

Flight 1901
December 13, 2001
Voice Transcriptions*
IMPROVE-2

4:55 AM

LS: Nick, are you on?

NB: Yes, I'm here.

LS: It looks like we've got a spot here for about the next few miles and we're going to have to reverse and go southbound.

NB: Okay. That sounds good. Thanks.

VS: The CCN is ready.

NB: Art, can you kind of keep an eye out if you see where we are with respect to cloud bases and so forth?

AR: Roger. We're a little above the lowest bases. I don't know whether he can get any lower than this though.

4:57 AM

LS: We'll be turning back southbound.

AR: Right off about 2 o'clock, Nick, if you can see out there, there's some clouds out there. There's a boundary layer cloud and you can see they're probably 500 ft or they're about above the bases of those. It's going ahead of the right wing now.

NB: I see what you mean. I guess you should turn on your instrument now and we'll just see what we can do down here.

4:58 AM

AR: I'll say one thing down here, Nick, I didn't think the winds would be this westerly this low. I thought they would be more channeled at this height. We're only about 2,000 ft above the ground level, maybe 1,700 ft, actually our radar altimeter is indicating.

* AR = Art Rangno, KM = Ken McMillen, LS = Larry Sutherland, NB = Nick Bond, TW = Tom Wilson, VS = Vidal Salazar, ZS = Zan Sutherland

NB: I don't have very many instincts for here, but I guess I'm kind of surprised too because even though the coast range is pretty modest, the Cascades you would think would be having an upstream effect here.

VS: The CCN has started and I'm taking measurements at 0.3, 0.5, 0.6, 0.7 and 1.0% supersaturation.

5:00 AM

NB: We're hitting a little precip here, of course. It looks like we're turning around to head south.

5:01 AM

TW: I think the PVM got a little full of water or something. It's reading negative values right now. When we get in clear air, I will try and zero here.

AR: I took the tape off there and it was dry just as I got on the plane and it wasn't raining. So I don't know where the water might have come from.

TW: It might have happened before we put the tape on.

AR: That's true.

NB: So, Art, right now we're at 3,000 ft. If I can get lower I probably should, right? In that we're going to hit even when we're out of precip we're going to hit some of these clouds.

AR: Not right away, they're fairly sparse. I think you'll probably just be circling in this clear area. I don't know how important it is to get exactly below the base of these things.

VS: The closer to the base the better the measurements.

AR: Larry, what is our minimum altitude in here? By the way there's a plume on the ground.

LS: How low do you want to go?

AR: You see that cloud base off the right wing there. Sorry, standby just a second, Larry. There's a plume down there off the right wing. I don't know if it's getting up to this level, but it looks like it's laid pretty flat, but you might watch out here. Do you see any sign of a plume back there and that would be about 10 seconds ago.

LS: Yes, I see it and it's not coming up here, Art.

AR: Right. It doesn't look it.

5:04 AM

AR: I tell you right now, Nick, I don't see much in the way of boundary layer clouds. There's a little shred cloud off about 11 o'clock. Other than that it looks pretty clear in this area.

NB: Okay. So we can keep staying right here.

AR: If we get lower, we might have a problem with that plume back there, if we go anywhere near it. I'll kind of watch out for anything else that might be out there. The other day we were in this area and there was something that we hit I guess. It's hard to believe it, but there was some sort of a plume up here.

5:05 AM

VS: We are depressurized, right?

NB: I assume so. I'll ask. Larry, we're depressurized, is that correct?

LS: Negative. We've got about a couple thousand feet of pressurization here. Did you want to be depressurized?

NB: I'll check. Hang on.

VS: Yes, we do.

NB: Yes. We need to be depressurized. You should tell me that.

LS: Here we go.

NB: Thanks.

5:08 AM

LS: Nick, you should be depressurized now.

NB: Thanks. We should be depressurized now.

5:09 AM

VS: So is it okay if we stay here for another 10 min?

NB: Yes, I think so. That's what I'm going to ask for. Larry, if we could kind of stay doing this sort of thing for about 10 min and then kind of head for our point, that would work out.

LS: Okay.

5:10 AM

AR: It looks like we're heading into significant drizzle or very light rain.

NB: Yes.

AR: See some clouds here. We're right near cloud bases here too of this stuff. I think they need to stay out of cloud for his measurements.

NB: Right. Larry, we're in cloud now and, if you can steer away from them, that would help.

LS: Okay. We just swung to the right to miss one. I think we're going to have to come back around maybe. Hang on. We're going to swing southbound here, Nick. What we're doing is we're going through a bunch of rain out here. It's not clouds.

NB: Right. I see that now.

AR: There were clouds there, Larry, believe me. I was watching the FSSP droplet concentrations, Nick, that's how I know plus I could see it go by the wing. It was a little light there.

5:12 AM

NB: I'm going to give Mark a call, so I'm offline for a bit.

5:13 AM

AR: We're getting into a little cloud here.

5:16 AM

AR: Just skimming the base of kind of a stratiform layer out there. It's a little different than the shred clouds we got before. We're just at the base of that.

VS: I'm done with the measurements here, so we can get going with the flight.

AR: Larry, I think Nick's still on the radio, but Vidal said he's finished with his measurements. So I guess you can proceed to point 1.

ZS: Okay. We will get a clearance.

AR: Did you copy that, Nick?

TW: He's still on the horn with S-Pol. I think we're having diminished precipitation around here.

AR: That's for sure. I think I'll throw in the towel.

TW: I think I was eavesdropping and I heard something of the sort. I'm not sure.

VS: Art?

AR: Yes sir.

VS: Do you think we're getting some contamination from that plume you were looking at?

AR: I didn't think so. It was laid down flat. Apparently the wind was keeping it and it just went out horizontally down on the ground. But if it did get up here, it would certainly show up on some other measurements. I didn't look at them, you know, some of our chemistry stuff or the aerosol measurements. It looked like it was just laid down flat.

VS: That's true, but my numbers are all over the place.

AR: Yes. I wonder about those cloud droplets. I don't know, does that effect your reading?

VS: It definitely does, yes.

AR: We kind of went in and out of these very wispy clouds. There was hardly anything to them. You don't see them until you're actually, barely see them until you're in them, but we did touch a couple of those. I saw the FSSP. There goes one right now for example. Look out the left wing. You can see that little fog going by.

VS: Yes.

AR: Little puffs only lasting a fraction of a second. There were some of those back there.

VS: Because when we go through cloud, you know the CCN are already nucleated so I'm getting like zero counts, which that means that the CCN is already nucleated.

AR: Right, that makes sense, doesn't it?

NB: I'm sorry, it's kind of frustrating we aren't able to get you more down here, but it seems like there's too many showers around.

VS: Yes. That's okay I guess.

AR: In the daylight we'd probably do better too because we'd have a better idea of the field of clouds and where the best hole would be. We wouldn't run into those clouds because they're almost impossible to see with the dark background unless they're in front of the city lights then you can't see them.

NB: It sounds like even though precip is a little bit on the wane here on the west slopes that Mark wants us to do at least a couple of runs through it. The P-3 is just about to break off and head home. So we'll see what kind of ice crystals were seeding their clouds. It looks like echo tops are something like 4.5 kilometers or so.

LS: Nick, I need a second point here for after we get to our first point.

NB: That second point would be 44 33.4' and 121 30.0'.

LS: Okay.

NB: We could make it just 15,000 ft for our starting altitude rather than 16,000 ft.

LS: Roger.

NB: By the way, we can pressurize now.

LS: Roger.

NB: So, Vidal, I'm going to have him pressurize. I assume that's okay.

VS: That's fine.

5:21 AM

TW: It seems like we're having problems with one of our nodes, the one with the A-D converter on it.

AR: Yes. I was just noticing some numbers aren't updating, text numbers. What do you have to do, Tom? Do you have to reboot?

TW: I don't know. I'm taking a look and seeing what's going on.

5:22 AM

AR: It's certainly above the freezing level and we're picking up some icing now. Like a cloud out there.

TW: I don't know what happened. All of a sudden everything just kind of went haywire when we started that climb.

AR: Right. Are we only recording the data that's updating?

TW: Pretty much, it's getting the data from the computers that are having problems.

AR: Like right now I'm not able to see what the liquid water content is. Is that something that we will not have recorded then?

TW: It will be recorded slowly.

5:23 AM

NB: Art, assuming that we will know what our altitude is and all that, as we get close to our nominal starting altitude, I'd like you to keep an eye on when we're getting near cloud top.

AR: Roger. I'll do my best. Right now the only cloud information I have is what goes by the red taillight. I have no FSSP, no PVM. I'll tell you when we're in precip though because we are getting good 2-D imagery.

NB: Right. On my display the PVM liquid water content is updating slowly.

AR: I just got it back.

TW: I'm going to actually reboot that one machine that has that stuff on it.

AR: Do you want me to log out of these windows?

TW: No, don't worry about it.

5:25 AM

AR: We're getting into some juice here, 0.4 grams per cubic meter.

NB: Yes, it looks like pretty big crystals on the HVPS.

5:26 AM

TW: Hopefully things are getting back to normal.

AR: We just had a sky full of stars up there, but now we're sort of popping in and out of some tops at this level.

5:28 AM

NB: Well, it looks like we're in cloud now, right, or just were?

AR: We've been in cloud the whole way here. We've had quite a bit of icing. Look at the ray dome out there on the right wing. Gorgeous sky now, lots of stars.

LS: We're on top.

NB: Okay. Then I think this is high enough.

AR: Personally, I can't see what's ahead though, Nick, but it wouldn't surprise me if there are some lumps. Can you see ahead, Larry, and see if there's anything that bulges up near Santiam?

LS: I don't see anything ahead of us. So there are clouds ahead, but just to the south of us on the right, to the east of us, is clear.

AR: Roger.

NB: We'd like to be in the cloud, so if you could nudge it down a tad.

LS: We might have clouds ahead of us. I don't see any stars directly ahead. I think you're going to be in it.

NB: Okay. I misunderstood. Carry on. Thanks.

AR: Right, I think that's correct. I think we've gotten to the highest stuff here.

5:30 AM

AR: I'm going to come up to the front.

ZS: Nick, we're going down 1,000 ft to try to get the cloud for you on top.

NB: Good idea. Thanks.

5:32 AM

TW: Are we in clear air?

AR: Affirmative. I think the PVM dried out, so I've got to notch it down a little bit.

LS: Nick, 14,000 ft is not going to do it, do you want to go to 13,000 ft?

NB: Yes.

5:33 AM

TW: The PVM has been zeroed.

NB: That was pretty good shooting.

AR: We're at 14,000, 13,900 ft.

NB: Yes. We could stay right here unless you know this is just a little bubble that we're not going to hit.

AR: I can't tell personally.

5:34 AM

LS: Nick, we're going to be in and out of the tops here at 14,000 ft.

NB: Yes. Maybe it is better to go down then. I should trust you from the start. So let's just go 13,000 ft and make sure we're in cloud.

LS: I think I ought to hold this for just a minute. It looks like something is coming up ahead, hang on.

AR: Nick, here's something that came up the other day. How important is it to know and to have points of clear air in the MM5, you know when you're comparing the MM5?

NB: Very important. We don't necessarily want to be just in cloud. We want to know where they end. So kind of going in and out, I think that's pretty valuable actually.

AR: Roger. Because we had this discussion the other day too that when we were flying upwind of the Cascades.

LS: Nick, I have a block here from 13,000 to 14,000 ft and it looks like we're just going to be in and out of tops. We have another top ahead of us here.

NB: That's fine. If we're in clear air some of the top, that's okay.

5:35 AM

AR: We ought to be getting to that waterfall.

NB: I'm going to call Mark here before we get across the crest.

LS: What was the flight time on the first leg?

AR: Larry, he's talking to the ground right now and I don't know what it was. We're coming toward the lee of the mountains and so it's possible that the turbulence might pick up.

5:37 AM

TW: Larry, I've got those times if you need them.

LS: Okay. Why don't you give them to me?

TW: 13:31 takeoff or engines on.

LS: Okay.

TW: 19:27 engines off.

LS: Okay.

5:38 AM

LS: Nick, if you're on, we're going to need a southwest point here pretty quick.

TW: Nick, did you hear that? They need a southwest point.

NB: Yes. I got that for you. The southwest point would be the same one that we started at, which is 44 00.1' and 122 49.6'.

LS: I have those on a different piece of paper. But if that's where we started our first point, I've got it in the GPS.

NB: Okay. On this leg we'd kind of like to descend down to 12,000 ft on our way back just to kind of in the same manner we were doing it before and then when we fly northeast again it will be at 12,000 ft.

LS: Roger.

5:41 AM

NB: Art, I have it at about on the order of 6 C cooler than the last time we were at here at this level.

AR: I couldn't remember what it was but I was noticing the -20 C here and I thought, "Gee, was it that cold before?"

5:42 AM

NB: So I think this is actually going to be pretty good. We'll get at least a glimpse of how things have evolved as it kind of chilled down. You know the winds are basically at the same direction. It's just kind of the cooler air masses just flowing in.

AR: Yes, you're quite right.

5:45 AM

NB: It's snowing out there pretty good now.

AR: Absolutely. At times when you were talking to Mark, it was really incredible. I mean it was just looking out at the snow and the light they have on the wing there, I mean it was just phenomenal. Half way up the slope I think it was or actually it was probably just west of Santiam Pass. That's where it was. Maybe this is a remnant of it.

NB: Right.

5:46 AM

NB: Maybe it's my imagination, but on the 2-DC I almost thought I saw some capped columns.

AR: You're absolutely right. I'm definitely sure that I saw a couple back there too. You almost never see them because they're so hard to see on this particular format.

5:47 AM

TW: What's a capped column?

AR: A stick with plates on the end. Like hexagonal plates on the end of a hexagonal column.

NB: In a way it looked like something, well, you'd make out of tinker toys in a manner of speaking.

AR: Yes.

5:48 AM

NB: Art, how do our liquid water contents compare with previously when we're at this level?

AR: At a different location they were as high as what we saw here. They did reach values of about 0.4 g/m^3 in areas on the last flight on the upslope side, but we don't have that seeder cloud now dropping the stuff into the orographic cloud. I don't recall there was as much liquid water over Santiam Pass on the last flight, however. We're not seeing the same thing now, but let me look back here.

NB: No big deal. Don't sweat it. We're right about at the pass now, so it will be interesting to see if it really starts popping up here in just a few seconds.

5:50 AM

LS: Descending now to 12,000 ft and that's good for us on this southwest-bound leg when we maintain a level like when we go northeast bound.

NB: Yes, that's correct.

5:51 AM

AR: Occasionally see some stars here at the time 055157 to be in and out of tops.

5:52 AM

AR: Continuing to skim cloud tops, lots of stars visible. In fact I just saw a shooting star, 055710.

5:57 AM

NB: Art, correct me if I'm wrong, but we did hit some precip down in this region before, didn't we?

AR: Yes, that's what I was thinking. It seems like we just came into a huge suppressed cloud top area or something.

NB: Because we're not even in cloud, are we?

AR: No, not lately. We've skimmed a couple of tops. As I say, I can't see ahead. Larry might be able to see something ahead because he's got those city lights ahead. Larry, do you see any cloud ahead?

LS: Yes, I think so. It's going to be in and out. I don't see any stars up there, if we're about 5 above the horizon, so I think we're descending into something.

NB: It sounds good. I don't mind being in the clear here and just, again, painting out where the tops are.

AR: Yes, I think that's exactly right, just filling in the blanks.

5:59 AM

NB: Larry, you can use these same southwest and northeast points for just while we're doing this track.

LS: Okay. I think that point you gave us is our Quebec point anyhow, wasn't it?

NB: Yes.

LS: Okay.

6:00 AM

AR: Larry, is your radar working? Can you see anything ahead on that?

NB: I'm going to talk to Mark now. I'll be offline for a bit.

6:01 AM

AR: As we descend to -17 to -16 C, starting to see a nice evolution to dendritic types in the 2-D imagery.

6:03 AM

AR: We're still in and out of cloud tops it appears. We just lost our stars.

6:04 AM

AR: Particles look heavily rimed in here. Liquid water content is only about 0.1.

6:05 AM

NB: Ken, are you on a headset?

6:06 AM

NB: Art, could you put Ken on a headset?

KM: Go ahead.

NB: So do you want Mark to make the reservations or just call Bob to make the reservations?

KM: Call Bob and tell him we'll be back about midnight and call Jeannie, it's the next number down there, to make reservations at the Holiday Inn.

NB: Okay. I've got you.

AR: There may have been a few drizzle drops back there. Low liquid water contents however.

6:08 AM

NB: Art, you might notice the winds now are 265 at 18 meters per second. Just a little way here they transition to 245 or something.

AR: That's interesting. I did notice they were 265, but I couldn't remember what they were. Is it because we're a little lower, Nick? I know that up at the other end it was more what 250 or something at Santiam at 14 or 13.

NB: Yes, we're not that much lower than when we came back here, it's just kind of a wind shift aloft is kind of up here at this end of the leg.

6:15 AM

AR: One star visible at 061644.

6:17 AM

AR: Numerous stars 061858.

NB: Art, you might note that our winds have shifted around now to 240 something. They were even to 230 for awhile.

AR: Wow. There is some kind of little wind shift in here you think?

NB: Yes, definitely. Whether that is enough to support kind of some additional convergence here and get a little more loft here maybe that's the difference.

AR: Roger. I don't know when the trough was supposed to go by at 700 mb. Is this the main bang then, excuse me, the trough apex going by at 700?

NB: It could well be. I was just going to take a look at what I have of the forecast stuff.

6:20 AM

NB: Yes, it seems like that trough passage. I didn't time it out or anything, but it is a bit faster than forecasted.

6:21 AM

AR: It seems that no matter how low we go we're still skimming tops. Look at all the stars up there now, although we're in cloud and out.

NB: Yes, last time we went through here I think it was pretty thick right in here before.

6:22 AM

NB: Art, what do you consider a high number of those kind of drizzle-size particles?

AR: Tens per liter.

NB: Because at times we're up in the hundreds. Is that believable?

AR: No, not really. Actually, when I said tens per liter, I was thinking of drizzle drops bigger than 100 microns and that concentration is for just about everything including everything below that limit. Some of those at this temperature there might be small plates that are on their way to be stellars and then dendrites and so forth.

6:24 AM

AR: It looks like these winds are coming around again. Do you think the trough is catching up with us or just getting close to the edge or the crest has something to do with it?

NB: Yes, I think that has something to do with it. We just went over the east side and here we're getting a burst of precip again, so maybe just something almost turbulent or kind of roll motions of some sort.

6:26 AM

LS: Nick, what's your plan here after we reverse?

NB: I'd like to on this one when we reverse go from 12,000 to 10,000 ft on the way back.

LS: Okay. Nick, did you want to go back to the same point after the reversal?

NB: That's correct.

LS: Okay.

6:27 AM

NB: I imagine you're going to be kind of interested on how much liquid water we'll hit as we go lower and lower here.

AR: Yes. Once again I have to say I'm a little disappointed.

NB: What, in the intensity of the precip?

AR: The liquid water content is too low for me.

NB: So what you're trying to say is you really want to build up high from the plane?

AR: No. It's just that my synoptic/orographic acumen here is not doing very well today. I didn't think the cloud tops would be this low. I thought with the amount of wind at the slopes that we'd be seeing half a gram fairly often and really piling it up and causing Larry to say, "I'm going to get out of this situation." It hasn't even been close.

6:32 AM

NB: Talking to Mark here. It looks like we're going to have to cut the science due to duty day. So just going to get some instructions from him.

6:41 AM

NB: Larry, Nick here.

LS: Go ahead Nick.

NB: If we could drop down to 10,000 ft here, since this is our last leg, to kind of get a little glimpse of what's going on a little lower that would be good.

LS: Okay.

6:43 AM

NB: Larry, if we could now drop down, I think we're at the region where we can go down to 8,000 ft. Is that correct?

LS: We'll check.

NB: If we could go just down to the minimum transect like we did before to close out this leg that would be helpful.

LS: Okay. We'll ask for it.

6:47 AM

NB: Art, I don't know if you heard and everybody else, but this is our last leg. So I'm kind of doing just a step descent down to try to get a little bit of a sample at a variety of levels.

AR: Sounds good. Everything sounds good that you said.

NB: I guess I'm not too torn up that we'll get home that much earlier without having to do another leg.

AR: I've become semi-comatose back here.

LS: Nick, how soon do you want to be at 8,000 ft?

NB: When you can get there. If you can descend now, that would be fine.

LS: Do you want to go down fast?

NB: No. Just kind of a typical speed.

LS: Is 500 ft/min okay for you?

NB: Yes, that's fine.

LS: Okay.

6:48 AM

AR: There's a pretty enthusiastic little snow squall here.

NB: Yes, they're pretty big flakes it looks like.

AR: Right.

6:49 AM

LS: Do you want to keep going down, Nick, as we get the clearance?

NB: That would be fine. I'd appreciate it.

6:50 AM

AR: No stars visible, 065050.

6:51 AM

NB: Art, we're still pretty cold, but it looks like we're making a transition to mostly needles.

AR: I haven't seen any needles yet. Needles usually are around -6 to -4 C and they have short hollow columns, -6 to -8 to -9 C.

NB: Yes. I'm not seeing them now. I thought I saw a bunch of them.

AR: I think you made that up.

NB: Obviously.

AR: I don't know. Sometimes you do get these short columns. I see some of those are starting in there.

NB: Maybe that's it. Right in here.

AR: Yep.

LS: Nick, we're going down to 6,000 ft now.

NB: Roger that. Thanks. That's as low as we need to go. Then when we get to our endpoint, you can take us home.

LS: Okay.

AR: I wish I had an applause track.

6:54 AM

NB: So I wonder how the big storm is shaping up?

AR: Which one is this?

NB: For the kind of Puget Sound region. You know this should be about the time when the winds are snapping along pretty good from the south.

AR: Yes, that's right.

6:55 AM

AR: I would start to call these needles. They're longer ones of the group that we're starting to see now. They're supposed to have little pointy things on the end, but a lot of times they're broken off they're so delicate.

NB: Did I tell you I was having an affair with a gal with a wooden leg, but I got mad at her and broke it off.

6:57 AM

AR: Nick, winds at this level are 290 now.

NB: Yes, so it's a really push through.

6:58 AM

LS: Nick, here's we're going.

NB: Thank you. Thanks for everything. I'm just going to be on the radio for a bit talking to Mark.

AR: Larry, do you notice some vibration?

LS: Yes, I do.

7:00 AM

NB: I'm back. I made some inquiries about the weather at Paine Field and supposedly they're south winds sustained 14. The biggest winds were around 2 or 3 Z and they were gusting in the 30s. My interpretation is it just came through a little sooner than we all kind of anticipated.

7:02 AM

NB: We're actually getting kind of a nice little profile here through this cloud since we're heading due north. Presumably it's kind of sampling as if we were kind of just spiraling up in one spot.

7:08 AM

NB: We can shut down the data system now.

7:56 AM

END OF TAPE

Summary of UW Flight 1901

No flight summary on tape.