

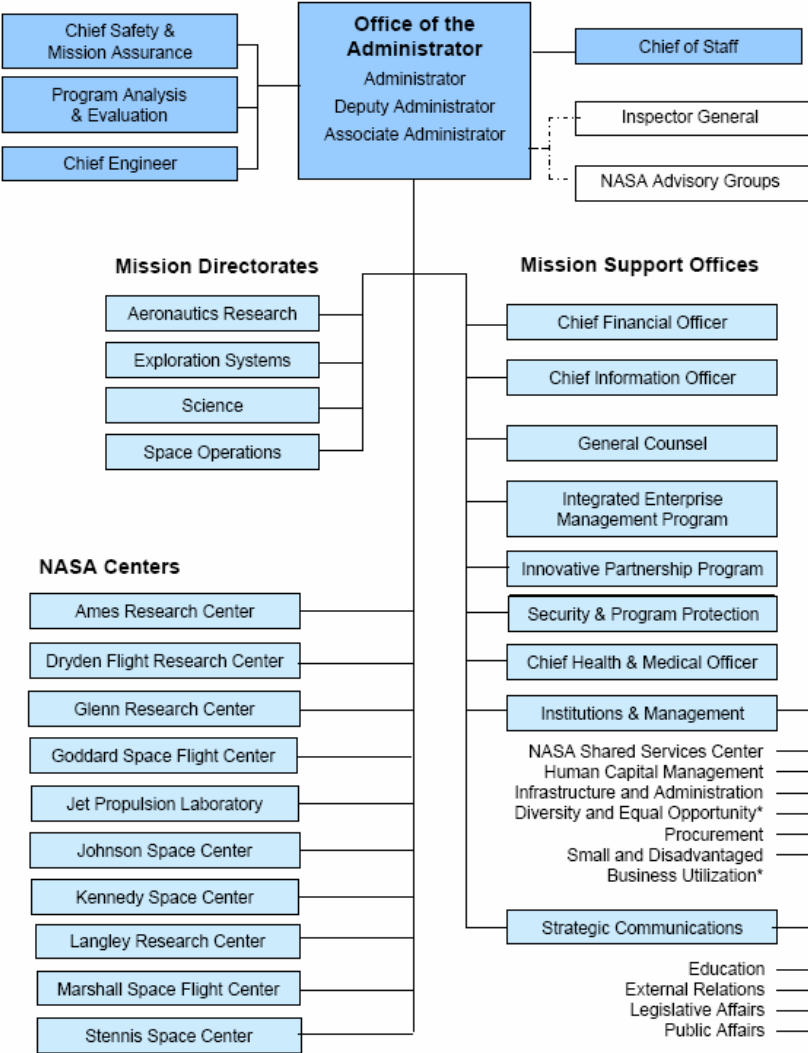


**ICCAGRA
May 2006**

NASA Update



AGENCY UPDATE

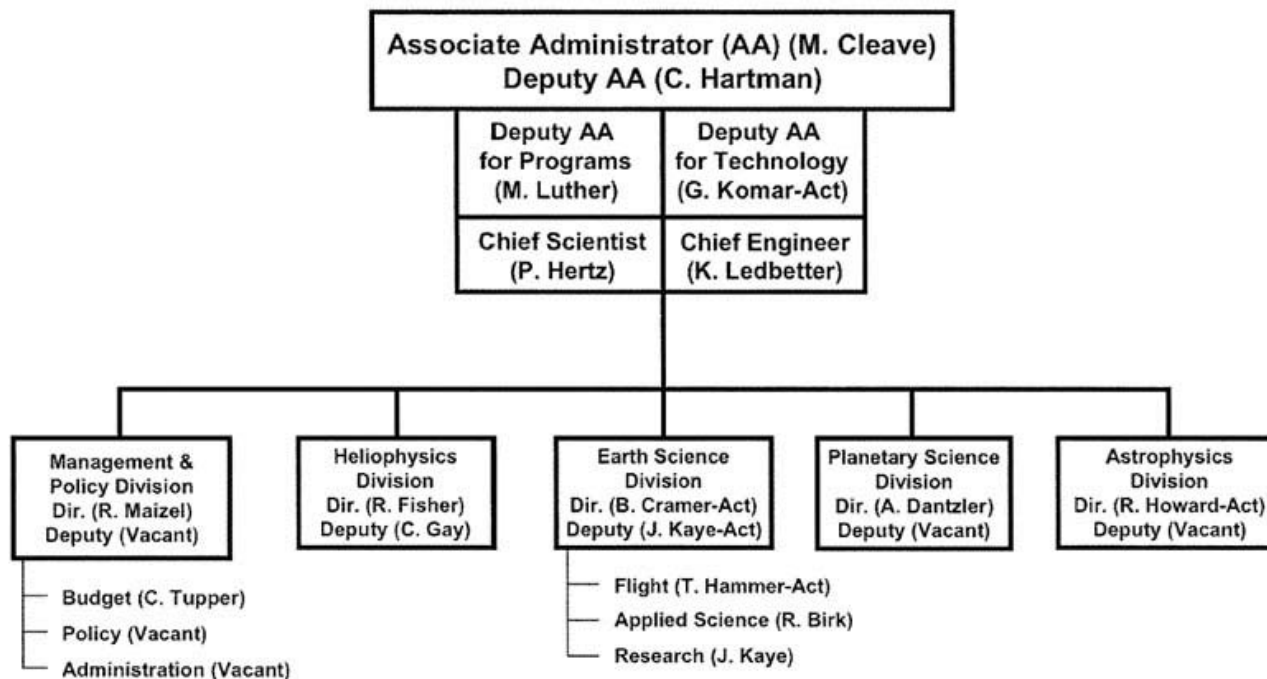




AGENCY UPDATE

WWW.NASAWATCH.COM

Science Mission Directorate New Organization Chart





Suborbital Science Programs

Add to the understanding and prediction of the Earth system. Suborbital observations fill time and space gap between surface observing networks and orbital platforms.

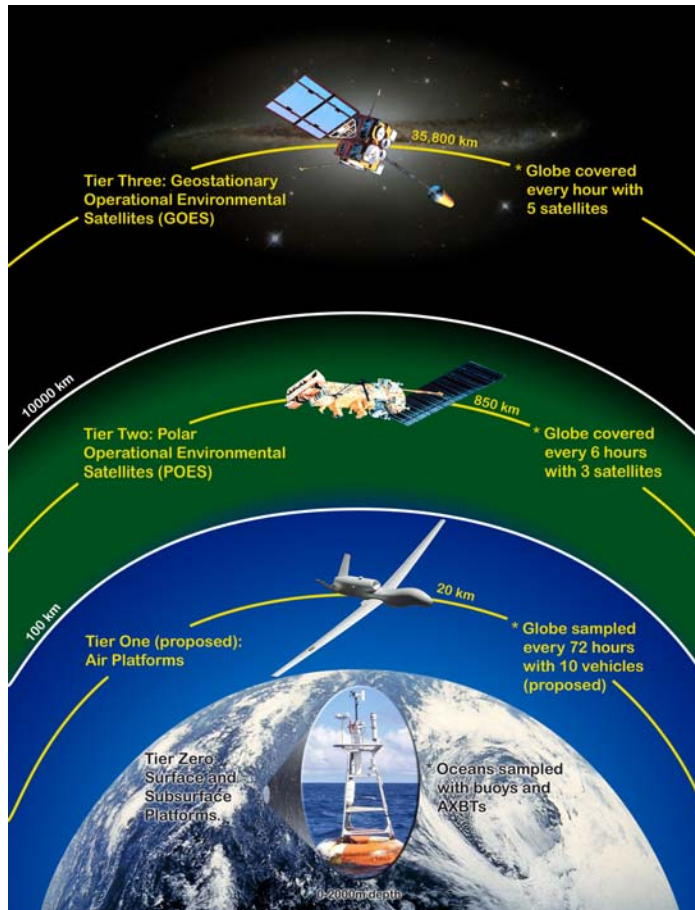
Objectives

- Development of new space sensors and new remote-sensing techniques.
- Satellite calibration/validation.
- Targeted observations of ephemeral phenomena with variable temporal and spatial scales.
- Atmosphere/near-space in-situ observations.
- Improvement and validation of predictive Earth process models using satellite data.
- Next-generation scientists with hands-on sensor hardware and field experiment experience.

**Sounding
Rocket
Program**

**Balloon
Program**

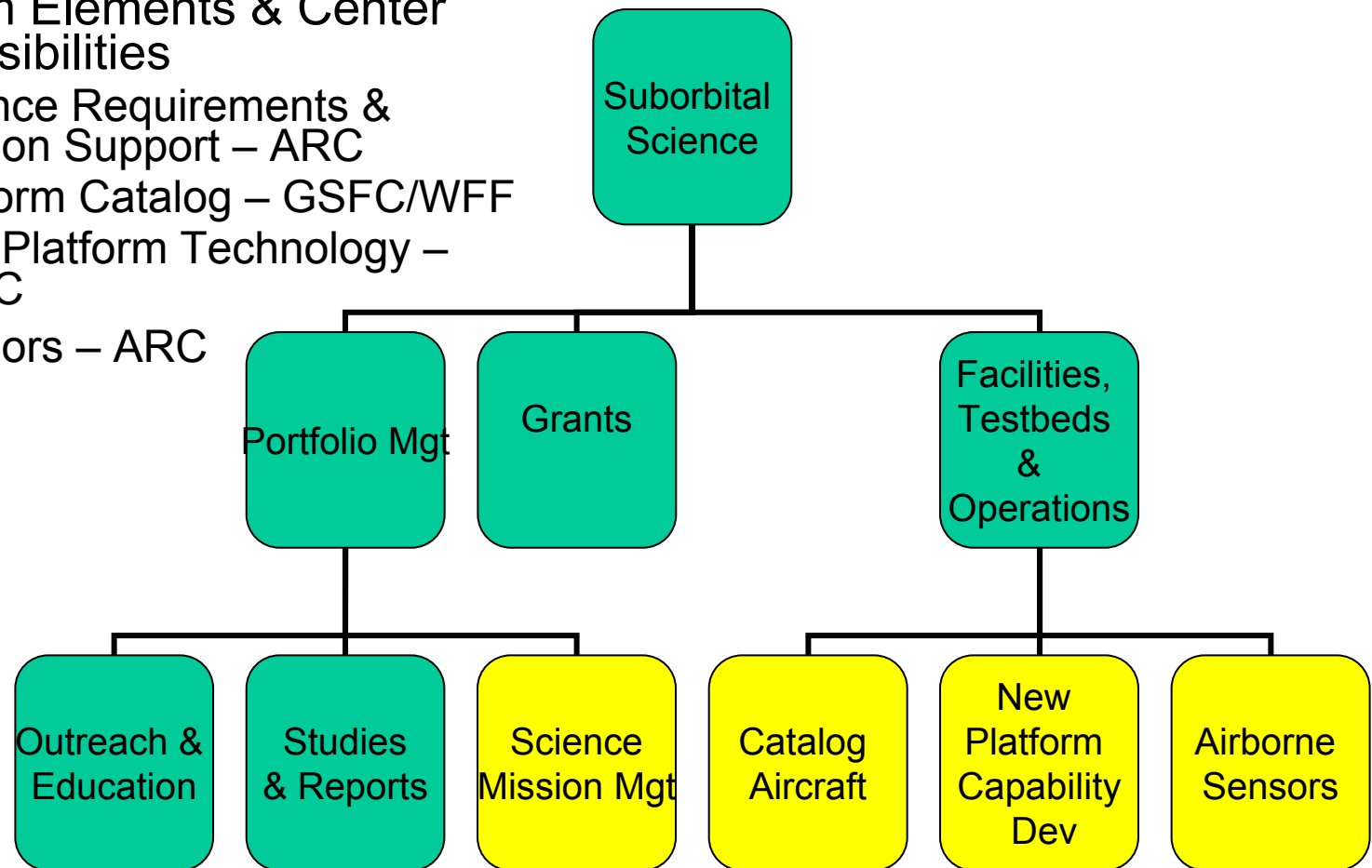
**Aircraft &
UAS
Program**





Program Structure & Organization

- Program Elements & Center Responsibilities
 - Science Requirements & Mission Support – ARC
 - Platform Catalog – GSFC/WFF
 - New Platform Technology – DFRC
 - Sensors – ARC





Program Baseline Budget

	FY05	FY06	FY07	FY08	FY09	FY10	FY11
FY06 PFP	36.04	34.96	32.63	32.59	30.08	30.17	
FY05 Op Plan Changes	4.5						
FY05 WB57 Upgrades	3.8						
FY07 PFP	44.3	34.17	35.31	35.28	32.81	32.89	32.89

7



WB-57 Activities 2005-2006

NASA 926

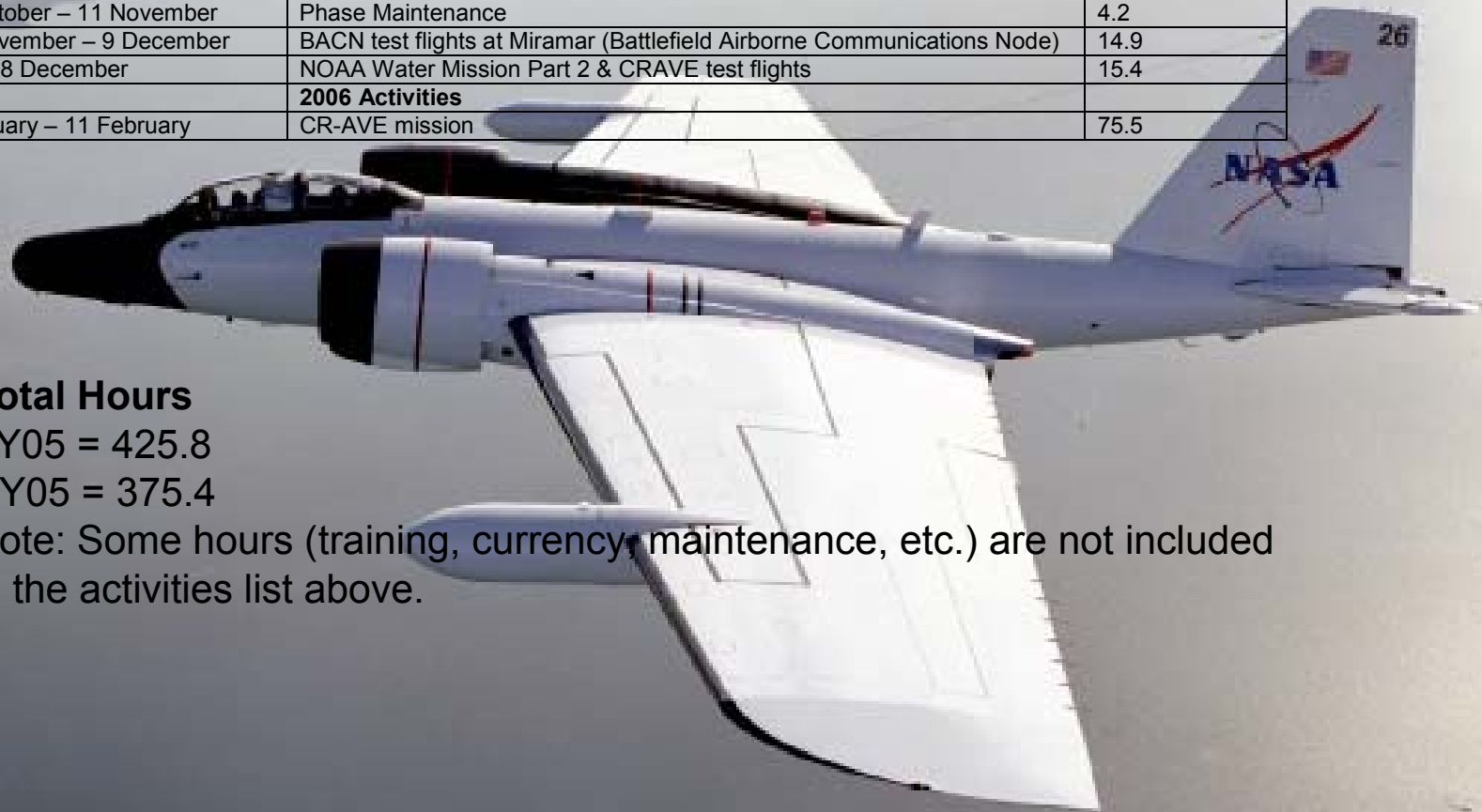
	2005 Activities	Approx. Hours
06 December 04 – 17 February	Integration & test flights for CARTA & Harvard isotopes instruments	46.1
26 February – 8 April	CARTA 2 mission to Costa Rica	122.4
23 May – 2 June	WAVE test flights	8.2
6 – 24 June	AVE Houston	44.5
27 June – 8 July	Water Isotope Intercomparison Flights	17.6
9 – 28 July	WAVE mission STS-114 launch	21.8
5 – 9 August	WAVE deployment to Costa Rica for STS-114 landing	12.1
24 – 29 August	PSR test flights	2.6
6 – 23 September	AVIRIS flights (Katrina, Woodpecker, Ames deployment)	46.8
10 October – 11 November	Phase Maintenance	4.2
14 November – 9 December	BACN test flights at Miramar (Battlefield Airborne Communications Node)	14.9
12 – 18 December	NOAA Water Mission Part 2 & CRAVE test flights	15.4
	2006 Activities	
3 January – 11 February	CR-AVE mission	75.5

Total Hours

FY05 = 425.8

CY05 = 375.4

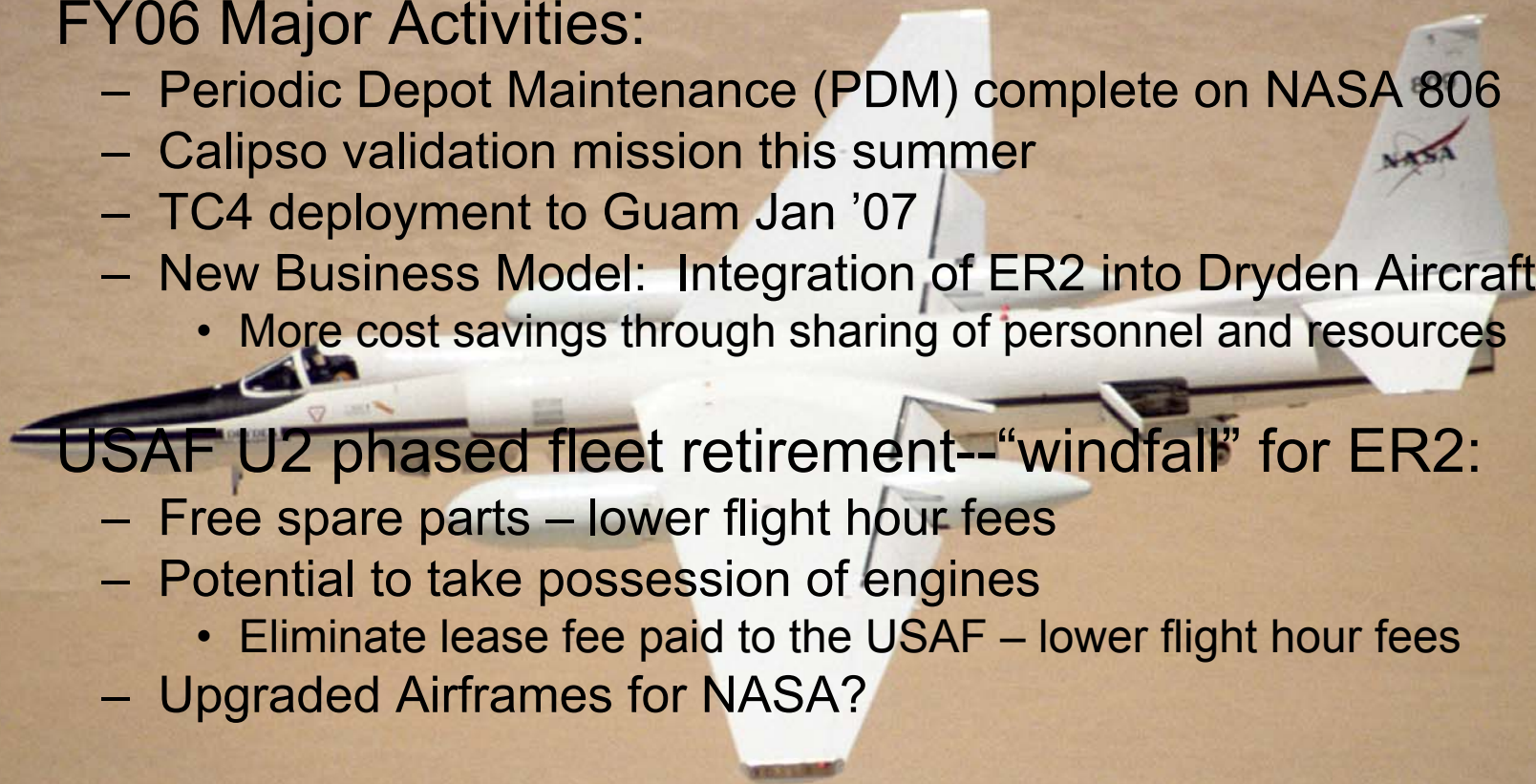
Note: Some hours (training, currency, maintenance, etc.) are not included in the activities list above.





ER-2 Accomplishments and Plans

- FY05 Major Accomplishments:
 - TCSP: July '05. 16 missions, 107.2 hours from Costa Rica.
 - Payload: AMPR, CRS, EDOP, HAMSR, LIP, MTP, MAS
- FY06 Major Activities:
 - Periodic Depot Maintenance (PDM) complete on NASA 806
 - Calipso validation mission this summer
 - TC4 deployment to Guam Jan '07
 - New Business Model: Integration of ER2 into Dryden Aircraft Pool
 - More cost savings through sharing of personnel and resources
- USAF U2 phased fleet retirement--“windfall” for ER2:
 - Free spare parts – lower flight hour fees
 - Potential to take possession of engines
 - Eliminate lease fee paid to the USAF – lower flight hour fees
 - Upgraded Airframes for NASA?





P-3B

- | • <u>Mission</u> | <u>Dates</u> | <u>Flt Hrs</u> |
|------------------|--------------|----------------|
| • Arctic Ice | Mar 2006 | 50 |





DC-8 Accomplishments

• <u>Mission</u>	<u>Dates</u>	<u>Flt Hrs</u>
• PAVE	Jan2005	88
• Stardust	Jan 2006	16





Twin Otter 2005

<u>Mission</u>	<u>Dates</u>	<u>Flt Hrs</u>
----------------	--------------	----------------

- | | | |
|---------------------|--------------|----|
| • AVIRIS Hawaii | Feb 2005 | 48 |
| • ATM Alaska | Aug-Sep 2005 | 98 |
| • AVIRIS Fall 2005 | Oct-Nov 2005 | 64 |
| • AVIRIS Coral Reef | Dec 2005 | 52 |
| • AVIRIS Spring | May 2006 | |





Sky Research Caravan





DOE B-200

- | • <u>Mission</u> | <u>Date</u> | <u>Flt Hrs</u> |
|-------------------|-------------|----------------|
| • LVIS Costa Rica | Mar 2005 | 50 |
| • LVIS Woodpecker | Jun 2006 | 25 |





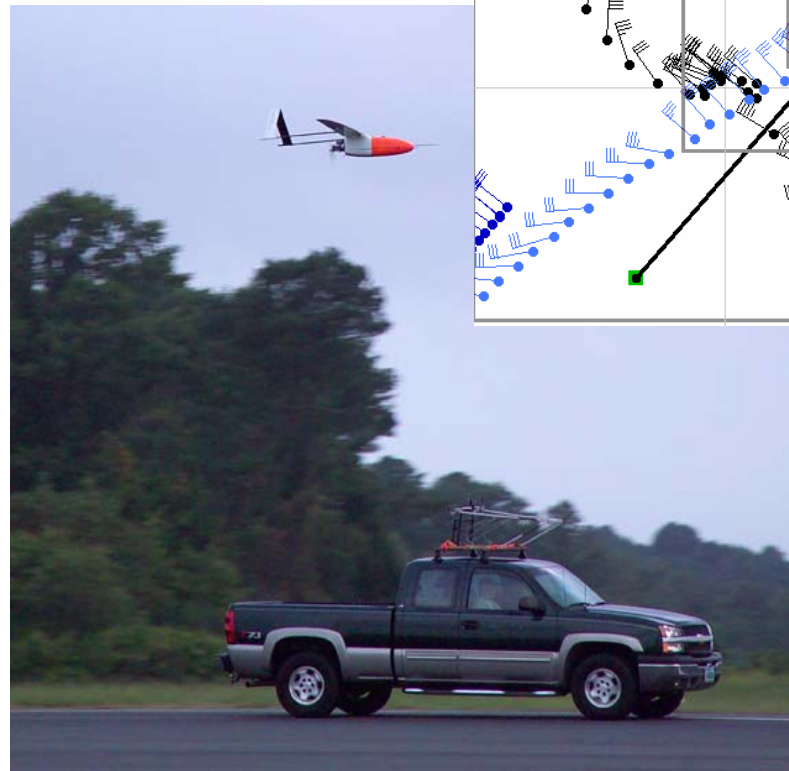
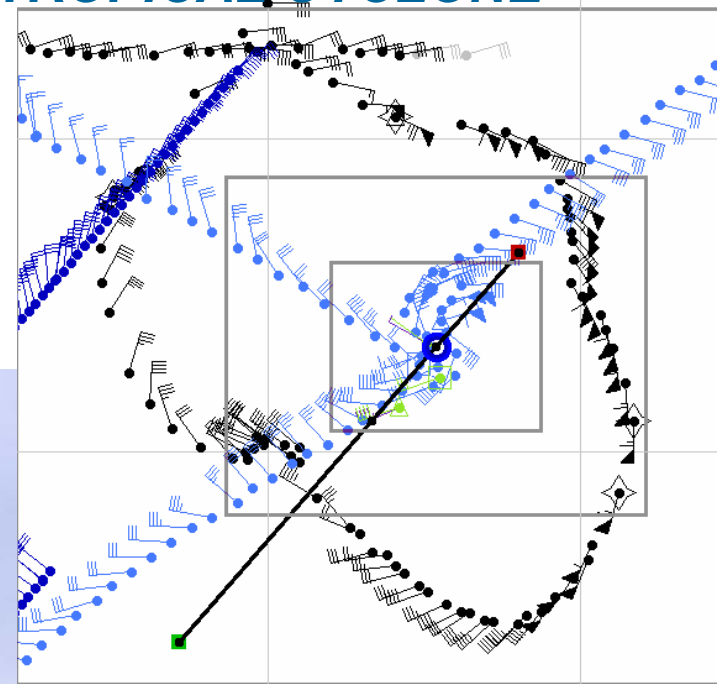
Hurricane Wind Comparison Aerosonde Flight - Ophelia 16 Sep. 2005

FIRST EVER UAV TO FLY INTO A TROPICAL CYCLONE

- NOAA WP-3D Stepped Frequency Microwave Radiometer (SFMR) Surface winds in light blue, Aerosonde winds in black, buoy winds in dark blue.

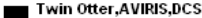
- Aerosonde closest approach to wind center was 30 nm southwest and 25 nm northeast. Peak winds at 2500 ft were 65 kt southeast of center and 75 kt north of center.

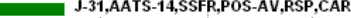
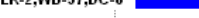
- Excellent agreement was found between buoy, SFMR and Aerosonde winds adjusted to surface values. SFMR winds SW of center were within 10 min of aerosonde.





Science Schedule

ID	Task Name	Hyperlink	Gtr 1, 2006				Gtr 2, 2006				Gtr 3, 2006				Gtr 4, 2006				Gtr 1, 2007				Gtr 2, 2007				Gtr 3, 2007			
			Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
26	Water																													
27	NASA AVIRIS Assessment of the 2005 Caribbean Coral Bleaching Event	6T008	 Twin Otter,AVIRIS,DCS																											
28	Arctic Sea Ice 2006	6P001																												
29	Envisat Validation with Arctic 2006 Pe	6P005																												
30	Arctic Ice Mapping - AIM Greenland	6T204																												
31	Multi-resolution Snow Products for the Hydrologic Sciences	6T010																												
32	NOAA NPOESS CMIS airborne simulator (test)	6W004																												
33	Global Estimation of Canopy Water Content	6T011																												
34	Passive/Active Microwave Measurements of Soil Moisture and Forest Biomass	6P004																												
35	Harmful Algal Bloom Ecology	62002																												
36	CLPX Cold Land Process Experiment	7T001																												
37	GISMO: Global Ice Sheet Mapping Or	7P001																												

ID	Task Name	Hyperlink	Gtr 1, 2006			Gtr 2, 2006			Gtr 3, 2006			Gtr 4, 2006			Gtr 1, 2007			Gtr 2, 2007			Gtr 3, 2007	
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
1	Atmosphere																					
2	Costa Rica AVE	6W001	 WB-57																			
3	INTEX-B/MILAGRO	6J001	 J-31,AATS-14,SSFR,POS-AV,RSP,CAR																			
4	INTEX-B Houston	68001	 DC-8																			
5	INTEX-B Hawaii	68001	 DC-8																			
6	IMPEX: NOAA INTEX-B Seattle		 ICAR C-130																			
7	INTEX-B Alaska	68001	 DC-8																			
8	NASA African Monsoon Multidisciplinary Analyses (AMMA)	68205 6A205	 DC-8,Aerosonde																			
9	DOE-CLASIC	72002	 ER-2																			
10	TC-4 Costa Rica	72301 7W301 78301	 ER-2,WB-57,DC-8																			



Science Schedule

ID	Task Name	Hyperlink	Qtr 1, 2006			Qtr 2, 2006			Qtr 3, 2006			Qtr 4, 2006			Qtr 1, 2007
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
49	Satellite Validation														
50	Stardust ReEntry Observation Campaign	68002	■ DC-8												
51	CALIPSO/Cloudsat Launch														
52	EOS Cross Validation VNIR-SWIR	62003													
53	CALIPSO/Cloudsat Cal/Val	62008													
54	Validation of EOS Mid and Thermal Infrared Data	62004													
55	Studies of Biosphere Atmosphere Interactions with a MODIS GCM	6T012													
56	WAVE 2 - STS-121														
57	WAVE Patrick deployment														
58	WAVE Reentry (possible deploy)														

ID	Task Name	Hyperlink	Qtr 2, 2006			Qtr 3, 2006			Qtr 4, 2006	
			Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
39	Surface									
40	Validation of MASTER on B200 at Lake Tahoe CA/NV	6B002								
41	Southern California Fault Assessment	6B003								
42	Test Flights of UAS Wildfire Sensor and IMM/CDE	6M001								
43	Test Flights of UAS Wildfire Sensor	6M001								
44	An AVIRIS Study to Support the Reb	6W301								
45	Western States 24 Hour UAS Wildfire Mission	6U001								
46	ASTER Mapping Improvements by Modeling Spectral-Spatial Scaling of HIS	6B303 6T303 62303								
47	Carbon Capture Program	6B004								



Science Schedule

ID	Task Name	Hyperlink	Qtr 2, 2006			Qtr 3, 2006			Qtr 4, 2006	
			Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
12	Carbon									
13	UAV for Sub-Pixel Land Cover Attributes and Dynamics	6A001								
14	Fluxnet Global Network of Carbon, Water and Energy Flux	6T014								
15	Mechanisms Controlling Annual, Interannual, and Decadal Changes in California's Carbon Budget	6T016								
16	LVIS Mapping Ivory Billed Woodpeck	6B001								
17	LVIS Sequoia National Forest	6B001								
18	Multisite Integration of LIDAR and Hyperspectral data for Improved Estimation of Carbon Stocks and	6T006								
19	Habitat Identification of the Ivory Billed Woodpecker using Hyperspectral Imaging	6W007								
20	Hurricane Katrina Hyperspectral and Cirrus DCS Damage Assessment	6W005								
21	Scaling and Saturation of Ecosystem Carbon Uptake Through Integration of Multi-Scale Remote	62006								
22	Effects of insect defoliation on regional carbon dynamics of forests	62007								
23	In-flight Fusion of Hyperspectral and LIDAR Data for NASA TEP	6T009								
24	Hyperspectral Measurements of Surface Soil Inorganic Carbon and Biological Crust under Climate Change Treatments at the NDFF and MGCF	6T015								



SUBORBITAL SCIENCE UPDATE - INTEX-B

NASA DC-8, Sky Research J-31, NSF C-130, DOE G-I, LaRC B200

Intercontinental Chemical Transport Experiment (Part B) – Deployment Schedule:

Houston:	Mar 1-20
Hawaii:	Apr 18-27
Alaska:	May 1-12

21 sensors

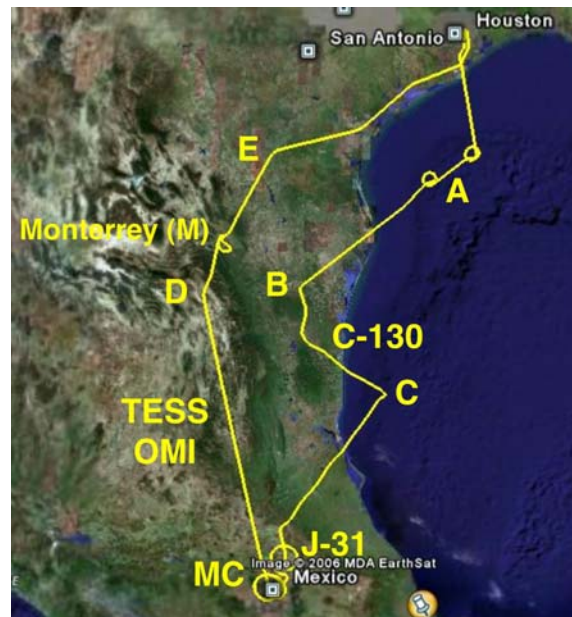
- 11 probes

- 2 lasers

- Species measured:

- HOX,
- NOX, HNO₄,
- SO₂, O₃, HCHO,
- H₂O, CO, CO₂,
- CH₄

- Aerosols



March 19 Flight Plan:

- Intercomparison with NSF C-130
- Coordinated spiral with J-31
- Validation of EOS Aura TES & OMI

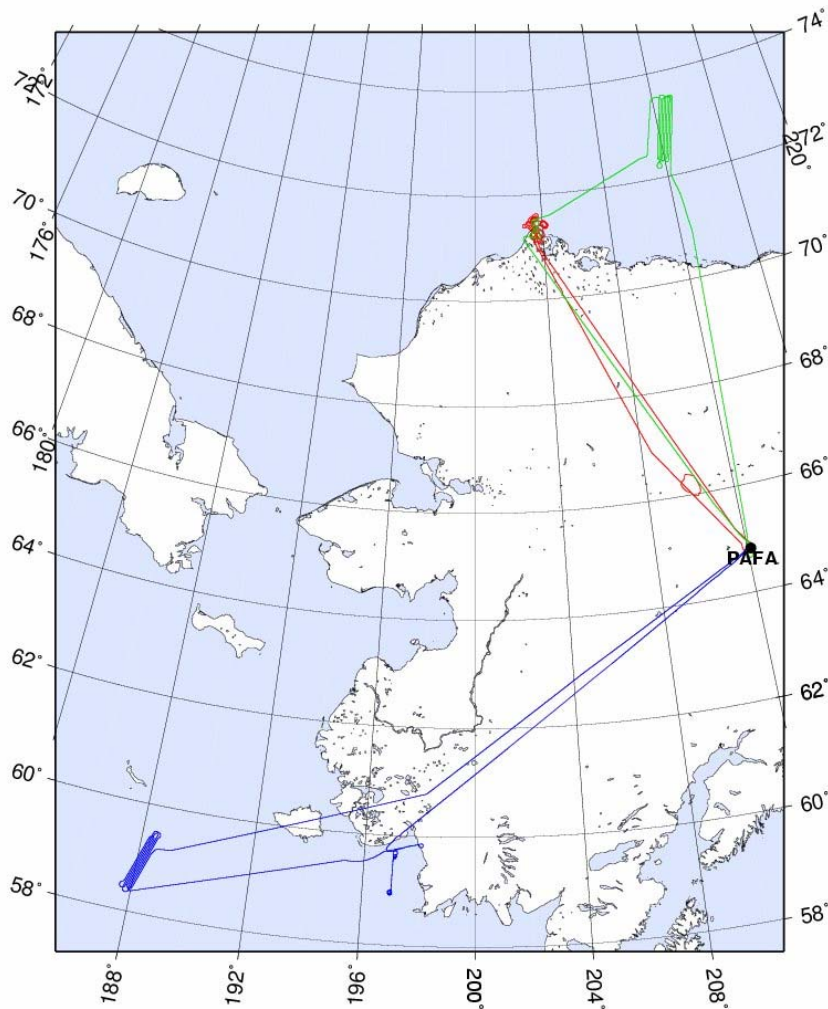
INTEX-B Mexico City Pollution
from DC-8, Mar 16



SUBORBITAL SCIENCE UPDATE – Arctic 2006

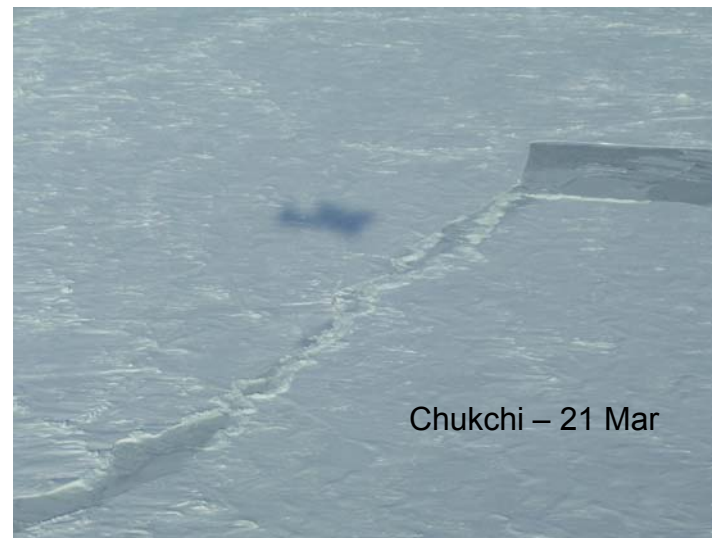
NASA P3-B

Proposed 2006 Alaska Sea Ice Flights



Alaska & Greenland:

- P3-B with Kansas U snow radar, NOAA PSR, IIP D2P radar altimeter, ATM 4 laser altimeter
- Validate EOS Aqua AMSR-E, ICESat, Envisat
- All planned flight tracks achieved





SUBORBITAL SCIENCE UPDATE – NSF Maldives Autonomous UAV Campaign, ACR Manta UAS



Maldives Hanimadhoo Island

- 3 Manta UAS in stacked formation, above, in, and below cloud
- Aerosol properties
- Black carbon
- cloud microphysics
- Broadband & spectral irradiances



Manta UAS

- Advanced Ceramics Research, Arizona
- Payload 15 lbs, 775 cu.in.
- Endurance 6+ hours
- Ceiling 16K ft
- Airspeed 40kts

NASA contributed funding, advised on mission success and flight operations procedures.
Lessons learned report coming.