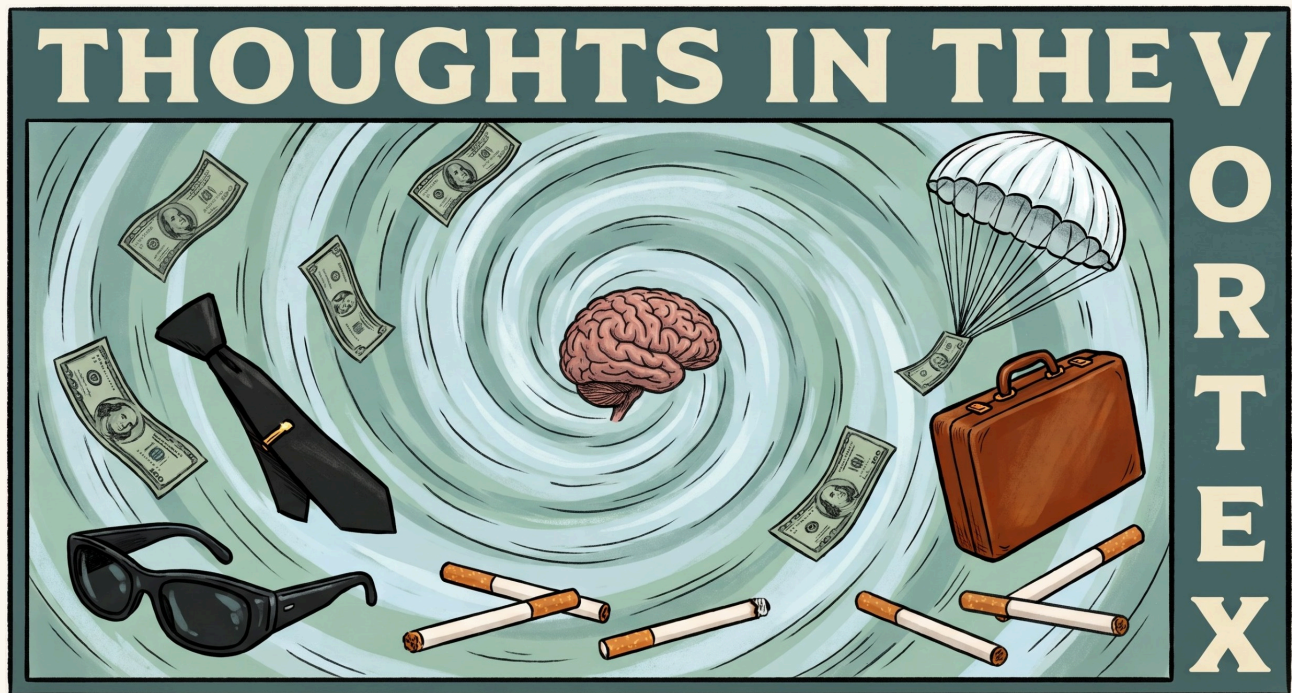




NORJAK · NORTHWEST ORIENT FLIGHT 305 · THE JUMP AND THE DROP ZONE

We're Getting Some Oscillations in My Sanity

Where the F@\$# Did He Jump

When Cooper left the plane, where the plane was, and every place the FBI decided he could have landed. This report also tests the "later jump" theory, shows how Cooper's own demands pinned the plane to Victor 23, and rebuilds the drop zone with the 1971 weather-balloon winds.

PS – We are not touching the flight path. It's ironclad and a different topic for a different day.

Jump · 8:11 PM ±1 min

Heard live on the company radio and reproduced by the January 1972 sled test

Drop zone · 1972 zone holds

Every 8:11 zone rebuilt with real 1971 winds falls inside NWA's envelope

Route · V-23 or bust

Low, slow and gear-down left one workable way south

Sources

FBI Vault, D.B. Cooper files, Parts 1–122

NOAA NCEI radiosonde archive (IGRA v2), Nov 24–25, 1971

October 2026

Citations: Vault part / PDF page / Bates no.

Key findings

The short version. Each point is built out in the sections that follow, with citations to the FBI Vault files as Part / PDF page / Bates.

1. **Cooper jumped at 8:11 PM, give or take a minute.** The bump hit while the co-pilot was on the company radio. NWA's Minneapolis office logged it live (2210 Central time), and the 8:12 teletype reads "305 GETTING SOME OSCILLATIONS IN THE CABIN." The January 1972 sled test reproduced the bump, and NWA fixed the time at 0411 GMT ± 1 minute.
2. **The plane was over rural north Clark County.** Radar puts it near Highland and La Center, just south of the Lewis River, about 10 nm north of the Portland VORTAC (which actually sat at Battle Ground). It was at 10,000 ft and 170 knots indicated, with the gear down and flaps at 15°.
3. **The "later jump" theory is possible but not likely.** It holds that 8:11 was only Cooper's weight going onto the stairs and that he jumped a few minutes later, during an 8:12–8:20 gap in NWA's contact with the crew. Nothing in the files rules that out. But every crew account describes one event, the 8:11 reaction was sharp and physical, and when contact resumed at 8:22 the crew couldn't say whether he was still aboard. The FBI and NWA, with the crew, the tape and the radar in hand, settled on 8:11.
4. **Cooper knew roughly where he was, not precisely.** He knew local geography, and dead reckoning from his own speed demands would have put him within about 7 nm (8 statute miles) along V-23, the route his demands all but forced. But he couldn't see heading, ground speed or wind, there was cloud below him, and the FBI concluded he jumped as soon as he practically could.
5. **The FBI/NWA 1972 drop zone holds up.** Rebuilt from scratch with the real 1971 weather-balloon winds and the radar position, every 8:11 landing zone, started from the radar track, falls inside NWA's January 1972 envelope. The radar timing could be a minute off, so the 8:12 zones count equally; about 70% of those fall inside too.
6. **V-23 or bust.** Low, slow and gear-down left one practical route south, Victor 23 past Portland, and Reno was about as far as it could go. Someone who knew aviation could have expected that and timed his jump by the clock.
7. **What stays open:** radar precision and timing, low-level winds, steering under the canopy, search coverage, a Continental pilot's discredited 65-kt wind, and the Tena Bar money (a later installment).

Interactive maps

Every FBI drop zone and every recalculated zone in this report is on a Google My Map you can zoom and toggle: [NORJAK – Flight 305 Drop Zones \(Google My Maps\)](#). The layers carry their sources, and the same layers are available as KML files.

How to read this report

Statements from the FBI files carry a Part / page / Bates citation. Newspaper clippings that sit inside the files are marked as press, not FBI findings. Outside data (weather records, navigation aids, parachute references) is listed in Appendix A. Where a point is our own inference or calculation, the text says so. Flight distances (DME readings, airway positions) are in nautical miles (nm); ground distances and search areas are in statute miles (mi). 1 nm = 1.15 mi.

SECTION 1

The flight: Seattle to Red Bluff

All times Pacific Standard. The NWA Minneapolis log is kept in Central time and the FAA tapes in GMT; both are converted here.

TIME	WHAT HAPPENED	SOURCE
7:36	Takeoff from Sea-Tac.	64 / 304 / 27170 · 110 / 66 / 356
~7:40	Through 6,500 ft. Crew levels at 7,000 ft and slows to about 160 kt because "he wants the steps down." 14 DME south of Seattle VOR, gear down, flaps going to 30°.	36 / 16 / 6239 · 64 / 304 / 27170
7:42-7:43	Cooper calls the cockpit: trouble getting the stairs down. Aft stair warning light comes on; plane 19 DME south of Seattle VOR on V-23.	64 / 304 / 27170
7:45	7,000 ft, 160 KIAS, flaps 30°, gear down.	64 / 305 / 27171
7:51-7:53	Climbing through 9,000 ft; level at 10,000 ft at 7:53:34, "airspeed in the vicinity of one seventy, one eighty."	36 / 17 / 6240
8:05	Last contact: crew asks Cooper if everything is OK and he says it is. Radar fix "north of the Pigeon Springs area and east of Ostrander."	64 / 305 / 27171 · 110 / 254 / 551
8:10	Company teletype: "Reno looks better as time goes by" / "305 R." NWA log entry at 2210 Central: crew reports the oscillation.	110 / 108 / 400 · 64 / 305 / 27171
8:11	The bump. Co-pilot on the company radio: "O.K. fine uh, at the present time ... uh, uh!" His earplug is pulled out as he turns to the cabin rate-of-climb meter. Plane at 10,000 ft, 170 KIAS, gear down, flaps 15°, TAT -7°C.	41 / 32 / 11400 · 64 / 305 / 27171
8:12	Teletype: "305 GETTING SOME OSCLLTNS IN THE CABIN / MUST BE DOING SOMETHING WITH AIR STAIRS."	110 / 108 / 400
8:13:14	Checks in with Seattle Center on 120.9 at 10,000 ft; Portland altimeter at 8:15:52. Routine, with nothing about the hijacker.	36 / 18 / 6241 · 110 / 199 / 491
8:20-8:22	No NWA entries from 8:12 to 8:20. At 8:20 the crew is "already on" ARINC's 131.8; at 8:22 the company frequency (131.9) is logged lost and the phone patch with Seattle ARINC is set up. Plane 23 DME south of the Portland VORTAC at 10,000 ft, 165 KIAS.	110 / 108 / 400 · 64 / 306 / 27172
8:52	Over the Eugene VOR, 10,000 ft, 170 KIAS.	64 / 306 / 27172
9:28	Over Medford, TAT -5°C, some airframe icing.	64 / 306 / 27172
9:43	Crew asks to climb to 11,000 ft (approved).	36 / 21 / 6244
10:05	58 DME north of the Red Bluff VOR, 11,000 ft.	64 / 307 / 27173

"DME" is distance in nautical miles from a radio navigation station. The "Portland VORTAC" (116.6 MHz) the crew refers to was located at Battle Ground, Washington, about 15 miles north of downtown Portland. **V-23** (Victor 23) is the federal airway the plane flew south from Seattle. **KIAS** (knots indicated airspeed) is what the cockpit gauge reads; in the thin air at 10,000 ft it reads well below the true airspeed (**TAS**), so 170 KIAS was about 195 kt true (about 224 mph). **TAT** (total air temperature) reads warmer than the outside air because the air heats up as it hits the probe at speed; the crew's -7°C means about -12°C outside. **ARINC** (Aeronautical Radio, Inc.) ran the radio-telephone relay airlines used to patch calls through.

SECTION 2

When did he jump?

Four records made at the time, plus a test flight seven weeks later, all point to the same minute.

The tape: 8:11 PM, co-pilot on the company radio

Part 41 · p. 32 · Bates 11400

Log reconstructed from tape recordings of the conversations between Flight 305 and Ground Control.

8:11 p.m.

"O.K. fine uh, at the present time . . . uh, uh! (co-pilot, who is speaking, turned to look at the cabin rate of climb meter because of an increase in cabin pressure and in doing so his ear plug was pulled from his ear). . . at the present time we're getting some uh, the uh, cabin uh rate uh. . . uh, scuse me, my ear plug came out and I uh, at the present time we're getting some oscillations in the cabin rate of climb indicator and uh, apparently he (unsub) must be uh attempting to do something with the uh, the airstairs back there."

(There is a time correlation check on this tape and through careful play back and sequencing the time of oscillations caused by the airstairs closing after unsub departed was calculated at 8:11 p.m.).

b6
b7c

Log reconstructed from the tape recordings. The bump interrupts him mid-sentence; the FBI's note says the time of the oscillation "caused by the airstairs closing after unsub departed was calculated at 8:11 p.m."

Company teletype, 8:10 and 8:12

Part 110 · p. 108 · Bates 400

SEADD EXXX WE GAVE NINE PLATES FOR ALL OF IT
305 R FOUND IT

11/25 @4
MSP FLT OPS WENO LOOKS BETTER AS TIME
GOES BY HAS 257 OVC 12 MILES R WIND .15
GUSTY
305 R
8:10 PM, PST KCO410CK

11/25 @4
305 GETTING SOME OSCLLTNS IN THE CABIN
MUS BE DOING SOMETHING WITH AIR STAIRS
MSP FLT OPS R
8:12 PM, PST KCO412CK

11/25 @4
305 CALLED GO TO 131.8
SEADD HE IS ALREADY ON THAT FREQ
MSP R WE ON HE PHONE WND WILL BE TALING
TO HIM SHORTLY
8:20 PM, PST SEADD R KCO420CK

"305 GETTING SOME OSCLLTNS IN THE CABIN." At 8:20 the crew is already on ARINC's 131.8 and the phone patch is still being arranged (blue).

NWA Minneapolis log, 2210 CST

Part 64 · p. 305 · Bates 27171

2210*

replied that it was. This was apparently the last communication the crew had with the IJ.

Crew reported oscillation of cabin rate of climb indicator. This probably due to HJ weight now on stairs, stairs extending further, resultant effect on cabin pressure. May be best estimate of when he exited airplane.

MSPFO advised crew that range to RNO now looked good (airplane now at 10,000', 170K, gear DOWN, flaps 15°, PF 4000#/hour/engine, TAXI -7°C. MSPFO calculated TAS and range from this data.

Logged as it happened: the oscillation "may be best estimate of when he exited airplane."

The attached plot indicates the envelope or possible landing points of the night jacker (HJ). It is based on the following:

- Aircraft position from USAF radar data from McChord AFB furnished by [redacted]
- Probable jump time (0411 GMT) from an analysis of the recorded communication from the flight relative to the cabin pressure fluctuation. Flight tests conducted on January 6 confirmed that the pressure fluctuation almost certainly occurred at the time the HJ left the airplane.
- Wind information from 10,000' MSL to the ground as determined by [redacted]
- Human body trajectories from data furnished by The Boeing Company (free-fall) and [redacted] who is an expert parachutist.
- Time correlation from the above USAF radar information and from the NWA communications network tape recording.

b6
b7c

Jump time 0411 GMT from the recorded communications, matched to radar, the company tape and the flight recorder.

The test flight

On January 6, 1972, NWA and the FBI flew the same 727 in the same configuration and pushed a 235-lb sled down the aft stairs. It reproduced the pressure bump the crew had felt. NWA's memo of January 9 states that the flight tests "confirmed that the pressure fluctuation almost certainly occurred at the time the HJ left the airplane" 18 / 317 / 5650 · 19 / 16-17 / 5852-53 · 41 / 36-37 / 11404-05 · 110 / 267 / 566. NWA's earlier December 4, 1971 plot had put the bump at 0410 GMT and said the crew were "certain it occurred before 0415" 64 / 299 / 27165.

Copycat bailouts

The same signature showed up when others went out the 727's aft stairs. Himmelsbach told the press in 1976 that "the same rapid fluctuations in air pressure were noted in three bailouts from 727 airliners in the next few months," before the FAA ordered the rear doors locked 53 / 245 / 22583 (press). Outside accounts describe the two best-known cases. Martin McNally hijacked American Flight 119 out of St. Louis on June 23, 1972, and jumped over Indiana early on June 24; the remaining crew "felt their ears pop" as the cabin pressure fluctuated (Detroit Metro Times, 2017). Richard McCoy Jr. hijacked United Flight 855 on April 7, 1972, and jumped over Utah. In his case the crew didn't know he was gone until, past the last Utah waypoint, a crew member left the cockpit to check and found the cabin empty (Fear of Landing, 2018; Parachutist, 2011). Both are outside accounts, not FBI records; see Appendix A.

"Not yet reached Portland proper ... definitely in the suburbs"

The crewman's interview places the plane "in the suburbs or immediate vicinity" of Portland 110 / 66 / 356. Read as geography, that sounds later than 8:11: at 8:11 the plane was about 27 miles north of downtown Portland. Read the way a pilot would, it fits. The crew were flying toward the "Portland" VORTAC, which was at Battle Ground, about 10 nm ahead, with the DME counting down inside the Portland terminal area. They were above a solid overcast, and the same interview says it "had not occurred to them" to pin down their exact position; they gave a window of 8:05 plus "5 to 10 minutes" and deferred to the company log for the exact time.

Verdict: the bump was Cooper leaving the plane

The pressure bump is what a 727 does when weight goes off the end of the aft stairs. The January 1972 sled test, in the same plane and the same configuration, reproduced it, and NWA concluded the fluctuation "almost certainly occurred at the time the HJ left the airplane." The copycat bailouts from 727s that followed showed the same signature. Whenever the bump happened, that is when he jumped.

SECTION 3

The "later jump" theory

A recurring community theory: the 8:11 oscillation was real but minor, Cooper's weight going onto the stairs rather than his exit. He actually jumped a few minutes later, during an 8:12–8:20 gap when NWA had no contact with the crew. Because NWA and the FBI had no record of that second event, they folded it into 8:11 when they fixed the jump time and drop zone.

The crewman's interview: "heard and felt"

Part 110 · p. 66 · Bates 356

[redacted] stated that approximately 5 to 10 minutes after the last contact with subject at 8:05 p.m., they **heard and felt an oscillation of the aircraft** and commented at the time that the hijacker could have departed, causing the unusual vibration since there had been no change in flight altitude, speed or any other external force which would account for this sudden oscillation. They telephoned the company in Minneapolis shortly thereafter, and stated that the oscillation, which could have been the hijacker's departure, would have occurred between 8:05 p.m. and their call to [redacted] 5 or 10 minutes later, the exact time which would be recorded in the company log.

[redacted] stated that they had not yet reached Portland proper but were definitely in the **suburbs or immediate vicinity thereof.**

b6
b7c

"Approximately 5 to 10 minutes after the last contact with subject at 8:05 p.m., they heard and felt an oscillation of the aircraft." The "5 to 10 minutes after ... 8:05" timing and the "telephoned the company ... shortly thereafter" wording (gray) are what the theory leans on.

Which channels were live, and which were taped

CHANNEL	COVERS	RECORDED?	IN THE FILES
NWA company radio: crew to Minneapolis flight operations (the "Eagle" line), also heard by NWA at Sea-Tac	Takeoff to 8:12, the last logged exchange. Nothing logged 8:12–8:20; the crew was on ARINC 131.8 by 8:20	Yes. A tape "previously started on a time standard signal." The 8:11 "ear plug" quote and NWA's 0411 GMT timing both come from it. The tape itself has not been released.	41 / 30–32 / 11398–400 · 110 / 267 / 566
Minneapolis flight-ops log	Whole flight	Written live from the radio and phone patches	64 / 303–308 / 27169–74
ARINC Seattle, 131.8 , then a phone patch to Minneapolis (later San Francisco on 130.6)	Crew told at 7:57 to switch when company radio was lost; on it by 8:20; patch up at 8:22. Relays by United 4331 and Western 328 near Red Bluff	Entries in the Minneapolis log from 8:22. No ARINC recording or operator log in the files.	110 / 106 / 398 · 110 / 108 / 400 · 64 / 306–307
FAA Seattle Center (Auburn)	About 30 mi south of Sea-Tac to northern California	Yes. FBI got a copy reel on 12/3/71; transcript in the files. Nothing from 7:59:15 to 8:13:14 , after Center sent the crew to 133.9; then a routine check-in and altimeter setting at 8:13–8:16.	24 / 637 / 3478 · 36 / 16–18 / 6239–41
FAA Sea-Tac Approach/Tower	Within 30 mi of Sea-Tac	Yes. Five reels to the FBI	110 / 145 / 437
NWA Sea-Tac ground teletype	Company messages relayed through Seattle	Paper roll (the 8:12 "oscltns" line)	110 / 90 / 382 · 110 / 108 / 400
Flight recorder	Airspeed and altitude	Yes; used in NWA's analysis	110 / 267 / 566
Cockpit voice recorder	—	None found in the files	—

So 8:11 itself is covered by a taped company channel and a live Minneapolis log. The gap is just after it: NWA logs nothing between the 8:12 teletype and 8:20, and the FAA transcript has only routine traffic from 8:13 to 8:16. Two FOIA targets (FBI, Seattle file 164-81) would test the theory: the NWA tape, in case it ran past 8:12, and any ARINC Seattle recording or log of 131.8 for 8:12-8:22.

FOR THE THEORY

- **NWA's 8:12-8:20 gap.** The teletype logs an exchange every one to eight minutes from 7:42 to 8:12, then nothing until 8:20. By then the crew is "already on" ARINC's 131.8, and Minneapolis's patch went up at 8:22 110 / 104-108 / 396-400 · 64 / 306 / 27172. A second event reported to the ARINC operator in that window could miss every NWA record.
- **NWA's first reading of 8:11 was "weight on stairs."** Minneapolis logged the 8:10 report as "HJ weight now on stairs, stairs extended further" 64 / 305 / 27171, and the 8:12 teletype says he "must be doing something with air stairs." "After unsub departed" is the FBI's later reading 41 / 32 / 11400.
- **The crewman's timing.** "5 to 10 minutes after ... 8:05," then the crew "telephoned the company in Minneapolis shortly thereafter" 110 / 66 / 356. That fits a bump around 8:15 reported on the 8:22 patch as well as it fits 8:11.
- The crewman's "suburbs of Portland" sounds later than 8:11 if read literally.
- **Tena Bar.** If the \$5,800 reached Tena Bar by natural means, no 8:11 or 8:12 zone can explain it. Every one of them (the FBI's and ours) drains to the Lewis River system: the Lewis, Cedar Creek and the East Fork. The Lewis joins the Columbia about 10 mi *downstream* of Tena Bar 43 / 377 / 17613. A jump during the gap, nearer the Columbia at Vancouver (about 8:17-8:18 at the flight's ground speed), could put money upstream of the bar. The exceptions are explanations that don't need a later jump: river dredging, or a person carrying the money there (Section 9).

AGAINST

- **One event in every crew account.** No interview describes a lesser jolt and then a bigger one. The crewman describes a single oscillation the crew "heard and felt" 110 / 66 / 356, "reported by radio ... at time" 10 / 343 / 1570.
- **The 8:11 reaction was sharp.** The co-pilot breaks off mid-sentence and turns to the gauge "because of an increase in cabin pressure," pulling out his earplug 41 / 32 / 11400. An increase is the signature of the stairs snapping closed; more weight pushing them out should lower cabin pressure. The "increase" wording is the FBI's, not the co-pilot's.
- **The first words on the patch don't report a jump.** At 8:22 the crew said the aft cabin lights were off and they "could not see whether HJ was still aboard" 64 / 306 / 27172. Seattle's 8:20 teletype adds nothing new either, though NWA Seattle "had been monitoring all communications with flight."
- **Routine talk with Seattle Center at 8:13-8:16.** A check-in and an altimeter setting, nothing about the hijacker 36 / 18 / 6241. This is weak: they didn't mention 8:11 to Center either.
- **The people who could check, did.** NWA's determination used the company tape, the flight recorder, the crew and McChord radar 41 / 37 / 11405 · 110 / 267 / 566. With the crew available, they fixed 0411 GMT, reproduced the bump with the sled, and kept it through the 1973 re-plot.
- **"Suburbs"** fits 8:11 once "Portland" means the Portland VORTAC at Battle Ground (Section 2).

Verdict: possible, but not likely; the jump was at 8:11 PM, ±1 minute

Nothing in the files rules out a second, unrecorded event during NWA's 8:12-8:20 gap, and NWA's own first reading of 8:11 ("weight now on stairs") leaves room for one. But every crew account describes one event, the 8:11 reaction was sharp and physical, and the crew's first words when the patch came up at 8:22 were that they couldn't tell whether he was still aboard. NWA and the FBI, with the crew, the company tape and the radar in hand, fixed 0411 GMT and confirmed it with the sled test. The theory now rests on a gap rather than a missing call. An ARINC Seattle record of 131.8 for 8:12-8:22, or NWA's tape if it ran past 8:12, would settle it.

SECTION 4

Did he know where he was? Criminal Mastermind or Dumb Luck

If Cooper picked his spot, 8:11 means something more than "as soon as he could." The record supports a general sense of position, not a precise one.

CRIMINAL MASTERMIND

- **He showed general geographic awareness earlier in the flight.**
 - He told the stewardess it was "only about twenty minutes from McChord to the Seattle-Tacoma airport," which was accurate 26 / 473 / 8883.
 - In the holding pattern he looked out and said "We are over Tacoma now," with no announcement prompting it. The FBI took this as a sign he had lived in the Northwest 26 / 473 / 8883 · 41 / 16 / 11384.
- His demands (10,000 ft, no more than 170 kt, gear down, flaps 15°) made the plane slow and its timing predictable. It's reasonable to believe he could have had a loose idea of his location based on the time that had passed.
- His demands all but forced the plane onto V-23, the standard low-altitude route south past Portland (Section 5).
- The FBI itself noted the crew "could see the lights of Portland and other distinctive lights in that area, so given knowledge of the specific area the hijacker could very easily have made a jump to a specific location" 18 / 143 / 5476.
- **Dead reckoning (our calculation).** Using only what he knew (the 170 kt he demanded, taken as his ground speed, no wind and the 7:36 takeoff), Cooper may have thought he had flown about 99 nm by 8:11. On V-23 that is about 7 nm (8 statute miles) south of where radar had him, near Battle Ground, so if he was timing his jump he would have believed he was even closer to Portland. (170 kt indicated is really about 195 kt true at 10,000 ft, but nothing in the cabin told him that.)
- **He was ready early, then waited.** About four minutes after takeoff (about 7:40; NWA's log has 7:41) he sent the stewardess forward; she last saw him in the aisle with a nylon cord tied around his waist 110 / 18-19 / 308-09 · 10 / 428 / 1661. He had already wrapped the money bag in parachute cord, with a loop for a handle, while the plane was still on the ground 110 / 54 / 344. He called the cockpit at 7:42 about trouble getting the stairs down, and the stair light came on soon after 10 / 428 / 1661 · 110 / 254 / 551. Yet he didn't go until 8:11, roughly 25-30 minutes later, which suggests he may have been waiting for something.
- **He jumped close to where he started.** He boarded at Portland International Airport, and Point A is only about 22 miles north of it.

DUMB LUCK

- The pilot chose V-23 "without consulting the hijacker" 54 / 75 / 23001 (press). From the cabin Cooper couldn't see heading, ground speed or wind, and nothing told him about a 33-kt headwind.
- Off V-23 the same clock-based guess misses by 20-120 miles, on a straight line to Reno or Sacramento, the coast or east of the Cascades. He could only count on the route if he understood his demands (Section 5).
- The ground was hidden under a solid overcast (cloud reports below). Himmelsbach: the plane was "on instruments in the higher of two layers of clouds all the way from Seattle to the vicinity of La Center" 53 / 245 / 22583 (press).
- He wanted the stairs down for takeoff 64 / 153 / 26967, and the FBI concluded he jumped as soon as practical, delayed by the stairs and by tying on the money bag (below).
- He didn't know how to work the airstair, the one function the stewardess said he seemed unfamiliar with 26 / 473 / 8883. This could suggest he wasn't well planned.
- Himmelsbach, 1976: "Cooper could not have known where he was when he jumped" 53 / 245 / 22583 (press). Ralph, Ralph, Ralph.

The FBI's own reading of why he went when he did

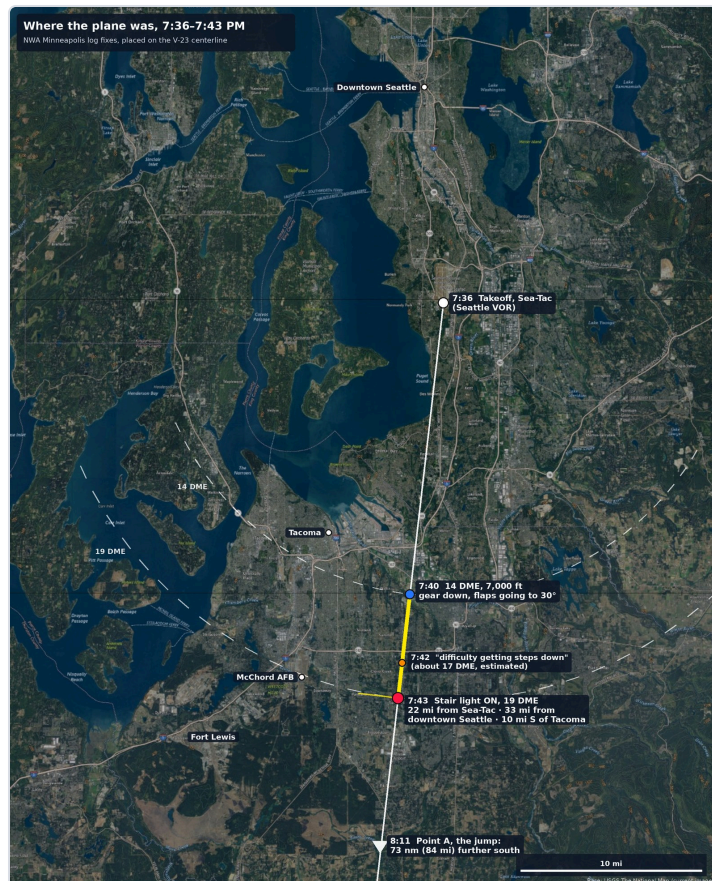
Part 41 · p. 26 · Bates 11394

the money were vague. He probably wanted to jump from the aircraft as soon as possible after the takeoff. The hijacker put two of the parachutes, a back pack and a front pack, on prior to take off. He also wanted the air stairs lowered prior to takeoff, which subsequently proved to be impossible. Finally the hijacker jumped as soon as practical after the stairs were lowered in flight. The hijacker was delayed from jumping by the trouble he experienced in lowering the air stairs and by the fact he was not provided a knapsack but rather a small white canvas bag which he had to affix to her person utilizing parachute shroud lines from an unused parachute.

"Finally the hijacker jumped as soon as practical after the stairs were lowered in flight," delayed by the stairs and by the canvas money bag he had to tie on "utilizing parachute shroud lines from an unused parachute."

Did he mean to jump near Seattle?

A community theory holds that Cooper planned to go out soon after takeoff, near Seattle, but the stairs held him up, and by the time they were down he judged it too late or the ground too wooded. NWA's log puts the plane here when the stairs came into play 64 / 304 / 27170:



Where the plane was, 7:36–7:43. Fixes from NWA's Minneapolis log, placed on the V-23 centerline from the Seattle VOR at Sea-Tac; the dashed arcs are the 14 and 19 DME distances the crew reported. The 7:42 point is estimated between the two fixes. The short yellow tick at 7:43 shows where the plane would be if it was already about 2 mi west of the airway, as radar later showed at Point A. Current imagery; in 1971 this ground was far less built up.

- **He wanted out early.** He asked for the stairs to be fully down for takeoff, then partly down, and was told neither was possible 64 / 304 / 27170 · 64 / 153 / 26967. By about 7:40 he had the cord tied around his waist

110 / 18-19 / 308-09. The FBI's own summary says he "probably wanted to jump from the aircraft as soon as possible after the takeoff" 41 / 26 / 11394.

- **The stairs did cost him a few minutes.** At 7:42 he called the cockpit with "difficulty getting steps down"; at 7:43 the stair light came on, "stairs apparently now partially extended," with the plane 19 DME south of the Seattle VOR at 7,000 ft 64 / 304 / 27170.
- **At 7:43 he was still close to Seattle.** About 22 mi south of Sea-Tac and 33 mi from downtown Seattle, 10 mi south of Tacoma, between Spanaway and Frederickson, about 5 mi east of McChord AFB and next to Fort Lewis.
- **But he then waited 28 minutes.** With the stairs already partly open, the plane flew on over the wooded foothills between Roy and Eatonville, past Mossyrock and the Cowlitz River, and over the hills 15-20 mi east of Castle Rock and Kelso. The Spanaway-Frederickson prairie at 7:43 was some of the most open ground on the whole route, and he finally jumped over the timbered hills of north Clark County. "Too wooded" doesn't explain waiting for more of the same.

Our read: the stairs explain a few minutes of delay, not 28. If he had meant to go near Seattle, he could have gone at about 7:43-7:50, still within about 30 mi of Sea-Tac. Something else set 8:11: the climb to 10,000 ft (7:51-7:53), the money bag, nerve, or a target further south.

Could he see the lights of Portland?

A related theory says he jumped when Portland's lights first came into view. We checked the geometry and that night's airport cloud reports:

- **Distance isn't the limit.** From 10,000 ft the horizon is about 140 miles away. In clear air, a city's lights carry 30-90 miles and a single streetlight 5-18 miles (Allard's law, using that night's 7-15 mile visibility). Portland and Vancouver would have been visible by about 7:50-8:00, and the Longview-Kelso mill lights passed close alongside around 8:05. "First sight" would not single out 8:11.
- **The cloud is the limit.** At 8 PM Portland reported overcast at 5,000 ft, Troutdale at 4,000 and Toledo at 3,000; the Weather Bureau called it "overcast all the way from Woodland, Washington, to Eugene" 83 / 6 / 35327 · 110 / 248 / 540. Individual lights would show only through breaks; a diffuse glow on the deck is plausible.
- **One version fits.** If the plane came out of the upper layer near La Center (Himmelsbach's "to the vicinity of La Center") and the crew saw Portland's glow ahead (the 12/23/71 memo), that would line up with 8:11. Nothing in the data confirms or rules it out.
- **His view was poor anyway.** On the aft stairs he faced back and down. Portland was ahead, 4-8° below the horizon, into a roughly 195-kt slipstream with the gear down. The aft cabin lights were off, so his eyes would have been dark-adapted 64 / 306 / 27172.

Verdict: general awareness, not precise knowledge

He knew he was heading south somewhere near Portland. With a watch, and knowing his demands would keep the plane on V-23 (Section 5), he could have been within about 7 nm (8 statute miles). He did not know enough to hit a chosen spot. The FBI's reading, that he jumped as soon as he practically could, explains 8:11 without needing a target.

SECTION 5

V-23 or bust

Cooper never named a route. His demands picked one for him.

His terms, as the stewardess relayed them to the cockpit

Part 110 · p. 54 · Bates 344

He said, "We're going to Mexico City, gear down, flaps down, you can trim the flaps to 15, you can stop anywhere in Mexico to refuel, but nowhere in the United States. The aft door must be open and the stairs to be down. The altitude under 10,000 feet, they know they can't go over that. Cabin lights out and everyone is to be forward of the first class curtain." [redacted] related these instructions to the pilot. b6

"Mexico City, gear down ... trim the flaps to 15 ... The aft door must be open and the stairs to be down. The altitude under 10,000 feet."

His terms were 10,000 ft or lower, about 170 kt, gear down, flaps 15° and the aft door open. Each one narrowed the way south:

- **Altitude.** At 10,000 ft or lower the jet routes, which start at 18,000 ft, were out, and so was crossing the Cascades in cloud. Even on V-23 the crew needed 11,000 ft for terrain clearance from Red Bluff to Reno 64 / 306 / 27172.
- **Range.** Minneapolis told the crew a non-stop to Mexico City was "impossible" with the gear down and flaps at 15°. Phoenix "might be within range but [Reno] would be better as far as range was concerned," and Cooper took Reno "without much, if any, objection" 64 / 304 / 27170. Even the Mexico plan ran through Yuma and Mazatlán 64 / 308 / 27174.
- **The route the crew got.** A clearance "for Victor 23 at 10,000 feet," which they called "a standard low altitude routing" 64 / 322 / 27188. The captain picked it "without consulting the hijacker" 54 / 75 / 23001 (press).

NWA Minneapolis log: his configuration and the range problem

Part 64 · p. 304 · Bates 27170

HJ specified that he wanted to go to Mexico City non-stop, that the aircraft configuration must be gear DOWN, flaps at 15°, that the aft entry door must be open at all times, and that the aft stairs be extended after take-off. Later specified that stairs must be fully extended before take-off. MSPFO advised crew (1) that non-stop SEA-MEX impossible with gear DOWN, flaps 15°, (2) that take-off with air-stairs full down impossible due to inability to rotate airplane. When HJ advised of this he asked that air-stairs be partially extended prior to take-off. MSPFO advised this also impossible since stairs could not be held in any intermediate position.

HJ had previously stated that no landing within continental U.S. would be permitted "for fuel or anything else". When advised of range limitation in his specified configuration, he agreed to something short of the border. Asked about PHX. Advised by MSPFO that this might be within range but that RNO would be better as far as range was concerned. Agreed to this without much, if any, objection.

Non-stop to Mexico "impossible with gear DOWN, flaps 15°"; Reno "would be better as far as range was concerned," agreed "without much, if any, objection."

Fuel was the real limit

The Minneapolis log tracks the fuel the whole way 64 / 306-307 / 27172-73. Gear-down, the 727 burned about 10,600 lb an hour, and V-23 used roughly three quarters of a full load.

	8:22	8:52	9:28	10:05	~10:30
Where	23 DME south of the Portland VORTAC	Over Eugene	Over Medford	58 DME north of Red Bluff	Approaching Reno
Fuel aboard	40,000 lb	33,500 lb	27,500 lb	22,000 lb	17,300 lb

The log notes a full load before takeoff 64 / 304 / 27170. About 51,000 lb at takeoff and 11,000-12,000 lb at the 11:01 landing are our estimates from the logged burn.

The other ways to Reno (our calculation)

We flew each alternative with the flight's own numbers: 195 kt true, about 11,500 lb an hour, a full load and the night's southwest wind of about 33 kt. The same model flies V-23 in 208 minutes with about 11,000 lb left; the real flight took 205 minutes and landed with about the same. An airline needed a 45-minute reserve plus fuel to an alternate, roughly 9,000-10,000 lb in this configuration.

ROUTE TO RENO	DISTANCE	TIME	FUEL LEFT	WORKABLE?	8:11 BY THE CLOCK*
V-23: Portland, Eugene, Medford, Red Bluff (flown)	574 nm	3 h 28 m	~11,000 lb	Yes barely	8 mi south of Point A
V-27, the coastal airway: Hoquiam, Astoria, Newport, North Bend, then inland to Red Bluff. Never comes within about 70 mi of Portland	674 nm	~4 h	~5,000 lb	No below reserves	About 90 mi WNW, at the coast
Straight to Sacramento, then Reno	651 nm	3 h 52 m	~6,000 lb	No below reserves	23 mi east
East of the Cascades: Ellensburg, Yakima, The Dalles, central Oregon, Klamath Falls	566 nm	3 h 26 m	~11,500 lb	Doubtful Cascades and high desert at 10,000 ft, in cloud and icing	About 120 mi NE
Straight line, no airway	490 nm	3 h 01 m	~16,000 lb	No passes within about 5 mi of Mt. Hood (11,240 ft)	42 mi east

*Where Cooper would have put himself at 8:11 using only the clock: 170 kt, no wind, from the 7:36 takeoff. A straight line to Mexico City gives about 90 mi off, east of the Cascades. Navaid positions are modern locations, approximately; 1971 airway numbers and minimum altitudes have not been checked against a period chart. Winds east of the Cascades and in Nevada are assumed, not measured.

Verdict: V-23 or bust

Someone who knew how airliners worked didn't need to ask about the route. Staying low, slow and gear-down left one practical way south, V-23 down the I-5 corridor past Portland, and Reno was about as far as the plane could get on it. Add his speed demand and the clock alone puts him within about 8 miles at 8:11. That doesn't prove he planned it: he never asked about the route, and he misjudged the range to Mexico and how the airstair worked. But a jump timed off V-23 fits where he went out.

SECTION 6

Where the plane was at 8:11

Radar, the crew's position fixes and the plane's own ground speed all agree.

POSITION	WHERE	SOURCE
8:05 radar fix	"North of the Pigeon Springs area and east of Ostrander." Exact fix not in the files.	110 / 254 / 551
Seattle teletype, 8:10	"2-3 miles southwest by west from Lake Merwin Dam."	11 / 93 / 1996
NWA Point A, Dec 4, 1971	Position at the bump, timed 0410 GMT; about 3.6 mi north of the 1972 Point A (about one minute of flight).	64 / 299 / 27165
NWA Point A, Jan 9, 1972	Position at 0411 GMT from McChord radar, ±0.5 nm. Just northeast of Highland, south of the Lewis River. Also the landing point if the chute never opened.	110 / 267-268 / 566-567
"New Point A," 1973	Computer re-plot of the radar (±½ mi instead of ±1 mi): about 0.9 mi southwest of the 1972 Point A.	41 / 48-49 / 11416-17 · 30 / 212 / 10861
Air Force map, re-timed (2024)	Cunningham's time labels on the 1971 Air Force radar map (Humes et al.): same track, a minute earlier. Its 8:10 is NWA's Point A; its 8:11 is about 3.2 mi SSW (NWA's 8:12).	Outside source (Appendix A)

The airway

V-23 ran from the Seattle VORTAC to the Battle Ground VORTAC: 186.6° true, which is 166° magnetic at the local variation of about 21° east. That matches the Continental pilot's "course of approximately 166 degrees" along V-23 39 / 227 / 15412 and the crew's "19 DME S SEA VOR on V23" 64 / 304 / 27170. The FBI radar tracks run 183-185° true, close to parallel, but at Point A the radar track sits about 2.2 mi west of the airway centerline. Section 8 starts its zones from the radar track, since radar is a measured position and the airway is only the intended course.

What the FBI's own documents say

NWA, Dec 4, 1971: "The airplane was at Point A at that time"

Part 64 · p. 299 · Bates 27165

2. The cabin pressure "bump" occurred at 0410 GMT, the time being recorded by the NWA Flight Operations Office (NWAFO) in Minneapolis. It is a virtual certainty that the pressure "bump" marks the time that the high-jacker (HJ) left the airplane. The airplane was at Point A at that time, thus the HJ's body would land at Point A if his 'chutes did not open (unlikely).

The bump at 0410 GMT "marks the time that the hijacker left the airplane. The airplane was at Point A at that time."

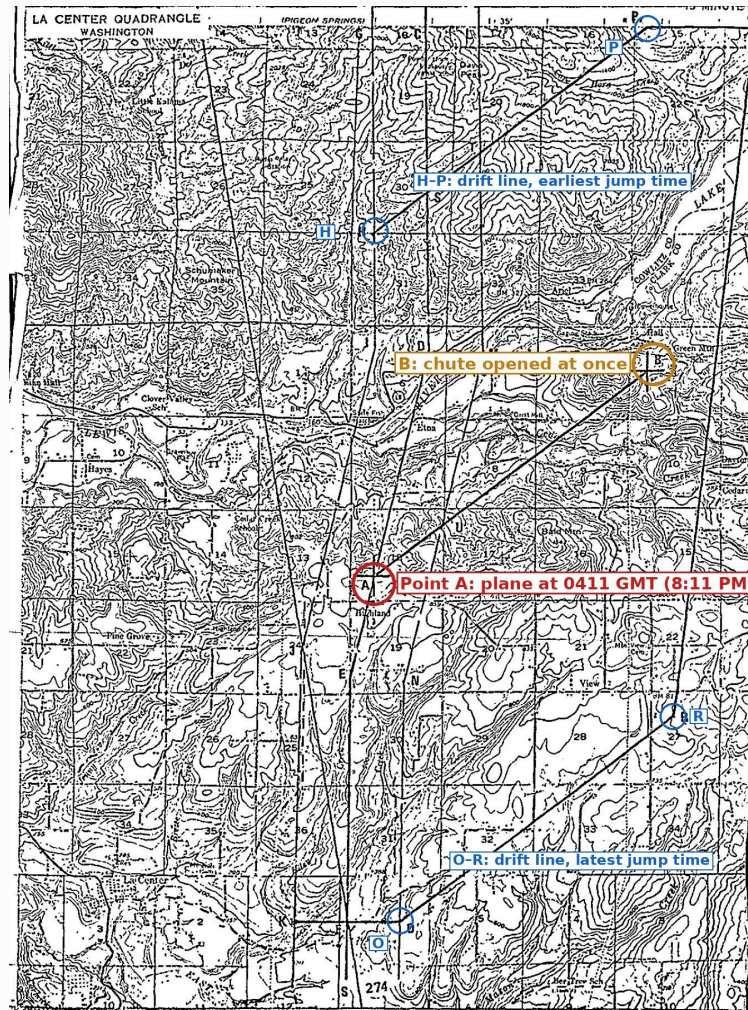
NWA, Jan 9, 1972: the revised Point A

Part 110 · p. 267 · Bates 566

6. If it is assumed aircraft position, jump time, wind vector, and other inputs used are all accurate (without allowance for the above stated tolerances):

a. The HJ's landing point would be at Point A if his 'chute did not open, or if he opened it so soon that the high speed caused 'chute damage that resulted in the equivalent of a free-fall to the ground. (The horizontal body trajectory due to

With the radar position and the 0411 GMT jump time taken as accurate, "the HJ's landing point would be at Point A if his 'chute did not open."



NWA's working map. The near-vertical lines are the plane's probable ground track and its ± 0.5 nm tolerance; A is the plane at the bump, A-B the drift line for a chute opened at once, and H-P / O-R the drift lines at the earliest and latest jump times. Rings and labels added; contrast enhanced.

Ground-speed check

Taking the crew's fixes and the radar point, distance over time gives the ground speed, and the gap from true airspeed gives the headwind: about 33 kt overall. From 7:43 to 8:52 the plane covered about 184 nm in 69 minutes, an average of 160 kt. Over the 11 minutes from Point A to the 8:22 fix it averaged about 178 kt, matching the crew's own estimate of "205 miles per hour" (178 kt) $110 / 65 / 355$. Point A's position and time fit the rest of the flight.

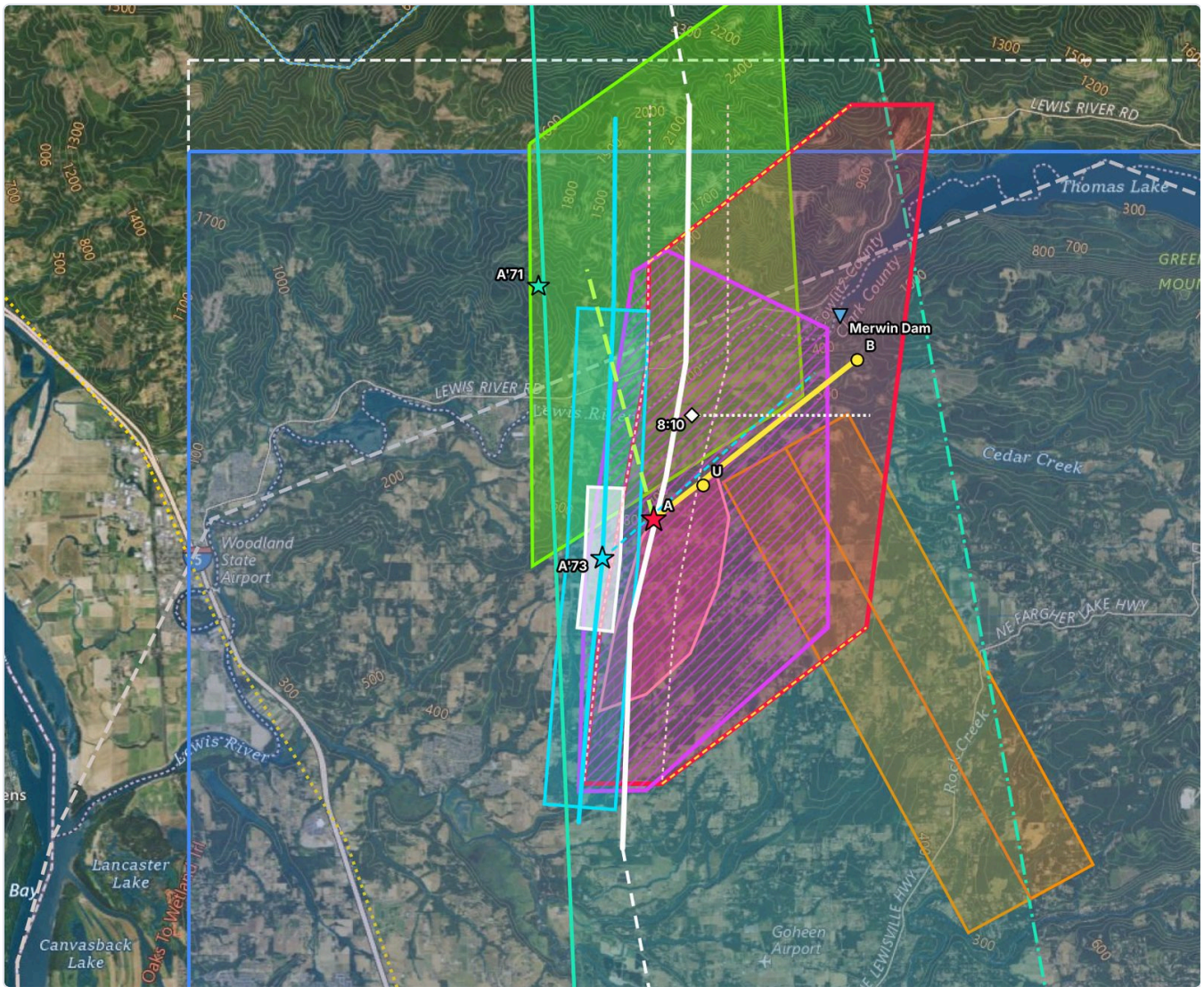
Navaid positions: AirNav (Seattle, Battle Ground, Eugene, Rogue Valley/Medford, Red Bluff VORTACs). Medford is assumed to be the same site in 1971. Map positions are georeferenced from the FBI's maps to about ± 0.3 km (La Center quadrangle maps) and $\pm 1-3$ km (the 12/4/71 chart).

SECTION 7

Every FBI drop-zone determination, 1971–1980

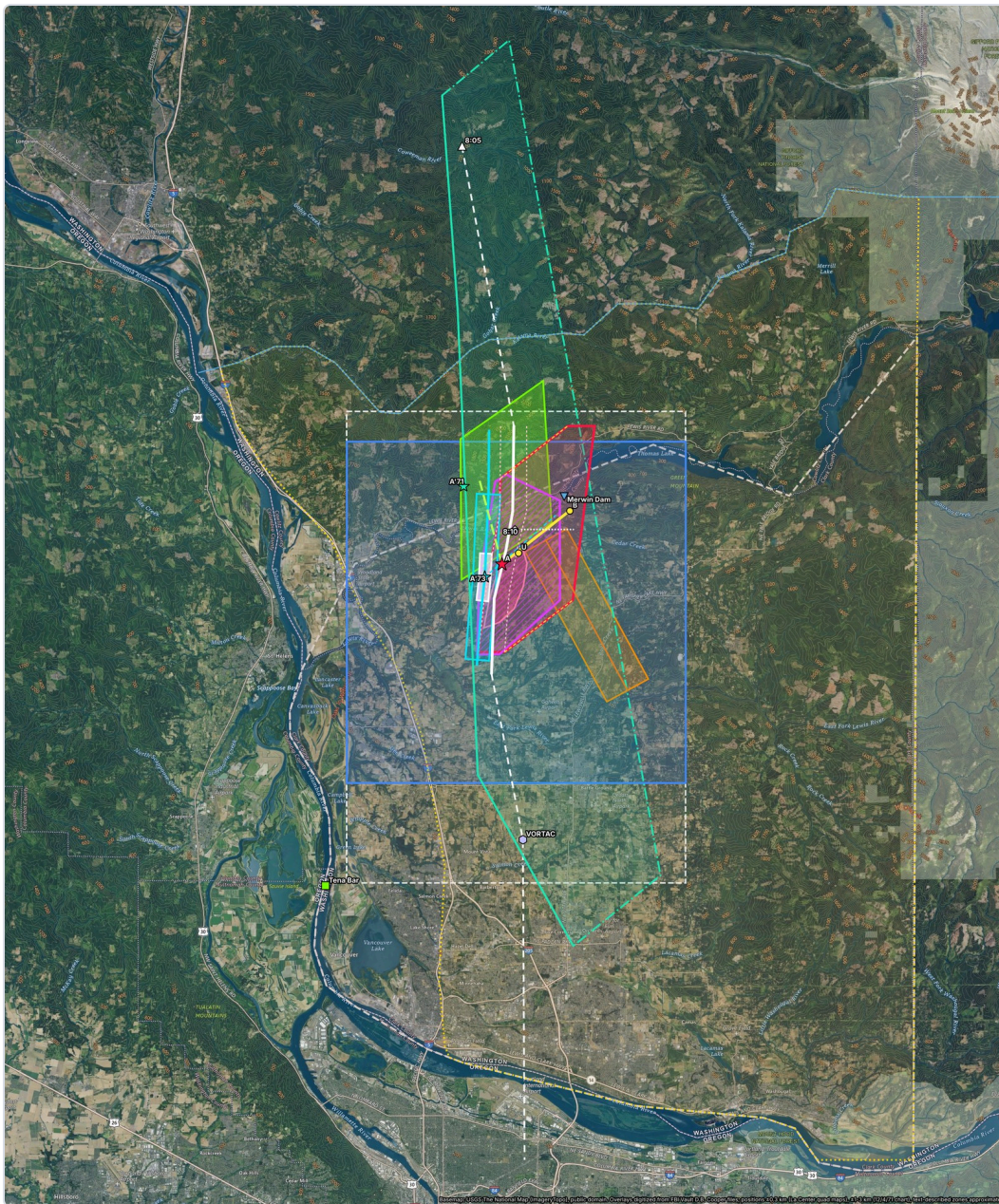
How the search area moved over nine years.

WHEN	DETERMINATION	SOURCE
Nov 1971	Initial search area: Woodland (W), Amboy (E), Kalama (N), and a point 7 mi north of the Columbia (S).	41 / 40 / 11408
Nov 1971	Prime search area: 7 mi each side of an 8-mi flight line, from the Lewis River / 2 mi north of Lake Merwin to Battle Ground; about 160 sq mi.	41 / 40-41 / 11408-09
Nov 26, 1971	Minneapolis line: landing "either side of a line" from 2 mi SSW of the Merwin Dam face to 1 mi NNW of Heisson.	10 / 427-428 / 1660-61
Dec 4, 1971	NWA first plot: area G-H-N-M for a jump between 0406 and 0415 GMT; parallelogram C-D-F-E "probably the most practical search area."	64 / 298-300 / 27164-66
Jan 9, 1972	NWA plot after the sled test: envelope of possible landing points (± 0.5 nm radar, ± 1 min jump time, wind error), about 29 sq mi as drawn; drift lines A-B, H-P, O-R; Point A as search priority 1.	110 / 267-269 / 566-568
Jan 11, 1972	Farrell's arcs from Point A toward the west track, "the most fruitful area."	18 / 467-468 / 5799, 5802
Mar-Apr 1972	First terrain search (Army and FBI), March 21-April 17; 200-265 troops; about 25 sq mi stated.	41 / 46 / 11414 · 41 / 50 / 11418
Fall 1972	Hunters' notice area: US 5 (W), Columbia (S), Kalama River (N), Skamania-Clark line (E).	41 / 46-47 / 11414-15
1972-73	Computer re-plot: "new course" and "new Point A"; a 1 × 7 mi no-chute corridor.	41 / 48-49 / 11416-17
Mar 1973	Second terrain search: 2 × ½ mi, 10 agents, March 12-29.	41 / 48 / 11416 · 30 / 212 / 10861
1980	After Tena Bar: "bounded on the north by the Lewis River, the east by the Clark-Skamania line, and the Columbia," in effect Clark County.	43 / 377 / 17613



The core area. FBI and NWA determinations, 1971–1973, on a USGS imagery base. The red star A is the plane at 8:11 (NWA, 1972). **The yellow line A–B is NWA’s path for Cooper under an opened parachute**, drifting northeast with the wind to land at B; U is where he’d land after free-falling to 2,500 ft. Positions digitized from the FBI’s own maps; zones described only in words are drawn from their stated boundaries and are approximate.

- Prime search area, Nov 1971
 Minneapolis line, 11/26/71
 NWA 12/4/71 area
 NWA 12/4/71 parallelogram
- NWA 1/9/72 envelope
 Farrell arcs, 1/11/72
 Army search, 1972 (hatched)
 1973 no-chute corridor
- 1973 second search
 Hunters' notice area
 FBI 1980 zone
 Drift line A–B



All determinations, 1971–1980. Basemap: USGS The National Map (ImageryTopo), public domain. Overlays digitized from the FBI Vault files.

NORJAK jump and drop-zone determinations

- | | | | | | |
|---|--------------------------------------|---|---|---|--|
|  | FBI 1980 drop zone (Clark Co.) |  | Farrell 1/11/72 arcs (priority) |  | Alt. drift if winds from 160–170° (illustrative) |
|  | 1972 hunters' notice area |  | 1973 no-chute corridor (1 × 7 mi) |  | Point A 1972 (plane at 8:11 / no-chute landing) |
|  | Initial search area, Nov 24–25, 1971 |  | 1973 2nd terrain search (2 × ½ mi) |  | "New Point A" 1973 |
|  | Prime search area, Nov 1971 |  | Flight track (extended, illustrative) |  | Point A 12/4/71 (±1–3 km) |
|  | Minneapolis 11/26/71 line (±1 mi) |  | NWA 12/4/71 flight path |  | Seattle TTY 8:10 position |
|  | NWA 12/4/71 area G–H–N–M (±1–3 km) |  | 1972 track tolerance (±0.5 nm) |  | 8:05 radar fix (approx.) |
|  | NWA 12/4/71 parallelogram C–D–F–E |  | NWA 1/9/72 probable track C–D–E–S |  | Portland VORTAC (8:22 = 23 nm S) |
|  | NWA 1/9/72 envelope (H–P–Q–R–O–K) |  | 1973 "new course" (computer re-plot) |  | Tena Bar money find, 1980 |
|  | 1st terrain search, Mar–Apr 1972 |  | A–B: NWA drift path under an opened chute | | |

Recalculated landing zones

A drift model run with the real 1971 winds, three canopy sizes, three ways of pulling, and two jump minutes. This is our calculation, not an FBI determination.

Method

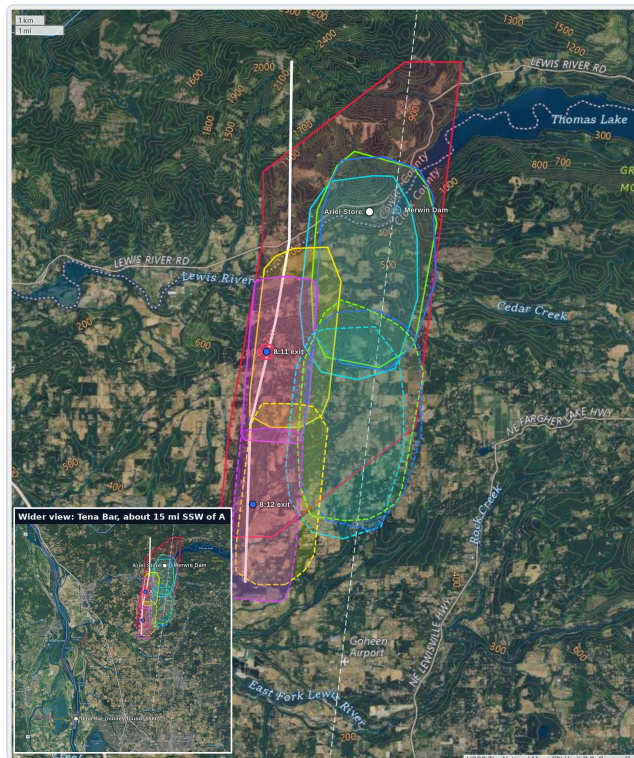
- **Landing point** = exit point + forward throw + wind drift in free fall + wind drift under canopy, stepped through altitude.
- **Free fall:** about 10 s for the first 1,000 ft, then about 5.5 s per 1,000 ft (USPA spotting rule of thumb).
- **Canopy descent:** from the FBI file, a 28-ft canopy falls about 17–18 ft/s with a 180–200 lb man, and 26- and 28-ft rigs were set to the same rate 20 / 71 / 6028. Scaled to about 230 lb and checked against the drag of flat circular canopies (Knacke). Sea-level rates: 24 ft 22.5–25, 26 ft 19.5–22, 28 ft 19–21 ft/s, faster in thinner air.
- **Pulls:** quick = opens 3–5 s after exit; late = opens at 2,000–3,500 ft (NWA's lowest likely opening was 2,500 ft 110 / 268 / 567); none = free fall to the ground, with up to 2,600 ft of forward carry (NWA).
- **Exit:** NWA's radar Point A at 8:11, within its ± 0.5 nm, ± 30 s; for 8:12, one minute further down the radar track (185° true) at the measured 160 kt.
- **Winds:** the 1971 weather balloons at Salem and Quillayute (NOAA IGRA), blended to 8:11 PM: about 231° at 33 kt at 10,000 ft, easing to about 250° at 10 kt at the ground. That matches the flight's own timing (about a 33-kt headwind, 7:43–8:52) and the Portland meteorologist's winds aloft for the FBI 20 / 240–241 / 6197–98.
- **Uncertainty:** 3,000 runs per case, with the wind profile rotated $\pm 10^\circ$ and scaled $\pm 15\%$, and ground elevation 300–1,300 ft.

PULL	CANOPY	UNDER CANOPY	DRIFT	JUMP AT 8:11 LANDS NEAR
Quick	24 ft	5.8 min	2.4 mi NE	On NWA's drift line, about 1 mi south of the Ariel Store
Quick	26 ft	6.7 min	2.7 mi NE	
Quick	28 ft	6.9 min	2.8 mi NE	
Late	any	1.4–1.7 min	0.6 mi ENE	Within about half a mile of Point A, near Highland
None	n/a	—	0.3 mi	

A jump at 8:12 moves everything about 3 mi south, down the radar track. Canopy size only matters for a quick pull, and then by less than half a mile.

Give the 8:12 zones equal weight

NWA fixed the jump at 0411 GMT by matching the company tape, the Minneapolis log and the flight recorder to the radar, and allowed ± 1 minute for it 110 / 267 / 566. A 2024 reading of the Air Force radar map (Cunningham's time labels, used by Humes et al.) runs about one minute ahead of NWA's, putting the plane at 8:11 where NWA has it at 8:12. We can't check that re-timing against the files, but a one-minute clock or plotting difference is entirely plausible for 1971. So the dashed 8:12 zones, about 3 mi south of the 8:11 zones, should be treated as just as likely. About 70% of them still fall inside NWA's envelope.



Recalculated zones with the 1971 winds, against the FBI/NWA January 1972 envelope (red). Solid = 8:11; dashed = 8:12. **The zones start from NWA's radar Point A (red circle) and run down the radar track (heavy white line).** The dashed white line is the V-23 centerline, about 2.2 mi east, shown for reference.

Recalculated landing zones

- Quick pull, 24 ft canopy (~2.4 mi drift NE)
- Quick pull, 26 ft (~2.7 mi)
- Quick pull, 28 ft (~2.8 mi)
- Late pull, any canopy (~0.6 mi)
- No pull (~0.3 mi)
- FBI/NWA 1/9/72 envelope

- V-23 centerline (reference)
- NWA 1/9/72 radar track (exit line)
- A = NWA radar Point A, 1972
- Exit at 8:11 (A) / 8:12 on the radar track
- Ariel Store; Tena Bar (inset)

Solid outlines = 8:11; dashed = 8:12 (about 3 mi south). Winds: Salem/Quillayute soundings blended to 8:11 PM, about 231° true at 33 kt at 10,000 ft and 250°/10 kt at the ground. 2026 drift model, not an FBI determination. Inset: the same zones zoomed out to show Tena Bar, where \$5,800 of the ransom was found in 1980.

How it compares with the FBI zone

- **Inside NWA's envelope:** 100% of the 8:11 zones, about 70% of the 8:12 zones, and about 82% of the two combined. Inside the 1972 Army search area: about 71%, 57% and 60%.
- **NWA's drift line:** a chute opened right away from Point A drifts 2.5–2.95 mi toward 047° in our model, against NWA's 3.63 mi toward 052°. This is measured the way NWA drew its line, straight from Point A without the forward carry off the stairs; with that carry included, the quick-pull drift in the table above is 2.4–2.8 mi. NWA's drift is about 25% longer, which fits NWA assuming a slower descent (about 17.5 ft/s, the FBI file's 28-ft rate for a 180–200 lb man).
- **Starting from the airway instead:** putting the exit on the V-23 centerline would move every zone about 2 mi east, outside most of NWA's envelope.

SECTION 9

Open questions and limits

- **Radar precision.** NWA worked to ± 0.5 nm, and the 1973 re-plot moved Point A about 0.9 mi. The raw McChord radar data is not in the released files, so we rely on NWA's plot of it. Timing is the other half: a one-minute difference in how the radar points are time-stamped moves every zone about 3 mi along the track (see Section 8).
- **Low-level winds.** The soundings were taken four hours before the jump and 40–120 mi away, and Portland's surface wind swung from 130° to 270° between 7 and 8 PM. This matters most for a quick pull, with 6–7 minutes under canopy.
- **Steering.** The model assumes he didn't steer. Slipping or steering, even crudely, for 6–7 minutes could move a quick-pull landing by about a mile.
- **Descent rate.** If the canopy came down as slowly as the FBI's consulting expert implied (about 10 minutes under canopy) 14 / 67–69 / 3376–78, quick-pull drift grows from about 2.8 mi to about 3.8 mi with the real winds (about 3.4 mi at NWA's implied 17.5 ft/s).
- **The Continental pilot's 65-kt wind.** In 1977 a Continental captain who flew Seattle–Portland that night told the FBI the wind at 10,000 ft was about 65 kt from 160 – 170° , which would have moved the zone 5–7 miles north 39 / 227–228 / 15412–13. His testimony has been shot down by the FBI, Flight 305's own data and independent weather data. The FBI closed the matter after a follow-up 39 / 331 / 15519; the flight's logged times show about a 33-kt headwind, and a 65-kt wind would have left the plane about 16 miles short of the radar at 8:11; and the 1971 weather balloons and the Portland meteorologist's winds aloft show about 20–35 kt from the southwest 20 / 240–241 / 6197–98.
- **A controller's "bump" call (new, 2026).** In September 2026 Bruce Kinsler, a trainee controller at McChord in 1971, told Eric Ullis he heard the crew broadcast "in the blind": "We just felt a bump and we think, you know, he's jumped." He said he circled the plane on his scope "east-southeast of Centralia-Chehalis Airport" (as quoted by Edwards). The call could be real. At 7:59:15 Seattle Center sent the crew to 133.9, a frequency Center couldn't hear from them at that altitude, and Center has nothing until 8:13:14 on 120.9 36 / 17–18 / 6240–41. Why we doubt his time and place:
 - East-southeast of Chehalis meets V-23 at about 7:56–7:58 at the flight's ground speed, before the switch to 133.9.
 - NWA's live log has no bump before the 8:10 oscillation report, and no crew account mentions an earlier one 64 / 305 / 27171.
 - It is one witness, telling it for the first time 55 years later.Our read: a blind call right after the 8:11 bump, before the crew gave up on 133.9 and checked in on 120.9 at 8:13, with the remembered position off. **An alternative:** around 8:00 Cooper went down the stairs to look for lights or landmarks, found nothing and came back up. That would explain why he didn't answer the crew's first two calls before saying "everything is okay" at 8:05 110 / 254 / 551. His weight on the stairs should also have moved the cabin gauge the crew was watching, though, and they reported nothing until 8:10. So this fits the missed calls better than it fits Kinsler's "bump."
- **Search coverage.** The 1972 Army search covered about 20–25 sq mi of dense timber, and the 1973 search was a single square mile. A right zone isn't the same as a thoroughly searched one.

Tena Bar (a later installment)

In February 1980, \$5,800 of the ransom turned up on the Columbia River shore at Tena Bar, about 15 miles south-southwest of Point A 43 / 377 / 17613. Water doesn't explain it easily: the Lewis River, which drains the zone, joins the Columbia *downstream* of Tena Bar. That's why the FBI widened its zone to Clark County in 1980. It's an open question for the zone as a whole, not something the jump-time or wind analysis settles, and it gets its own report next.

Bottom line

The FBI/NWA January 1972 zone is the best-supported estimate of where Cooper came down, assuming he left the plane at 8:11 ± 1 minute, which every record made at the time supports. The main later challenges to it, a "later jump" and a 65-knot southerly wind, don't survive the records or the 1971 weather data.

APPENDIX A

Sources

FBI Vault, D.B. Cooper files

Cited as Part / PDF page / Bates. Part links: vault.fbi.gov/D-B-Cooper. Every Bates number was checked against the stamp on the page image. The one exception is Part 110, page 269, whose stamp is illegible; 568 follows from the stamped pages before it (566, 567). Every page listed here is reproduced in full in the companion PDF, *Companion: the FBI pages cited*, with a header naming the sections that cite it.

PART / PAGE / BATES	DOCUMENT
10 / 343 / 1570	Las Vegas teletype summary of the crew interview ("reported by radio ... at time")
10 / 427-428 / 1660-61	Minneapolis landing-zone line and NWA log times, 11/26/71
11 / 93 / 1996	Seattle teletype, 11/27/71: plane 2-3 mi SW by W of Merwin Dam at 8:10
14 / 67-69 / 3376-78	Parachute expert Q&A (time under canopy)
18 / 143 / 5476	SAC memo, 12/23/71: crew could see the lights of Portland
18 / 317 / 5650 · 19 / 16-17 / 5852-53	January 1972 sled test
18 / 467-468 / 5799, 5802	Farrell memo, 1/11/72: priority arcs from Point A
20 / 71 / 6028	Rigger's associate: 26-ft and 28-ft rigs, descent rate
20 / 240-241 / 6197-98	Portland meteorologist's FD-302, 12/3/71: hourly reports and 8-9 PM winds aloft for Salem and Portland
24 / 637 / 3478	FAA: copy reel of the Seattle Center tape, 12/3/71
26 / 473 / 8883	Stewardess's observations: McChord, "over Tacoma," the airstair
30 / 212 / 10861	1973 radar re-plot ("new Point A") and second terrain search
36 / 13-21 / 6236-44	Seattle Center ATC transcript (GMT)
39 / 227-228 / 15412-13	Continental pilot interview, airtel 3/1/77
39 / 330-331 / 15518-19	Follow-up memo, 4/8/77, and FBI disposition
41 / 16, 26, 30-32, 36-50 / 11384, 11394, 11398-400, 11404-18	Seattle summary: jump timing, time-signal tape and log excerpts (Bates 11398-400), searches, maps
43 / 377 / 17613	1980 drop zone and Tena Bar
53 / 245 / 22583 (press)	Himmelsbach interview, 1976
54 / 75 / 23001 (press)	Press clipping: route chosen "without consulting the hijacker"
64 / 153 / 26967	Hijacker's demand to take off with the aft stairs down
64 / 298-308 / 27164-74	NWA plot of 12/4/71 and NWA Minneapolis flight-ops log (route, range and fuel)
64 / 322 / 27188	Crew interview: "Victor 23" clearance at 10,000 ft
83 / 3-7 / 35324-28	Hourly aviation weather sequences, 0300-0500 GMT 11/25/71
110 / 18-19 / 308-09	Seattle summary of the stewardess's account (cord around his waist, stairs)
110 / 54-55 / 344-45	Stewardess's FD-302: money bag wrapped in cord; sent forward about 4 minutes after takeoff
110 / 65-67 / 355-357	Crew interview (FD-302, Las Vegas)
110 / 90 / 382	NWA Sea-Tac ground teletype roll handed to the FBI
110 / 104-108 / 396-400 · 110 / 119 / 411	Company teletype log, 7:22-8:24 PM (no entries 8:12-8:20)
110 / 145 / 437	FAA: five reels of Sea-Tac Approach/Tower tapes

110 / 199 / 491	Seattle Center transcript copy: 8:13 check-in at 10,000 ft
110 / 246–248 / 538–540	Weather Bureau observations
110 / 254 / 551	8:05 PM radar position
110 / 267–269 / 566–568	NWA landing-point envelope, 1/9/72

Outside sources

Weather balloons	NOAA NCEI, Integrated Global Radiosonde Archive v2: Salem (USM00072694), Quillayute (USM00072797), Medford (USM00072597). ncei.noaa.gov
Navigation aids	AirNav navaid data (SEA, BTG, EUG, OED, RBL). airnav.com
Spotting / free fall	USPA Integrated Student Program, Category E. uspa.org/isp ; US Army FM 57-38, <i>Pathfinder Operations</i> , Ch. 6 (D = K-A-V)
Canopy drag and descent	Knacke, <i>Parachute Recovery Systems Design Manual</i> ; RAF AP 3456 (24-ft flat canopy descent rates)
Night visibility of lights	Allard's law with Koschmieder extinction ($\sigma = 3.912 / \text{visibility}$); ICAO Doc 9328 night illuminance threshold
Air Force radar map, re-timed	Richie Thaxton, Bailee Zinzer and Karen Humes, "DB Cooper Landscape Map," University of Idaho, Dept. of Earth and Spatial Sciences, ArcGIS StoryMaps, Nov. 2024 (flight-path time labels credited to Chris Cunningham). storymaps.arcgis.com
Kinsler account	Robert H. Edwards, "D. B. Cooper and Bruce Kinsler," <i>Dr Bob Edwards' Substack</i> , Oct. 2026, quoting Kinsler's Sept. 15, 2026 interview on Eric Ullis's D.B. Cooper Channel. drrobertthedwards.substack.com
Basemap	USGS The National Map, ImageryTopo (public domain); OpenStreetMap contributors; US Census county lines
Copycat cases	McNally: Danny Wicentowski, "The final flight of Martin McNally," <i>Detroit Metro Times</i> , Jan. 31, 2017. metrotimes.com McCoy: Sylvia Wrigley, "The odd story of Richard Floyd McCoy Jr.," <i>Fear of Landing</i> , Oct. 26, 2018. fearoflanding.com ; Musika Farnsworth, "Skyjacker: The Richard McCoy Jr. Story," <i>Parachutist</i> (USPA), Mar. 12, 2011. parachutist.com

APPENDIX B

Data and method notes

- **True airspeed** from indicated airspeed with standard-atmosphere pressure altitude and the sounding temperature: 170 KIAS at 10,000 ft and $-12^{\circ}\text{C} \approx 195 \text{ kt TAS}$.
- **Wind from timing:** headwind = average true airspeed – ground speed per leg. The 7:43–8:11 leg mixes 7 minutes at 7,000 ft/160 KIAS, a 3-minute climb and 18 minutes at 10,000 ft/170–180 KIAS.
- **Georeferencing:** least-squares fits of FBI map scans to landmark coordinates. Residuals about 0.1–0.65 km on the La Center quadrangle maps and 1–3 km on the 12/4/71 chart.
- **Model runs** and data files are kept with the research folder (drift model, wind check, sounding extracts, KML layers), so the numbers here can be rerun or challenged.
- **Magnetic variation** about 21° east (Battle Ground VORTAC, 1975 listing). Pilot courses and tower winds are magnetic; weather-report and sounding winds are true.