Photo courtesy of Vanda Grubisic, DRI

University of Wyoming COWvex 2006

Cloudsat Over Wyoming Validation EXperiment

October 26 2006 - January 15 2007(??)

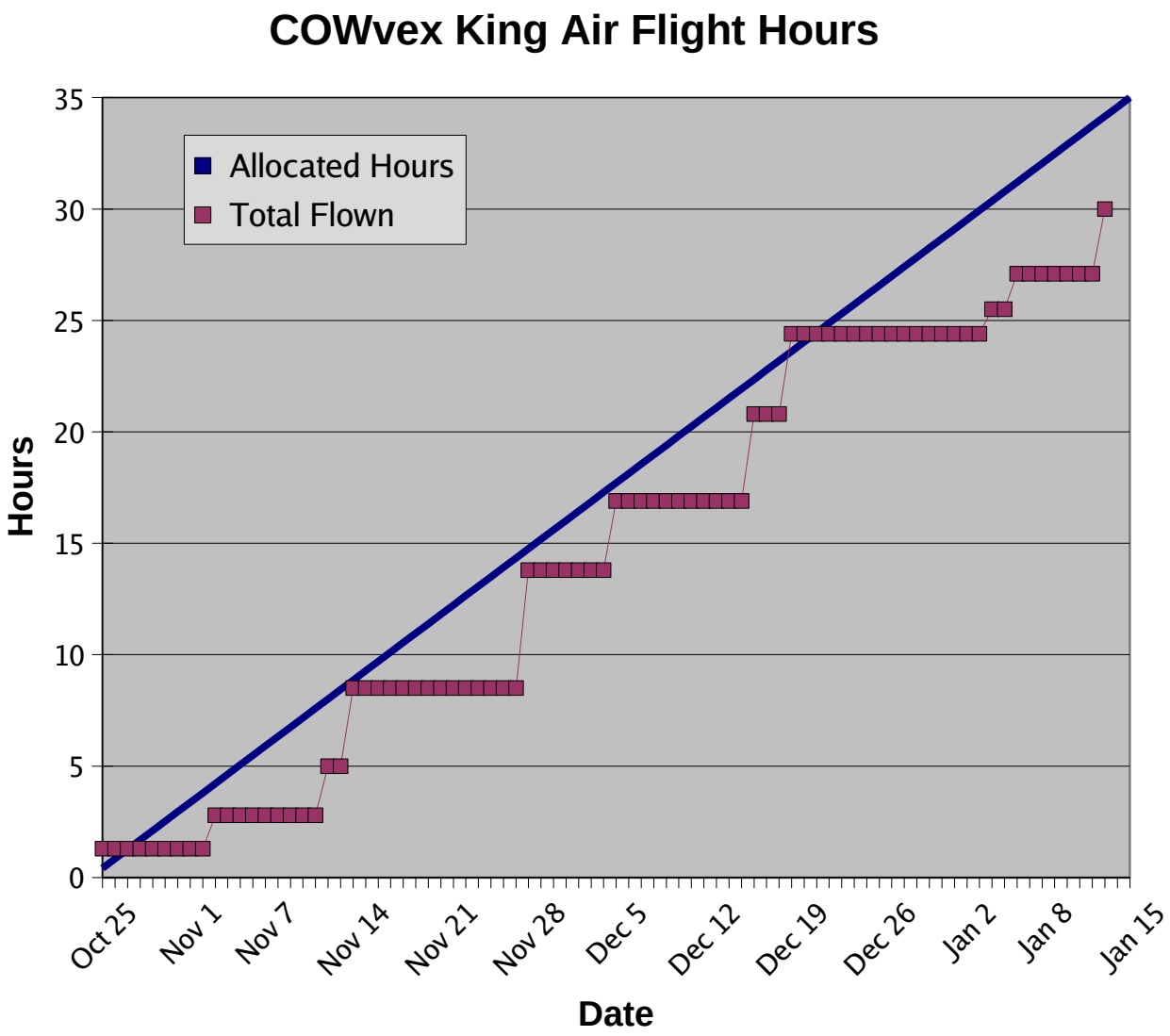
- Contacts
- KingAir Data
- WCR Data
- Plot of Flight Hours

Operations Calendar

Flight Planner

Date	Flight Number	Status	Times (UTC)	Hours	Notes
February 8	Lidar Test 2		1742-1950	2.2	
January 31	Lidar Test 1		1746-1926	1.8	
January 13	Flight 11	First flight with Wyoming Cloud Lidar, flew line from Rawlins to Boysen, shallow clouds, very little liquid water, no known problems	1858-2144	2.9	
January 6	Flight 10	Flight over Shirley Basin, very windy, blowing snow on ground, echoes extending to ground, but little or no precipitation reaching ground? no known problems	1927-2103	1.6	
January 4	Flight 9	Flight aborted, radar quit working, unable to restart it	1845-1945	1.1	
December 19	Flight 8	Flight over northwestern CO, deep nimbostratus clouds, advecting along line, no known problems	1845-2214	3.6	
December 16	Flight 7	Flight over western SD, fairly thin, weak reflecting clouds, at times optically non-existent, no known problems	1830-2215	3.9	

December 5	Flight 6	Flight over northern Wyoming near Bighorns, Orographic (??) clouds close to ground, end of flight did ground circles for radar, V-channel dropped early in flight using 500 ns pulse.	1840-2146	3.1	debrief
November 28	Flight 5	Flight over Guernsey and South towards Cheyenne, very homogeneous stratus clouds from ~15 kft to 22 kft, max reflectivities ~10 dBZ. No known problems with data system, instruments or radar.	1926-2126	2.1	
November 28	Flight 4	Flight over Western Nebraska, reasonably deep stratus/nimbostratus, widespread, tops > 23 kft in places. Data system and radar worked well. V-channel dropped using 500 ns pulse.	0813-1115	3.2	
November 14	Flight 3	Flight over western South Dakota. Deep Ns, precipitation reaching ground, bright band evident, good case. Data System died on return ferry, two data files.	1826-2150	3.5	debrief
November 12	Flight 2	first night flight, clouds not as deep as expected, problems with the V-channel on the WCR in 500 ns mode, needed to go to 250 ns pulses to eliminate problem, no other known problems, Tamdar not working	0812-1015	2.2	
November 3	Flight 1	Good first research flight, some problems with the V-channel on the WCR, needed to go to 250 ns pulses to eliminate problem	1933-2058	1.5	debrief
October 26	Test 1	Problems with WCR v-channel first half of flight, successfully tested sat overpass prediction software, conducted ground circles for radar, limited cloud data at beginning of flight	1801-1919	1.3	debrief
Total Flight Hours			30.0 of 35.0		


COWvex King Air Flight Hours
Allocated Hours
Total Flown
Hours
0
5
10
15
20
25
30
35
Oct 25
Nov 1
Nov 7
Nov 14
Nov 21
Nov 28
Dec 5
Dec 12
Dec 19
Dec 26
Jan 2
Jan 8
Jan 15
Date

Reading the operations calendar:

- **Green text indicates dates when COWvex flights are possible (*wx permitting)***
- **Red text indicates dates when COWvex operations are down (either due to crew limitations or holidays)**
- **Blue text indicates dates/flights that are TBD re: COWvex operations**

Note: operations on 7 December are down due to pilot vacation and transportation flight

Note: operations on 5 December will depend on pilot availability (possible late transportation on 12/4, followed by early transportation flight on 12/5….may have to cancel one of the research flights)

Note: operations on 12 December possible only if no transportation flight
Note: operations on 21 December possible only if no transportation flight

December

Sun	*Mon*	*Tue*	*Wed*	*Thu*	*Fri*	*Sat*
				30 am/pm	**1**	**2**
3 am/pm	**4**	**5** am/pm possible conflict w/ transportation	**6**	**7** am/pm Cooksey Vacation Trustees flight	**8**	**9**
10	**11**	**12** am/pm Fagerstrom unavailable	**13**	**14** am/pm	**15**	**16** am/pm
17	**18**	**19** am/pm	**20**	**21** am/pm Drew Vacation	**22** Drew Vacation	**23** am/pm Drew Vacation
24	**25** Christmas	**26**	**27**	**28** am/pm	**29**	**30** am/pm
31						

2006

January

Sun	*Mon*	*Tue*	*Wed*	*Thu*	*Fri*	*Sat*
	1 am/pm	**2**	**3**	**4** am/pm	**5**	**6** am/pm
7	**8** am/pm	**9**	**10**	**11**	**12**	**13** am/pm
14	**15** am/pm	**16**	**17** am/pm	**18**	**19**	**20**
21	**22**	**23**	**24**	**25**	**26**	**27**
28	**29**	**30**	**31**			

2007

Debrief Notes
JF

Flight: Flight 6
Files: 20061205a
Crew:
Fagerstrom
Leon
French
Baran

Prior to flight, the clouds appeared further north than was expected based on the previous nights forecast, also winds were stronger, suggesting it may take longer to get to measurement location, thus we decided to take off as early as the aircraft was ready to go (originally takeoff time was set for 12 noon).

Wheels up at 1840 (20 minutes early)…there were no problems in getting the aircraft ready to go early.

On boot up of wasp, vxi card failed to initialize. WCR was hard-powered down and restarted. On restart vxi card initialized and startup proceeded as normal.

Approximately 15 minutes into flight V-channel dropped out (running 500 ns pulse). V-channel did not come back up after cycling power on DC power supply. From ~1900 Z operated WCR with 250 ns pulse.

At 1918 tried again 500 ns pulse…v-channel worked and we continued using 500 ns for remainder of flight.

Before overpass flew satellite track, ground-relative (clouds were orographic in nature). After overpass time, we drifted with air-relative satellite track.

Ended up going much further north than original request. Working with SLC was quite easy.

No issues from any of crew in post-flight discussions.

Debrief Notes
LO

Flight: Flight 3
Files: 20061114a & 20061114b
Crew:
Cooksey
Leon
Oolman
Wechsler

The starter on the right engine failed to engage initially when we were starting engines.

The transfer disk (/tdata) failed at 20:43:33. Jim and I will look at the logs and try to diagnose what happened.

I finally threw the power to the UPS to get the system to shut down. The radar and deice where both running under full power when I turned the UPS back on. Shortly after I turned the UPS back on, Cooksey noted a load split on the power. Potentially this could shut down one of the generators. In the future, if we need to shut down the UPS, we need to make sure that high load devices (the WCR or pumps) are shut down before powering up the UPS.

The weather system we were trying to intercept for the satellite overpass was evolving and moving rapidly. We changed our flight plans with the FAA several times. While forecasting small scale features is difficult we need to try not to wear out our cooperation with the FAA. As it was, we were flying in an area that seemed to have little traffic.

Dave suggested that we may wish to simply switch the mirror during the actual overpass rather than do a circle. This should waste less time.

We did a four beam, 45 degree bank in cloud for WCR calibration.

No dropouts of the 'V' channel were noted. Most of the flight was with a 500 ns pulse.

Debrief Notes
LO

Flight: Flight 1
File: 20061103a
Crew:
Cooksey
Leon
Oolman
Wechsler

Wheels up: ~12:30 noon

The first research flight for COWvex, flown on 11/3/06, wentvery well. Except for a small radar glitch, everything workwell.

The radar lost the 'V' channel early in the flight with a500 ns, three beam mode. Stopping and starting the transmit did not fix the problem nor did cycling the DC power. It worked, without any further glitches, with a 250 ns mode.

The new popup display for SATXREL and SATDT worked well. A heavier font would make it more legible.

We may wish to consider whether a small display may be possible for the pilot when we design the new data system. The pilot uses the science display to navigate when we use pointers or the satellite tracking. This information is not available when the radar data is being viewed.

We need to be more diligent at notifying everyone of the flight. Matt was out of the loop.

The Heiman was removed prior to the flight. The header was adjusted. The postflight processing will need to be adjusted.

The TAMDAR appears to be working and was available from the web.

The check list appears to be complete. We had plenty of time to get things prepared for the flight.

We completed the mission with two 45 degree loops, 3000 feet above the ground with the dual-down, dual-side mode.

Debrief Notes
JF

Flight: Test Flight 1
File: 20061026a

Crew:

Cooksey
Leon
Oolman
Wechsler

Wheels up: ~12:00 noon

Weather: snowing in AM, but not snowing at time of wheels up, flew through thin cloud layer on climb out, then clear remainder of flight.

Operations area was north and west of LAR, near Medicine Bow VOR.
ATC more difficult than normal due to large arrival delays at Denver.

Cooksey: flying off instructions from Leon and Oolman to stay on overpass line, variable *satxrel* gives distance (in km) from line. It was not clear (during flight) weather neg. number referred to left or right of line. It was determined that for a **negative** *satxrel* the King Air is **west of the line** and thus must **move further east**.

Some discussion focused on whether some type of graphical display would be better. Decided that because of the peculiarities of the advecting line and the prediction of the advection based on wind, that graphical display would be difficult.

In an effort to allow display readable by pilot, Glenn & Larry will build a popup window in *realtime* that will display *satxrel* and time to overpass in large numbers. This should be accomplished before next flight.

It was noted that ICS traffic was more than normal due to discussion of flight plans and instrument problems. At times, ICS traffic stepped on pilot's communications with ATC (note ATC traffic greater than normal).

Flight planning:
Larry needs to complete map image for flight planning purpose that contains VORs and sat overpass. This map will be used by pilots for flight planning with Denver and Salt Lake Center.

Need to get weather web tools running…these will allow scientist to download wx images & model output in relation to overpass line and make preflight and during flight decisions re: where to fly.

Problems with radar during flight. V-channel was dropping out for about half of flight. This was seen in earlier projects. Have not been able to duplicate on ground. May be fixed in flight by cycling power on DC power supply.

Did not get radar in cloud relative antenna cals – need to do on one of the next flights
Did not get Rodi maneuvers for wind cal.