

■ ■ TWENTY YEARS FROM NOW YOU
WILL BE MORE DISAPPOINTED BY
THE THINGS THAT YOU DIDN'T DO
THAN BY THE ONES YOU DID DO.

SO THROW OFF THE BOWLINES.
SAIL AWAY. CATCH THE TRADE
WINDS IN YOUR SAILS.

EXPLORE,

DREAM,

DISCOVER. ■ ■

Mark Twain



THE DREAM

SEE YOUR WORLD TURN UPSIDE DOWN

Third private manned space flight and X-Prize winning flight.
SpaceShipOne rockets up to over 360,000ft
Ron Dartowitz

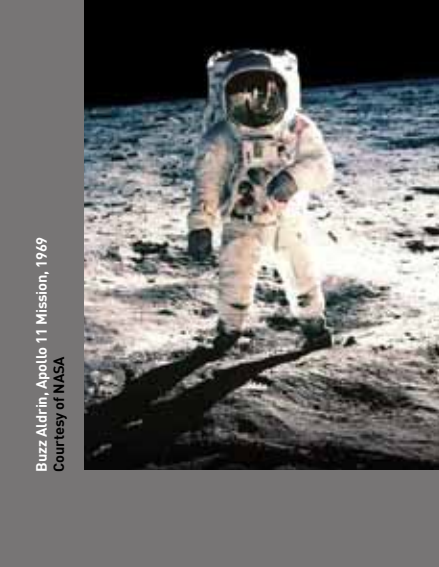


THE PACE OF CHANGE

We live in an age of extraordinary innovation. We accept a pace of change that even our most recent ancestors could not have imagined. Almost anything is possible and almost everything is available.

Strange then, that putting men and women into space, a pinnacle of human achievement that was conquered almost half a century ago, has remained completely out of reach to the millions who dream of crossing the final frontier.

It's easy to make promises that this will change, but hard proof is what matters which is why Virgin Galactic is different. We have a new, better and proven way to get to space, one that overcomes so many of the barriers of the past.



Buzz Aldrin, Apollo 11 Mission, 1969
Courtesy of NASA

“ WE NEED AFFORDABLE SPACE TRAVEL TO INSPIRE OUR YOUTH, TO LET THEM KNOW THAT THEY CAN EXPERIENCE THEIR DREAMS, CAN SET SIGNIFICANT GOALS AND BE IN A POSITION TO LEAD ALL OF US TO FUTURE PROGRESS IN EXPLORATION, DISCOVERY AND FUN. ”

Burt Rutan, Founder, Chief Technical Officer & Designer Emeritus



Sir Richard Branson



THE REALITY

THIS IS NOT THE END...
BUT IT'S A VERY
GOOD BEGINNING.

Burt Rutan on the space flights
of SpaceShipOne

THE NEW GENERATION

After the history making flights of SpaceShipOne in 2004, Virgin Galactic was born and work started on creating the world's first commercial spaceline.

Based on the prototype SpaceShipOne, the new generation of Virgin Galactic spacecraft has been designed to provide the ultimate space flight experience.

On December 7 2009, VSS Enterprise, Virgin Galactic's first passenger carrying spaceship was unveiled to the world.

Across the globe, hundreds of Virgin Galactic future astronauts are preparing to turn their dreams into reality.



VMS Eve and VSS Enterprise, Mojave, December 2009
Mark Greenberg



THE EXPERIENCE

A climb to 50,000ft before a safe air release. A brief moment of quiet then the rocket engine ignites...

After 2 days of flight preparation and meeting with your crew, you're suited up and raring to go. The climb to 50,000ft is marked with quiet contemplation but there's an air of confidence and eager anticipation.

With awe-inspiring power, the spaceship accelerates to around 3000 mph or nearly 4 times the speed of sound.

Then the countdown to release, a brief moment of quiet before a wave of unimaginable but controlled power surges through the craft. You are instantly pinned back into your seat, overwhelmed but enthralled by the howl of the rocket motor and the eye-watering acceleration which, as you watch the read-out, has you traveling in a matter of seconds, at almost 3000mph, nearly 4 times the speed of sound.

Outside SpaceShipTwo's windows the soft blue atmosphere melts into the black infinity of space.

As you hurtle through the atmosphere's edges, the large windows show the sky turning from cobalt blue to black. You're on a high, you're loving it. You start to relax, but in an instant your senses are back on full alert, the world contained in your spaceship has completely transformed.

The rocket shuts down. Instant silence. Instant weightlessness. Instant elation.

The rocket motor has been switched off and it's not just quiet, it's QUIET. The silence of space is awe inspiring. What's really getting your senses screaming now though, is that the gravity which has dominated every movement since the day you were born is not there anymore.

■ ■ THERE ARE OVER 6 BILLION PEOPLE ON EARTH, TO BE 1 OF 6 ASTRONAUTS IN SPACE LOOKING DOWN ON THEM WILL BE A VERY SPECIAL THING. ■ ■

Michiel Mol
Future Astronaut



Earth seen from SpaceShipOne at 38,742ft
Brian Binnie, Test Pilot of SpaceShipOne



There is no up and no down and you're out of your seat experiencing the freedom that even your dreams underestimated.

After a graceful mid-space somersault you find yourself at a large window. What you see is a view that you've seen in countless images but the reality is so much more beautiful and provokes emotions that are strong but hard to define.

EXPERIENCE THE FREEDOM OF ZERO-G

■ ■ AND I SAY TO MYSELF,
WHAT A WONDERFUL WORLD... ■ ■

Louis Armstrong

A VIEW TO TAKE YOUR
BREATH AWAY

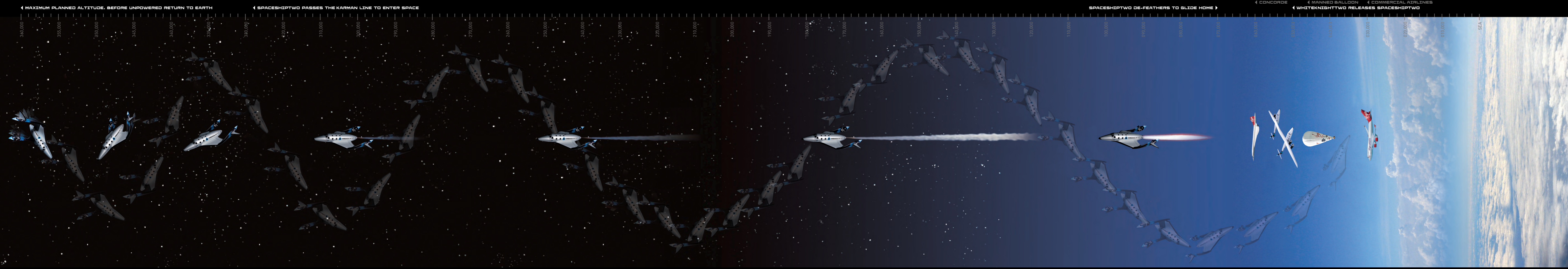
The blue map, curving into the black distance is familiar but has none of the usual marked boundaries.

The incredibly narrow ribbon of atmosphere looks worryingly fragile. What you are looking at is the source of everything it means to be human, and it is home.

■ ■ YOU CANNOT APPRECIATE THE
EXPERIENCE JUST BY LOOKING AT A
MAGAZINE COVER...TO TAKE IT IN
WITH YOUR OWN EYES, EVERYTHING
YOU FEEL IN YOUR BODY IS THE
SAME, IT IS... WOW. ■ ■

Brian Binnie
Test Pilot of SpaceShipOne

CROSSING THE FINAL FRONTIER - HOW HIGH WILL YOU FLY?



Then you're back to your reclined seat and gravity is starting to return. The deceleration produces strong G forces, but you're lying down to ease the intensity. You feel the feathered wings of the spacecraft producing a powerful drag as the thickness of the atmosphere increases, although out of the windows it still looks like space.

The G forces quickly ease off and you hear the pilot announce the start of the glide home.

Home sweet home.

Later that evening, after the celebrations and being awarded your astronaut wings, you know that life will never quite be the same again.

WE SHALL NOT
CEASE FROM
EXPLORATION,
AND THE END
OF ALL OUR
EXPLORING WILL
BE TO ARRIVE
WHERE WE
STARTED AND
KNOW THE
PLACE FOR THE
FIRST TIME. ■■

TS Eliot



BECOMING PART
OF HISTORY

The Virgin Galactic future astronauts have
formed the world's most exclusive club.

Their pioneering drive and enthusiasm for
the project has combined to create a unique
and active community.

Timothy, 50

"Who wouldn't want to? I love flying and
this is going to be the ultimate flight! It's the
opportunity of a lifetime - to experience the
thrill of riding a rocket into space and then
being able to wonder in silence at the
incredible beauty of the planet below. I am
sure we will never forget it."

Alex, 46

"I want to see our planet. The 1960's moon
landings did it: I was hooked before I could
barely run, let alone fly. My interest in
visiting space is about as old as my first
glimpse of the moon."

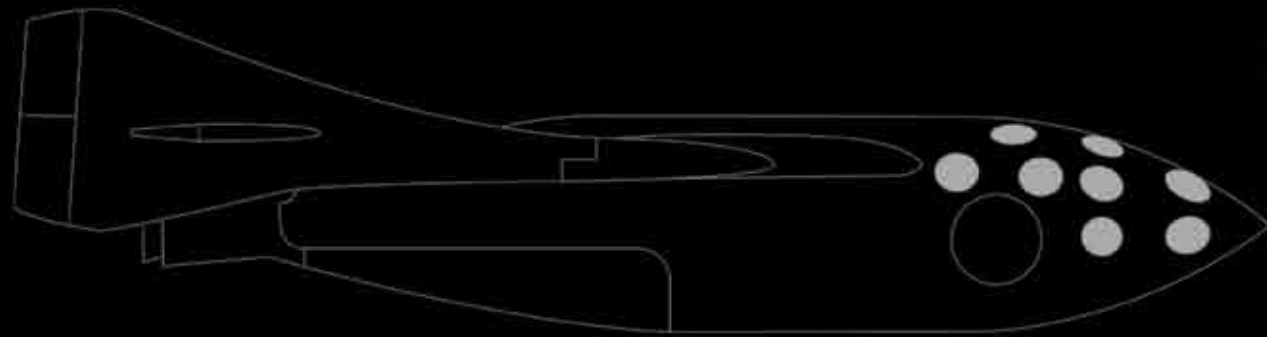
THE ASTRONAUTS

Justin, 42

"The reason I wanted to go galactic is quite
simple... I have a chalkboard of life. Things
I want to achieve in my few years on this
planet... Nothing could be bigger or better
than going into space."

Sonja, 33

"I will experience what it means to make
a childhood dream a reality!
To be so closely involved in this historic
project from the very beginning and to
witness each milestone on the way into
space first hand is fascinating! I am able to
see from very close up how a new era
of space travel begins."



EVOLVING TECHNOLOGY



Before SpaceShipOne and WhiteKnightOne, space launch technology had remained largely unchanged since its earliest days. It had not had the benefit of much private sector innovation or competition and was closely tied to military capabilities and the ambitions of the world's super powers.

Virgin Galactic's VSS Enterprise will share much of the same basic design and technology as SpaceShipOne but goes a stage further by meeting safety and comfort levels necessary to enable a wide diversity of passengers to become astronauts without specialist skills or experience.

This is the first time that a spaceship has been built with these considerations at the absolute forefront of the design and construction process.

VSS ENTERPRISE (SPACESHIPTWO)

SpaceShipTwo uses all the same basic technology, carbon composite construction and design as SpaceShipOne. However it is around twice as large as that vehicle and will carry six passengers and two pilots.

Each passenger seat benefits from two large windows: one to the side and one overhead. So, if you don't want to float free in space and you'd rather just remain in your seat you'll still get a great view.

VMS EVE (WHITEKNIGHTTWO)

The first WhiteKnightTwo, christened VMS Eve after Richard Branson's mother, is the largest all-carbon composite aviation vehicle ever built and the most fuel efficient of its size. It has unique capability to carry heavy

payload (around 35,000 lbs) to high altitude (around 50,000ft) and a range of over 2000 nautical miles. Remarkably for a vehicle of its size, it is also capable of performing high and zero g maneuvers.

TECHNICAL INNOVATION

- 1. Strong Composite Materials—** SS2 is made of composite materials to give the craft a huge amount of strength while remaining incredibly lightweight.
- 2. 50,000ft Air Release—** An air release minimizes fuel use and increases safety.
- 3. Hybrid Rocket Motor—** This offers important safety and environmental advantages over liquid or solid systems that are more commonly used on manned space vehicles.

- 4. Feathered Re-entry—** The aerodynamics of SpaceShipTwo's pivoted wings act like a shuttlecock, slowing and controlling the spaceship's re-entry.
- 5. Glide back to spaceport—** A conventional runway landing eliminates the need for parachutes and splashdowns.

VMS Eve and VSS Enterprise take off into the Mojave skies
Mark Greenberg

VMS Eve and VSS Enterprise over Mojave
Mark Greenberg



VSS Enterprise during her first captive carry flight
Mark Greenberg



VMS Eve and VSS Enterprise soar the Mojave skies
Mark Greenberg



VMS Eve on the runway, Mojave
Mark Greenberg



SAFETY FIRST

Sir Richard Branson after his maiden flight on VMSEVE, Oshtosh, July 09
Mark Greenberg

SAFETY IS VIRGIN GALACTIC'S NORTH STAR

Burt Rutan's innovative design revolutionized safety in space travel. The use of an air release coupled with a controllable hybrid rocket engine offers many system back-ups. The unique 'feathered' re-entry technology, relying on the laws of physics as opposed to human judgement or computers, slows the spacecraft so that re-entry is relatively care free and always at the correct angle. This approach ensured the safe spaceflights during 2004 and gave Virgin the reassurance it needed to take things to the next stage.

The spaceship can be thought of as an air released glider with a rocket motor and extra systems for spaceflight. Just like any conventional flying machine, it requires aerodynamic forces to provide its stability and control which it only has whilst in the atmosphere.

In space the force of gravity gradually slows the spaceship before pulling it back towards Earth. During this period the pilots are able to maneuver the vehicle to provide a changing view.

The spaceship is powered by a hybrid rocket motor. This type of system is not a new idea but offers important safety and environmental advantages over liquid or solid systems that are more commonly used on manned space vehicles. In particular, it means that the pilots will be able to shut down the SpaceShipTwo rocket motor at any time during its operation and glide safely back to the runway.

Carbon Composite Construction
Scaled Composites - and the clue is in the name - builds its vehicles with the maximum use of composite construction techniques. Both WhiteKnightTwo and SpaceShipTwo are no exception. WhiteKnightTwo is the largest all-composite aircraft ever built. Carbon fiber composite is an extraordinary material; four times the strength of steel and a quarter of its weight, meaning less energy is required to propel both vehicles.

Not only is it very light and strong, but it also has a virtually unlimited fatigue life; as long as the stresses are kept below the ultimate, it does not deteriorate in use in the same way that metal fatigues. It is also easy to modify additional pieces.

Scaled's unique understanding of carbon composite construction techniques in aerospace design is key to the safer by design philosophy that has been central to the Virgin Galactic project.

Technical Snapshot of Virgin Galactic's SpaceShipTwo

Launch Altitude: Above 45,000ft — 14,000 meters
Pay Load: 6 passenger astronauts
2 pilot astronauts

2nd stage of sub-orbital launch system

Apogee: > 110km — 70 miles
Max speed: Mach 3.5 — 4,200 kph — 2,600 mph

Elevons
Actuated by pilot's centre stick for vehicle pitch and roll control

Electric Servo Horizontal Stabilizers
For trim control

Feather Mechanism
Feather actuation and lock pneumatically operated

Hybrid Rocket System*

Roll Thrusters

Emergency Egress

12 feet — 3.7m

Nose Skid
Simple, high friction landing gear

Rudders
Actuated by pilot's pedals for vehicle yaw control

CTN:
Case, Throat and Nozzle

Main Valve Bulkhead:
Includes slosh baffle/valve/injector igniter components

Oxidizer Tank

TPS
Thermal Protection System

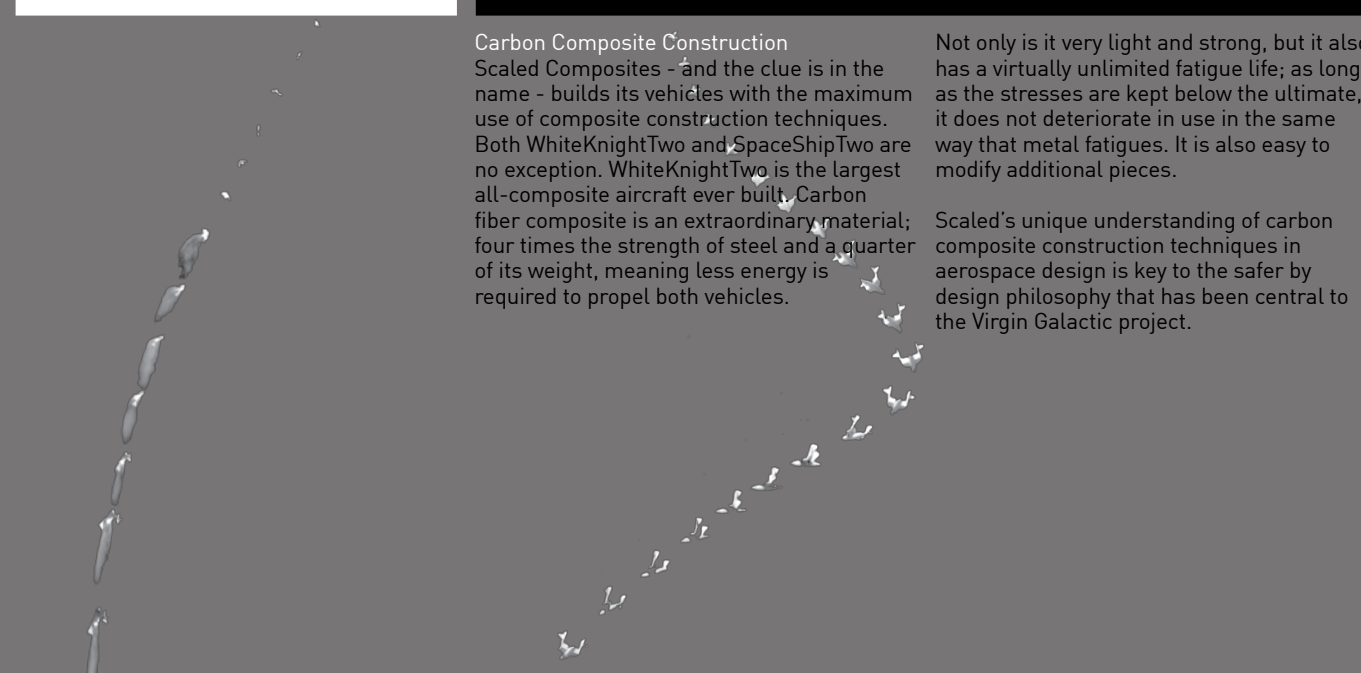
Windows
Side 17" — 43cm
Top 13" — 33cm
Crew station 21" — 53cm

Entry/Exit
Large Cabin door for easy entry and egress on lower left side

Thrusters
To control pitch and yaw of spaceship in zero gravity

*Hybrid Rocket Propulsion: Oxidizer Tank and CTN Hybrids are among the safest and simplest rocket motors. Uses a Liquid Oxidizer (Tank) and a Solid Fuel (CTN).

Combustion occurs above the solid fuel surface inside the CTN and resultant hot gases exit out the nozzle producing thrust. Hybrid Rocket motors can be shut down at any point after ignition.



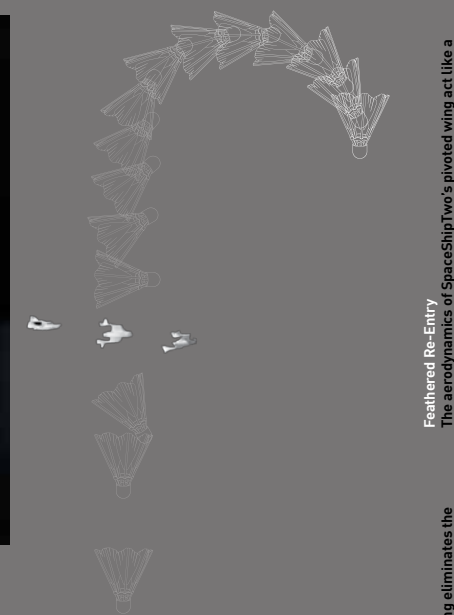
50,000ft Air Launch:
An air launch minimizes fuel use and increases safety.



50,000ft Air Launch:
An air launch minimizes fuel use and increases safety.

70,000ft Glide to Base:
A conventional runway landing eliminates the need for parachutes and splashdowns.

Feathered Re-Entry:
The aerodynamics of SpaceShipTwo's pivoted wing act like a shuttlecock, slowing and controlling the spaceship's re-entry.



50,000ft Air Launch:
An air launch minimizes fuel use and increases safety.

One of Virgin Galactic's primary objectives is to end the exclusivity that has been attached to manned space travel, by designing a vehicle which can fly almost anyone to space and back safely...

Pre-Flight Experience Program. Our goal is to provide you with the most incredible experience of your life. The trip will be intense, exhilarating, and the more that can be simulated beforehand, the better the real thing will be.

There will be 2 days of pre-flight preparation, bonding and training onsite at the spaceport. Learning how to make the most of your time in zero gravity and tips on how to be the most

comfortable with higher levels of G forces will form an important part of your preparation. We expect to use the WhiteKnightTwo carrier aircraft, which will feature a duplicate SpaceShipTwo cabin, as an integral part of the preparation experience.

Your pre-flight preparation will ensure that you are mentally and physically prepared to savor every second of your spaceflight.

Basic emergency response training, prescribed by our regulators will be at the forefront. Activities to familiarize you with the spaceflight environment will follow a close second.

Everything about your pre-flight and flight experience will be recorded and provided to you to relive the experience and share it with your family and friends.

Virgin Galactic will establish its worldwide headquarters in New Mexico, USA and will operate its spaceflights from Spaceport America, the world's first purpose built, commercial spaceport, which is located in the southern part of the state. Designed by renowned architects, Foster + Partners, and funded by New Mexico, Spaceport America will provide cutting edge facilities and a stunning location for aspiring astronauts to realize their dreams.





VMS Eve and VSS Enterprise
over the Mojave desert
Mark Greenberg