

JK Experimental Protocol

Purpose: To measure barometric pressure and relative altitude. We hope to see if a change in pressure affects the balloon's altitude. Specifically, we want to see if high or low pressure will affect a balloon's altitude relative to previous measurements.

Equipment: Balloon, helium, gondola with instrumentation, stopwatch, 1000ft of line, bright ribbon flags, laptop.

Payload: gondola- Lab Pro, Barometer, and all accessories.

Weight: ~814g

Lab Pro Remote Data Setup:

1. Connect Lab Pro with sensors to laptop
2. Verify fresh batteries in Lab Pro
3. Open Experiment file with Logger Pro
4. Verify if "Interface is connected"
5. Select Show Sensors from Experiment menu:
Ch1 = Barometer (kPa)
6. Select Data Collection from Experiment menu:
Mode = Time-Based, sample time at 0
7. Select Remote Setup from Experiment menu:
Review Settings
Select OK
Verify that the yellow LED on LabPro is on and stays on
8. Disconnect the LabPro from the laptop. Exit out of Logger Pro and shutdown laptop if necessary.

Flight Procedure:

1. Fill balloon with helium until the lift is at least 500g more than the weight of the loaded gondola.
2. Securely tie balloon closed and attach to metal ring. Attach all rigging including gondola to the ring.
3. Start recording notes in log. Note all start and stop times as well as any comments or observation regarding the balloon or gondola.
4. When ready for launch, verify that the LEDs on the LabPro are still on.

5. Press the Start/Stop button on the LabPro and the stopwatch ***ONCE*** at the same time.
6. Verify that the LabPro beeps once, the yellow LED is off, and the green LED flashes every sample interval. If this does not happen, then reconnect the LabPro to the computer and setup again.
7. Launch balloon and let out the line to 100 ft. This should take 2 minutes.
8. Stop, then tie a bright flag around the line and hold at this altitude for 2 minutes.
9. Continue with steps 7 and 8 until 1000 ft of line is let out. Record all start and stop times.
10. Hold at top for 4 minutes.
11. Start reeling the balloon in.

LabPro Remote Data Recovery:

1. Verify that the green light is still flashing on the LabPro for every sample interval.
2. Press the Start/Stop button to stop data collection. The LabPro should beep once and the LEDs should go out.
3. Turn on laptop and open Logger Pro.
4. Connect the LabPro to the laptop and verify “Interface is connected”
5. When “Remote Data Available” window opens, select “Yes”
6. When “Retrieve Remote Data” window opens, select “Into current file” then “OK”
7. Verify data and save.
8. Select Reconnect Interface from the Experiment menu
9. When “Remote Data Available” window opens, select “No” to erase all data on LabPro.

Data Analysis Procedure:

1. Repeat above procedures if necessary to get good data. Save all data.
2. Be sure all data are saved and labeled when all tests are done.
3. Analyze the data with Logger Pro
 - a. Add a new calculated column named “Altitude”
 - b. Enter formula as $C * (\text{“Barometer”} - \max(\text{“Barometer”}))$
 - c. $C = -285 \text{ ft}$
 - d. Graph 1: Pressure vs. Time
 - e. Graph 2: Altitude vs. Time
 - f. Graph 3: Pressure vs. Altitude
4. Transfer graphs to PowerPoint

