Stratoflex

Investigated by Ishan B., Aditya R., Anvay A., and Anne
Affiliated with The Hack Foundation (d.b.a Hack Club)
Slack: @ishan, @aditya, @crazed_off, @anne
Slack ids- U07055PSUT0, U04AKUFC402, U0874FV7ZA7, U07BBK4KHUK

Date of Submission Apr 6, 2025 v3.1.2

Objectives

There are two main objectives for Stratoflex: to observe the freezing point of liquid at low pressures in the stratosphere in comparison to that of Earth, and to observe sublimation or potential boiling while at the same time recording visual, temperature, and pressure data of the Earth and any other objects in space.

Methodology

This project consists of a left and right chamber, divided in the middle to create four sub-chambers. The top-left and top-right chambers would house two 4K cameras recording from the left and right chambers. The left chamber would also include the temperature/humidity as well as one barometer sensor to observe pressure.

These temperature and barometer readings would be saved. The recordings would be saved on a Samsung Pro Plus 256GB SD Card connected to our 8GB Raspberry Pi 4.

All chambers of the experiment will be insulated by Aerogel tape to ensure that parts remain operational and insulated during the experiment. The liquid chamber will be insulated to observe if the lowered boiling point of water will cause the water to change states even at a relatively low temperature.

Hypothesis & The Definition of Success

We hypothesise that if water is placed in a controlled, insulated borosilicate glass tube and carried into the stratosphere, where atmospheric pressure and ambient temperature are significantly lower than at Earth's surface, it will undergo phase changes such as boiling or sublimation at temperatures below 0°C. This is due to the decreased atmospheric pressure in the stratosphere, which lowers the boiling point of water and may allow it to change states even without reaching standard boiling or freezing temperatures.

We define success as the successful collection of visual, temperature, and pressure data throughout the experiment, with the clear observation of any changes in the water sample. These may include boiling, sublimation, or freezing. Confirmation of this change and its relation to the recorded data will validate the experiment.

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Item Name	Cost	Quantity	Total Cost
4GB Raspberry Pi 4	$54.99	1	$54.99
Arduino Uno R4	$16.00	1	$16.00
Sony	$69.99	2	$139.98
Samsung Pro Plus SDXC 512	$49.99	1	$49.99
Borosilicate Glass Tube	$8.41	1	$8.41
Ice Age Thermo Chill	$26.08	1	$26.08
Aerogel Insulation Tape	$10.99	1	$10.99
Temp/Humidity	$5.99	1	$5.99
Precision Barometer for Arduino	$14.99	1	$14.99
SanDisk Extreme 64GB (temp/baro)	$11.99	1	$11.99