Demo Instructions

Here are the components of the demo laid out in full. The main components are:

1) Kite handle and string
2) 3D printed box with electronics payload
3) Balloon clamp
4) 30 gram weather balloon
5) Parachute
6) **Pair of scissors** (not included)

The components should all be tied together, except for the parachute, which does not need to be attached to the payload until everyone is ready to do the launch.

When in a field or open space, remove the balloon clip by lifting on the edge opposite the hinge and place the pre-arranged items (clip and payload hardware attached to kite string) a few feet away. Place the parachute to the side as well.

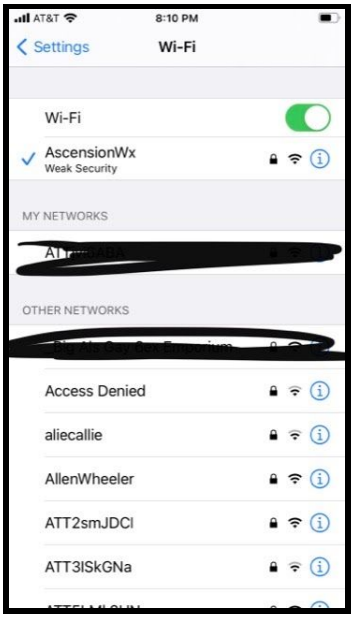
Take the helium tank out of its cardboard box. Twist the handle on top of the helium tank to the left until it cannot turn any further. Place the neck of the red balloon over the nozzle and begin filling the balloon by squeezing or bending the rubber nozzle slightly. Cover the opening of the balloon as best you can to prevent helium from escaping.

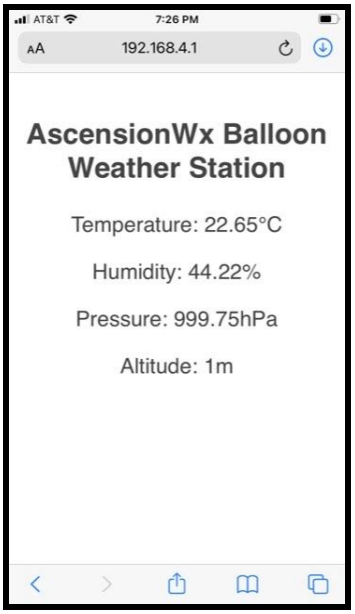
As the balloon grows, place one foot on the kite string handle to ensure the balloon doesn't fly away. Fill the entirety of the tank into the balloon, or until the balloon reaches 3 feet in diameter. When finished, fold the neck of the filled balloon once and secure it with the clamp by pinching the clamp shut.

While one person holds the balloon, a second person should turn on the LoRa32 device (switch shown in image with blue arrow). Once it's turned on, the parachute can be attached to the payload by feeding the parachute strings into the clip at the top of the box.

Open the WiFi settings on a smartphone and select “AscensionWx” from the list of access points. The password is “**balloons**.” Once connected to the network, scan the QR code on the device or open a web browser and input the IP address shown on the screen (for example 192.168.4.1). The webpage should show the weather recorded by the balloon and refresh every 5 seconds. Refer to the Appendix for any technical issues.

Walk away from your friend and grab the little purple sensor board sticking out of the back of the payload. Ask him to see how the humidity changes as your fingers move over the sensor. *Why do you think this is?*





When everyone has tested the app on their smartphone, use a pair of scissors to cut the kite string near the handle and launch the balloon. Note the increasing altitude value shown in the app. Once the balloon is out of WiFi range, the webpage will no longer update. Watch the balloon for queues on wind direction.

The data collected by the balloon can be used to monitor climate and predicting thunderstorms! See the following video to learn the details: https://www.youtube.com/watch?v=pcLkkoR2LS4

Note on Future Work with the Radiosonde Balloons

To receive long-range from the balloons and make it a recurring event, AscensionWx needs to install a LoRaWAN gateway and hydrogen generator at the university. Once these items are working properly, we can send some more instructions on how the students can use a different app and be paid in digital currency for doing the launches. After 20 launches, we can use the data to make rain forecasts for Accra.

Appendix

If the QR code does not appear on the screen when the On/Off switch is pushed to the left, then there is likely a problem with the battery. It can be recharged with a USB-B cable (Android phone charger).

If the QR code shows up, but weather values are NaN or 0, then check that the external BME280 sensor is correctly attached to the board. Here is what the pin connections should look like on a board taken outside the box: