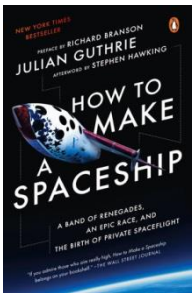

How to Make a Spaceship: A Band of Renegades, an Epic Race and the Birth of Private Space Flight

By Julian Guthrie and Sir Richard Branson June 15, 2017

The book starts with Mike Melville's dramatic first flight of SpaceShip One on June 21, 2004 to become the first "commercial", non-government astronaut:

"[Mike] tried the switches again. The left stabilizer would not move. Jim Tighe [Mission control] said darkly "This is not good". Rutan, sitting to Shane's right grimaced slightly and hunched forward. Mike was his best pilot and best friend. He was his first employee at Rutan Aircraft Factory. Sally had wanted her husband taken off the flight test program of Spaceship One. She had a bad feeling about the rocket and tried to make the case that Mike had done enough for the program already. Rutan had said no. Rutan had seen how Mike was uncharacteristically nervous before the morning's take off. Mike wanted to make history for himself , for the team and for those who were never supposed to amount to much. There was also Peter Diamandi's 10 million cash prize dangled out there offered to a team like theirs that could fly to the start of space twice within 2 weeks. Today was a day to make history but it also got them one step closer to the prize…"

Now the author of the book skips back to June 20, 1969 and zooms into the home of young Pete Diamandis watching the first moon landing. It is refreshing to follow the much publicized landing through the eyes of a 3rd grader - and when Walter Cronkite said: "We're home. Man on the Moon" Diamandis decided to become an astronaut and space explorer – contrary to his father's wish to follow his footsteps as a medical doctor. Pete's biography is outlined in detail interspersed with the amazing stories of other space enthusiasts, outlining the complicated and sometimes coincidental confluence of their quest for space like that of the "dreamer in the desert", Burt Rutan. His obsession and talent with airplanes and his ingenious inventions and projects like "Voyager 1", the non-stop, non-re-fueling flight around the world by his brother "Dick" Rutan - are described in breathtaking detail, revealing his brother's talent for flying airplanes under extreme conditions.

Eric Lindbergh's fate and involvement is described in a dedicated chapter ("the heron and the astronaut") and throughout the book. Pete was inspired by the Orteig prize, won by Charles Lindbergh, Eric's grandfather: Diamandis wanted to create a $10 Mio X Prize for reaching the space frontier at 100 km altitude, the "Karman line", with one pilot, ballast for 2 passengers, repetition of the flight within 2 weeks using a reusable, non-commercial spaceship – and survival of the pilot for at least 7 days after the prize winning flight.

Diamandis was convinced that this prize and with it the next step into space would only be achieved by highly motivated and dedicated individuals or small groups – never by government institutions.

Details of Pete's forming years are described, his medical studies at MIT, at the same time founding "Students for the Exploration and Development of Space" (SEDS), the International Space University (ISU) and completing his B.S., then moving on to Harvard Medical School and in 1989 and founding his own start-up company "International Micro Space" (Orbital Express) for launching satellites faster and cheaper than NASA while completing his medical M.S. degree.

Entering “real life” as COE of his own company “International Micro Space” Pete promptly ran into financial problems, but this did not distract him from founding another company “ Angels Technologies” for supporting the fledgling wide band communications with circling “high altitude, long range” airplane – the “Proteus” to be built by Burt Rutan. Other start up’s founded later by Diamandis were “Space Adventures” and “Zero-G Corporation” offering parabolic zero-G flights.

In addition Pete pursued his dream of solidifying a space-race prize. The 10 Mio X Prize (later called Ansari X Prize) was officially inaugurated in May 1996 in St. Louis (“history repeats itself”). One of the illustrious participants was Burt Rutan, revealing himself as a potential contestant among a field of international participants from Argentina England, Romania, Russia and of course from America. Potential contestants and enthusiasts inspired by the X Prize are presented with special chapters like Steve Bennet (U.K, Nova 1 and Starchaser) and John Carmack (USA, Armadillo Space), Jeff Bezos (Shepard - VTVL), TGV-Rockets (USA), Pablo de Leon (Argentina), Dumitru Popescu (Romania).

Prominent early supporters of the Space-X prize included “uncle” Arthur C. Clarke, Buzz Aldrin, Tom Clancy, James Cameron, the movie maker ….

Two entire chapters are dedicated to Mike Melville – the “cowboy pilot”, and to Burt’s daredevil test pilot and brother Dick Rutan’s who attempted to fly non-stop around the globe – this time in a balloon –but was airborne only a couple of hours when his balloon exploded. Fortunately Dick and his co-pilot mastered to bail out.
Other “stout” members of Pete’s “strike force” are mentioned in context, like Byron Lichtenberg, Jeff Bezos (SEDS chapter in Princeton), Paul Allen and John Carmack interwoven with Pete’s struggle to raise the X Prize money, getting only No’s from “Dr. Yes” Branson and Jeff Bezos because they wanted to participate as contestants. Almost all of American industry shied away from sponsoring being afraid of bad press if somebody would get hurt or die for the X Prize.
After becoming COE of another space oriented start-up company (BlastOff!) founded by Larry and Bill Gross, Pete had to relocate to Pasadena, close to CALTEC and JPL, but suffered another setback after the company folded in 2001.
By 2003 Diamandis had acquired only half of the prize funding - however during one of his desperate pitches to raise funding he met Elon Musk, who wanted to go to Mars (“the Moon was reached and done – the next step is Mars”) and also to embarrass the government, thus becoming “brothers in arms”.

In the meantime Burt Rutan was abandoning his idea of using the Proteus aircraft also for the X Prize competition and was hatching new designs, inventing “feathered” wings for re-entry to withstand loads and heat. His mantra was, ”my pilots will start, fly and land their spaceship on a landing strip”. Having convinced himself about the soundness of his new “SpaceShip One” design – all he needed now to develop a non-commercial carrier airplane (became known as “White Knight”, featuring a twin fuselage) and a rocket motor with enough thrust to reach the 100 km altitude. With these ideas he managed to convince Paul Allen (co-founder of Microsoft) to “go for it”.

Pete, still short of 5 Mio for the Space X prize got help from Eric Lindbergh, who has significantly recovered from his devastating rheumatoid-arthritis, who wanted to recreate his grandfather’s flight across the Atlantic on its 75 anniversary on May 2, 2002 in support of the X Prize - raising much interest but almost no additional money in favor of funding the X Prize.
With a “hole in one” insurance deal Peter finally had a meeting with Anousheh and Hamid Ansari, founders of “Telecom Technology”: in May 2004 the X Prize was renamed to the “title sponsor” Ansari X Prize.

In the meantime Rutan plowed on full speed, backed by Paul Allen, SpaceShip One rollout was on April 18, 2003, first powered flight (Brian Binnie) in December 2003, ending with a crash landing. After another flight by Peter Siebold in May 2004 reaching only 64,43 km, Mike Melville attempted to reach the 100 km Karman-border with flight 15P when one of the stabilizers got stuck (see above), but Melville was lucky to get it working again after several attempts, thus saving the the SpaceShip One from crashing and completed a successful 100 km altitude flight. Burt Rutan was now able to announce officially his readiness to try to win the Ansari X Prize, knowing he had still some problems to solve.
After a frantic weight reduction struggle to make room for the required 2 passenger ballast during the flight and removal of the complete fuel ullage for more thrust, Melville completed the first Ansari X Prize flight (Sept 29, 2004, 102.93 km), however the aircraft developed a scary, uncontrollable spin during the powered flight and barely made it out of the atmosphere into space where Melville was able to stabilize the ship with its reaction control system.
After Melville's unexpected pull-out of the program, Binnie (Oct 4, 2004, 112.014 km) got his second chance and completed a flawless second flight "nailing" the prize according to the Ansari X prize conditions.
A unique success for Burt Rutan and his sponsor Paul Allen demonstrating the capability to send humans into space with privately built spaceships (Scaled Composits 1 : Government 0).
As Binnie expressed his feelings after his successful flight "I am proud to live in America where you have the Yankee-ingenuity to roll up your sleeves and go for it."
George W. Bush complimented Burt Rutan and the winning team with "Thank you for dreaming the big dream" during his call to Mohave spaceport.

This book gives an overview of the most important, well known events in airplane and spaceflight history – but it is delightful to read it from an unusual perspective of the enthusiastic and dedicated protagonists of this book, which were inspired by the first moon landing and became the trailblazers for inaugurating commercial spaceflight and space tourism.
The author Julian Guthrie has thoroughly researched and expertly interconnected the very different paths and events in a unique fashion thus creating a homage of Peter Diamandis and Burt Rutan and the undeterred promoters of space exploration and exploitation.

How to make a Space Ship? – With a lot of enthusiasm, dedication, luck, individuals who count and an unwavering belief in your mission.

A great book that documents the most interesting and exciting phase of human space travel - a phase that deserves not to be forgotten.
This impressive narrative will linger in my mind for years – at least as long as the first paying customer gets his astronaut wings form Sir Richard Branson!
Then I will read it again