

# Under Armour

## Spacewear for Virgin Galactic future astronauts

It is just 50 years since the world was captivated by a trip to the moon. Flight as a means to explore our world and beyond has remained at the forefront for adventures, researchers, artists and dreamers. In preparation for regular commercial flights to space the team at Virgin Galactic have tasked US company Under Armour with the role of Technical Spacewear Partner to develop a spacewear system in readiness for the spaceship Unity's first commercial flight.

Under Armour is a brand built to make athletes more effective and innovation has always been central to their development of products. These have included UA Rush workout clothing with mineral-infused fabrics designed to reflect energy and improve performance, and US Hovr running shoes. But going to space presents an entirely new challenge, so a dedicated team has been working in collaboration with Virgin Galactic to deliver a system that is safe, functional and comfortable, putting its own twist on classic spacesuit and footwear to mould the way the next generation of space travellers will dress.

### The base layer

The base layer acts as a second skin to the body, utilising the same technology used in UA Rush to enhance performance and blood flow during zero gravity flight. The entire base layer is built with their new Intelliknit fabric for total moisture and temperature management. The development process has been managed to leave no material waste during the process in keeping with their vision for a sustainable future.



### The spacesuit

The spacesuit is fashioned in a deep space blue, with lighter blue elements and pops of gold throughout, inspired by an image of the sun in space, casting its rays on Earth. The Virgin Galactic flight DNA symbols are embedded along the spine, symbolizing the unity of the suit with the mission. UA Clone, a proprietary auxetic material that forms to the exact shape of the body for a precision fit and zero-distraction feel, is used in the elbows and knees for to ensure mobility and comfort. UA's Hovr cushioning is incorporated into the shoulder and neck areas, which are high impact zones during the high G portions of flight.

The liner incorporates other new fabrics, such as Tencel Luxe, SpinIt and Normex, used for temperature control and moisture management, as future astronauts may experience a spectrum of temperatures throughout their journey. UA integrated all the brand's performance fabrics – cooling, smooth, fast-drying, moisture-managing, comfortable and safe – to ensure a comfortable experience possible.

An important part of the suit construction included functional features such as multiple pockets for necessary and personal items including integrated push-to-talk communications.

Each spacesuit iteration underwent rigorous testing with key stakeholders in the VG team including pilots, spaceship engineers, medical officers, astronaut instructors and the customer experience team to ensure it would outperform in-flight expectations.

Following feedback they added a clear pocket on the inside of the jacket above the heart for a photo of a loved one, and a patch unique to each mission that is removable from the suit to be attached to the astronauts' flight jacket which will be presented after each mission.



### The footwear

UA reinvented the traditional space boot to create something that is highly functional, but also carries through the same style and design elements as the spacesuit. Taking additional inspiration from racing drivers' footwear, coupled with cutting-edge footwear technologies, the designers mimicked the lightweight feel for optimum mobility, moving away from what we'd all think of as the big, bulky boot astronauts have previously worn. As in the spacesuit UA Clone adaptive technology forms to the exact shape of the foot for a precision fit, while the UA Hovr cushioning provides support for a functional, comfortable and flame-retardant piece of footwear.

The aesthetic design elements complement the spacesuit, with the shades of blue and gold flashes coming together beautifully. The graphic on the sockliner reads, "We Stand on the Shoulders of Giants." Inspired by a quote from Sir Isaac Newton that the Virgin Galactic program holds close. In addition, the Virgin Galactic flight DNA symbols and logo unify the full space kit.

The development of the spacewear system is the next step towards the two brands' shared vision for creating a better future and more sustainable world through commercialised space travel. ■

This article was drawn from <https://about.underarmour.com/news>

“At Under Armour, we pride ourselves on always getting better and leaning into innovation to drive progress for our athletes, but few things can prepare you for a project as challenging and exciting as this one. Spaceflight is a unique and demanding regime and requires a different approach. What we've engineered utilizing our key technologies will define the future of spacewear and puts us at the forefront of this history-making event. We are grateful to Richard and the incredible team at Virgin Galactic for trusting us with this groundbreaking challenge.”

Kevin Plank, founder and CEO, Under Armour



The design of 'Space suits' has changed over the years but have still not been very aesthetically pleasing (do not look great!)

## Task 1

**READ THROUGH** the article '*Under Armour, Space wear for Virgin Galactic future astronauts*' and complete the following tasks:

**DESCRIBE** the spacesuit that has been designed in the article.

**EXPLAIN** the purpose of the base layer in the design.

**COMPARE** the design of the 'Space boot' with the design of a regular boot that you might wear.

**EVALUATE** the design of the space suit or the space boot. (You could do both!)

## Task 2

Think about all the different things that would have had to be considered when designing a space suit and space boots that would be safe, functional and comfortable for astronauts to wear and still look 'Stylish'.

Design your own Space suit or Space boots (Or you can do both). Think about the following:

- It needs to be safe
- It needs to be functional ( It can be used easily)
- It is comfortable
- It needs to look good (You could base it around your favourite designer)

Make sure you annotate (detailed labelling) your drawing to make sure it is clear what each part of your design is and why you have chosen it.



# Year 8 Task sheet



Use these definitions of 'Command words' to help you answer the questions.

**DESCRIBE**- A written report of how something is done or what something is like.

**EXPLAIN**- Making something clear or easy to understand.

**COMPARE**- Identify similarities and differences.

**EVALUATE**- To judge from available evidence