Balloon Travel

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More than a few comments went back and forth recently, and one reader made an OUTSTANDING, more scientifically approached perspective. The topic suggests follow-up, so here we go.

Before we go to The Committee for the usual Q&A, a brief background to this topic:

Many moons ago (sixty or seventy at least), The Committee told me about balloon travel becoming an alternative to jet aircraft for long distance, global travel. Essentially, a balloon would rise to an altitude where there is almost no air thus wind, and remain stationary as the Earth rotates below, then descending to its destination.

Earth rotates at approximately 1,667 kilometers per hour, or 1,000 miles. (40,000 km circumference, 24 hours per turn). Commercial jet aircraft reach top cruising speeds of about 550 miles per hour, 480 knots or nautical miles per hour, about 900 kph. The speed advantage is obvious, the challenge being the atmosphere, which also rotates right along with the sphere called planet Earth. It's the reason we use jet propulsion now and is the obstacle of decreasing effect, to a rising balloon. By forty kilometers of altitude and certainly by fifty (about 130,000 to 165,000 feet) there is very little to almost no remaining air or wind (obviously).

Q: Esteemed Committee, can you please explain a few things I want to ask, about high altitude or balloon air travel?
C: Yes, of course.

Q: How will this work?
C: Very well. We know you have more detailed questions.

Q: I assume you have read the comments.
C: We see them all, yes.

Q: The issue of wind resistance as the balloon rises, seems like a serious problem.
C: Solved by rising quickly, to reduce the lower velocity forward or directional travel intended.

Q: Before we get into levitation, how is the device constructed?
C: Plastics, titanium and carbon fiber. Some magnesium components would be good and aluminum alloys for some other components.

Q: What about the balloon itself?
C: Fabric lined with several materials impervious to the temperatures. The balloon will not attempt to be airtight, which would create a need for much heavier material and weight. The fabrics and linings will provide strength thus safety yet be porous enough to permit controlled planned leakage of the buoyancy gas. This will permit a much lighter weight, achieving the same effect.

Q: What will the lining be?
C: A variation of what you would call Kevlar.

Q: The fabric?
C: Nylon.

Q: OK, so a passenger vessel made of plastics, titanium, maybe some aluminum and magnesium with a nylon fabric balloon lined with a Kevlar like material.
C: That is correct, essentially.

Q: How does it rise?

C: Helium, from a tank of compressed gas. The balloon will be inflated while anchored at the surface after travelers have gone aboard, then released and allowed to rise. The balloon will be boosted then rise freely, with little directional control aside from the booster until reaching approximately 80,000 feet or 24,000 meters.

Q: Why this altitude?
C: This is approximate; the introduction of directional control can begin lower or even a little higher. The ultimate decision will be the size and weight of the balloon plus the passenger compartment.

Q: How does it rise and how fast?
C: For faster levitation, there will be developed a re-usable rocket device, which will boost the rise then detach when no longer useful. This device will use methane and oxygen tanks much the way rocket engines operate. The reason for methane is nearly complete combustion of the simple hydrocarbon molecule, thus very low emissions. This booster rocket will automatically detach from the passenger compartment, deploy its own parachute and float to the surface. Its location will be tracked then guided to a specific location, then picked up. The technology for this guidance will be the same as used now for missiles. The device will automatically control its parachute to regulate rate of descent and direction, to reach the surface in the designated area.

Q: What if there is bad weather, such as thunderstorms?
C: This will not pose a problem for the descent of the spent booster unit, because the balloon and passenger vessel will not attempt departure until such storm or weather has passed. Much as is already done with aircraft now.

Q: How fast will the balloon rise?
C: Approximately four hundred meters per minute, average.

Q: Let's see, if it plans to reach 40,000 meters, that's one hundred minutes or 10 minutes more than an hour and a half. An hour and forty minutes, in other words.
C: Yes, and the balloon will make lesser average forward progress over the first hour or so of travel. It will always move west, in the opposite direction the planet turns or rotates.

Q: So, a traveler going from Brisbane or Sydney, Australia to Perth could use this method but to travel from Perth in the other direction?
C: This could be done however would require nearly a day.

Q: How will the passenger compartment be pressurized and heated?
C: Compressed air tanks and electricity. Either external photovoltaic panels or an on-board generator, as back-up.

Q: What will power the generator, where there is no air?
C: It will operate with its own liquid fuel and oxygen tanks.

Q: How will the balloon be inflated?
C: A lightweight, collapsible helium bag initially, inflated at the surface. It will be supplied by a tank of liquid helium, also when airborne.

Q: How will the passengers receive breathable air?
C: Tanks of liquefied atmospheric gases.

Q: How will the balloon be steered, once the prevailing winds are no longer a factor?
C: Release of compressed gas.

Q: Isn't the total weight of these tanks and contents going to be a problem?
C: No. The ideal combinations of weight, balloon and passenger compartment sizes will be easy to calculate. The release of initially liquid then pressurized gas is not required in significant amounts in a

very low pressure or near vacuum environment, such as exists at forty to fifty kilometers of altitude. Because there is almost no resistance, very little gas will cause a significant, sustained shift in course.

Q: Okay, but forward and lateral movements are independent of one another. If Earth moves at 1,600 kph, there is no way this balloon can generate lateral movement anywhere close to that. The course of travel will have to be nearly in a straight line.
C: Correct, supplemented with ground or other transit. The attraction if cross or intercontinental travel. Connections to other means will still be necessary, as is done now.

Q: Won't the balloon drift off course as it descends again into the heavier atmosphere?
C: No, because the descent into heavier denser atmosphere can be precisely calculated. Thus the balloon will be at a precise location such that dense atmospheric effects will simply be a planned part of the descent. Vertical drop and horizontal movement are independent of one another, and the vertical drop can be controlled with great precision.

Q: What if there is a loss of balloon pressure, such as a meteor puncture?
C: The balloon will have emergency parachutes.

Q: This method doesn't sound like it will replace shorter distance travel, and will only be worth it for certain trips. North America to Europe would require eighteen to twenty hours, versus the other way, only about four to five. Jets do it now in either or nine, either way.
C: The far lower cost of manufacturing the passenger vessel or compartment, balloon and ground facilities will be one large attraction, and the near absence of emissions another. There will be some energy and fuel use to compress and liquefy the necessary atmospheric gases, however far less than are currently used to power aircraft turbines.

Q: I am guessing this thing will steadily descend once it reaches top altitude, then descend very quickly.
C: Correct, and this rapid descent will reduce with atmospheric effect. Terminal velocity caused by atmospheric resistance, does not exist at very high altitude and remains low until well into the stratosphere. Thus rates of descent of one thousand kilometers per hour are initially possible. The device will descend from forty to five kilometers altitude in a matter of minutes. From this point the descent will be slowed increasingly and more sharply by air resistance then parachutes, in a precise, controlled and predictable way. Prevailing winds will be known, the route adjusted already to the point of descent.

Q: This method could reduce one third of long distance jet travel, maybe two thirds of all westbound traffic.
C: If you so wish, however events to come will make this method attractive for all travel because the alternatives will fade. The scarcity of hydrocarbon jet fuel is what we mean.

Q: Esteemed Committee, thank you.
C: Our pleasure. Be well until you return.