

NSERC P-3 Data System

NASA P3-B DataSystem Overview

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Oct 5, 2010 – Discover AQ Meeting

Data System Overview

- The new P-3 Data System is identical to based the current DC8 housekeeping Data System.
 - Initial Install Feb '10
 - Final Configuration and testing in January



Major System Components

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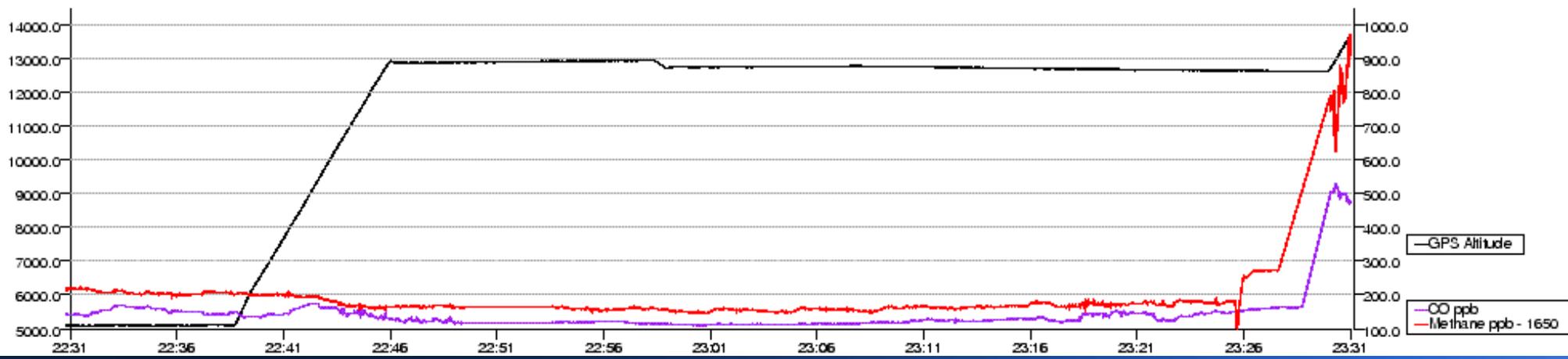
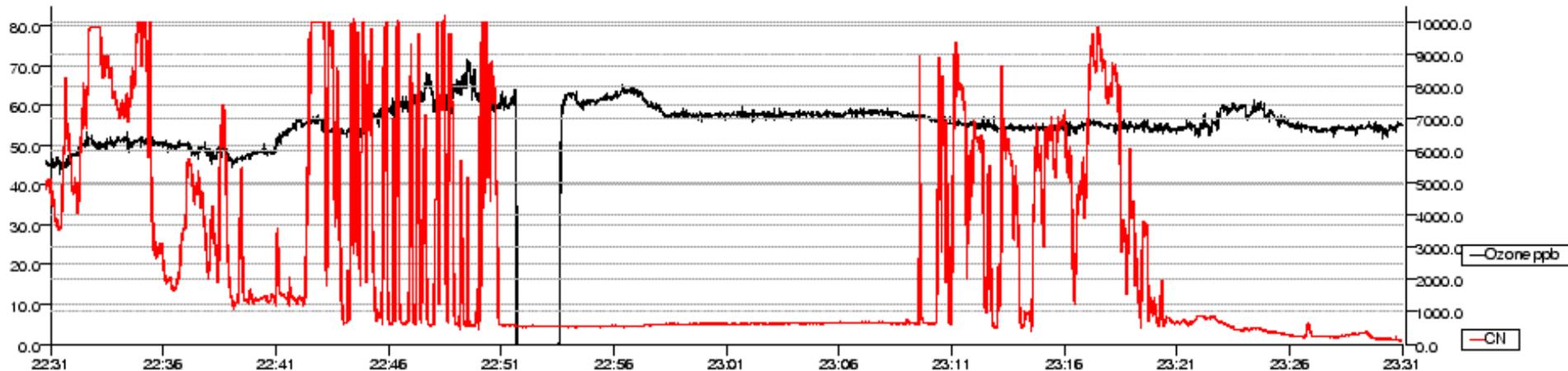
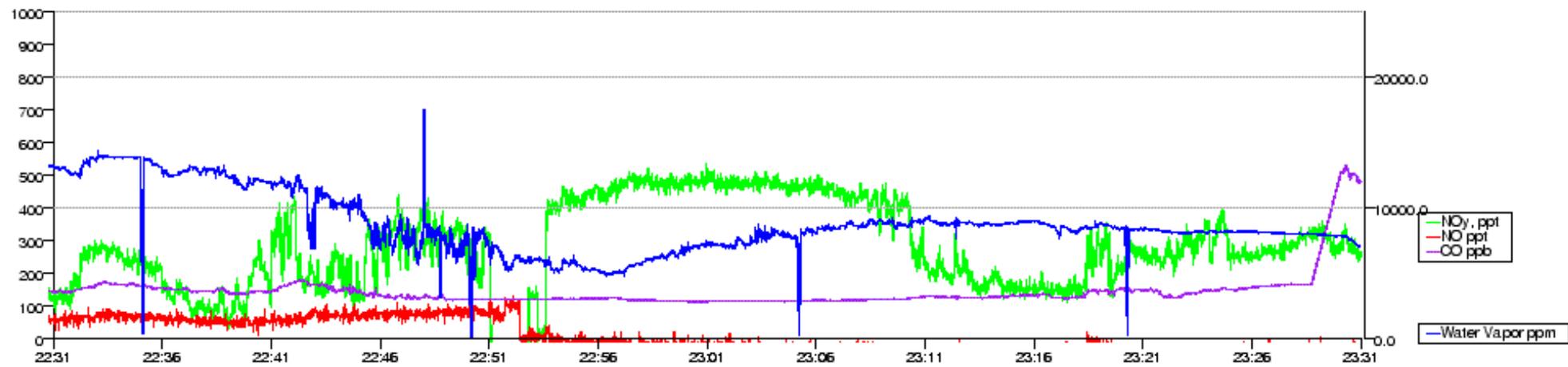
- REVEAL
- Web Based Situational Awareness Displays
- Timing Services (IRIG-B, NTP)
- Satellite Communications Systems
- Onboard Network/Network Services

REVEAL/NASDAT System

- The REVEAL System records and redistributes aircraft facility instrument data.
 - ARINC 429
 - A/D Channels
- Output Data Formats
 - IWG1 Trivial Data Feed (1 Hz), DADS, NMEA
 - Ethernet or RS-232 Delivery
- Next-gen NASDAT system should be available by FY12.

Web Display System

- The system provides a system of web-based data displays.
 - Parameter Data
 - Stripcharts
 - Cameras
 - Map based data and weather displays
 - Custom instrument displays

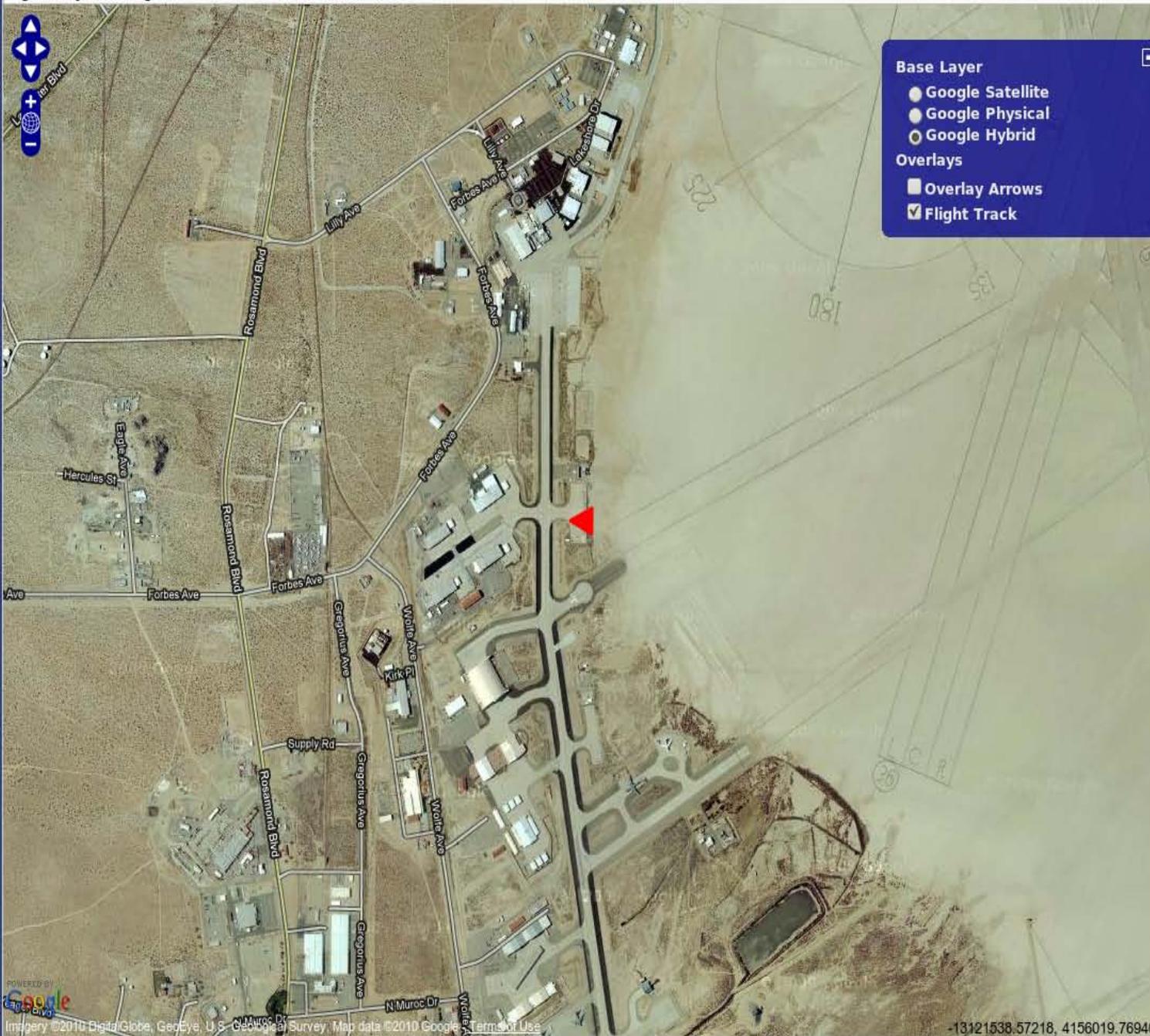


REVEAL	Forward Cam	Nadir Cam	GOES Images	Strip Charts	DIAL Feed	Weather RADAR	Google Earth	Xchat	Falcon View	Forward/Nadir
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187 23:30:42

Latitude	+55 22.7 deg min	Static Air Temp	-2.0 deg C
Longitude	-087 50.7 deg min	Total Air Temp	9.8 deg C
Pressure Altitude	12892 ft	IR Surface Temp	5.7 deg C
GPS Altitude	12654 ft	SAT Compute	-1.5 deg C
True Heading	27.5 deg	Dew/Frost Point Temp	-2.7 deg C
Ground Speed	317 knots	Solar Zenith Angle	62.4 deg
True Airspeed	301 knots	Sun Elevation-Grd	22.2 deg
Indicated Airspeed	246 knots	Sun Elevation-AC	27.6 deg
Mach Number	0.470	Specific Humidity	4.888 g H ₂ O/kg air
Vertical Speed	640 ft/min	Partial Pressure H ₂ O	4.9 mb
Pitch	6.1 deg	Relative Humidity-Ice	93.0 %
Roll	-3.8 deg	Relative Humidity-Water	91.3 %
Drift Angle	5.9 deg	H ₂ O Saturation VP	5.34 mb
Wind Speed	34 knots	H ₂ O Saturation VP-Ice	5.24 mb
Wind Direction	272 deg	Ozone	54.3 ppb
Dist To Nxt WayPt	774.7 nm	CO	? ppb
Time To Nxt WayPt	146.5 min	Water Vapor	7835.1 ppm
Cabin Altitude	-29 ft	Scattering	2.4
Static Pressure	622.1 mb	CN	146 n/cm ³
		CH ₄	? ppb
		NO	-54 ppt
		NO _y	286 ppt

OpenLayers Map



Base Layer

- Google Satellite
- Google Physical
- Google Hybrid

Overlays

- Overlay Arrows
- Flight Track

Aircraft Data

Position

System Timestamp	2010-03-31 20:30:01
Longitude (deg)	-117.885456
Latitude (deg)	34.941547
GPS Altitude (m)	696.620399
True Heading (deg)	270.74707

Instrument Data

UCATS Ozone (ppb)	2.3
Ozone ppbv	-1
N20 Mixing Ratio (ppb)	X.XX
CH4 Mixing Ratio (ppb)	X.XX

Satellite Communications

- The P3 has a combination of high and low bandwidth communications channels available.
 - REVEAL Single-channel Iridium Connection for Real-time Telemetry.
 - Multi-channel iridium connection for general data transfer.
 - INMARSAT BGAN system.

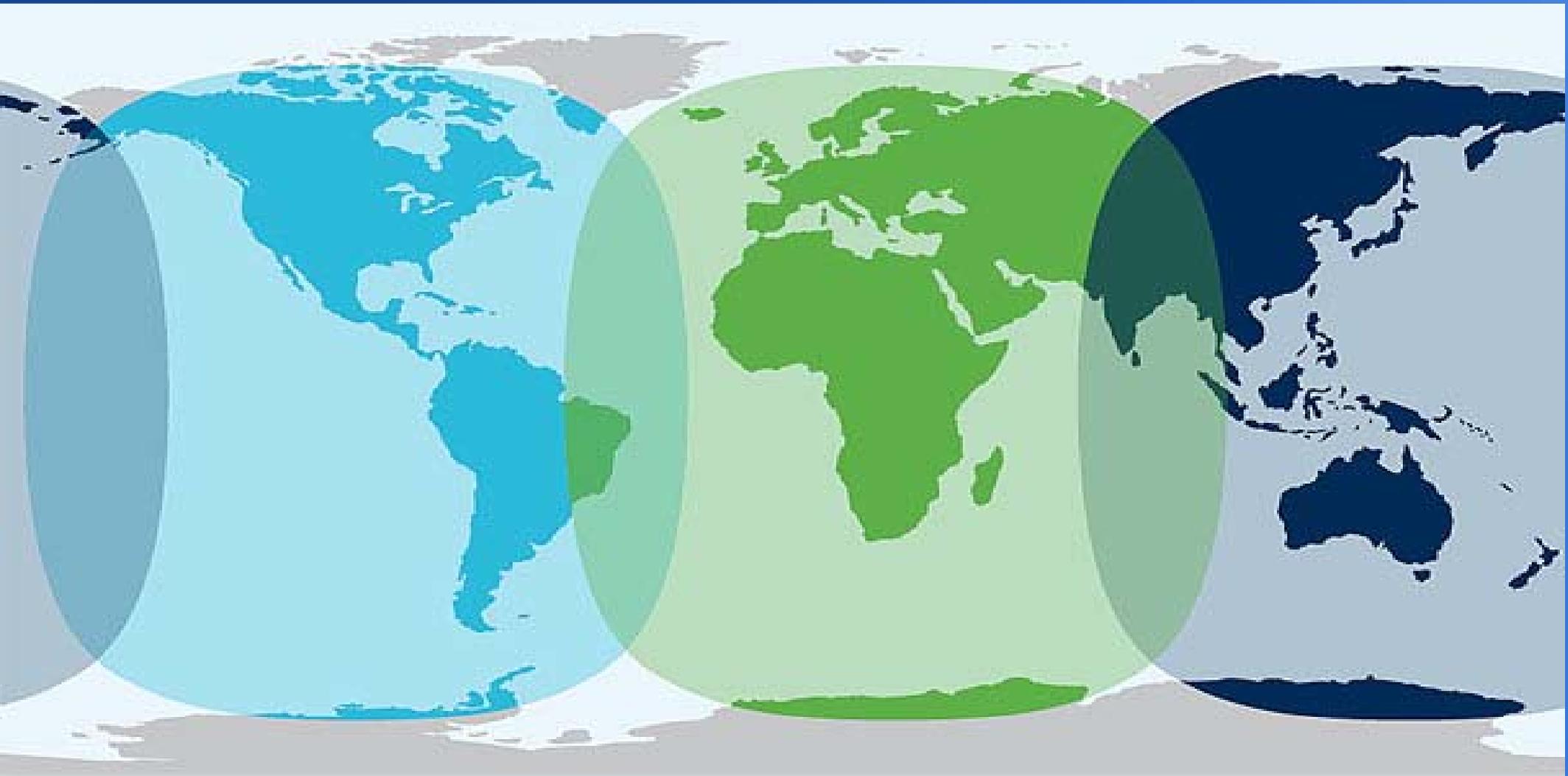
Iridium

- Low-bandwidth connection.
 - Individual Channels are 2.4 kbps, half duplex.
 - Multi-channel combines to create 9.6 kbps.
 - High Latency ($> 1s$)
- All-you-can-eat billing plan with DoD SIMs.
- World-wide coverage.
 - Occasional dropouts do occur, but bad "sections" continually move and are effectively unpredictable.

INMARSAT

- High-bandwidth
- Multiple usage modes:
 - "Background Mode"
 - Bandwidth Non-Guaranteed
 - Pay-by-the-byte (\$5.88/megabyte)
 - "Streaming Mode"
 - 32, 64, 128 or 256 kbps.
 - Pay-per-minute (up to \$7/min)

INMARSAT Coverage Area



X-Chat

- Text-based Chat System
- Accessible either via installed client or web application.
- Predefined channels are logged
 - Private channels can be created which are not logged.
- "Bots" are being developed to allow querying of current aircraft data.

Cameras

- The P-3 Forward and Nadir cameras
 - Axis 221 - 640x480 (Up to 24fps)
 - Axis 223M - 1600x1200 (Up to 10fps)
 - Generally recorded at 1-10 Hz.
 - Video is now available in and immediately post flight.

Facility Instrumentation

- Both the DC-8 and P-3 have received Edgetech Vigilant Model 137 Hygrometers.
 - Depression of up to 65C at an ambient temperature of 25C.
 - Dew Frost/Point Range of -50 to +90
 - Accuracy of +/- 0.20 C

Facility Instrumentation (2)

- Heitronics KT-19II IR Pyrometer for IR Surface temperature measurement.
- New Cabin Pressure sensor

Ground Based Aircraft Monitor

- Aircraft Tracking on Google Earth with overlays.
- Simple Web Based Monitor
 - Mission Description
 - Cameras
 - Maps
 - Breif Status Updates

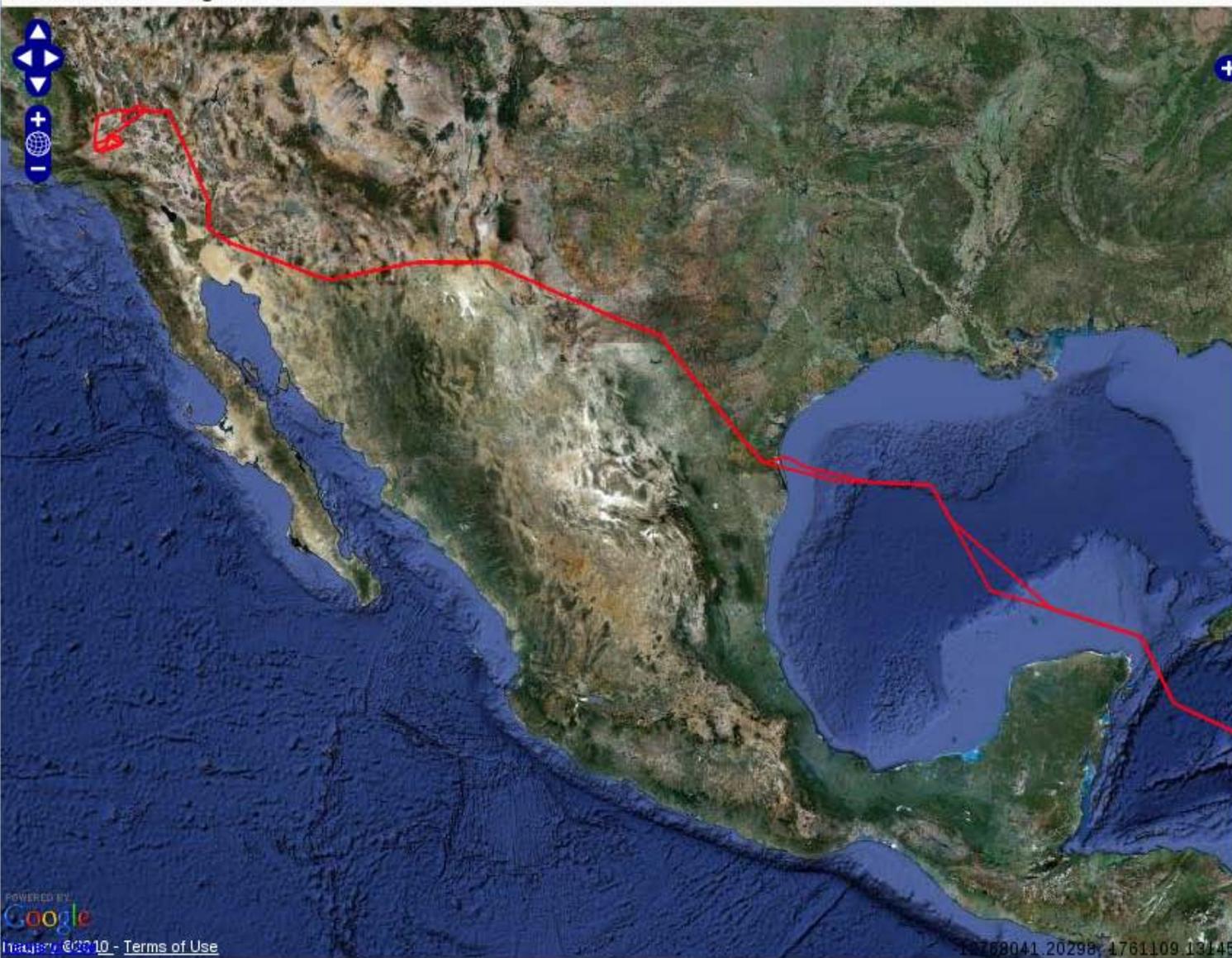


NASA GLOBAL HAWK

GRIP 2010

Airborne Science Program

Global Hawk Flight Track



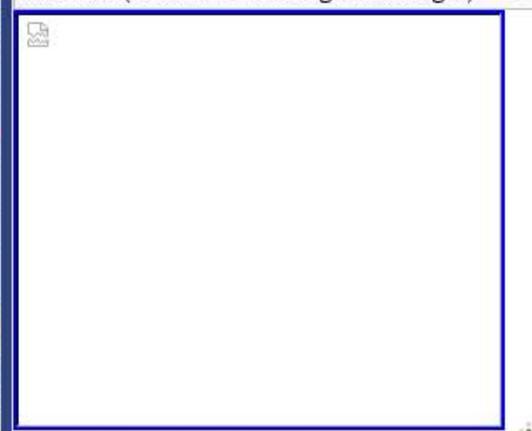
About GlobalHawk

The NASA Global Hawk project, operated at NASA's Dryden Flight Research Center, is currently participating in the Genesis and Rapid Intensification Processes (GRIP) hurricane research mission.

Aircraft Status

The NASA Global Hawk is currently returning to DFRC after flying to Tropical Depression Matthew, east of Nicaragua today. All science instruments and sensors functioned normally as 11 passes over the developing eye were made. Landing back at DFRC is expected at 1700Z (1000 PDT) after a 25 hr. flight.

HDVis (Click for Larger Image)





PARK
BRAKE

ASPL

STOW/ADPTE
MAIN MENU
-EjectSeat
-Opt Load
-2nd
-RDY
-120
66