HARBOR

Flight Checklist for preparation of the Ozonesonde Payload

Table of Contents

List of Illustrations:

HARBOR Ozonesonde Payload Flight Checklist

Thank you for volunteering for the HARBOR Ozonesonde team! Your mission is ensuring that the ozonesonde payload is deployed and that valid data is retrieved during flight.

It is essential that these instructions are followed in order, otherwise problems may occur possibly leading to a loss of data or equipment damage.

Step 1: Receive the ozonesonde payload and supporting hardware. (See Illustration 1)

List of hardware:

- Ozonesonde in foam flight box
- Calibration checklist
- laptop
- Ozonesonde equipment box, including:

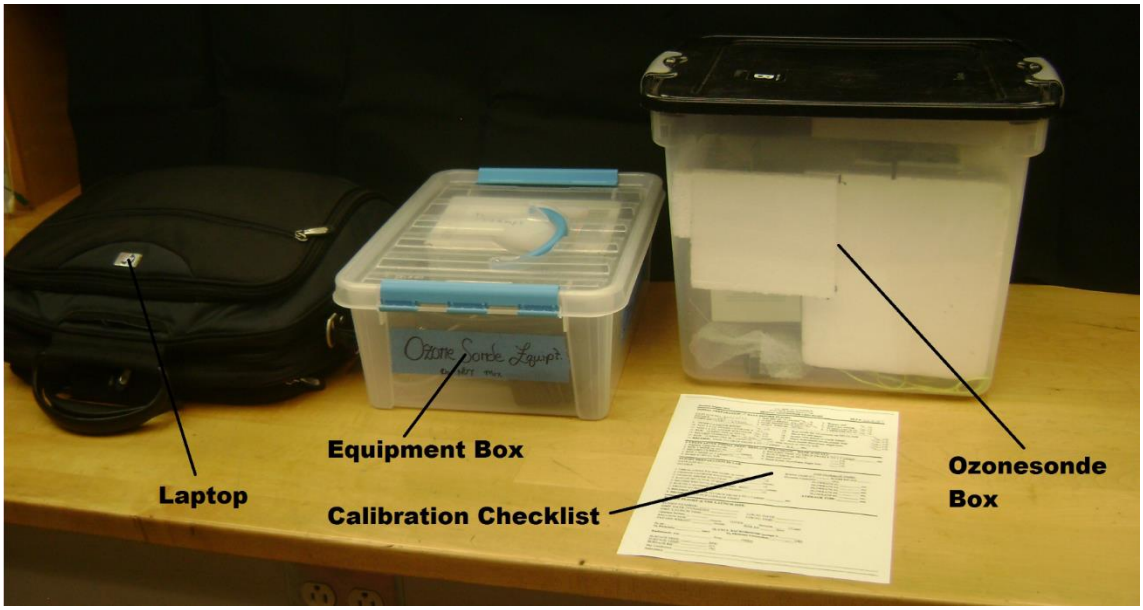

Illustration 1: Ozonesonde Equipment

- Radio capable of 403MHz reception
- Preamplifier
- Associated cables and connectors
- AC adapter for powering receiver
- Handheld weather station

Step 2: Prepare Radiotheodolite

- Set up lower stepper motor by inserting legs into receptacles (4):
- Carefully remove tape from shaft key on azimuth shaft.
- place top assembly on azimuth shaft.
- Attach antenna.
- Attach Pitch and Heading cables, and stepper motor cables to RPi toolbox:

Illustration 2: Insert legs

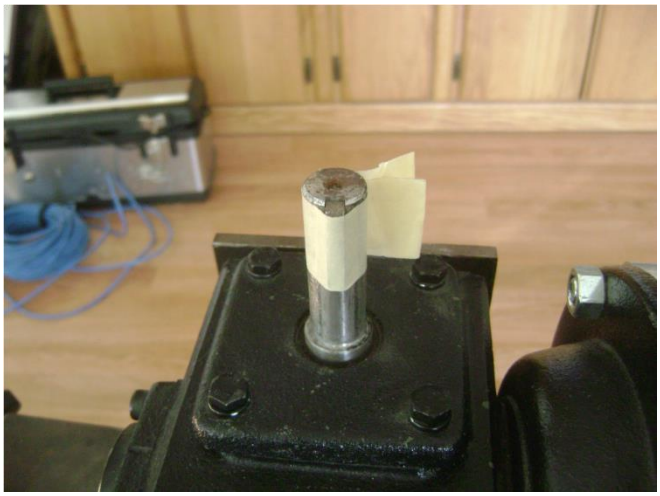

Illustration 3: Remove tape

Illustration 4: Place top assembly on shaft

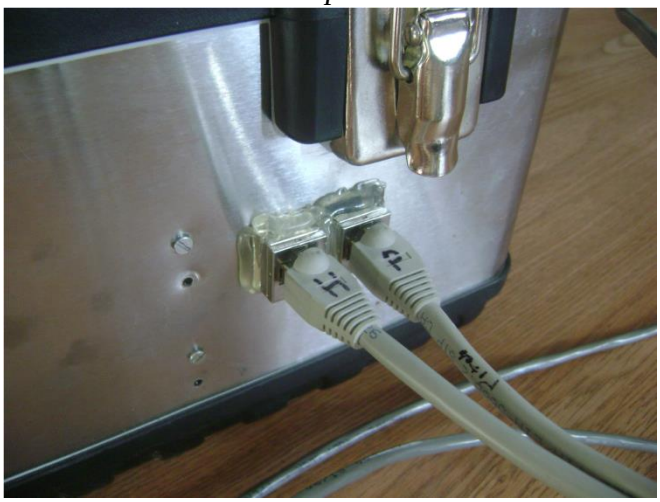

Illustration 5: Attach Pitch and Heading cables

Illustration 6: Attach stepper motor cables

Illustration 7: Attach Ethernet cable

Illustration 8: Starting Remote Desktop Connection

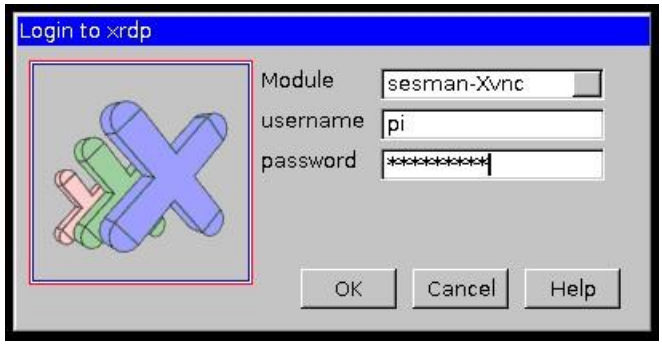

Illustration 9: Logging on

- Plug 120V cable into a reliable source of electricity. RPi WILL BOOT AUTOMATICALLY. DO NOT DISCONNECT 120V CABLE UNTIL RPi HAS BEEN PROPERLY SHUT DOWN.
- Connect Ethernet cable to port on RPi toolbox, connect other end to laptop.
- Connect USB to serial converter to laptop, connect null modem cable to converter, and connect other end to USB to seial converter on RPi toolbox.
- On laptop, start Remote Desktop Connection. Connect to 192.168.0.19. When RPi login appears, the username is: pi, the password is: raspberry.
- On RPi desktop, double-click on <ARROW BACKUP> . Use arrow keys to test movement of antenna. Exit when finished by pressing <CONTROL-C>.

Step 3: Prepare receiver complex

- Connect laptop to AC mains using charger.
- Boot laptop. The username and password are “harbor”.
- Connect preamplifier to antenna using supplied cable.
- Connect preamplifier to radio using supplied cable.
- Connect a 9V battery to preamplifier.
- Connect radio to AC adapter and plug AC adapter into the AC mains.
- Turn on radio by pressing power button on the front.
- Verify that the frequency is 403MHz.
- Verify that the mode is WFM. If not, tap the [FUNCTION] button and then the [MODE] button. This combination needs to be repeated until the display shows *WFM*.

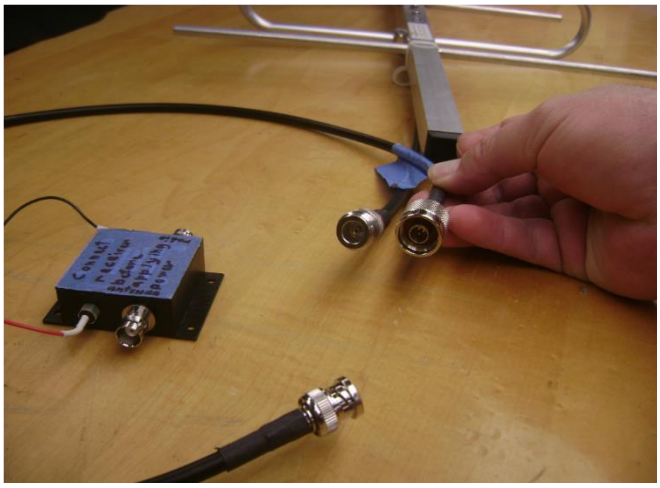

Illustration 10: Antenna Connectors

Illustration 11: Connecting Receiver

Illustration 12: Connecting AC adapter

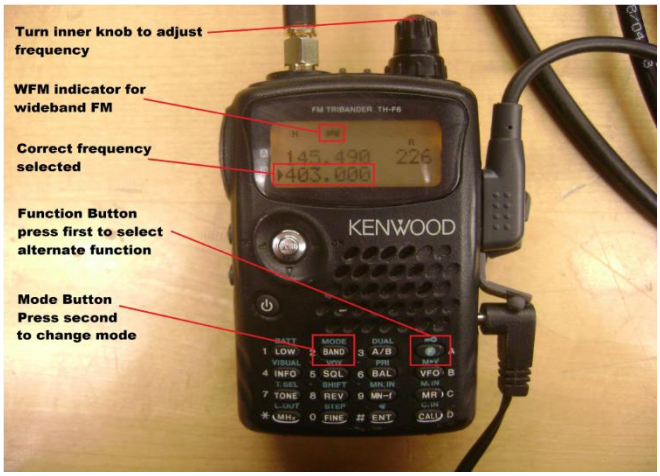

Illustration 13: Receiver settings

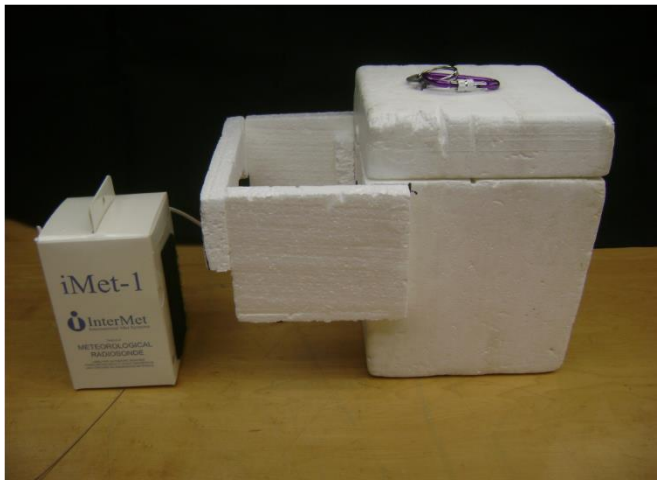

Illustration 14: Radiosonde and ozonesonde cases

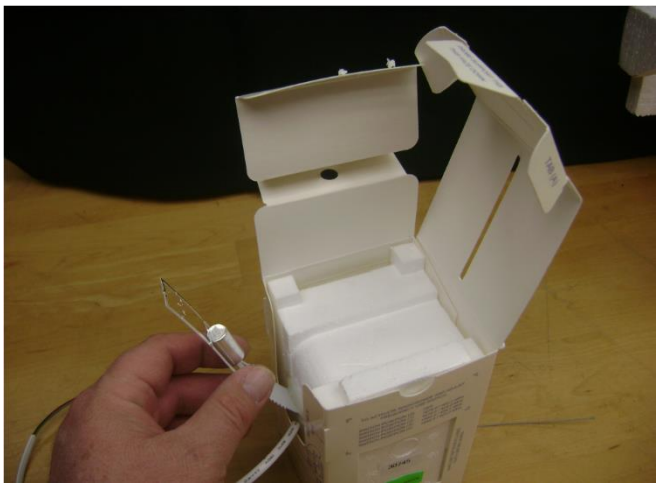

Illustration 15: Freeing sensor boom

Illustration 16: Opening access panel

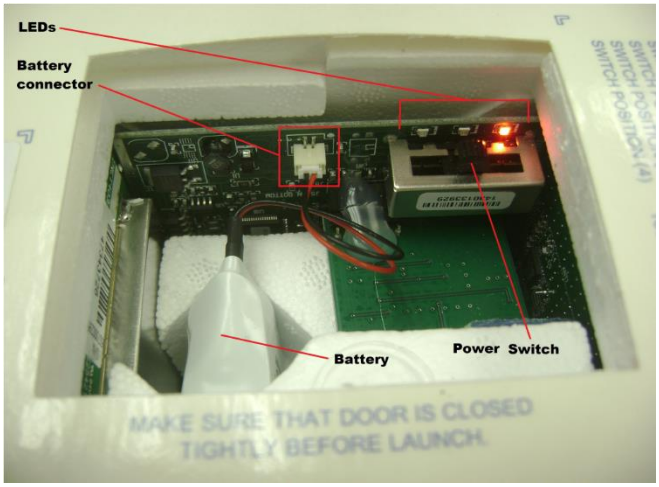

Illustration 17: Closeup of radiosonde interior

Step 4 Prepare radiosonde.

- Carefully open radiosonde box. The temperature sensor and the humidity sensor are attached to a flexible boom. ***They are very fragile, treat them with care.***
- Open access panel by sliding foam cover up through the opening in the radiosonde box. The cover does not need to be fully retracted.
- Remove "new" label from the battery pack and insert battery plug into radiosonde PCB.
- Turn on radiosonde. The switch has 5 positions, including off. Off is position one. Place power switch in position 3 unless informed otherwise.
- The yellow LED should light immediately. After initialization, the radiosonde will begin transmitting. While transmitting, the red LED will flash with a 50% duty

Illustration 18: Connecting audio cable

cycle, while the green LED will flash with a very short duty cycle.

- Close cover. Carefully close radiosonde box, keeping the temperature and humidity boom on the outside of the box. The radiosonde box has printed instructions on the outside for how to close.
- Verify that modem tones are coming from the speaker of the receiver. Briefly enjoy the music. If no music, make sure volume is turned up (outer knob.)
- Connect audio cable to receiver handset. The 2.5mm (small) end connects to the receiver. The 3.5mm (large) end connects to the laptop microphone jack.

Step 5 Prepare ozonesonde

- The ozonesonde contains liquid chemicals and should be maintained in a vertical position at all times.
- Remove ozonesonde from plastic bag. Secure plastic bag
- Remove metal lid from PCB.
- Remove shorting plug from cell, secure shorting plug.
- Plug cell leads into ozonesonde PCB. Observe polarity: blue to blue and white to white.
- Plug radiosonde cable into the leftmost jack on the ozonesonde PCB.
- Replace lid. Ensure that no wires are pinched by the lid.
- Remove intake tube from ozonesonde frame. Insert into pump intake.
- Replace ozonesonde in foam box with the battery.
- Coil the excess radiosonde wire inside the ozonesonde box and secure with tape. DO NOT SECURE THE OZONESONDE INTAKE TUBE.

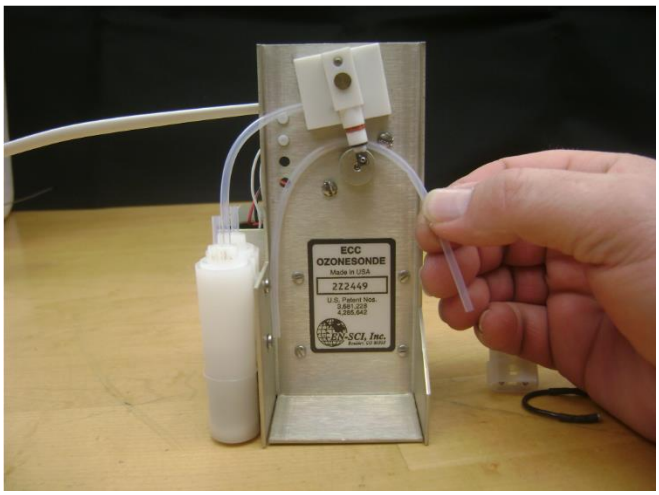

Illustration 19: Removing ozonesonde intake tube

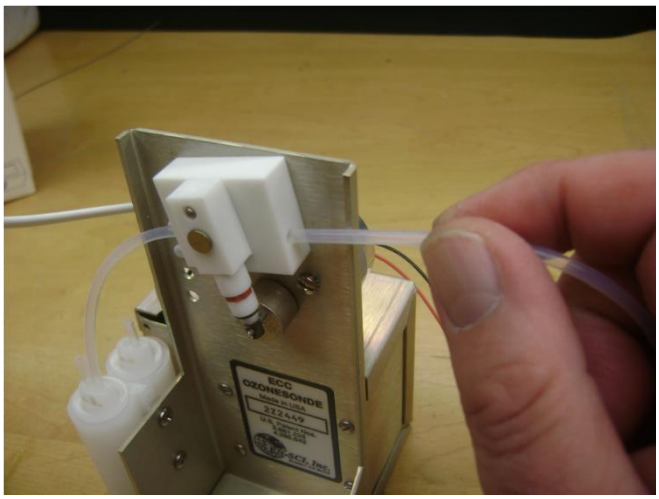

Illustration 20: Inserting ozonesonde intake tube

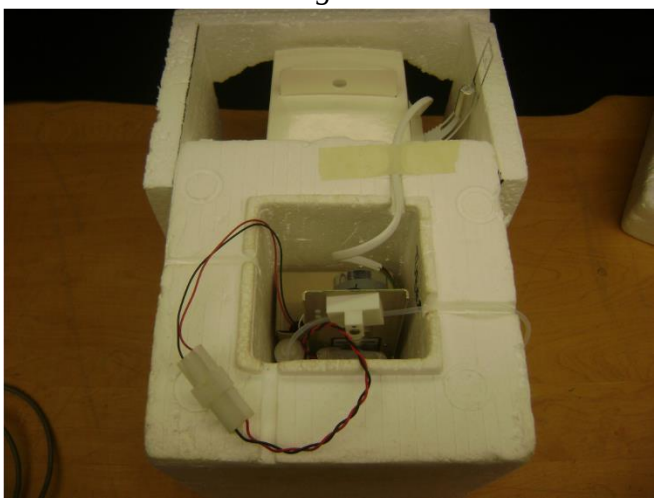

Illustration 21: Ozonesonde installed in flight box

Illustration 22: Recording local pressure and temperature.

- Remove “new” label from battery pack.
- Connect battery. Ensure that ozonesonde pump is running. Ensure that no wires can interfere with the operation of the ozonesonde pump.
- Replace ozonesonde foam box lid and secure with webbing harness.
- Turn over the ozonesonde to the flight personnel that will attach it to the payload train.

Step 6 Start SkySonde software

- On the laptop, start SkySonde Server. Verify that packets are being received.
- Start SkySonde Client:
- Under the Acquisition tab:
- Under Data Source, select SkySonde Server (realtime)

- Under Radiosonde, input serial number of radiosonde
- Under Output Files, insert flight name: HAR*YYMMDD*
- Select GPS under Pressure/Altitude Source for Calculations
- Under GPS NEMA Output, select the COM port of the USB to Serial converter. Use Device Manager if necessary.
- Under the Station tab:
- Under Station Information, enter station name, abbreviation, Latitude, and Longitude of station.
- Under Surface Data, enter the altitude of the launch site.
- Ensure that Use First Radiosonde Packet is unchecked.
- Under Ozone tab:
- Ensure that EN_SCI Ozonesonde checkbox is checked.
- Ensure that Pump Efficiency Correction is set to SkySonde Default 2012.
- Fill all other fields with data from Calibration Checklist.
- Under Hygrometer tab:
- Ensure hygrometer button is unchecked.
- Under Multiple Instruments tab:
- Ensure all buttons are unselected.
- Under GRUAN tab:
- This data is optional.
- Click <OK>.
- When sounding is over, close SkySonde Client.

Step 7 Turn over data.

- Data is stored in C://SkySonde Data
- Transfer to memory stick and relinquish to Dr. Sohl.

HARBOR Flight Checklist

Step 1: Receive Equipment

__ Ozonesonde Box

__ Equipment Box

__ Laptop

__ Calibration Checklist

Step 2: Prepare Receiver

__ Connect radio to AC mains

__ Boot laptop

__ Start VSPE

__ Start TrueTTY

__ Connect preamplifier to antenna

__ Connect preamplifier to radio

__ Connect 9 volt battery to preamplifier

__ Connect AC adapter to radio

__ Turn on radio

Step 3: Prepare Radiosonde

__ Open access panel

__ Install new battery

__ Turn on radiosonde

__Verify that Red LED begins flashing

__ Verify reception

__ Close radiosonde box

__ Connect audio cable from radio to laptop

__ Verify reception of packets

Step 4: Prepare Ozonesonde

__ Remove shorting plug

__ Plug cell leads into PCB

__ Plug radiosonde into PCB

__ Replace lid

__ Insert intake tube

__ Install ozonesonde in flight box with battery

__ Connect battery

__ Verify reception of ozonesonde packets

Step 5: Gather flight data

__ Begin flight

__ End flight

Step 6: Transfer data

__ Give data to Dr. Sohl