

# Vanessa O'Brien

## *Goes to Space on Blue Origin's NS-22*

**HUGE CONGRATULATIONS to SES Explorer and Honorary Advisory Board member Vanessa O'Brien for achieving her 6th Guinness World Record...the Explorers Extreme Trifecta! In August last year, Vanessa passed the Kármán Line into sub-orbital space with Blue Origin, to reach an apogee of 351,232 feet (107km) becoming the first woman to reach the extremes on land, sea and air, completing the Explorers' Extreme Trifecta, a Guinness World Record.**

Vanessa share's her experience...

I joined Blue Origin's suborbital spaceflight mission, NS-22, its sixth manned mission and first to carry two women, on 4th August 2022. I proudly carried the UN Women Flag, to prove that no mountain is too high when women work together to make a difference in the world. After an intense week of training, we were loaded into the crew capsule and the doors were locked.

"T minus ten, nine, eight, seven, six, five, command engine start, two, one... New Shepard has cleared the tower and is headed to Space... God Speed, Titanium Feather." T-3 seconds is when the engine is ignited.

Besides me, there was Coby Cotton, Mário Ferreira, Clint Kelly III, Steve Young, and Sara Sabry. The name Titanium Feather was selected by our team after I identified Titanium as number 22 on the periodic table of elements, and feather was added by Sara Sabry, as feather stood for the perfection of flight and is a mascot for Blue Origin. NS-22 even had an official song, David Guetta's Titanium featuring Sia.

Like many expeditions, we didn't know each other until we were brought together. Like many expeditions, you rely on your team for success. The crew capsule is weight balanced, with seats set to



Vanessa O'Brien proudly holds the UN Women Flag (photo by Blue Origin)

individual height and weight. Any one of us can, up to two minutes and 30 seconds before take-off (T-2:30), say, "I WILL NOT FLY". Those four words will cancel the spaceflight for everyone. Blue Origin will do its best to reset the ballast for a launch

the next day. After T-2:30, the auto sequence begins, and everyone on board is committed for take-off.

Blue Origin's spaceflight system is controlled entirely by on-board computers and its rocket composed

of two vehicles: a crew capsule, which sits on top of a propulsion module (ie, booster). The two vehicles lift off together and are designed to separate during flight. After separation, the booster returns to Earth, performing an impressive vertical landing on the launch pad, while the crew capsule follows a separate, higher trajectory and returns under parachutes to touchdown on land nearby. Both vehicles are intended for recovery and re-use and its BE-3PM engine is fuelled by clean liquid oxygen and hydrogen. During flight, the only by-product of engine combustion is water vapor.

Our team trains endlessly. Our day starts at 04:00 and runs until well past 19:00. Blue Origin is all about safety, and every day we practice, practice, and practice. I couldn't stop thinking of the endless jokes – How do you get to Carnegie Hall? Practice! At the end of the week, each of us would have to pass individual written and practical exams. The most important of these tests involved safety and what to do if something went wrong.

If a problem is detected with the booster, as happened on the spaceflight following ours, NS-23, the pressurized crew capsule separates, and the escape motor fires, pushing the crew capsule safely away from the booster. In a nominal mission like ours, the escape motor does not fire, and the crew capsule separation is much gentler, essentially using springs. There are four safety features for landing that are built into the crew capsule.

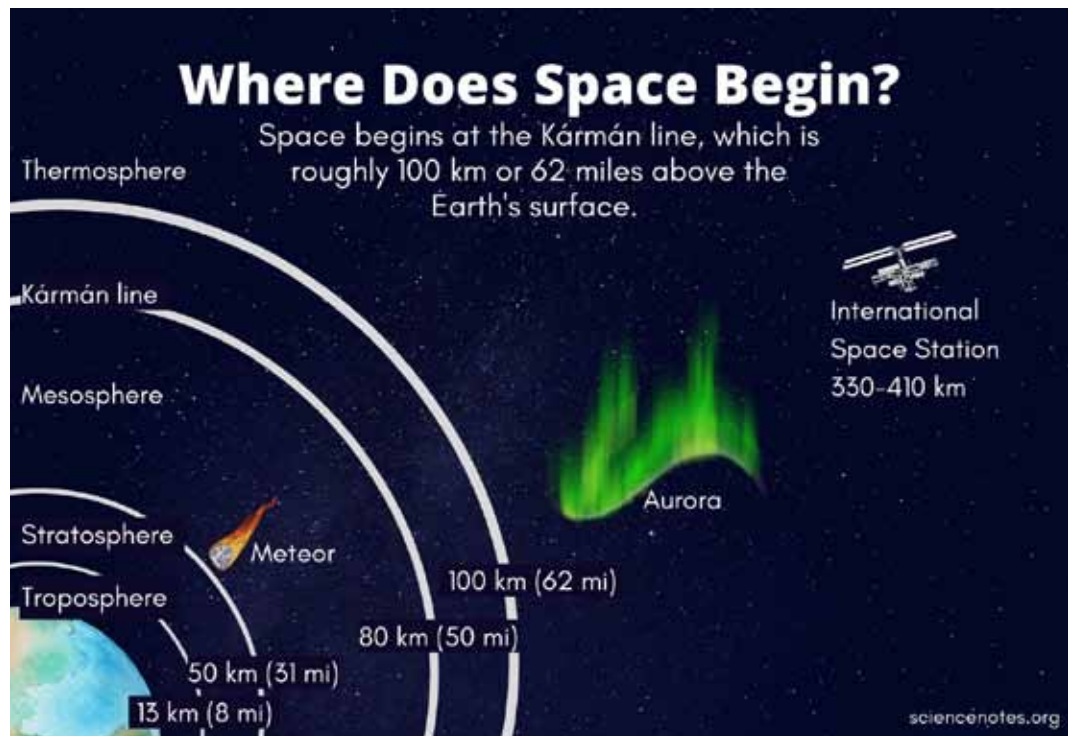
**FIRST**, three independent parachutes deploy to ease the crew capsule's descent.

**SECOND**, the reclining astronaut seats are built with a five-point harness designed to absorb energy (think of a dentist chair with scissor-like suspension underneath to absorb shock).

**THIRD**, the crew capsule has a “crushable structure” that can absorb some of the force of impact.

**FOURTH**, small thrusters pointing downward fire when the crew capsule is close to the ground. These thrusters push against the Earth's surface, reducing the speed of the crew capsule.

We reached our maximum ascent velocity of 3,603 km/h, traveling supersonic at three times the speed of sound. Once our crew capsule separated and passed the Kármán line, we had three minutes of weightlessness. What I saw was 180 degrees of the Blue Marble and what looked like all the layers of the atmosphere – the troposphere, stratosphere, mesosphere, and as we were in the thermosphere, I wouldn't see that. These layers of atmosphere floated above the earth like a cloud. My next impression was how bright the sun was, as if someone took a flashlight and shined it in one's eyes. The crew



capsule was all windows and constantly rotated, so I found the sun overpowering, so much so, that I didn't notice the darkness, although it is there in pictures. I find it interesting to notice what one is attracted to. I was attracted to the light; however, with that attraction came worry that the light was too strong for the Earth without any protection, which brought me back to gazing at the atmospheric layers. It was not for me to say whether these layers were 'thin', I had no comparison.

My take-away is that these early missions are necessary for the private space sector to fulfil its vision of having millions of people living and working in space. For Blue Origin, whose motto is Step by Step, ferociously; information gained about New Shepard (suborbital) leads to information used on New Glenn (orbiting Earth) and Suborbital Reef (a private space station targeted for 2025-2030). There is always a bigger picture, and I am grateful to have been part of the early stages of commercial spaceflights, within the private sector, as a spaceflight participant.

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