

Elijah 3 Mission Report

Flight name: Elijah 3

Flight call sign: KC9EJY

Launch date: Tuesday, August 10, 2004

Launch time: 7:13 am

Launch site: Fairfax Park, Eau Claire, WI

Latitude: Unknown

Longitude: Unknown

Altitude: Unknown

Traveling direction:

- Southeast

Bursting altitude: Unknown

Landing time: Approximately 11:30 am

Retrieval location: Pine River, WI

Latitude: Unknown

Longitude: Unknown

Altitude: Unknown

Total distance balloon traveled: 126 miles

Summary of Balloon Launch and Retrieval

The launch and science payload teams arrived on the University of Wisconsin – Eau Claire campus at 4:00 am to find the usual launch site (UW-Eau Claire athletic field) inaccessible. A search was begun to find a new launch site and both teams decided on Fairfax Park. Preparation for launch began at 5:00 am under questionable weather conditions, consisting of high winds and 100% cloud cover. Filling of the balloon proved difficult due to the windy conditions and required several people at all times to hold on to it. Once both the tracking and scientific payloads were ready for launch the balloon and parachute assembly was released to find there was not enough helium in the balloon to lift both payloads. More helium was added and the release of the balloon was attempted again. This time the balloon took off, only to hover roughly 300 feet above the ground heading southeast. Tracking using both GPS signals and visual contact were maintained from the launch time of 7:13 am to 7:23 am, upon where the balloon became entangled in a tree. The balloon assembly came loose due to the high winds but the GPS signal was apparently no longer functional. Only visual contact and the directional finder would allow the teams to track the balloon. Visual contact was maintained until the balloon rose above the cloud cover. Further attempts were made to track the balloon using the directional finder but were met without success.

Upon driving home from Eau Claire a phone call was received at 3:50 pm from a lady in Pine River, WI (approximately 30 miles west of Oshkosh). She had seen the parachute and payloads land in a neighbor's soy bean field at roughly 11:30 am. Members from the science payload team picked up the payloads and parachute the following day. The balloon appears to have burst, suggesting that the balloon did reach a high altitude. The tracking capsule was cracked completely in half with the bottom half and all tracking equipment missing, explaining why GPS contact was lost. The science payload made out reasonably well, though impact with the tree appears to have caused the microcontroller to lose power briefly, stopping data collection and camera operation.

Members of the launch team returned three days later to the location where the balloon assembly became entangled in the tree in an attempt to recover the missing tracking equipment. The directional finder was used since its batteries were believed to still be operating. Tracking through the woods where the balloon assembly got stuck in a tree and following the southeast journey of the balloon once it came loose proved unrewarding. No signal was picked up using the directional finder throughout the entire search.

Problems Encountered

- The balloon was not filled with the required amount of helium.
- The tracking capsule shattered upon impact with a tree.

Description of Problems Encountered and Possible Solutions

The balloon was not filled with the required amount of helium.

This a direct result of the questionable weather conditions present at the time of launch. The high winds pulling on the balloon when using a fish scale to measure the lift obscured the measurement. The scale read the proper amount of helium (indicating 2 to 4 lbs of lift over the combined weight of the payloads and parachute) when the first attempt to launch was made. Additional helium was added bringing the reading to nearly 7 lbs of lift for the final release. This was still not enough helium because the winds were pulling on the balloon to add lift, as was read on the scale.

This problem is solved by launching under better weather conditions, as this has never been a problem throughout past launches.

The tracking capsule shattered upon impact with a tree.

The balloon assembly became entangled in a tree roughly 30 feet above the ground. Upon impact with the tree the tracking capsule shattered, allowing all the tracking equipment to fall out.

This problem will be solved by creating an aluminum wire frame to contain all the tracking equipment, which will be placed inside the Plexiglas container. All equipment will be fastened to the aluminum frame, which will be secured to the top of the capsule. Additionally, a fabric wrap will be made to fit around the outside of the capsule to enclose all the components inside.

Conclusion

The launch of Elijah 3 had its difficulties and was certainly a learning experience for all involved. Windy conditions affected the filling of the balloon and impact with a tree shattered the tracking payload. With all forms of tracking capabilities disabled the balloon was believed lost once solid cloud cover caused visual contact to be lost as the balloon began to ascend. Fortunately, the parachute and capsules were sighted as they landed and all that was lost was the tracking equipment which fell out of the broken tracking capsule.

Launch timeline

Monday, August 9

2:00 pm – meet at MSOE, finish building capsule

3:00pm – leave Milwaukee

- drive up to Eau Claire and stay overnight at the Quality Inn

Tuesday, August 10

4:15 am – arrive at UW-Eau Claire athletic field to find it inaccessible

5:00 am – find new launch site, Fairfax Park

5:10 am – begin launch preparation

7:13 am – release balloon and begin chase

7:23 am – balloon becomes entangled in a tree

around 7:35 am - balloon becomes loose and begins to ascend; sight lost shortly afterwards

1:00 pm – leave search area

3:50 pm – phone call received stating balloon was found

5:00 pm – arrive back in Milwaukee