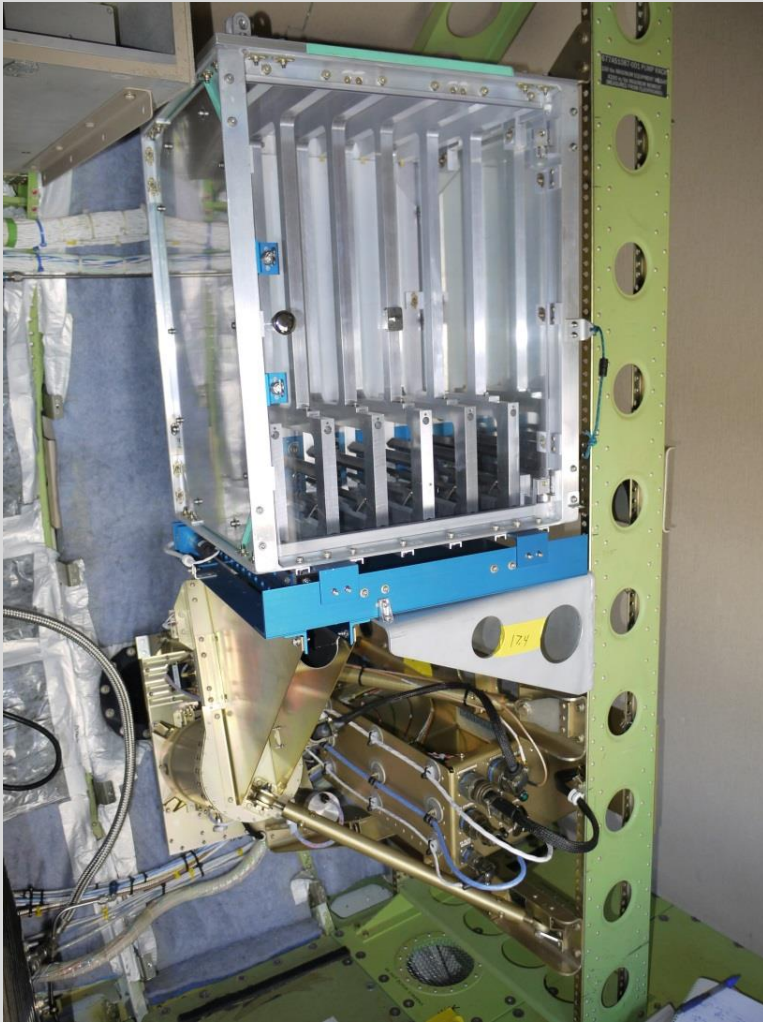
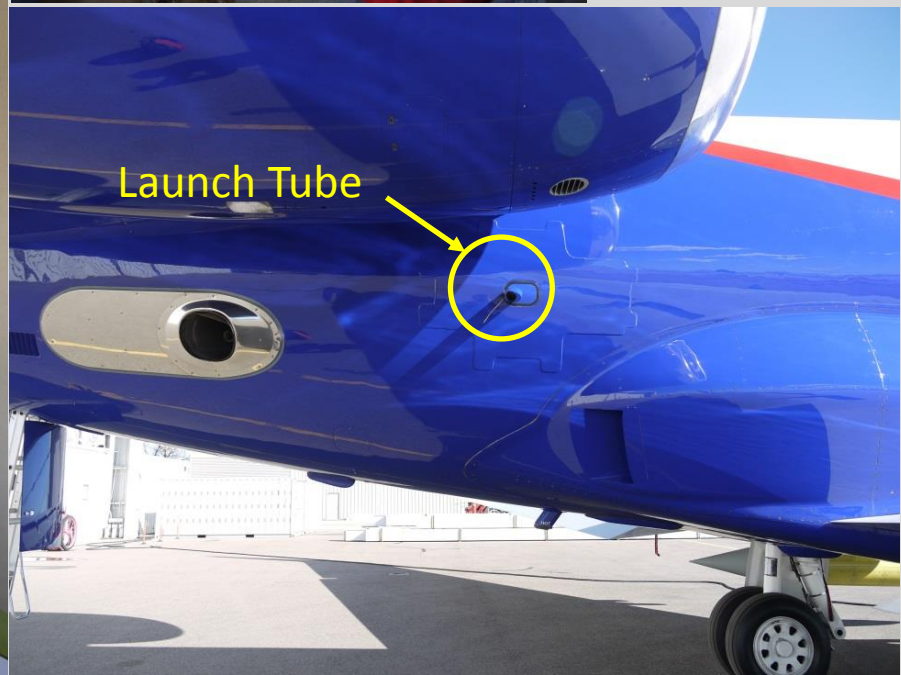


NCAR/NSF G-V Automated Dropsonde System

Automated Dropsonde Launcher
Storage 50 Dropsondes



Aircraft Data System
Track up to
8 Dropsondes
simultaneously



NCAR GPS Dropsonde

Research quality measurements

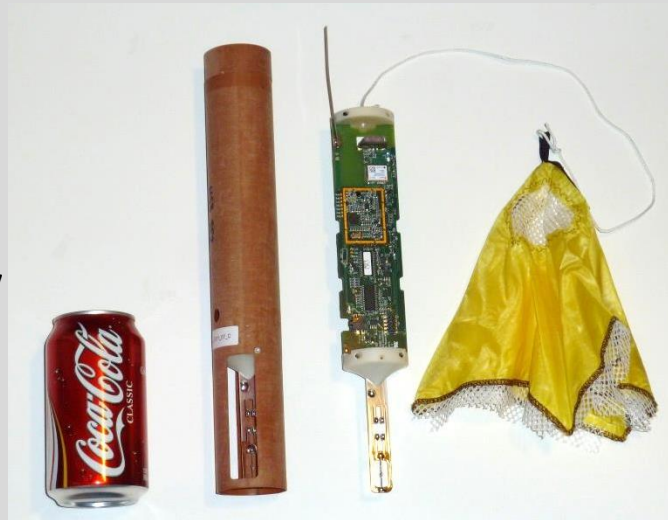
Pressure – Temperature – Humidity

Winds speed/direction

High vertical resolution

8 Multiple sondes in air simultaneously

Long telemetry range 300+ Km

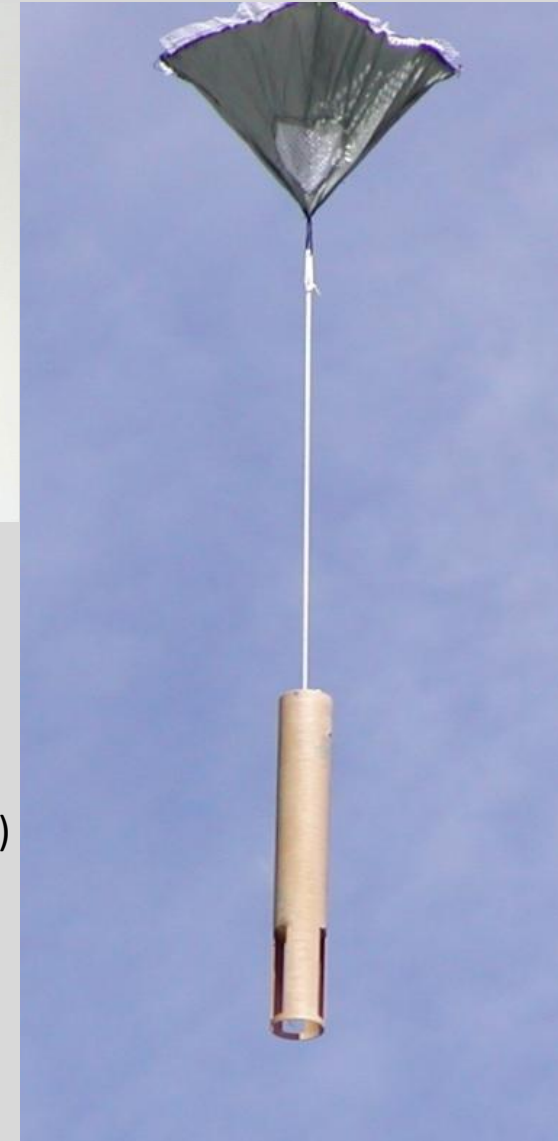


Performance Specs

- Fall speed ~11 m/s at sea surface
- Fall Time: ~15 Min from 45K ft.
- **PTU Sensors Measurement rate every 0.5sec**
 - Vertical resolution : ~ 6 meters @ surface
 - Pressure
 - 0.1 mb resolution
 - 0.5 mb repeatability
 - 100mb to 1050 mb range
 - Temperature
 - 0.1° resolution
 - 0.2° repeatability
 - -80 ° to +40 ° range
 - Humidity
 - 1% resolution
 - 2% repeatability
 - 0 to 100% range
- **Winds Measurement rate every 0.25 sec**
 - Horizontal Winds 0.1 m/s resolution
 - Vertical resolution : ~ 3 meters @ surface

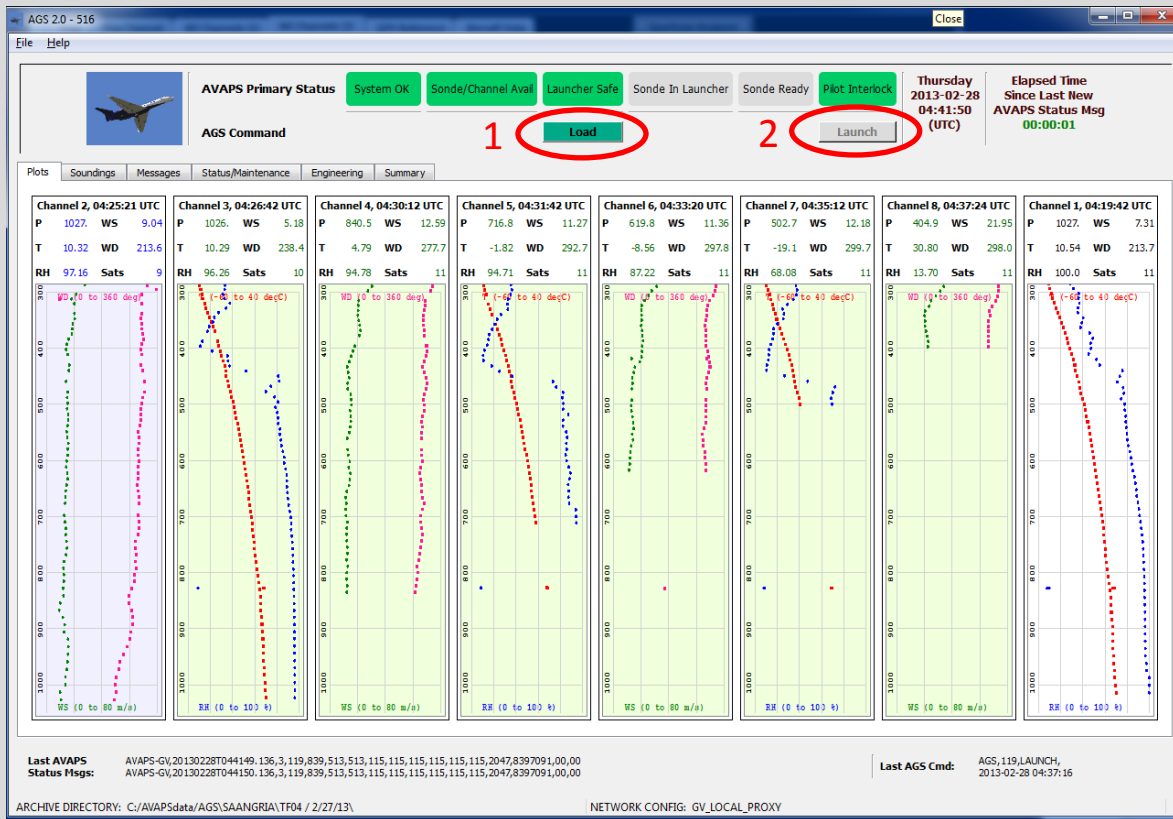
Dropsonde Size:

- Mass: 165 grams (< 6 oz)
- Length: 30.5 cm
- Diameter: 4.7 cm



AVAPS Aircraft Real Data Display and Operator Interface

AVAPS Ground Software (AGS)



2 Button Sounding Interface For Automatic Launcher

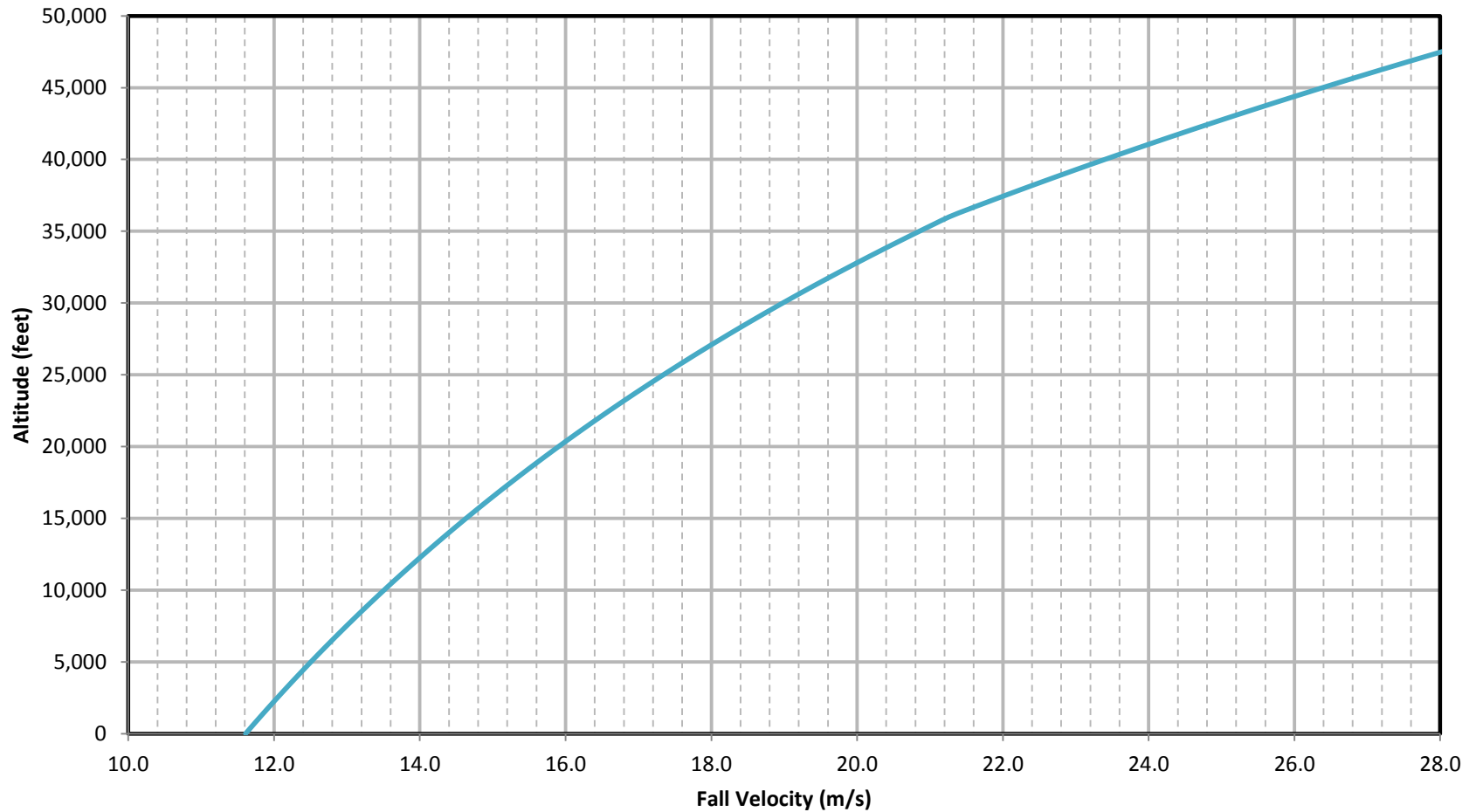
- 1) Load sonde
- 2) Launch sonde



- AGS displays real-time either thermodynamic or wind plots for each of the 8 channels
- Engineering status monitor of automatic launcher

Dropsonde Descent Velocity

Descent Velocity vs Altitude



Typical Dropsonde Profiles

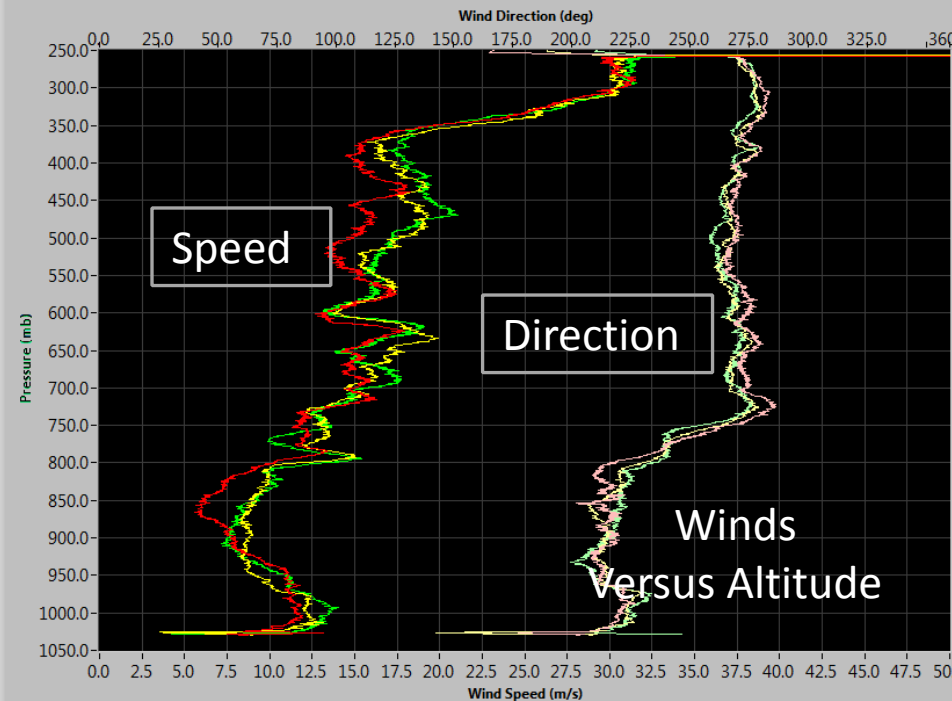
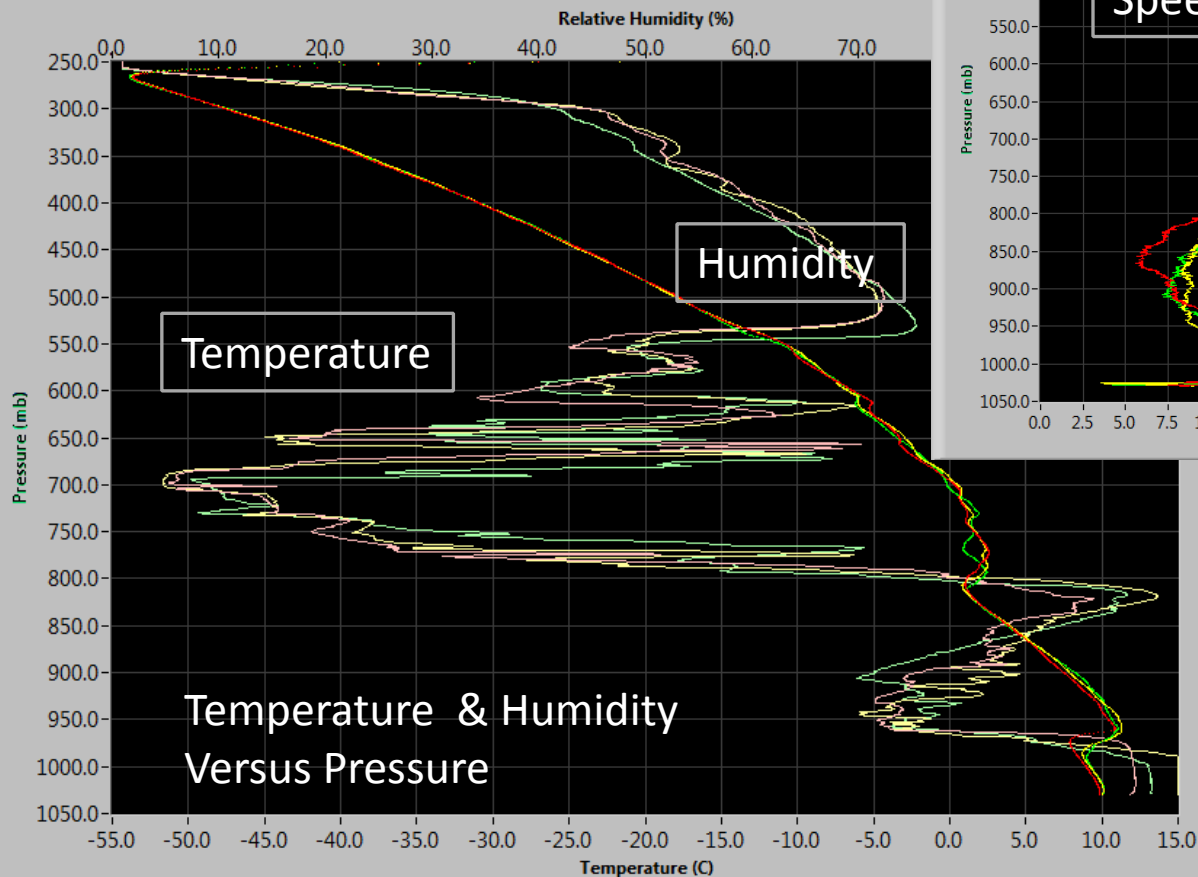
(Three rapid drops)

PRE-SAANGRIA Flights

3/1/2013

Pacifica Ocean off the coast of Oregon

<3 minutes between Drops



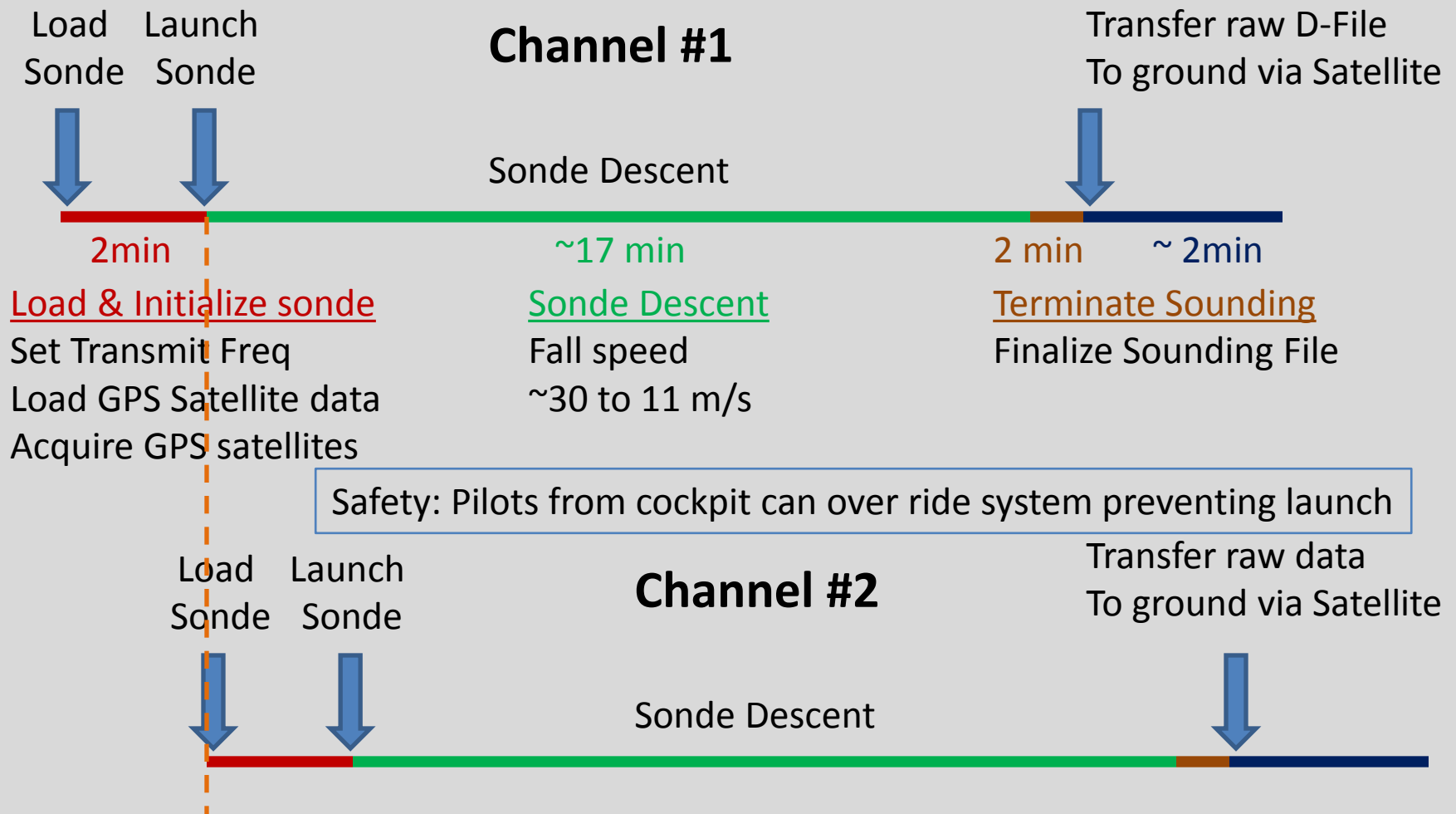
Sensor stabilization to
Atmosphere at launch

Temperature: 30 sec (~780 m)

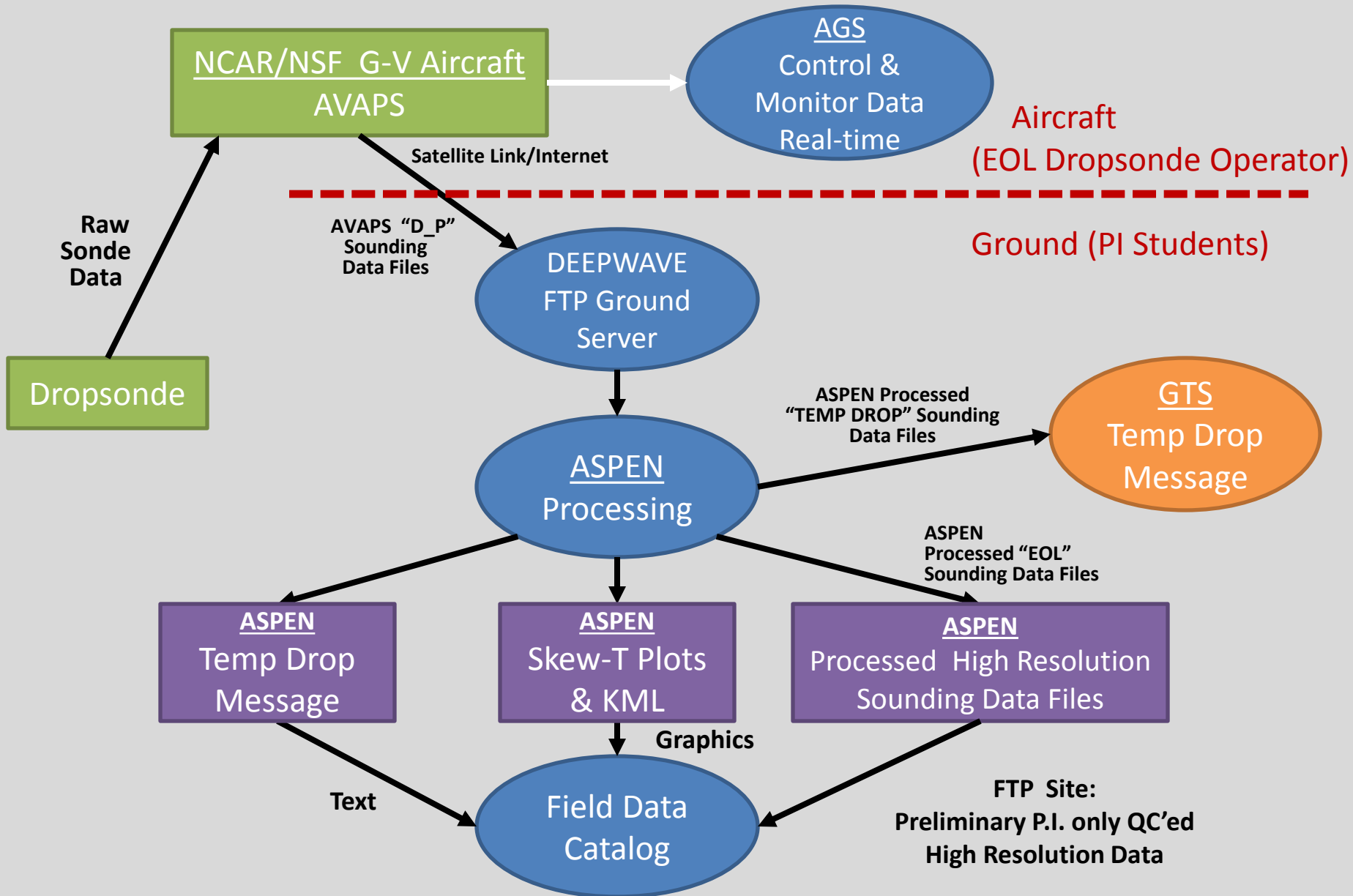
RH: 45 sec (~1170 m)

Winds: 10 sec (~260 m)

Drop Sequence Time Line on board the G-V



DEEPWAVE – Dropsonde Data Flow



ASPEN- Tabular QC'ed Data

Aspen 3.1 - 7506

D20110304_084959_recomp4_P.1

Main Raw **QC** XY Graph Skew-T Levels WMO Comm Summary

D20110304_084959_recomp4_P.1 102015193 GH - WISPAR, GH - Science Flight 2 Global Hawk, NASA B72 (AV-6)

Time (s)	Pres (mb)	Tdry (C)	RH (%)	Spd (m/s)	Dir (deg)	Alt (m)	Dz/dt (m/s)	Lat (deg)	Lon (deg)
117.00	140.2	-44.2	1.0	9.6	291.5	13698.8	-27.1	51.6733	-145.2537
117.25				9.7	291.3				
117.50	140.5	-44.2	1.0	9.8	291.0	13685.3	-27.1	51.6733	-145.2536
117.75				9.9	290.8				
118.00	140.8	-44.1	1.0	10.0	290.5	13671.8	-27.0	51.6733	-145.2535
118.25				10.1	290.3				
118.50	141.1	-44.1	1.0	10.2	290.0	13658.3	-26.9	51.6733	-145.2535
118.75									
119.00	141.3	-44.1	1.0	10.4	289.5	13644.8	-26.9	51.6733	-145.2534
119.25				10.5	289.3				
119.50	141.6	-44.0	1.0	10.6	289.1	13631.4	-26.8	51.6733	-145.2534
119.75				10.6	288.8				
120.00	141.9	-44.0	1.0	10.7	288.6	13618.0	-26.8	51.6733	-145.2533
120.25				10.8	288.3				
120.50				10.9	288.1			51.6732	-145.2532
120.75				11.0	287.9				
121.00	142.5	-44.0	1.0	11.1	287.7	13591.2	-26.7	51.6732	-145.2532
121.25				11.1	287.4				
121.50	142.8	-43.9	1.0	11.2	287.2	13577.9	-26.7	51.6732	-145.2531
121.75				11.3	287.0				
122.00	143.0	-43.9	1.0	11.3	286.8	13564.6	-26.7	51.6732	-145.2530
122.25				11.3	286.6				
122.50	143.3	-43.9	1.0	11.4	286.3	13551.2	-26.7	51.6732	-145.2529
122.75				11.4	286.1				
123.00	143.6	-43.9	1.0	11.4	285.7	13537.9	-26.7	51.6732	-145.2529
123.25				11.4	285.4				
123.50	143.9	-43.9	1.0	11.4	285.0	13524.5	-26.7	51.6732	-145.2528
123.75				11.4	284.6				
124.00	144.2	-43.9	1.0	11.3	284.1	13511.2	-26.7	51.6731	-145.2527
124.25				11.3	283.7				
124.50	144.5	-44.0	1.0	11.2	283.2	13497.9	-26.7	51.6731	-145.2526
124.75				11.2	282.7				
125.00	144.8	-44.0	1.0	11.1	282.1	13484.6	-26.7	51.6731	-145.2526
125.25				11.1	281.6				
125.50	145.0	-44.0	1.0	11.0	281.1	13471.3	-26.8	51.6731	-145.2525
125.75									
126.00	145.3	-44.0	1.0	10.9	280.1	13457.9	-26.8	51.6731	-145.2524
126.25				10.8	279.6				
126.50	145.6	-44.0	1.0	10.8	279.2	13444.4	-26.8	51.6731	-145.2523
126.75				10.7	278.8				

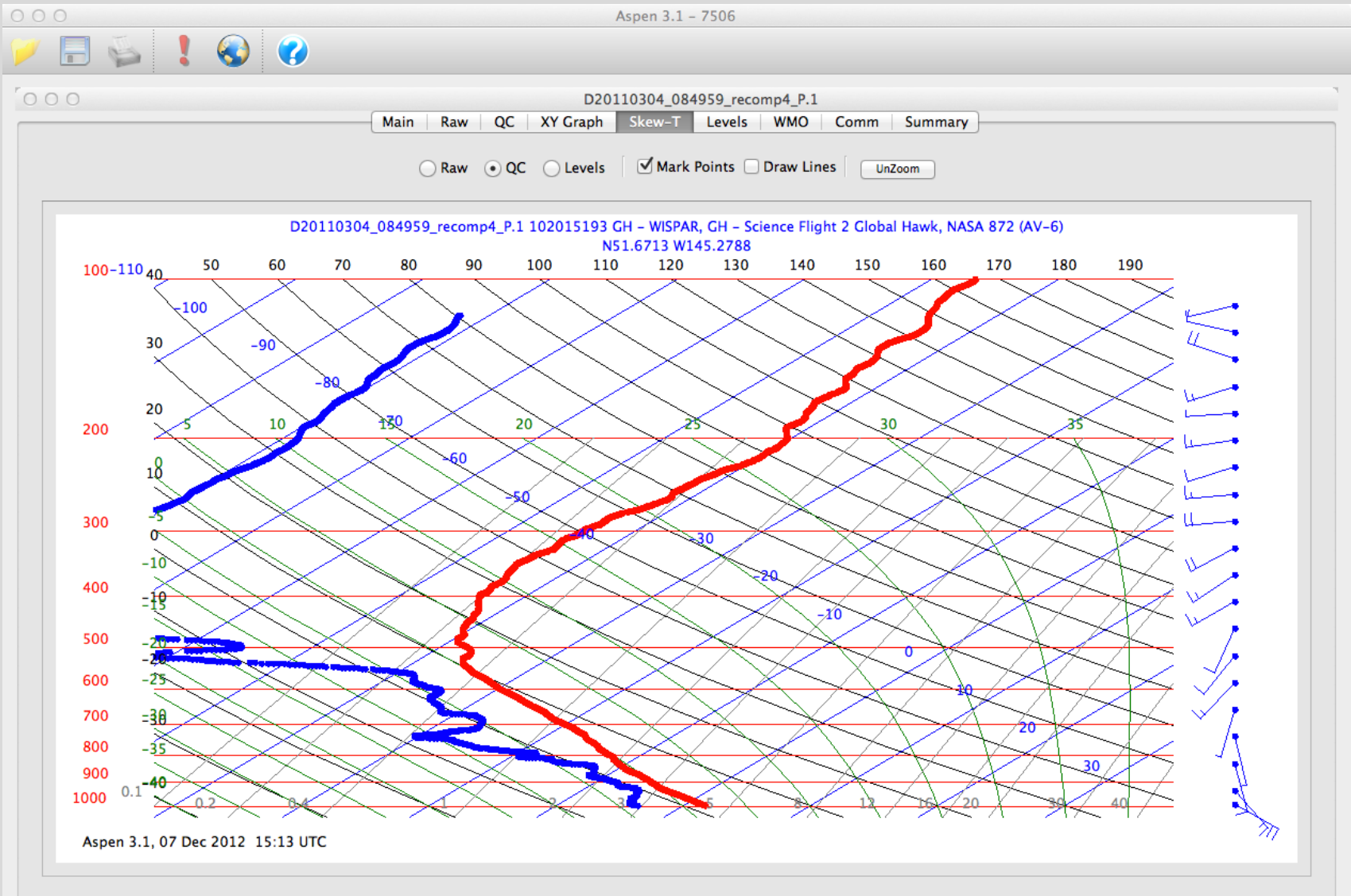
Ready

ACTIVE CONFIG: editsonde CONFIG DIR: /Users/martinc/.config/Aspen/ 

for Atmospheric Research

Aspen-3

ASPEN – Skew-T Plot



ASPEN – Temp Drop Significant and Mandatory Levels

Aspen 3.1 – 7506

D20110304_084959_recomp4_P.1

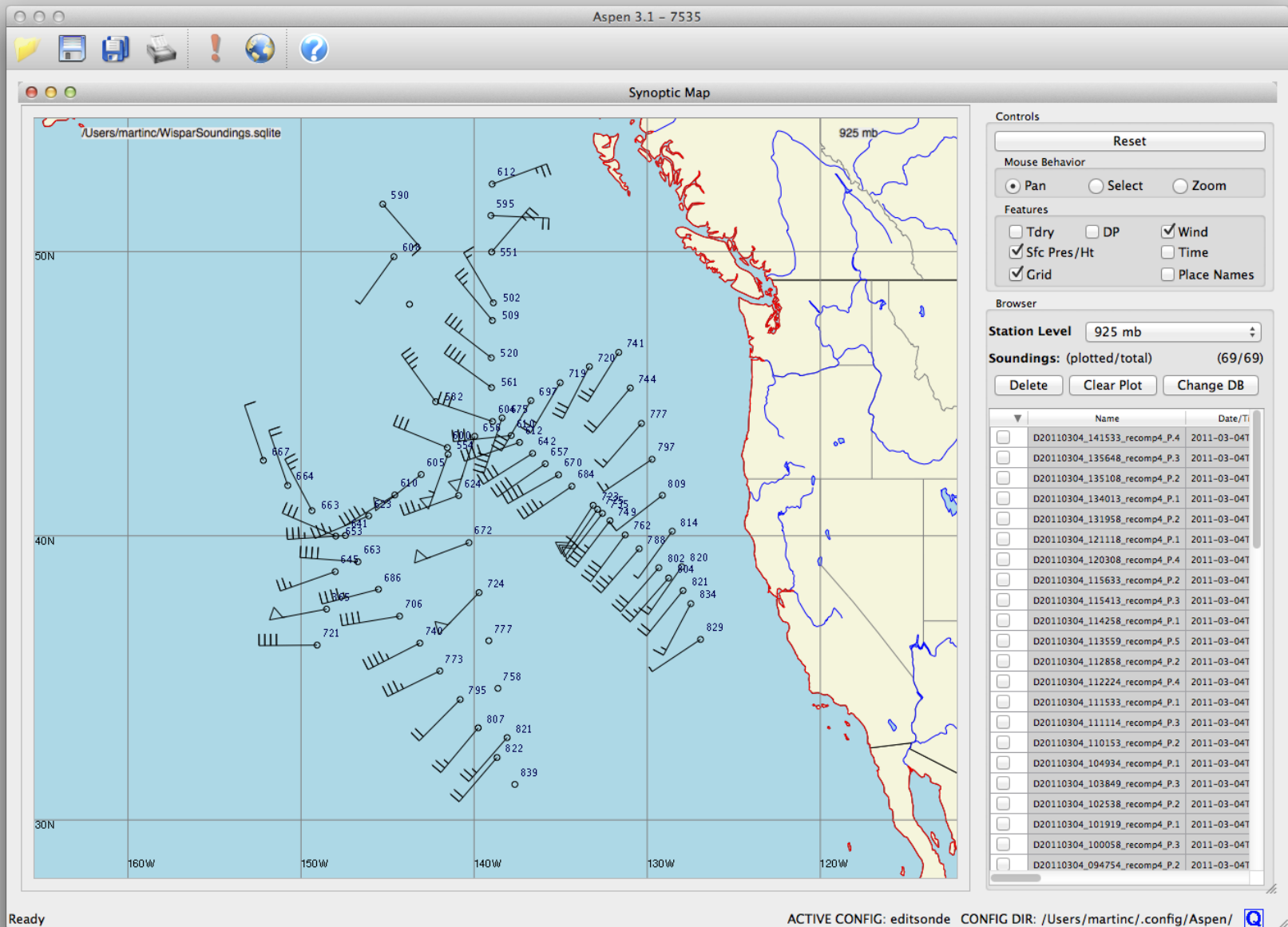
Main Raw QC XY Graph Skew-T Levels WMO Comm Summary

D20110304_084959_recomp4_P.1 102015193 GH – WISPAR, GH – Science Flight 2 Global Hawk, NASA 872 (AV-6)

Click on a level to disable/enable it. Disabled Levels are highlighted in red.

n ▲	Type	Time (s)	Pres (mb)	Tdry (C)	RH (%)	Dir (deg)	Spd (m/s)	Alt (m)
0	Extrapolated Altitude	-1.0	70.0					18266
1	62626 REL Location	-1.0	82.5					
2	Uppermost Thermodynamic	-1.0	82.5	-53.5				
3	Uppermost Winds	-1.0	82.5			260.2	10.6	
4	GDL Wind Speed	10.0	87.1			271.3	22.1	
5	GDL Wind Speed	19.2	91.1			263.2	4.5	
6	GDL Wind Direction	25.5	93.7			288.7	6.2	
7	GDL Wind Direction	37.8	98.9			286.3	9.3	
8	GDL Temperature	38.5	99.2	-46.6				
9	Standard	40.2	100.0	-46.6		272.7	8.5	15951
10	GDL Wind Direction	44.2	101.9			251.4	7.8	
11	110-100mb Temperature	60.5	109.9	-46.6				
12	110-100mb Winds	60.5	109.9			231.2	7.6	
13	GDL Wind Direction	63.5	111.4			237.3	5.7	
14	GDL Wind Direction	68.2	113.9			278.6	5.3	
15	Uppermost Thermodynamic	74.0	116.8	-45.6	1.0			
16	GDL Wind Direction	75.8	117.7			263.6	5.5	
17	GDL Wind Speed	85.5	122.9			298.7	3.5	
18	GDL Temperature	88.0	124.2	-44.1	1.0			
19	GDL Wind Direction	98.2	129.8			256.5	7.8	
20	GDL Temperature	107.5	134.9	-45.1	1.0			
21	GDL Wind Direction	111.5	137.1			295.5	7.2	

ASPEN Synoptic Map



DEEPWAVE Dropsonde Summary

- 280 Dropsondes
- Estimated ~20 dropsonde releases per flight
 - 3 extra sondes will be prepped and loaded for each flight
 - RH sensors protected from contamination, burn process prior to each flight
- AVAPS system is capable of Dropsonde releases every 120 seconds
- 2 ISF field support staff for duration of project (Tech & Eng)
 - Support back-to-back flights
- 1 (minimum) ISF staff on board G-V for drop operations
- Completed MPEX project (2013) 426 drops
 - 1 jammed sonde in launcher, ~8% fast falls (reduced vertical resolution)
- Data Quality Control Post processing will occur in 6 months or less after completion of project by ISF scientists