ARM Aerial Vehicle Program (AVP)

Report to Aerosol and RP WG

Sep 18, 2007

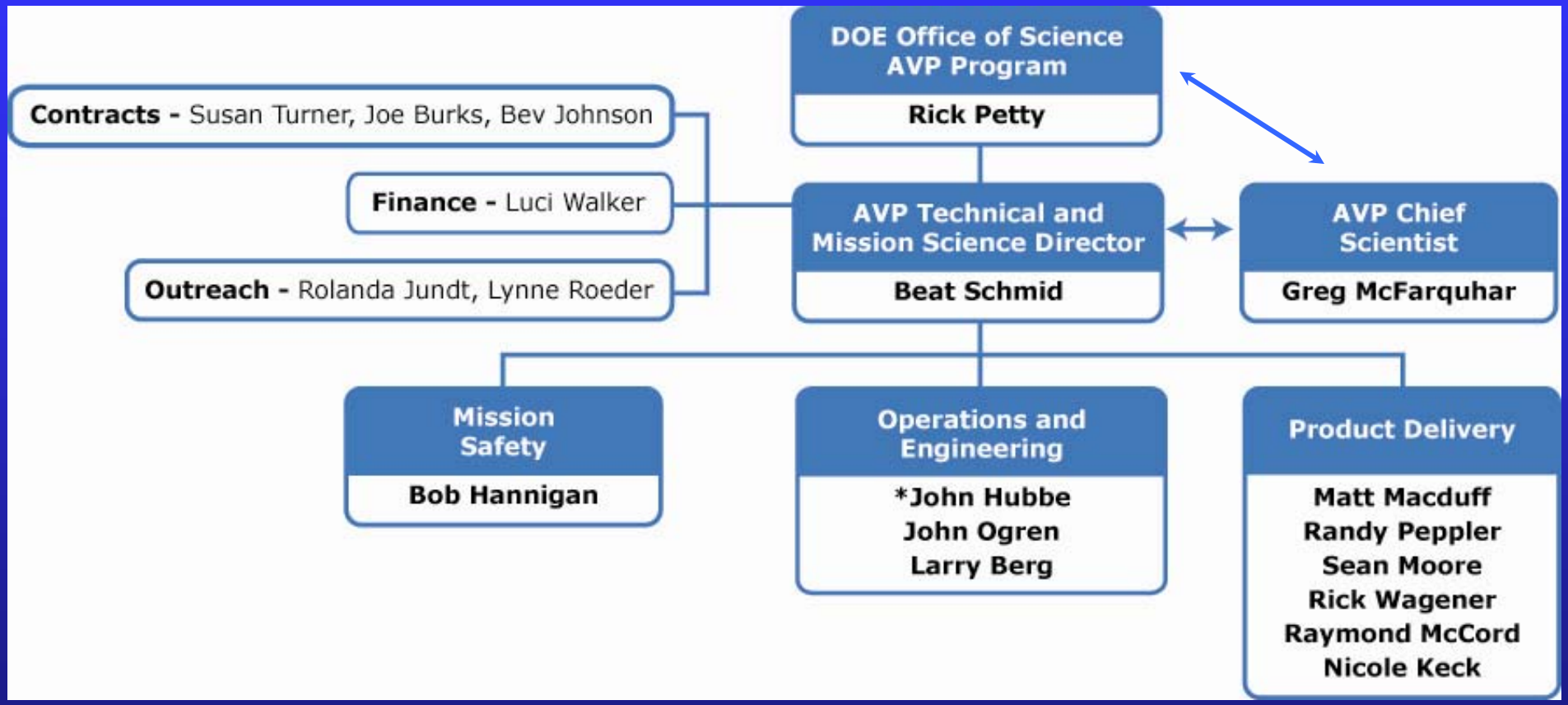
Beat Schmid

What is the ARM AVP?

- June 2006: Former ARM UAV program was re-competed as ARM AVP among DOE National Labs
- Oct 2006: PNNL proposal (PI J. Voyles) successful
- AVP Technical Director:
  - J. Voyles → J. Mather → B. Schmid
- AVP Chief Scientist:
  - G. McFarquhar (previously UAV Chief Scientist)
- AVP Program Manager
  - R. Petty DOE HQ

AVP Org Chart

(Aug 1, 2007)



AVP Tasks FY07

- CLASIC (2007): Planning, Execution and Follow-up → Helped facilitate CHAPS
- ISDAC/RISCAM (2008): Costing, Planning
- Costing of 2009 AVP proposals
- Transfer, maintain, calibrate, modify, upgrade instrumentation from former UAV program
- IAP Cessna 206
- Outreach (Web, Media day CLASIC/CHAPS)

CLASIC

- ARM AVP has guided implementation CLASIC/CHAPS Air (help from SGP Site Science Office)
- Planning meeting, Feb 1+2, 2007, Dallas, TX
- Flight Simulation Meeting Ponca City, May 10+11, 2007, OK
- June 2007, Campaign Ponca City, OK
  - Logistics
  - Flight coordination & safety, FAA, Vance
  - Platform Science (CIRPAS TO & C206)
  - Mather, Schmid, Ronfeld, Hannigan, Flynn
- Aug/Sep 2007, additional C206, HOP, ER-2, flights
- March 2008, CLASIC Workshop, Norman, OK
- CLASIC/CHAPS Session at Spring AGU May 26-30, 2008 in Ft. Lauderdale,Florida

ER-2 Capabilities and Role in CLASIC

- Primarily remote sensing platform for CLASIC
- Operated around 70,000 feet (21 km)
- Based in Houston, TX
- Data characterizes 3-d cloud boundaries, cloud properties, and precipitation, aerosols and surface properties
- Parts of flights provides data to support evaluation of retrieval algorithms developed for instruments on A-train

NASA King Air B200 Deployment Plans for CHAPS

HSRL

Chris Hostetler, Richard Ferrare, John Hair,
Anthony Cook, David Harper, Mike Wusk
NASA Langley Research Center

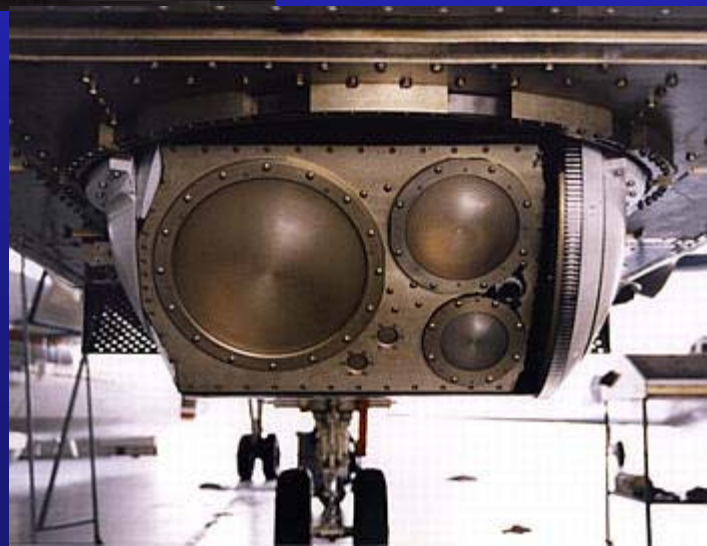
Funded by
NASA HQ Science
Mission Directorate
Radiation Sciences Program

Atmospheric Science Program (ASP)

Funded by
Department of Energy
Atmospheric Science Program

NASA P-3

Soil moisture from PSR



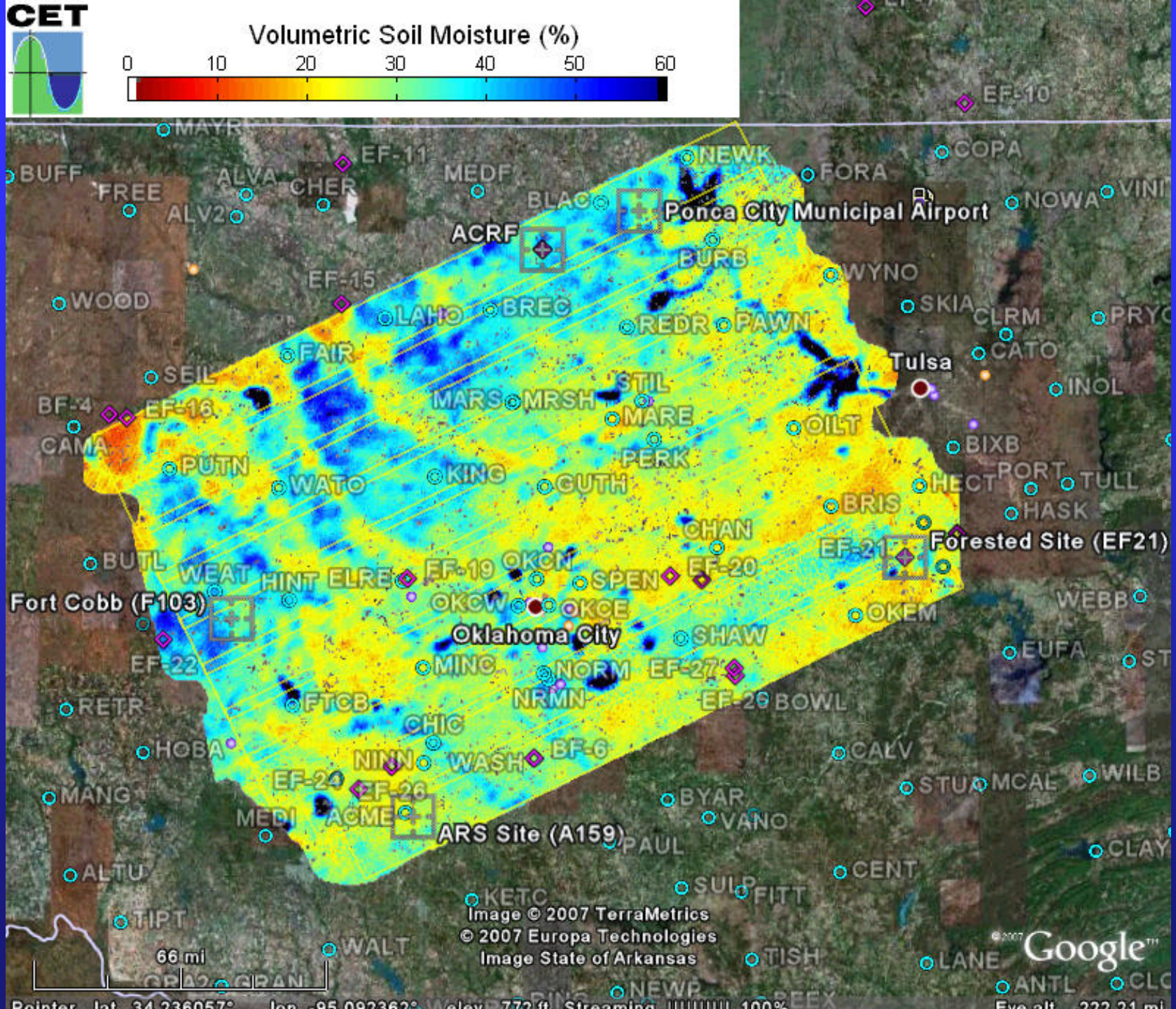

CET
Volumetric Soil Moisture (%)
0
10
20
30
40
50
60
Ponca City Municipal Airport
ACRF
Tulsa
Forested Site (EF21)
Fort Cobb (F103)
Oklahoma City
ARS Site (A159)
Image © 2007 TerraMetrics
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Image State of Arkansas
66 mi
Google

Twin Otter (International) Soil Moisture PALS-II

J-31 (Sky Research)

Surface and Cloud Bidirectional Reflectance Distribution Function

CIRPAS Twin Otter

Aerosol and Cloud properties, carbon cycle gases

Cessna 206

Aerosol optical properties, carbon cycle gases

G-1

Aerosol and Cloud properties

The Duke University Helicopter Observation Platform (HOP)

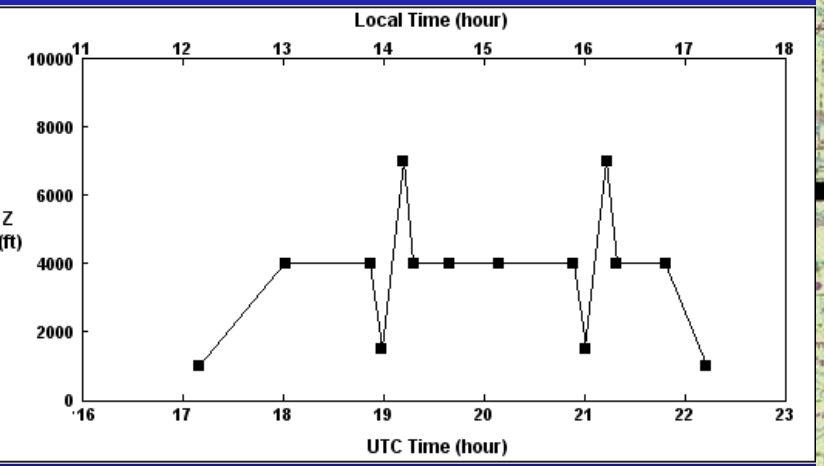
Bell 206B-3 “Jet Ranger”

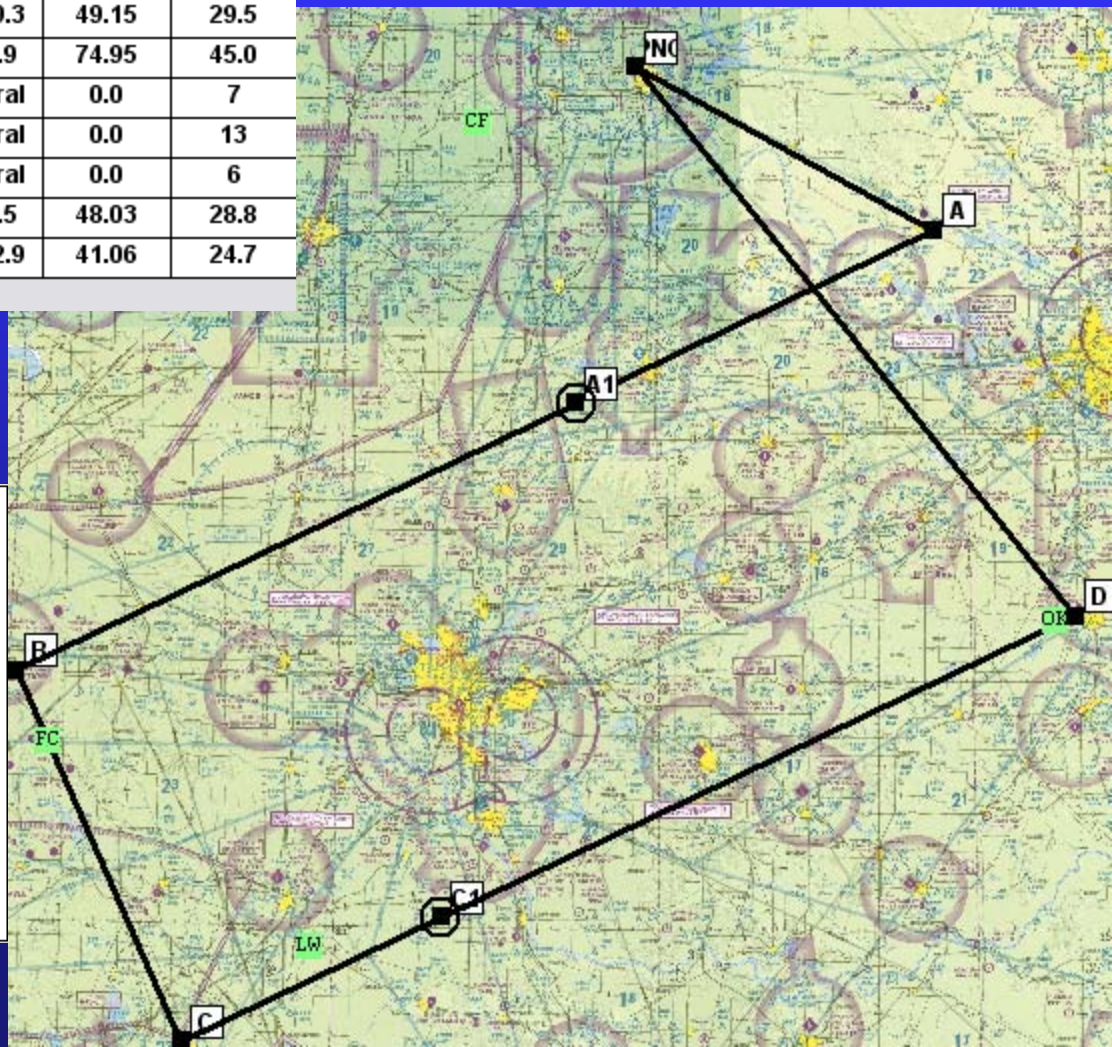
Goal for CLASIC: measure spatial and temporal variation of fluxes of **momentum, heat, moisture** and **carbon dioxide** in the ABL over the different types of land cover found at the experimental site in Oklahoma, under the different meteorological conditions that will be encountered during the IOP.

Total Distance (nm): 417.73 Total ETE (min): 302.7

WP	UTC Time	LAT	LON	ALT (ft)	SPD (kts)	HDG	Dist (nm)	ETE (min)
PNC	17:09:60	36deg 44min	-97deg 06min	1007				
D	18:00:56	35deg 37min	-96deg 01min	4000	100.0	135.6	84.88	50.9
C1	18:51:50	35deg 01min	-97deg 35min	4000	100.0	238.7	84.80	50.9
C1	18:58:50	35deg 01min	-97deg 35min	1500	0.0	spiral	0.0	7
C1	19:11:50	35deg 01min	-97deg 35min	7000	0.0	spiral	0.0	13
C1	19:17:50	35deg 01min	-97deg 35min	4000	0.0	spiral	0.0	6
C	19:38:44	34deg 46min	-98deg 13min	4000	100.1	238.0	34.86	20.9
B	20:08:12	35deg 30min	-98deg 38min	4000	100.1	329.3	49.15	29.5
A1	20:53:10	36deg 03min	-97deg 15min	4000	100.0	57.9	74.95	45.0
A1	21:00:10	36deg 03min	-97deg 15min	1500	0.0	spiral	0.0	7
A1	21:13:10	36deg 03min	-97deg 15min	7000	0.0	spiral	0.0	13
A1	21:19:10	36deg 03min	-97deg 15min	4000	0.0	spiral	0.0	6
A	21:47:58	36deg 24min	-96deg 21min	4000	100.1	58.5	48.03	28.8
PNC	22:12:40	36deg 44min	-97deg 06min	1007	99.7	292.9	41.06	24.7

Aircraft: SAMP256
Flight Date: 22 June 2007
Departure from PNC: 17:10 UTC
Initial Altitude: 4000 ft
Remarks: CIRPAS 5, Cu Mix (modified)
Contact:386-433-0396
ETE: 5 + 03





ISDAC/RISCAM

- ISDAC: April 2008 (PI Ghan)
- RISCAM: April – June 2008 (PI Verlinde)
- Aircraft: NRC CV-580
- Sep 2007: Site visit Fairbanks, Deadhorse, Barrow (D. Ronfeld, J. Hubbe)
- Overlaps with NASA ARCTAS (DC-8, P-3, B200) and NOAA ARCPAC (P-3)