



Driftsonde System Overview & Pre-Concordiasi (Seychelles) Flight Results



CONCORDIASI WORKSHOP ***29 – 31 March 2010***

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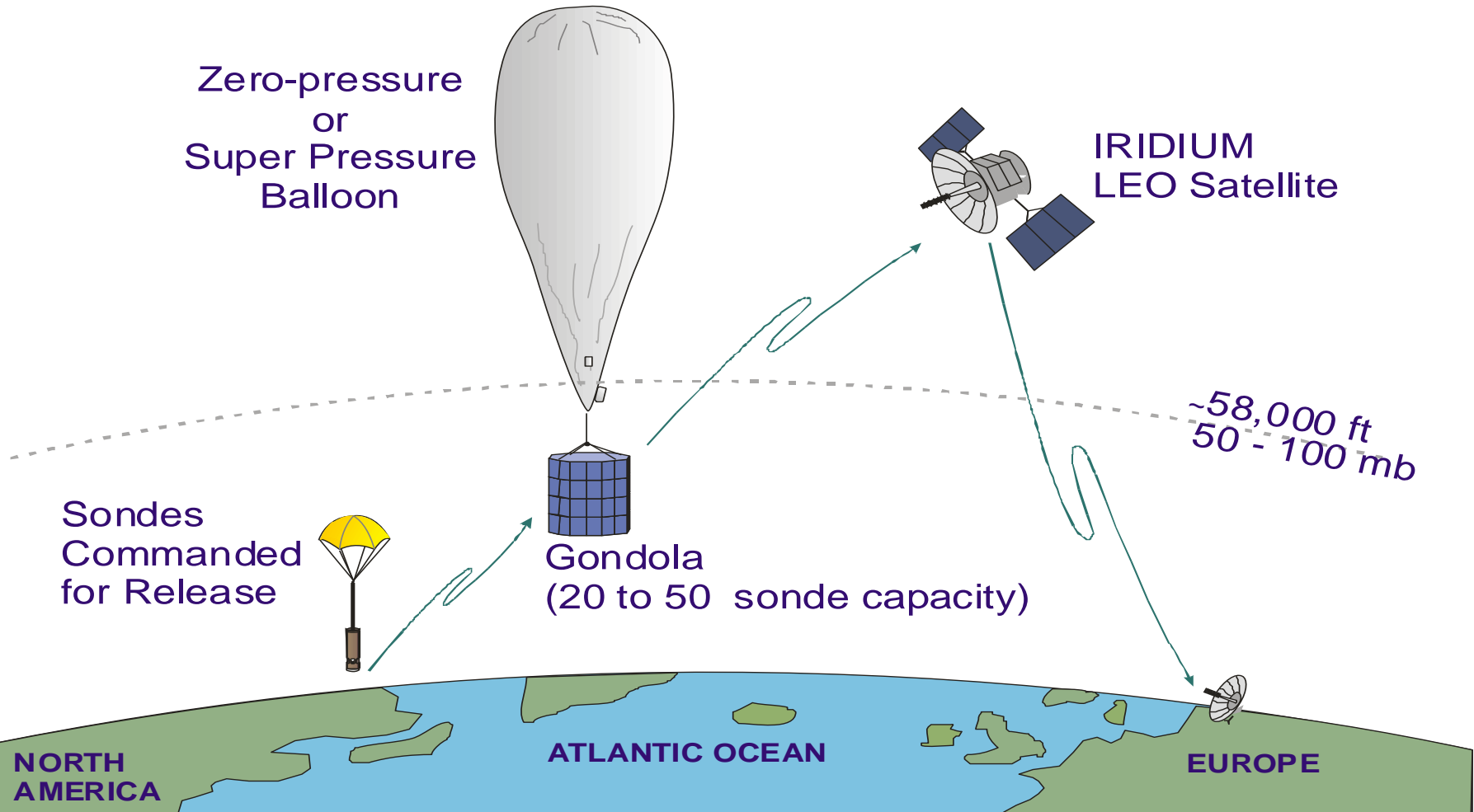
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Driftsonde Scientist Group

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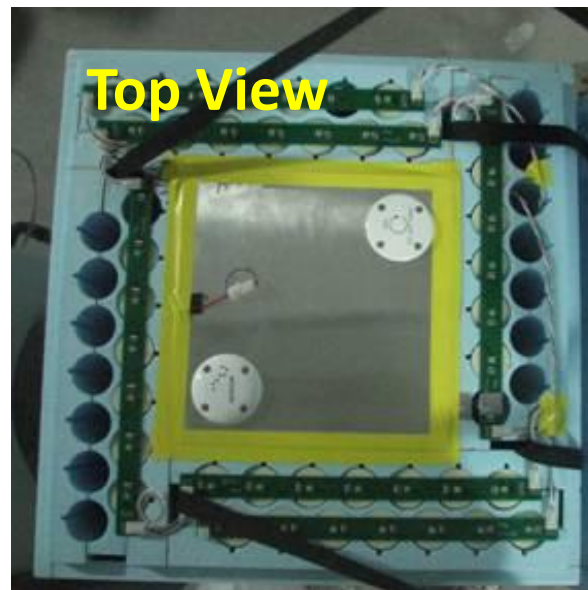
System Concept: Balloon Based Dropsondes System



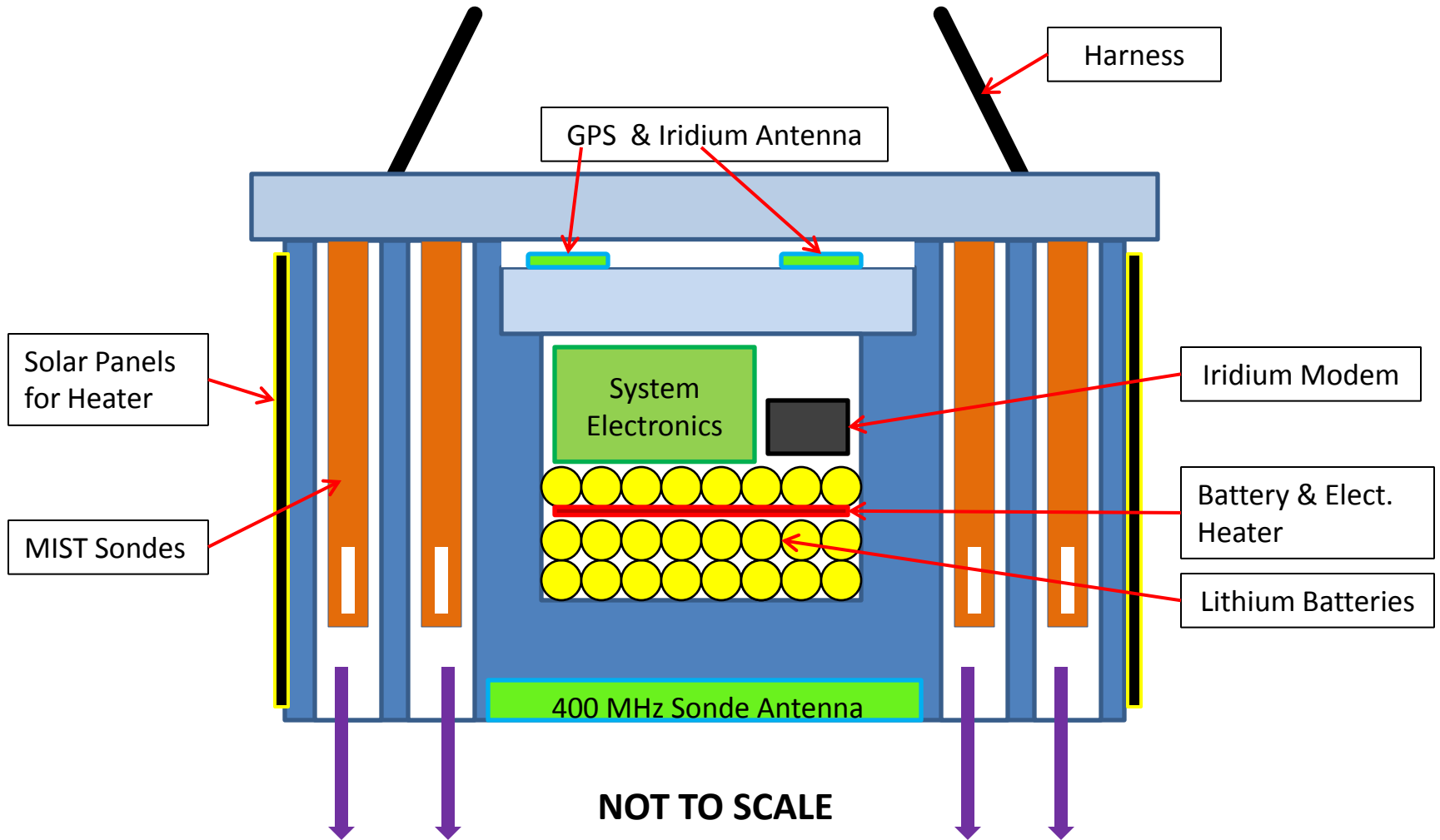
Cost-effective dropsonde observations of wind, temperature, and humidity to fill critical gaps in coverage over oceanic and remote arctic and continental regions over days to weeks.

Driftsonde Gondola

- MIST Sonde Capacity: 54 units
- Mass: ~24kg
- Size: 71 cm x 71 cm x 45 cm
- Power: Lithium SO₂ Batteries
- Solar Panel Heaters for batteries and electronics
- Construction: Blue Core Foam
- Operational Life: ~ 6 weeks
- Automated Radiosonde Sounding System
- Iridium Satellite Communications
- System Health Engineering Monitoring
 - Position & Velocity - GPS Receiver
 - Pressure Sensor
 - Battery voltages
 - Solar Panel voltage
 - Component Temperatures



Gondola Illustration



Miniature In-situ Sounding Technology (MIST Sonde)



MIST Dropsonde

Sensors:

GPS Winds & Altitude via GPS receiver

Vaisala RS-92 PTU Sensors

Temperature

Pressure

Humidity

Sensor measurement rate:

2 Hz PTH data

4 Hz Wind data

Fall time: ~ 17 minutes from 60 mb

Fall Velocity: ~40 m/s @ 60 mb

~10 m/s @ sea surface

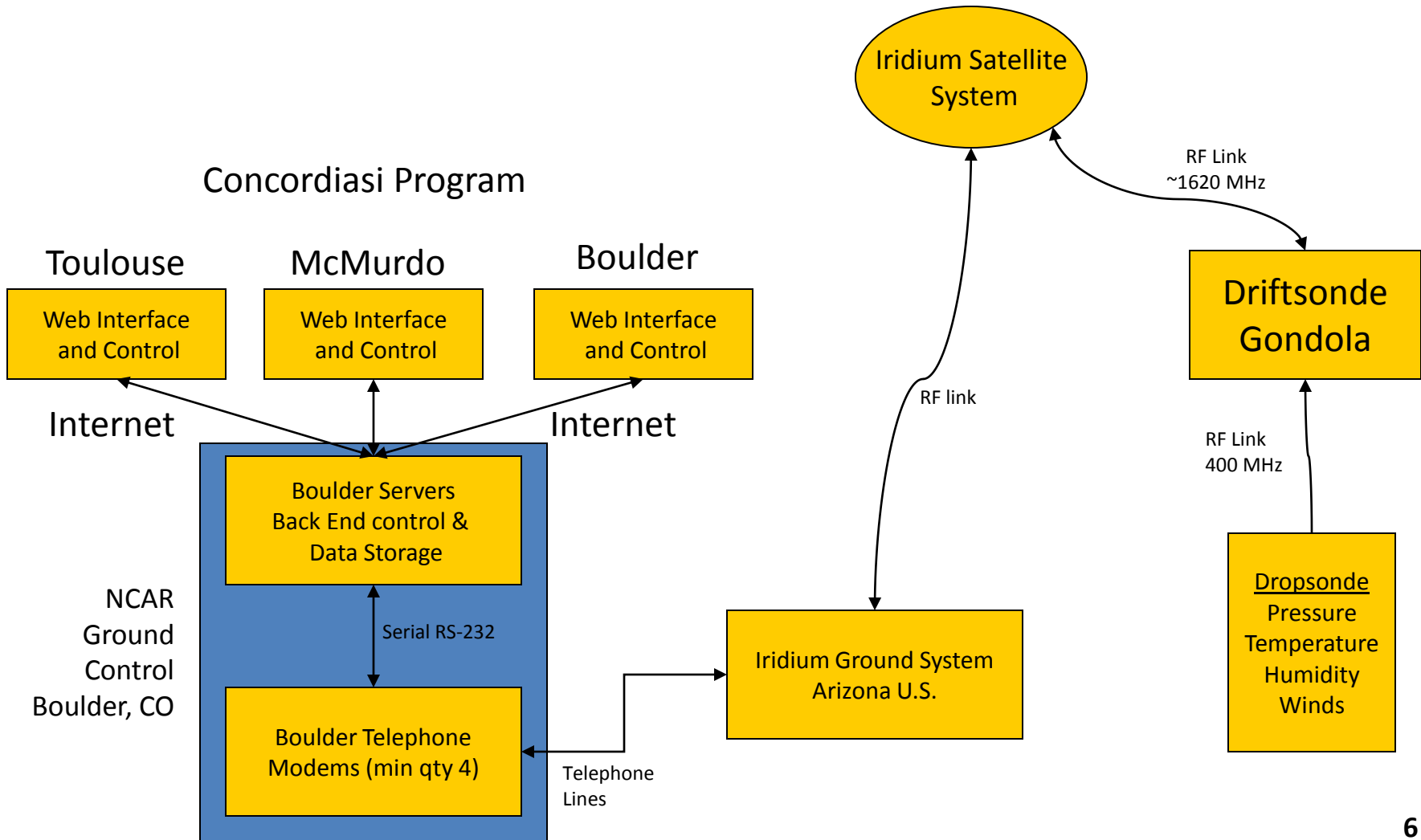
Size: 4.4 cm diameter

30.5 cm length

Mass: 182 grams

System Communications and Data Flow

Concordiasi Program





Driftsonde WEB Interface Control and Data Display



Capabilities

- Schedule Sonde releases
- Set Drop Limits
- Table of sonde release location and drop times
- Sounding data files
- Sondes Available for release
- Log of ALL commands sent to gondola
- Google Earth Maps- Track history
- Iridium communications
- WEB database of all soundings
- Password protected site, with limited to full use privileges

Engineering health of gondola

- System (battery) Voltages
- GPS Position & Velocity
- Flight Pressure
- Temperatures monitoring of all components

NCAR

Earth Observing Laboratory

The National Center for Atmospheric Research

Gondola: Record count limit: Units:

User	Gondola	Current time	Reset time	Lat	Lon	Alt	Latest contact
Terry Hock	T-PARC Driftsonde: TF16d27	12/10/08 08:15:11 UTC		17.399921	152.604684	2,466 m	09/29/08 11:45:54 GMT (2 months)

Sounding control

Gondola	Lat	Lon	Alt	Up for	Gondola local solar time	Sondes avail	Reset in	Sonde status
T-PARC Driftsonde: TF16d27	17.399921	152.604684	2,466 m	2 months	12/10/08 18:25	0	Unknown	Inactive

Current drop limit:

Sondes for T-PARC Driftsonde: TF16d27

Sonde Id	AVAIL	DROPPED	FAILED	Drop Time	Location	Files					Map	Co
						CSV	D-file	ESF	Skew-T	GTS		
04E0AFEA		X		09/23/08 18:04:59	19.2868 -156.142	View Download	View Download	View Upload	View Upload		View Upload	Sounding good. Sent to Edit
04E0B000		X		09/23/08 23:55:21	19.9645 -161.137	View Download	View Download	View Upload	View Upload		View Upload	Sounding good. Sent to Edit
04E1E50A		X		09/24/08 06:11:18	20.3265 -164.129	View Download	View Download	View Upload	View Upload		View Upload	Sounding good. Sent to Edit
04E1E702		X		09/24/08 12:06:16	20.4634 -168.052	View Download	View Download	View Upload	View Upload		View Upload	Sounding good. Sent to Edit
04E0AFFE		X		09/24/08 15:08:22	20.7549 -170.065	View Download	View Download	View Upload	View Upload		View Upload	Sounding good. Sent to Edit
04E1E6F2		X		09/24/08 19:59:48	20.7802 -172.138	View Download		View Upload	View Upload		View Upload	Error creating D-file - p valid. Stuck Sonde did Edit
04E1E792		X		09/24/08 21:54:57	20.8849 -173.037	View Download	View Download	View Upload	View Upload		View Upload	Sounding good. Sent to Edit
04E1E74E		X		09/24/08 23:57:02	20.9642 -175.098	View Download	View Download	View Upload	View Upload		View Upload	Sounding good. Sent to Edit
04E1E7E8		X		09/25/08 02:59:28	21.065 -177.004	View Download	View Download	View Upload	View Upload		View Upload	Sounding good. Sent to Edit
04E1E704		X		09/25/08 05:59:23	21.3566 -179.092	View Download	View Download	View Upload	View Upload		View Upload	Sounding good. Sent to Edit



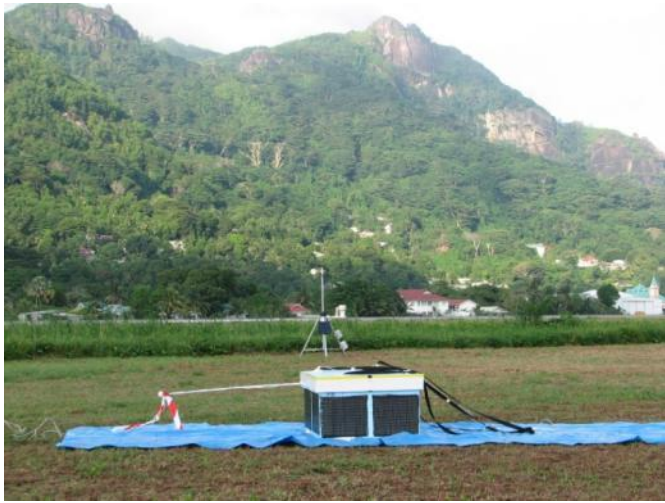
Engineering Monitoring
Boulder, USA

Scientific Flight Operations
Center & Flight Control
Toulouse, France

Balloon Launch Location
Victoria, Seychelles

Pre-Concordiasi Launch and Flight Operations Locations

Seychelles Flight Preparations



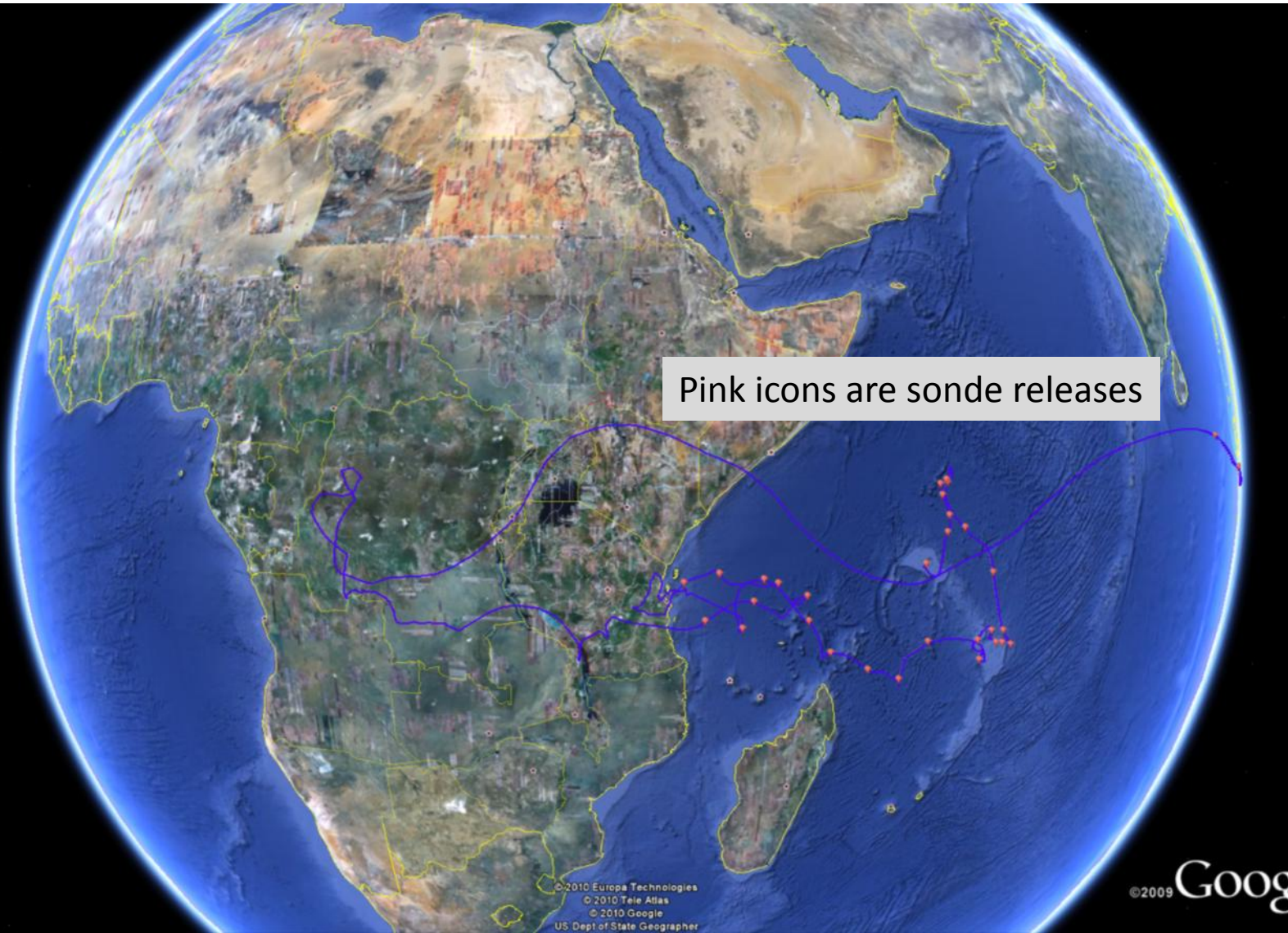
Balloon Inflation



Pre-Concordiasi MSD1 Flight Track



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Pink icons are sonde releases





Pre-Concordiasi MSD2 Flight Track



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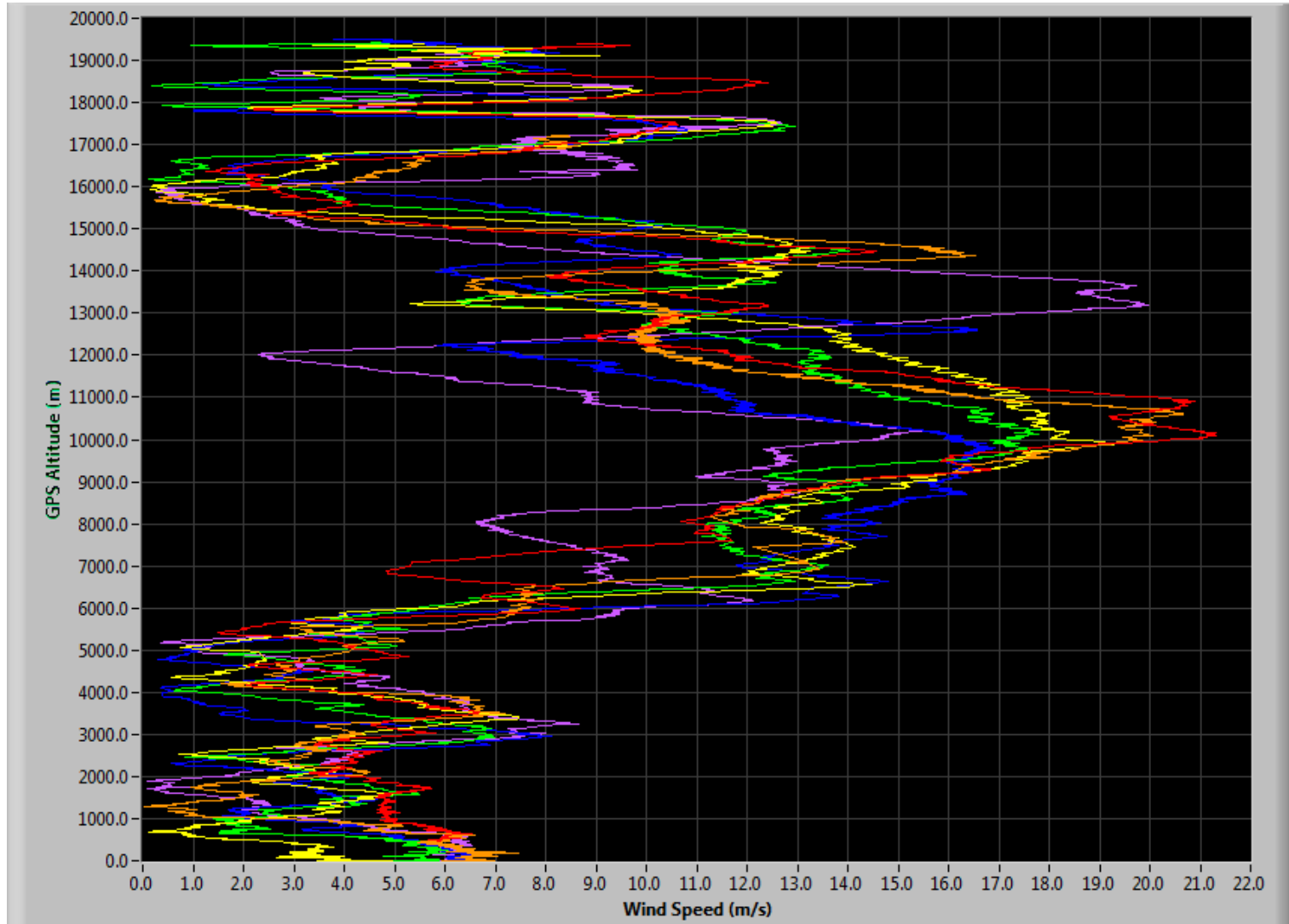


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2°38'54.87" N 10°25'35.19" W elev -15472 ft

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MIST Sonde Wind Speed Data

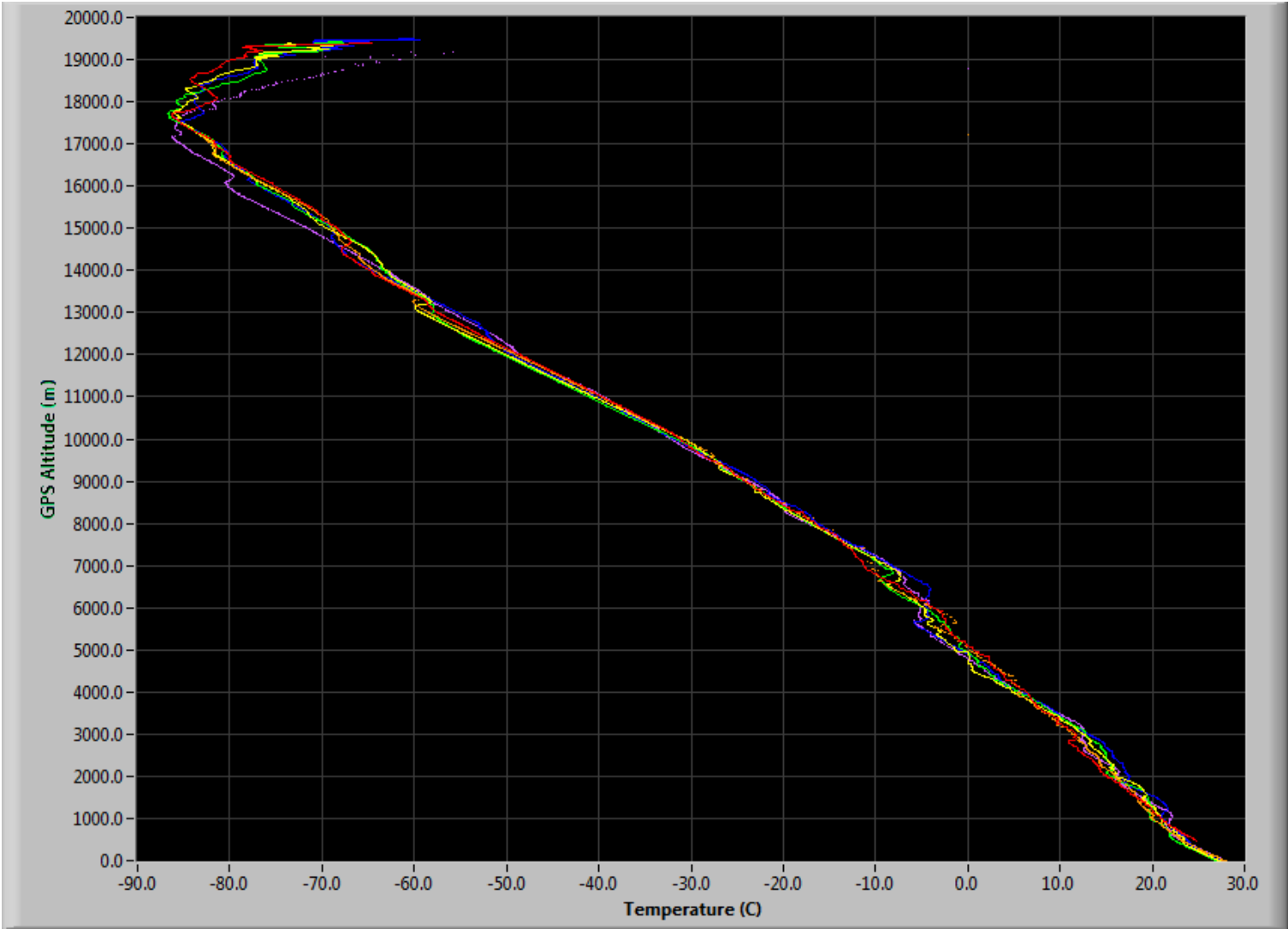
First 6 drops from MSD1





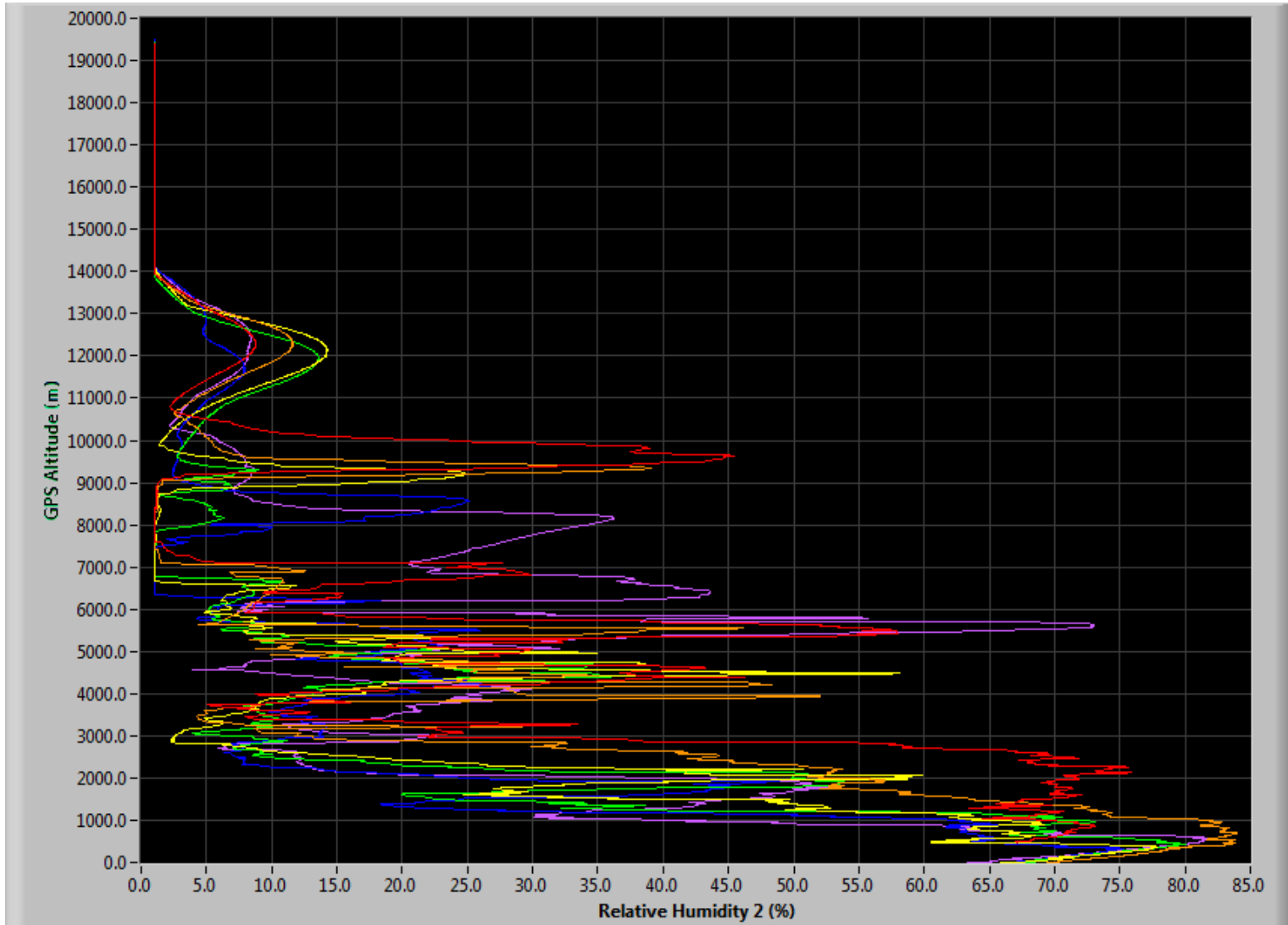
MIST Sonde Temperature Data

First 6 drops from MSD1

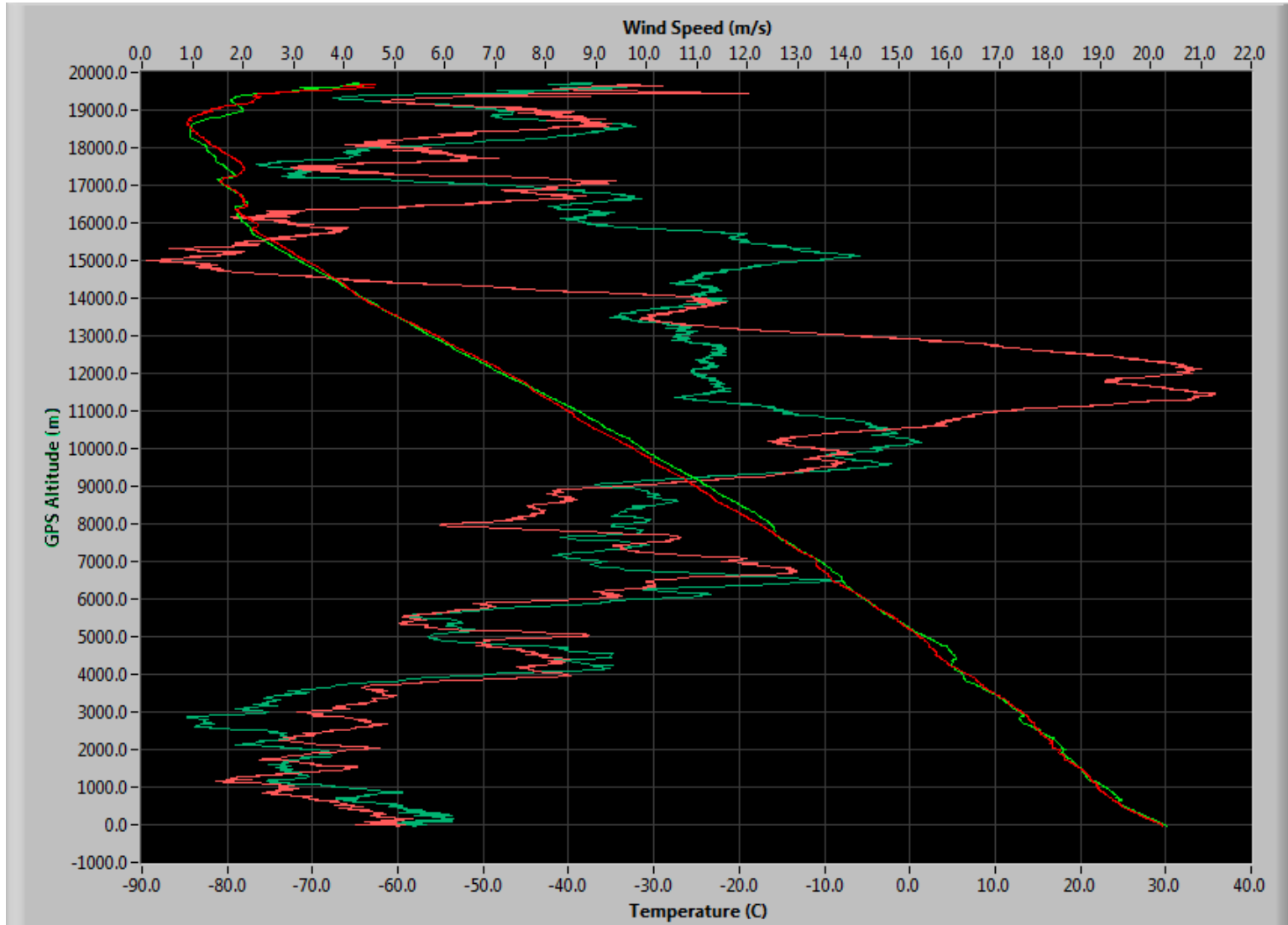


MIST Sonde Humidity Data

First 6 drops from MSD1



MIST Sonde Performance Temperature and RH from MSD1



Summary of Operations

MSD1 launched February 8, 2010

- 48 days of operation (as of March 28)
- Launched with 32 sondes
- 30 dropped (as of March 28)
- 1 failure*

MSD2 Launched February 21, 2010

- 34 days of operation (as of March 28)
- Launched with 49 sondes
- 37 dropped (as of March 28)
- 2 failures *



* Sondes failed battery voltage test, were not released.

Operations summary of MSD1 & MSD2

Successes

- First use of scheduled drop times
- Updated WEB site and back end system control
- First operation use of low power mode for extended operations (~6 weeks)
- First use of solar panels to keep electronics and lithium batteries warm
- Improved Sonde release mechanism and algorithm, no “release” failures to date
- Improved time to first winds from sonde (minimum 6 satellite in track at release)

Issues

- Long transfer of sounding data to ground via Iridium, under investigation
- Small improvements to WEB site and ground system



Conclusion

Driftsonde operations is meeting technical goals to support the Concordiasi program in the fall of 2010.

Thanks to the excellent CNES team in the Seychelles and the Flight Operations Meteo-France team in Toulouse.

Thank you for your attention



Questions?

