Jacqueline Garcia

Cesar A. Torres

CS Scholars 24

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Free Fall From Space - Alan Eustace

In April, I attended a very special seminar given by Alan Eustace where he spoke about his self-funded project: Free fall from space wearing only a space suit. In his 2-hour presentation, Alan Eustace, who was previously Google Senior Vice President of Knowledge, explains his project that ultimately leads to him jumping from the edge of the stratosphere wearing a specially designed 400-pound space suit. In this free fall, from a height of 135,000 feet, he exceeds 821 miles per hour; breaking the sound barrier and other previously established records for high-altitude jump projects.

This project was begun because of Eustace’s curiosity of how scuba diving could be applied to space. He wondered if he could free fall with just using a space suit; this would be the “scuba-diving equivalent.” In total, Eustace explains that there were 25 total tests over a long period time. To simulate the temperature at the stratosphere, Eustace explains that they used a huge refrigerator and liquid nitrogen. The space suit is able to sustain the temperature inversion that occurs as you go up the stratosphere: At the Tropopause, the boundary layer between troposphere and stratosphere, its stops getting colder and stabilizes. Then it gets warmer! Eustace explains this as temperature inversion. The refrigerator was cooled to -108 degrees fahrenheit.

One of the major issues that the team (only 20 people) encountered was how to deal with the spin that would occur. The process is as follows: Eustace would get into the 400 pound suit, and he would be carried by a weather balloon. Once he reached the stratosphere, he would be detach from the balloon and perform a free-fall. One of the main issues that arose were the spin that could occur when deployed. At first, on a test on a dummy, the balloon was attached on the waist. This caused a violent spin, and this would kill Eustace if this occurred to him. At some point, this seemed like an impossible challenge to fix. However, after watched carefully footage of the dummy, they decided to see if changing the attachment point of the balloon would change anything; it definitely did. The best position where there was hardly any spin was at the back of the neck.

Another problem that arose: as Eustace descended, a drogue would be used to provide control and stability. However, there was a possibility of entanglement. Previously, in 1960, Joe Kitting whom set a previous record almost died from the parachute tangling around his neck. This was huge issue. What the team came up with was to use a carbon tube from which a small drogue would unfold from. This would keep the parachute away from Eustace body! A very simple solution to a seemingly impossible issue.

Watching this seminar was great, it really showed the process that a huge project would go through and really how ideas just form as the project develops. Eustace made sure that we understand that it was important to not give up when difficult problems arise in projects: they can have very simple solutions.