Episode Book

EPISODE #5547

53 Bird Strikes a Day: What Actually Happens

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SYNOPSIS

A shattered engine and a river landing is the image most people have of bird strikes. The data tells a different story: roughly 19,400 reported strikes at 713 U.S. airports in 2023 alone — about 53 a day — with global damage costs near $1.2 billion a year. This episode digs into why the risk is wildly uneven across airports, how migratory flyways and local habitat shape the danger, what airports actually do about it, and how jet engines are certified to swallow frozen birds and keep flying. Along the way: quieter engines may be making strikes more likely, and one study shows a wildlife management program can look like it failed simply because reporting got better.

TRANSCRIPT



Corn

Most coverage of bird strikes opens with the same image. A shattered engine, a flaming cowling, a plane coming down in a river. The implication is that this is a rare and violent freak event.



Herman

And the data says the opposite. It says this happens fifty-three times a day in the United States.



Corn

Which reframes the entire question. Daniel wrote in this week with a set of them. He notes that bird strikes have been a safety concern for a long time, that some airports have elaborate protocols for scaring birds off approach paths, and then he wants the reality check. How common or rare are these actually? Is this something that affects basically every airport, or only a subset with significant risk? And has engine technology improved to the point where an ingested bird can be survived, or does every strike trigger an emergency of some kind?



Herman

Four questions, and the answers don't line up the way people expect.



Corn

Let's start with the numbers, because they reframe the whole thing.



Herman

A bird strike is any collision between an aircraft and wildlife. Usually birds, sometimes bats. It can happen at any phase of flight, but it clusters on approach, departure, and low-altitude flight, because that's where the aircraft and the birds occupy the same airspace.



Corn

And the volume is the part that surprises people. Between 1990 and 2023, about two hundred ninety-one thousand six hundred wildlife strikes were reported to the FAA.



Herman

In 2023 alone, roughly nineteen thousand four hundred strikes at seven hundred thirteen U.S. airports. That's fifty-three a day.



Corn

Reported.



Herman

Reported. That's the caveat that matters. FAA strike reporting is voluntary, and the agency says so on its own database page. So the real number is higher. Possibly substantially higher.



Corn

Which means every figure we're about to cite is a floor, not a ceiling.



Herman

A floor. And the cost frame is the other way to feel the scale. The global estimate runs about one point two billion dollars a year in damage and associated costs.



Corn

So: routine, near-daily, expensive, and undercounted. The rare thing is not the strike. The rare thing is a strike that matters.



Herman

That's the tension for the whole episode. And the trend line is going the wrong way.



Corn

Go on.



Herman

ICAO data cited in the literature shows an annual average of twelve thousand two hundred nineteen reported strikes between 2008 and 2015. That's nearly double the six thousand seven hundred average from 2001 to 2007.



Corn

That's not noise. That's a doubling in under a decade.



Herman

Part of it is better reporting. Part of it is real. Wildlife populations are expanding. Aircraft movements are up. And there's a third driver that's counterintuitive.



Corn

The quieter engines.



Herman

Aircraft have gotten substantially quieter over the last few decades, which is a good thing for everyone on the ground. But birds use sound as a warning. A quieter engine gives them less acoustic notice that something is bearing down on them.



Corn

So the technology that reduces noise pollution may be increasing strike risk.



Herman

That's the shape of it. I'm not sure anyone has cleanly separated how much of the trend is that versus reporting versus traffic volume, but the mechanism is real and it's the kind of thing that makes you sit with a number.



Corn

It's a nice example of a fix that works and creates a different problem downstream.



Herman

Every engineering decision is a trade.



Corn

So that's frequency. Now Daniel's second question, and this is the one I find more interesting. Every airport, or a subset?



Herman

Both, and unevenly. That's the honest answer.



Corn

Unpack that.



Herman

Strikes were reported at seven hundred thirteen U.S. airports in 2023. That's system-wide. This is not a problem confined to a handful of unlucky fields. But the risk is highly site-specific, and the variation is enormous.



Corn

What drives it?



Herman

Three things, mostly. Local bird populations and habitat. Migratory flyways. And the species present.



Corn

Habitat first.



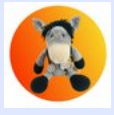
Herman

Wetlands, landfills, farmland, open water near the airport. Anything that concentrates birds within the approach and departure corridors. If you put a landfill two miles off the end of a runway, you have built a bird attractant and pointed aircraft at it.



Corn

That's a planning failure, not a bird problem.



Herman

It's a planning failure. And it's often decades old, because the airport was there first and the landfill came later, or the other way around.



Corn

Flyways.



Herman

Airports sitting under major migration routes see sharp seasonal spikes. A 2026 study of Shanghai Pudong International Airport looked at one thousand seven hundred sixty strike incidents between 2014 and 2024. Eighty-four point five percent involved migratory birds.



Corn

That's a striking number.



Herman

And the seasonality is clean. Peaks in autumn for species richness, peaks in spring for diversity. It tracks the migration calendar almost exactly.



Corn

So at a flyway airport, the risk isn't constant. It's a calendar.



Herman

It's a calendar, and it's a calendar that shifts year to year with weather and breeding conditions. Which is why detection and prediction is one of the four pillars of the FAA's mitigation framework. You want to know when the high-risk window is.



Corn

And the third driver, species.



Herman

Body mass matters enormously. A 2018 study found avian body mass correlated strongly with hazard score. The correlation coefficient was zero point seven six.



Corn

That's a tight relationship.



Herman

It's very tight. The most hazardous species to military aircraft were snow goose, common loon, Canada goose, and black vulture.



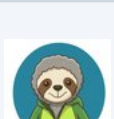
Corn

A Canada goose is not the same threat as a sparrow.



Herman

Not remotely. A sparrow is a non-event. A Canada goose is four to five kilos of dense muscle and bone arriving at two hundred knots relative velocity. That's a different physics problem.



Corn

Which explains why the risk assessment has to be per-airport. You can't flatten this to a national average.



Herman

Italian research in 2011 built a Birdstrike Risk Index precisely for that reason. Two airports with identical traffic can have wildly different risk profiles, because one is next to a wetland on a flyway and the other is in a desert.



Corn

So the answer to Daniel's question. Every airport has exposure. The subset with significant risk is defined by geography.



Herman

Geography, habitat, and species. Coastal airports, major hubs in flyway corridors, anything near water or waste. Those carry disproportionate risk.



Corn

And the mitigation has to be tailored to each one.



Herman

Which is the perfect transition to what airports actually do about it.



Corn

Given that risk is site-specific, what do airports do?



Herman

There's a regulatory floor. Airports with scheduled passenger service are required to conduct wildlife hazard assessments and implement wildlife hazard management plans. That's not optional.



Corn

And the FAA framework has four areas.



Herman

Habitat management, which is making the airport unattractive to wildlife. Managing grass height, drainage, removing food sources. Wildlife dispersal, removal, and exclusion. Detection and prediction of wildlife movements. And enhanced aircraft detection by birds.



Corn

That last one is the one I want to hear about.



Herman

Novel aircraft lighting schemes. The idea is to make the aircraft more visible to birds. Because a bird's visual system is different from ours, and the standard lighting configuration may not read as a threat.



Corn

So you're trying to make the plane legible to a goose.



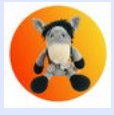
Herman

You're trying to make the plane legible to a goose. It sounds absurd and it's a real research area.



Corn

What about the habitat side? Concrete examples.



Herman

FAA and USDA research looked at green roofs at Chicago O'Hare. The finding was that stonecrop-vegetated roofs did not increase strike risk. Other vegetation types might attract hazardous birds, but stonecrop didn't.



Corn

So the green roof was fine. But it could have gone the other way.



Herman

It could have gone badly. That's why you test.



Corn

Translocation.



Herman

A 2025 study on great horned owls found translocation from thirteen civil airports and three military airfields had a return rate of two point six percent. So if you catch an owl and move it, it mostly stays moved.



Corn

Two point six percent is remarkably low.



Herman

It's an effective tool. And owls are a growing problem, which is worth flagging.



Corn

Why?



Herman

Because owls are nocturnal. Most dispersal tactics are daytime tactics. Pyrotechnics, dogs, vehicles on the airfield. None of that works on a bird that hunts at night. A 2025 study called owl strikes a contemporary and growing aviation safety issue for exactly that reason.



Corn

So the management toolkit has a blind spot.



Herman

It has a night shift problem.



Corn

What about direct removal? Lethal control.



Herman

It's used. It raises conservation concerns, because some endangered and vulnerable species appear in strike records. And it's not a clean solution, because you're removing individuals from a population that may be protected.



Corn

And DNA barcoding.



Herman

Increasingly used. Molecular identification of exactly which species is being struck. Because if you don't know what you're hitting, you can't target the management. Studies at Nanjing Lukou and Shanghai Pudong used it precisely for that.



Corn

So you're swabbing the engine and running a barcode.



Herman

You're identifying the species from residue. It's forensics.



Corn

Now here's the part of the research I found surprising. The Altringer study.



Herman

The 2024 study in Scientific Reports. It found that implementing a federal wildlife hazards management program produced a substantial increase in reported strikes.



Corn

Which sounds like the program made things worse.



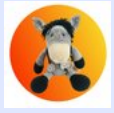
Herman

It's a reporting effect. Better data capture, not necessarily more strikes. When you put a program in place, people report more, because there's now a process and a reason to.



Corn

So the program looks like it failed by the metric everyone watches.



Herman

And where reporting was already robust, the same study found management produced a measurable decrease in strike-induced economic damage.



Corn

That's a beautiful measurement problem.



Herman

It's the classic thing. You improve your measurement and your numbers get worse, and everyone concludes the intervention backfired.



Corn

Which is exactly the kind of thing that kills good programs in budget reviews.



Herman

It is. And it's worth saying plainly. The reported number going up after you start managing is not evidence the management failed.



Corn

Right. Now the engine question. Daniel's third. Has technology improved to the point where an ingested bird can be survived?



Herman

Substantially, yes. And the certification testing is the place to start, because it's more dramatic than people expect.



Corn

Frozen birds out of a cannon.



Herman

Jet engines are certified by firing frozen birds into running engines to simulate ingestion. Often chicken, sometimes turkey, depending on the mass they need.



Corn

That's a real test.



Herman

It's a real test, and the standard distinguishes bird sizes. Engines must demonstrate the ability to continue producing thrust after ingesting small or medium birds. And they must demonstrate the ability to shut down safely after ingesting a large bird.



Corn

Define safely.



Herman

Containment. The engine may be destroyed internally. It must not throw debris through the casing into the wing, the fuselage, or the fuel tanks. No uncontained failure, no fire penetrating the casing.



Corn

So the engine is allowed to die. It's not allowed to take the aircraft with it.



Herman

That's the design philosophy. Sacrifice the engine, protect the airframe.



Corn

And the blade design has improved.



Herman

Wide-chord, swept blades. Composite or titanium. Much better tolerance to impact than the older designs. The blades absorb and deflect rather than shatter.



Corn

So a modern engine is more robust than a 1970s engine.



Herman

Meaningfully more robust. Though I'd caveat that the certification tests use single birds or small flocks at defined weights. A large flock of large birds is a different scenario.



Corn

Which brings us to the Hudson.



Herman

US Airways Flight 1549, 2009. Canada geese into both engines. Dual-engine failure. That remains the canonical worst case, and it's the reason the caveat matters.



Corn

Because the certification standard is one large bird, not a flock of large birds into both engines.



Herman

The system is designed so a single bird usually doesn't bring down a plane. It is not designed so that a flock of geese into both engines is survivable by engineering alone. That's a piloting problem at that point.



Corn

Which answers Daniel's last question. Does every strike trigger an emergency?



Herman

No. The overwhelming majority don't. Given nineteen thousand four hundred reported strikes in 2023 and the fact that these are routine, most cause no damage and no emergency. Many are never noticed by the crew until post-flight inspection.



Corn

So the pilot lands, walks around the aircraft, and finds feathers in the cowling.



Herman

Finds feathers, finds a dent, finds nothing at all. The strike was a non-event.



Corn

When does it become an emergency?



Herman

When there's damage or abnormal engine indications. Pilots may continue normally, which is the most common outcome. They may return to the airport as a precaution, often after an engine parameter anomaly or visible damage. Or they may declare an emergency, which is engine failure, fire, vibration, or dual-engine involvement.



Corn

And single-engine failure is survivable.



Herman

Single-engine failure is survivable and trained for. Aircraft are designed and pilots are trained to fly on one engine. There are plenty of cases where an engine with damaged fan blades keeps producing some thrust until it's shut down.



Corn

So the dangerous scenario is specifically dual-engine ingestion.



Herman

Dual-engine ingestion from a large flock. Rare, but it has happened.



Corn

Two recent cases worth separating, because they're often conflated.



Herman

United Airlines Flight 328, February 2021. Boeing 777, uncontained engine failure shortly after takeoff from Denver. Debris rained onto a neighborhood. It was widely discussed as a bird strike. The NTSB determined the cause was fan blade fatigue, not a bird strike.



Corn

So that one gets filed under metallurgy, not ornithology.



Herman

It gets filed under metallurgy. And it's worth saying because the public memory of that event is wrong.



Corn

And Jeju Air.



Herman

Jeju Air Flight 2216, December 2024, South Korea. A Boeing 737-800 crashed after a reported bird strike. The black boxes stopped recording four minutes before the crash. Investigators have examined whether a bird strike damaged one engine and the crew may have inadvertently shut down the working engine.



Corn

That's the live one.



Herman

That's the live one, and it's not final. What it has done is renew public attention on bird strikes and on crew response procedures. If the working-engine theory holds, the problem wasn't the bird. The problem was the response to the bird.



Corn

Which is a different failure mode entirely.



Herman

It's a crew-resource-management question wearing a bird-strike costume.



Corn

I flew into Denver once and watched a hawk pace the aircraft on the parallel taxiway for a full minute. Nobody on the flight deck seemed concerned. I found that reassuring in a way I couldn't fully explain.



Herman

The hawk was probably more concerned than they were.



Corn

The hawk had better situational awareness than I did.



Herman

Most things do.



Corn

So we've got the frequency, the distribution, the protocols, the engines, the emergencies. What's left is the ground level. What does any of this actually look like on a Tuesday?



Herman

It looks like a guy in a truck.



Corn

Agreed.



Herman

The most effective thing we did was mowing the grass to the right height. Which is boring and doesn't make for good television.



Corn

How do you know the right height?



Herman

You get told. There's a number. You mow to the number, you log it, you move on. The trick is that the height changes with the season and with the species you're trying to discourage, so it isn't one number forever.



Corn

So the cannon was the last resort.



Herman

The cannon was the last resort, and mostly it moved the birds to the next field over. Which is a different airport's problem, or nobody's problem until it's somebody's problem.



Corn

A propane cannon makes a deep thump. You feel it in your chest more than you hear it.



Herman

You feel it in your chest. And I set one off once while a colleague was standing right next to it.



Corn

How close is right next to it?



Herman

Close enough that he didn't speak to me for a week. Which was fair.



Corn

What did the clipboard do?



Herman

The clipboard held the counts. Dawn and dusk, species and numbers, every day, whether or not anything happened. The counts are what the airport uses to decide where to mow and when to fire the cannon.



Corn

So the paperwork was the actual system.



Herman

The paperwork was the actual system. The cannon was a footnote.



Corn

That's the thing that doesn't make it into the certification tests or the DNA barcoding.



Herman

None of it does.



Corn

So the elaborate protocols Daniel asked about are, at the ground level, a guy in a truck with a clipboard, mowing grass to a number and occasionally firing a cannon at a bird that will probably just relocate to the next field.



Herman

That's the honest version.



Corn

Which is a strange thing to hold next to a frozen turkey fired out of a cannon into a running engine.



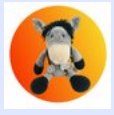
Herman

It's the same problem from two ends. One end is designing the engine to survive. The other end is trying to make sure it never has to.



Corn

And the second end is mostly mowing.



Herman

Mostly mowing.



Corn

So here's the tension I keep circling. Strikes are routine and mostly benign. The rare dual-engine event is catastrophic and the system can't design it away. How do you weigh the cost of elaborate mitigation against a tail risk you can't eliminate?



Herman

You do it the way the industry actually does it. You accept that you can't get to zero, and you spend where the marginal dollar buys the most risk reduction. Which is why the site-specific assessment matters so much.



Corn

Because a desert airport and a coastal airport on a flyway shouldn't be spending the same money.



Herman

Shouldn't be spending the same money, shouldn't be running the same program. The Birdstrike Risk Index exists precisely because a national average is useless for a local decision.



Corn

And the Jeju Air investigation may reshape crew training around bird strikes specifically.



Herman

It may. If the working-engine theory holds, the lesson isn't about birds. It's about what a crew does when one engine is damaged and the other is fine.



Corn

Which is a training problem, not an engineering problem.



Herman

It's a training problem. And the quieter-engine trend suggests the frequency problem may get worse before it gets better, which raises the stakes on getting the response right.



Corn

The system is designed so a single bird usually doesn't bring down a plane.



Herman

And the system can't design away the flock.



Corn

That's the whole thing in one line.



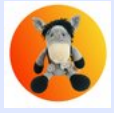
Herman

It is.



Corn

One more thing from the research that didn't fit anywhere else. The FAA added its most current wildlife strike report, covering 1990 through 2025, to its website in August. So the numbers we've been citing are about to be superseded by a year of fresher data.



Herman

Which will almost certainly show more strikes than the previous report.



Corn

That won't necessarily mean the problem got worse.



Herman

It won't. It might just mean more people filled out the form. Which is the reporting paradox all over again.



Corn

If you found this interesting, a review helps other listeners find the show.



Herman

Thanks as always to our producer, Hilbert Flumingtop.



Corn

This has been My Weird Prompts. We'll be back soon.



Herman

See you tomorrow.