SIS PRESS PACK

HOW DOES THE SPACECRAFT GET INTO SPACE?

We lift our spacecraft with a huge bespoke stratospheric balloon filled with hydrogen gas. The gas inside the balloon is lighter than air, creating lift that carried the craft into space!

DOES IT RETURN TO EARTH? HOW LONG DOES THE JOURNEY TAKE?

As the balloon rises, the pressure change causes it to expand until it's taller than the White House (nearly 25 metres in diameter). Eventually, the balloon will be unable to expand any further and burst, causing the spacecraft to parachute back to Earth at our calculated landing position. The entire flight lasts around 2h30, 1h30 to get to space and 1h to return to Earth.

HOW HIGH CAN THE BALLOON GO? IS IT IN SPACE?

Space is defined by a vacuum. Our flights travel to around 110,000 feet or 33.5km, to the closest region of space to Earth, known as Near Space. Near Space starts at around 19km at the Armstrong Limit, which is the tipping point where the vacuum is so severe that a human being can't survive without a pressurised suit. At the peak of the flight, almost twice this height, the atmospheric pressure is 0.6% of what we experience at ground level and we are above 99.5% of the gas that makes up the Earth's atmosphere.

HOW DO YOU ESTIMATE WHAT DAYS ARE GOOD FOR A FLIGHT?

For a successful launch day, we have to consider safety, suitability and aesthetics.

From a safety perspective, projected flight paths must not travel through restricted airspace and the projected landing site must be far from built-up spaces or major roads.

The risk of collision is very small and the size, speed and profile of our spacecraft are carefully designed to minimise the impact of a crash, but the best thing we can do is launch on days where our flight path offers a wide margin for error. We can calculate the flight path using sophisticated climate simulation software which draws on real-time data from over 100,000 weather stations around the world to model the current and future wind patterns throughout the atmosphere and Near Space.

To fill and release the balloon which carries the spacecraft, we need low ground wind speeds, while the electronics and camera systems on our spacecraft prefer drier conditions—while we can launch in rain or snow, condensation on camera lenses can ruin an otherwise textbook launch. We also prefer days which aren't very cloudy for this reason; too much cloud cover undermines the visual impact of how high we get above the Earth.

HOW DO YOU STOP THE BALLOON EXPLODING ON THE FLIGHT?

We don't! Our custom-built balloons are made from undyed natural latex which is tremendously stretchy, allowing the balloon to expand as it rises to maximise the altitudes we reach. They're manufactured to a high quality standard which means they have a very consistent thickness—this means the strain is distributed evenly across the balloon's surface so it stays intact for as long as possible.

However, they will burst once they reach a maximum diameter (around 20 metres, the height of Buckingham Palace), and we can calculate the altitude where this will happen to a very high degree of accuracy, using this to inform our flight path calculations. We use this burst point to trigger the parachute deployment system, and our spacecraft parachutes back to Earth, touching down gently at around 5mph.

WHAT'S THE ENVIRONMENTAL IMPACT OF A LAUNCH?

We put a lot of effort into minimising our environmental impact. Our balloons are made of undyed, natural latex, which is nontoxic to animals and will break down over the same length of time as an oak leaf. When the balloon bursts, the design means that the vast majority of the material remains connected to the neck of the balloon and is recovered upon landing. Any parts which break off are less than 5cm^2 in size and if eaten by an animal, will pass through their digestive tract harmlessly.

We also use hydrogen as the lifting gas that carries our spacecraft into space. Hydrogen is a renewable resource and producing it is very low-impact compared to the helium used in party balloons.

Finally, 95% of the components we use on our flights are reusable and made from recyclable materials. Most of our components are manufactured in-house using novel low-impact methods such as FDM 3D printing which create minimal waste.

SUMMARY & STATISTICS

- The balloon is filled with hydrogen, which is the most abundant element in the universe, as well as the lightest element at 1/8th the density of air.
- The lighter-than-air gas lifts the spacecraft at 5–6m/s (17–20mph) for around 90–100 minutes.
- Our launch vehicles travel to around 110,000 feet above the Earth, above 99.5% of the Earth's atmosphere (measured by mass).
- Ambient temperature at peak altitude is around −65°C (−85°F).
- The balloon expands as it rises; on the ground, it'll be bigger than a person, by the time it's at peak altitude it will be the height of Buckingham Palace/the White House.
- Eventually the balloon cannot expand further and bursts. The craft falls at around 200mph for the first five minutes after burst, before the parachute begins to slow the descent. By the time it lands, it's moving at 5mph.
- From launch site to landing may be as far as 200 miles, but we can predict where it will land to within 500m.
- On average, flights take around 2.5 hours from launch to landing.

ABOUT SENT INTO SPACE

Sent Into Space is the world's leading provider of commercial Near Space launches. Founded in Sheffield in 2011, Sent Into Space has conducted over 1000 flights to the upper stratosphere, combining cutting-edge aerospace engineering with video production and marketing expertise to create incredible campaigns.

Sent Into Space's work includes global marketing stunts, space cinematography for documentary and cinema, scientific research, aerospace research and development, educational projects and even ash scattering memorial services. Regulated by the UK Civil Aviation Authority and with full public liability insurance, they are unrivalled in their launch record.

COMPANY HISTORY

Chris Rose and Alex Baker met while studying their PhDs in Mechanical Engineering at the University of Sheffield. One evening in 2010, an idle conversation in the pub sparked the idea of launching a balloon into space with a camera onboard to shoot an incredible panorama.

Over six months, they researched the history of radiosondes, looking at ways to track a helium balloon into space and weather prediction software to model its path up and back down again, experimenting with various methods of insulating the camera that would capture video on their maiden voyage. On the 17th of December 2010, they launched their very first flight from the back garden of Chris's family home.

When the image they captured and the story behind their flights went viral, Chris and Alex received an influx of requests from scientists, schools, production companies, marketing executives and private individuals clamouring for their own launches. A decade later, Sent Into Space has launched from countries across the globe, featured in international news outlets, primetime tv and the big screen, and set numerous world records and world firsts in the field of aerospace. Not bad for two engineers experimenting in their spare time!