2019 All-Phase Water Probe Experiment (APEX)
University of Wyoming King Air Research

Summary

The Alpenglow All-Phase Water Probe (ALPHA) Experiment (APEX) is intended to test and demonstrate the capabilities of the Alpenglow ALPHA under a range of cloud/no cloud conditions.

Links

- Planning and tracking tools
- Plot of flight hours
- Lidar and Radar Quicklooks

Date	Flight # (*.kml)	Status	Times (UTC)	Hours	Crew/Notes
29 May 2019	RF09	Targeted clouds east of Laramie, sampling ice and liquid. Both 2D-S channels unusable early in flight. The Li-7000 pump was turned on midway through the flight. The LWC100 was removed prior to this flight.	0316-0435	1.4	Tom Drew Perry Wechsler Dave Plummer
		Targeted clouds east			

Order APEX Data

- King Air 1 Hz files
- King Air high rate 25 Hz files
- CIP 2D images
- Nadir Cloud Lidar
- Zenith Cloud Lidar
- Wyoming Cloud Radar Level 1
- Wyoming Cloud Radar Level 2

User Information

- Planning Chart
- EOL Facilities
- Software Repository
- Projects & Data

28 May 2019	RF08	of Laramie, sampling ice with occasional liquid. The LWC100 was intermittant.	0310-0417	1.2	Tom Drew Perry Wechsler Dave Plummer
24 May 2019	RF07	Targeted clouds primarily north of Wheatland, sampling in ice, mixed, and liquid conditions. The LWC100 was intermittant.	0301-0516	2.4	Tom Drew Perry Wechsler Dave Plummer
22 May 2019	RF06	Targeted band of clouds near Wheatland. They were rapidly disappating. Water vapor channel on alpha was replaced with an elastic channel for remainder of project. No WCR data was collected. The LWC100 was intermittant.	0312-0417	1.2	Tom Drew Shelby Fuller Larry Oolman Perry Wechsler
20 May 2019	RF05	Passes back and forth through a line with ice mixing ratios sometimes up to 1 g/m3. LWC100 element broke during the flight.	0331-0459	1.5	Ed Sigel Larry Oolman Perry Wechsler
17 May 2019	RF04	Passes back and forth through a line that was mostly ice.	0317-0414	1.1	Ed Sigel Dave Leon Larry Oolman Perry Wechsler
14 May	RF03	Flight through remnants of day time	0312-	1.0	Ed Sigel Nick Mahon

- Requests
- Planning and tracking tools
- Facility User's Guide

Facility Instruments

- In Situ
- Wyoming Cloud Radar
- Wyoming Cloud Lidar

Contact

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Jeff French

UNIVERSITY OF WYOMING

2019		convection.	0408		Larry Oolman Perry Wechsler
10 May 2019	RF02	Night flight. Alpha was unable to warm to operating temperatures after cooling to near freezing on the ramp.	0334-0425	1.0	Ed Sigel Alan John Larry Oolman Nick Mahon
6 May 2019	RF01	First flight of the alpha in low light conditions. Flew through evening convection. The Water vapor channel of alpha was not working.	0152-0245	1.0	Ed Sigel Alan John Larry Oolman Perry Wechsler
Test Flights					
3 May 2019	TF01	Align lidars and do radar circles	1715-1823	1.2	Ed Sigel Perry Wechsler Larry Oolman Min Deng
Flight Hours		As of May 29, 2019, 13.0 out of 13 hours were flown, 0.1 remain.			

05/29/2019 Pilot notes (Research FLT. 9)

Crew: Drew, Wechsler, Plummer

Flight Time: 1.4

Planned: Takeoff at 21:00. Filed to ALBIN at 15,000, trying to intercept some radar echoes moving South towards Cheyenne.

Actual: Took a delay on takeoff for an inbound Skywest. Picked up the IFR clearance on the ground to ALBIN. Enroute changed to CYS waypoint and then a 35 nm radius around CYS blocked 11,100 – 15,000 MSL. Flew the first echo northerly then traversed several lines heading west dropping to 9000 ft. MSL. Turned south through an echo, then northeast . Finally targeted a workable echo and made three passes through it before turning towads the IAF for RNAV 30 Landed 30.

Project: APEX-19
29 May 2019

Flight: RF09

Notes:

Targeted clouds east of Laramie. Some good pockets of liquid towards the center, particularly on the last couple passes. Were delayed on the ground in light precipitation waiting for incoming aircraft. 2D-S was unusable early on due to window contamination, cleared up later in the flight. Delayed start for Li-7000. Torque measurements not resolved from previous flight, LWC100 removed prior to flight.

Crew: Drew, Wechsler, Plummer; LOD: Morgan

Flight Summary:

UTC Comment

0316 Wheels up.

0319 Instruments up and running, 2D-S unusable - masking is generally blocking out entire array.

0333 At southern end of echoes on NEXRAD, turning NNE.

0335 Skirting tops at 15 kft, will request lower block of 10-12 kft.

0339 Descend to 11.1 kft, look along E-W track.

0340 2D-S H channel is clearing up, columns on CIP.

0345 Turning S to complete box pattern.

0351 Heading E for last couple legs, descending to 9 kft.

0355 In ~0.4 g LWC on Nevzorov.

0357 Reverse track along similar leg.

0401 2D-S V channel cleared up, 100+ um drops?

0403 Return along similar pass then return home.

0408 Consistently high LWC towards center of leg.

0410 Turn back west and head home.

0435 On the ground.

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05/28/2019 Pilot notes (Research FLT. 8)

Crew: Drew, Wechsler, Plummer

Flight Time: 1.2

Planned: Takeoff at 21:00. Filed to FLEMS at 15,000, trying to intercept some radar echoes moving north out of Colorado.

Actual: Picked up the IFR clearance on the ground to FLEMS. Attained a 25 nm radius around FLEMS and block altitude of 13,000-15,000. Spent most of the time at 14,000, however did climb to 15,000 on last two passes. Decided to move center point to the CYS 270@15. Worked a couple of lines NE/SW though the echoes, climbed to 18,000 on the last southern pass and flew to the IAF for RNAV 30 and landed 30.

05/24/2019 Pilot notes (Research FLT. 7)

Crew: Drew, Wechsler, Plummer

Flight Time: 2.4

Planned: Takeoff at 21:00. Depart towards DDY at FL 200. Looking for radar echoes, liquid and ice clouds.

Actual: Took off VFR, and picked up clearance towards DDY climbing to FL200. Echoes at CPR seemed to be dying out, so we decided to head over towards KEAN which still had a good echo. Descended to a block 14,000-17,000, but stayed at 14,000 for the rest of the flight. Made a southeast/ northwest track through radar echo, and then headed towards IIP where it appeared to be moving. Centered our airspace on IIP and started to work north/south legs but the echoes were more persistent East of IIP, so we adjusted to E-W legs. We were in snow most of the time, but did encounter some icing conditions at times. On the second eastbound leg, decided to follow a long thin line of echoes south extending from KEAN to just east of KCYS. Southeast of KCYS, went direct to LAR and landed on a visual approach.

Project: APEX-19
24 May 2019

Flight: RF07

Notes:

Targeted clouds mainly north of Wheatland before heading south to sample a narrow line east of Cheyenne. Largely sampled at 14 kft with fairly deep echoes above & below on WCR. Mainly in ice clouds, with some mixed-phase and liquid-phase encountered.

Crew: Drew, Wechsler, Plummer; LOD: Glover

Flight Summary:

UTC Comment

0301 Wheels up.

0307 Instruments up and running, things generally look good.

0317 Breaking out of cloud - some liquid right on edge.

0318 Picked up some ice, liquid response on CDP/Nevzorov.

0324 At SE end of cloud, will turn to pass ~NW through it.

0331 Clouds thinning out, will head north to continue sampling in cloud.

0336 Big flakes on 2D-S.

0339 Breaking out of cloud on north side, will turn back for more sampling.

0344 Will head back north a bit, then look to do approximately east-west leg in cloud.

0354 Skirting tops on eastern edge, plenty of liquid here.

0356 Turning back west, continuing in liquid-phase (no echoes on NEXRAD composite).

0402 Continuing west, finally back in ice cloud.

0409 Head east along similar leg, plan will be to cut south through line east of mountains, then head home.

0418 Heading south.

0516 On the ground.

05/21/2019 Pilot notes (Research FLT. 6)

Crew: Drew, Oolman and Wechsler, Fuller

Flight Time: 1.3

Planned: Takeoff at 21:00. Depart to the northwest to OPPEE fly strait and level at flight level 200. Start collecting data as soon as posable to verify that the instrument is working.

Actual: Just before startup changed plan to head to the Northeast, I filed KEAN for a point. Picked up clearance on the ground and departed RWY 3 heading towards KEAN. Reaching KEAN turned northwest and blocked 14,000-FL190 descended to 14,000. 20 NW made a 180 turn and tracked SE. Turned back to the NW and passing KEAN decided to turn direct LAR. Descended to 11,100 and about 10 nm of LAR turned toward the Approach fix for RNAV 30 (south of town).

05/19/2019 Pilot notes (Research FLT. 5)

Crew. Sigel, Oolman and Wechsler.

Flight Time: 1.1

Planned: Takeoff at 21:00. Depart to the northwest to OPPEE fly strait and level at flight level 200. Start collecting data as soon as possible to verify that the instrument is working.

Actual: Departed LAR at 21:30. Picked up clearance on the ground. Small delay because there was no flight plan on file. I corrected my error with my cell phone and we departed. Departed RWY 3 Turned towards OPPEE and climbed to 200. During the departure we had moderate turbulence and Ice. We asked for 30nm rang around OPPEE to maneuver in and a block altitude of FL200 to 15,000. We would have been better going to MBW. The clouds were a bit to the east of OPPEE so we asked to deviate towards them they gave us a clearance to deviate as necessary anywhere again, and a block of 150 to 200. We were at 160 for most of the flight. We crossed east of the MBW VOR and took up a north and south track. . We made 6 passes north and south though pretty good precipitation. We were in light icing. On the last two legs we climbed to FL 190 and found mostly ice and no water. The clouds were dissipating quickly. We called it a night and proceeded back to LAR. I opted for the RNAV 3 approach due to the low ceilings. It worked well and added time but was well worth it in the end. The celling was about 800 overcast. The A/C worked well and there were no anomalies.

05/16/2019 Pilot notes (Research FLT. 4)

Crew. Sigel, Oolman, Leon and Wechsler.

Flight Time: 1.1

Planned: Takeoff at 21:00. Depart to the northwest to MBW fly strait and level at flight level 200. Start collecting data in clear air and fly though precipitation to verify that the instrument is working.

Actual: Departed LAR at 21:00. Picked up clearance on the ground. Heading towards MBW VOR @200. We asked for 30nm rang around MBW to maneuver in and a block altitude of FL200 to 15,000. The clouds were a bit to the west of MBW so we asked to deviate towards them they gave us a clearance to deviate as necessary anywhere, and a block of 150 to 200. We crossed west of the MBW VOR and took up a west heading. Looking for suitable clouds. After finding the clouds we made 6 passes east and west though them. We were in light icing. On the last of the six legs we climbed to FL 230 and found mostly ice and no water. We called it a night and proceeded back to LAR. The A/C worked well and there were no anomalies.

05/13/2019 Pilot notes (Research FLT. 3)

Crew. Sigel, Oolman, Mahon and Wechsler.

Flight Time: 1.0

Planned: Takeoff at 21:00. Depart to the northwest fly strait and level at 170 towards OPPEE Intersection. Start collecting data in clear air and fly though precipitation to verify that the instrument is working.

Actual: Departed LAR at 21:00. Picked up clearance on the ground. Heading towards OPPEE intersection @170. We asked for 30nm rang around OPPEE to maneuver in and a block altitude of FL200 to 15,000. We crossed north of the OPPEE Intersection and took a west heading. Looking for suitable clouds. Flew back to the east of OPPEE. We worked three legs north and south of OPPEE. We were no icing and very few clouds. The clouds that we did find had very little perception. We called it a night as the clouds that were there dissipated. A/C worked well on short final I lost the ability to talk to the crew. I could not find a reason and decided to look at it further in the light. Spanky is notified.

05/09/2019 Pilot notes (Research FLT. 2)

Crew. Sigel, Oolman, Mahon and John.

Flight Time: 1.0

Planned: Takeoff at 21:15. Depart to the northwest fly strait and level at 200 towards OPPEE Intersection. Start collecting data in clear air and fly though precipitation to verify that the instrument is working.

Actual: Departed LAR at 21:20. Picked up clearance on the ground. Heading towards OPPEE intersection to Flt level 200 contacted Denver. We asked for 30nm rang around OPPEE to maneuver in and a block altitude of FL200 to 15,000. We crossed the OPPEE Intersection and took a west heading. We worked two legs east and west. We were no l icing and very few cows. On the third attempt to the west Mahon announced that the laser was down and to head back. I picked up the weather 210@9 8000 overcast. I asked Denver to return they gave me direct @ 110. 8 miles out at 11 we couldn't make out any part of Laramie. I asked for direct FIKEB for the RNAV to 21. We broke out about 1000 AGL The rest of the flight was uneventful. No problems with the A/C and the temp controller worked great.

05/01/2019 Pilot notes (APEX RF01)

Crew. Sigel, Oolman, Wechsler and John.

Flight Time: 1.1

Planned: Takeoff at 19:30. Depart to the north fly strait and level at 200 towards MBW VOR. Start collecting data in clear air and fly though precipitation to verify that the instrument is working.

Actual: Departed LAR at 19:50. The aircraft heat went to full hot just after rotation. The mode was in manual cold. As briefed John held the switch too cold for two minutes after reaching 10,000 feet. The heat subsided quickly. We then Flew North towards MBW climbing to 200. We asked for 30nm rang around MBW to maneuver in and a block altitude of FL200 to 15,000. We crossed the MBW VOR on a 320 heading and worked three legs back and forth on that radial at FL180. We were in lite icing and moderate rain at times. On the fourth attempt to fly the radial. There was lighting showing up on the radar. I decided to turn out to the east and get clear of the weather. The cloud layer was very high and clear to the east so I felt we had a good exit at any time. We broke out of the clouds to the east and proceeded back to Laramie in VMC.

05/01/2018 Pilot notes (APEX Test FLT. 1)

Crew. Sigel, Oolman, Wechsler and Deng.

Flight Time: 1.2

Planned: Takeoff at 10:30. Depart to the north fly strait and level at 175. After the data was collected do radar circles and return to LAR

Actual: Departed LAR at 11:25. The aircraft heat went to full hot just after rotation. After reaching 10,000 feet and completing the after takeoff check list I went to Manual cold and held the switch down for two minutes and heat subsided. We then Flew North towards MBW climbing to 175. We dog legged to the west to avoid any problems with Casper's airspace. We made a slow 180 degree turn back to the south, just west of Casper and descended to 10,000. We found a spot that fit the criteria for making radar circles and preformed two and half turns to the left and two and a half to the right and then returned to Laramie.