

Elijah 2 Mission Report

Flight name: Elijah 2

Flight call sign: KC9EJY

Launch time: 6:40 am

Launch site: UW-EC Athletic Field, Eau Claire, WI

Latitude: 44.819

Longitude: -91.479

Altitude: 211 meters

Traveling direction:

- Unknown

Bursting altitude: Unknown

Landing time: Unknown (predicted 9:40 am)

Retrieval location: Yet to be retrieved

Latitude: Unknown

Longitude: Unknown

Altitude: Unknown

Total distance balloon traveled: Unknown

The entire payload and assembly are yet to be recovered.

Summary of Balloon Launch and Retrieval

The launch team arrived on the University of Wisconsin – Eau Claire athletic field around 1:00 am. Preparation for launch began at 4:00 am and all went smoothly with exception to losing a GPS unit. The GPS unit was set on the hood of the tracking vehicle and slipped off when the car went to get fuel. Aside from that, the filling of the balloon and the release procedure went according to plan. Conditions for launch were near ideal, with a little more cloud cover than desirable. The balloon was launched at 6:40 am with video coverage and still digital photos taken of the entire procedure. Two tracking vehicles were equipped to maintain contact with the payload. Sounding predictions taken in advance and the day of the launch predicted the balloon traveling northeast, an average of all the readings taken showing approximately 71.84 km (44.64 miles).

GPS communication with Elijah 2 was maintained for the first nine minutes of flight. Visual contact was established for the first nine minutes as well and was lost when the balloon rose above the clouds. No further GPS readings were received after the first nine minutes. Efforts in recovering the signal and finding the payload included stopping at a local library and attempting to track the balloon through APRS sites online and downloading the most current weather predictions for the area. The tracking team drove to the predicted landing area and watched for the balloon throughout the expected landing time with no success. The payload has yet to be recovered. If the payload is found by someone in the upper Wisconsin area, there is contact information in the capsule so that it can be returned.

Problems Encountered

- GPS contact was lost after nine minutes of flight.
- The entire payload assembly is yet to be found.

Description of Problems Encountered and Possible Solutions

GPS contact was lost after nine minutes of flight.

At this time we have a few theories as to why we stopped receiving GPS signals from the payload. As is always an option, a connection somewhere within the tracking capsule could have become unattached, discontinuing communication.

The one component changed on the tracking capsule was the antenna. The radio antenna used in previous launches was replaced by another antenna mounted on the bottom of the capsule pointing downward. We suspect that perhaps the new antenna only transmitted the GPS signal in a vertical direction, so when not directly underneath the balloon communication would not be possible. Research is going to be done on the proper antenna to use, if indeed this was the reason for lost communication.

A third possibility discussed which is more unlikely was the fact that the GPS signal was lost at the time the balloon disappeared above the clouds. If this was the cause of losing contact then launching on perfectly cloudless days would provide a solution.

The entire payload assembly is yet to be found.

Even though contact was lost with the tracking payload and the landing location is unknown, there is a chance the capsule could be found and returned. Contact information and phone numbers that the team can be reached at are visible on the capsule. Though the chances may be slim of this happening, the Elijah X balloon assembly was found and returned over a month after it was launched and lost.

Conclusion

The launch procedure for Elijah 2 went smoothly. The new launch team worked together well and managed the launch preparation efficiently. Although connection with the balloon was lost after only nine minutes of flight, the team did not give up and continued for the next four plus hours to find a method to find the balloon. At this time, the payload is yet to be recovered.

Launch timeline

Thursday, June 17

5:30pm to 7:30pm – meet at MSOE, pack

8:30pm – leave Milwaukee

Friday, June 18

1:00am – arrive at UW-Eau Claire athletic field

3:00am – science payload team arrives (to watch)

4:00am – begin launch preparation

6:40am – release balloon and begin chase

9:40am – predicted landing time

1:30pm – leave search area

5:00pm – arrive back in Milwaukee

Elijah 2 Predictions & Results

Actual launch information

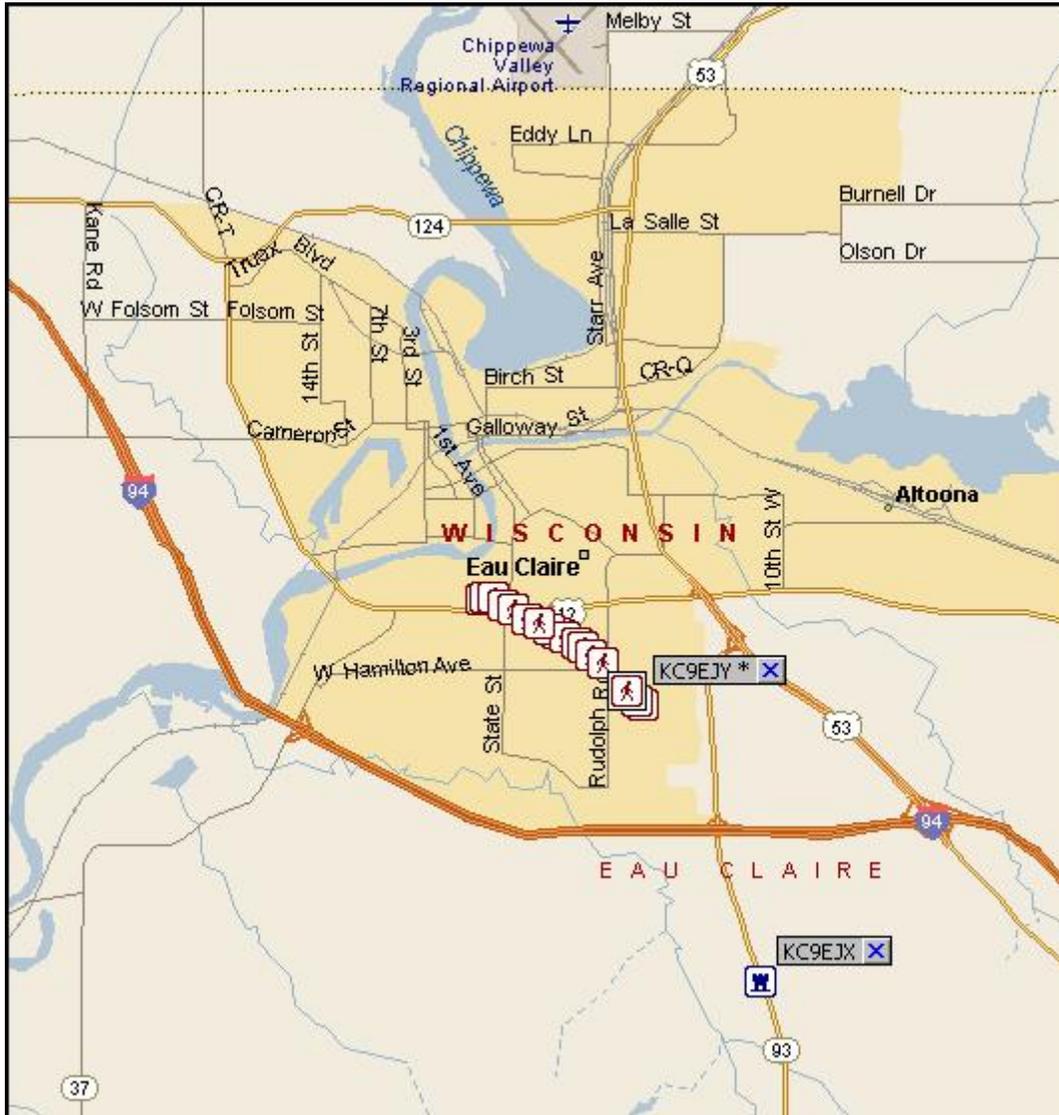


Figure 1: Screen capture in MapPoint of balloon path prior to losing contact.

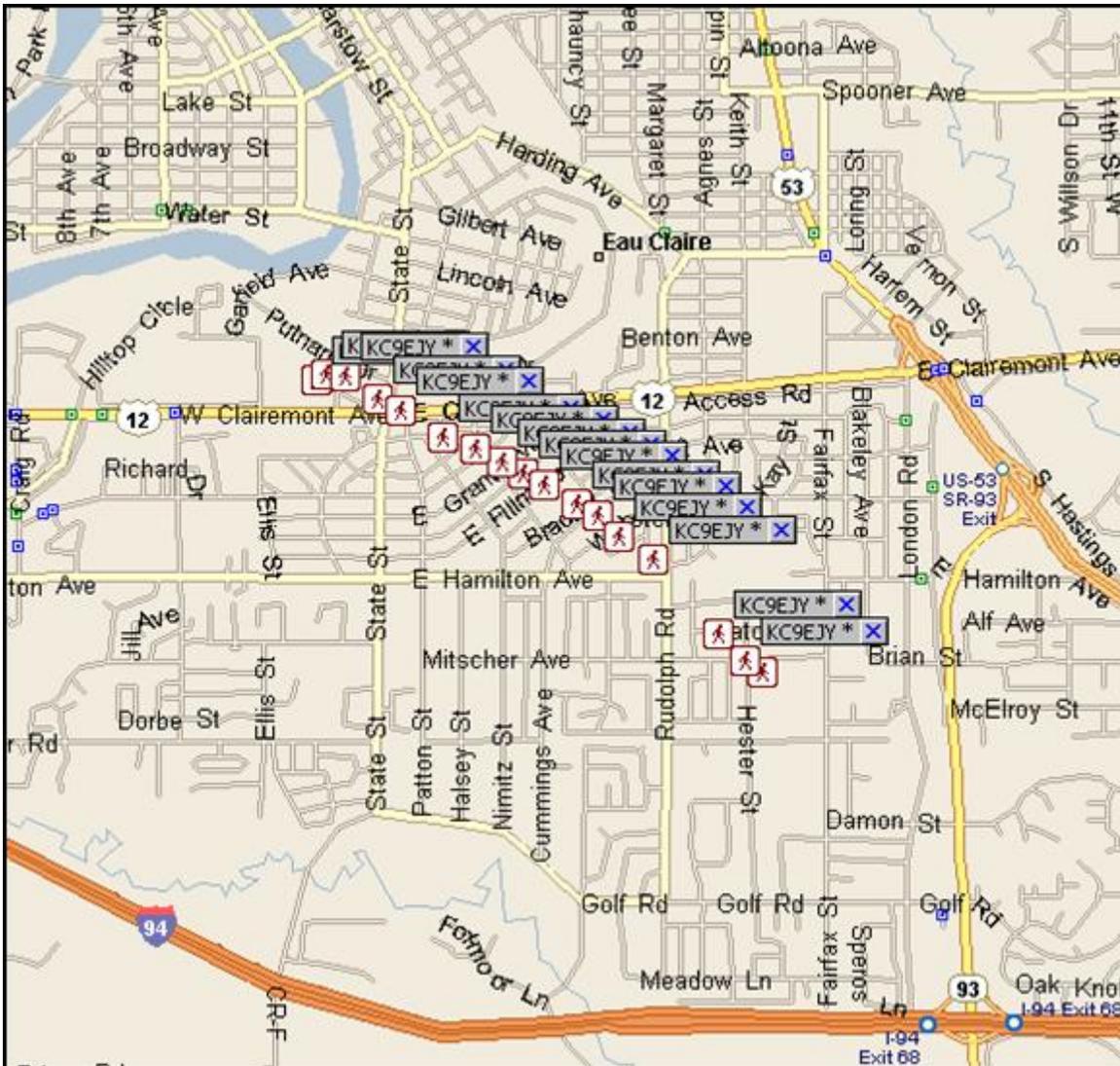
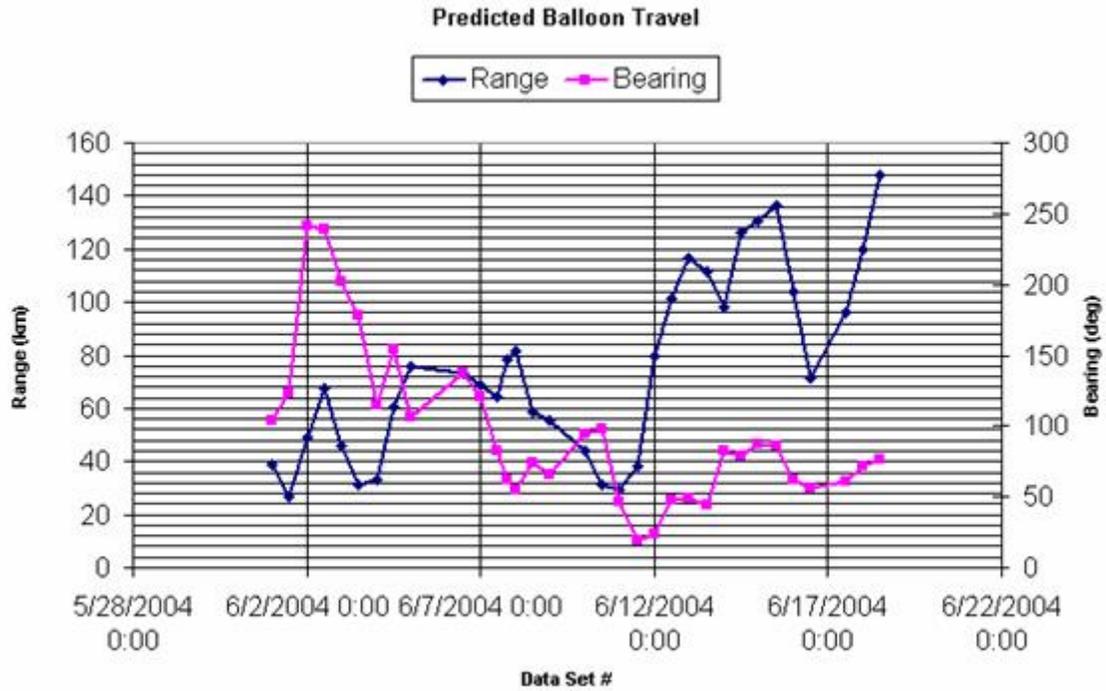


Figure 2: Zoomed in screen capture in MapPoint of balloon path prior to losing contact.

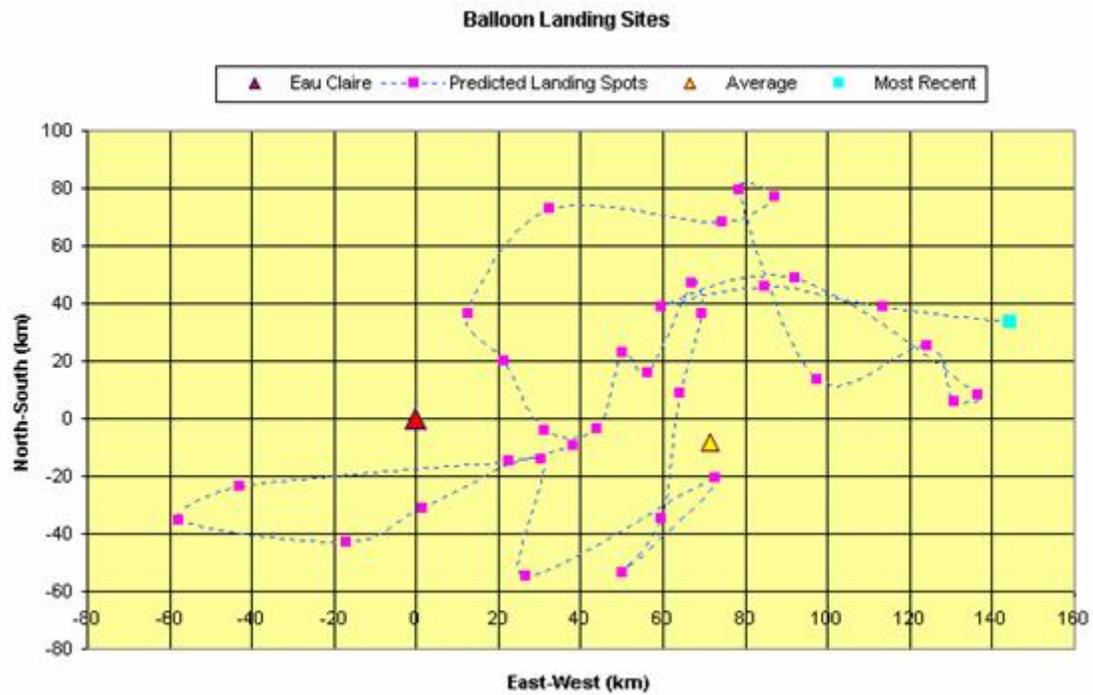
Launch predictions

Date and Time	Data Set #	Distance Traveled	Final bearing
		km	degrees
6/1/2004 0:00	1	39.2	104.3
6/1/2004 12:00	2	26.9	122.6
6/2/2004 0:00	3	49.00	241.4
6/2/2004 12:00	4	67.60	238.8
6/3/2004 0:00	5	45.90	201.5
6/3/2004 12:00	6	31.50	177.5
6/4/2004 0:00	7	33.30	114.6
6/4/2004 12:00	8	60.80	154
6/5/2004 0:00	9	75.70	106
6/6/2004 12:00	10	73.50	137
6/7/2004 0:00	11	69.00	120.2
6/7/2004 12:00	12	64.60	81.9
6/7/2004 18:00	13	78.30	62.4
6/8/2004 0:00	14	01.90	54.0
6/8/2004 12:00	15	58.40	74.5
6/9/2004 0:00	16	55.20	65.5
6/10/2004 0:00	17	44.20	94.3
6/10/2004 12:00	18	31.40	97.5
6/11/2004 0:00	19	29.40	46.4
6/11/2004 12:00	20	38.40	19.3
6/12/2004 0:00	21	79.90	24
6/12/2004 12:00	22	101.10	47.5
6/13/2004 0:00	23	116.50	48.5
6/13/2004 12:00	24	111.60	44.7
6/14/2004 0:00	25	98.20	82
6/14/2004 12:00	26	126.50	78.6
6/15/2004 0:00	27	130.90	87.5
6/15/2004 12:00	28	136.60	86.6
6/16/2004 0:00	29	104.20	62.1
6/16/2004 12:00	30	71.10	56.7
6/17/2004 12:00	31	96.20	61.4
6/18/2004 0:00	32	120.00	71.2
6/18/2004 12:00	33	148.10	76.8
average		77.84	96.583871

Table 1: Predicted bearing and distances from launch site



Graph 1: Predicted balloon travel showing range and bearing



Graph 2: Predicted balloon landing sites

