Set up radiosonde and balloons

Location:
- We set the laptop up at the tables by the pool plugged in to power via the extension cord. Power is behind the chairs at edge of pool facing the beach.
- We set the balloon up where we can drive the car to the bottom of the road, nearest the courtyard by the pool.

1. Start receiver:
   a. Turn on receiver, make sure on FM
   b. Stack tables three high for radio tower, put metal stand on it
   c. Test receiver for noise, quiet is good, if there is a noise you will need to change
   d. Connect receiver via aux cable to computer via microphone port (white sticker)
   e. Check volume is on 2 bars, if not change it.

2. Initialize Radiosonde
   a. Turn on computer
   b. Connect gray cable to USB slot
   c. Connect grey box to USB cable (Box 28602#02 should work)
   d. Unsleeve radiosonde - be careful about the sensor and antenna
   e. Connect grey box to green chip in radiosonde
   f. Open bottom Grawmet5 program on desktop
   g. Click initialize in menu or icon in top left
   h. Click through initialization (check you are in correct quadrant)
   i. Use kestrel (orange handheld weather station in bag) to get current weather, press up button to cycle through values
   j. Fill in values on computer
   k. If there is a sonde in the air still sending a signal (i.e. you've launched a sounding in the last two hours), and you want to launch another, change frequency on computer (page with dials) and on receiver to ensure no interference (note: remember to change it back to 403.05 at the end for the next launch). You can use any frequency in the range 402-403.
   l. After you start sounding, a window will come up with the location. It should be automatically getting it from GPS. Check that it is correct lat and lon and elevation.
   m. After that, the raw data table will come up. Initially data will only come in with humidity. Wait a few seconds and it should start coming in with full lines on both tables.
   n. Leave the sonde attached to the computer while you fill up balloon

If data isn't coming in (i.e. you are missing lines, or page is blank, or temperature/humidity data isn't filling in) correctly try the following:
- Play with volume on receiver. Usually it is good with 2 bars.
- Check frequency on the receiver is the same as initialization (usually 403.05) but sometimes different if you changed it for a quick launch before.
- Check battery on receiver - if screen looks faint or it appears to be flashing replace them.

- Close Grawmet program (go to the icon at bottom and click close window), restart program and reinitialize.
- Get a new sonde, and go back through the process.
- Restart computer and go again.
- If none of that works, pack all the equipment up and go get a margarita from the bar. Maybe try again later!

3. Inflate balloon
   a. Get dolly and strap from trunk.
   b. Slide helium tank out of minivan from side door. You will need to support some of the weight to make sure it doesn't crash to the floor but generally you can slide it onto the ground.
   c. Put the helium tank on the dolly, strap around it a few times, and tie off to ensure it doesn't fall off the dolly.
   d. Move to a flat surface where it won't fall over.
   e. Unscrew the metal cap and attach pressure valve (metal dials with red tube). Make sure it's tight with wrench (shouldn't be able to see any thread).
   f. Ensure dial on pressure valve is closed and then open valve on top of helium tank.
   g. Attach balloon to red tube (about 3-4 inches of overlap) with zip-ties (fold balloon and get zip tie nice and tight.
   h. Hang balloon from hand, open valve, fill 400 PSI.
   i. Tie off balloon above tube with string. Ensure tight so that no helium escapes.
   j. Tie spool (white tube with radiosonde) onto bottom of string attached to balloon through metal loop on top of white spool.
   k. Ensure someone has a good hold on bottom of balloon and spool and then cut zip tie attaching the balloon to red tube. Don't let go, or you lose the balloon!

4. Attach radiosonde
   a. Leave someone holding balloon in sheltered area and go back to computer to get sonde.
   b. Power on sonde by flipping black switch (under where you attach the sonde to the grey box).
   c. Unplug sonde from grey box.
   d. Check computer, ensure data is still coming in well.
   e. Slide sonde into plastic casing. Ensure antenna goes through open slot on bottom of casing and sensor is point upward. Detach side flaps.
   f. Return to balloon. Remove tape from spool (white tube attached to balloon). Attach string that comes out the bottom of the spool to plastic flaps with many knots.
   g. Ensure all loose strings are cut off so as not to interfere with the sensor.

5. Launch balloon:
   a. Call St Croix Air Traffic Control at 3407784826 or 3407781011
   b. Tell them you are NASA balloons, you are at the Carambola Resort, and you are ready to launch. Usually they will respond back by saying you are clear to launch. They may also give you additional instructions to call back once the balloon is beyond 2500ft or at the end of the sounding to inform them of this. Typically you should do both but

sometimes they ask you to only do one or the other or they tell you not to worry. If they don't give you any instructions, do both.

    c. Once you have clearance to launch, walk the balloon to the east side of the courtyard (winds are easterlies so you want to give enough clearance between you and the trees).

    d. Let the balloon go first, and then when you feel tension on the sonde, let the sonde go. Try to ensure the string is clear of the sensor and doesn't get wrapped around the sensor.

    e. Clear up the equipment (ensure car is locked, helium is away etc). If you are launching another sonde you can leave car there and helium on ground by cars side.

6. Monitor sounding
    a. When you get back to the laptop, ensure data is still coming in on the raw data table. If its not, there are a few things you can try:
        i. Check the frequency is correct on the receiver.
        ii. Play around with the volume on the receiver. If it gets far away, sometimes you need to increase the volume to 3 or 4 bars.
    b. The current data including pressure, altitude, temperature etc. is on the left.
    c. You can check various diagrams by clicking on the icons at top:
        i. For the skewT hit the SK icon
        ii. For the position relative to you, hit the circle inside a circle icon (looks like a target).
        iii. For the hodograph, hit the HO icon
        iv. For a time-series of the variables, hit the PR icon (the one on the left)
        v. For the processed data table, hit the PR icon (the one on the right)
        vi. To get back to the raw data table, hit the RA icon

7. End the sounding and save data:
    a. Once the data stops coming in for 10+ minutes (and you can't get it to come back in by fiddling with the receiver) or you are above 100mb in the current data, you can stop the sounding.
    b. Hit the stop (square) icon. Wait a few seconds. A loading bar will come up. Let it do it's thing.
    c. Once it's finished, go to the PR table. A save button will be in the bottom right. Hit that, save it in the form: SCRX_YYYYMMDD_hhmm.txt. Data and time is from launch time (listed in the current data on the left). Make sure the date and time is UTC which is what the computer is in.
    d. Also save the SkewT. Hit the SK icon. Once the skewT comes up, hit the save icon (top left). Save it in the same format: SCRX_YYYYMMDD_hhmm.jpg
    e. Close grawmet by clicking on it's icon in the bar at the bottom of the page and hitting close window.
    f. Pack up! Electronics go in the black bag. Laptop goes in the white bag. Make sure to unstack the tower.