

HUMAN FACTORS

Why Good Pilots Make Bad Decisions

Culture • Decision Making • Risk • Accountability

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Human Factors is not about bad pilots.

It is about understanding why capable people sometimes make decisions that, with hindsight, appear completely wrong.

A competent pilot can make a poor decision without becoming a poor pilot. That distinction is important if we want people to report, discuss and learn from mistakes.

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What Shapes Human Performance?

Workload • fatigue • stress • expectation

Experience • distraction • communication

Commercial and operational pressure

Culture • status • leadership • accountability

Human error is often the end of the chain, not the beginning of the investigation.

In East African operations, the same pilot may deal with weather, remote strips, weak communications, passengers, fuel, security considerations and schedule pressure during one sector.

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PART I THE HUMAN MIND

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Hindsight Bias

After an accident, the correct decision can appear obvious.

The crew did not have the accident report.

They had incomplete information, workload, weather, fuel, passengers, ATC and time pressure.

Better question: Why did the decision appear reasonable at the time?

After an accident we know the weather, track, fuel state and outcome. The crew knew only what was available to them at that moment. Ask what made the decision look reasonable then.

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Situational Awareness

PERCEIVE — What is happening?

UNDERSTAND — What does it mean?

PREDICT — What is likely to happen next?

The third step is often where the safety margin begins to disappear.

Example: northbound from Nairobi towards Nanyuki or Samburu. Cloud starts sitting on the high ground. Seeing the cloud is perception; recognising the escape options are shrinking is projection.

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Plan Continuation Bias

Departure in acceptable conditions.

Weather deteriorates.

Most of the flight is already completed.

Turning back now feels increasingly expensive.

The question quietly changes from “Is it safe?” to “Can I make it work?”

Example: Wilson–Mara. You are already west of Narok, the lodge vehicle is waiting and another aircraft landed 20 minutes ago. Would you accept the same weather if you were still standing in the briefing room?

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Confirmation Bias

We naturally notice information supporting the decision we already want to make.

Cloud ahead: “Probably local.”

Another aircraft got through: “Good, it is possible.”

Another aircraft turns back: “He is probably more conservative.”

Same information. Different interpretation.

A Juba crew hears one aircraft report acceptable conditions and another divert. Which report carries more weight if the crew already wants to continue?

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Workload, Stress and Tunnel Vision

Low workload can reduce vigilance.

Moderate workload generally supports good performance.

Excessive workload produces task shedding and tunnel vision.

The brain does not stop working. It starts deciding what information to ignore.

In Somalia or South Sudan, combine unfamiliar routing, radio calls, weather, fuel monitoring and an operational change. Nothing is individually overwhelming, but together they can consume the crew.

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Fatigue

Acute fatigue: one demanding duty period.

Cumulative fatigue: repeated demanding days with incomplete recovery.

Effects include slower reactions, poorer judgement, memory lapses and reduced attention.

The dangerous part: cumulative fatigue can begin to feel normal.

A Nairobi–Juba–Nairobi duty may be legal. Add an early report the next morning and several demanding days before it. Legal duty limits and good human performance are not always the same thing.

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Startle and Surprise

Startle is the immediate physiological reaction.

Surprise is cognitive: "This is not what I expected."

Training reduces the time between surprise and effective action.

First priority: fly the aircraft.

Unexpected weather, a runway incursion, a TAWS warning or a sudden ATC change can briefly take a pilot from managing the flight to simply trying to understand what has happened.

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Automation and the Magenta Line

Modern avionics provide extraordinary capability.

They can also create mode confusion, heads-down time and over-reliance.

GPS can provide precise position without providing judgement.

GPS tells you where you are. It does not necessarily tell you whether you should be there.

A precise GPS track can create confidence while the aeroplane is still in the wrong place vertically, meteorologically or operationally. Accuracy is not the same as safety.

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PART II

CULTURE, EGO AND RISK

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Culture Determines Which Risks Feel Normal

“Everyone flies through there.”

“I have done it a hundred times.”

“The other guys got in.”

“A good bush pilot can handle it.”

None of these appears in an Operations Manual, yet each can influence behaviour.

Every flying community has unwritten rules. The danger begins when 'this is how we do it here' becomes more influential than the SOP or the actual conditions.

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The Superhero Pilot

Talent + confidence + limited exposure to rare consequences can become a dangerous combination.

Success creates recognition.

Recognition reinforces confidence.

Confidence can increase risk acceptance.

Previous success proves only that the accident did not happen last time.

A young pilot who repeatedly succeeds at difficult strips or marginal weather may quickly gain a reputation. The social reward can arrive long before the experience needed to recognise the limits.

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The Risk Escalation Loop

Talent → Early success → Recognition

Recognition → Confidence → Greater risk acceptance

Greater risk → More success → Status → Normalisation

Eventually the margin can run out.

The trap is that the loop usually feels positive. More difficult flights completed, more confidence, more trust from passengers and colleagues. The risk increase can remain almost invisible.

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Macho Behaviour

Classic hazardous attitude: "I can do it."

Landing when others divert.

Continuing through weather others avoid.

Demonstrating how short, low or difficult an operation can be.

The hidden reward can be status, admiration and identity.

The pilot who gets into a strip after everyone else diverts may receive admiration rather than criticism. That reward matters. Human behaviour follows what the group celebrates.

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Confidence versus Arrogance

CONFIDENCE: "I can manage this aircraft."

ARROGANCE: "The rules and warnings that apply to others do not really apply to me."

Arrogance suppresses contradictory information from crew, engineers, dispatch and ATC.

Confidence is essential. Arrogance is an information filter.

Confidence accepts new information. Arrogance explains it away. A weather warning, engineer's concern or junior pilot's challenge is useful only if the senior pilot is still willing to hear it.

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THE TERRAIN DOESN'T CARE ABOUT YOUR LOGBOOK.

Experience is one of aviation's strongest protections, but it does not make anyone invulnerable.

Thousands of hours improve judgement, but terrain, weather and performance remain indifferent to rank, reputation and experience.

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The Familiarity Trap

Repeated exposure builds valuable experience.

It also creates expectation and shortcuts.

A route flown safely 100 times can feel intrinsically safe.

The 101st flight still has to be judged on today's weather, terrain, aircraft and crew.

A route to the Mara, Samburu or a familiar South Sudan strip can become mentally 'easy' because it has been flown so often. Today's conditions still deserve today's decision.

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Status and Identity

Flying communities create reputations: the bush pilot, the weather pilot, the person who can get in anywhere.

Reputation can become identity.

Turning back may then feel like more than an operational decision.

Professionalism must carry more status than heroics.

If your reputation is 'the pilot who always gets in', a diversion can feel like a threat to identity. That is exactly why companies should attach status to conservative decisions.

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Social Media and Performance

Dramatic approaches, low flying and extreme operations attract attention.

Routine professional decisions rarely do.

This can distort incentives, particularly where status matters.

Are we demonstrating good aviation, or performing aviation?

A routine diversion rarely makes an exciting video. A dramatic low approach might. We should be careful that attention and professional respect do not become confused.

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Normalisation of Deviance

First time: "I am not comfortable with this."

Fifth time: "We have done this before."

Twentieth time: "This is how we operate."

A successful outcome does not necessarily mean it was a good decision.

East African example: Dash 8 aircraft approaching from the north-west in IMC while reporting VMC conditions. This can become a wider Human Factors issue: expectation, operational pressure and normalisation may influence the crew's decisions and the assumptions made by other traffic and ATC.

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PART III FATALISM AND ACCOUNTABILITY

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Fatalism

After a tragedy, beliefs about fate or God's will may provide genuine comfort and meaning. Those personal beliefs deserve respect.

The safety concern arises if fatalism reduces perceived agency before an event, or discourages learning afterwards.

We cannot control every outcome. We can influence the probability of the outcome.

Expressions such as 'it was God's will' can be deeply meaningful after a loss. The safety question is different: before the flight, did our decisions increase or reduce exposure to the hazard?

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"IT WAS GOD'S WILL."

A personal belief about loss does not require us to conclude that an accident was unpreventable.

Respect belief, but do not allow grief to close the investigation. Faith and prevention do not have to be in conflict.

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DOES THAT MEAN IT WAS UNPREVENTABLE?

No investigation can change the past. Its purpose is to change the future.

The purpose of investigation is not to challenge belief. It is to identify which barriers could make the next flight safer.

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Closed Organisational Cultures

Strong internal loyalty is not inherently unsafe.

Risk emerges when recruitment and social networks create a culture that is difficult to challenge.

Junior staff may hesitate to question senior figures.

Contrary information may be treated as disloyalty rather than safety input.

The issue is not ethnicity. The issue is whether the culture permits challenge and learning.

This can occur in any close-knit organisation: family, school, community, nationality or long-standing social network. The safety test is whether an outsider or junior member can challenge the accepted view.

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Authority Gradient

Too steep: junior crew remain silent.

Too flat: command responsibility becomes unclear.

Effective CRM requires clear command plus permission to challenge.

A First Officer who sees the threat but cannot say it is not an effective safety barrier.

Imagine a young First Officer into Juba or Mogadishu who is uncomfortable with weather or fuel. The Captain says, 'I've done this for years.' Does the First Officer still speak?

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When Accountability Fails

A credible safety system needs investigation, oversight and meaningful corrective action.

If enforcement or judicial processes are perceived as ineffective, inconsistent or subject to influence, an external safety barrier is weakened.

Repeated unsafe behaviour without consequence can become institutionally normal.

Accountability is not the same as blame.

Human Factors are also represented in the regulatory accountability: there can be reluctance to take immediate disciplinary or protective action after a serious occurrence on the basis that the final accident report must first be completed. Conclusions about causation should properly await the investigation, but that should not prevent proportionate interim safety action where an apparent and continuing risk exists. Certain occurrences may require immediate regulatory intervention while the investigation continues. Where action is inconsistent or delayed, questions of personal bias, political influence, institutional pressure or corruption may arise, whether real or perceived. That perception itself can weaken confidence in the safety system.

Waiting for an accident report and managing an immediate safety risk are not the same thing.

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Collective Normalisation

One pilot routinely taking a shortcut: individual behaviour.

An operator routinely taking the shortcut: organisational culture.

An industry accepting it: systemic culture.

When nobody challenges the deviation, the unwritten rule can replace the written one.

One shortcut is behaviour. A company-wide shortcut is culture. When an industry quietly accepts the same shortcut, the written rule can become almost irrelevant.

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What Happens After Something Goes Wrong?

Strong safety culture: INVESTIGATE → LEARN → CHANGE

Weak safety culture: DEFEND → EXPLAIN → FORGET

A safety culture is measured most clearly after something goes wrong.

Watch the first management reaction after an incident. Is the priority to understand what happened, or to protect reputation? That reaction tells staff what to report next time.

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Just Culture

Honest error → learn and improve.

Poor judgement → coach, train and review.

Reckless behaviour → accountability.

Management and organisational failures must be examined as seriously as pilot actions.

No-blame culture and blame culture are both inadequate. The goal is Just Culture.

A pilot who honestly reports an error should not be treated like someone who knowingly takes reckless risk. Equally, 'Just Culture' cannot mean that nothing ever has consequences.

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PART IV FROM ERROR TO ACCIDENT

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The Swiss Cheese Model

Weather planning
 Terrain awareness
 Procedures and SOPs
 Pilot decision making
 ATC / organisational / regulatory barriers

The accident occurs when weaknesses in several independent defences align.

A CFIT accident may end with a pilot's decision, but behind it can sit weather information, procedures, company expectations, training, supervision and infrastructure.

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Threat and Error Management

THREAT — weather, terrain, traffic, short runway.

ERROR — wrong altitude, wrong frequency, programming error.

UNDESIRE AIRCRAFT STATE — low, fast, off-track, unstable.

Catch the chain before the undesired state becomes an accident.

Kenya gives us excellent TEM examples: terrain, weather, wildlife, short strips and traffic are threats. The crew's job is to prevent inevitable errors from becoming an unsafe aircraft state.

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HOW WOULD YOU DECIDE?

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Scenario 1 — Weather En Route

VFR charter from Wilson to the Mara.

Weather is acceptable at departure.

Halfway there, cloud lowers and visibility deteriorates.

Another operator reports getting through ten minutes earlier.

Continue, divert, hold or return? At what point do you make the decision?

What would YOU do? Passengers have an international connection, fuel is comfortable, and another Caravan reports marginal conditions ahead.

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Scenario 2 — The Unstable Approach

Aircraft is high and fast.

Runway is visual.

Passengers have an onward connection.

Another aircraft has just landed.

Continue or go around? Which factor is actually driving the decision?

Add one factor at a time: wet strip, tailwind, passengers watching, another operator has just landed. Ask which fact is operationally relevant and which is merely psychological pressure.

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Scenario 3 — Maintenance Pressure

Engineer identifies a defect that is borderline but concerning.

Aircraft is required for a major charter tomorrow.

Replacement part is not available locally.

Management asks: "Can we safely get one more day out of it?"

Where does technical judgement end and organisational pressure begin?

Lets ask engineers, pilots, dispatch and the Ops Manager separately.

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AT WHAT POINT WOULD YOU HAVE STOPPED?

The difficult skill is recognising that moment before the outcome tells you the answer.

The important decision is usually made before the final dramatic moment. Human Factors is about recognising the earlier point where options were still plentiful.

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PART VI BUILD THE BARRIERS

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Practical Defences

SOPs and checklists

Stable approach and go-around criteria

Weather and terrain minima

CRM and independent cross-checks

Fatigue management and reporting

TAWS, RNAV and published procedures

Design the system on the assumption that good people will occasionally make mistakes.

The best defence is rarely 'be more careful'. Good systems make the safe action obvious, easy to execute and culturally acceptable.

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Management Creates Human Factors Conditions

Pilot diverts. What happens next?

“Good decision.” reinforces conservative judgement.

“Why couldn't you get in?” creates a very different future behaviour.

Safety culture is not what the manual says. It is what the organisation rewards.

If a pilot returns to Wilson because the Mara weather is poor, the Chief Pilot's first sentence matters. 'Good call' and 'Why didn't you get in?' train completely different future behaviour.

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What Should We Reward?

Diverting early.

Going around.

Speaking up.

Reporting mistakes.

Admitting uncertainty.

Make the safest pilot the person younger pilots want to emulate, not the one with the best war stories.

Praise the pilot who diverts early, the engineer who stops the aircraft and the First Officer who challenges respectfully. Those are visible demonstrations of professionalism.

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GOOD PILOTS MAKE MISTAKES.

A mature safety system begins by accepting that fact.

The uncomfortable truth is also the useful one: competence does not remove human fallibility.

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GOOD ORGANISATIONS EXPECT THEM TO.

The purpose of barriers is to stop one mistake becoming an accident.

A mature organisation assumes errors will occur and builds enough independent barriers that one error does not become a fatal event.

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BUILD THE BARRIERS.

Human Factors is not about removing the human from aviation.

It is about designing aviation around the reality that we are human.

The aim is not perfect pilots. It is an aviation system robust enough to tolerate ordinary human imperfection.

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Aircraft–Human Interface

Modern avionics give the pilot more information than ever before.

But accessing that information increasingly demands visual attention and conscious processing.

Traditional controls often provide position, shape, movement and tactile feedback.

The Human Factors question is not whether modern avionics are better. It is what new workload they create.

This is not an argument against glass cockpits. Modern avionics have transformed safety. The question is whether the interface supports the human in the environment in which the aeroplane is actually flown.

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Hard Controls and Muscle Memory

A throttle lever, trim wheel, switch or autopilot knob has a fixed position and a physical response.

With familiarity, many actions can be completed by feel while the pilot continues looking outside.

REACH → FEEL → MOVE

Physical controls can turn repeated actions into procedural and muscle memory.

A Caravan pilot can reach for power, trim or an autopilot knob with very little visual attention. Fixed position and physical movement create a strong spatial memory.

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The Touchscreen Sequence

A touchscreen may require the pilot to LOOK → IDENTIFY → READ → INTERPRET → SELECT → CONFIRM.

The same piece of glass can perform many unrelated functions depending on the page or mode selected.

That transfers workload from tactile and spatial memory towards visual attention and cognition.

The interface may be technologically simpler while becoming cognitively more demanding.

Touchscreens can turn a simple action into a visual task. The pilot must find the correct page, identify the field, touch accurately and then confirm that the system accepted the input.

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Where Are Your Eyes?

Change a frequency. Select a waypoint. Alter the flight plan. Change a transponder code. Modify an autopilot mode.

Each task may require several seconds of heads-down attention.

In VFR operations, those seconds are taken directly from lookout, traffic avoidance and terrain awareness.

Who is flying outside the aeroplane while the pilot is managing the screen?

At 120 knots, 15 seconds heads-down is roughly half a nautical mile travelled. In a busy VFR environment, that is a meaningful amount of aeroplane movement without an outside scan.

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FEEL versus SEE

PHYSICAL CONTROL: location, direction and movement can often be recognised without looking.

TOUCHSCREEN: page, function, selection and system response normally require visual confirmation.

Neither is inherently safe or unsafe.

The important issue is how much scarce visual and cognitive capacity the task consumes.

A physical control tells the hand something. A touchscreen generally tells the eyes something. Both can work extremely well, but they draw on different human resources.

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Now Add Turbulence

A physical knob gives the hand something to locate and grip.

A touchscreen requires accurate finger placement on a moving surface in a moving aeroplane.

Add turbulence, ATC, traffic, weather and an unfamiliar procedure.

A small interface task can suddenly become a significant workload event.

Try entering a waypoint or changing a touchscreen field in convective bumps over northern Kenya. The interface task has not changed, but the human difficulty has.

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Automation Has Changed the Pilot's Job

Older cockpit: the pilot directly operates the aeroplane.

Modern cockpit: the pilot increasingly manages systems that operate the aeroplane.

What have I selected? What mode is active? What will it do next?

Mode awareness has become a core flying skill.

The question is increasingly not 'can I fly the aeroplane?' but 'do I understand what the automation is doing now, and what it will do next?'

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More Information. Less Attention?

Terrain • traffic • weather • synthetic vision • engine data • navigation • performance.

All are valuable safety improvements.

But almost all compete for one limited human resource: the pilot's eyes.

Information availability and attention demand must be considered together.

Synthetic vision, traffic, weather and terrain are enormous safety improvements. But the pilot still has only one pair of eyes and a finite amount of attention.

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Design for the Human

Eyes outside when they need to be outside.

Physical feedback where physical feedback matters.

Automation that reduces workload rather than merely relocating it.

Have we designed the pilot around the avionics, or the avionics around the pilot?

The best interface lets the pilot obtain the information and control needed with the least unnecessary attention. Technology should release capacity, not simply move workload onto a screen.

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MANY THANKS

Many thanks for allowing me to elaborate my view on Human Factors in our East African aviation environment for pilots, crew and operations.

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"THE MOST SO SERIOUS"
EAST AFRICAN AVIATOR!

KRYPTONITE & COPPER WINGS

HOW SUPERMAN CAPTAINS SNEAK INTO SOUP WITHOUT FILING IFR.

1 THE COPPER WINGS ARRIVES... PRETENDING IT'S VFR.

2 NAIROBI TOWER HAS QUESTIONS. COPPER WINGS HAS ANSWERS.

3 TCAS DOESN'T CARE ABOUT YOUR SUPERPOWERS.

4 KRYPTONITE LEVEL CRITICAL.

5 MEANWHILE... THE LITTLE GUY PLAYS BY THE BOOK.

SPOT THE SUPERCUB!

CAPTAIN'S MOTTO:
I DON'T NEED IFR...
I HAVE KRYPTONITE!
(AND DENIAL.)

MEERKAT'S SAFETY TIP

COPPER WINGS CHECKLIST

WIN FUCK ALL™

BECAUSE... SNEAKING INTO WEATHER IS TEMPORARY. EXPLAINING IT TO INSURANCE IS FOREVER.

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