2018 instrument development and testing
University of Wyoming King Air Research

Summary

Test flights for 2018, focused on:
-Development and testing of AVAPS dropsonde system
-Testing supplementary IMU measurements with KPR
-Reinstallation and testing of nadir lidar, Friehe temperature probe, and Licor-7500 in preparation for WE-CAN/BB-FLUX in summer 2018

Links

- Planning and tracking tools

Date	Flight # (*.kml)	Status	Times (UTC)	Hours	Crew/Notes
13 June 2018	TF08	Lidar alignment, also overflew smoke plume from Badger Creek fire.	1849-2042	2.0	B Wadsworth L Oolman T Juliano M Deng
25 May 2018	TF07	Clear air flight with maneuvers for KPR/Ellipse IMU, also tested reinstallation of Licor 7500 & Friehe.	1942-2124	1.8	B Wadsworth Z Little D Plummer
4 May	TF06	Clear air flight with maneuvers for KPR/Ellipse IMU, along with	1652-1848	2.0	B Wadsworth A Morgan

Order TEST18 Data

- King Air 1 Hz files
- King Air high rate 25 Hz files
- Nadir Cloud Lidar

User Information

- Planning Chart
- EOL Facilities
- Software Repository
- Projects & Data Requests
- Planning and tracking tools
- Facility User's Guide

2018		wind calibration maneuvers.			D Plummer B Glover
1 May 2018	TF05	Focused on cloud and precipitation measurements for KPR/Ellipse IMU.	1636-1910	2.7	E Sigel A Morgan D Plummer L Oolman
13 Mar 2018	TF04	Clear air flight with dropsonde test at 17.5 kft, with aircraft sounding for comparison and maneuvers for KPR/Ellipse IMU testing.	1551-1733	1.8	B Wadsworth M Goodstein D Plummer N Potts Z Little
4 Mar 2018	TF03	Focused on KPR measurements of cloud & precipitation.	2042-2140	1.0	B Wadsworth A Robertson L Oolman C Grasmick
21 Feb 2018	TF02	Second flight for low altitude AVAPS testing in clear air, some maneuvers and measurements for KPR/Ellipse IMU.	1734-1850	1.4	E Sigel N Potts D Plummer M Goodstein Z Little
16 Feb 2018	TF01	Low-altitude passes over KLAR for testing dropsonde procedure using dummy sondes; **no flight data recorded**.	n/a	1.0	E Sigel D Plummer B Glover Z Little
Flight Hours		As of Sep 01, 2018, 13.7 hours were flown.			

Facility Instruments

- **In Situ**
- **Wyoming Cloud Radar**
- **Wyoming Cloud Lidar**

Contact

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Project: TEST18
4 May 2018

Flight: TF06

Notes:

Another clear air flight focused on maneuvers (straight legs and 30-deg bank circles) for KPR/canister-mounted Ellipse IMU. Wind calibration maneuvers were also performed.

KPR computer became unresponsive during startup and had to be rebooted. This occurred again during the second set of calibration circles, although files were not recorded through the first set of circles either despite the display updating as normal through those maneuvers.

Crew: Wadsworth, Morgan, Plummer, Glover

Flight Summary:

UTC Comment

1652 Wheels up

1700 Figure-eight complete for Ellipse alignment, heading to calibration site

1702 Doing highest passes first, switching KPR to 75 m

- - - -

Straight and level passes in three KPR configurations:

171530-171800 At 9 kft AGL, recording in 75 m config, starting with several seconds recording raw data

172020-172250 7500 ft, 60 m following same procedure

172520-172750 5000 ft, 30 m, "

- - - -

Radar calibration circles (at 30 degree banks rather than the usual 45):

1730-173430 RH circle 1 - NOTE: discovered later that no files were recorded during the first circles, even though the display was functioning as normal

*173540 LH circle 1 - *aborted with display unresponsive after 1st circle, rebooting KPR computer**

174220-174700 LH circle 1

174800-175220 RH circle 2

175255-175735 LH circle 2

- - - -

Switch KPR back to 30 m config for passes over Grayrocks Reservoir

1806 Pass at 5 kft AGL over Grayrocks, recording in 30 m config with several seconds of raw data again

1811 60 m at 7.5 ft AGL, same procedure

1815 75 m at 9 kft AGL, "

- - - -

1816 Reorienting for wind cal at 13 kft

1819 Starting left turn, speed maneuvers. Winds ~15-20 kt at FL

1821-1823 Corresponding right turn

1823 Starting left turn, yaw maneuvers

1826-1829 Corresponding right turn

- - - -

1837 shut down wcr/kpr

1848 Wheels down

Project: TEST18
1 May 2018

Flight: TF05

Notes:

Focused on cloud & precipitation measurements with the KPR and recording corresponding Ellipse IMU measurements (collocated with the Applanix at this point). Good measurements in deep clouds & precip, but calibration maneuvers aborted - too much obscuration at standard site, and poor weather conditions near Medicine Bow after collecting cloud & precip measurements.

Crew: Sigel, Morgan, Plummer, Oolman

Flight Summary:

UTC Comment

~1615 Ellipse recording, altitude 50-60000 ft on ground (Eventually came into line after taxiing)

1636 Wheels up

Testing KPR filters during ferry, particularly power profile near ground:

1638 Recording 30 m

1641 60 m mode

1644 75 m

1647 beamcal mode

1651 Back to 30m ahead of calibration site, WCR sees snow down to ground. Max 20dBZ on KPR, with variable tops 1-2 km above and fallstreaks below 10-25 dBZ

1658 Precip to ground - deep enough at times but too variable for substantial passes, will step west to more persistent line over mountains

1709 At 13 kft, nearing precip line

- - - -

1710 Starting legs in 30 m config, echoes from surface to 3 km above, up to 25 dBZ

1713 Returning SSW for restricted airspace

1717 shallower below us as we head south - will return back north and ascend to 15 kft to get better echoes below

1722 Heading back SSW - will leave 30 m mode, then switch at S end

- - - -

1726 Stepping down to 14 kft, **switched to 60 m for return N**

1729 Heading N, deep echoes from surface to 2-3 km above, to 25-30 dBZ

1732 Right turn, return SSW - clouds getting a bit more sporadic along turn in NE end of leg

1735 Deeper echoes in SW 2/3 of leg, fall streaks to 30+ dBZ

1737 Return NNE on same leg

- - - -

1743 Switch to 75 m mode, will look further NE for deep precip

Initially between cloud layers, should get in cloud again as we continue E

1749 Back into some deeper clouds

1752 a couple minutes of weaker clouds, into deeper echoes again

1755 Note, Ellipse heading ~9 degrees off of Applanix at this point

1758 Exiting east end, return W (5 minutes of deep cloud)

1803 Heading east for last few minutes

- - - -

1809 Returning to Medicine Bow, will try to do calibration maneuvers there

1816 30 m KPR enroute to MedBow

1846 Switched to 60 m enroute south

Poor weather conditions following convective development - turbulence and shear likely, will RTB instead.

1910 Wheels down

Project: TEST18
12 Mar 2018

Flight: TF04

Notes:

Crew: Wadsworth, Potts, Plummer, Goodstein, Little

Final AVAPS test, drops from 17.5 kft in clear air. Performed low-level visual check and aircraft sounding over drop site. Extended straight legs longer than necessary for additional KPR/Ellipse measurements.
Winds were < 5 m/s through much of the provile (near 10 m/s at FL), with little sonde drift during the ~4 minute descent.
Drop procedure also tested WCR interference and mitigation:
#1,2 - WCR not transmitting (retained signal)
#3 - WCR transmitting (retained signal)
#4 - WCR transmitting, 400 MHz filter installed (temporarily lost signal until we circled back over the drop point)

Note, turbulence and CABINP faulty, same AV computer issues we've seen before.

Flight Summary:

UTC Comment

1551 Wheels up

1554 Performed figure eights at 2.2 kft AGL to align Ellipse

1615 WCR to idle for first two sonde drops

1620 Low level visual check complete, ascending to 17.5 (use ascent for sounding comparison)

163020 Drop #1, 163420 land

164010 Drop #2, 164410

1646 on heading for drop #3, radar on

164850-165250 Drop #3 w/WCR transmitting, may have broken on impact

Continue on ~5 minutes for KPR/Ellipse measurements

1657 turning for drop #4

170600 Drop #4 w/WCR transmitting and 400 MHz filter installed

1707 Lost sonde signal, turning back - regained signal, sonde impacted ground at 1710

1733 wheels down

02/16/2018 AVAPS Pilot notes (Test Flight 1)

Crew. Sigel, Little, Plummer, Potts and Goodstein.

Flight Time: 1.4

Planned: To test AVAPS with drops over the LAR airport at 160 kts 1000 AGL pressurized. Side step RWY 21 to the south. Two sets of radar circles.
Return to LAR

Actual: Departed LAR in a right hand nonstandard pattern. We made 5 identical drops at 160 kts 1000 AGL, pressurized. There was a small deviations in extending the traffic pattern to allow an aircraft to pass at the south end of the field. We completed all five drops and flew to the west to make the radar circles. After completing the circles we noticed a cloud layer on top of the snowy range. I climbed to 16500 and flew over the top of the clouds. After 5 minutes we returned to LAR.

Project: TEST18
21 Feb 2018

Flight: TF02

Notes:

Flight mainly focused on clear air AVAPS testing at low altitude around KLAR, did some maneuvers and measurements for KPR/Ellipse IMU as well.

Crew: Sigel, Goodstein, Plummer, Potts, Little

Flight Summary:

UTC Comment

1729 Start SBG software recording during taxi

1734 Wheels up

1740 Note SBG not aligned, still recording

1742 On approach for drop #1

1744 Drop #1, ~15 kt SW winds

1747 Saved SBG file, switched to recording at 200 Hz

1749 Drop #2

1757 Drop #3 ~30 sec to ground

1802 Drop #4

1803 Stop Ellipse recording, switch to 50 Hz

1808 Drop #5

1812 Right circle, recording with down beams

1815 Left circle (note suspend at 1816 for traffic)

1818 Resume left circle

1822 Recording in up/down mode now. ~1 km of -15 dBZ cloud above, -65 dbm noise

1827 Climbing up to get down beam measurements

1831 Return leg above clouds, up to 15.5kft

1836 RTB

1850 Wheels down.

02/16/2018 AVAPS Pilot notes (Test Flight 1)

Crew. Sigel, Little, Glover, Plummer.

Flight Time: 1.0

Planned: To test AVAPS with low level drops over the LAR airport by side stepping RWY 21 to the south.
Two dry runs dropping no sondes. 100 feet at 160 kts.
Third run Pressurized drop one sonde from 100 feet at 160 kts.
Fourth run Unpressurized drop one sonde from 100 feet at 120 kts.
Fifth run Unpressurized drop one sonde from 100 feet at 200 kts.
During the reloading of sondes we may need to climb to avoid turbulence.
Return to LAR

Actual: Departed LAR in a right hand nonstandard pattern. After lining up on the left hand side of Rwy 21 I decided that there were too many buildings to close to the intended flight path. I adjusted to the north closer to Rwy 21. I informed the ground crew so they could adjust. We completed our two dry runs. The third run was pressurized and dropped the sonde from 100 feet at 160 kts. The sonde dropped successful. The fourth run was to be unpressurized and the pressurization was slow to come up so we went around and waited until pressure dropped in the cabin. The fifth run we dropped our sonde at 100 feet and 120 kts, unpressurized. The sonde dropped successful. The sixth run went as planned we dropped from 100 feet unpressurized at 200 kts. Ground crew asked for one last run at 500 feet 160 kts to see what the profile would look like. We completed the last dry run at 500 feet and 160 kts. We returned LAR