

Stratospheric Conditions: A Near-Space Balloon Project Abstract

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High altitude ballooning is an established method of engaging students in authentic aerospace research activities. The balloon was launched on March 6, 2020 from the South side of Carson City, NV. The balloon's payload monitored altitude, UV index, temperature, humidity, location, speed, and pressure. The payload also carried a quartz crystal with fluid inclusions to test whether the high altitude conditions would crack the crystal. During the payload's construction some improvements were made including: a new GPS chip, new arduino board, a built-in SD card reader, and more robust securing mechanisms. Equipment included a GoPro camera, Spot GPS tracker, APRS (Ham radio) tracker, internal heater, and arduino controller. The balloon flew for about 1.75 hours and burst at an altitude of 22,862 m. The payload landed in the roadless desert about 10 miles east of Fernley, well beyond the predicted landing site. Finding the balloon involved using the GPS coordinates to track it on foot across the desert. The lowest temperature encountered during flight was -55C. The fastest speed reached was 250 km/hr, while average speed was 97 km/hr. Relative humidity varied from 5% to 52% during the flight. The quartz crystal did not crack. The payload sustained damage to the housing and the GoPro upon landing.