.

This book is about that profession: where it came from, how its members are chosen and trained, what the work actually consists of, and what space does to the people who work in it. It follows the history from the first flights of the early 1960s through the station era to the present, when government astronauts share orbits with private crews, and it pauses along the way on the questions people ask most: what the launch feels like, what happens to the body, what the crews do all day, and what it means to look down at the whole Earth through a window the size of a dinner plate.

A note on scope and honesty before the flight plan. This book names no products, quotes no citations, and leans on no statistics that expire with the next launch. Where the record is contested or the science unsettled, it says so. And it treats the astronauts of every nation as members of one profession; the flags on their suits differ, but the physics, the risks, and the discipline are the

same for everyone.

A book about astronauts must also be a book about a profession's memory, and the memory runs deep. The profession's members are the heirs of a history that includes triumphs that rearranged a century's self-image and accidents that are studied like scripture, and every crew that flies today is trained in the lessons of crews that did not come home. The chapters ahead name no individual recklessly and treat the history as the profession treats it, as a working inheritance: a set of disciplines, habits, and hard-won cautions that make it possible for ordinary, extraordinarily prepared people to do an extraordinary job repeatedly, even routinely, in the least forgiving workplace there is.

Chapter 01: The Making of a Profession

Human spaceflight did not grow out of a long tradition; it was invented in about fifteen years by two countries racing each other. At the end of the 1950s nobody had flown in space, nobody knew whether a human could survive launch or reentry, work in orbit, or return sane. The first satellites had barely flown. The profession of astronaut was created in the same few years as the machines that would carry it, and the selection of the first astronauts was as much a scientific experiment as a hiring process.

The two founding programs chose differently, and the contrast defined the profession's early years. The Soviet Union picked young military pilots, tested for fitness and calm, and put them in small, automated capsules in which the passenger had almost nothing to do; the word they coined, cosmonaut, means sailor of the cosmos, and the earliest ones were chosen to endure a flight rather than fly it. The United States picked experienced military test pilots, all of them graduates of the hardest flying schools in the world, and gave them capsules with manual backup controls, on the argument that a pilot's hands might be needed if the machines failed. Both approaches worked, and the argument about how much a spacecraft's passenger should control is still alive in modern cockpit design.

The early selection criteria were blunt. The candidate needed to be in superb physical health, with no hidden condition that a hostile environment could turn deadly. He needed to be psychologically stable in a specific, testable sense: not fearless, but able to perform while afraid. He needed technical education enough to understand the machine he was riding, and a temperament that could absorb a decade of interrupted family life, public attention, and the constant presence of death in the training schedule. In the first generation, the pool was narrowed by politics as much as physiology: the first astronauts were military officers because the rockets were military rockets, and the first women who trained for space in both countries had to wait years for the doors to open fully.

The profession's identity formed fast. The early astronauts were celebrated as explorers in the tradition of the polar heroes and the first aviators, and they adopted the habits of both: the clipped understatement of the military test pilot, the physical toughness of the expedition mountaineer, and the logbook discipline of the sea captain. The public saw the courage; the profession itself was built on something less dramatic, the willingness to be studied, tested, and instrumented, because in the early years every flight was as much a medical experiment as a mission.

Through the six decades since, the definition of astronaut has widened four times. The first widening was national: other countries built programs, and by the 1980s astronauts came from dozens of nations, many flying as payload specialists to run a single experiment. The second was professional: scientists, engineers, and physicians joined the test pilots, and mission specialists replaced the single-pilot ideal with crews of mixed skills. The third was commercial: tourists and private crews began flying, first to a station and then on private spacecraft, blurring the line between passenger and crew. The fourth is still under way: international lunar programs promise a new generation whose home port will be the Moon rather than the Earth, and whose profession will be shaped by missions measured in weeks and months rather than days.

Underneath all the widenings, the core of the job has stayed fixed. An astronaut is a person trusted to operate a vehicle of enormous consequence, in an environment that kills without protection, on behalf of people who will never go. Everything in the training, the selection, and the daily routine of the profession exists to be worthy of that trust, and the rest of this book is the long explanation of how the trust is built.

The profession's founding generation also settled a question that had worried medicine for decades: whether the human body could tolerate the experience at all. The worries had names and faces. The acceleration of launch, several times gravity, might black out even a fit pilot; weightlessness might disorient the balance system permanently; the heart, unloaded, might forget how to pump on return; and the mind, alone and weightless above the planet, might come apart. The first flights, and the decade of biological flights that preceded them with dogs and primates, retired the worst of the fears one by one, and each retirement widened the profession's sense of who could join. The lesson generalizes, and the profession still uses it: yesterday's disqualifying terror is usually tomorrow's training syllabus, and the boundary of the possible moves with evidence rather than nerve.

The national styles of the founding era also produced the profession's vocabulary, and the words carry history worth knowing. The Russian word, cosmonaut, was coined in the same design-office culture that built the first rockets, and it spread worldwide with the program's early successes; the American word, astronaut, emerged from the same Greek roots and took the rest of the world with it; the Chinese term, translated as taikonaut in Western media, joined the family when the third program flew. The words are synonyms, and the profession's members use each other's freely, but the small differences survive in the record: every account of the early era in this book uses the era's own words, and the ear should hear them as titles of equal

dignity, held by people who were, whatever their passports, colleagues in the same first generation.

The strangest fact about the profession's founding is that it had no precedent to inherit, and the strangeness is worth sitting with, because it explains the improvisation that ran through everything the first generation touched. Medicine had ancient schools, aviation had barnstormers and mail routes and wars to draw on, and even the nuclear submarine, the century's other sealed and distant workplace, was crewed by men trained on earlier boats. The astronaut corps started from a job description nobody had ever held. The agencies could not recruit for experience, so they recruited for transferable essence: test pilots, and in time surgeons and scientists, were chosen precisely because their existing trades already rehearsed the trade's core acts, which are to climb into a machine that has not been proven, to trust the machine's engineers while distrusting the machine politely, to perform while frightened, and to report afterward with a candor that borders on the notary's.

Everything else, the selection boards invented as they went, in public and on deadline. The profession's founding documents are therefore not ancient charters but working papers, medical standards drafted in haste, training plans sketched between flights, and the job's own description of itself revised flight by flight, a cabinet being assembled while the ship was already at sea. This matters for how the chapters ahead should be read. When the first generation made a rule, the rule usually had a name attached to it, a mishap, a close call, or an argument somebody won in a meeting, and the profession's habit of treating its own history as equipment, maintained and inspected rather than displayed, comes straight from that improvised start. The trade was invented by its first practitioners, and it is the only profession on the record of which that is fully true from the first day to this, a founding without an inheritance, which makes the inheritance it now passes down entirely its own work.

End of free sample. The full book is available at putrabooks.github.io

ABOUT THE AUTHOR

Aira Astralis is a science writer specializing in astronomy and space exploration. Her work spans the full breadth of humanity's relationship with the cosmos -- from the earliest naked-eye observations to the engineering marvels of modern space missions.

Her books are built on a foundation of primary sources: peer-reviewed research, mission archives, and direct engagement with the scientific community. She writes for readers who want to understand not just what we know about the universe, but how we came to know it.

She believes that the most important frontier is not out there but in the gap between what scientists discover and what the public understands. Her books exist to close that gap.