

## **A 40 acre dry cleaner bag carries nearly 3,000 pounds. That's the Red Bull Stratos Balloon.**

**Type:** The balloon is filled with helium to create lift. Helium is non-flammable, non-toxic if vented to the atmosphere and a safe, predictable method of ascent.

**Material:** It is constructed of strips of high-performance polyethylene (plastic) film that is only 0.0008 inches (0.02 mm) thick. In total, these strips would cover 40 acres (16.2 hectares) if they were laid flat. Polyester-fibre reinforced load tapes are incorporated to do the weight bearing.

**Size, volume and shape:** The balloon for Felix's mission from the edge of space will be nearly 30 million cubic feet (849,500 m<sup>3</sup>) in capacity - 10 times larger than Joe Kittinger's balloon in 1960.

At launch, it will be tall and thin, stretching 55 stories high. As the balloon ascends, the helium will expand and the balloon will slowly fill out to an almost completely round shape:

Length of uninflated balloon before launch: 592.41 feet (180.5 m). Height of balloon at take-off: 550 feet (167.6 m). The height from the top of the balloon to the bottom of the capsule will be: 695 feet (211.8 m). Size of balloon at 120,000 feet (36,576 m): Height 334.82 feet (102 m) / Diameter: 424.37 feet (129.3 m)

**Weight:** The uninflated balloon weighs 3,708 pounds (1,682 kg)

### **INFLATION AND LAUNCH INFRASTRUCTURE**

Helium is delivered on two large trucks. Another truck with a "launch arm" restraint holds down a portion of the balloon during inflation. At launch, the arm moves out of the way to allow the balloon to ascend. Simultaneously, a large crane drives in to position the capsule under the balloon. The crane releases the capsule, the balloon lifts it off the crane, and the ascent begins.

### **OTHER INFORMATION**

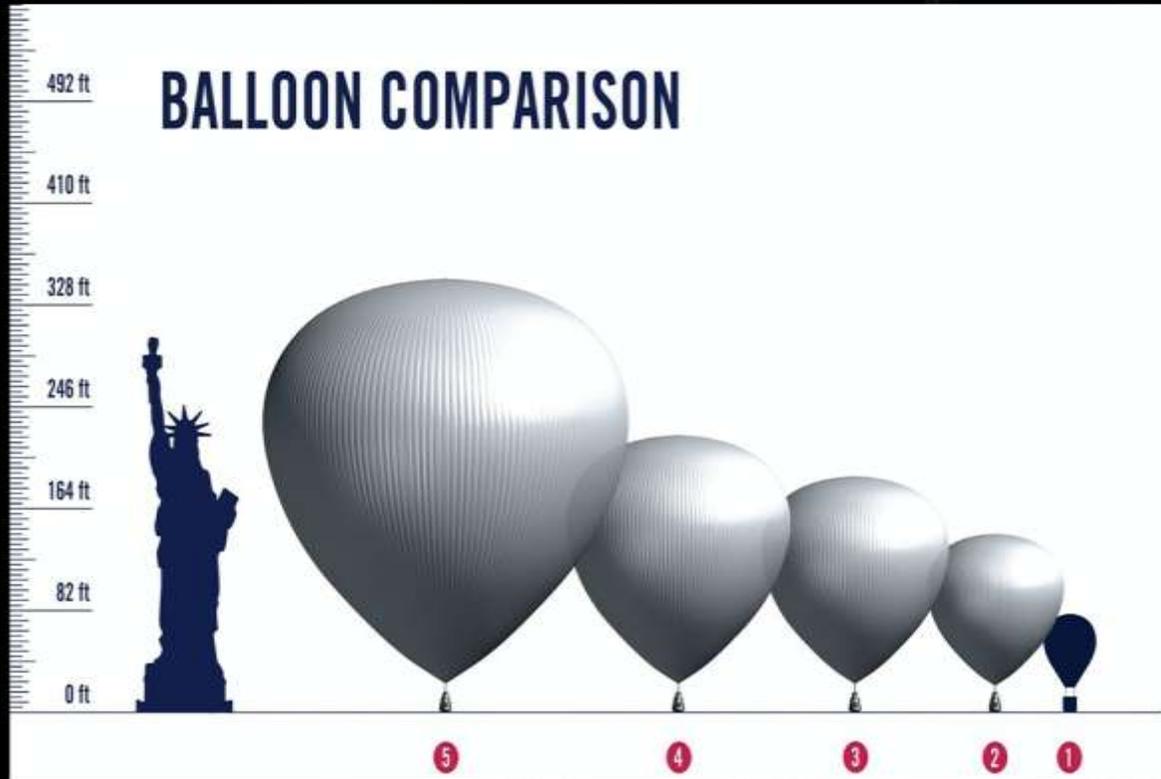
#### **Was the balloon specially developed for the Red Bull Stratos mission?**

The balloon is a standard design utilizing principles and materials that have been refined over 60 years of high-altitude scientific balloon flights.

#### **Are there hazards associated with helium balloon flight?**

Balloons are susceptible to wind, which can literally tear them - particularly at critical times.

- **Take-off**, when difficulties due to weather or other factors could drag the capsule across the ground or cause a sudden dangerous drop in height. If a problem occurred below 1,000 feet, there would not be enough time to deploy a personal or capsule parachute.
- **Ascent through the troposphere** (30,000 to 60,000 feet – 9,100 to 18,300 m), where turbulence is common.



# BALLOON COMPARISON

## 1 TYPICAL HOT AIR BALLOON

Capacity (air): 105,000 ft<sup>3</sup>  
Height: 75 ft  
Sightseeing altitude: 2,000 ft

## 2 RED BULL STRATOS TEST JUMP 1

Capacity (helium): 1.22 million ft<sup>3</sup>  
Height: 127 ft  
Jump altitude: 71,581 ft

## 3 KITTINGER'S EXCELSIOR III JUMP

Capacity (helium): 3 million ft<sup>3</sup>  
Height: 185 ft  
Jump altitude: 102,800 ft

## 4 RED BULL STRATOS TEST JUMP 2

Capacity (helium): 5.3 million ft<sup>3</sup>  
Height: 210 ft  
Jump altitude: 97,145.7 ft

## 5 RED BULL STRATOS MISSION JUMP

Capacity (helium): 29.47 million ft<sup>3</sup>  
Height: 334.82 ft  
Target altitude: 120,000 ft

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[www.redbullstratos.com](http://www.redbullstratos.com)

THE RED BULL STRATOS BALLOON IS TEN TIMES LARGER THAN THE BALLOON USED BY THE CURRENT RECORD HOLDER, COL. JOE KITTINGER, WHO JUMPED FROM AN ALTITUDE OF 102,800FT IN 1960. THIS GRAPHIC GIVES YOU A COMPARISON.

TAGS: BALLOON

**Float altitude** (top altitude), where low air pressure will cause the helium to expand so much that if the excess cannot escape through the balloon's vent tubes, it will burst. Helium inflation quantities are carefully calculated to avoid this.

### **How long does it take to inflate the balloon?**

The overall launch process for this kind of balloon requires approximately 8 hours of preparation immediately before launch, including about 45 to 60 minutes for insertion of the helium.

### **How big is the launch crew?**

The balloon launch crew itself is about 12 to 15 people, all of whom must wear clothing that won't snag the balloon. A number of individuals will clear the runway of fine debris before laying out the balloon. Fewer than 10 people actually handle the balloon, and those who do wear cotton gloves.

### **Why does a helium balloon rise?**

Helium is lighter than air. If the balloon is large enough in relation to the weight of its payload, the helium will ascend and bring the payload with it.

### **How fast will the balloon ascend?**

The balloon will ascend at about 1,000 feet per min. (305 m/min). At some points, its ascent could be as fast as 1,400 feet per min. (427 m/min). Upon reaching about 100,000 feet (30,480 m), however, it will likely slow to roughly 750 feet per min, (229 m/min) until it levels off at approximately 120,000 feet (36,576 m) above sea level.

### **How is the balloon steered?**

Wind is used to direct a balloon's trajectory. Wind speed and direction vary at different altitudes so balloons are steered by changing altitude to reach the desired wind conditions. Releasing helium causes a decrease in altitude, while dropping ballast allows a balloon to rise.

### **How does the balloon avoid other aircraft in the sky?**

The balloon will be tracked by the mission team while in the air. The mission team coordinates closely with the U.S. Federal Aviation Administration to obtain clearance for flight and special reflective tape is incorporated into the seams so that it can be seen on radar.

### **Felix's target altitude is described as "float altitude." What is that?**

Float altitude is the point at which the balloon levels off and stops ascending. Although helium is lighter than air, at higher altitudes air density is reduced. Float altitude is reached when the average density of the balloon is the same as the density of the surrounding atmosphere.

### **What happens to the balloon after Felix jumps?**

After Felix has landed, Mission Control will trigger the separation of the capsule and balloon, so that the capsule can descend under its parachute. A nylon "destruct line" will release the helium so that the balloon returns to Earth. Then, the team will gather the envelope into a large truck, a process that can take several hours.

### **Is the same balloon being used repeatedly for tests, as well as the final mission?**

No. The test balloons are smaller than the almost 30 million cu. ft.(849,500 m.) balloon used for the ascent to 120,000 ft. (36,576 m). None of these delicate balloons can be re-used. In fact, once Felix's balloon is even taken out of its box it must be launched promptly or discarded.

### **Who is responsible for launching the balloon?**

ATA Aerospace provides the balloon launch services, personnel and equipment for Red Bull Stratos. Key personnel on the ATA team include crew chief **Ed Coca**, meteorologist **Don Day** and project lead **Tracy Gerber**. A joint venture of Albuquerque-based Applied Technology Associates and ASRC Aerospace, ATA Aerospace offers the expertise of an extensive history in large-scale balloon launches, including serving as the prime contractor on the AFRL Space Technology Research, Analysis, Integration and Test (STRAIT) contract. On this contract, ATA Aerospace provides the program management; engineering services; integration, test, and launch support; on-orbit support; and test facility operations and management for satellite and high-altitude systems and subsystems including buses and payloads. For more information:

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