

01

The Case of the Pilots Upstairs

Why would anyone build a cockpit on the roof?

THE PROBLEM WE'RE SOLVING

In the 1960s, every big jet had its pilots sitting in the nose. Then the biggest jet of all moved them up a floor, and gave itself a strange bump. Most people think the bump is about looks or luxury. They are wrong, and that wrong guess hides one of the smartest moves in aviation.

AFTER THIS CASE, YOU'LL BE ABLE TO

- explain the 747's famous bump to anyone, in one sentence
- see through a wrong guess with one detective question: "**which came first?**"
- spot a machine that was built for a **future** job, not just today's
- use **Rule 1**, "**Nothing is free**", to read any design you see

WHY THIS HELPS YOU

Engineers don't memorize shapes. They ask what each shape **pays for**. Learn that one question here and you'll start seeing reasons everywhere: the bump on the back of your phone (a big camera squeezed into a thin phone), the shape of a car, the plane outside your window. It's how designers think. After this case, it's how you'll think too.

8 min

READING TIME

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DIFFICULTY

Rule 1

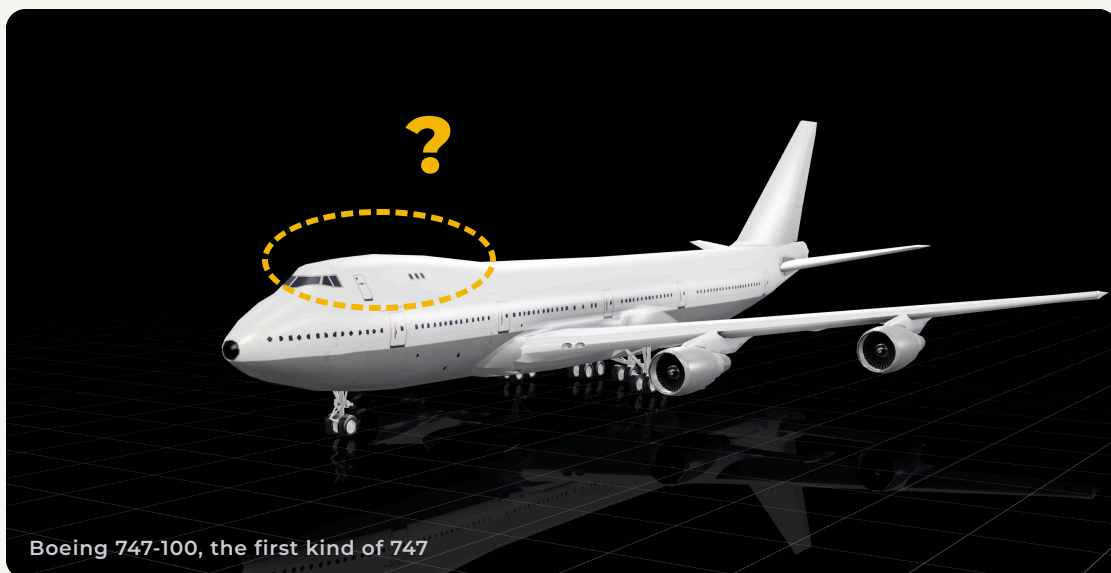
NEW RULE

Boeing 747

THE SUSPECT

CASE FILE 01 • THE CLUE

Why would anyone build a cockpit on the roof?



Look at the front of a 747. Behind the cockpit windows, the top of the plane swells up into a big bump, like the head of a whale. Most airliners have a top that runs smooth and straight from nose to tail. The 747 doesn't.

Boeing built **1,574** of these planes over 54 years, and they all kept the hump. That is not an accident. Somebody decided it *had* to be there.

Your job, detective: find out why.

FIRST CLUE

The pilots of a 747 do not sit in the nose like on other jets. They sit **upstairs**, inside the front of the hump.

1969

first flight
(9 February)

1,574

built, the last one
delivered in 2023

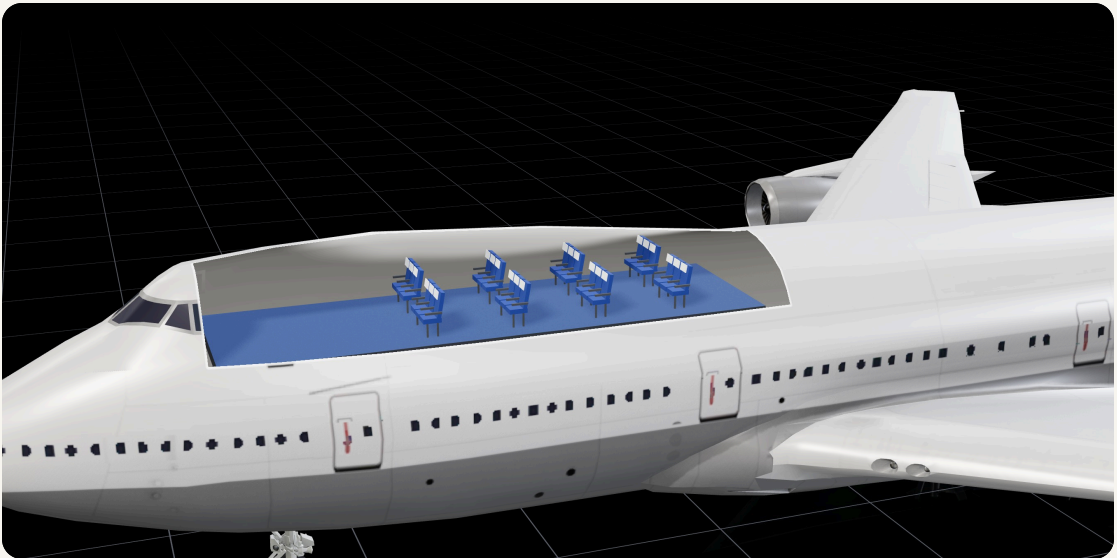
2

floors at the front:
one on top of the other

THE WRONG GUESS

"Easy. The hump is a fancy lounge for rich passengers."

Not a bad guess! The first 747s really did have a lounge up there, with a spiral staircase to climb to it. Passengers could climb up and relax there during the flight.



But look at the evidence. The airline that ordered the first 747s, Pan Am, had to **pay extra** for that lounge. The staircase and the lounge added **4,420 pounds** of weight and **\$200,000** to the price of each plane.

And before anyone chose a lounge, two men argued about the empty room. Pan Am's chief engineer, John Borger, wanted it as a place for the crew to rest. Pan Am's boss, Juan Trippe, said no: give it to the passengers.

So the room was there **first**. The lounge came **second**. Something else made the hump.

DETECTIVE TIP

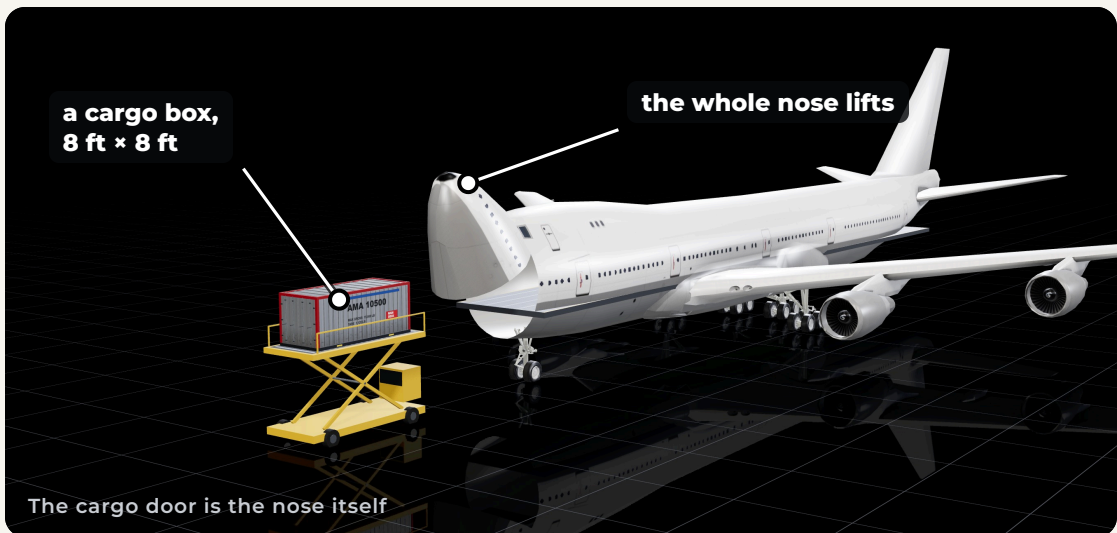
What something is *used for* is not always what it was *made for*. Always ask: which came first?

THE EVIDENCE

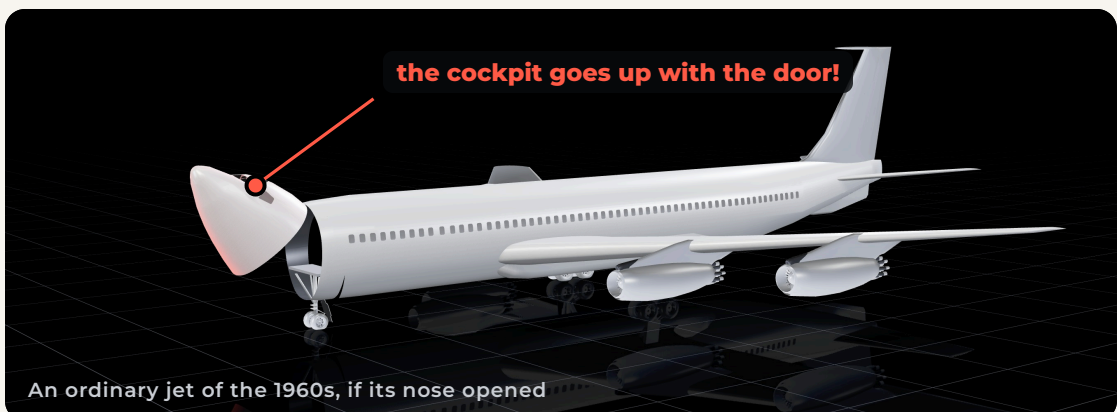
Go back to the 1960s, when the 747 was being designed. Almost everyone in aviation believed the future was **supersonic**: by 1975, jets faster than sound would carry the passengers. A slow jet like the 747 would be left to carry... cargo.

So the 747 was planned for **double duty**: a passenger plane now, a cargo plane later. And it was made wide enough for two standard cargo boxes, each **8 feet by 8 feet**, side by side.

The best way to load long boxes is straight in through the front, like sliding a drawer into a cupboard. For that, the **whole nose** has to swing up out of the way:

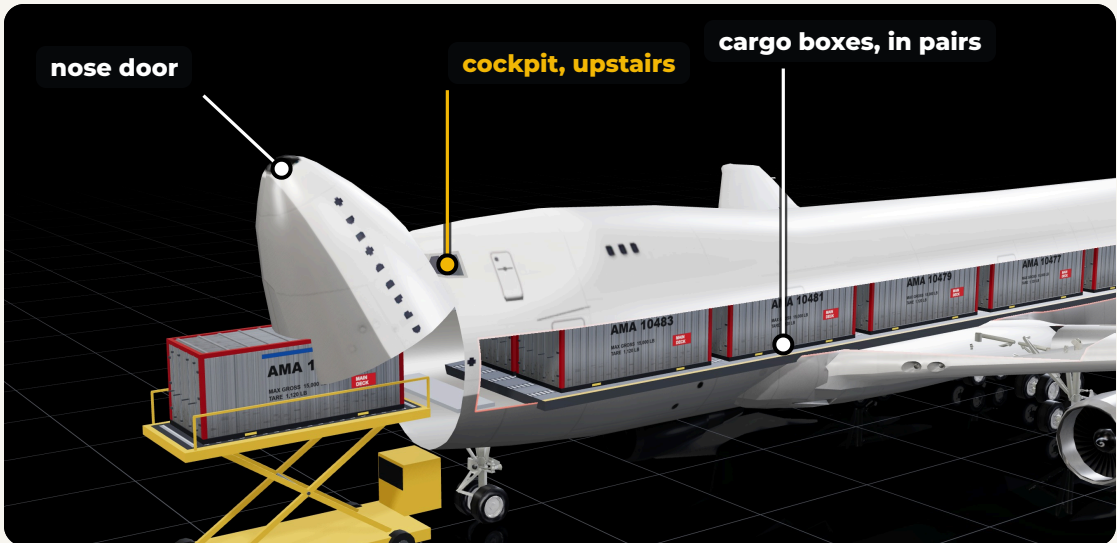


Now the big problem. On every jet before the 747, where did the pilots sit? **Right in the nose**. Lift that nose, and the cockpit goes up with it:



CASE SOLVED

Boeing's answer: **move the pilots upstairs**. The cockpit went on top, above the cargo deck and out of the way. Now the whole nose can lift, and boxes can roll straight in, right under the pilots' feet.



To lift the cockpit, Boeing built a short **second floor** on top of the front of the plane. The outside of that short second floor is... **the hump**. And the room behind the cockpit, the one Borger and Trippe argued about, is simply the rest of that second floor.

**VERDICT**

The 747 has a hump because its pilots had to move upstairs, so a cargo door could open where they used to sit.

SAME CLUE, OTHER SUSPECTS

A good detective always checks: is this a one-off, or a **pattern**? So let's look at other planes that were built to swallow huge cargo through the front.



This is the **C-5 Galaxy**, a giant American military cargo plane. It first flew on 30 June 1968, about seven months before the 747. Its whole nose swings up, and its pilots sit on an upper deck, above the cargo.

Now jump to 1982 and the other side of the world: the **An-124**, a giant cargo plane from the Soviet Union. A door in the nose? Yes. Pilots upstairs, above the cargo? Yes again.

Different companies, different countries, different decades. **Same answer.** When engineers who never worked together keep landing on the same shape, that shape isn't fashion. It's the answer to a problem.

RULE 1 OF 10

Nothing is free.

Every shape on a plane is paid for with something. The 747 got a nose that opens. It paid with a cockpit on the roof. The hump is the receipt.

FUN FACT: THE FUTURE FOOLED EVERYONE

Supersonic jets never took over. Concorde, the supersonic airliner, was retired in 2003. The "for now" 747 kept being built for twenty more years, and the very last 747 ever made, delivered on 31 January 2023, was a **cargo plane**.

Quick quiz

- 1. In the 1960s, what did people think would carry passengers in the future?
a) bigger propeller planes b) supersonic jets c) airships
- 2. Why could a 1960s jet not just open its nose for cargo?
- 3. True or false: the 747 got its hump so it could have a lounge.
- 4. Name another plane whose pilots sit upstairs, above a door in the nose.

AIRPORT MISSION

Many 747 cargo planes still fly today. If you spot one that was *built* as a cargo plane, look below the cockpit windows. Can you see the thin line around the nose where it opens?



Spin the 747 in 3D
open the nose yourself · scan or tap



Watch the answer
in about a minute · scan or tap

DETECTIVE NOTEBOOK

Write Rule 1 in your own words, and one thing around you that it explains:

Case notes (sources): Pan Am Historical Foundation, "Birth of the Superjet: Coming Into Focus" (SSTs expected by 1975; double duty; the hinged nose and the flight deck above it; 8 × 8 ft containers side by side; the lounge's 4,420 lb and \$200,000; Borger and Trippe) · Boeing, final 747 delivery, 31 Jan 2023 (1,574 built; the last a 747-8 Freighter) · Smithsonian National Air and Space Museum (Concorde retired 2003) · C-5 Galaxy and An-124 (first flights, nose doors, flight decks on the upper deck); their Wikipedia articles · C-5 photo: U.S. Air Force, Staff Sgt. Efen Lopez, 2005, public domain.

Answers: 1 - b, supersonic jets. 2 - the pilots sat in the nose, so the cockpit would lift with the door. 3 - False: the room was there first, the lounge was added later for \$200,000. 4 - the C-5 Galaxy or the An-124.