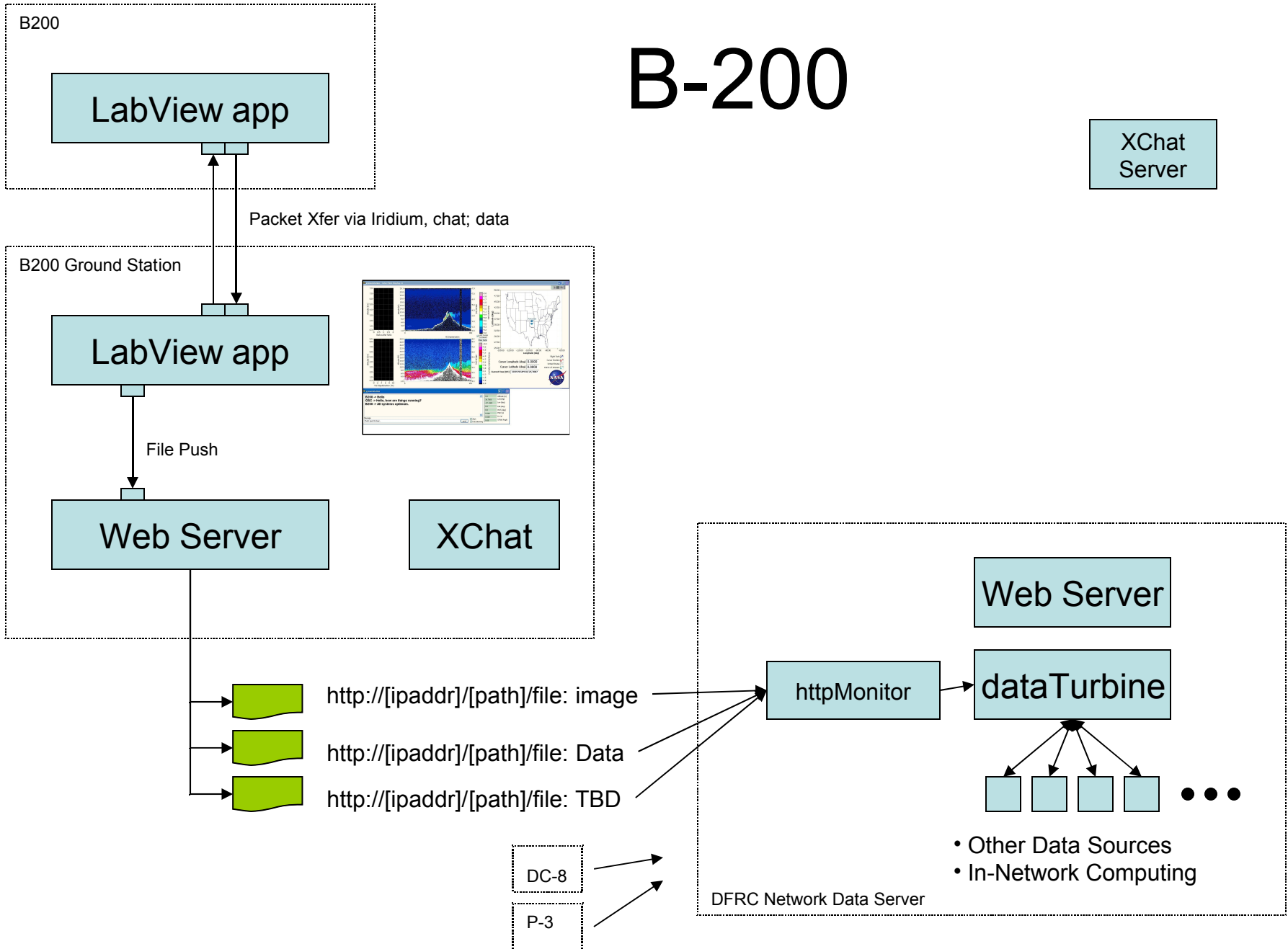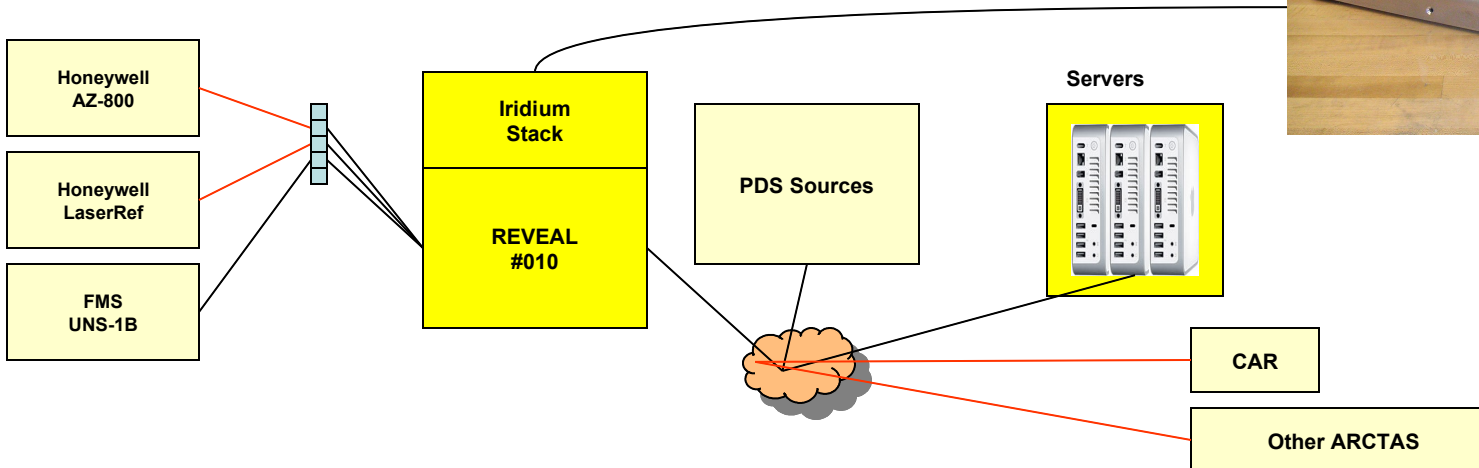# REVEAL & Related Support

- General:
  - Focus on realtime situational awareness & decision support
    - Prototyping services for "sensorweb" net-centric operations
      - "multi-instrument, multi-platform, in-flight communications
      - Application support
    - Sustainable architecture
      - Platform capability + fleet support "cyberinfrastructure"
      - Mission/flt mgmt vs instrument/science mgmt
  - Operational phase starts in Oct. 2010
- P-3B:
  - {PDS+REVEAL+servers+net} → evolve DC-8-like functionality
- B200:
  - Existing capability interfaced to ground infrastructure
- Instruments:
  - Talk to us if you need/want to automate low bandwidth data transfers

B200

LabView app

B-200

XChat
Server

Packet Xfer via Iridium, chat; data

B200 Ground Station

LabView app

File Push

Web Server

XChat

Web Server

http://[ipaddr]/[path]/file: image

httpMonitor

dataTurbine

http://[ipaddr]/[path]/file: Data

http://[ipaddr]/[path]/file: TBD

• Other Data Sources
• In-Network Computing
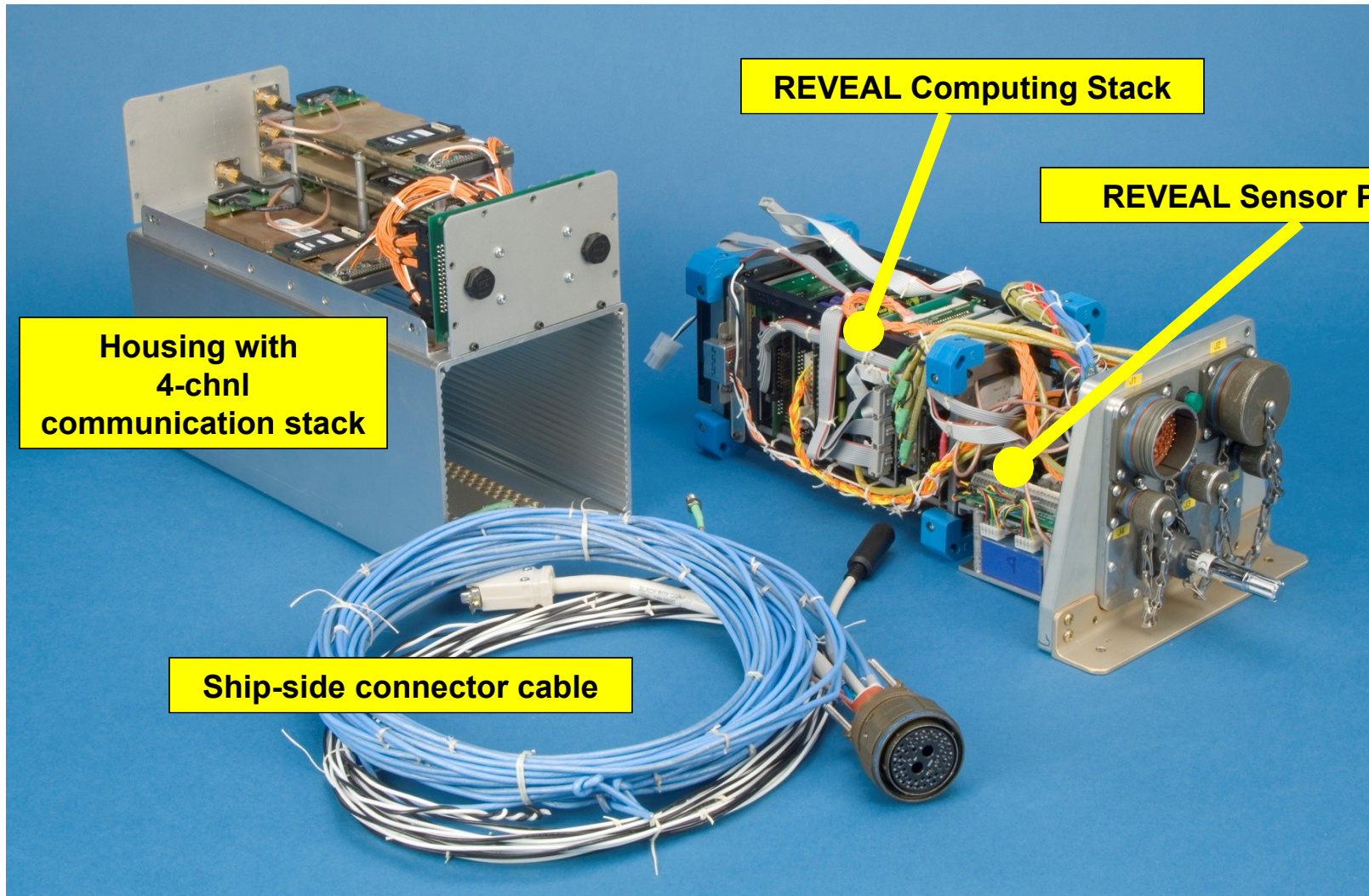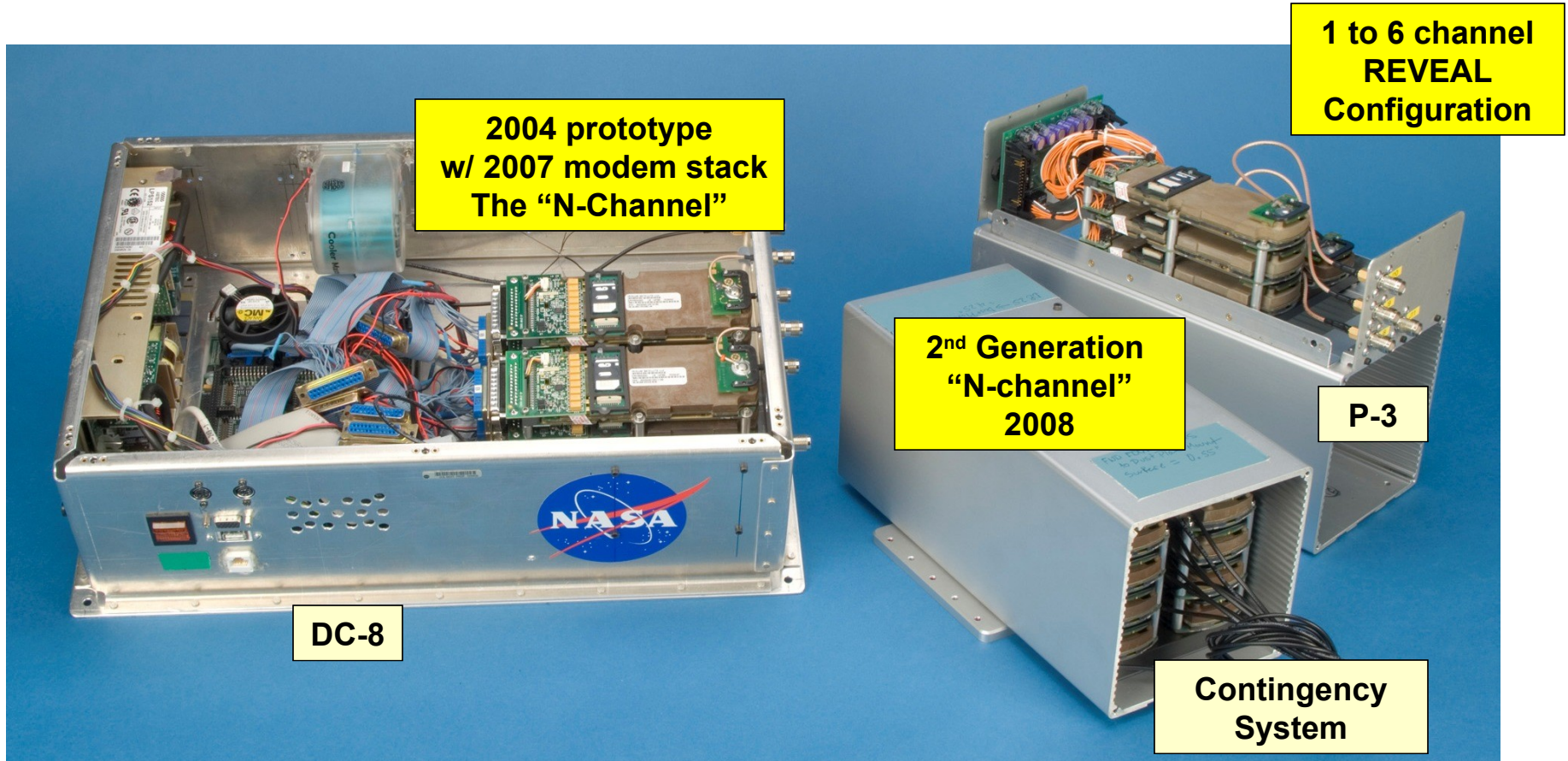
DC-8

P-3

DFRC Network Data Server

Wallops P-3B

- The dominant activity 1st Qtr FY08
- Goal: DC-8-like functionality for ARCTAS
- Design/fab antenna farm
  - Simplified re: DC-8 solution
  - Baseline for other aircraft
- Design/fab compute server mount system
  - Supports on-board flight data monitoring & displays, file transfer, XChat, etc.
  - 3 Mac Minis to be mounted, MacOS and Linux (FedoraCore)
- Fab'd REVEAL system
- Status:
  - REVEAL and multichannel Iridium link Install Dec08
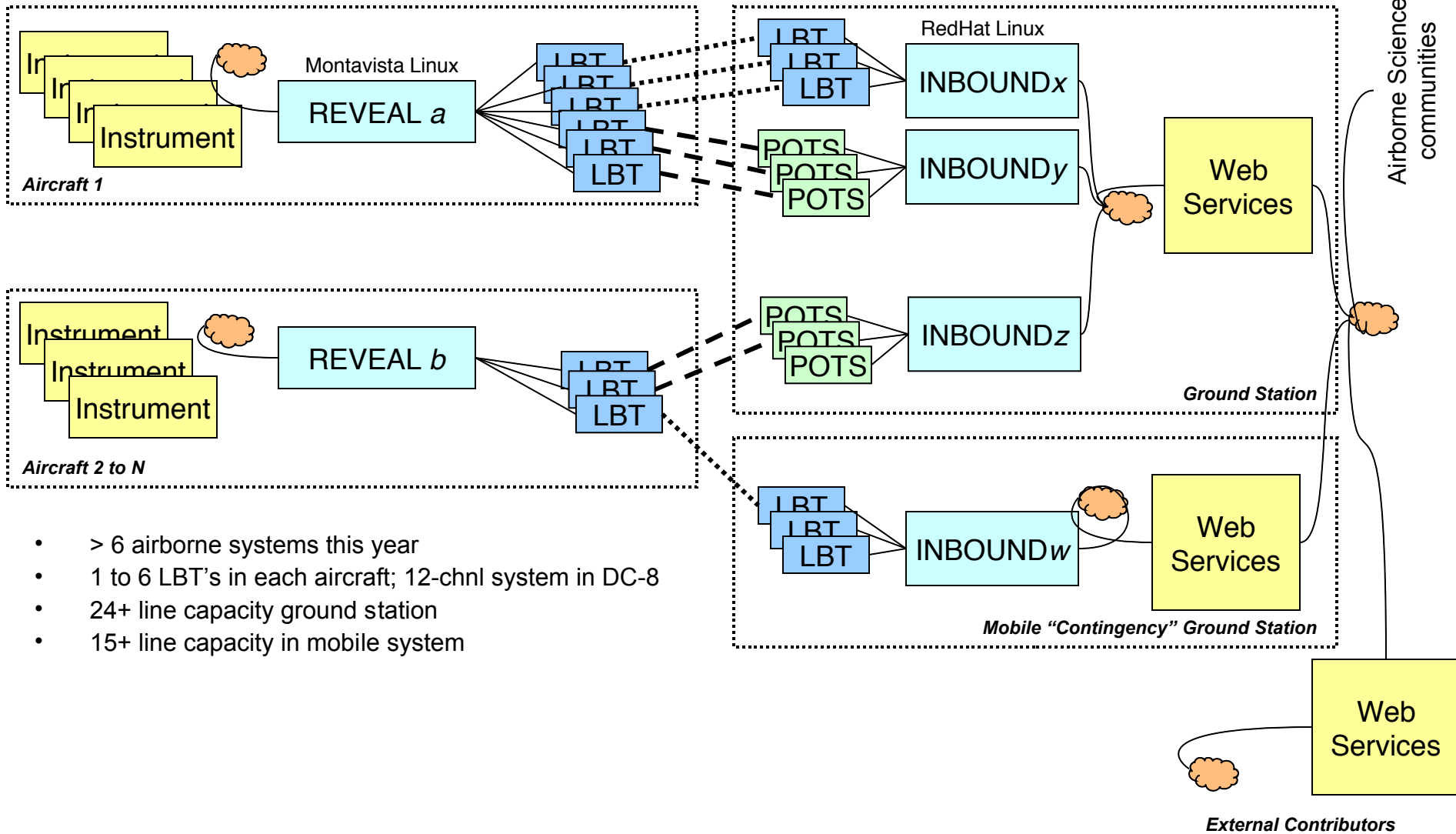 - in use Jan flights. 3 servers online and tested (partially functional)

Honeywell
AZ-800

Honeywell
LaserRef

FMS
UNS-1B

Iridium
Stack

REVEAL
#010

PDS Sources

Servers

CAR

Other ARCTAS

The P-3's REVEAL System: An Inside Look

Multi-Channel Iridium Evolution

1 to 6 channel REVEAL Configuration

2004 prototype w/ 2007 modem stack The "N-Channel"

2nd Generation "N-channel" 2008

P-3

DC-8

Contingency System

Notional Global Test Range (We have this today)

Aircraft 1

Montavista Linux

REVEAL *a*

Instrument

LBT

RedHat Linux

INBOUND*x*

INBOUND*y*

POTS

Web Services

Airborne Science communities

Aircraft 2 to N

REVEAL *b*

LBT

POTS

INBOUND*z*

Ground Station

LBT

INBOUND*w*

Web Services

Mobile "Contingency" Ground Station

Web Services

External Contributors

- \> 6 airborne systems this year
- 1 to 6 LBT's in each aircraft; 12-chnl system in DC-8
- 24+ line capacity ground station
- 15+ line capacity in mobile system

Architectural framework
Cyberinfrastructure, sensor webs, system symmetry

Vehicle Management

Payload Management

On Vehicle

On Ground

On Vehicle

On Ground

Flight Ctrl

Planning Advising

Planning Advising

payload Ctrl

Info Mgmt

Info Mgmt

Sensors
Instruments
Real Data Sources

Sensors
Instruments
Real Data Sources

Comm infrastructure

Comm infrastructure

UAV GC Facility

Info Mgmt

Info Mgmt

Flight Ctrl

Planning Advising

Payload Ctrl Facility?

payload Ctrl

Planning Advising

Sensors
Instruments
Real Data Sources

Sensors
Instruments
Real Data Sources

For UAV GCF, define notional interfaces at system boundary
*Do same thing everywhere else. -> try to ID common needs*

Contingency System Prototype

Creating Sensor Webs for Airborne Science

- Strategy: Productivity & decision support from situational awareness and network distributed systems integration

- Customers need more…

  Bandwidth, availability, flexibility

  w/o proportional cost growth

This strategy realizes the sensor web vision
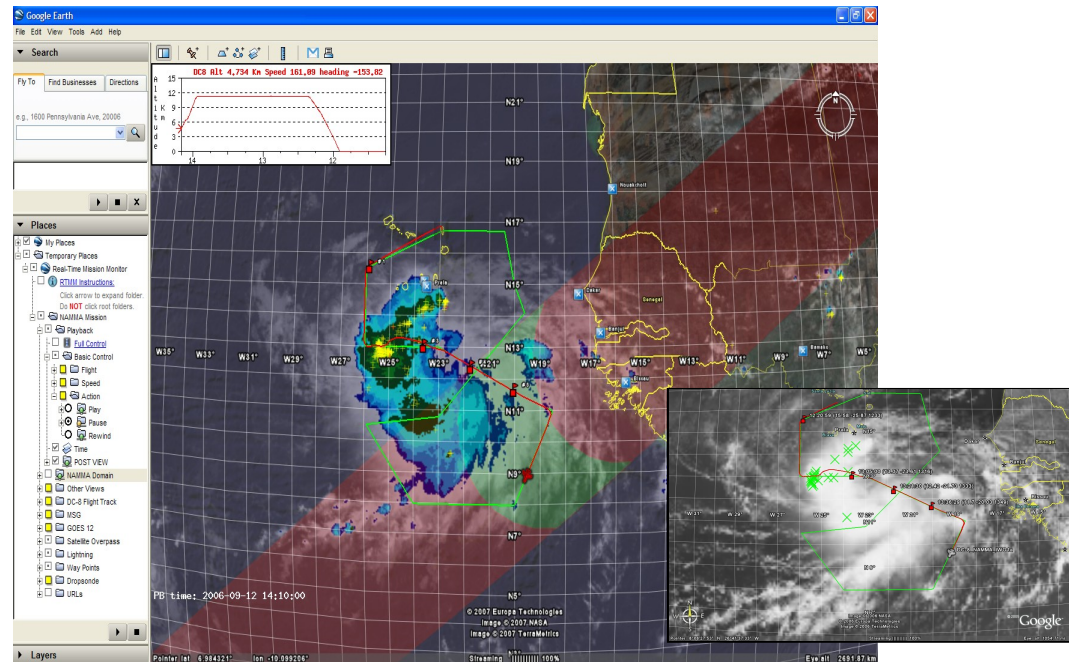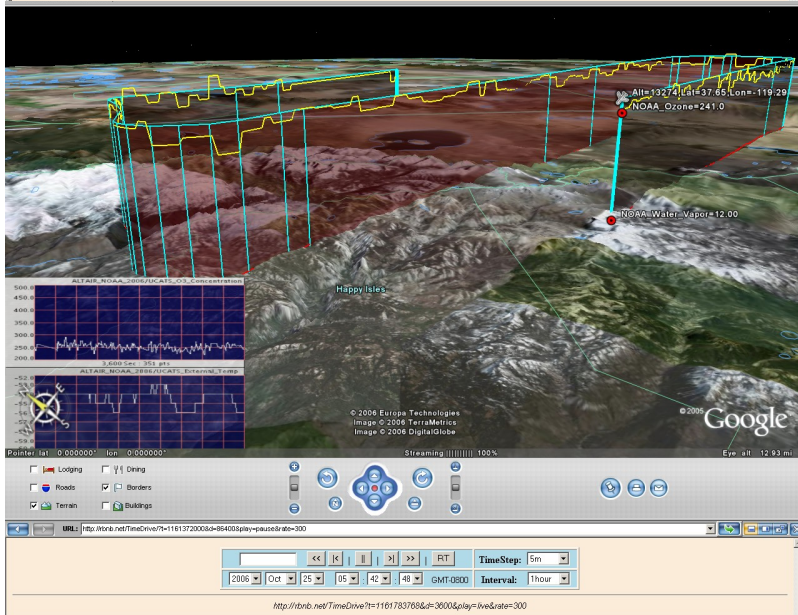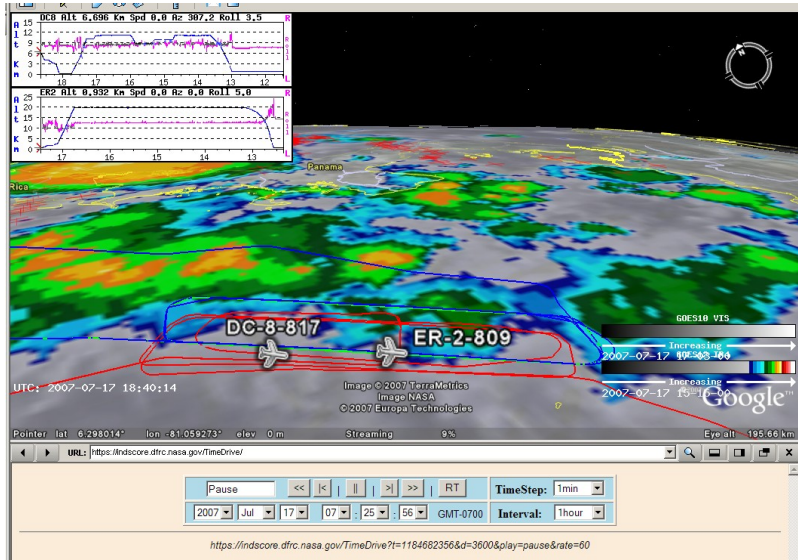
ARCTAS requirements

- *Spatiotemporal measurement*: time correlation across datasets
  - Coordinated flight plans
  - Near realtime situational awareness
  - Flexibility/adaptability

Motivations

- Questions that ARCTAS and POLARCAT address involve measurements that are on different A/C.
- Scientific return and a broader spatial and temporal context is enhanced through coordinating A/C with satellite overpasses and/or surface sites.
- Similar measurements on different platforms need intercomparisons to confirm a common data set.
- Some objectives require concurrent measurements with diverse platforms.
- Integrating these measurements require coordinated flight plans.

Aircraft Coordination for Interdisciplinary Science

Phil Russell

with key inputs from: Antony Clarke, Jack Dibb, Rich Ferrare, …

OMI,TES/Aura   POLDER   CALIPSO   CloudSat   MODIS,MISR/Terra MODIS/Aqua

DC-8

B-200

P-3

ARCTAS
Science Team Meeting
Lanham-Seabrook, MD
8-10 Jan 2008

ARCTAS
SUPPORT PLAN

REVEAL & Global Test Range