What equipment do you need to skydive from 120,000 feet?

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By this point, you've probably heard that Felix Baumgartner is planning to skydive from 120,000 feet above the earth. For the record, that's about 23 miles from solid ground. The jump was originally supposed to happen on October 9, but because of 14 mph wind speeds—they needed speeds of less than 2 mph to jump safely—it was postponed until Sunday, October 15. (You can watch the jump live, here [1])

Baumgartner, 43, is no stranger to high-altitude jumps. In July, he jumped from 18 miles, reaching speeds of 536 mph, and in March it was from 13 miles at speeds of 364 mph. The current record holder, Joseph Kittinger, who jumped from 102, 800 ft in 1960, is the only man to have survived an attempt to jump from these heights.

Because this type of jump hasn't been attempted before, the technology that will aid Baumgartner is mostly designed specifically for him and this particular feat.

Pressure suit and helmet

The basic outline for the suit [2] was similar to those worn by high-altitude pilots. The engineers have altered the suit to fit the needs of this specific jump. To prevent decompression sickness, aka the bends, the suit is pressurized to 3.6 pounds per square inch and to prevent ebullism—when body tissue turns to gas around 65,000 feet—the “controller” will maintain the appropriate pressure. It’s both fire-retardant and insulated for extreme temperatures between 100 degrees and negative 90 degrees Fahrenheit, plus the vent hose can heat or cool the suit as needed.

Baumgartner is in the unique position of needing the protection afforded by a full-pressure suit, but the flexibility of a sky diving jumpsuit. The team designed a suit that works by using mirrors and a unique material that adds mobility.

The 8 pound helmet includes a heating circuit to maintain visibility, an adjustable sunshade, and a pump that will provide oxygen to Baumgartner.

The suit is also loaded with camera equipment [3] designed for the extreme environmental conditions Baumgartner will be experiencing.

The chest pack
The chest pack [4] fits over the pressure suits and contains a range of technologies that will assist Baumgartner and his crew during the jump. The mailbox-sized box contains: communication systems, a GPS, telemetry equipment, a 120 degree HD camera, a verification system to confirm to the world governing body for air sports and aeronautical world records that he reached the goal, and an inertia measurement unit.

High-altitude balloon and capsule
The balloon [5], which will initially stand at 55 stories high, is made of a delicate high-performance polyethylene film that’s about 0.0008 inches thick and must be handled with cotton gloves to prevent snagging. It will be filled with helium and attached to the capsule, which will carry Baumgartner to the jumping altitude. Deflated, the balloon weighs about 3,708 lbs, but it’s still particularly susceptible to strong wings—the balloon was the reason the launch was postponed—and tears and it takes about 8 hours from start to finish to set up.

The capsule, weighing in at 2,900 pounds, is actually made up of four different parts: the pressure sphere, the cage, the shell and the base, and crush pads.

The sphere is a fireproof, fiberglass, and epoxy area where Baumgartner will be sitting. The six foot area is pressurized to 8 pounds per square inch and contains the instrumentation panel, a chair, and a camera. The steel alloy cage surrounds the pressure sphere for protection. The shell surrounds the cage and sphere and contains foam-insulated skin covered in fiberglass and paint that will protect the entire capsule from the extreme conditions. The base will protect the capsule from being harmed during the descent. The crush pads, designed to handle 8 Gs, will cushion the capsule upon landing.

The point
You may find yourself asking what the point of this jump is. If successfully completed, the jump could lead to the enhancement of safety equipment for high-altitude fliers and astronauts. Plus, with the increasing possibility of space tourism, the jump will hopefully allow companies to design the best and safest experience for the customers. Plus, since Baumgartner hopes to break the speed of sound, it will serve as an experiment as to how supersonic speeds affect the human body.

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