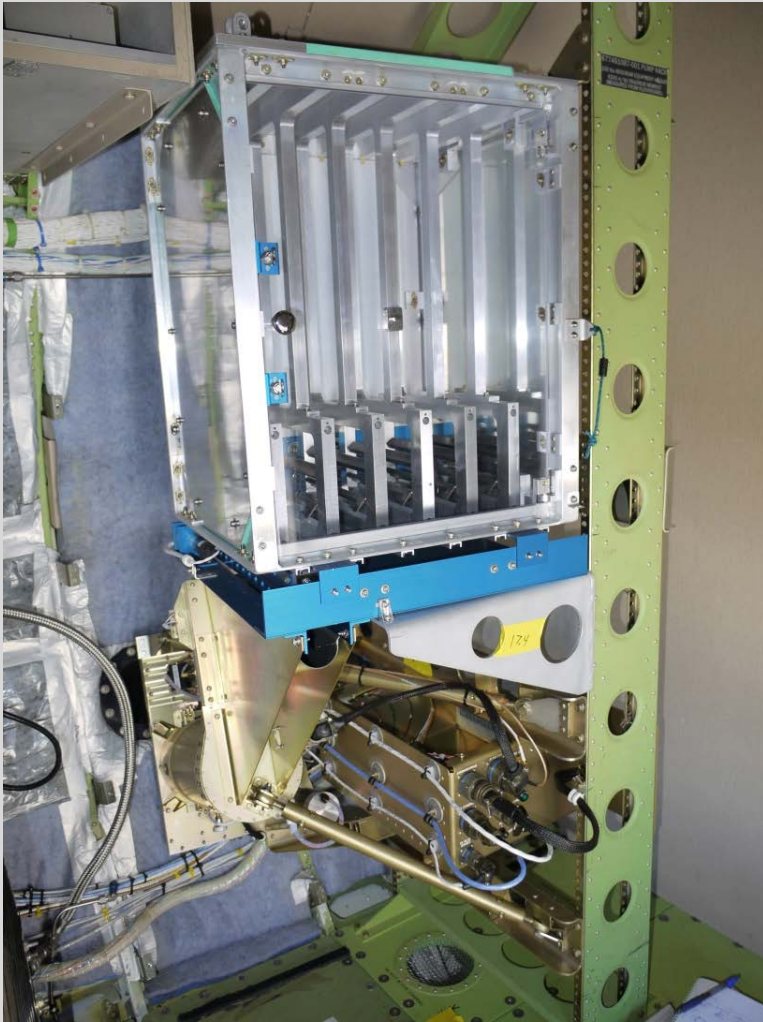


# NCAR/NSF G-V Automated Dropsonde System

Automated Dropsonde Launcher  
Storage 50 Dropsondes



Aircraft Data System  
Track up to  
8 Dropsondes  
simultaneously



# NCAR GPS Dropsonde

## Research quality measurements

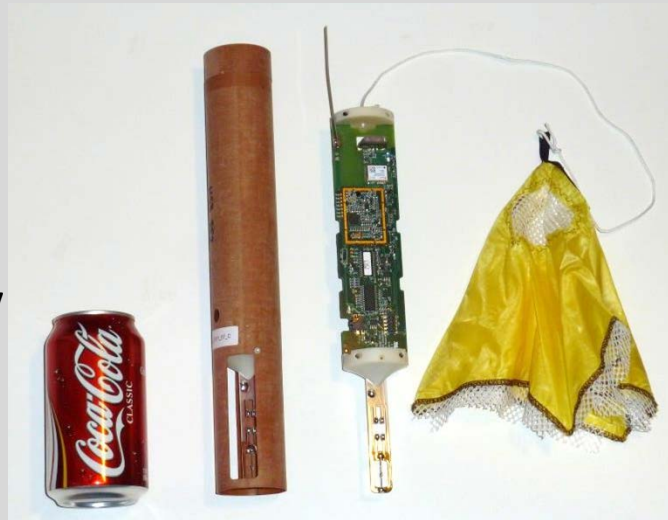
Pressure – Temperature – Humidity

Winds speed/direction

High vertical resolution

8 Multiple sondes in air simultaneously

Long telemetry range 300+ Km

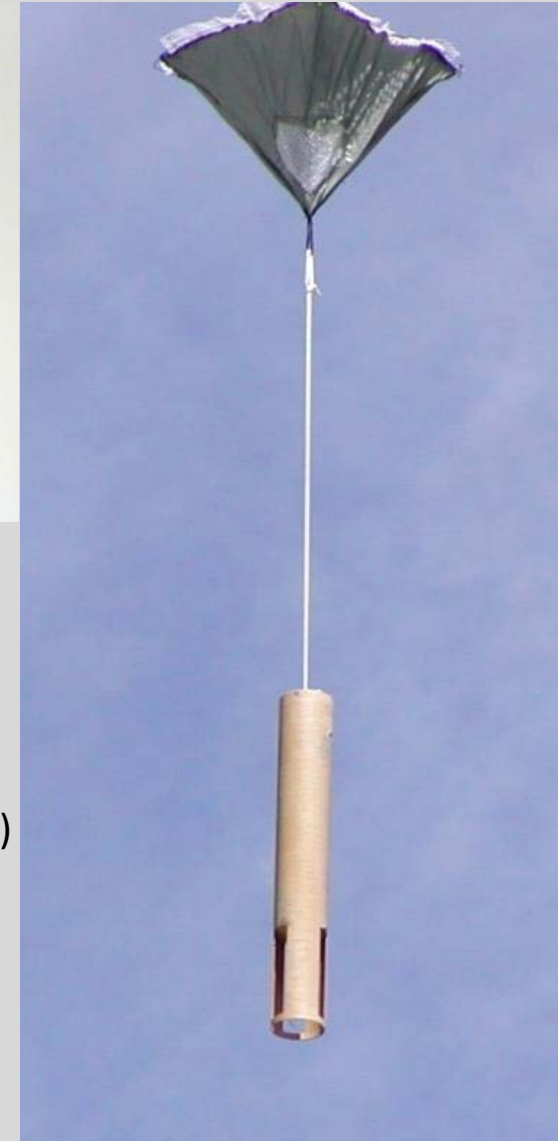


## Performance Specs

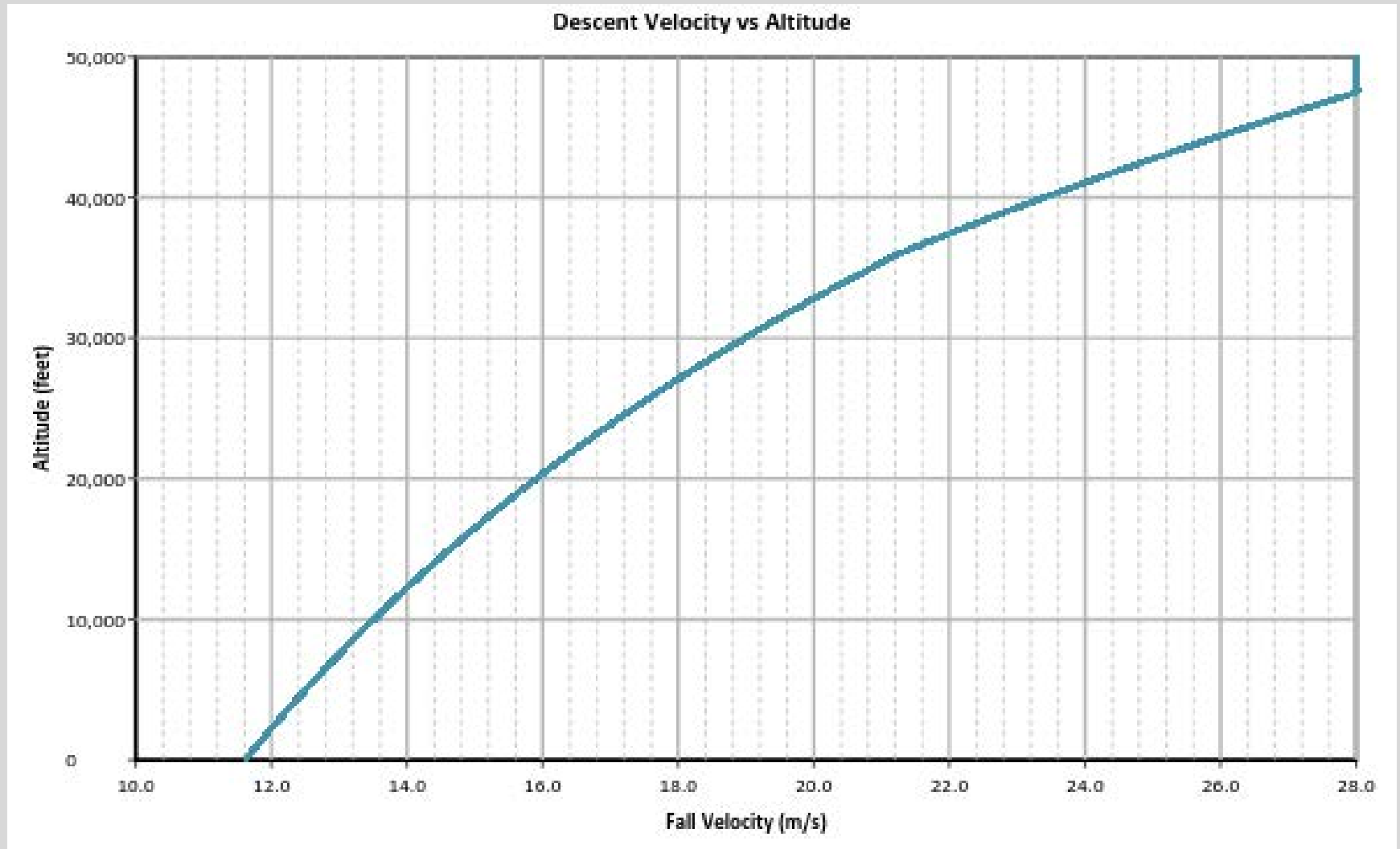
- Fall speed ~11 m/s at sea surface
- Fall Time: ~15 Min from 45K ft.
- **PTU Sensors Measurement rate every 0.5sec**
  - Vertical resolution : ~ 6 meters @ surface
  - Pressure
    - 0.1 mb resolution
    - 100mb to 1050 mb range
  - Temperature
    - 0.1° resolution
    - -80 ° to +40 ° range
  - Humidity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



# Dropsonde Descent Velocity



# Typical Dropsonde Profiles

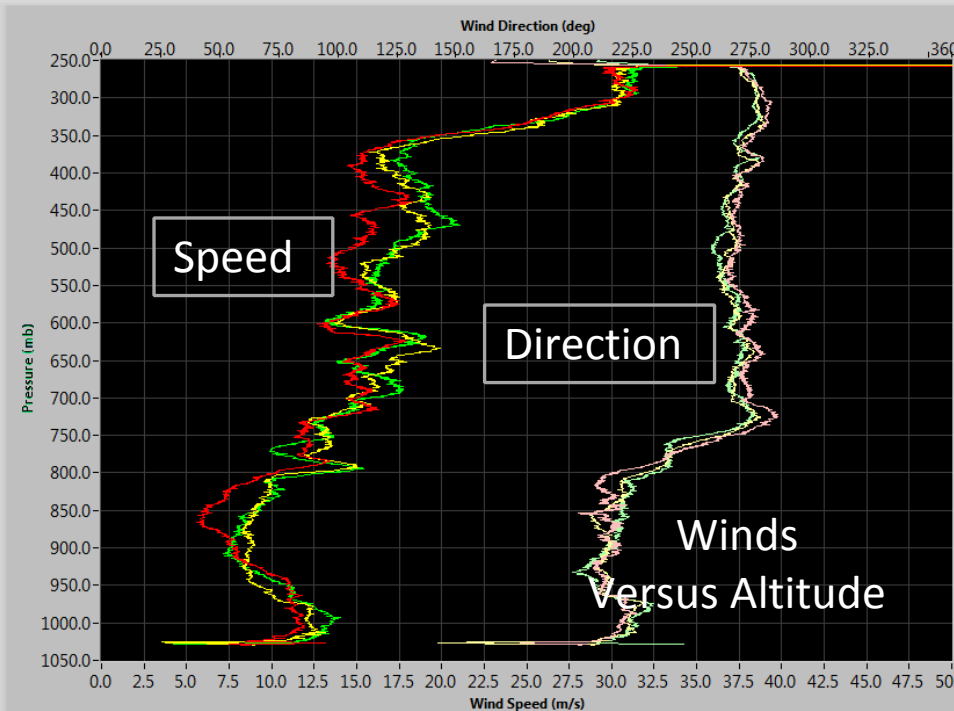
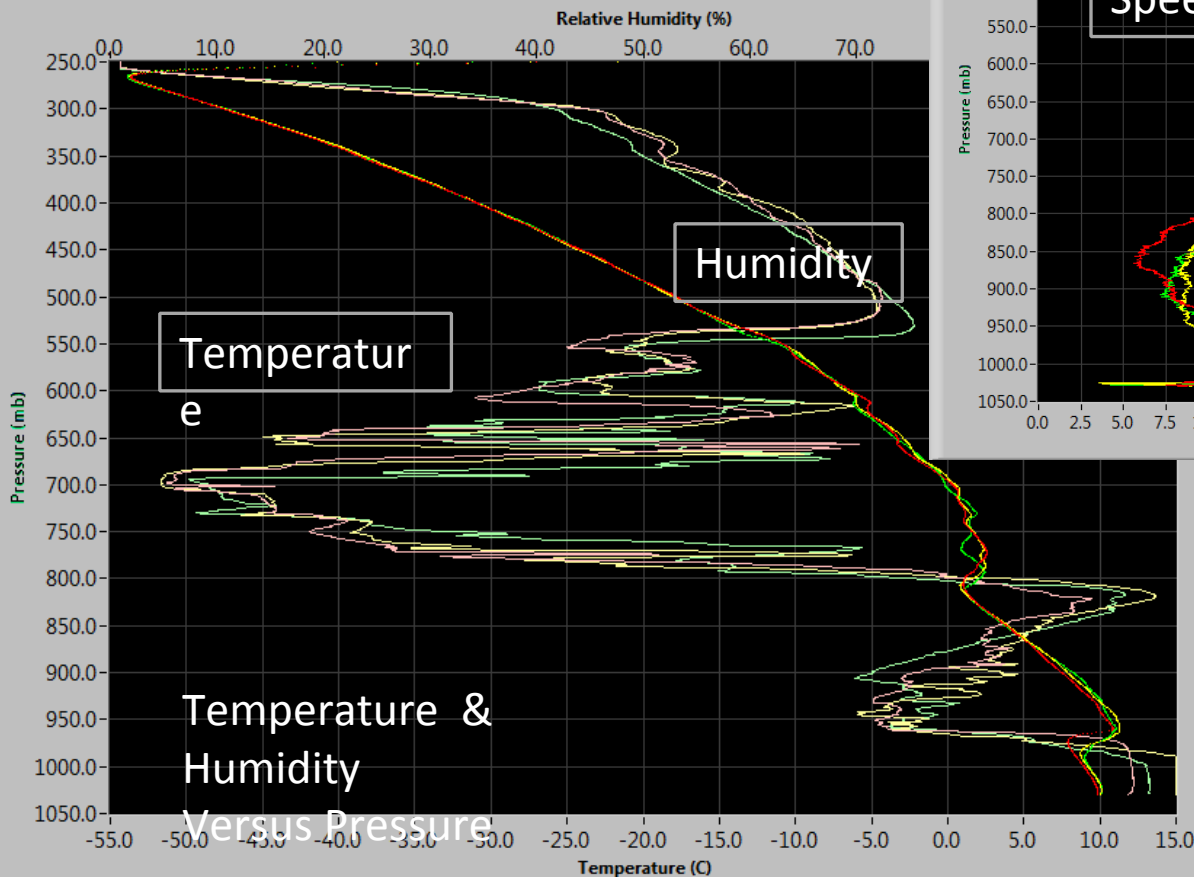
## (Three rapid drops)

### PRE-SAANGRIA Flights

3/1/2013

Pacifica Ocean off the coast of Oregon

<3 minutes between Drops



Sensor stabilization to  
Atmosphere at launch

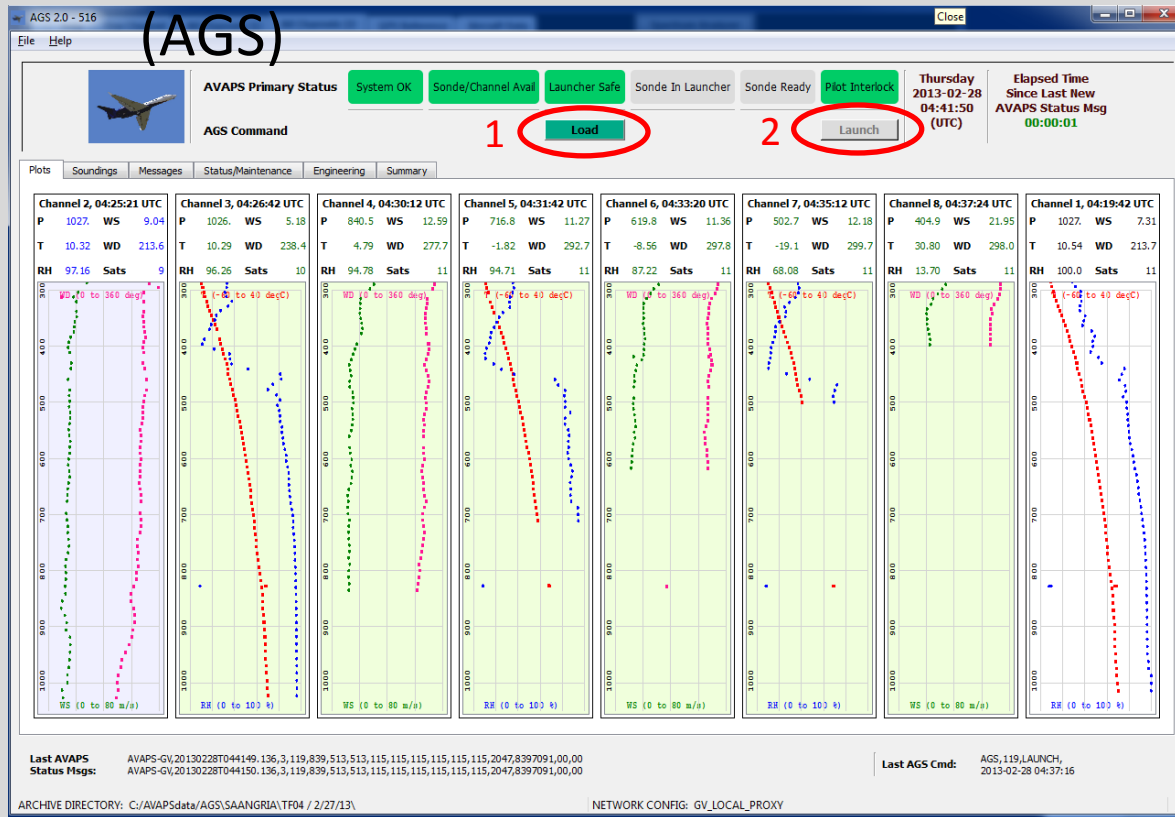
Temperature: 30 sec (~780 m)

RH: 45 sec (~1170 m)

Winds: 10 sec (~260 m)

# AVAPS Aircraft or Ground Real-time Data Display and Operator Interface

## AVAPS Ground Software



## 2 Button Sounding Interface For Automatic Launcher

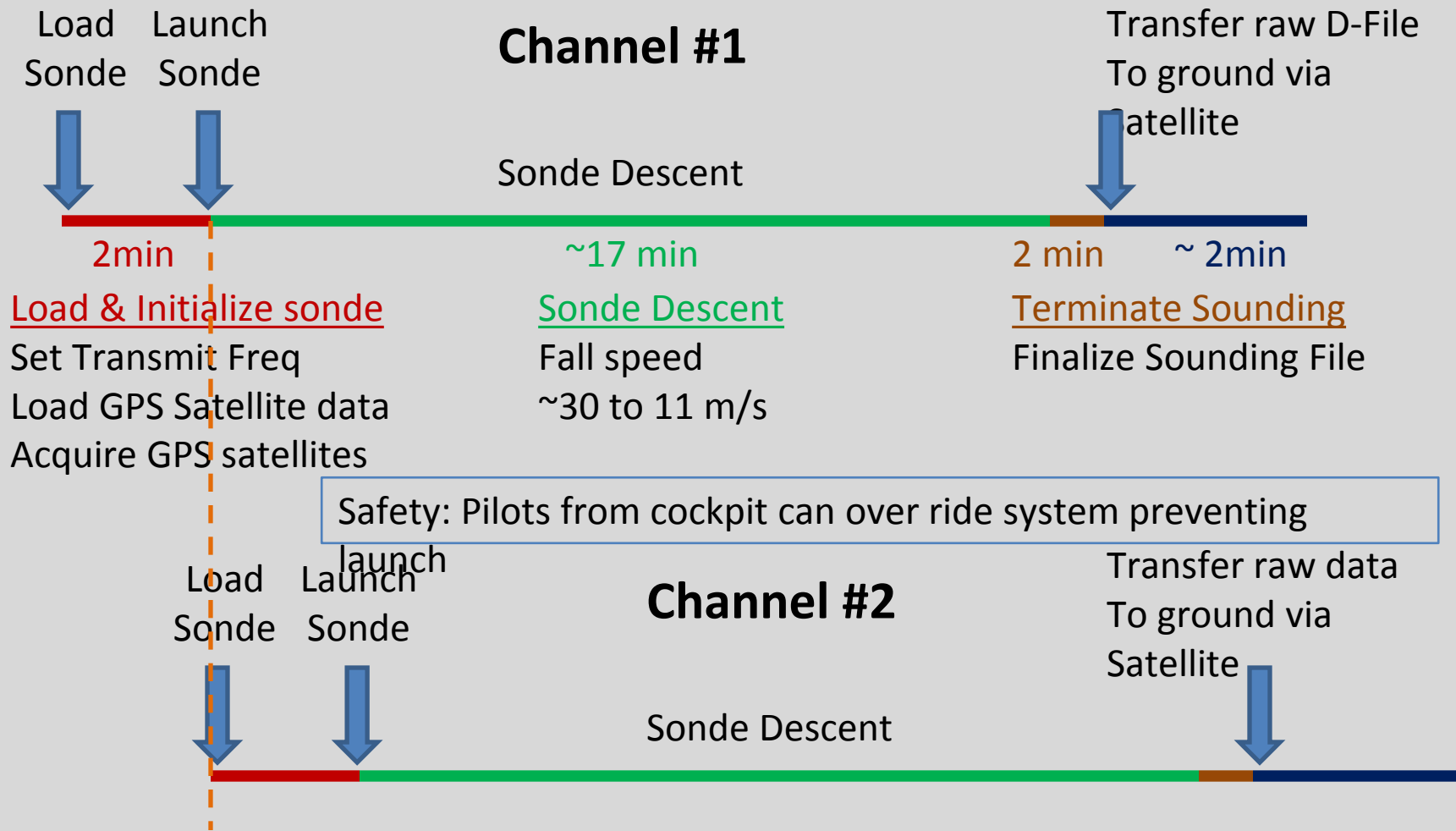
- 1) Load sonde
- 2) Launch sonde



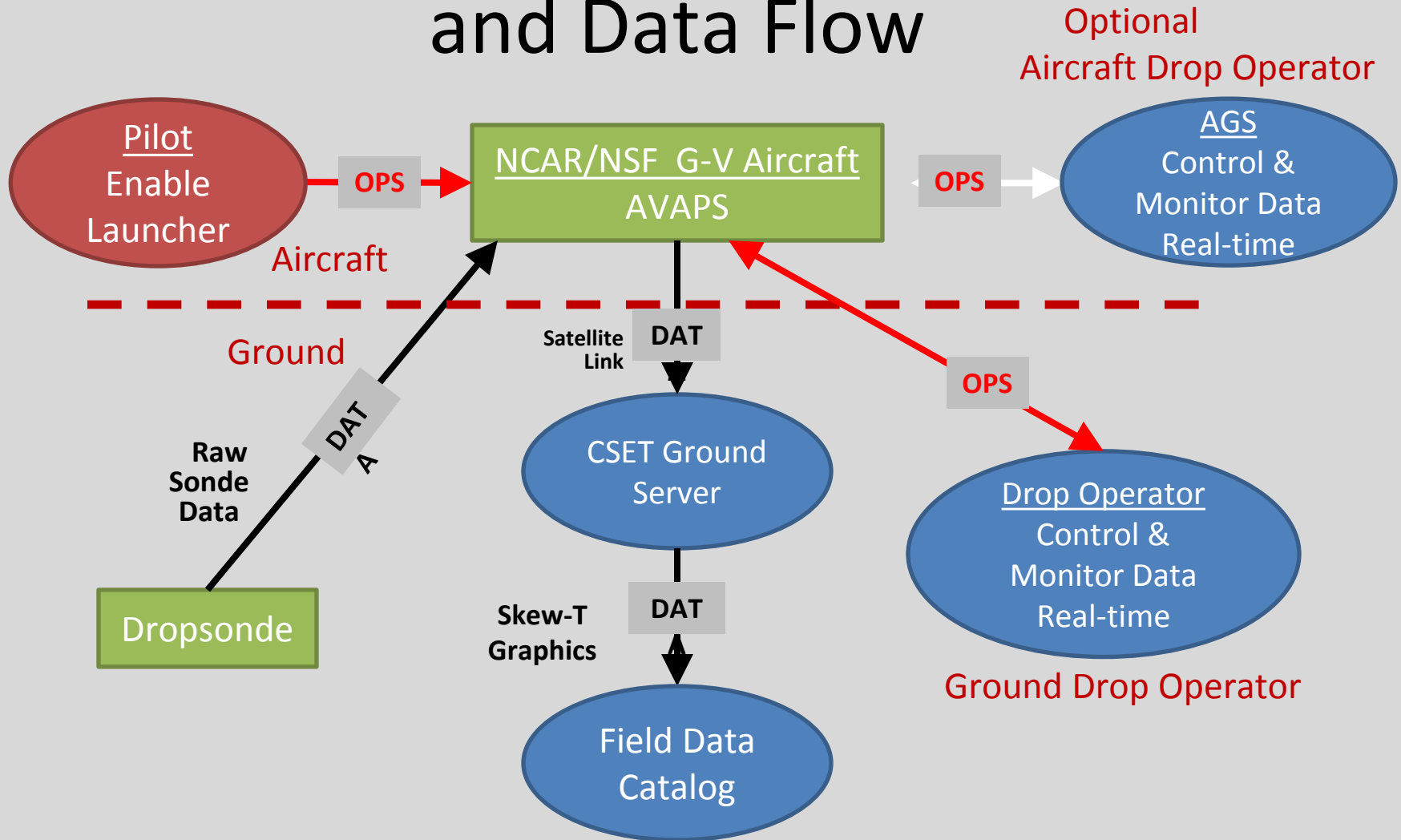
Sonde storage in launcher

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

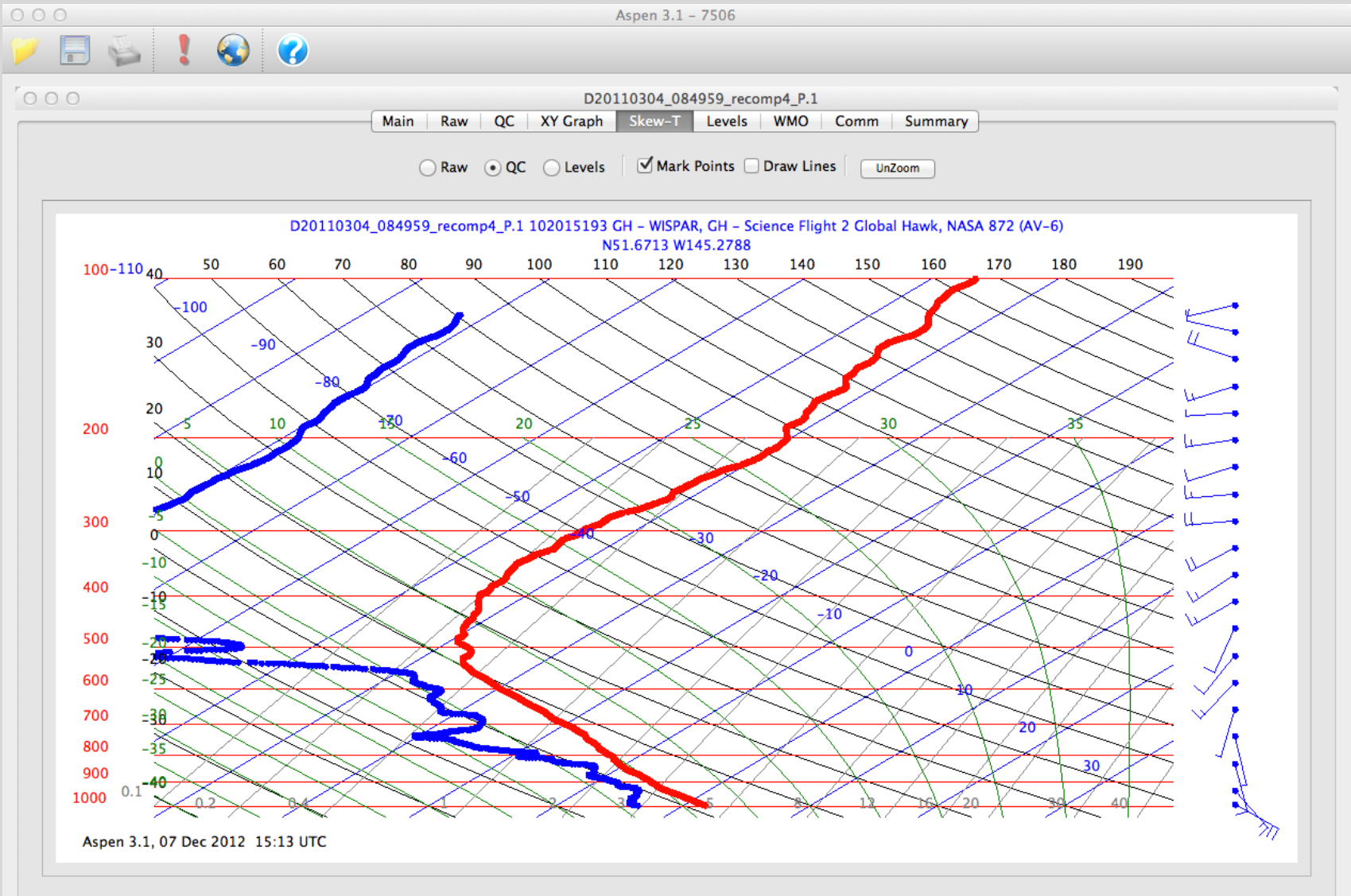
# Drop Sequence Time Line on board the G-V



# CSET– Dropsonde Ops and Data Flow



# ASPEN – Skew-T Plot





# CSET Dropsonde Summary

- 120 Total Dropsondes for field campaign (with spares)
- Estimated ~10 dropsonde releases per flight over water
  - RH sensors protected from contamination, burn process prior to each flight
  - Training to crew or Hawaii staff if sondes are to be loaded in Hawaii
- One ISF field support staff in field for duration of project ( 2 Tech shifts)
  - Prepare and Load Dropsondes
  - Test to insure system is ready prior to flight
  - At completion of flights, remove all unused dropsonde, copy raw data, inspect/test instrument
  - Sonde release and monitoring from ISF Tech on the ground in Sacramento
  - Coordination required for determining of sonde release times during flight
- Completed DEEPWAVE project (2014) 279drops - 98% success rate
- Higher dropsonde risk with no operator on the G-V due to a malfunction
- Satellite Communications must be maintained to release dropsondes remotely
- Data Quality Control Post processing will occur in 6 months or less after completion of project by ISF scientists