



Bearcat Experiment

Balloon Fest, 2003

Date: Saturday, 3/29/03

We will launch a tethered meteorological balloon to 1000 ft elevation at the Dann Ranch, Vacaville, CA as part of the Balloon Fest, 2003.

Purpose: to measure barometric pressure, (relative altitude), temperature, and the vertical component of the geomagnetic field. We hope to see if they change uniformly with altitude. We plan to specifically see if these reading have drifted from launch to recovery and then to look for patterns in the readings as compared to barometric pressure.

Equipment: Balloon, helium, gondola with instrumentation and camera, stopwatch, 1000ft of nylon cord, bright orange ribbon flags.

Payload: LabPro DAQ, Palm PDA with Data Pro Software, Barometer, Thermometer, Magnetometer, digital camera with intervalometer.

Data Pro Settings:

Ch1 = Temp(F), Ch2 = Baro(mmHg), Ch3 = MagnetF(mT)

Mode = Time graph, autoscale

5 seconds/sample, 480 samples, 2400 seconds(=40min) in experiment

Triggering = none

Weight: 1500 g

Flight Procedure:

1. Fill balloon with helium until it will lift 500 g more than the weight of the fully loaded gondola.
2. Securely tie balloon closed and attached to metal ring. Attach all rigging including the gondola, directly to the ring.
3. Start the written log. Measure and record the wind speed. As the flight continues, note all start and stop times as well as any comments or observations about the wind speed & direction or the balloon and gondola's behavior.
4. Start the Data Pro data collection mode & the stopwatch at the same time. Be sure that the LabPro starts flashing its collection light.
5. Start the digital camera Intervalometer. Be sure that you hear it take the first picture.
6. Launch balloon and let it rise smoothly about 100 ft or 30 m. This first 100 ft should take about 2 minutes.
7. Stop, tie a bright ribbon flag around the line and hold at this altitude about 3 minutes.



8. Since, the balloon is low enough to still make out people and the camera is taking pictures every 30 seconds this is a perfect time to be sure we get some good pictures of our group and launch site.
9. Continue but faster: rise 100 ft (1 minute), tie a ribbon & hold altitude (1 minute) until all 1000ft of line is out. Record all actual times for any stops and starts.
10. Hold at top for 5 minutes.
11. Start smoothly bringing it down. This should take about 5 minutes.
12. As soon as the balloon is recovered:
 - a. Stop Data Pro collection
 - b. Stop intervalometer
 - c. Measure and record wind speed
 - d. Save the data in Data Pro. Record the file name on the log.
 - e. Restart and do it all again if new data is still needed.

Data Analysis Procedure:

1. When all Flight tests are done:
 - a. Be sure last data set is saved
 - b. Quit Data Pro
 - c. Disconnect the Palm PDA
 - d. Disconnect the digital camera
2. Transfer data to the laptop computer
 - a. Connect the Palm cradle to the USB port
 - b. Synchronize the Palm on the Laptop computer. This transfers the data as a text file into the \Palm\DataPro folder.
3. Analyze the data in the Graphical Analysis program
 - a. Open Graphical Analysis and "Import from text file"
 - b. Add a new calculated column named "Altitude"
 - c. Formula: $-10 * ("Barometer" - \max("Barometer"))$
 - d. If barometer is in mmHG then use -10 for meters or -33 for ft
 - e. If barometer is in kPa then use -1.33 for meters or -4.4 for ft
 - f. If barometer is in mBar then use -13.3 for meters or -44 for ft
 - g. If barometer is in psi then use -0.193 for meters or $-.64$ for ft
 - h. Graph #1: Altitude vs time
 - i. Graph #2: Temperature vs time
 - j. Graph #3: Magnetism vs time
 - k. Graph #4: Temperature vs altitude
4. Transfer graphs to PowerPoint
 - a. In GA, select graph window, Ctrl C to copy the graph
 - b. Open PowerPoint Presentation, select new page, Ctrl V to paste the graph on that page



Images

1. Attach PenCam SD digital camera to Laptop using USB cable
2. Start PenCam SD software and download images to
C:\MyDocuments\BalloonFest\Images
3. Open Compushow 32, select all images, batch convert, shrink larger,
800x600, jpg
4. Open PowerPoint Presentation, Insert pictures from file.
5. Attach Canon digital camera to laptop using USB cable
6. Turn on camera to connect mode.
7. Download all images, rotate as needed, and delete from camera
8. Use Compushow as above and insert to PPT as above