The NCAR Driftsonde Sounding System

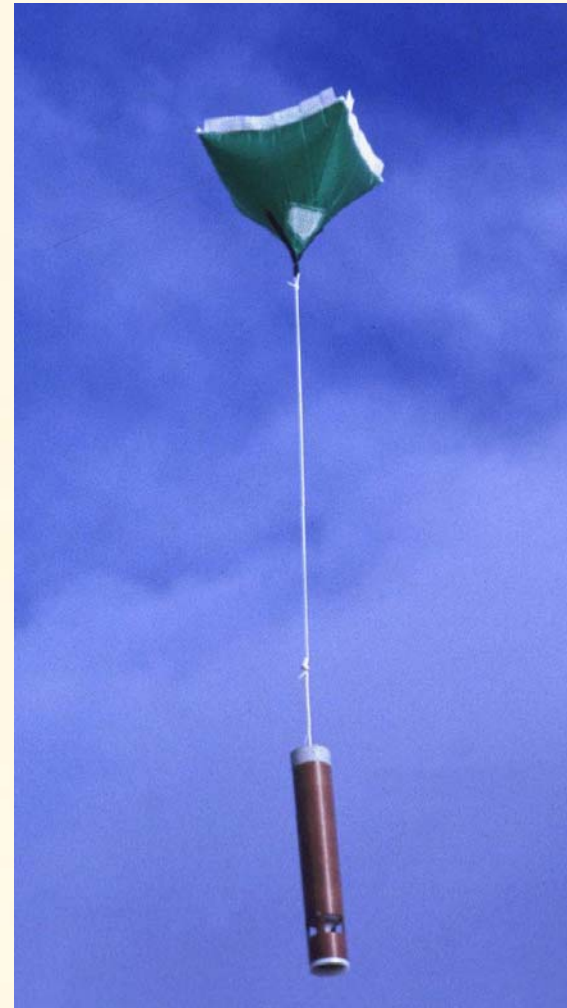Charlie Martin
Terry Hock
National Center for Atmospheric Research
Boulder, CO

Sounding Types

Radiosonde
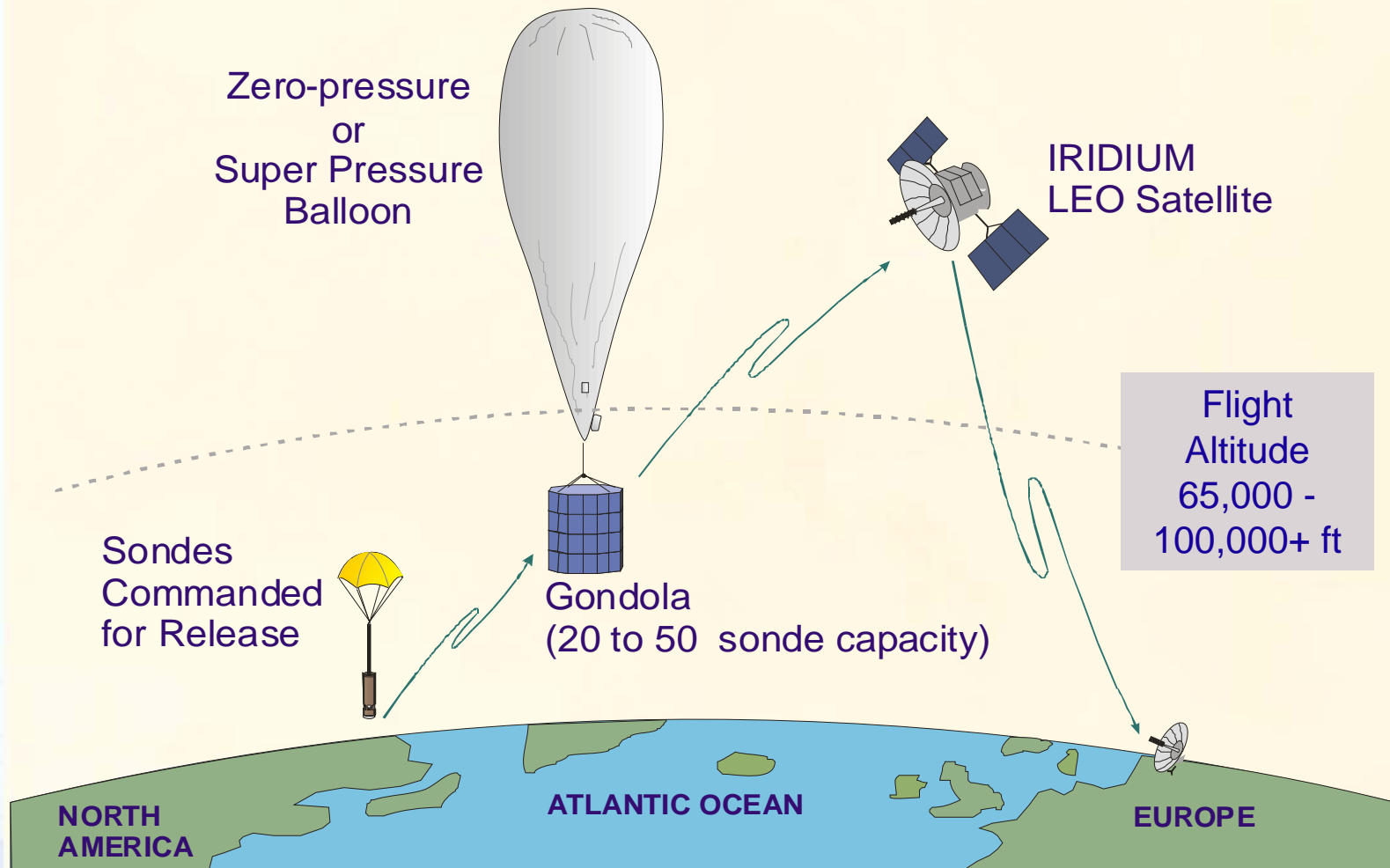
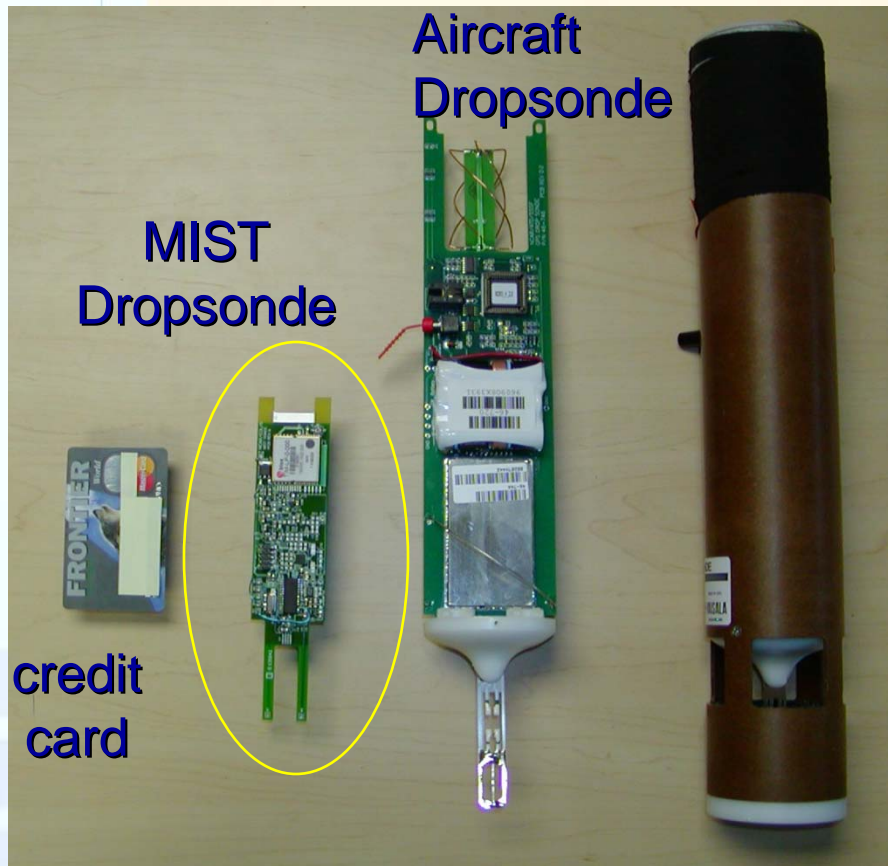Dropsonde

Driftsonde Concept

NCAR

Zero-pressure
or
Super Pressure
Balloon

IRIDIUM
LEO Satellite

Flight
Altitude
65,000 -
100,000+ ft

Sondes
Commanded
for Release

Gondola
(20 to 50 sonde capacity)

NORTH AMERICA

ATLANTIC OCEAN

EUROPE

Driftsonde Deployments

Project	Year	Location	Balloon Operator
Development	< 2006	Oregon	NSC
AMMA	2006	Niger	CNES
T-PARC	2009	Hawaii	CNES
NASA	2009	McMurdo	NASA
Pre-Concordiasi	2010	Seychelles	CNES
Concordiasi	2010	McMurdo	CNES

The MIST Dropsonde
(Miniature In-situ Sounding Technology)

NCAR

Aircraft Dropsonde

MIST Dropsonde

credit card

Sensors:
GPS Winds & Altitude
Vaisala RS-92 Sensor:
Temperature
Pressure
Humidity

Sample rates:
2 Hz PTH data
4 Hz Wind data

Fall time: ~ 20 minutes from 65kft

Fall velocity: ~50 m/s @ 65kft
~10 m/s @ surface

Size: 4.4 cm diameter
30.5 cm length
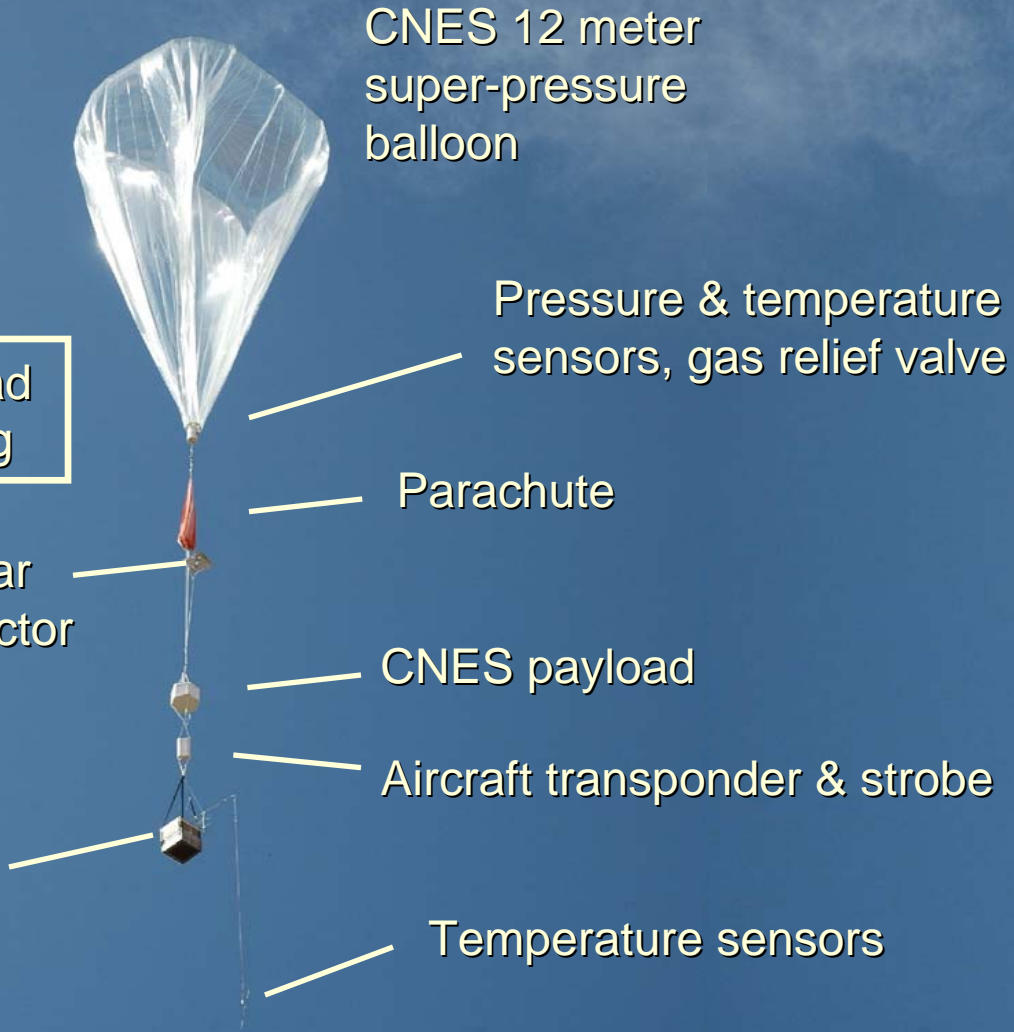
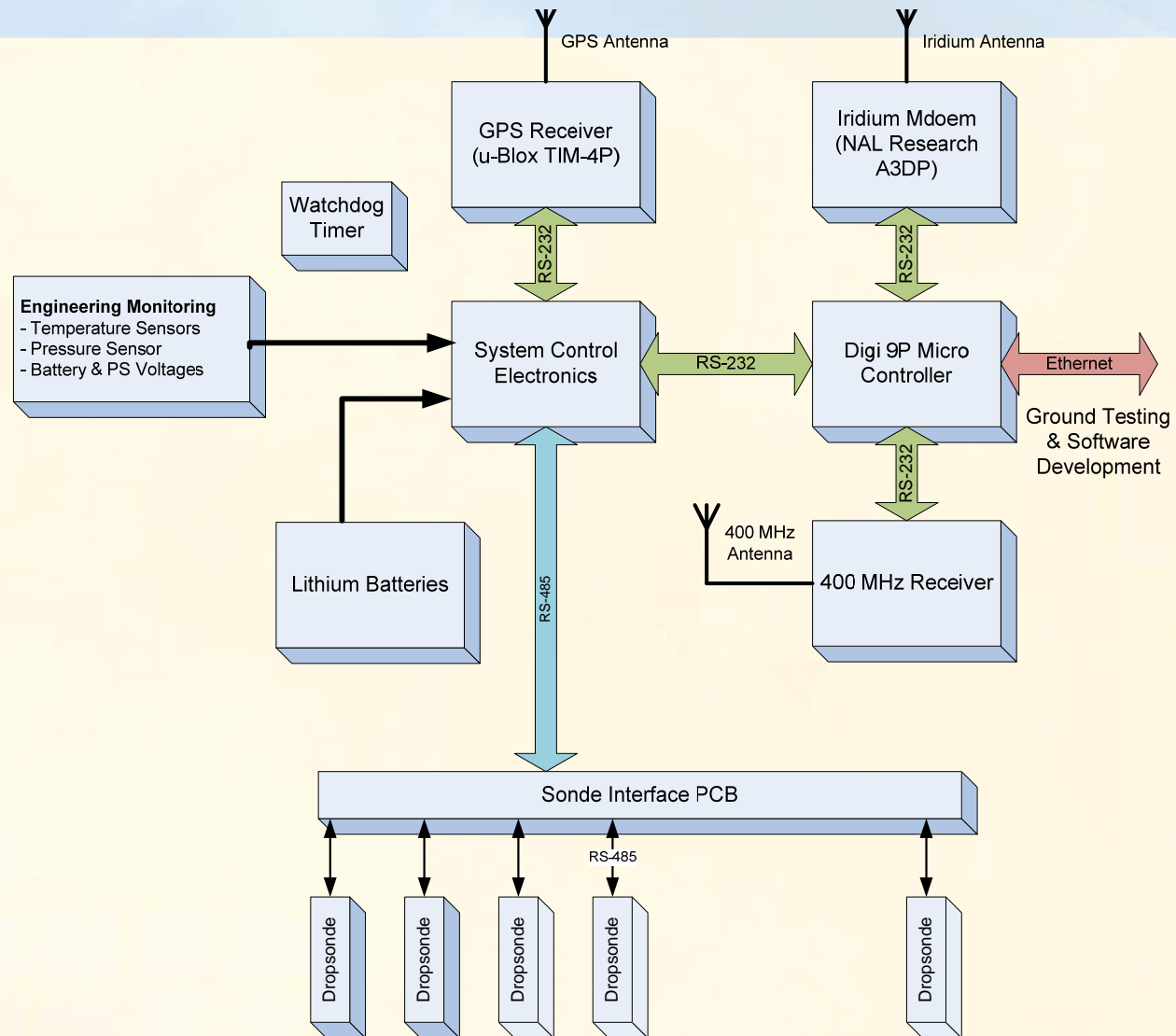**Mass:** 175 grams

Driftsonde Flight Train

~ 12 meters

~ 20 meters

CNES 12 meter super-pressure balloon

Pressure & temperature sensors, gas relief valve

Total payload weight 42 kg

Parachute

Radar reflector

CNES payload

Driftsonde gondola (24kg)

Aircraft transponder & strobe

Temperature sensors

Gondola System Overview

Gondola

Electronics

First generation

System Software

Location	Technology	Functions
		Electronics Control
	Linux	Soundings
Gondola	C++	Telemetry
	Python	System Status
		Communications
	Ruby/Rails	Data Ingest
Ground	Python	Web Interface
	Postgress	Data Serving

System Control & Data Flow

NCAR

Iridium Satellite System

RF Link ~1620 MHz

Toulouse
Web Interface and Control

McMurdo
Web Interface and Control

Boulder
Web Interface and Control

Internet

Iridium RF link

Driftsonde Gondola

Dropsonde RF Link 400 MHz

NCAR Ground Control Boulder, CO

Boulder Servers Back End control & Data Storage

Serial

Modems (min qty 4)

Telephone

Iridium Ground System

Dropsonde Pressure Temperature Humidity Winds

During Concordiasi

Driftsonde Web Interface

Pre-Concordiasi

January-April 2010

- **Test:** Concordiasi - McMurdo
- **Site:** Republic of the Seychelles
- **Balloons:** CNES 12m super-pressure
- **Two flights:**
  - MSD1: launch 08 Feb 2010 (45 days)
  - MSD2: launch 21 Feb 2010 (32 days)
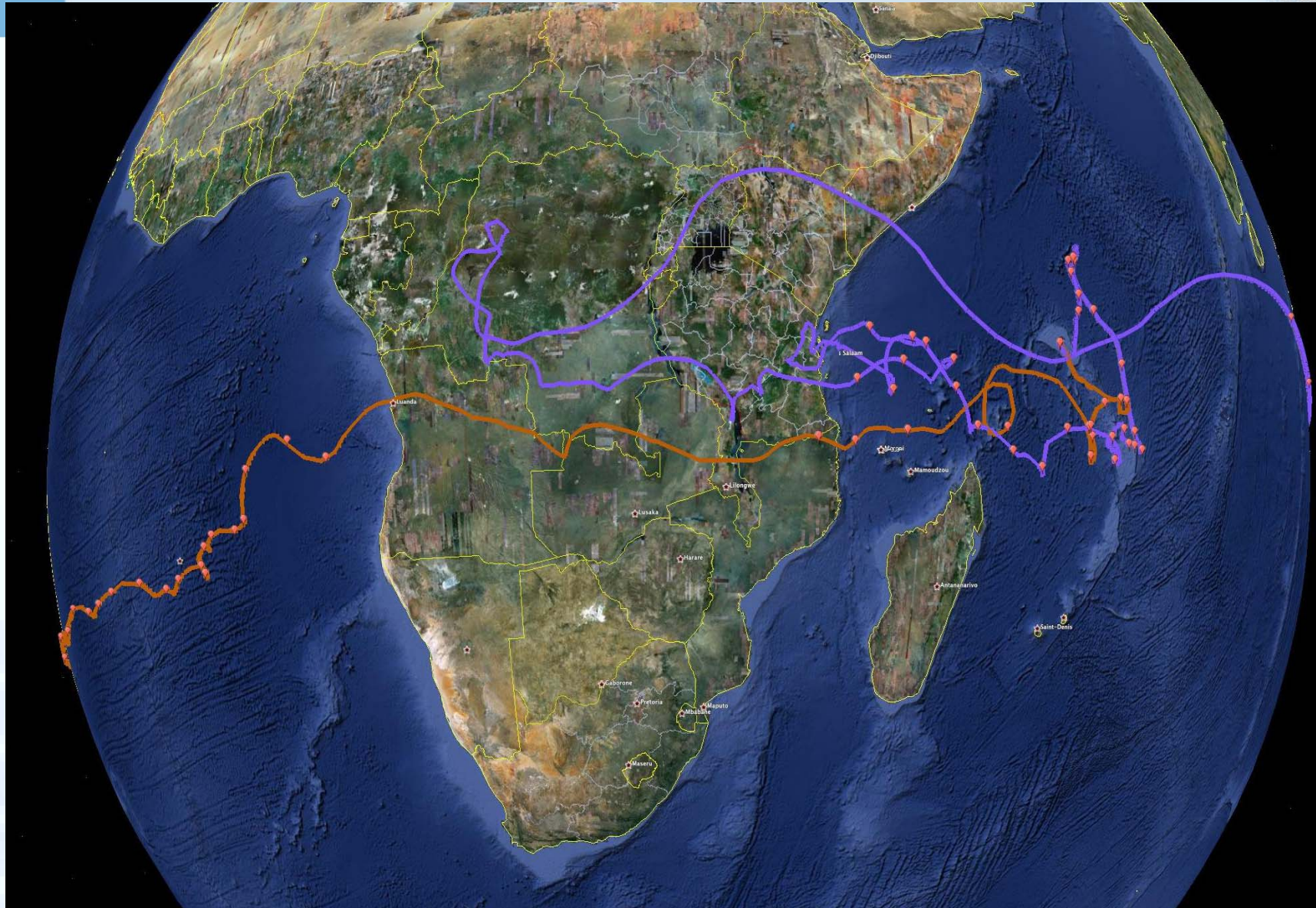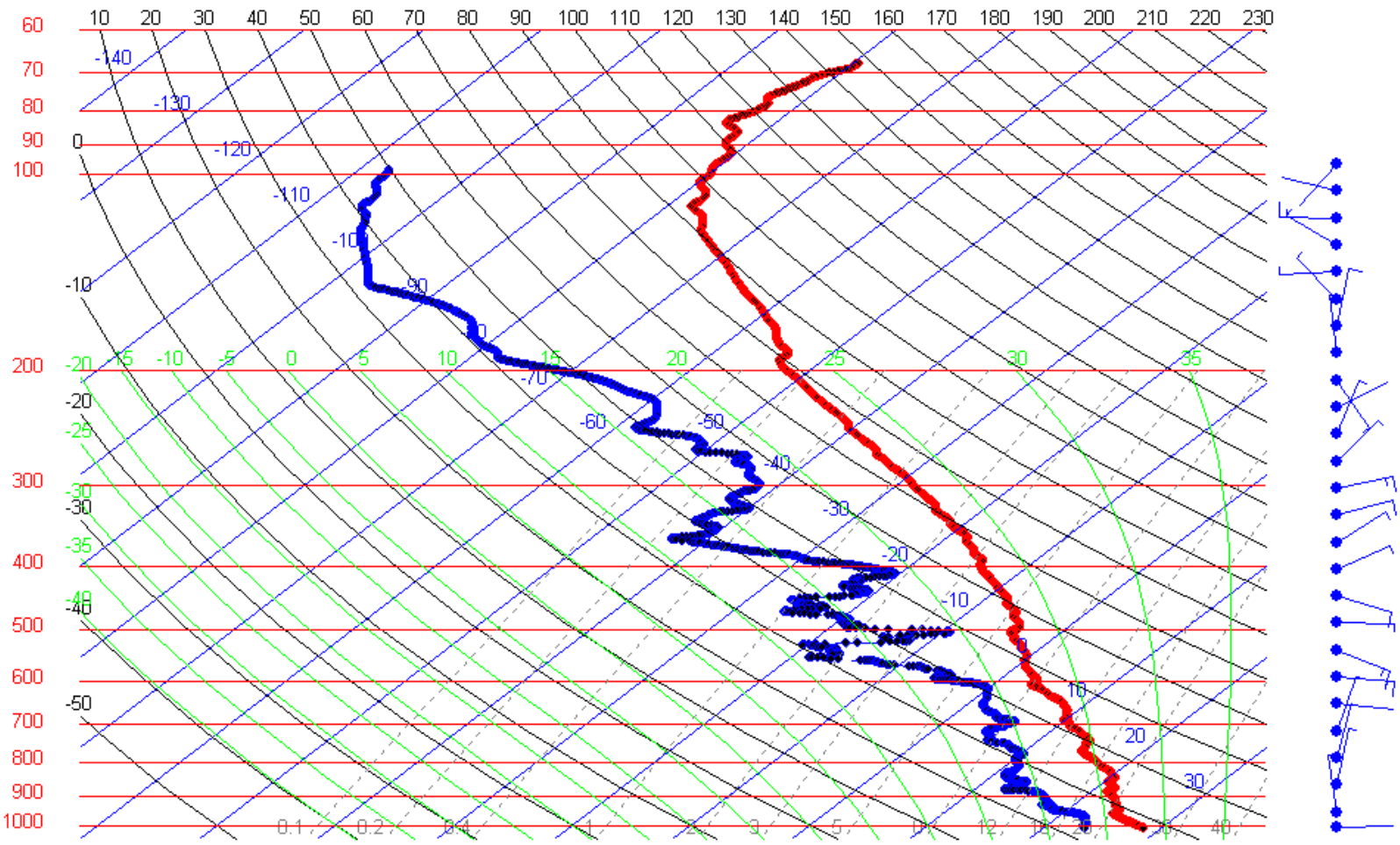- **Soundings**: 63 to date

Pre-Launch

Launch

Flight Tracks

Soundings

D20100225_034150_MSD2_04E1E4F3.1 081913075 Pre-Concordiasi [Seychelles 2010], MSD2 DRIFTSONDE, drift29

Aspen V2.8.1.8, 25 Mar 2010 00:58 UTC

Concordiasi
McMurdo

NCAR

Primary mission   Satellite validation

Flight duration   > 6 weeks

Number of flights   14

First launch   Early September 2010

Sounding schedule   1 - 4 per day

Acknowledgments

- Terry Hock

- Jack Fox

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- Nick Potts

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- Dean Lauritsen

- Hal Cole

Questions?