

## MY WEIRD PROMPTS

Podcast Transcript

EPISODE #329

# The Invisible Enemy: Why Turbulence is Getting Worse

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## EPISODE SYNOPSIS

Have you noticed your recent flights getting a bit more "adventurous" lately? In this episode, Herman and Corn Poppleberry explore the rising phenomenon of Clear Air Turbulence (CAT) and whether climate change is actually making our travels more dangerous. From the harrowing Singapore Airlines incident to the incredible engineering of modern wings, the brothers break down what is happening in the cockpit and why you shouldn't panic when the seatbelt sign turns on. Learn how pilots handle "invisible" rivers of air and how future Lidar technology might finally give us a way to see the unseeable.

## DANIEL'S PROMPT

### Daniel

Is severe clear air turbulence becoming a more common phenomenon? What would you say to someone who is afraid of turbulence, and do experienced pilots and crew members ever actually get scared when the plane starts rocking?

# TRANSCRIPT

## Corn

Hey everyone, welcome back to My Weird Prompts. I'm Corn, and as always, I'm joined by my brother, Herman.

## Herman

Herman Poppleberry, at your service. Coming to you from our slightly drafty living room here in Jerusalem.

## Corn

It is a bit chilly today, isn't it? But we've got a topic that is definitely going to heat things up. Our housemate Daniel sent us a voice note this morning. He mentioned that his wife has been getting a lot more anxious about flying lately, specifically because of turbulence.

## Herman

It is a very real phenomenon, Corn. We have seen some harrowing headlines over the last year or two. Daniel was asking if this is just a case of better reporting and social media, or if the skies are actually getting angrier.

## Corn

Right, he wanted to know if severe clear air turbulence is becoming more common, what we should say to the nervous flyers out there, and—this was the interesting part—if the pilots themselves ever actually get scared when the plane starts bucking.

## Herman

Oh, that is a fantastic question. I have actually been diving into the latest atmospheric research on this, and the short answer is: yes, the data is starting to back up that gut feeling a lot of travelers have. The skies are changing.

### Corn

That is a bit ominous, Herman. But before we get into the "why," let us talk about the "what." Because when most people think of turbulence, they think of flying through a big, dark thunderstorm. But what Daniel is talking about—clear air turbulence, or C A T—is a different beast entirely.

### Herman

Exactly. It is the invisible enemy. If you are flying through a storm, the pilot can see that on the weather radar. They see the moisture, the convection, the red and yellow blobs on their screen, and they fly around it. But clear air turbulence happens in, well, clear air. There is no moisture for the radar to bounce off of. It is purely a result of wind shear—rapid changes in wind speed or direction over a very short distance, usually near the jet stream.

### Corn

And that is what makes it so jarring. One minute you are watching a movie and sipping a ginger ale, and the next, the floor literally drops out from under you. So, to Daniel's first question: is it actually getting worse?

### Herman

It really is. There was a landmark study out of the University of Reading—researchers like Paul Williams and Mohamed Foudal have been tracking this for years. They found that between nineteen seventy-nine and twenty-twenty, the total annual duration of severe turbulence over the North Atlantic increased by fifty-five percent. Studies from the University of Reading project severe turbulence could increase by up to 182%—nearly double—by mid-to-late century under high-emission climate scenarios.

### Corn

Fifty-five percent already, and potentially doubling? That is not just a statistical fluke.

### Herman

Not at all. And it is not just the North Atlantic. We are seeing similar trends over the United States, Europe, and parts of Asia. Moderate turbulence went up by about thirty-seven percent, and even light turbulence is up seventeen percent. If you feel like your flights are bumpier than they were when we were kids, you are not imagining it. You are objectively spending more time in unstable air.

### Corn

So what is the driver here? I assume this connects back to some of the climate trends we have discussed before?

### Herman

It is the primary driver. Climate change is warming the troposphere—the lower part of the atmosphere where we live—but it is actually cooling the stratosphere, which is higher up. This increases the temperature gradient between those two layers.

### Corn

Okay, so the temperature difference is getting steeper.

### Herman

Exactly. And that temperature difference is what fuels the jet stream. When that gradient gets sharper, the wind shear in the upper atmosphere becomes more intense. The jet stream essentially becomes more "fractured" or chaotic. You get these invisible rivers of air moving at three hundred kilometers per hour right next to air moving at half that speed. When a plane crosses that boundary, that is your turbulence.

### Corn

It is like a boat moving from a calm lake into a raging river.

### Herman

Perfect analogy. Except the river is invisible and moves in three dimensions. And because we are seeing more extreme heat trapped in the lower atmosphere, those "rivers" are becoming more turbulent.

### Corn

We saw a really tragic example of this back in May of twenty-twenty-four, right? The Singapore Airlines flight S Q three twenty-one. That one really shook the industry.

### Herman

That was a watershed moment. One passenger unfortunately died, and over a hundred people were injured. The plane dropped about fifty-four meters in just a few seconds. To put that in perspective for the listeners, that is about the height of a fifteen-story building. Just... gone.

### Corn

I remember reading the preliminary report on that. The gravitational forces, the G-forces, swung from positive one point five G to negative one point five G in a matter of seconds.

### Herman

Think about what that does to a human body. At one point five G, you feel fifty percent heavier than you are. Then, a split second later, at negative one point five G, you are being thrown toward the ceiling with more force than gravity is pulling you down. If you are not buckled in, you become a projectile. That is why we saw those horrific photos of the ceiling panels being smashed. It was not the luggage; it was people.

### Corn

It is a sobering reminder. Turbulence incidents have continued to make headlines in recent years.

### Herman

Turbulence risks are becoming a state-level operational concern. In fact, turbulence is noted as a key risk area in ICAO's ongoing Global Aviation Safety Plan, reflecting increased industry focus.

### Corn

So, let us pivot to the psychological side of this, because I think this is where Daniel's wife—and probably a lot of our listeners—are sitting. When the plane starts rocking, it feels like the wings are going to snap off. It feels like the pilots have lost control. Herman, do the pilots ever actually get scared?

### Herman

I have talked to a few pilots about this, and the consensus is really interesting. Most experienced pilots will tell you they do not get "scared" in the sense of "we are going to die." They view turbulence the same way a professional driver views a very potholed road. It is annoying, it is a lot of work, and it is a major safety concern for the people in the back, but they are not worried about the plane falling out of the sky.

### Corn

Why not? Because to a passenger, "falling out of the sky" feels like a very logical conclusion to severe shaking.

### Herman

It is all about the engineering. Modern aircraft are built to withstand forces that are far, far beyond anything the atmosphere can throw at them. You know those "wing flex" tests you see on YouTube?

### Corn

Oh, I love those. Where they pull the wings of a Boeing seven-eight-seven or an Airbus A-three-fifty up until they almost touch above the fuselage.

### Herman

Exactly! Those wings can flex more than seven meters before they reach their breaking point. In even the most severe turbulence—the kind that sends people to the hospital—the wings might only flex a meter or so. The plane is basically a giant, high-tech spring. It is designed to bend so it does not break. Pilots know this. They know the structural integrity is virtually absolute.

### Corn

So what are they actually doing in the cockpit while we are all white-knuckling our armrests?

### Herman

They are busy. They are checking their instruments, trying to find a "ride report" from other planes in the area. They are talking to Air Traffic Control to see if there is a smoother altitude. They might be slowing the plane down to "turbulence penetration speed," which is basically like a car slowing down to go over a speed bump. It reduces the stress on the airframe and makes the ride slightly less jarring.

### Corn

But surely there is a limit? I mean, if the turbulence is so bad you cannot read the screens...

### Herman

That is when it gets "unnerving," to use a word I saw from a retired captain. If the vibrations are so intense that you literally cannot focus your eyes on the primary flight display, yeah, that is a bad day at the office. But even then, the autopilot is often doing a better job than a human could at maintaining the attitude of the aircraft. The pilots are not scared for their lives; they are scared for the cabin crew.

### Corn

That is an important distinction. The people most at risk are not the ones with the gold stripes on their shoulders.

### Herman

Exactly. The pilots are buckled in with five-point harnesses. They are not going anywhere. But the flight attendants are often up, moving heavy meal carts, trying to secure the cabin. If you want to know if a pilot is genuinely worried, listen to their voice on the intercom. If they tell the flight attendants to "take your seats immediately," that means they have seen something on the radar or heard a report that suggests things are about to get very real.

### Corn

It is that transition from "comfort" turbulence to "safety" turbulence.

### Herman

Right. Most turbulence is just a comfort issue. It is like driving on a gravel road. But severe C A T is a safety issue for anyone not tethered to the floor.

### Corn

You know, we touched on aviation safety way back in episode one hundred and thirty-nine when we were talking about operational technology, but the human element here is so different. If I am a nervous flyer, what is the one piece of data or the one "aha" moment that can help me stay calm when the shaking starts?

### Herman

For me, it is the "Jell-O" analogy. Imagine the airplane is a tiny toy stuck inside a giant bowl of Jell-O. If you tap the bowl, the toy jiggles. It might move up and down a few centimeters, but it is not going to "fall." It is suspended in the medium. Air at ten thousand meters is not "nothing." It is a fluid. It has mass and density. When the plane hits a bump, it is just reacting to a change in the fluid density. It is still being held up by the air. You cannot "fall" out of air any more than a fish can "fall" out of water.

### Corn

I like that. It makes the air feel more... substantial. More supportive.

### Herman

And if you need a more technical "aha," look at the stats. Despite the increase in turbulence, the number of fatal accidents caused by turbulence alone is incredibly small. Most injuries happen because someone did not have their seatbelt on. In the Singapore incident, virtually every serious injury was an unbelted passenger or crew member. If you are buckled in—even loosely—you are safe. The plane is your armor.

### Corn

It is interesting you mention the armor aspect. We talked about "Digital Vaults" in episode one hundred and sixty-eight, and while that was about data, the philosophy of "hardening" a system is the same. The airplane is a hardened system. It is probably the most over-engineered piece of equipment you will ever step foot in.

**Herman**

By a long shot. And the technology is trying to catch up to these "invisible" bumps. There is some really cool stuff happening with Lidar—Light Detection and Ranging.

**Corn**

Oh, tell me about that. Is that like the lasers they use on self-driving cars?

**Herman**

Exactly. Companies like Boeing and agencies like J A X A in Japan have been testing airborne Lidar systems. Instead of radar, which needs water droplets to work, Lidar fires a laser beam ahead of the plane. It measures how that light scatters off of tiny dust particles and air molecules. By analyzing the "Doppler shift" in that reflected light, a computer can actually map the wind speed and direction up to seventeen kilometers ahead of the aircraft.

**Corn**

So it gives the pilots a "heads up" for the invisible stuff?

**Herman**

Precisely. It could give them a sixty to ninety-second warning. That does not sound like much, but it is enough time to get the flight attendants in their seats and tell everyone to buckle up. Currently, it is a bit too heavy and expensive for every plane to have one, but as the technology shrinks, it is going to become standard.

**Corn**

That would be a game changer for the nervous fliers. Just knowing that the "invisible" is becoming "visible."

### Herman

We are also seeing much better "crowdsourced" turbulence reporting. Airlines like Emirates are now using AI-based platforms that use machine learning to map turbulence in real time. Apps like Turbli or the systems integrated into the cockpit now share real-time Eddy Dissipation Rates—that is the technical measurement of turbulence—between planes. If a plane five minutes ahead of you hits a patch of "severe," your pilot knows exactly where it is and can ask for a different altitude before you even get there.

### Corn

So, to circle back to Daniel's question for his wife... the "why" is climate change, the "how" is increased wind shear, but the "so what" is that we have better tools and stronger planes than ever before.

### Herman

Right. And I think it is worth mentioning that while we talk about these "scary" events, they are still statistically rare. We fly tens of thousands of flights every single day. The vast, vast majority of them land without a single person being jostled enough to spill their coffee.

### Corn

It is the "availability heuristic," isn't it? We remember the one video of a cabin in shambles because it is dramatic, but we forget the fifty flights we have taken that were perfectly smooth.

### Herman

Exactly. And hey, if you are enjoying these deep dives into the stuff that keeps us up at night—or in this case, keeps us buckled in—we would really appreciate it if you could leave us a review on your podcast app or on Spotify. It genuinely helps other curious minds find the show.

### Corn

It really does. We have been at this for three hundred and twenty-five episodes now, and the community feedback is what keeps us going. We love hearing from you guys.

**Herman**

Absolutely. We are actually planning to do a follow-up on what pilots do during those long cruise hours—the "mystery of the cockpit"—in a future episode, so stay tuned for that.

**Corn**

I am looking forward to that one. I have always wondered if they are just playing Sudoku up there.

**Herman**

Some of them probably are, Corn. Some of them probably are.

**Corn**

Well, Herman, I think we have given Daniel plenty to take back to his wife. The skies might be a little more active, but the "armor" we are flying in is more than up to the task.

**Herman**

Just keep that belt fastened, even when the sign is off. It is the simplest, most effective piece of safety tech ever invented.

**Corn**

Wise words from Herman Poppleberry. Thanks for joining us today on My Weird Prompts.

**Herman**

You can find us at my weird prompts dot com for the full archive and the contact form if you want to send us a prompt like Daniel did.

**Corn**

And we are on Spotify and all the major platforms. Until next time, keep asking those weird questions.

**Herman**

And keep your seatbelts low and tight. See ya!

**Corn**

Bye everyone!