I. Aspen: Setup for Global Hawk Missions

1. Download the most recent version of Aspen for your computer
   a) https://www.eol.ucar.edu/software/aspen
   b) use v33429 (for Mac OSX, this can only be run on Sierra)
   c) note: this is the only version that includes the new calculation of RH <1% and new temperature and relative humidity time constants for NCAR's new NRD41 dropsondes with improved temperature sensors.

2. Create a local folder where you will download Global Hawk GPS dropsonde D-Files for the current mission (e.g. YYYYMMDDgh)
   a) Create a sub directory called "*dfiles*" >> raw D-Files from the GH are downloaded here
   b) Create a 2nd sub directory called "*output*" >> Aspen output can be put here

3. Setting up the Sounding Database & Opening the Aspen Application
   a) Remove all old *soundings.sqlite* files from your computer (if there are any) before you open Aspen
   b) If you are starting dropsonde processing from the beginning of the flight >> open Aspen
   c) If you are starting a shift in the middle of a flight >> get *soundings.sqlite* from the previous dropsonde processor and put it in YYYYMMDDgh >> open Aspen
   d) A pop-up window called *Locate Sounding Database* will appear when you initially launch Aspen
      - Select Ok if this is the beginning of the flight >> Aspen creates a new *soundings.sqlite* file in your home directory (e.g. /Users/jasondunion/soundings.sqlite)
      - …or select *Browse* if you have received a *soundings.sqlite* from a previous sonde operator >> point to that *soundings.sqlite* file in YYYYMMDDgh

4. Select the Configuration Set for Processing
   a) Aspen >> Preferences >> Select Active Configuration Set 1 >> "*mini-dropsonde*"

5. Under *mini-dropsonde* >> select "*Edit*" >> Advanced Configuration Management window (these edits will only have to be made the 1st time Aspen is opened)
   a) QC Parameters
      - no changes needed
   b) Processing
      - QC Comment (EOL File Only) >> "*Preliminary QC Data. Not Intended for Scientific Research*"
      - Fixed Data Source and Destination Directory >> select "*Enabled*"
      - Fixed Data Source and Destination Directory >> select "*Change*" >> select local mission directory set up in step #2 >> e.g. */Users/jason/desktop/YYYYMMDDgh*
   c) WMO
      - Message Type >> *TEMP*
      - Upsonde abbreviated header (if take-off is from Wallops) >> *UZNT13*
      - Upsonde abbreviated header (if take-off is from Edwards AFB) >> *UZPN13*
      - Upsonde ICAO code >> *KWBC* (note: this may also have to be changed in the WMO tab when the 1st sonde gets processed)
      - Email address for TEMP >> change from "nobody" to >> nws.rthkwbc.ops@noaa.gov
      - Select >> "*Append NNNN terminator*"
      - Note: Upsonde abbreviated header (*UZNT13 vs UZPN13*): this is based on what basin the dropsonde was launched in. Aspen will automatically update this header as needed.
   d) Auto Save
      - Select >> "*Auto Save Enable*"

- Change Auto Save Directory to desired directory to save Aspen's output data
- e.g. /Users/jason/Desktop/YYYYMMDDgh/output
- QC Output Formats >> Select >> "*EOL (.eol), "NOAA FRD (.frd)"*
- WMO BUFR (.bfr) >> 2016 ECMWF request to EOL
- Skewt Output Formats >> Select >> "*PNG (.png)*"
- WMO >> Select >> "*Text (.txt)*"

e) Synoptic Map
- Geographical Database >> should default to the local directory where Aspen resides…e.g. Users/Jason/AspenV3.3-429/Geodata/ne1to50m.sqlite
- Sounding Database >> this is the *soundings.sqlite* file that you set up in Step 3d >> if this step was skipped, just select "*Change*" to browse for the *soundings.sqlite* that you want to use
- Synoptic Map title >> enter the desire name of the map (e.g. YYYYMMDDgh)
- Note: if this is the beginning of the flight >> before the 1st dropsonde is processed >> click the Earth icon in the main Aspen window >> if old soundings.sqlite files were deleted, no old D-files will appear on the right side of the panel. If any old D-files do appear >> select (check box) any old D-files in the listing on the right side of the panel and select >> *Delete*. This will remove any old drops in the listing.

f) Visual
- XY Graph Scale Limits >> no changes needed (use the default *AutoScale* values)
- Skew-T Graph Settings >> Temperature (degC) >> min=-80; max=40
- Skew-T Graph Settings >> Pressure (mb) >> min=50; max=1050
- Keep all other Skew-T values set to their default values
- Note: these changes are important: we want the Skew-T graphs to look consistent so that users can easily browse through the GPS dropsonde data after the missions

6. Aspen Parameters that need to be set when the 1st dropsonde is opened
   a) Comm tab (these parameters should only need to be set once)
   - Agency/Aircraft >> change to >> "*NA872*"
   - Mission Storm System: if Wallops take-off >> *WXWXA*
   - Mission Storm System: if Edwards AFB take-off >> *WXWXE*
   - Note: CARCAH may assign a special Mission Storm System (e.g. WX07A)
   - Mission ID: determined by CARCAH (e.g. *LESLIE*, *TRAIN*, *SHOUT1*, etc.)
   - ICAO id >> KWBC
   - Note: CARCAH can be contacted on X-Chat (#CARCAH) or at: (305) 229-4474
   - Note: the *Observation Number* needs to be updated for each dropsonde that is processed (start with "01").
   - Note: if this the last dropsonde OB of the mission: select "*Last Report*"

   b) WMO Tab: OB # (this number needs to be updated for each dropsonde)
   - Note: when a dropsonde is 1st opened, Aspen just inserts the OB # as "99"…DO NOT transmit a sonde with a "99" OB #.
   - Note: The "Observation Number" box sometimes has an editing glitch >> double click on the box 1st…you can then manually enter the OB #.
   - Note: after you enter the OB # for a given dropsonde (under the *Comm* tab), you must go to the *WMO* tab and select the *Save* icon to save the WMO message with the updated new OB #.
   - Note: saving this file is important since the WMO file with the default "OB 99" (that was saved when the file was first opened) will not be overwritten with the updated WMO message with the correct OB #;
   - Note: when saving the updated WMO file, the WMO that should be overwritten will be in the format YYYYDDMM_HHMMSS_PWMO.txt

7. Excel Flight Log
   a) Jason D. will create a new Google Sheet (dropsonde log sheet) to share with the dropsonde processing group using the NAOA Google Drive before each mission. The file name format will be YYYYMMDDGH_DROPLOG. Dropsonde information and notes should be included in this file as the flight progresses.

8. Sending a QCed dropsonde WMO message to the NWS Gateway
   a) See Sec. II below for the email options for sending WMOs to the NWS Gateway.
   b) Note: we will not be sending BUFR messages to the GTS in 2017

9. Sending a Corrected Report (if the transmitted OB has an error and needs to be resent)
   a) Comm tab >> check "Corrected Report" box
   b) WMO tab >> click all of the 61616 lines >> click modify >> change "*OB XX*" to "*OB XX CCA*" >> Select the red "x" on the box to close and save the changes
   c) Select the *Save* icon before clicking another Aspen tab or "CCA" edits will be lost
   d) Note: for GH dropsondes: 3-4 61616 lines need to be modified in the WMO message

10. Monitoring TEMP DROP messages coming through the NWS Gateway (NHC site)
    a) Atlantic
       • Latest: http://www.nhc.noaa.gov/text/MIAREPNT3.shtml
       • Archive (KWBC): http://www.nhc.noaa.gov/archive/recon/2017/REPNT3
    b) EPAC
       • Latest: http://www.nhc.noaa.gov/text/MIAREPPN3.shtml
       • Archive (KWBC): http://www.nhc.noaa.gov/archive/recon/2017/REPPN3
    c) If you see your TEMPDROP OBs on the NHC page, they are getting through the NWS Gateway. CARCAH is also checking these links to monitor transmitted TEMPDROPS.
    d) An additional option for checking that OBs are getting through the NWS Gateway is to check with CARCAH on X-Chat (use the CARCAH channel).

11. X-Chat (available through MTS or chat clients like X-Chat Aqua
    a) #shout: channel for communicating with the SHOUT team
    b) #avaps: channel for communicating dropsonde launches with the AVAPS operator
    c) Note: NASA HOPE-EPOCH will also be using an xchat channel during ops (name TBD)

12. Other Useful Websites For Situational Awareness
   Ocean Prediction Center- Unified Surface Analysis (surface pressure analysis)
      http://www.opc.ncep.noaa.gov

   University of Wisconsin MIMIC TPW Imagery (~600-925 mb tropical moisture)
      http://tropic.ssec.wisc.edu/real-time/mimic-tpw/global/main.html

   University of Wisconsin-CIMSS Upper-Level Water Vapor Winds (100-500 mb)
      http://tropic.ssec.wisc.edu/real-time/windmain.php?&basin=atlantic&sat=wg8&prod=wvir&zoom=&time
      http://tropic.ssec.wisc.edu/real-time/windmain.php?&basin=eastpac&sat=wg9&prod=wvir&zoom=&time

   University of Wisconsin-CIMSS Low to Mid-Level Cloud-Drift Winds (400-950 mb)
      http://tropic.ssec.wisc.edu/real-time/windmain.php?&basin=atlantic&sat=wg8&prod=ir&zoom=&time=
      http://tropic.ssec.wisc.edu/real-time/windmain.php?&basin=eastpac&sat=wg9&prod=ir&zoom=&time=

   NOAA NHC SST Analyses (good 1st guess for expected surface temperature in soundings)
      http://www.nhc.noaa.gov/aboutsst.php

II. Global Hawk Dropsondes: Accessing D-Files, transmitting to the NWS Gateway and ESRL, and Archiving

1. **Global Hawk Dropsonde D-Files**
   a) GH D-Files will be transmitted automatically to the HRD FTP server in real-time
      - ftp://ftp.aoml.noaa.gov/pub/hrd/data/global_hawk/noaa_uas2017/incoming/
   b) Set up a web browser and download the D-Files to your local *YYYYMMDDgh/dfiles* folder from this link as they arrive on the FTP server

2. **Emailing WMO text files to the NWS Gateway (note that Method 1 involves a 1-time setup)**
   a) Method 1: set up your Mac Mail with a *WMO Dropsonde* account (easiest set up option)
      - Mac Mail >> Preferences >> Accounts >> select >> "+" (add account) >> "Other Mail Account…"
      - Name >> WMO Dropsondes
      - Email Address >> sonde-gts@eol.ucar.edu
      - Password >> *contact Jason D.*
      - Select >> "Sign In" >> a new box appears with message >> "Unable to verify account name or password"
      - User Name >> ncarsoundings
      - Account Type >> IMAP
      - Incoming Mail Server >> *smtp.googlemail.com*
      - Outgoing Mail Server >> *smtp.googlemail.com*
      - Select >> *Sign In* (if sign is successful Mac Mail returns you to the Accounts box >> *eol.ucar.edu* IMAP should now appear in the active accounts in the left sidebar)
      - Select >> *eol.uca.edu* IMAP >> *Account Information* tab >> modify the *Description* and *Full Name* lines (see below)
      - *Description* >> WMO Dropsondes
      - *Full Name* >> WMO Dropsondes
      - *Mailbox Behaviors* tab >> Select >> *Never* >> so that messages in Sent, Junk, and Trash are never deleted
      - Select another tab at the top of the Accounts window (e.g. *General)* to prompt Mac Mail to save changes
      - WMO Dropsondes should now appear under >> Mac Mail >> Preferences >> Accounts
      - Click on the WMO Dropsonde account and make sure that the *Enable this account* box is checked while you are processing dropsondes (this account can be turned off when not in use)
      - When sending a WMO message to the NWS Gateway >> from the Aspen tab (WMO message should be displayed here) >> select >> *Email*
      - Mac Mail should generate an email addressed to: nws.rthkwbc.ops@noaa.gov >> this is the address that was set up in Step 5c of the Aspen setup section
      - The subject line will automatically be filled in with: *ASPEN generated WMO message* >> replace this with: *EDIS Message Input NPN738063*
      - Include a CC to: sonde-gts@eol.ucar.edu in each WMO email that is sent off
      - Make sure that no other text except for the WMO message appears in the email window (e.g. no signature lines, etc.)
      - Note: this Mac Mail account can be turned on and off >> Preferences >> Accounts >> Account Information >> Select/De-Select *Enable this account*

   b) Method 2: Use Google Mail
      - Sign into Google Mail >> login: ncarsoundings@gmail.com; password: *contact Jason D.*

- Emails are sent from: sonde-gts@eol.ucar.edu
- Emails are sent to: nws.rthkwbc.ops@noaa.gov
- Add a CC to: sonde-gts@eol.ucar.edu
- Subject line: *EDIS Message Input NPN738063*
- Copy the text from the WMO text file and paste it directly into the email message
- Make sure that no other text except for the WMO message appears in the email window (e.g. no signature lines, etc.)

3. **FTPing Processed GPS dropsonde data to ESRL (ESRL then uploads the data to NASA's MTS)**
   a) For each dropsonde, send this ASPEN output to ESRL: .eol, .frd, .bfr, skew-t, and WMO
   b) ftp ftp1.esrl.noaa.gov >> username: *psdguest*; password: *contact Jason D.*
   c) cd psd2/gh_dropsonde
   d) Note: this should be done after each dropsonde is processed to make sure the data are getting out to the science team quickly (especially important for MTS use by mission science)
   e) Note: Useful programs for FTPing quickly during a long mission: Fetch, Transmit, & FileZilla

4. **End of Shift Tasks**
   a) Generate synoptic charts for all mandatory levels
      - Aspen >> Select the globe icon (synoptic charts) >> select *Plot All* >> select *Zoom* to desired size for viewing >> select *Pan* to center the plotted wind barbs
      - File >> Save All Synoptic Levels >> browse to output directory >> Aspen creates separate .png images for each mandatory level
      - create a directory called YYYYMMDDgh_"*your last name*"
      - create 7 subdirectories called "*dfiles*", "*eol*", "*frd*", "*bfr*", "*skewt*", "*wmo*", and "*synoptic*"
      - include your *soundings.sqlite* file in the "*synoptic*" directory
      - If this is NOT the last shift >> email your *soundings.sqlite file* to the next dropsonde processor scheduled to relieve you
      - If this IS the last shift >> download the flight log spreadsheet from the Google drive and save it in the folder YYYYMMDDgh_"*your last name*"
   b) Compress/zip the folder YYYYMMDDgh_"*your last name*" and email it to: jason.dunion@noaa.gov