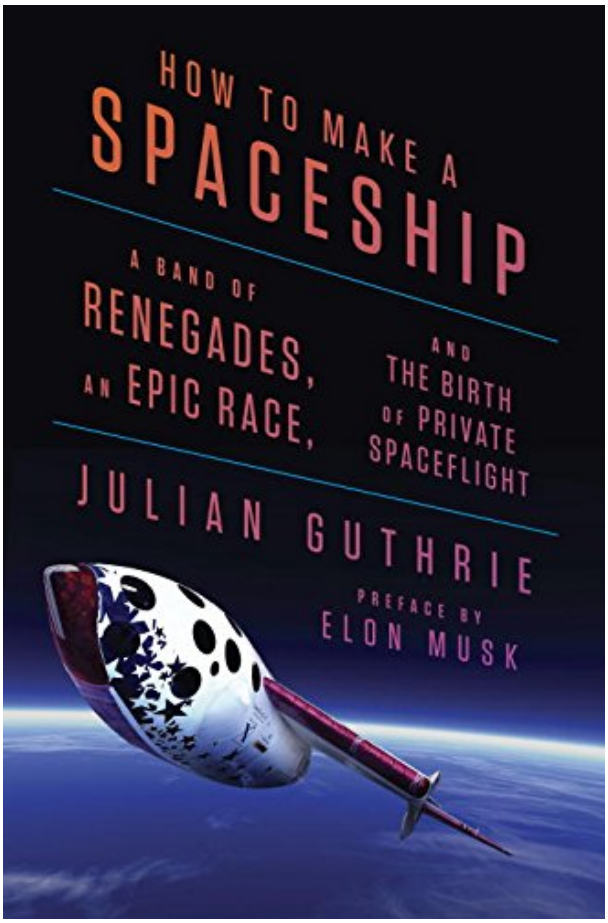
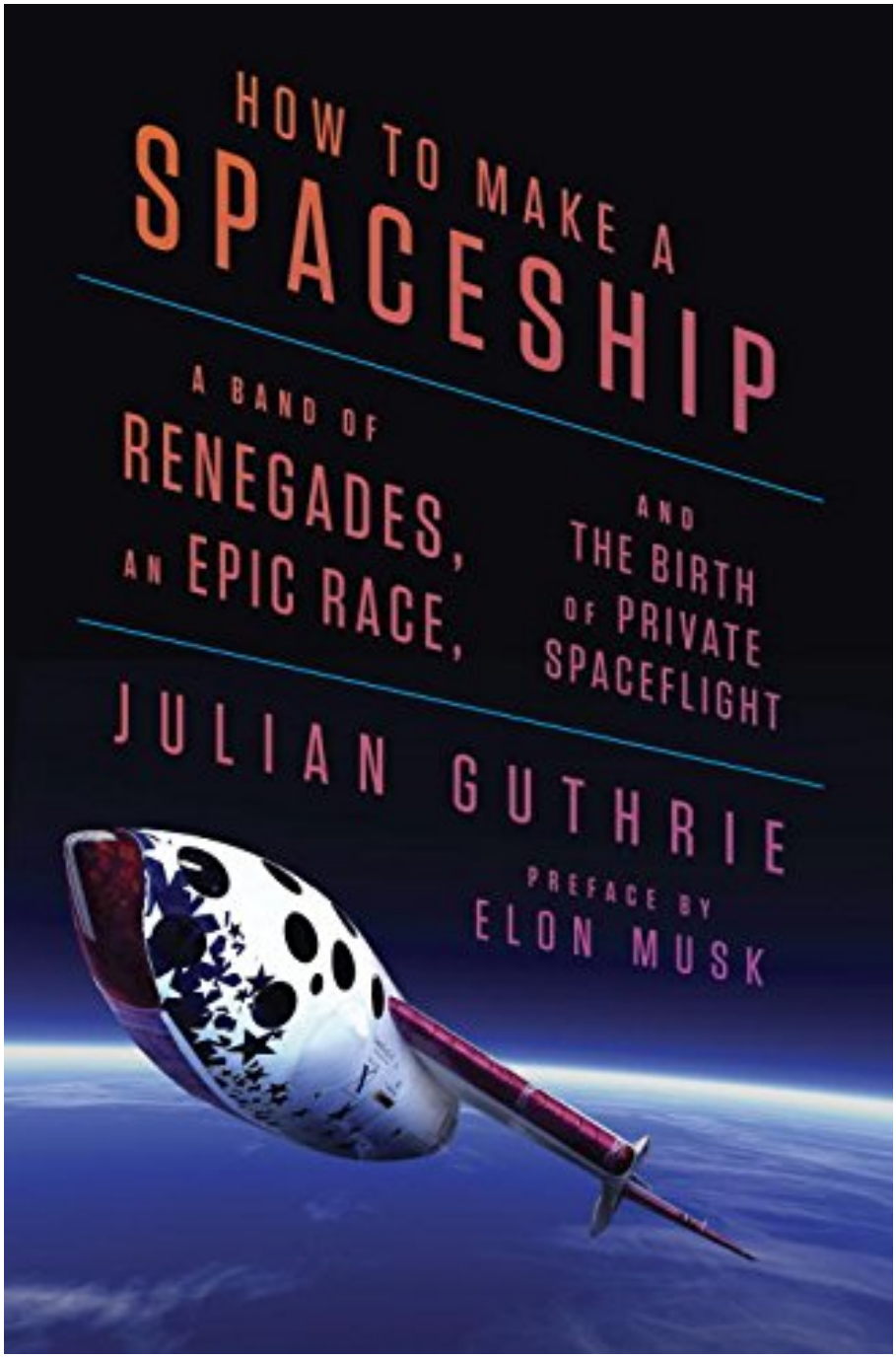
HOW TO MAKE A SPACESHIP: A BAND OF RENEGADES, AN EPIC RACE, AND THE BIRTH OF PRIVATE SPACEFLIGHT BY JULIAN GUTHRIE





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Review

“Guthrie has a gift of building suspense around these airborne incidents of inherent drama — such as a balloon flight gone wildly wrong that ends in a botched parachute jump — as well as larger questions about space, technology and life’s purpose . . . “How to Make a Spaceship” is . . . ultimately flight-worthy and impressively ambitious. When the history of 21st century American space efforts is written decades or centuries from now, this book will be a valuable contemporary record of what it was like when humanity was trying to break out of its home.” – San Francisco Chronicle

“[How to Make a Spaceship] reads like a thriller. The story sounds incredible, as if torn from the pages of science fiction. And it has a happy ending. But as with all entrepreneurial ventures, nothing went according to plan: It was riddled with failure and disappointment; ugly battles broke out between friends and founders; the world often looked like it was coming to an end; and Diamandis had to gamble everything he had. Most interesting was an observation that [Richard] Branson made in the book’s foreword: There isn’t much of a difference between being an adventurer and an entrepreneur. As an entrepreneur, you push the limits and try to protect the downside. As an adventurer, you push the limits, and protect the downside — which can be your life.” —Vivkek Wadhwa, Washington Post

“If you admire those who aim really high, How to Make a Spaceship belongs on your bookshelf. [It] offers a rousing anthem to the urge to explore.” —Wall Street Journal

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About the Author
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1

Unruly

At around ten p.m. on July 20, 1969, eight-year-old Peter Diamandis positioned himself in front of the large television set in the wood-paneled basement of his family's home in Mount Vernon, New York. His mom, dad, younger sister, and grandparents were seated nearby. Peter, in pajamas and cape, aimed his mom's Super 8 camera at the screen, panned the room, paused on his white German shepherd, Prince, and returned to the television.

On the carpet next to Peter were his note cards and newspaper clippings, organized by NASA mission-Mercury, Gemini, and Apollo-and by rockets-Redstone, Atlas, Titan, and Saturn. The third-grader, unable to sit still under normal circumstances-his mother called him ataktos, Greek for unruly-fidgeted, bounced, and rocked in place. This was the moment Peter had dreamed about, a moment that promised to be better than all the electronics he could buy at Radio Shack, cooler than every Estes rocket ever made, more exciting even than the M80s lit on his birthday, sending his mom and friends diving for cover.

The Sears Silvertone TV was turned to CBS Evening News with Walter Cronkite, the seasoned newsman who was at Cape Kennedy, Florida. Peter, with the camera on, read the words "MAN ON THE MOON: THE EPIC JOURNEY OF APOLLO 11." He listened to a clip from a speech given by President Kennedy in May 1961: "I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to the Earth. No single space project in this period will be more impressive to mankind, or more important for the long-range exploration of space; and none will be so difficult or expensive to accomplish." The onscreen countdown began for Apollo 11 astronauts Neil Armstrong and Edwin "Buzz" Aldrin to park their lunar lander on the surface of the Moon, a quest for the ages, a Cold War imperative, and a high-stakes contest between nations that had begun when the Soviet Union launched Sputnik, the world's first artificial satellite, on October 4, 1957. Now, almost twelve years later, America was trying to make history of its own. Astronaut Michael Collins, piloting Apollo 11's command module Columbia, had already separated from the lander and was alone in lunar orbit, waiting for his fellow astronauts to walk on the Moon.

If all went according to plan, Collins, Aldrin, and Armstrong would reunite in orbit in less than a day. About seventeen thousand engineers, mechanics, and managers were at the Florida space center for the launch. In all, an estimated four hundred thousand people had worked on some part of the Apollo program, from the women in Dover, Delaware, who did the sewing and gluing of the life-protecting rubberized fabric of the spacesuits, to the engineers at NASA, Northrop, and North American Aviation who worked for years on the clustering, three-chute parachute system for Columbia. The cost of the program was put at more than $25 billion.

Peter daydreamed constantly about exploring the glittering and dark expanse in his own spaceship, like the Robinson family in the television series Lost in Space, with the precocious nine-year-old son Will Robinson and the humanized and weaponized Robot. But on this night, the TV screen had his undivided attention.

Cronkite, in his deep voice and languid manner, said, "Ten minutes to the touchdown. Oh boy . . . Ten minutes to landing on the Moon." The program flashed between streamed images of the Moon and simulations of the landing done by CBS with NASA's help. The signal from the lunar camera had to be transmitted a quarter of a million miles to the Parkes Radio Astronomy Observatory west of Sydney, Australia, and then across the Pacific Ocean by satellite to the control center in Houston. From there, the images would go to television networks and finally to television sets in the United States and abroad.

In the first few minutes of flight, the Saturn V first stage-which had its design origins as a ballistic missile used by the Germans in World War II-had used four and a half million pounds of propellant, and the craft's velocity relative to Earth had gone from zero to 9,000 feet per second in ascent.

Cronkite announced: "Go for landing, three thousand feet."

"Eagle looking great," said Mission Control in Houston, as grainy black-and-white images of a barren, rock-strewn landscape appeared on television sets.

"Altitude sixteen hundred feet," Cronkite narrated. "They're going to hover and make a decision. . . . Apparently it's a go. Seven hundred feet, coming down."

"Nineteen seconds, seventeen, counting down," Cronkite said. It was just before dawn on the Moon, and the sun was low over the eastern horizon behind the lunar lander.

Peter focused his camera on the screen. He had used his mom's camera to film NASA television broadcasts before. He had clipped countless newspaper and magazine stories of space missions and written letters to the National Aeronautics and Space Administration. He had a "Short Glossary of Space Terms," issued by NASA, and he memorized terms like "monopropellant" and "artificial gravity." He won first place in a county dental poster contest with his drawing of the launch of Apollo to the Moon and the caption "Going away? Brush three times a day." He and his elementary school friend Wayne Root made their own stop-motion movies, using Star Trek models on fishing line as props. Peter learned that he could scratch the film in postproduction to make spaceships fire laser beams. On weekends, Peter loved to sit his family down in the living room upstairs and give lectures on stars, the Moon, and the solar system, explaining terms like "LEO," for low-Earth orbit.

The launch of the Saturn V rocket on July 16, four days before the scheduled Moon landing, had been to Peter every Fourth of July rolled into one. Three men riding on top of a fiery rocket aimed at space! Five F-1 engines burning liquid oxygen and kerosene and producing 7.5 million pounds of thrust! It was like sending the Washington Monument rocketing skyward. Peter littered his schoolbooks with sketches and doodles of planets, aliens, and spaceships. He had drawn the Saturn V over and over, with its first stage, second stage, and third stage, its lunar module, service module, and command module.

At 363 feet, it was taller than a football field set on end, both beauty and monster, weighing more than 6.4 million pounds when prepared for launch. Peter had watched Neil Armstrong and Buzz Aldrin climb through the docking tunnel from Columbia to Eagle to check on the lunar module. The lunar module-the LM, pronounced "LEM" and originally called the Lunar Excursion Module-had never been tested in the microgravity of the Moon. Peter was not alone in wondering whether this spaceship would make it back to Earth. Columbia would return at more than 17,000 miles per hour. If its descent was too steep, it would burn up; if too gradual, it wouldn't make it through the atmosphere back to Earth. Even when coming into the atmosphere perfectly-threading the needle at supersonic speeds-Columbia would be a fireball, with temperatures on the outside exceeding three thousand degrees Fahrenheit. Peter's father, Harry Diamandis, appreciated this moment in history and welcomed any news that wasn't about the Vietnam War or the emotional civil rights struggles of the day. But he couldn't understand his son's fascination with space, given the challenges of life on Earth. He and his wife, Tula, had come from the small Greek island of Lesbos, where he grew up tending goats and bartering for food-olives for almonds, kale for milk-and working at his father's cafŽ. Harry's mother, Athena, was a housekeeper who would bring home surplus bits of dough in her apron pockets to bake for the family. One of Harry's favorite Christmas presents was a red balloon. He was a village boy, the first in his family to graduate from high school and go to college. Harry had wanted to be a

doctor, and passed his medical boards in Athens before setting his sights on America. He arrived in the Bronx speaking no English. Their journey from Lesbos to America, and Harry's path to becoming a successful obstetrician, at times felt like its own trip to the Moon, with improbable odds, an element of fear, and a feeling of being a stranger in a foreign land.

On the television screen in the Diamandises' living room, images showed a simulation of the lunar landing. Then Apollo 11 commander Armstrong radioed, "Houston, Tranquility Base here. The Eagle has landed." The Eagle sat silently on the Sea of Tranquility in the Moon's northern hemisphere. Mission Control radioed back, "Roger, Tranquility. We copy you on the ground. You got a bunch of guys about to turn blue. We're breathing again."

"The lunar module has landed on the Moon," Cronkite marveled. "We're home. Man on the Moon."

More than five hundred million people, from crowds gathered before screens in Disneyland to American soldiers in Vietnam, watched as the white-suited, tank-headed Armstrong, a ghostly, blocky figure, backed out of the module and made his way down the steps. Tula watched Peter, hoping her son remembered to breathe. Armstrong said, "I'm at the foot of the ladder. The surface appears to be very, very fine-grained as you get close to it. It's almost like a powder. I'm going to step off the LM now."

It was just minutes before eleven p.m. in the Diamandis household. From Earth, the Moon was in a waxing crescent phase. Slowly, Armstrong moved his cleated foot onto the talcum surface, becoming the first human to ever touch another celestial body. "That's one small step for man," Armstrong said, "one giant leap for mankind." The view was desolate but mesmerizing, a desert scrubbed clean. The sky looked thick and dark like black velvet.

Peter stopped filming. This was the difference between believing in God and witnessing God. It was both answer and question, new frontier, old Earth. It was NASA doing what it said it would do. The astronauts were modern-day Magellans.

Cronkite removed his black-rimmed glasses, rubbed his hands together, and dropped his paternal demeanor. "There's a foot on the Moon," he said, removing his glasses and wiping his eyes. "Armstrong is on the Moon. Neil Armstrong-thirty-eight-year-old American-standing on the surface of the Moon! Boy, look at those pictures-240,000 miles to the Moon. I'm speechless. That is really something. How can anybody turn off from a world like this?"

It was close to midnight when Tula finally got the kids to bed. Marcelle, who was six, was asleep before her head hit the pillow. Peter, still wired with excitement, told his mom once again that he was going to be an astronaut when he grew up. Tula's reply never varied: "That's nice, dear. You're going to be a doctor." Medicine was known; space was experimental. Besides, the first-born son in a Greek family always followed his father's path. Family friends were already calling young Peter the future Dr. Diamandis. Tula had given Peter a child's doctor's kit, and he would sometimes have her recline on the sofa so he could check her pulse and listen to her heartbeat. Being a doctor would be an honorable profession for Peter.

After Tula left the room, Peter turned on his flashlight and ducked under his tented bedspread. He made entries in his secret diary: The Moon was freezing in the shadows but baking in the sun. He would need a suit and the right boots-maybe his ski boots. There was no air to breathe on the Moon, so he'd need oxygen. He'd need food, water, and of course, a rocket. He drew more pictures of Saturn V, and of the astronauts. Late into the night, drawings and notes scattered around him, Peter fell asleep wondering how he could possibly be a doctor when he needed to get to the Moon.

In the years following the lunar landing, Peter began making his own rovers, among other machines. He was predatory in his pursuit of motors to hack. In one case, the lawn mower motor disappeared, turning up later on his go-kart. Then the bedsheets went missing, revealing themselves eventually as parachutes for the go-kart. The Diamandis family lived in the middle of the block on a middle-class street on the north side of Mount Vernon, New York, about thirty minutes from New York City and bordering the Bronx. Their house was a two-story white Dutch colonial with blue shutters, a big front yard, and a narrow gravel driveway where Peter liked to set up jumps for his bike. The house also had a side yard and backyard, with cherry trees and a swing set put together with great effort by his dad and uncle.

Peter drove his lawn mower-powered go-kart down the street from his house, turned onto Primrose Avenue, and pushed the cart to the top of an enormous hill. Wearing no helmet, he blasted down Primrose Avenue like a junior John Stapp, the Air Force colonel who studied g-forces by famously riding rocket-powered sleds to a top speed of 639 miles per hour. Peter deployed his go-kart's "parachute" only when precariously close to the busy intersection.

Peter took particular delight in his sister's toys, eyeing them as a raven stares at a meaty carcass. When Marcelle received a new Barbie Dream House, Peter discovered that its motor was perfect for one of his projects, and the Barbie window shades provided the ideal chain to automate the arm of one of his robots. Marcelle and her parents went from amused to exasperated. Peter also hatched various weapon-related plans, including one that used a pipe cleaner fashioned as a projectile for his BB gun. When it didn't work, Peter mistakenly tried to suck it out of the barrel, only to have the discharged pipe cleaner shoot straight down his throat. He was rushed to the hospital and back to his experiments by nightfall. Peter got good grades, but his teachers wrote on his report cards, "Peter talks too much," and he could "work a little harder on settling down."

Every Sunday, Peter and his family drove to the Archangel Michael Greek Orthodox Church near Roslyn, where Peter was an altar boy, tasked with carrying the incense, candles, or the large gold cross and helping with communion. Confession wasn't required, but he talked openly with the kind Reverend Father Alex Karloutsos, telling him that he regularly took his sister's toys and too often made his parents worry. And he told him about his love of space; it was his "guiding star."

Peter shared with Father Alex his belief that they were all living in a biosphere, a kind of terrarium seeded with life by aliens. The aliens returned, Peter confided, to collect people as specimens or seedlings, but only in rural places like Nebraska where they wouldn't be noticed. Father Alex liked listening to Peter and knew that he was not a boy who could be placated by statements like "God is love." Father Alex told Peter that the greatness of the universe was a reflection of God's presence in our lives.

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The historic race that reawakened the promise of manned spaceflight

Alone in a Spartan black cockpit, test pilot Mike Melvill rocketed toward space. He had eighty seconds to exceed the speed of sound and begin the climb to a target no civilian pilot had ever reached. He might not make it back alive. If he did, he would make history as the world's first commercial astronaut.

The spectacle defied reason, the result of a competition dreamed up by entrepreneur Peter Diamandis, whose vision for a new race to space required small teams to do what only the world's largest governments had done before.

Peter Diamandis was the son of hardworking immigrants who wanted their science prodigy to make the family proud and become a doctor. But from the age of eight, when he watched Apollo 11 land on the Moon, his singular goal was to get to space. When he realized NASA was winding down manned space flight, Diamandis set out on one of the great entrepreneurial adventure stories of our time. If the government wouldn't send him to space, he would create a private space flight industry himself.

In the 1990s, this idea was the stuff of science fiction. Undaunted, Diamandis found inspiration in an unlikely place: the golden age of aviation. He discovered that Charles Lindbergh made his transatlantic flight to win a $25,000 prize. The flight made Lindbergh the most famous man on earth and galvanized the airline industry. Why, Diamandis thought, couldn't the same be done for space flight?

The story of the bullet-shaped SpaceShipOne, and the other teams in the hunt, is an extraordinary tale of making the impossible possible. It is driven by outsized characters—Burt Rutan, Richard Branson, John Carmack, Paul Allen—and obsessive pursuits. In the end, as Diamandis dreamed, the result wasn't just a victory for one team; it was the foundation for a new industry and a new age.

From the Hardcover edition.

- Formats: Audiobook, CD, Unabridged
- Original language: English
- Number of items: 13
- Running time: 990 minutes
- Binding: Audio CD

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Peter daydreamed constantly about exploring the glittering and dark expanse in his own spaceship, like the Robinson family in the television series Lost in Space, with the precocious nine-year-old son Will Robinson and the humanized and weaponized Robot. But on this night, the TV screen had his undivided attention.

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"Altitude sixteen hundred feet," Cronkite narrated. "They're going to hover and make a decision. . . . Apparently it's a go. Seven hundred feet, coming down."

"Nineteen seconds, seventeen, counting down," Cronkite said. It was just before dawn on the Moon, and the sun was low over the eastern horizon behind the lunar lander.

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The launch of the Saturn V rocket on July 16, four days before the scheduled Moon landing, had been to Peter every Fourth of July rolled into one. Three men riding on top of a fiery rocket aimed at space! Five F-1 engines burning liquid oxygen and kerosene and producing 7.5 million pounds of thrust! It was like sending the Washington Monument rocketing skyward. Peter littered his schoolbooks with sketches and doodles of

planets, aliens, and spaceships. He had drawn the Saturn V over and over, with its first stage, second stage, and third stage, its lunar module, service module, and command module.

At 363 feet, it was taller than a football field set on end, both beauty and monster, weighing more than 6.4 million pounds when prepared for launch. Peter had watched Neil Armstrong and Buzz Aldrin climb through the docking tunnel from Columbia to Eagle to check on the lunar module. The lunar module-the LM, pronounced "LEM" and originally called the Lunar Excursion Module-had never been tested in the microgravity of the Moon. Peter was not alone in wondering whether this spaceship would make it back to Earth. Columbia would return at more than 17,000 miles per hour. If its descent was too steep, it would burn up; if too gradual, it wouldn't make it through the atmosphere back to Earth. Even when coming into the atmosphere perfectly-threading the needle at supersonic speeds-Columbia would be a fireball, with temperatures on the outside exceeding three thousand degrees Fahrenheit. Peter's father, Harry Diamandis, appreciated this moment in history and welcomed any news that wasn't about the Vietnam War or the emotional civil rights struggles of the day. But he couldn't understand his son's fascination with space, given the challenges of life on Earth. He and his wife, Tula, had come from the small Greek island of Lesbos, where he grew up tending goats and bartering for food-olives for almonds, kale for milk-and working at his father's cafŽ. Harry's mother, Athena, was a housekeeper who would bring home surplus bits of dough in her apron pockets to bake for the family. One of Harry's favorite Christmas presents was a red balloon. He was a village boy, the first in his family to graduate from high school and go to college. Harry had wanted to be a doctor, and passed his medical boards in Athens before setting his sights on America. He arrived in the Bronx speaking no English. Their journey from Lesbos to America, and Harry's path to becoming a successful obstetrician, at times felt like its own trip to the Moon, with improbable odds, an element of fear, and a feeling of being a stranger in a foreign land.

On the television screen in the Diamandises' living room, images showed a simulation of the lunar landing. Then Apollo 11 commander Armstrong radioed, "Houston, Tranquility Base here. The Eagle has landed." The Eagle sat silently on the Sea of Tranquility in the Moon's northern hemisphere. Mission Control radioed back, "Roger, Tranquility. We copy you on the ground. You got a bunch of guys about to turn blue. We're breathing again."

"The lunar module has landed on the Moon," Cronkite marveled. "We're home. Man on the Moon."

More than five hundred million people, from crowds gathered before screens in Disneyland to American soldiers in Vietnam, watched as the white-suited, tank-headed Armstrong, a ghostly, blocky figure, backed out of the module and made his way down the steps. Tula watched Peter, hoping her son remembered to breathe. Armstrong said, "I'm at the foot of the ladder. The surface appears to be very, very fine-grained as you get close to it. It's almost like a powder. I'm going to step off the LM now."

It was just minutes before eleven p.m. in the Diamandis household. From Earth, the Moon was in a waxing crescent phase. Slowly, Armstrong moved his cleated foot onto the talcum surface, becoming the first human to ever touch another celestial body. "That's one small step for man," Armstrong said, "one giant leap for mankind." The view was desolate but mesmerizing, a desert scrubbed clean. The sky looked thick and dark like black velvet.

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"There's a foot on the Moon," he said, removing his glasses and wiping his eyes. "Armstrong is on the Moon. Neil Armstrong-thirty-eight-year-old American-standing on the surface of the Moon! Boy, look at those pictures-240,000 miles to the Moon. I'm speechless. That is really something. How can anybody turn off from a world like this?"

It was close to midnight when Tula finally got the kids to bed. Marcelle, who was six, was asleep before her head hit the pillow. Peter, still wired with excitement, told his mom once again that he was going to be an astronaut when he grew up. Tula's reply never varied: "That's nice, dear. You're going to be a doctor." Medicine was known; space was experimental. Besides, the first-born son in a Greek family always followed his father's path. Family friends were already calling young Peter the future Dr. Diamandis. Tula had given Peter a child's doctor's kit, and he would sometimes have her recline on the sofa so he could check her pulse and listen to her heartbeat. Being a doctor would be an honorable profession for Peter.

After Tula left the room, Peter turned on his flashlight and ducked under his tented bedspread. He made entries in his secret diary: The Moon was freezing in the shadows but baking in the sun. He would need a suit and the right boots-maybe his ski boots. There was no air to breathe on the Moon, so he'd need oxygen. He'd need food, water, and of course, a rocket. He drew more pictures of Saturn V, and of the astronauts. Late into the night, drawings and notes scattered around him, Peter fell asleep wondering how he could possibly be a doctor when he needed to get to the Moon.

In the years following the lunar landing, Peter began making his own rovers, among other machines. He was predatory in his pursuit of motors to hack. In one case, the lawn mower motor disappeared, turning up later on his go-kart. Then the bedsheets went missing, revealing themselves eventually as parachutes for the go-kart. The Diamandis family lived in the middle of the block on a middle-class street on the north side of Mount Vernon, New York, about thirty minutes from New York City and bordering the Bronx. Their house was a two-story white Dutch colonial with blue shutters, a big front yard, and a narrow gravel driveway where Peter liked to set up jumps for his bike. The house also had a side yard and backyard, with cherry trees and a swing set put together with great effort by his dad and uncle.

Peter drove his lawn mower-powered go-kart down the street from his house, turned onto Primrose Avenue, and pushed the cart to the top of an enormous hill. Wearing no helmet, he blasted down Primrose Avenue like a junior John Stapp, the Air Force colonel who studied g-forces by famously riding rocket-powered sleds to a top speed of 639 miles per hour. Peter deployed his go-kart's "parachute" only when precariously close to the busy intersection.

Peter took particular delight in his sister's toys, eyeing them as a raven stares at a meaty carcass. When Marcelle received a new Barbie Dream House, Peter discovered that its motor was perfect for one of his projects, and the Barbie window shades provided the ideal chain to automate the arm of one of his robots. Marcelle and her parents went from amused to exasperated. Peter also hatched various weapon-related plans, including one that used a pipe cleaner fashioned as a projectile for his BB gun. When it didn't work, Peter mistakenly tried to suck it out of the barrel, only to have the discharged pipe cleaner shoot straight down his throat. He was rushed to the hospital and back to his experiments by nightfall. Peter got good grades, but his teachers wrote on his report cards, "Peter talks too much," and he could "work a little harder on settling down."

Every Sunday, Peter and his family drove to the Archangel Michael Greek Orthodox Church near Roslyn, where Peter was an altar boy, tasked with carrying the incense, candles, or the large gold cross and helping with communion. Confession wasn't required, but he talked openly with the kind Reverend Father Alex Karloutsos, telling him that he regularly took his sister's toys and too often made his parents worry. And he

told him about his love of space; it was his "guiding star."

Peter shared with Father Alex his belief that they were all living in a biosphere, a kind of terrarium seeded with life by aliens. The aliens returned, Peter confided, to collect people as specimens or seedlings, but only in rural places like Nebraska where they wouldn't be noticed. Father Alex liked listening to Peter and knew that he was not a boy who could be placated by statements like "God is love." Father Alex told Peter that the greatness of the universe was a reflection of God's presence in our lives.

Most helpful customer reviews

3 of 3 people found the following review helpful.
The human story behind an extraordinary achievement in space flight
By Lee G
Think back to Alan Shepard, the first American in space, and imagine if someone had told you that a handful of civilians, without a dime of government funding, would loft two humans into space a scant 43 years later. Yet, spurred by a contest with a generous financial reward, a group headed by legendary aircraft designer Burt Rutan did just that. Especially notable is that the prize money didn't come close to covering their costs, and that's why their story is such a compelling one. The prize was the spark, but internal forces far more profound were driving these people, and it's the human story we get in this book. Read it, then go back and watch the footage of the two winning flights and the events leading up to them. You'll then have a deep and satisfying appreciation for this extraordinary achievement.

2 of 2 people found the following review helpful.
A great read.
By Amazon Customer
A great read, The story weaves together half a dozen character-driven threads. It's all about a cast of large characters: Peter Diamandis (the promoter), Burt Rutan (aeronautics prodigy), John Carmack (software genius), Erik Lindbergh (son of the great aviator), Michael Melvill and Brian Binnie (test pilots). The story brings to life the competition that led to the first reusable commercial suborbital spaceflights, My personal favorite is Burt Rutan. His creations have been amazingly innovative. One of my favorite scenes has MIke Melvill riding on top of the Rutan Raptor UAV prototype, flying it back to base like a some old-time cowboy. The book is packed with great stuff. The winning flights, of course, are the high points of the story. You've got to love the professionalism, determination, calm and expert piloting under pressure of both Melvill and Binnie. The Right Stuff indeed.

0 of 0 people found the following review helpful.
How to Make a Foundation
By Seth Hettena
The book starts out quite strong. Peter Diamandis, the founder of the X-Prize, is an a dynamo of activity. He is simultaneously attending Harvard Medical School and graduate school at MIT, launching a university, organizing collegiate clubs that turn into national organizations. He's the driving force behind the first part of the book, the writing is strong, and it makes for very interesting reading.

Unfortunately, Part II of the book, which is about the trials and tribulations behind the founding of the X-Prize is brutal. All the momentum the author built in the first part of the book comes to a grinding halt. We follow Peter around to meeting after meeting and learn about the death of his friend. Quite frankly, I skipped the last few chapters of this part and I don't feel like I missed anything. This third of the book could and should have been summarized in one chapter.

Part III, how Burt Rutan wins the X-Prize, gets interesting again. But by this point the whole thing is a bit

disjointed.

It's really three books in one and the author would have done better to focus on the building of a spaceship -- as suggested by the title -- and less on the building of a foundation. Peter Diamandis is an interesting character to be sure. And I can understand why the author wrote so much about him. He kept detailed notes on his life and tape recorded his thoughts. It's a goldmine for an author, but in the end, it doesn't serve the book. Peter doesn't make spaceships; Burt Rutan does.

The book I was hoping for would have led me through all the trials and tribulations in building a spaceship in much greater detail and the engineering challenges that were faced and overcome. The book touches on this then spends more time recounting the two winning X-Prize flights. Clearly, this is a talented author who needs some guidance in organizing her material.

See all 66 customer reviews...

HOW TO MAKE A SPACESHIP: A BAND OF RENEGADES, AN EPIC RACE, AND THE BIRTH OF PRIVATE SPACEFLIGHT BY JULIAN GUTHRIE PDF

After understanding this quite easy way to read and also get this **How To Make A Spaceship: A Band Of Renegades, An Epic Race, And The Birth Of Private Spaceflight By Julian Guthrie**, why do not you tell to others regarding through this? You could tell others to see this web site and choose browsing them preferred publications How To Make A Spaceship: A Band Of Renegades, An Epic Race, And The Birth Of Private Spaceflight By Julian Guthrie As known, below are lots of lists that supply many type of books to collect. Simply prepare couple of time and also net connections to obtain the books. You could really take pleasure in the life by checking out How To Make A Spaceship: A Band Of Renegades, An Epic Race, And The Birth Of Private Spaceflight By Julian Guthrie in an extremely easy manner.

Review
“Guthrie has a gift of building suspense around these airborne incidents of inherent drama — such as a balloon flight gone wildly wrong that ends in a botched parachute jump — as well as larger questions about space, technology and life’s purpose . . . “How to Make a Spaceship” is . . . ultimately flight-worthy and impressively ambitious. When the history of 21st century American space efforts is written decades or centuries from now, this book will be a valuable contemporary record of what it was like when humanity was trying to break out of its home.” – San Francisco Chronicle

“[How to Make a Spaceship] reads like a thriller. The story sounds incredible, as if torn from the pages of science fiction. And it has a happy ending. But as with all entrepreneurial ventures, nothing went according to plan: It was riddled with failure and disappointment; ugly battles broke out between friends and founders; the world often looked like it was coming to an end; and Diamandis had to gamble everything he had. Most interesting was an observation that [Richard] Branson made in the book’s foreword: There isn’t much of a difference between being an adventurer and an entrepreneur. As an entrepreneur, you push the limits and try to protect the downside. As an adventurer, you push the limits, and protect the downside — which can be your life.” —Vivkek Wadhwa, Washington Post

“If you admire those who aim really high, How to Make a Spaceship belongs on your bookshelf. [It] offers a rousing anthem to the urge to explore.” —Wall Street Journal

“[How to Make a Spaceship] includes enough death-defying stunts, madcap schemes, wild coincidences, and rousing redemptive moments to fuel a dozen Hollywood blockbusters.” —Wired.com

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“If readers are looking for scientific discussions, humorous anecdotes, and intense action, Guthrie covers those. The flights are written to make readers feel like they’re experiencing them in real time, nerves and all.” —Publishers Weekly

“Engaging… Just the thing for aspiring astronauts and rocketeers.” —Kirkus

“I don’t know how Julian Guthrie does it. In her last book, she didn’t race in the America’s Cup, yet readers felt they had. And now in How to Make a Spaceship, although she wasn’t strapped into the cockpit of the first civilian spacecraft to rocket into outer space, her vivid writing places readers right there. With the flair of a novelist and the precision of a fine journalist, she takes readers on a journey not just into space but into the hearts and minds of the adventurers who dare go where NASA no longer does. Her tale will quicken your pulse.” —Ken Auletta, author of Googled: The End of the World as We Know It

“The story of Peter Diamandis is a reminder of the power of passion and persistence. How to Make a Spaceship chronicles the amazing journey of a key figure in the private race to space—a dreamer who, in the face of multiple setbacks and naysayers, simply refused to let go of his dream.” —Arianna Huffington, author, cofounder of The Huffington Post

“Too few kids and young adults understand the power of science and technology. We need role models demonstrating the power of passion and perseverance to make dreams come true. How to Make a Spaceship is filled with innovators and doers. The story will inspire makers of all ages.” —Dean Kamen, inventor, entrepreneur, founder of FIRST Robotics

“This incredible book is The Right Stuff with afterburners. Intrepid designers and innovators risk their reputations. Gutsy test pilots risk their lives. Explorers push new boundaries of what so many once thought was impossible. All brought together by a real gravity-defying force, Peter Diamandis. How to Make a Spaceship is required reading for anyone who cares about space, aviation, and the future of flight.” —Captain Mark Kelly (USN, Ret.), former naval aviator, test pilot, and NASA astronaut

“This outstanding and compelling book shows the power of one man’s vision, and the ability of small teams to accomplish extraordinary things. How to Make a Spaceship will inspire and guide you to take on your own Moonshot.” —Ray Kurzweil, Inventor, Author, Futurist and Chancellor, Singularity University

“[An] engaging account of the race to get a rocket up to the Karman line without getting NASA involved....Just the thing for aspiring astronauts and rocketeers.” —Kirkus Reviews

About the Author
Julian Guthrie is an award-winning journalist who spent 20 years at the San Francisco Chronicle and has been published by The Wall Street Journal, The Huffington Post, and others. Her most recent book is The Billionaire and the Mechanic, a best-selling 2014 account of Oracle CEO Larry Ellison’s pursuit of the America’s Cup.

From the Hardcover edition.

1

Unruly

At around ten p.m. on July 20, 1969, eight-year-old Peter Diamandis positioned himself in front of the large television set in the wood-paneled basement of his family's home in Mount Vernon, New York. His mom, dad, younger sister, and grandparents were seated nearby. Peter, in pajamas and cape, aimed his mom's Super 8 camera at the screen, panned the room, paused on his white German shepherd, Prince, and returned

to the television.

On the carpet next to Peter were his note cards and newspaper clippings, organized by NASA mission-Mercury, Gemini, and Apollo-and by rockets-Redstone, Atlas, Titan, and Saturn. The third-grader, unable to sit still under normal circumstances-his mother called him ataktos, Greek for unruly-fidgeted, bounced, and rocked in place. This was the moment Peter had dreamed about, a moment that promised to be better than all the electronics he could buy at Radio Shack, cooler than every Estes rocket ever made, more exciting even than the M80s lit on his birthday, sending his mom and friends diving for cover.

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It was close to midnight when Tula finally got the kids to bed. Marcelle, who was six, was asleep before her head hit the pillow. Peter, still wired with excitement, told his mom once again that he was going to be an astronaut when he grew up. Tula's reply never varied: "That's nice, dear. You're going to be a doctor." Medicine was known; space was experimental. Besides, the first-born son in a Greek family always followed his father's path. Family friends were already calling young Peter the future Dr. Diamandis. Tula had given Peter a child's doctor's kit, and he would sometimes have her recline on the sofa so he could check her pulse and listen to her heartbeat. Being a doctor would be an honorable profession for Peter.

After Tula left the room, Peter turned on his flashlight and ducked under his tented bedspread. He made entries in his secret diary: The Moon was freezing in the shadows but baking in the sun. He would need a suit and the right boots-maybe his ski boots. There was no air to breathe on the Moon, so he'd need oxygen. He'd need food, water, and of course, a rocket. He drew more pictures of Saturn V, and of the astronauts. Late into the night, drawings and notes scattered around him, Peter fell asleep wondering how he could possibly be a doctor when he needed to get to the Moon.

In the years following the lunar landing, Peter began making his own rovers, among other machines. He was predatory in his pursuit of motors to hack. In one case, the lawn mower motor disappeared, turning up later on his go-kart. Then the bedsheets went missing, revealing themselves eventually as parachutes for the go-kart. The Diamandis family lived in the middle of the block on a middle-class street on the north side of Mount Vernon, New York, about thirty minutes from New York City and bordering the Bronx. Their house was a two-story white Dutch colonial with blue shutters, a big front yard, and a narrow gravel driveway

where Peter liked to set up jumps for his bike. The house also had a side yard and backyard, with cherry trees and a swing set put together with great effort by his dad and uncle.

Peter drove his lawn mower-powered go-kart down the street from his house, turned onto Primrose Avenue, and pushed the cart to the top of an enormous hill. Wearing no helmet, he blasted down Primrose Avenue like a junior John Stapp, the Air Force colonel who studied g-forces by famously riding rocket-powered sleds to a top speed of 639 miles per hour. Peter deployed his go-kart's "parachute" only when precariously close to the busy intersection.

Peter took particular delight in his sister's toys, eyeing them as a raven stares at a meaty carcass. When Marcelle received a new Barbie Dream House, Peter discovered that its motor was perfect for one of his projects, and the Barbie window shades provided the ideal chain to automate the arm of one of his robots. Marcelle and her parents went from amused to exasperated. Peter also hatched various weapon-related plans, including one that used a pipe cleaner fashioned as a projectile for his BB gun. When it didn't work, Peter mistakenly tried to suck it out of the barrel, only to have the discharged pipe cleaner shoot straight down his throat. He was rushed to the hospital and back to his experiments by nightfall. Peter got good grades, but his teachers wrote on his report cards, "Peter talks too much," and he could "work a little harder on settling down."

Every Sunday, Peter and his family drove to the Archangel Michael Greek Orthodox Church near Roslyn, where Peter was an altar boy, tasked with carrying the incense, candles, or the large gold cross and helping with communion. Confession wasn't required, but he talked openly with the kind Reverend Father Alex Karloutsos, telling him that he regularly took his sister's toys and too often made his parents worry. And he told him about his love of space; it was his "guiding star."

Peter shared with Father Alex his belief that they were all living in a biosphere, a kind of terrarium seeded with life by aliens. The aliens returned, Peter confided, to collect people as specimens or seedlings, but only in rural places like Nebraska where they wouldn't be noticed. Father Alex liked listening to Peter and knew that he was not a boy who could be placated by statements like "God is love." Father Alex told Peter that the greatness of the universe was a reflection of God's presence in our lives.