



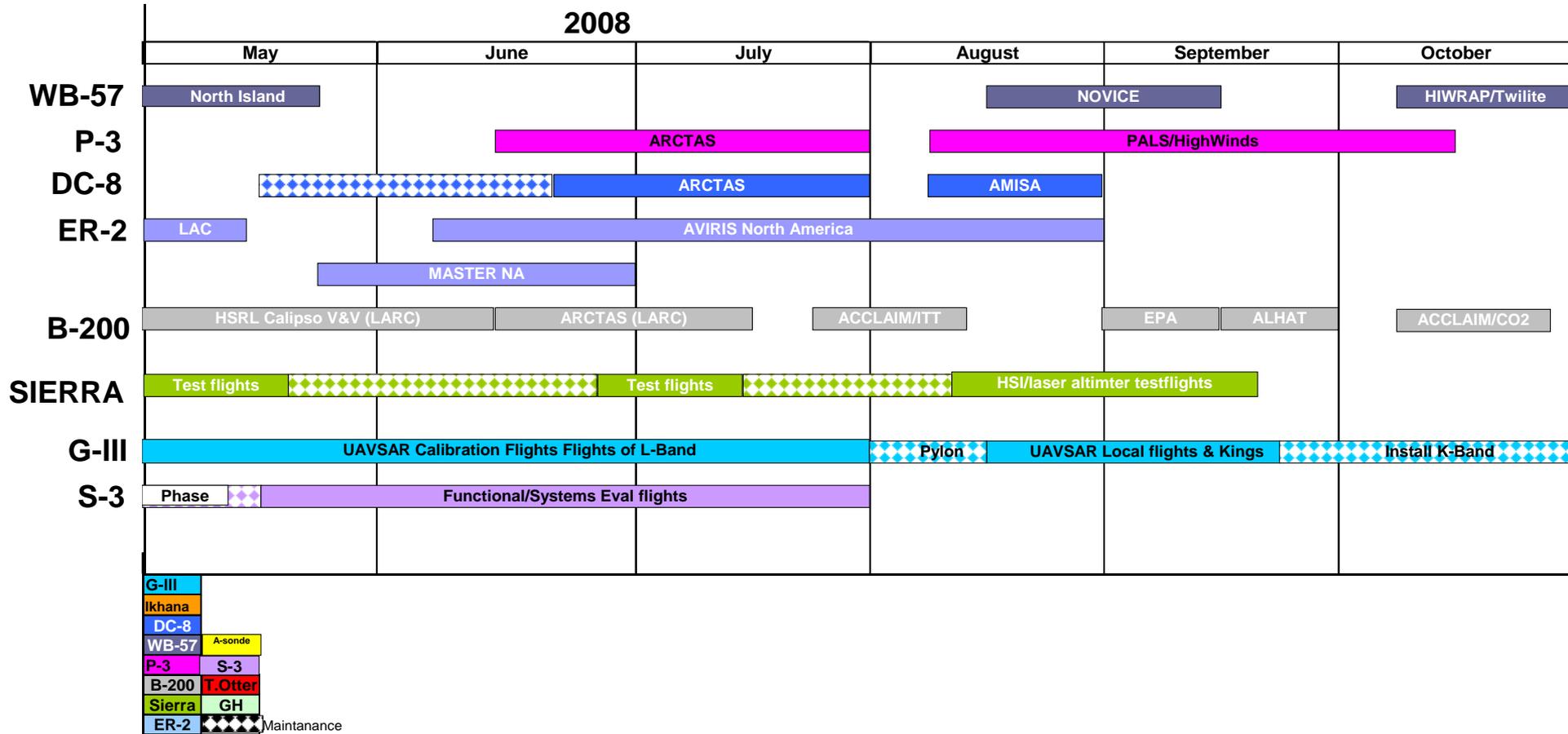
NASA
Science Mission Directorate
ICCAGRA Meeting

NASA Airborne Science Program

May 22 2008

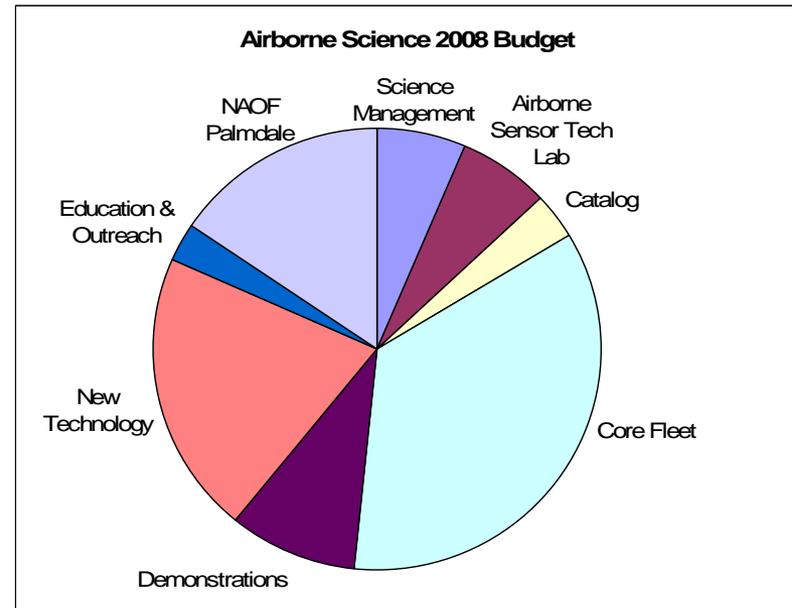
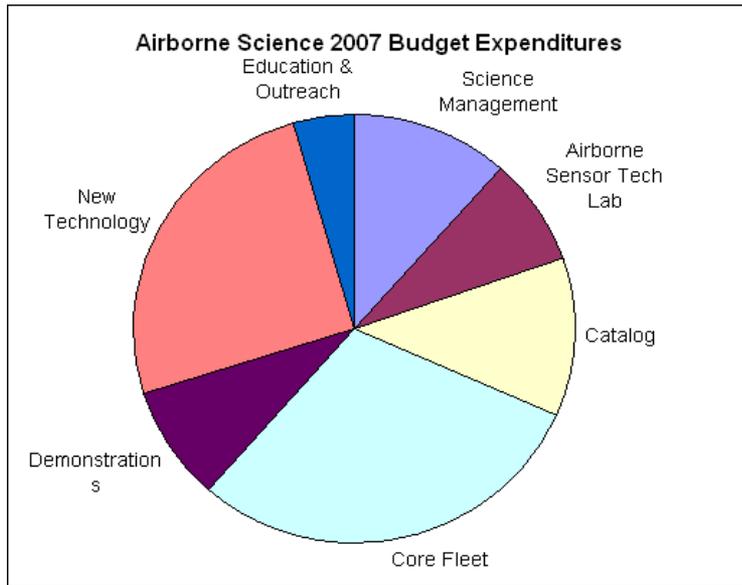


Platform Schedule





Airborne Science Program Budget (less CMO and taxes)





Airborne Science Program Direction

Program Changes and Direction:

- Increased Focus on Core Aircraft – maintaining and upgrading
 - Budget Restoration mostly accomplished, still lacking some Upgrades
- Program name change Suborbital Science to Airborne Science
 - Done
- DC-8 Moved to DFRC Control – NSERC maintains Science and Mission Ops
 - Done
- Establishing a new facility at Palmdale for Airborne Science
 - Established
- Adding Global Hawks to Core aircraft
 - Done
 - Transfer complete
 - Budget Established
 - NGC Space Act Signed, NOAA Implementing Agreement within two weeks
- Increase GRC and LaRC participation in the NASA Airborne Science Program
 - LaRC and GRC are now regular members and part of the Flight Request Process



Airborne Science Program Direction

- Going from National Science Objectives to Required Measurements to Platform Selection
 - Released Requirements Document
 - Standard to the agency
 - Succeeded in stopping the question of what aircraft can we get rid of
 - Contributed to our funding restoration
- Sensor Portability
 - New Data Distribution System based on IWGADTS standards in Core fleet
 - Have started design and new system targeted for operational use on GH in April then ER-2 and WB-57
 - Already on DC-8 and being developed for P-3
 - Will start Intercenter Integration Guide next month
 - Have started a bit slowly but is under way will most likely take a year and a half to implement
- Develop bridges to our national and international airborne science community
 - Strengthen ICCAGRA
 - Working with EUFAR – joint meeting next year – attending the next EUFAR meeting
 - Adding Key Note senior agency leaders to meeting
 - IWGADTS subcommittee making headway
 - Work with ICORSE
 - Introduced us to ISPRS
 - Establishing an official international airborne science working group
 - Significant participation with ISRSE 09
 - Will hold first ISPRS working group meeting
 - ISRSE has agreed to highlight science aircraft contributions
- New Manager
 - Now an old manager
 - Adding a quarterly news letter
 - Adding a recognition program
 - Adding a history capture program



Airborne Science Capability Additions and Program Stabilization



**NASA Airborne
Science Facility in
Palmdale**



NASA Dryden Flight Research Center Photo Collection
<http://www.dfrc.nasa.gov/Gallery/Photo/index.html>

NASA Photo: ED08-0022-01 Date: January 17, 2008 Photo By: Tom Tschida

The Dryden Aircraft Operations Facility in Palmdale, Calif., is now home to two large science aircraft, NASA's SOFIA observatory and a DC-8 science laboratory.





NASA Global Hawk Status

26 Sept 2007

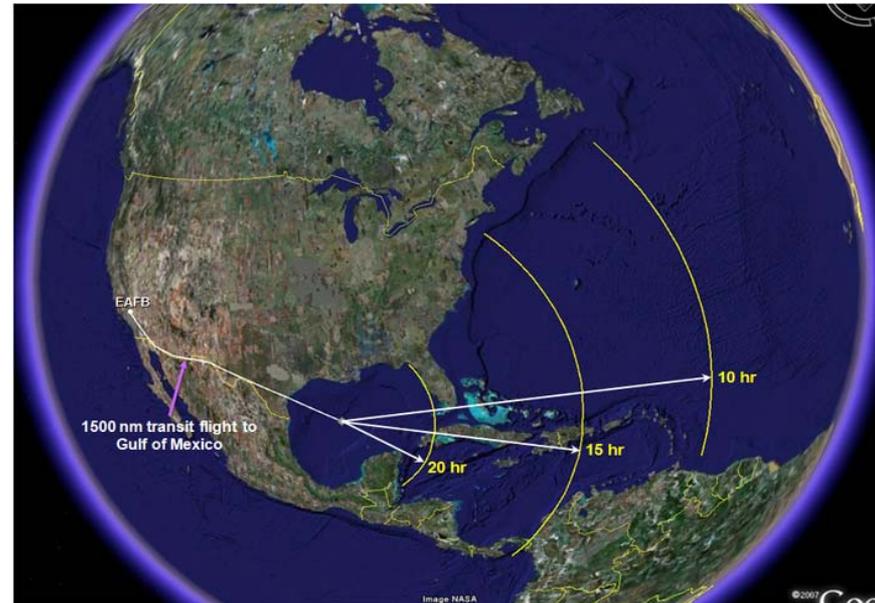


NASA/USAF MOA

- The transfer of two Global Hawk aircraft from the USAF to NASA has been finalized.
- Both aircraft have all the required equipment for flight, and Northrop Grumman is currently performing inspections on the aircraft under a contract with NASA.
- NASA and NGC signed Space Act Agreement, NOAA is about to sign an implementing agreement to be a partner
- FY08 is the stand-up year, and the initial operating capability will be in FY09 with UASAVE.

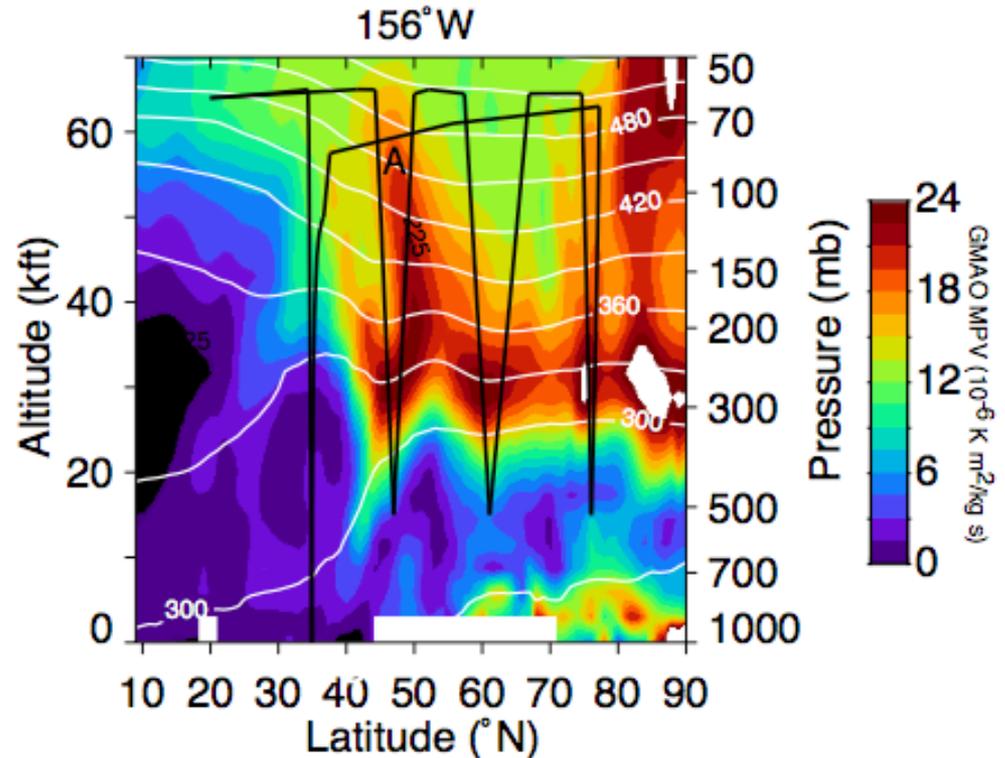
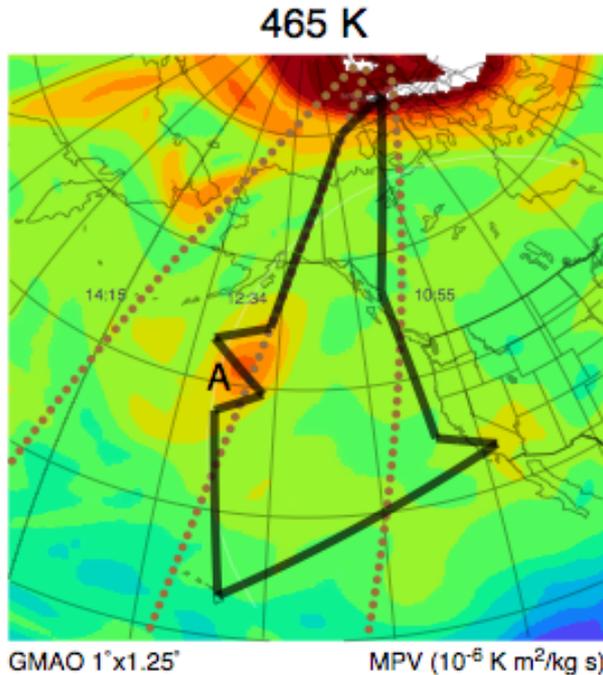
Range	> 11,000 nmi
Endurance	> 31.5 hours
Maximum Altitude	65,000 feet
Gross Weight	26,750 lbs
Fuel Capacity	15,300 lbs
True Airspeed	335 knots
Payload Weight	2000 lbs
Payload Power	10 kVA
Payload Volume	> 100 ft ³
Airfield requirement	8,000 x 150 feet
Engine	AE-3007H
Fuel	JP-8
AV-1	< 600 flight hours
AV-6	< 200 flight hours
Autonomous all phases of flight	

SPACE ACT AGREEMENT
 BETWEEN
 NORTHROP GRUMMAN SYSTEMS CORPORATION
 INTEGRATED SYSTEMS SECTOR
 AND
 NASA DRYDEN FLIGHT RESEARCH CENTER
 FOR
 ESTABLISHMENT AND OPERATION OF A GLOBAL HAWK UNMANNED AERIAL
 SYSTEM





GH UAS-AVE vortex fragment flight



30 hour flight

Objective 1: sample remaining polar vortex for ozone depleted air

Objective 2: sample polar fragment over Pacific

Objective 3: Coordination with Aura satellite overpass

Objective 4: Pole-to-tropics sampling of air masses

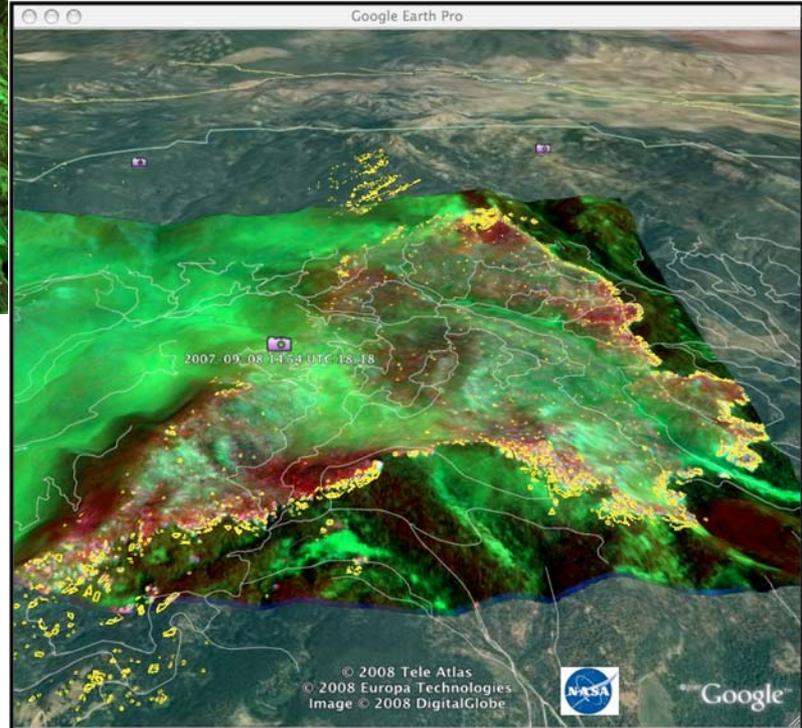


Western States Fire Mission 2007 – NASA/USFS/DHS/FEMA/CA OES

- Completed DFRC Airworthiness and Flight Safety Review Process
- Received Certificate of Authorization (COA) from the FAA
- Completed final checkout of Ikhana systems and Western States Fire Mission Payload
- Flew Fire Mission From Washington thru Idaho to San Diego – was on CNN, DHS supported the southern California extended mission
- Flights lasted up to 20 hours
- Briefed to President



Southern California Oct 26, 2007 Santiago Fire



I consider this an extraordinary success. I was standing in Area Command for the Zaca incident on the morning of the first flight. Our conversation surrounded the "fog of war" existing due to an inversion on the southeast corner of the fire... the incident management teams did not know where the fire was, and that information was critical to modify their strategy and initiate action. The intel provided by the UAV, real time and geospatially oriented, answered that critical question and saved precious hours.

Ed Hollenshead, Director
Fire and Aviation Management, Pacific Southwest Region - R5



UAS Hurricane Mission 2007

- **Mission Review Status**

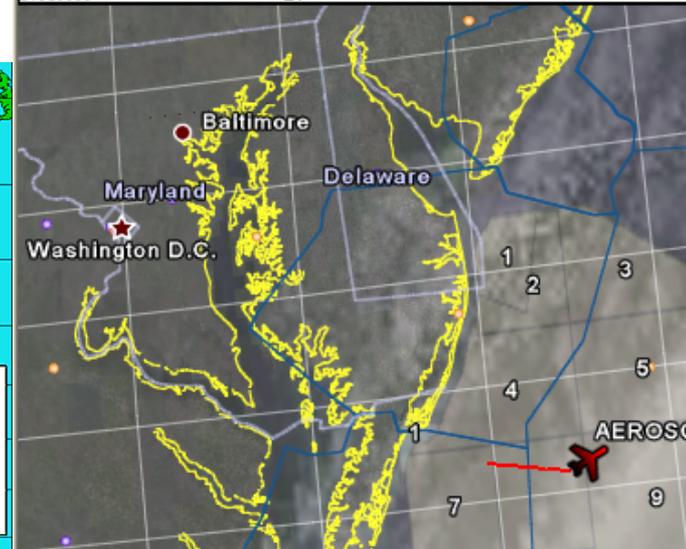
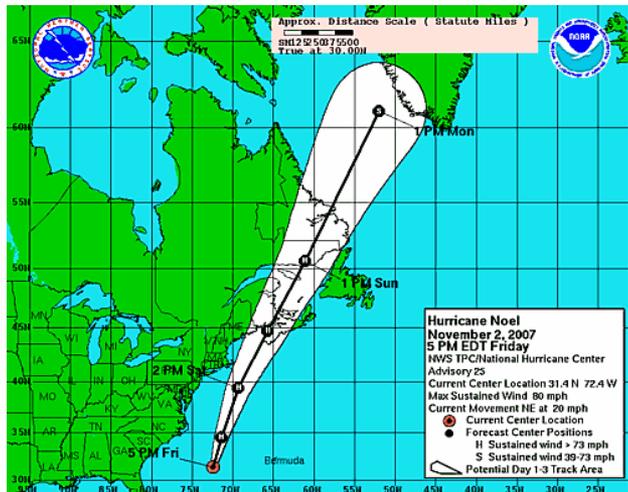
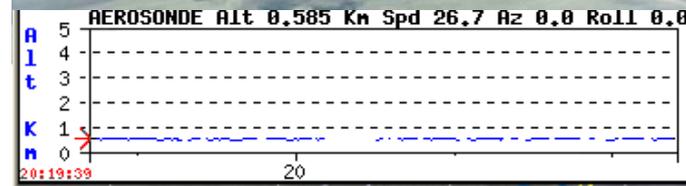
- Mission Readiness Review completed 8/31/07
- WFF King Air is the Aerosonde escort aircraft

- **Mission documentation completed**

- Required mission documents signed off
- Improving display capability in Real Time Mission Monitor (RTMM) in Google Earth

- **Hurricane Noel 11/2/07**

- Flew Nov 2 from WFF
- Flew 17.5 hours at 500 feet from edge to eye, several vertical profiles to 5000 ft. First time this interaction data has been obtained
- Over 10 hours in the storm, before a controlled termination in the water
- Map at right shows max potential range from NASKW & WFF without overland restrictions (white circles), current operational area in Gulf of Mexico (green), and Gulf oil rig no fly zone (red)
- Flown jointly with the NOAA P-3
- FAA issue regarding interpretation of authorization to fly between Wallops and the COA issuing authority at FAA. Resolved with no wrong doing by NASA



7/21/2008



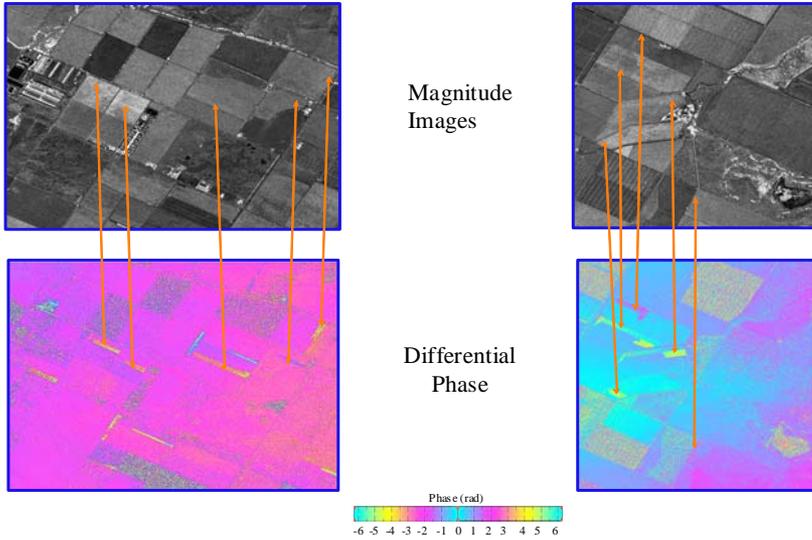
UAVSAR

JPL

Deformation in California Central Valley

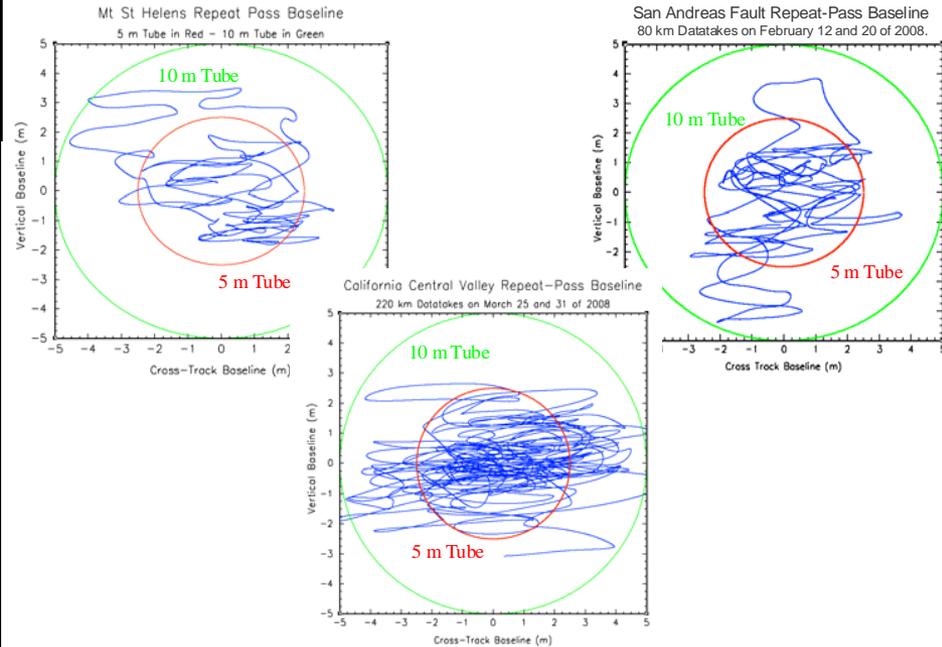


- Expansion of the soils do to watering can be observed in the phase differences. One cycle of phase change corresponds to 6 cm of deformation. Observed deformation on the order of 1-2 cm.



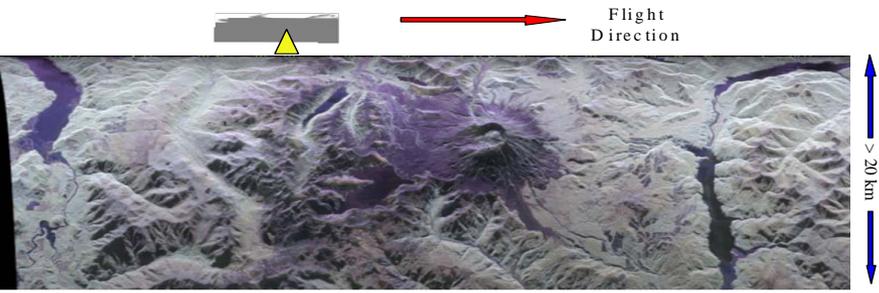
JPL

Example Repeat Pass Baselines



JPL

Mt St Helens - UAVSAR March 24, 2008



- Fully polarimetric image of Mt St Helens collected on March 24, 2008 by the UAVSAR radar. A second acquisition was collected on March 31, 2008.



Arctic Research of the Composition of the Troposphere from Aircraft and Satellites

(ARCTAS)

A NASA contribution to IPY and the international POLARCAT initiative

<http://cloud1.arc.nasa.gov/arctas>



Conducted in spring and summer 2008 with the following foci:

1. **Long-range transport of pollution to the Arctic** (including arctic haze, tropospheric ozone, and persistent pollutants such as mercury)
2. **Boreal forest fires** (implications for atmospheric composition and climate)
3. **Aerosol radiative forcing** (from arctic haze, boreal fires, surface-deposited black carbon, and other perturbations)
4. **Chemical processes** (with focus on ozone, aerosols, mercury, and halogens)

April 2008: Fairbanks and Barrow, Alaska; Thule, Greenland

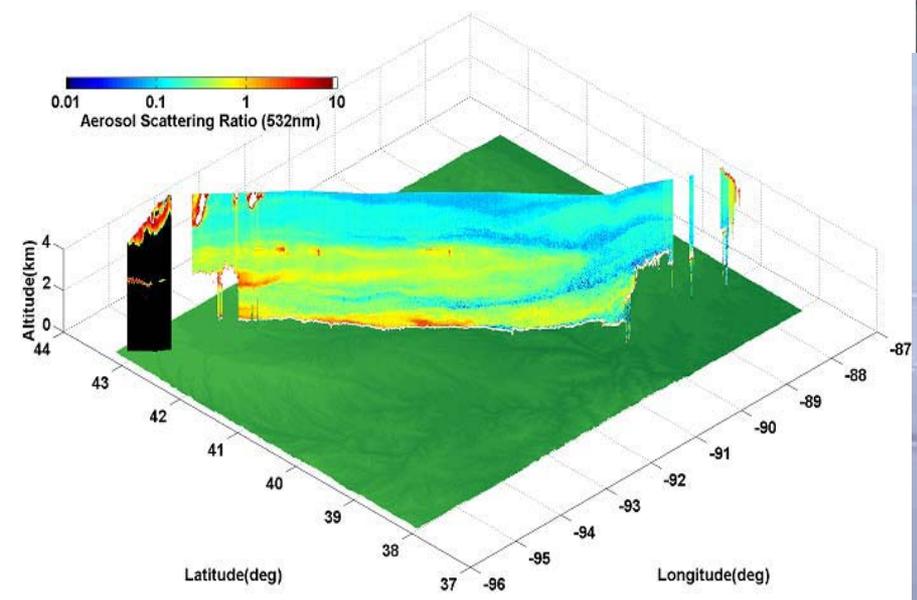
July 2008: Cold Lake, Alberta; Yellowknife, NW Territories

Partners: NASA, NOAA, DOE, NSF, Canada, France, Germany





ARCTAS MISSION

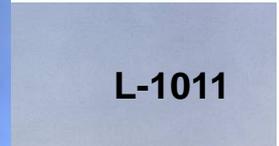




Aircraft Catalog

Blanket Purchase Agreements (BPA)

- Blanket Purchase Agreement respondents have come in. An unprecedented 12 companies offering dozens of aircraft are included:
 - **Heavy Lift Aircraft**
 - L-1011
 - **Medium Lift Aircraft**
 - B-200
 - G-1
 - Twin Otter
 - SAAB 340
 - OV-1
 - **Light Aircraft**
 - Archer
 - **Unmanned Aircraft**
- BPA award
- Paid for on a per mission basis. No recurring leases no contract minimum





Upcoming Events

- **Major Upcoming Activity:**
 - May 08 – MASTER NA, ER-2
 - Jun 08 – AVIRIS NA, ER-2
 - Jun 08 – California Air Resources Board Missions, DC-8, P-3
 - Jun 08 – ARCTAS 2, Canada, P-3, B-200, DC-8
 - Aug 08 – NOVICE, WB-57
 - Aug 08 – AMISA, Sweden, DC-8
 - Aug 08 – Pals, HighWinds, Greenland, P-3
 - Sept 08 – TO AVIRIS, Twin Otter
 - Apr 09 – UASAVE, Global Hawk
 - Aug 09 – WB-57 GWI and Superpods, WB-57
 - Sept 09 – Hurricane Mission, Global Hawk
 - Jan 10 – TC4 Guam, DC-8, WB-57



Back up





First Western States Fire Mission 07



Morning Collect



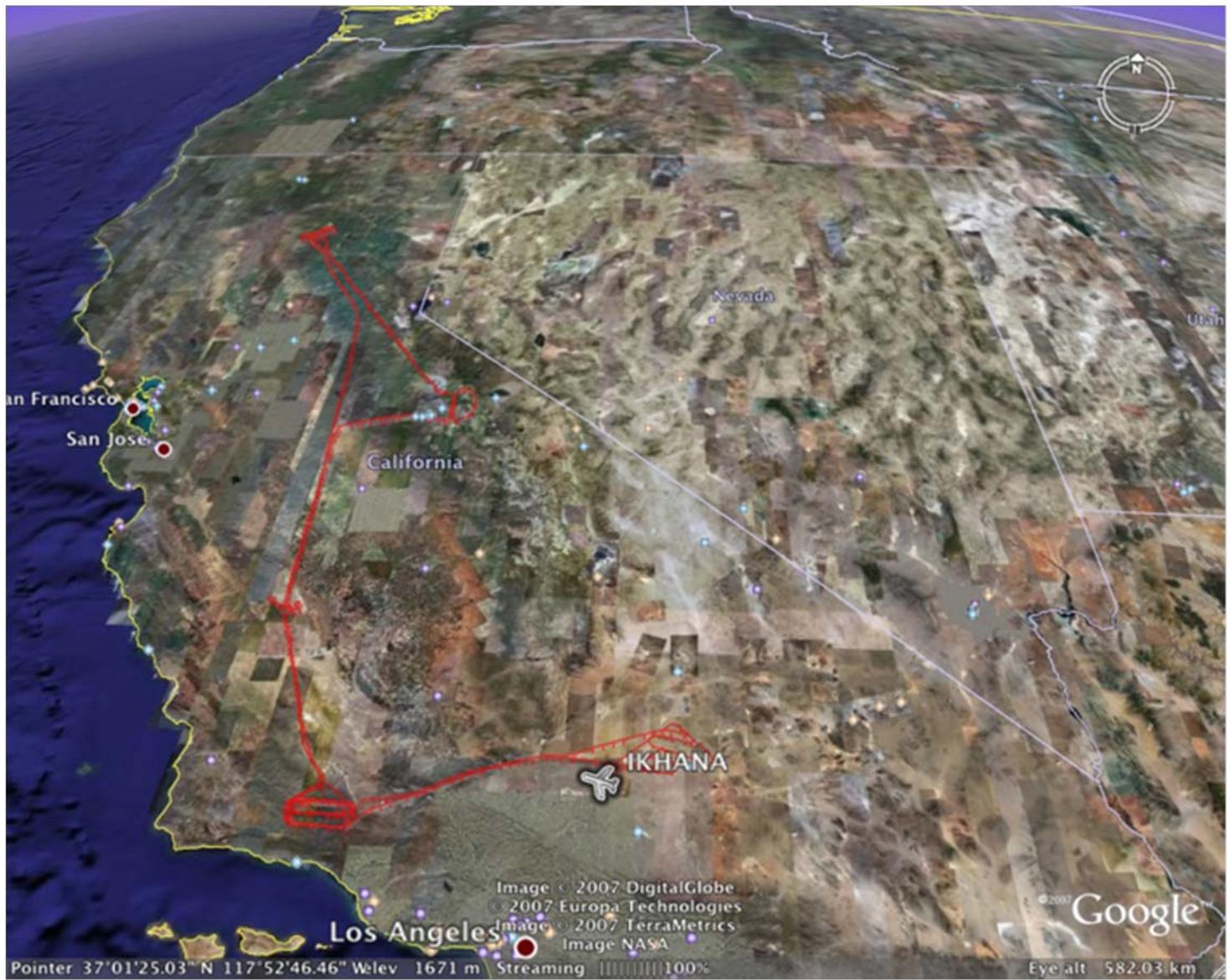
Afternoon Collect - 6 hours later

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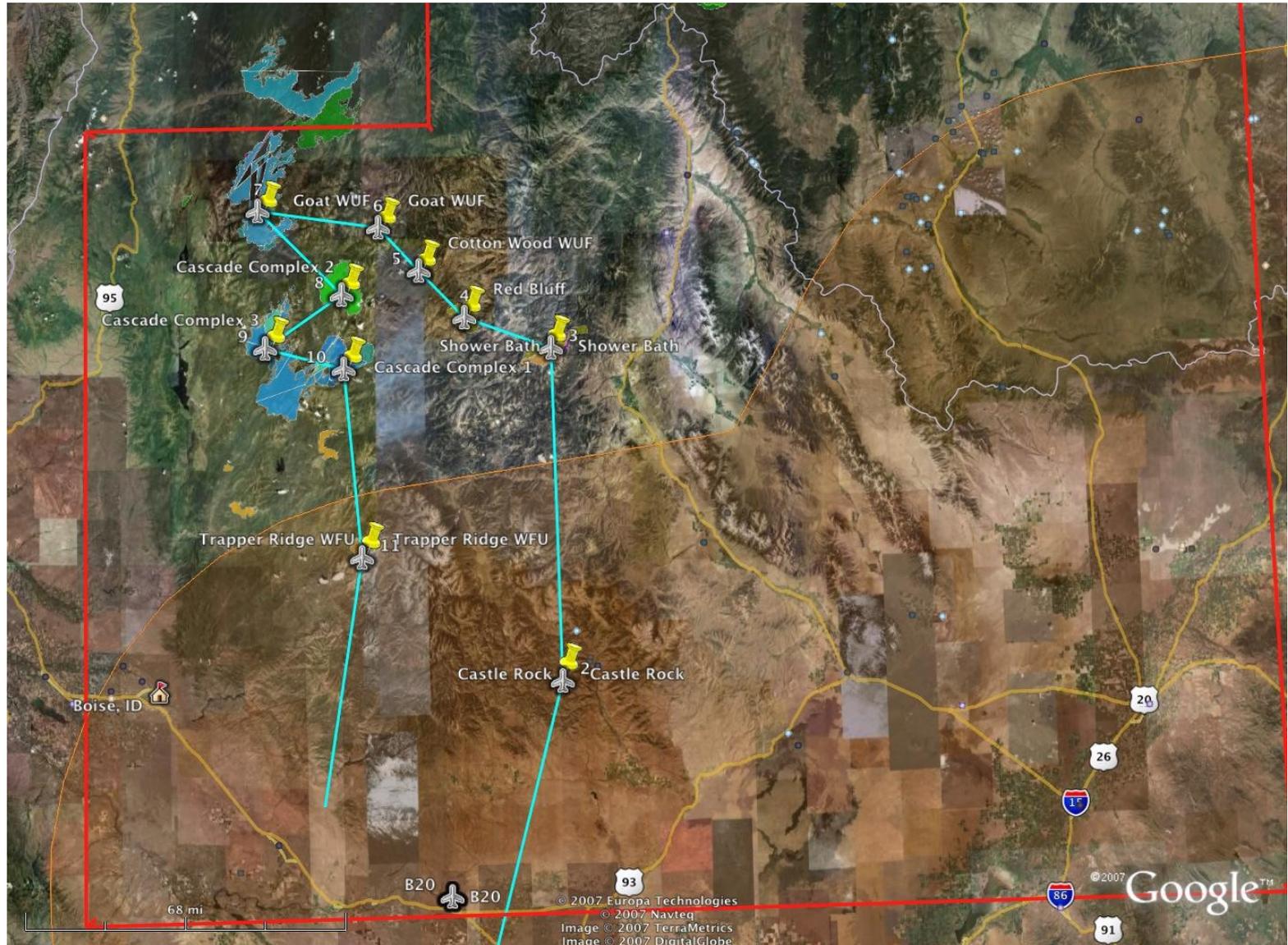


WSFM Flight #1





WSFM Flight #2 plan





TC-4 Aircraft Mission Tracks





Central America Mission Tracks

