TANC Experiment Procedure

Date: Saturday, May 13, 2006.
We will launch a tethered meteorological balloon to 1000 ft. at Tobin James Cellars, Paso Robles, CA as part of the Balloon Fest, 2006.

Purpose:
To measure the intensity of Eath's magnetic field and relative altitude. We are looking for patterns to determine if there is a direct relationship between these two variables.

Equipment:
balloon, helium, gondola with instruments, 1000 ft nylon cable, stopwatch.

Payload:
Laptop computer, with LoggerPro software, LabPro DAQ with magnetic field sensor, theodolites (2-axis) (quanity: 2)

Weight: ~ 1800g

LabPro Remote Data Setup:
1) Connect the sensor to the LabPro and connect the LabPro to the computer using the USB port & cable.
2) Make sure there are fresh batteries.
3) Start the LoggerPro software program and open the saved experiment file.
4) Verify that the sensor is detected by the computer.
5) Open "Experiment" menu
    a. select "Sensors"
    b. select "Show Sensors"
6) Open "Experiment" menu
    a. Select "Data Collection"
    b. Mode "Time-based"
    c. 75 minutes, 60 samples/minute, Oversampling (100x), Samples=4501
7) Open "Experiment" menu
    a. Select "Remote"
    b. Select "Ch. 1: LabPro"
        -Review Settings
        -Select OK
        -Verify that the yellow LED on the LabPro is lit.
8) Disconnect the USB cable fromthe LabPro:
    a. LoggerPro and the Labtop computer may be shut down if desired.

Flight Procedure:
1) Fill the balloon with helium until it will lift at least 500g more than the weight of the fully loaded gonola.
2) Tie the balloon closed securely and attach the metal ring. Attach the gondola, with the equipment inside, to the metal ring.

3) Start the written log. Measure and record the wind speed. Note all start and stop times and any comments or observations made about the wind speed and direction or the balloon and gondola's behavior.
4) When ready to launch, make sure the yellow LED on the LabPro is still ON. If not, reconnect to the computer and setup again.
5) Press the START/STOP button on the LabPro ONCE and start the stop watch at the same time at the lauch station and each theodolite staion.
6) Make sure the LabPro beeps once, the yellow LED turns off, and the green LED flashes once every sample interval. If this does not occur, reconnect the LabPro to the laptop and setup again.
7) Launch the balloon and let it rise at a steady pace.
8) At every minute, alert the theodolite stations to record data that will be calculated into altitude later.
9) Once the end of the nylon cord has been reached, hold it for about one minute. The theodolite stations will still be recording.
10) Start bringing it down, taking apprioximately as much time as it did bringing it up.
11) look at the LabPro and verify that the green LED is still flashing. If not, reconnect with the labtop and setup again. If it is, press the START/STOP button on the LabPro ONCE. DO NOT touch any other buttons unless consent is given in the instructuions. After the START/STOP button has been pressed, the green LED should turn off.

LabPro Data Recovery:
1) Restart LoggerPro and the laptop computer if needed.
2) Reconnect the LabPro (USB) to the computer and verify that the "Interface is connected."
3) The "Remote Data Available" window opens:
    a. Select "Yes"
4) The "Retrieve Remote Data" window opens:
    a. Select "Into current file" And "Make Data available for multiple retreival."
    b. Select "OK"

Data Analysis Procedure:
1) Repeat the previous three procedures as needed to receive the best data possible. Save each set even if it is not complete.
2) When all flight tests are done:
a. Verify that all data sets are saved and labled.
3) Analyze the data in the LoggerPro program:
    a. Add a new calculated column named "Altitude."
    b. formula C*("Magnetic Field sensor" - max("Magnetic Field Sensor"))
    c. Verify the magnetic field sonsor is in mT.
    d. Graph #1: Altitude vs. Time
    e. Graph #2: Magnetic intensity vs. time
    f. Graph #3: Magnetic intensity vs. altitude
    g. Annotate the graphs with notes from experiment log.
4) Transfer graphs to Power Point:
    a. In LabPro, select graph window, Ctrl-C to copy the graph

b. Open PowerPoint Presentation, select new page, Ctrl-V to paste the graphs on to that page.