Deployable Instruments - Laramie Based - Research Test flights (DILBERT)
University of Wyoming King Air Research

Summary

DILBERT consists of a set of test flights based in Laramie to test the in-flight functionality of new equipment, and to characterize data received from new instrumentation and compare results of old vs. new systems to identify potential problems.

- UWKA flight planning and tracking tools
- Convert Google Earth points to way points

Date	Flight # (*.kml)	Status	Times (UTC)	Hours	Crew/Notes
17 Sep 2020	RF02	Test flight ahead of FLUX-20 research operations. Focused on clear air speed runs for LWC-301 calibration. No Li-7000 measurements.	2033-2129	1.0	E Sigel B Glover D Plummer Z Little
23 Jul 2020	RF01	Shakedown flight and test operations for HVPS, LWC-301, new pressure transducers, and HCPI probe. No Li-7000 measurements. IWG packet forwarder not engaged for LWC-301 until later in flight. De-ice breaker not	2008-2141	1.7	E Sigel J French D Plummer K Shaffer

Order DILBERT Data

- King Air 1 Hz files
- King Air high rate 25 Hz files

User Information

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

		engaged for HVPS/2DS.			
Flight Hours		As of Feb 09, 2021, 2.7 out of 12 research hours were flown, 9.3 remain.		Test and Ferry: 0.0	

Facility Instruments

- In Situ
- Wyoming Cloud Radar
- Wyoming Cloud Lidar

Contact

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Facility Manager:

Jeff French

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DILBERT20 - 1 Hz flight data from the Wyoming King Air

Choose which flights you wish to download.

Select All Deselect All

File Name	Total Size (MB)	Number Files	Begin Time	End Time
☐ 20200723.c1.nc	5	1	2020-07-23 19:55:37	2020-07-23 21:47:21
☐ 20200917.c1.nc	2	1	2020-09-17 20:08:19	2020-09-17 21:32:00

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09/17/2020 Pilot notes (Dilbert Research FLT. 2/ Flux20)

Crew. Sigel, Plummer, Little and Glover.

Flight Time: 1.0

Planned: Takeoff at 14:30. Depart to the north fly strait and level at 18 towards MBW VOR. Start collecting data in clear air. Slowing to the minimum airspeed and back to the maximum strait and level airspeed. Then descend to 9000 feet and do the same.

Actual: Departed LAR at 14:30. We then Flew North towards MBW climbing to 180. We asked 180 degree turns at the end of each leg. We crossed the MBW FL180 at speed but were unable to get the slowdown in. Visibility was less than a mile at times and it was not VFR. We proceeded back to LAR and were able to speed the aircraft up and slow it down a few times. After completing the FLT level 180 legs we asked for 9000 feet and to provide our own terrain separation. DEN would not do this so we settled for an 11000 foot leg to see if we canceled IFR and flew the 9000 foot leg VFR if we would feel comfortable. I did not feel comfortable and we did one more 11000 foot leg and returned to Laramie. The aircraft worked well there were no abnormal things to report.

3:33 PM Thu Sep 17
84%
VFR & TFRs
FPL
Search
3:24 PM MDT
Stratus, No Towers
MEDICINE BOW
111.6 Ch 53 MBW
CASPER
+293
ATN3456
LARAMIE
117.6 Ch 123 LAR
LARAMIE-RGNL (LAR)
ASOS 135.475
Glide: Altitude below 200'
SEP 17
3:24 PM MDT
-20m
-18m
-12m
-10m
-8m
REC
1:19:36
Cross Track Error
0.5
ETE Dest

Groundspeed
0 kts
GPS Altitude
7,274'
Track

Climb Gradient

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Project: DILBERT-20
17 Sep 2020

Flight: RF02

Notes:

A combination systems test flight for the FLUX-20 project and an instrument test flight for DILBERT-20. Specific maneuvers were designed around speed runs in clear air for the LWC-301: using a clean configuration (gear up, no flap extension), starting at the maximum safe IAS, cutting power to go to the minimum safe speed, then powering up to max speed again. These maneuvers were repeated several times, with and without deice power to the 301, and at 18 kft and 11 kft (originally planned for 9 kft but low visibility precluded maneuvering at lower altitudes). No usable Li-7000 data, due to a loose cable connection resolved after the flight.

Crew: Sigel, Glover, Plummer, Little; LOD: Little/West.

Flight Summary:

UTC Comment

2033 Wheels up

2038 Most Li-7000 variables absent, variable list had disappeared. Reconstructed list and cycled power, no change. Resolved following flight.

First set of speed runs at 18 kft.

204345 At max safe IAS, in clean configuration. Deice power on. Slowing through 204530.

2046 Had to reverse course late in maneuver.

2049 Back on track.

204930 Begin second set along straight line, deice power on.

2051 Speeding up from 120 kt.

205330 Complete, beginning one more at this altitude with deice power off.

2055 Speeding up from 120 kt.

2057 Maneuver complete, deice power back on and descend for next speed runs.

At 11 kft for second set of speed runs.

210630 At max speed with deice power on. Slowing through 2108, back to max speed at 211130.

211450 At max speed for second run with deice power on, slowing through 2116, back to max speed at 211820.

211820 At max speed for final runs with deice power off. Slowing through 211940, back to max speed at 212145. Continued for another run with deice power off enroute to KLAR, slowing through 2123, and back to max speed at 212420. Return home.

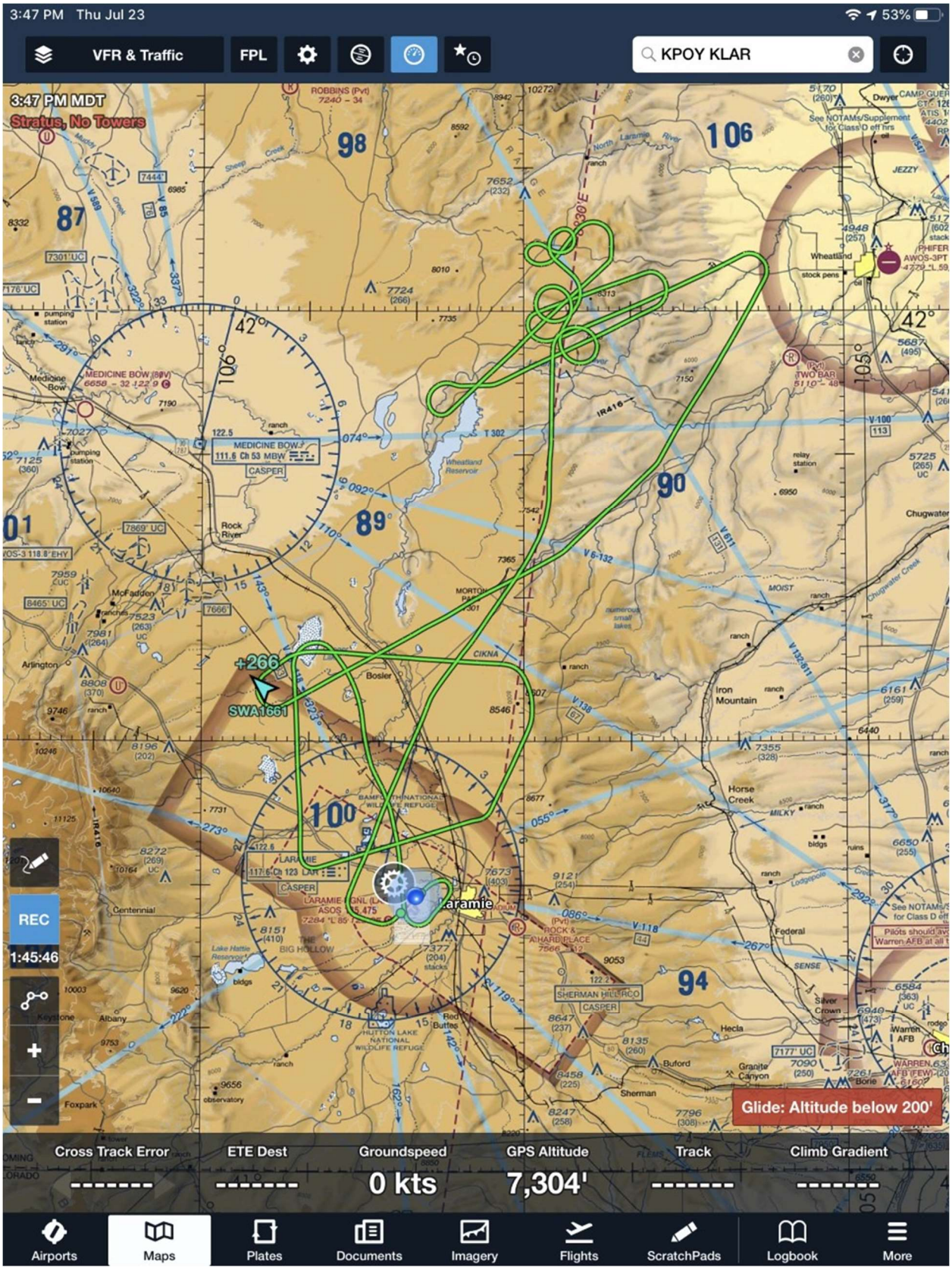
2129 On the ground.

07/23/2020 DILBERT Pilot notes (Test Flight 1)

Crew. Sigel, Plummer, French, Shaffer

Flight Time: 1.7
Planned: To go find clear air around 12 to 14 thousand feet. First to do item was Rodi Maneuvers. Second on the list strait and level legs at slowest airspeed increasing 5 knots on each leg. Third item was to find clouds with green and yellow echoes penetrate them to test the new equipment.
Return to LAR

Actual: Departed LAR and started to fly to the clearest open spot in the clouds. LAR had a broken level at 9000 feet. Out over the Shirley basin there was a hole over 10 miles across. We climbed to 14500 feet and preformed the Rodi Maneuvers. After that we started on the strait and level legs. I started at a 120 knots and increased speed by 5 knots from there. Setting up clean configuration power at idle until the speed was down. Set the power to 900 on the torque and we flew along nicely for approximately a minute. At the end of the leg the airspeed started to decrease so I increased power to 1800. I was well behind the power curve so pushed the nose over and regained speed lost approximately a 100 feet. After 4 legs we picked up a clearance and started to fly though clouds. We mostly went through green echoes and a bit of yellow. Some of the precipitation was moderate with a bit of light ice. We returned LAR and canceled our clearance in the air. The flight was very uneventful. I went over everything twice and double checked myself often. One mistake I did make on the flight was shortly after departure Jeff pointed out that I had not turned on the probe heats for their equipment. Other than that it was a fun and successful first flight back to the research Aircraft.


3:47 PM Thu Jul 23
53%
VFR & Traffic
FPL
KPOY KLAR
3:47 PM MDT
Stratus, No Towers
SWA1661
REC
1:45:46
Glide: Altitude below 200'
Cross Track Error
ETE Dest
Groundspeed
GPS Altitude
Track
Climb Gradient
0 kts
7,304'
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Project: DILBERT-20
23 July 2020

Flight: RF01

Notes:

Shakedown flight for aircraft and payload after lengthy downtime and some new installations - HVPS, LWC-301, and new pressure transducers are newly installed, as well as the HCPI probe for its upcoming flights. Flight consisted of Rodi wind calibration maneuvers, straight legs in clear air at five engine settings to provide comparison pressure measurements, and cloud passes in a mix of liquid and ice.

The Licor-7000 was not communicating (known issue prior to flight). Additionally, the IWG packet forwarder for the LWC-301 was not initialized during startup, this was caught later in the flight, and additional passes in liquid were made to test the 301's response. Finally, the deice breaker was not set for the HVPS/2DS; some stuck bits were noted late in the flight. The HCPI imager was run as a test for UW operation - it seemed to perform well, although the default configuration was set to record much faster than intended (10 Hz vs 1 Hz), which was not caught and corrected until later in the flight.

Crew: Sigel, French, Plummer, Shaffer; LOD: Little

Flight Summary:

UTC Comment

2008 Wheels up

2010 Upward WCL on and recording

2016 Probe heats on (no substantial cloud encountered yet)

Wind calibration maneuvers:

202230-202510 Right turn (yaw)

202520-202750 Left turn (yaw) (note, cloud at ~2026)

202900-203110 Right turn (speed)

203120-2033 Left turn (speed)

Pressure measurements: straight and level in clear air, stepping up from minimum to maximum usable power in five increments, and allowing some time for power/speed to stabilize. Prop RPM at ~1700.

1: 203520-203710 Torque 850, had to boost power ~2038

2: 203820-204130 Torque ~800-1200

3: (times missing, will add) Torque ~980-1200

4: 2049-2052 Torque ~1050

2054-~2058 Torque ~1100

2100 Begin hunting for some clouds

2105-07 Small liquid on Nevzorov/CDP, no response on LWC301 voltages

2109 Graupel - some response appearing on HCPI imagery

2110 Additional graupel

2111 Switched HCPI to 1/sec outside of cloud

2113 Climbing to 17500 for some additional cloud passes

2121 LWC-301 issue resolved, IWG packet forwarder was not started.

2122 Additional cloud passes with liquid, LWC-301 now seems to be responding in system monitor

2124-2128 Repeated cloud passes near -7C, liquid up to 0.5 g

2141 On the ground