

Test Flight

Aircraft Flight Log for the University of Washington, Cloud and Aerosol Research Group

Date 12-21-00	Flight Number 1845	Main Goals of Flight TEST COORDINATION WITH NAVY P-3 IN WARNING AREA, CHECK LWC MEASUREMENTS, TEST NEWLY INSTALLED 2-D CLOUD PROBE & CLOUD PARTICLE IMAGER IN CLOUDS AND PRECIP, CHECK WINDS VCTY OIL AT BRAVIN LAUNCH TIME, CK RADAR FIXES-U	
Project name IMPROVE Test			
Engines on time 2140U 1340 EST	Engines off time 0016 UT 1616 LST	DURATION = 2:36	
Departure airport PAE	Arrival airport PAE	Which of the Main Goals were Essentially Accomplished?	
Flight Scientist signature J. Rangno		TESTED LWC METERS IN SC-WEAK CU, IMAGERS IN PRECIP WINDS OVR/NEAR UIL	
Pilot signature J. Stensrud		DID NOT TEST COORD. W/NAVY A/C SINCE THEIR FLT SCRUBBED, HAD PRECIP FOR "CLOUD" RADAR CK. STRONG RADAR SIGNAL, MUCH IMPROVED OVER PREVIOUS FLT.	
Surface met. & visual obs.		HOWEVER, RESULTS OF IMAGER TESTS/CKS UNSATISFACTORY. NO 2-DC IMAGES AT ALL, NO IMAGES OF PARTICLES BY CPI.; HAD TO RESTART SEVERAL TIMES, ONLY BLANKS ACQUIRED. SOME BLACK BACKGROUNDS SUGGESTED CAMERA NOT FUNCTIONING AT TIMES. CLOS DISAPPOINTING. MORE SYNOPTIC LAYERED NEAR-SHORE THAN HOPED FOR; BEST	
a) At takeoff OVC, R-	Clouds sampled in flight AC As Ns Sc St Cu Cb	Other Accomplishments CLOUDS TOO FAR OFFSHORE	
b) In flight FAIL BANDS POST-FLT WEAK CONVECTION W MANY PARTIAL COVERAGE LATER		FOUND WE WERE ABLE TO WORK OFFSHORE REGION 5 OF WARNING AREA.	
c) On landing OVC, R--			
Research crew BOND WILSON SPURGEON RANGNO		Equipment failures 2-DC CPI DMT-NOISY	Additional Comments on Flight

Flight 1845
December 21, 2000
Voice Transcriptions*
IMPROVE (Flight testing)

1:55 PM

DS: Art, are you up?

2:01 PM

DS: Are you there, Tom?

TW: Yes, I am.

DS: Good. Do we have Grant's other file on board now or is it?

TW: It's on my laptop.

DS: Okay. It looks like you've done something already with the winds. I'm just looking at them here. Have you implemented some earlier one?

TW: I'd have to look at the equations. I don't know. I'd have to check.

DS: I can do that.

TW: HVPS looks good. The 2-D doesn't look too hot. It's pretty much junk I think.

DS: I haven't got that far yet. One triumph at least.

2:03 PM

TW: Actually I'm getting no 2-D data at all right now. I'm getting HVPS data, but now cloud probe.

DS: Okay. Our version may not be up on it yet. This one is a little slow to fire and it's been sitting outside for quite a while and it got cold soaked.

TW: Well, I did get 23 strips. Let me see what time they came.

DS: The gold one indicates that the laser came up at that time.

* AR = Art Rangno, DS = Don Spurgeon, NB = Nick Bond, TW = Tom Wilson

2:04 PM

TW: I just got some more strips.

DS: What strip number are you up to on the HVPS?

TW: I don't know, like 4,000 or something, 3,300.

DS: I have 3,163 back here.

TW: You have to hit end occasionally to have it catch it, otherwise you're going to get way behind.

DS: End is when it's a double arrow on it?

TW: No, end is just to hit the end key and then it will jump to the end of block.

DS: Okay.

2:06 PM

TW: Don't

DS: Go ahead.

TW: Do you have the latest HVPS program?

DS: I just copied it from node 1.

TW: Okay. That's good. You might want to do it from node 4 to play it safe.

DS: Okay. I need to copy the most recent 2-D one here too it looks like.

TW: Okay.

DS: Get both of those from node 4?

TW: Yes.

2:17 PM

DS: We don't have a hot mike system unless somebody else keys it.

2:22 PM

DS: Tell Art, he can use my headset.

TW: Hey Don.

2:24 PM

TW: Don.

2:32 PM

AR: Testing 1, 2, 3. Do you copy, Larry? Larry, do you copy? Don, do you copy? Who is that?

LS: That's me, Art, Larry.

AR: Thanks. I'm back in the bubble now. I can see all around a little better. What I thought I saw was something off the right wing now, but I don't know where it is right now. I think we're going to come into it. I've been watching that.

2:47 PM

AR: Larry, do you copy? I'd like to increase our climb to 500 ft/min.

LS: Okay.

AR: Notice that little cloud there is a little shelf cloud. It's kind of detached from the stuff below.

LS: I haven't been able to watch it.

2:49 PM

LS: Art, we're going to have to break off. We're getting drifted over the shoreline.

AR: Roger. We'll continue our climb rate at 500 ft and you can head off to the west and I'll look for a turret. If we don't see anything nearby, we're going to break off and head up toward Forks if you can do that general area. It doesn't have to be over Forks as we talked before.

LS: Yes. If we can be on top of the clouds, we can be over Forks. If not, we're going to have to stay offshore.

2:51 PM

LS: Okay. I'm going to swing off to the west here. We're only about 6 min away from Quillayute.

AR: Roger, I understand. Thank you.

2:52 PM

AR: Give it a moment. It's pretty hot back here.

DS: Art?

AR: Roger, Don.

DS: I have your CPI drawing the character will come up in another few minutes.

AR: Do you think the camera was warming up? I can't write to memory here. What was that about?

DS: I couldn't tell you. Something is in a funny state.

LS: Art, do you want to be up at Quillayute at 3:00 or 3:30, which is it?

AR: It doesn't have to be exact. I'd rather look for a turret here and have that kind of a secondary thing right now.

LS: Okay.

2:53 PM

AR: That's a big cloud bow off the right wing.

LS: Art, we're right on top.

AR: I don't see really what we need to fly in, so let's head over a little closer to Forks. I guess we can VFR. Can you climb to 10,000 ft.

LS: Okay.

AR: Let me tweak that a little bit. I want to be actually at 700 mbars. If we can do a crosswind and downwind legs of maybe 3 min each at 10,000 ft.

LS: Okay. I'm going to have to do a circle here when we get to 10,000 ft to get the wind thing down and then I'll give it to you. Art, can we go west of Forks there about 15 miles?

AR: You bet.

2:56 PM

AR: Actually, Larry, it's going to be lower than 10,000 ft. I'm looking for the 700 mbar level and because of that deep low out there, it's going to be a little lower than I was estimating. I wasn't thinking. So coming up on it here at about 9,000 ft actually, about another 100 ft.

LS: Okay.

AR: We'll have to go up a little more here, 705, 708, 704, 703. It will probably be another 100 ft. 702, 700. 701, 702, 703. Maybe just a little bit higher. 702, 701, 701, 702. Take it up another 50 ft or so. That will be close enough. Okay. 700, 700, 701. Okay. I think this is close enough, Larry, if you want to do your circle.

LS: I'm in the circle now.

3:00 PM

AR: Tom, do you copy?

TW: Yes, I copy.

AR: The HVPS looks like it's malfunctioning now.

TW: You said 1 bar there, right?

AR: Yes.

TW: Yes, it's waiting for data because there's nothing more left. That's some diagnostic buffer that I think I shouldn't be drawing.

AR: I see. You don't think we're saving these images.

TW: Yes, we're saving them. We're saving everything.

AR: Okay.

TW: I don't think this particular data that you see right now should be drawn. I think it's like a diagnostic buffer that comes and it shouldn't be drawn on the screen.

AR: Okay. Got it.

TW: It should just be skipped over.

LS: So, Art, you want a leg parallel or perpendicular to the wind or one with the wind?

AR: That's negative. Let's do the reciprocals of those legs and let's make the legs 2 min just to save a little bit of time. I think we should get enough in 2 min.

LS: Okay. So we want one each way for about 2 min.

AR: Roger.

3:02 PM

LS: Art, your winds are from 150 magnetic and 26 knots.

3:03 PM

LS: Hey, Art. Are you ready to start the first leg? Hello Art? Art, in 2 min I'm going to do a 260° and I'll call you when we're back on track northbound.

3:06 PM

LS: Art, start your 2 min. Art, I'm going to do a 90° turn and we'll start turning again. Start turning, Art.

3:12 PM

AR: Larry, I'm back in the bubble. I was fiddling with an instrument right now. How far along are we on these legs?

LS: We did a reciprocal at the end of the run and we were just going back on our second perpendicular here and I'll give you a mark when get back around on the heading.

AR: Okay. If we hit a cloud that wouldn't be too bad. They look closer probably than they are.

3:16 PM

LS: I've got a correction on the wind for you, Art, 150 at 41.

3:17 PM

AR: Larry, as soon as you're done, you can head back to Paine Field as quickly as possible.

LS: Okay.

3:18 PM

LS: Art, if we're done, can we climb here?

3:19 PM

TW: Don, "chat."

3:20 PM

AR: Larry, a question came up, are we pressurized today?

3:28 PM

TW: We're getting some big particles right now.

AR: Yes, sort of a wispy little snow flurry actually is what you'd call it if you were outside in it. It wouldn't be that much because the visibility is pretty darn high. I would guess that as we get into Puget Sound we'll see some mixed stuff.

TW: How many flybys are we doing?

AR: There will be three flybys.

3:38 PM

DS: Are you up there, Tom?

TW: Yes I am.

DS: It looks as if we've got a spot or something on the HVPS.

TW: Yes. It will go for awhile and then stops for awhile. Yes. It was there for a long time after that last little rain storm.

DS: At least you know what the cause of that is?

TW: Yes. Actually those dots probably appear a lot closer together than they really look because of that 25 spacing thing.

DS: Yes. I think I have mine set to 50.

TW: I think I'm going to put up a display that says how far you are behind actual time, you know. A lot of times you don't even realize you're looking at data that's like 40 s old.

DS: Yes. It's dried out again already or has now. I jumped ahead a bit. Got a few more good snow/flakes in there. Tomorrow should be quiet out here because I don't think anybody is going to be in as far as aircrew.

TW: Talking about that 2-DC.

DS: Yes. I'm thinking about we'll pull it back in here. We'll do a little spraying with it inside here and see what it looks like.

TW: Okay.

DS: If it looks good, I'd still like to pull the claw and put it in the other slot.

TW: Okay.

DS: If we can get good data from both, that will confirm that the wires aren't the fault and it's the card. If we don't get good data from the two, then I'll have to go and see what's going on with the wiring as well.

TW: Do you mean it could be the probe A or probe B on the card or something like only probe A is working.

DS: Yes. We have to try several things.

TW: Right. I could always try and switch the cords around too and have probe A and probe B. That would be real easy to help eliminate the card if I switch probe A and probe B around.

DS: But at the moment I'm not suspecting the card necessarily. I'm suspecting either the wire run, like maybe a wire is broken somewhere, or something along those lines. Since the HVPS is working if we could swap it to the upper can out there and then move the wire in here. Because the two wires are the same internal here, we can move those over so it's going into the correct port on the card and see if we still get good data from the claw. That will answer if the wires are good or not.

TW: I think we've got another spot.

DS: It looks like it. Debbie has said that the recordings are better, which is good although we should probably go to "chat" if we're going to continue to chat.

TW: Okay.

3:50 PM

LS: Hello Art.

3:51 PM

DS: Tom.

3:54 PM

DS: Tom.

TW: Don.

4:00 PM

AR: Thank you very much. Do you want us in the back again when we land?

4:06 PM

Summary of Flight 1845 (Test Flight)

AR: This is a summary for flight 1845. We took off to fly a frontal system making landfall on the Washington coast. The main goal of the flight was to test our coordination with a military aircraft expected to be in the warming areas. For that reason we were initially limited to a flight block of 9,000 ft and above. Then as the flight time occurred, the military flight was cancelled and we had the whole warming areas to ourselves. So in a proposed test of the liquid water content meters, we decided to go down to measure cloud base, get a good reading on cloud base (which will tell the amount of water vapor going into the cloud), the cloud base temperature and pressure, and then work our way up through the cloud and have a good handle on whether the cloud liquid water is exceeding the adiabatic liquid water content as appeared to happen on the last flight.

Unfortunately, the clouds were not really put together as well as they looked they might be on the satellite imagery. They were kind of tattered and had lots of separations between layers and kind of wispy and not so convective as was hoped that would push the liquid water to a gram or more per cubic meter. We continued with that until we popped out of cloud top and about that time it was getting pretty close to 3 PM. At that point we didn't see anything at cloud top that looked like a protruding tower that still might allow us to accomplish that goal. Instead there were mushy little iced out cumulonimbus here and there in multilevel clouds. So we headed out to the vicinity of Quillayute to rendezvous more or less with the Quillayute rawinsonde and do some maneuvers to test our wind measuring system in the downwind/crosswind directions during two legs each in each direction, so four legs total. Now we're going to speed on back to Paine Field and do a couple of flybys of the Paine Field tower to wrap things up. In terms of the two key instruments we installed, the 2-D cloud probe did not work and the CPI just quit several times. We just could not get any images, not a

portion of a single crystal. There were only blank images and sometimes backgrounds gave black images that suggests the camera was not operating. So that's about all I have because I wasn't watching very close. I spent most of my time in front of the CPI and back in the bubble and talking to the pilots. We were short a headset, so that didn't allow all the communications we normally would have done. So I guess that's about it. I would like to say that the HVPS worked beautifully today, acres and acres of volumes of good particle images there, so that was certainly a big plus.