The National FAA Safety Team Presents

Topic of the Month – November 2023

Normalization of Deviance

Federal Aviation Administration

Presented to:	Safety Minded Aviators, Everywhere…
By:	Stephen Bateman, CFI, AOPA Flying Clubs
Date:	Tuesday 21st November 2023

Produced by:
The National FAA Safety Team (FAASTeam)

Welcome

- **Steve Bateman, CFI, AOPA Flying Clubs, FAASTeam Lead Rep Portland FSDO, *WINGS*Pro**
- **Your monthly 33-minute dose of aviation safety**
- ***WINGS* Credit: Yes…!**

- **Probably no time for questions, but please send me email:**

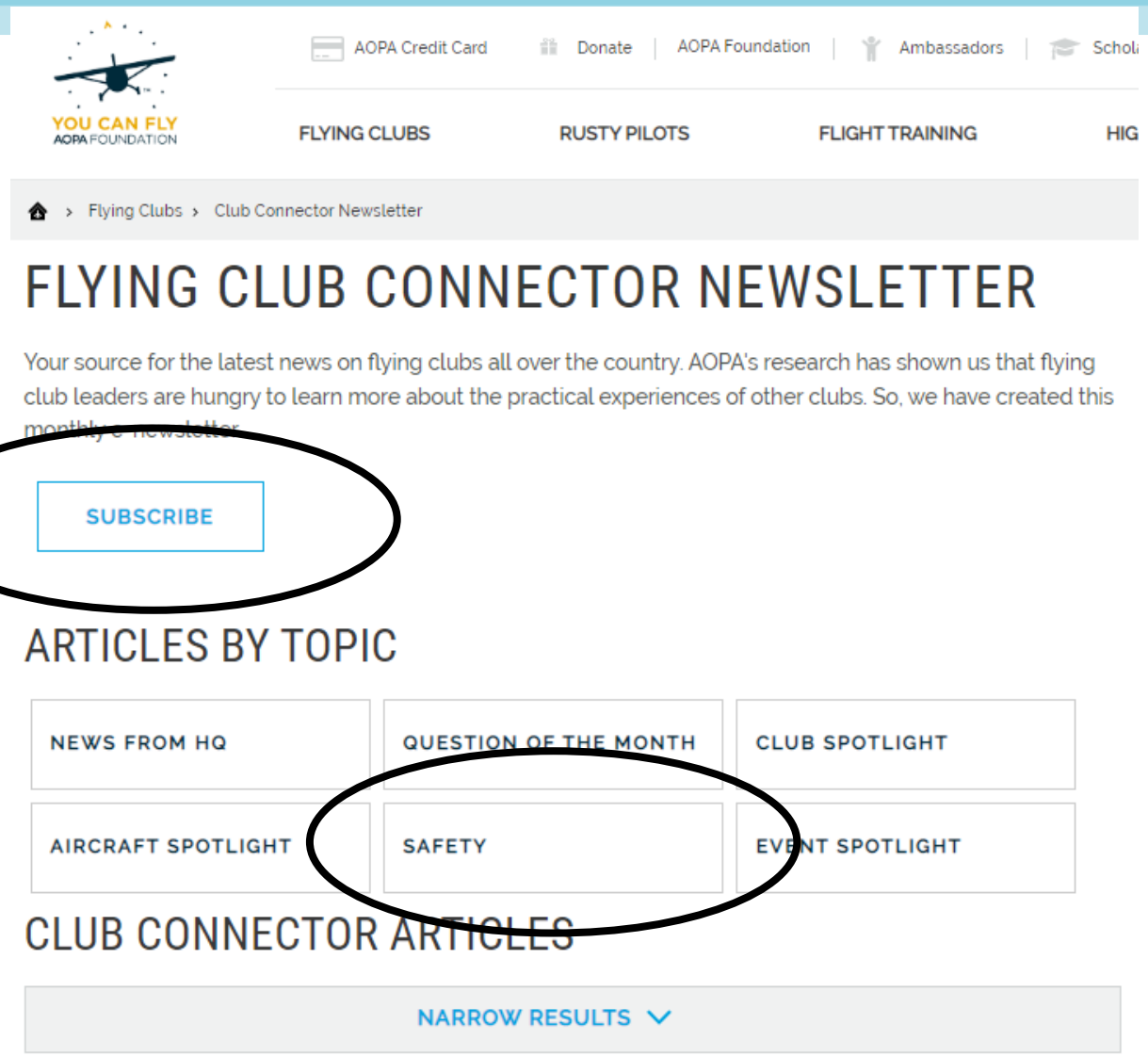
steve.bateman@aopa.org

Tel: 301 695 2356

So…

- **No recording…but even better…**
  - https://youcanfly.aopa.org/flying-clubs/flying-club-newsletter

- **You can download the presentation!**
  - This and earlier ToM presentations are available…
  - Sign-up now!
  - November edition 11/19/2023



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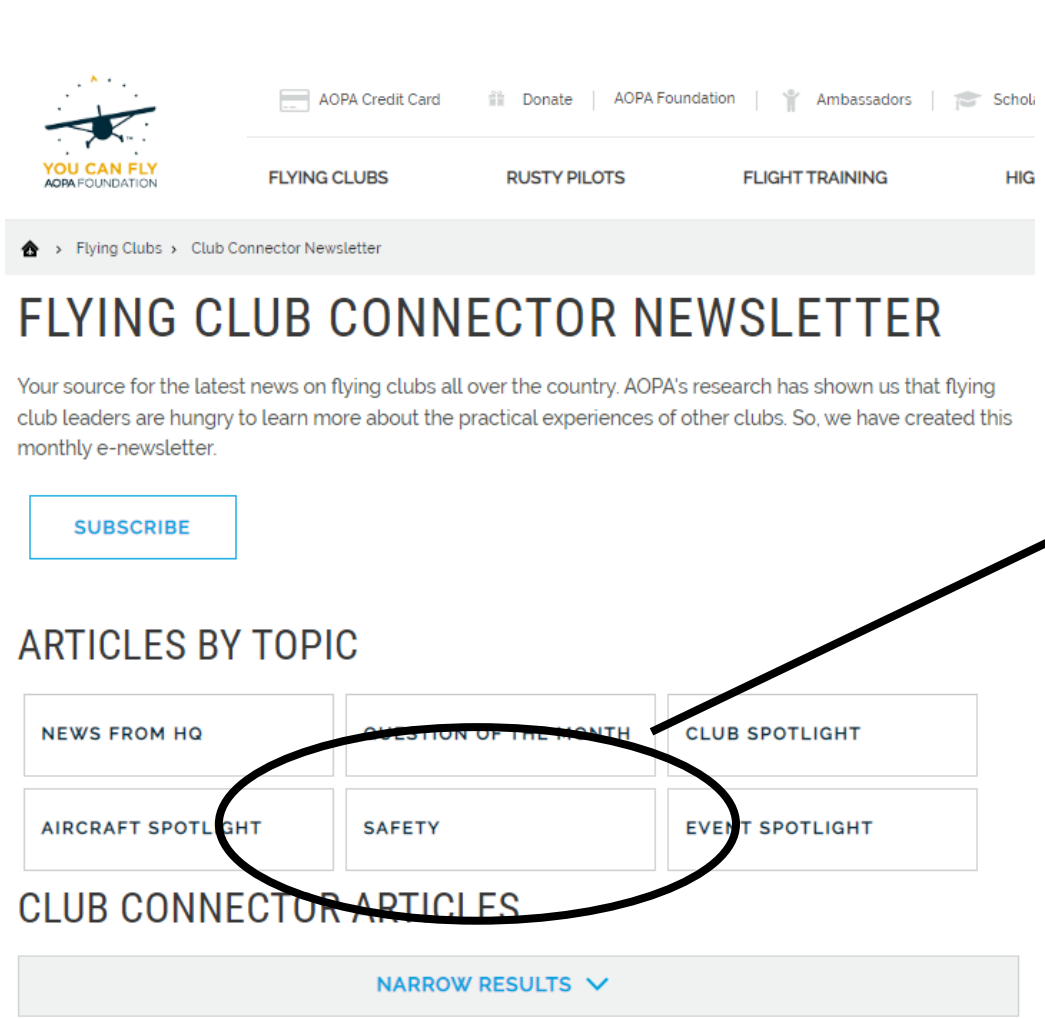
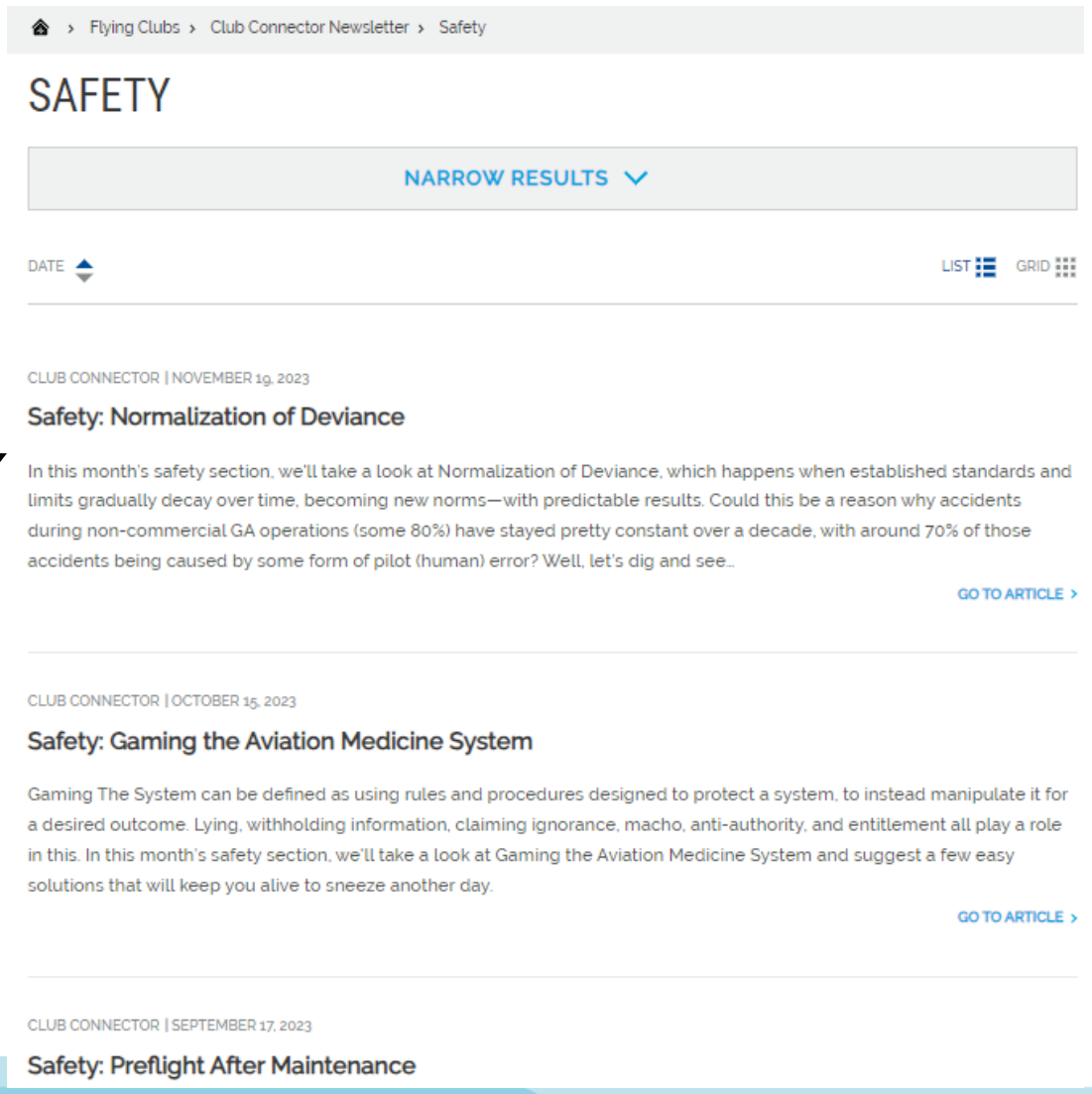




Overview

- **The Situation In No Uncertain Terms**
  - Doing the same things and expecting different results is…
- **A Multitude of Biases and Human Traits**
- **Normalization of Deviance**
- **Changing the Game With Human Factors**
- ~~**Maintaining**~~ **Improving Proficiency**

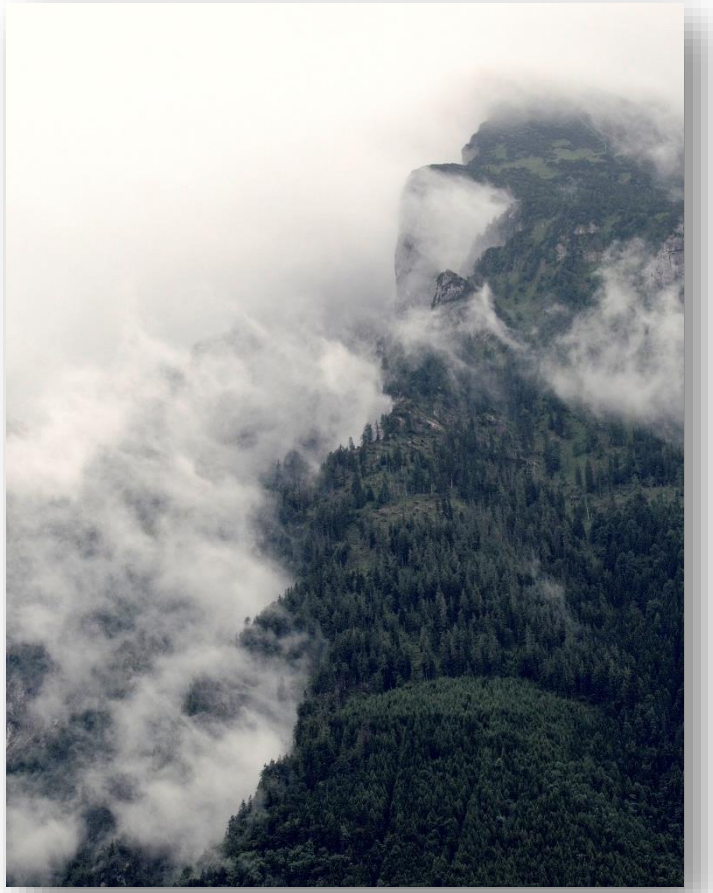
GAJSC, CFIT and Biases

- **The General Aviation Joint Safety Committee (GAJSC) Controlled Flight Into Terrain (CFIT) working group suggests that human biases—particularly Plan Continuation Bias—are significant factors in CFIT accidents.**
- **Plan Continuation Bias…nibbles away at the no-go/go decision**
  - Done it before?
  - Done it recently?
  - Worked out previously
  - Establishes a new normal
- **Normalization of Deviancy**

***GAJSC – General Aviation Joint Safety Committee**

So, what's that got to do with CFIT?

- **CFIT is the *result***
- **The *cause* is very often us…**
- **The 5-whys of root cause analysis:**



The 5-Whys:

- **An airplane crashed into a hillside…seemly under control…**
- **Why did the airplane hit the hillside?**
  - The plane crashed due to rising terrain and lowering ceilings
- **Why did the pilot not see the rising terrain and lowering ceilings**
  - Because the pilot was confused and distracted
- **Why was the pilot distracted?**
  - Because the GPS showed something different than expected
- **Why was it different?**
  - Because the pilot failed to update the flight plan when departing
- **Why did the pilot fail to update the flight plan?**
  - Because of done-it-many-times-before complacency

This is the root cause

Obviously, I would never do that!

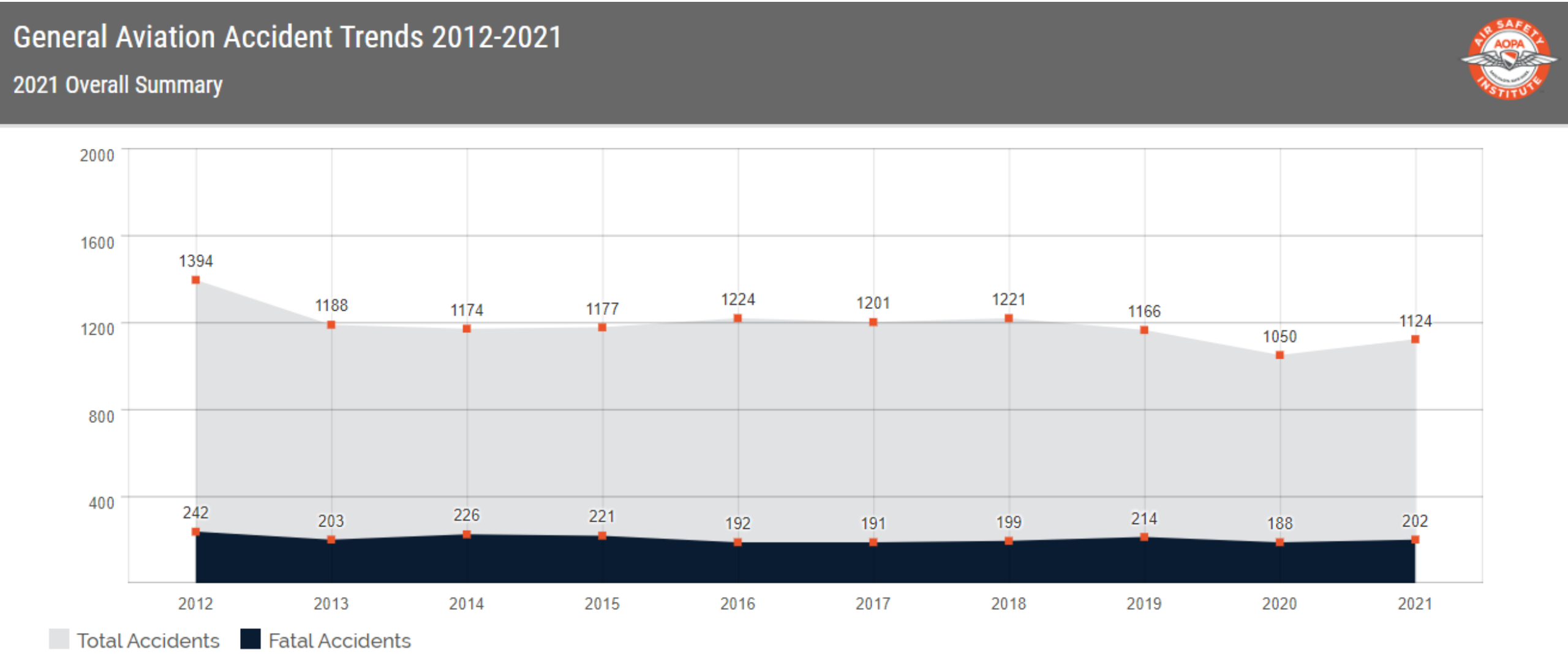
It’s not like we do this…

- **I’m going to go flying and have an accident…which one shall I choose today?**
  - Loss of Control
  - CFIT
  - *FR into IMC
  - Unstable approach
  - Jump in and go
  - Hazardous attitude(s)
  - Fuel mismanagement
  - Out of ~~currency~~ proficiency
  - Fly a new-to-me aircraft without any training
  - Incorrect response to situation
  - Brain burb in flight
  - Ignore hazardous attitudes
  - Throw ADM out of the window…

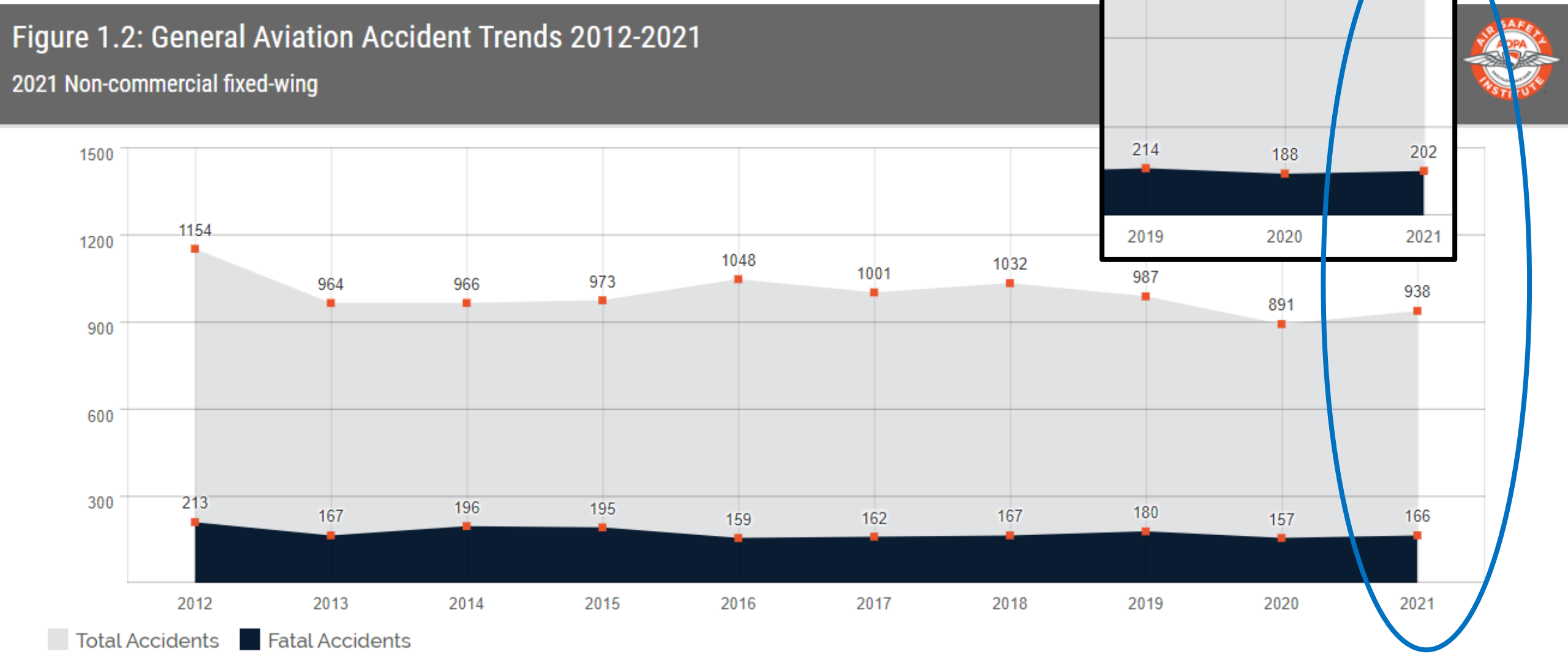
The data suggests that we do…

All GA Accident Trend

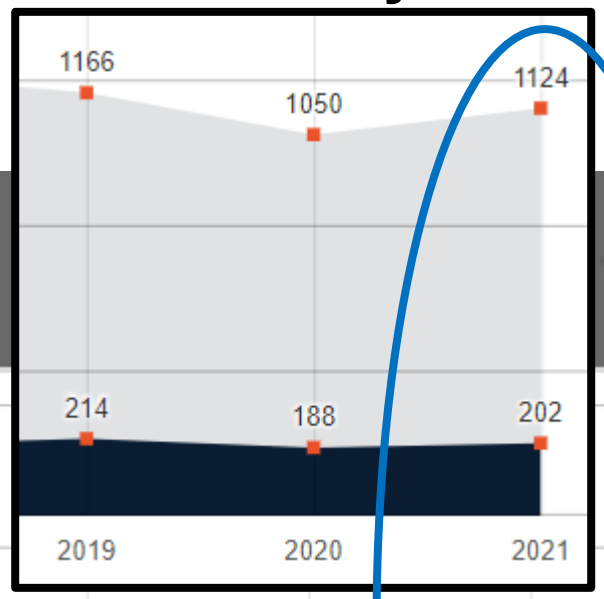
AOPA ASI Nall Report



Non-Commercial Fixed-Wing Trend:



Overlay All GA



Who and When…

Figure 1.4: General Aviation Accidents in 2019

2019 Non-commercial fixed-wing

	Accidents		Fatal Accidents	
Pilot-Related	**614**	62.1%	**88**	49.2%

Figure 1.4: General Aviation Accidents in 2020

2020 Non-commercial fixed-wing

	Accidents		Fatal Accidents	
Pilot-Related	**614**	69.1%	**79**	51.6%

Figure 1.4: General Aviation Accidents in 2021

2021 Non-commercial fixed-wing

	Accidents		Fatal Accidents	
Pilot-Related	**647**	69%	**103**	62%
Mechanical	**151**	16.1%	**12**	7.2%
Other / Unknown	**128**	13.6%	**46**	27.7%
null	**12**	1.3%	**5**	3%

Figure 1.7: Flight Conditions

2021 Non-commercial fixed-wing

	Accidents		Fatal Accidents		Fatalities	
Day VMC	**834**	88.9%	**114**	3.6%	**165**	4.5%
Night VMC	**53**	5.7%	**17**	3.6%	**26**	4.5%
Day IMC	**23**	2.5%	**18**	3.6%	**41**	4.5%
Night IMC	**13**	1.4%	**11**	3.6%	**22**	4.5%
Unknown	**15**	1.6%	**6**	3.6%	**12**	4.5%

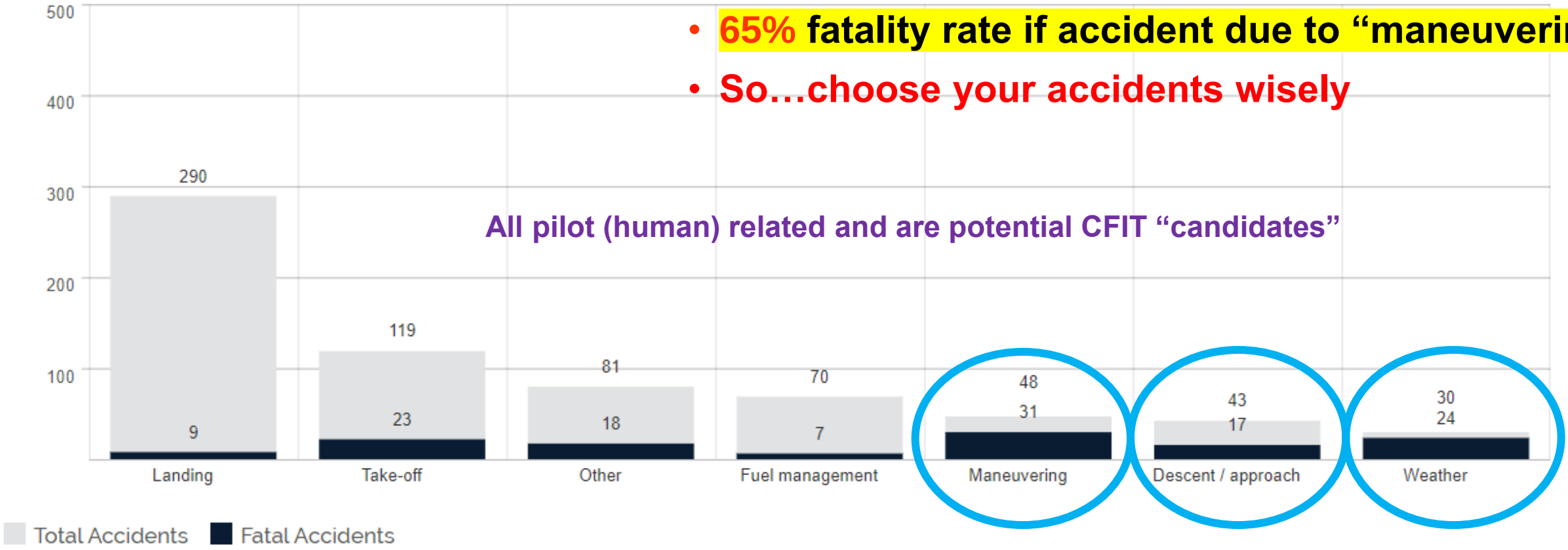
**Night fields include dusk.*

Pilot (Human) Related

- Landing dominates number of accidents, but generally survivable (not including go-around)
- 80% fatality rate if accident is weather related
- 40% fatality rate if accident on descent and approach
- 65% fatality rate if accident due to “maneuvering”
- So…choose your accidents wisely

Figure 1.11: Major types of accidents

2021 Non-commercial fixed-wing



All pilot (human) related and are potential CFIT “candidates”

Good news…bad news…

- **Good News!**
  - We are not inventing new ways to have accidents!
- **Bad News!**
  - We are still practicing the old ways!
- **Why is this? Even with all the safety education we do…**
- **Have we met a "natural limit" of accident reduction? Or is it just a threshold to overcome?**
- **Will more regulation solve the problem? At what price?**
- **Or…is there a New Frontier that we must embrace to cross a threshold?**

Human Factors
The Final Frontier

Are We Ready and Smart Enough to Accept It?

- Hobbs, A. (2004). Human Factors: The Last Frontier of Aviation Safety? *The International Journal of Aviation Psychology, 14*(4), 335–341. https://doi.org/10.1207/s15327108ijap1404_1

- The argument is that, only once we have tackled the “easy” causes of accidents, like lack of proficiency, mechanical and technical failures, will be ready to look at the most difficult factor—our human selves.
- Looks like we are there…

So...What is General Aviation

- General aviation (GA) is all flight activity except that of the military and scheduled airlines
- Commercial GA is where someone gets paid for the flight…freight, sightseeing, law-enforcement, flight school…
- Non-Commercial GA is for personal and recreational use

Non-Commercial GA accounts for:

- **84% of GA accidents**
- **82% of GA fatalities**

Why…?

Non-Commercial GA accounts for:

- **84% of GA accidents**
- **82% of GA fatalities**

- **Jump in and go?**
- **Lack of SoPs?**
- **Infrequent training?**
- **Inadequate training?**
- **Lack of sim training**
  - **Practical skills**
  - **Human factors scenarios**
    Training to handle “biases”?

Complications

- **Bias—a prejudice in favour of or against one thing…**
- **Normalization of Deviance**
  - Operational Drift
  - Erosion of compliance to standards and limits
  - Gets easier to justify, over time

- **Normalization of Biases**
  - We get used to having them through familiarity – have we become aviation bigots?

Examples of Biases in Aviation

- Confirmation bias (Confirming or supporting a plan or perception)
- Continuation bias (Plan continuation)
- Hindsight Bias ("Life can only be understood backwards but it must be lived forwards")
- Outcome bias ("Some of you may die, but it is a risk *I'm* prepared to take". Shrek.)
- Expectation bias (Expectation about an outcome dominates actions)
- Framing bias (Gains and losses)
- Ambiguity effect (Avoid options that are ambiguous)
- And…more…

https://skybrary.aero/

Countermeasures to Mitigate Cognitive Bias

- Biases are part of human behaviors and traits that we must understand before we can counter them:
  - Hazardous attitudes
  - Human factors
- The first defense against any hazard is to recognize that it exists. *Awareness of how these biases can affect decision making must be included in basic and refresher training*. Umm…
  - The word “bias” occurs only three times in the PPL ACS…to do with taxiing
  - “Human Factors” occurs once, as part of preflight
  - Lack of scenarios involving real-life ADM to illustrate human factors problems—and solutions
- One of the most effective and proven strategies to combat human error is crew resource management (CRM). (Check and balances)

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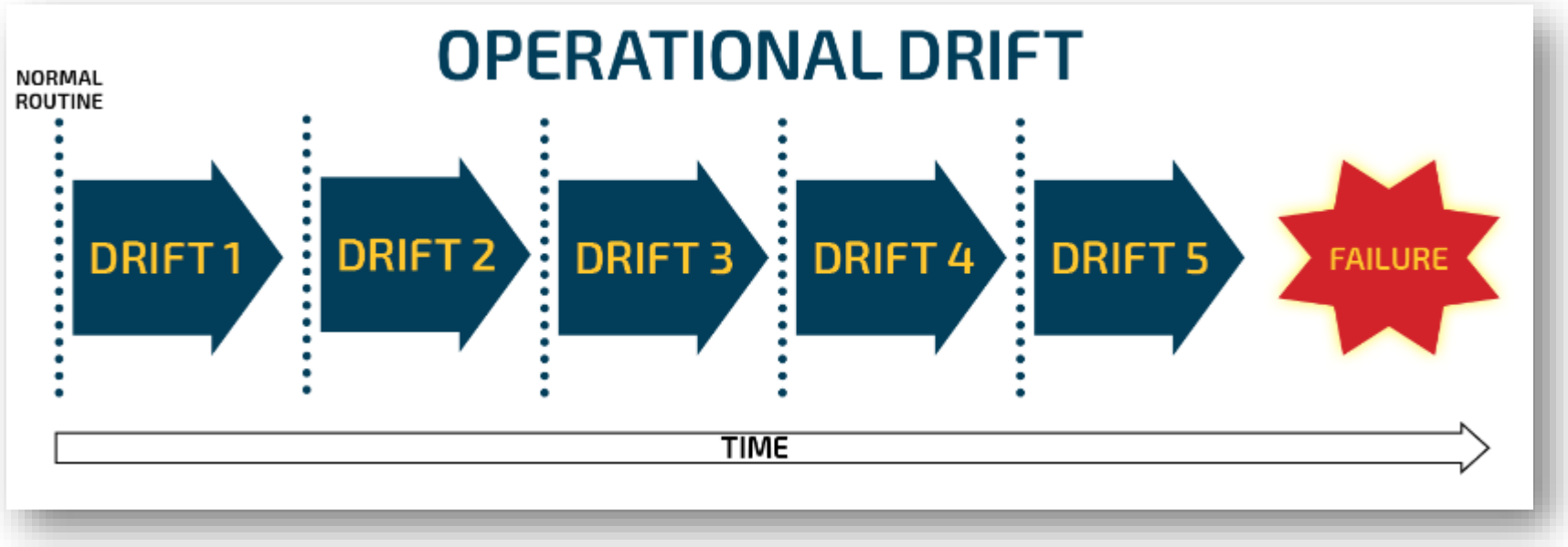
Everyday Example (Epidemic?)

- **Posted vs. Practical Speeds?**
  - Anti-authority hazardous attitude—don't tell me what to do—or…
  - Rationalization:
    - I'm not speeding—just keeping up with traffic flow
    - It's not safe to drive at the limit—I'll get wiped out…
    - Average speed on the 405 in LA is 75 MPH (65 is the posted limit). New norm.

Operational Drift

- **Acceptable process limits tend to drift over time**



Change “Obvious” Perspectives

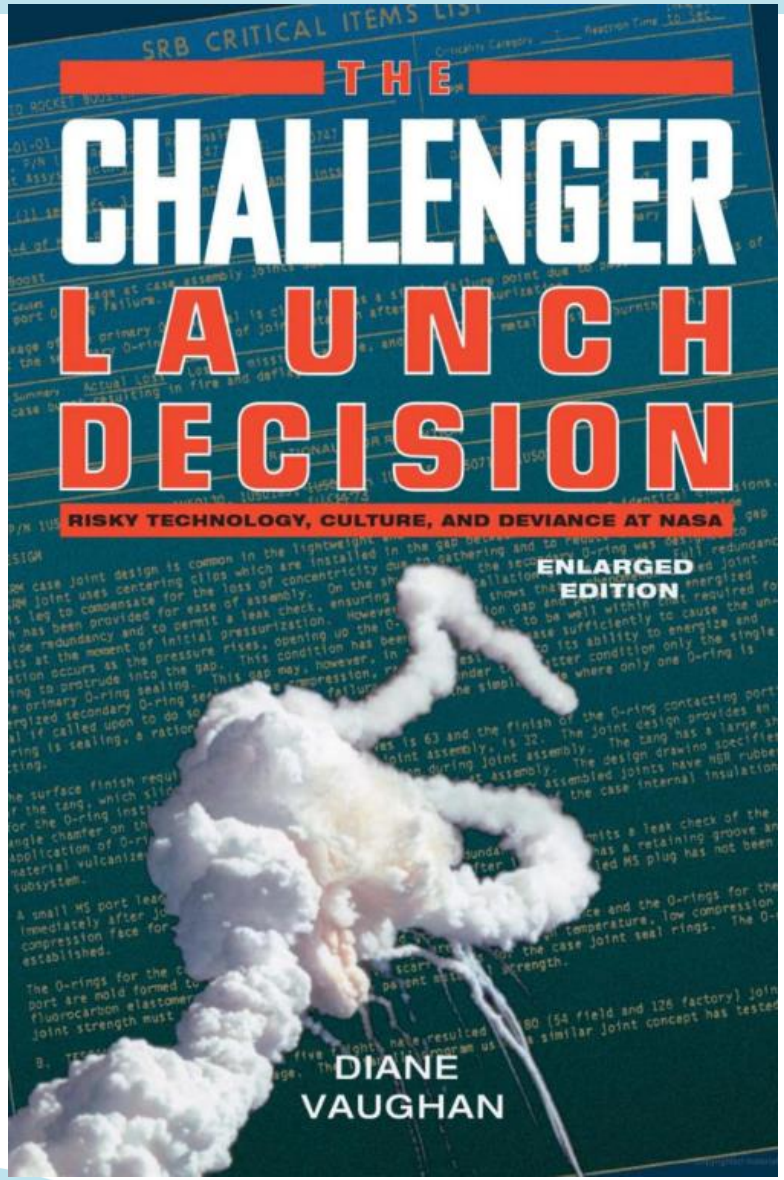
- “*The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA*”
- **Author: Diane Vaughan**

- **Changed the accepted cause from “technical issues” (O-ring) to drifts in procedures…**

  "a long incubation period [before a final disaster] with early warning signs that were either misinterpreted, ignored or missed completely.“

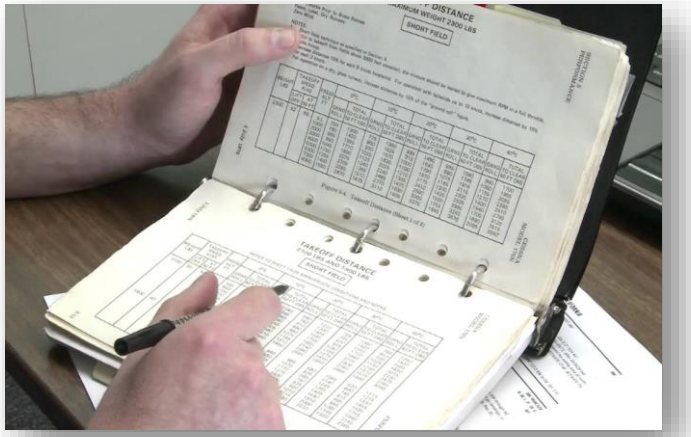
- **Normalization of Deviance**

  “The gradual process through which unacceptable practice or standards become acceptable”

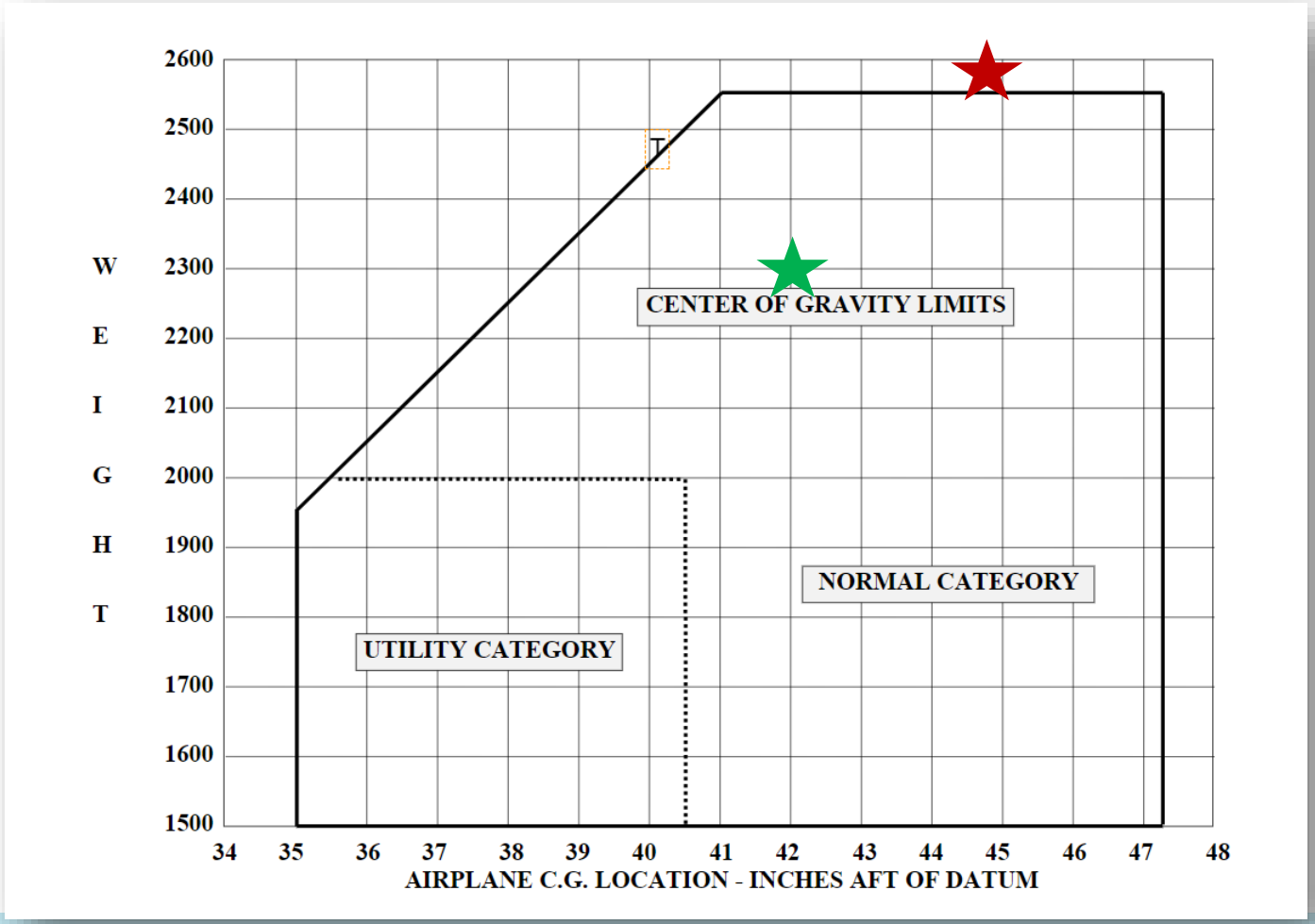


How often have you heard….

- She'll haul anything you can fit through the door
- Relax—it flew in here, it'll fly out
- We've got plenty of fuel—I've done this trip dozens of times
- No contamination in left tank…no need to check the right



Ten years of creeping operational drift

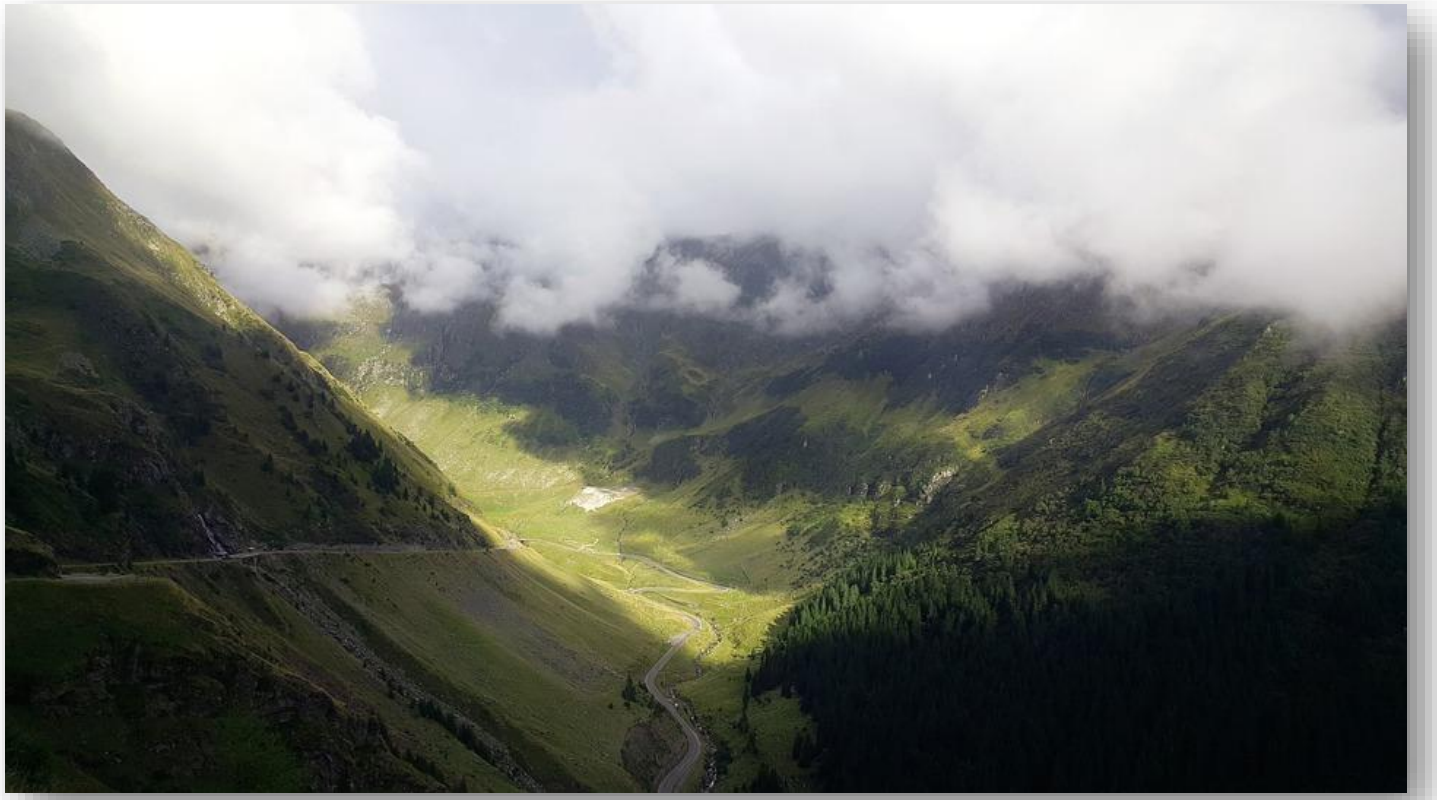


- Weight increased slowly over time
- Performance reduced slowly over time
- A new normal, at every slight change
- The deviance becomes normalized
- Sneaky, insidious, creeps-up…until…

Operational Drift and CFIT

Reduced margins of safety

CFIT—a possibility



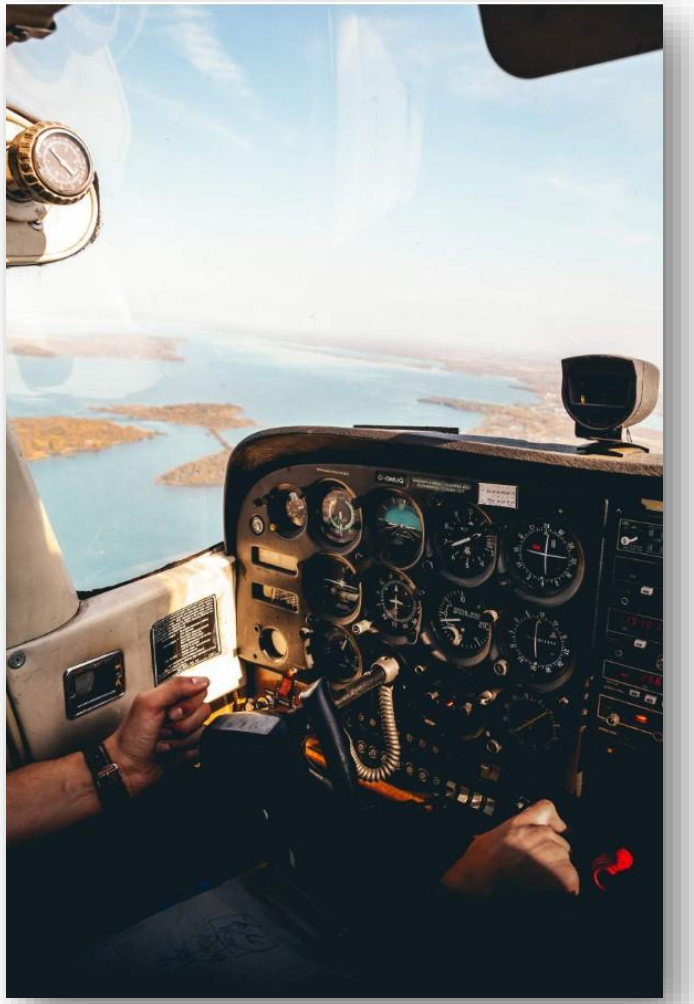
Coping with Normalization of Deviancy

Recognition

- Everyone is susceptible
- Awareness is the first step
- Admit you are human and so are fallible
- Go back to basics
- Be kind and listen to others

Document and operate within limits

- POH
- Regulations
- Personal
- Cultural expectations and norms



Fly the Way You (Should Have) Been Trained

- **If you weren't, then that is job #1…**
- **Practice Safety Risk Management**
  - Identify hazards and risks associated with your flights
  - Heady stuff – *so psychologists try to make it easy for us*…
  - *This is not psychobabble…treat it seriously*
  - PAvE, IMSAFE, DECIDE, 3Ps, 5Ps…
  - Six hazardous attitudes – IM AIRE
- **Human Factors**

Personal Minimums

Pilot

Aircraft

en**V**ironment

External pressures

Pilot (Human)

- Certification level
- Total experience
- Recent experience
- Health
- Fatigue
- Stress

} IM SAFE

Aircraft (Human Interpretation)

- Performance
- Range
- Instrumentation
- Navigation equipment
- WX avoidance equipment

enVironment (Human Interpretation)

- Topography
- Runway & approach aids
- Wind and weather
- Lighting conditions
- Weather

External Pressures (Human)

- Employers & passengers
- Schedules & deadlines
- Monetary costs

Regulations

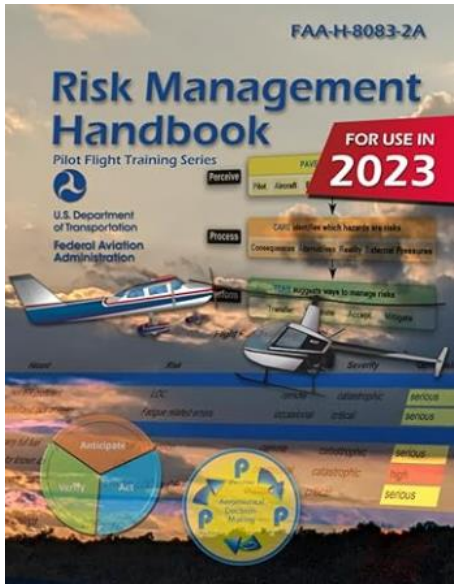
- **They exist for a reason…don't be that %@#**
- **Provide a frame of reference for all of us**
- **Well…some of us…speed limits apply to other people…**
- **Remember the 6 hazardous attitudes**
  - 7-mile extended left base for runway 29…uh...*what*?

The Six Hazardous Attitudes of Being Human
IM AIRE

	Attitude	Symptom	Antidote
I	Invulnerable	It won't happen to me	It can happen to me
M	Macho	I can do this	Taking chances is foolish
A	Anti-Authority	Don't tell me what to do	Follow the rules - they are there for a reason
I	Impulsive	Got to do something…anything…	Slow down - follow your training
R	Resignation	I'm helpless - can't change the outcome	I can make a difference
E	Entitlement	I have the right to do this	Flying is an equal privilege, get back in line

Adjust for Specific Conditions

	If you are facing	Adjust baseline personal minimums by	
Pilot	Illness, use of medication, stress, or fatigue; lack of currency (e.g., have not flown for several weeks)	Add	At least 500 feet to ceiling
Aircraft	An unfamiliar airplane or an aircraft with unfamiliar avionics or other equipment	Add	At least 1/2 mile to visibility
enVironment	Unfamiliar airports and airspace; different terrain or other unfamiliar characteristics	Add	At least 500 feet to runway length
External Pressures	"Must meet" deadlines, pressures from passengers, etc.	Subtract	At least 5 knots from winds



Adjust to more conservative levels

Develop & adjust with your CFI

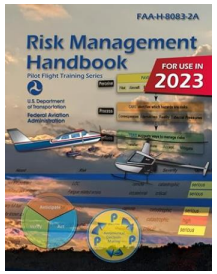
- **CFIs provide:**
  - Perspective
  - Consistency
  - Coaching
  - Experience
- **Non-judgmental (Choose your CFI wisely)**
  - Read "Death by Time Builder" for an illustration of bad behaviors
- **Regular Reassessment**
  - Required for professionals, including CFIs
  - Highly recommended for all pilots

Preflight with a FRAT

Flight Risk Assessment Tools

When implementing a Safety Management System (SMS), one of the most critical components to develop is a Flight Risk Assessment Tool (FRAT). Because every flight has some level of risk, it is critical that pilots are able to differentiate, in advance, between a low risk flight and a high risk flight, and then establish a review process and develop risk mitigation strategies. A FRAT enables proactive hazard identification, is easy to use, and can visually depict risk. It is an invaluable tool in helping pilots make better go/no-go decisions and should be a part of every flight.

- Risk Management Handbook, Chapter 3
- Mixed thoughts…only useful if you are honest
- It will NOT give you the answer
- It's the thought process that counts



Using a Flight Risk Assessment Tool (FRAT)

Identifying hazards and associating them with risks can be accomplished using a simple spreadsheet or form during flight planning. The form used to record each hazard is known as a Flight Risk Assessment Tool (FRAT).

Numerical FRATs

A numerical FRAT lists different hazards and an associated number, which indicates the significance of each hazard. The pilot selects the relevant hazards, and derives a total score. Typically, the score falls into three ranges. If the total score is below a certain minimum, the FRAT indicates low risk. If it is in an intermediate range, the pilot is advised to "exercise caution." If the score is above an upper threshold, the FRAT indicates danger. [*Figure 3-6*]

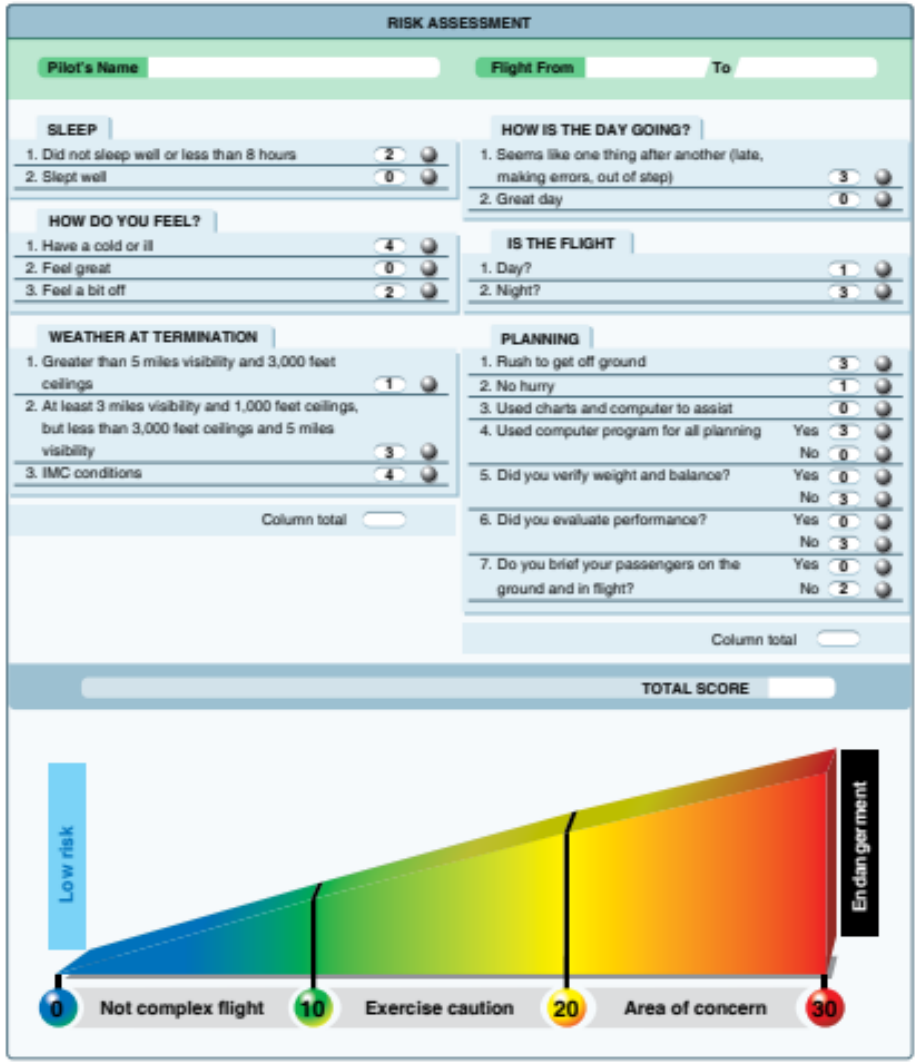
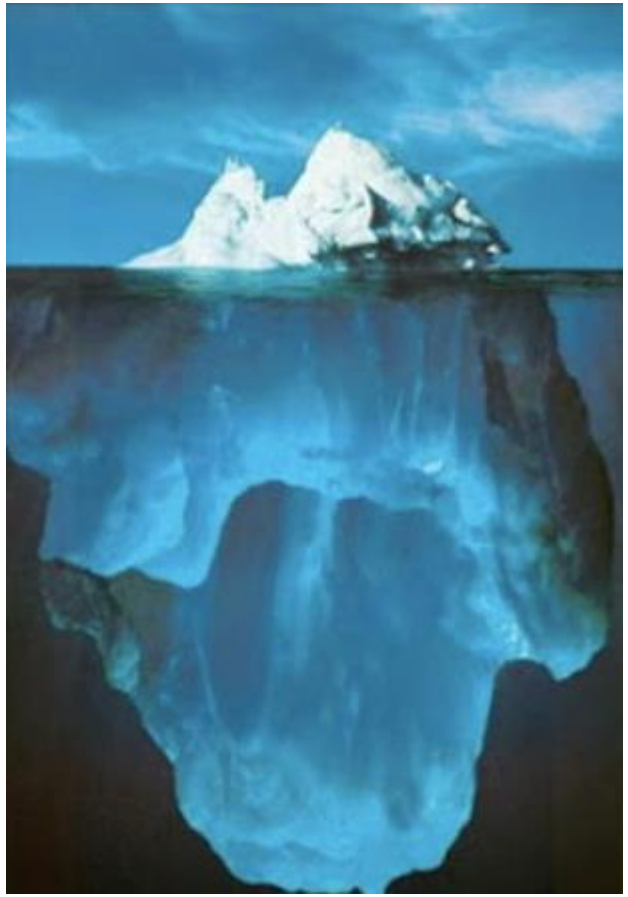


Figure 3-6. *Example of a numerical FRAT.*

Proficiency and Peace of Mind

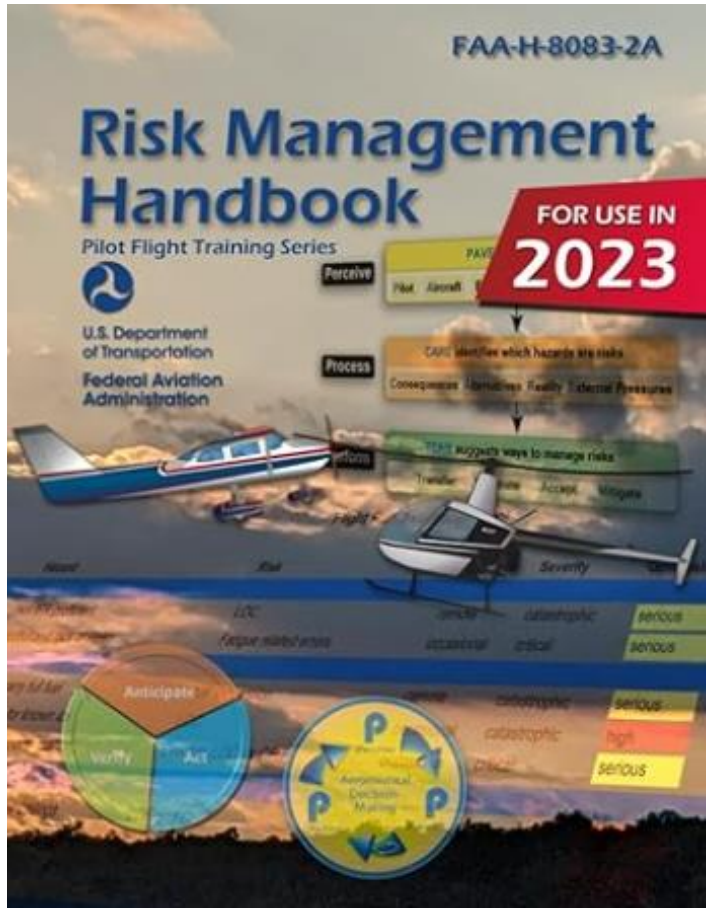
- **Fly regularly with your CFI—*WINGS* activities**
  - Do different things to become familiar
  - Do familiar things differently
- **“Revert to training”…only works if…?**
  a) You've seen it before
  b) You’ve done it recently
  c) Insist on scenario training during your fight review and/or *WINGS* flights. Dig into options, understand predispositions (biases)
- **Practice, practice…**
  - Get in your head
  - …and keep it there…for when you need it



Summary:

- **Non-commercial GA accidents and fatalities remain stubbornly flat. Another force is holding us back (ourselves).**
- **Human biases are patterns of reasoning that weigh the value of information according to pre-conceived beliefs, not facts.**
- **Normalization of Deviance is the progressive and subtle deviation from standards and limitations, so resulting in new (often unacceptance) norms.**
- **As deviations from standards and limitations progress, checks, balances and system safety factors are eroded or completely lost.**
- **Pilots must commit regularly revisiting original standards and limits to understand and counter drift.**
- **Pilot organizations such as flying clubs should also commit to this best practice.**
- **This goes beyond human error and requires the understanding of human behaviors and traits.**
- **Documentation of personal minimums and periodic objective pilot performance assessments should be made in consultation with a flight instructor. Only useful if you are honest…and we are human…**
- **Objective in-flight "how-goes-it?" assessments should be frequency made to ensure that operations are conducted within expected standards, limitations, and norms.**

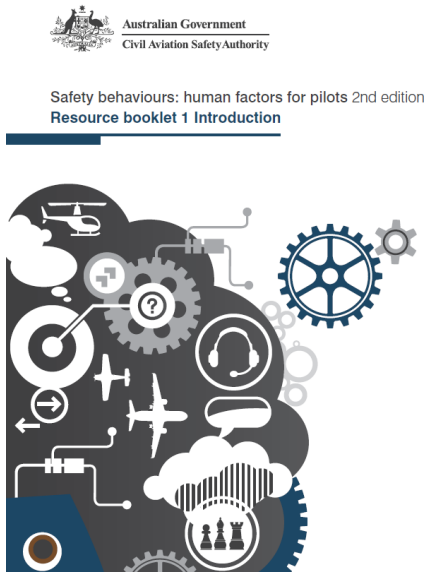
Homework-1: Read the Risk Management Handbook



Homework-2 (Overdue from previous months)

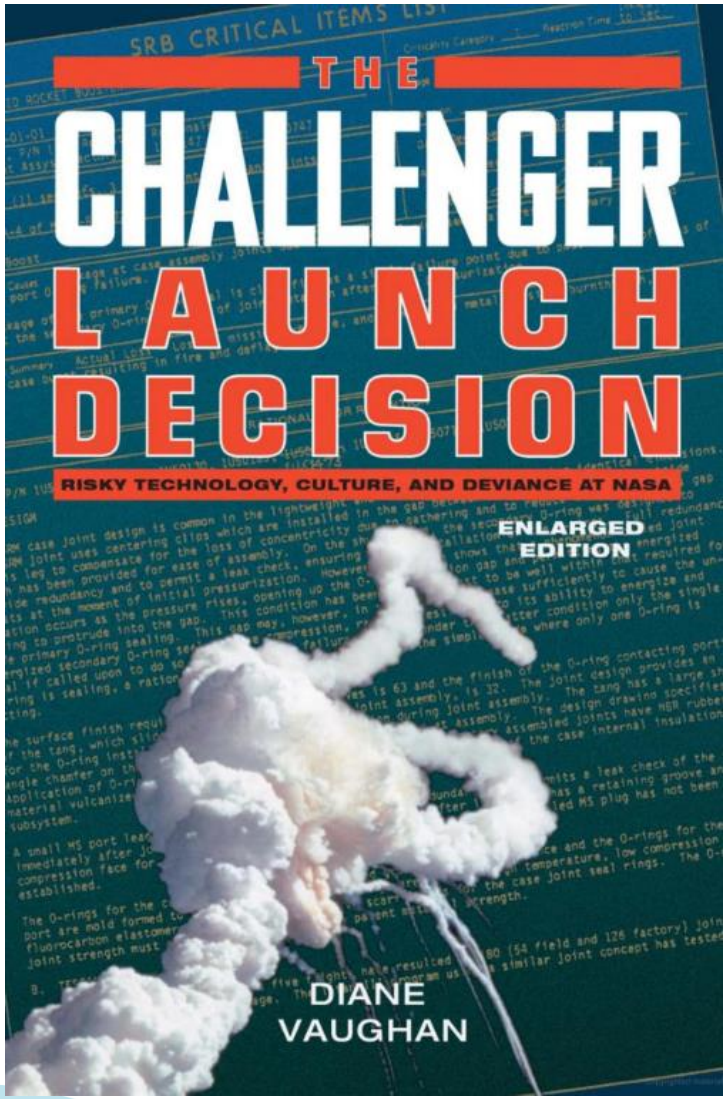
- **Ask a loved once if you should invest the time in this course…**

- **New Human Factors Course—Ten Modules**
  - Videos, quizzes, workbooks, tests.
- **Log into faasafety.gov:**
- **Go to activities-> courses-> all available courses**
  - Search for human factors
  - Then scroll to find these ALC codes:
    - 730, 731, 732, 825, 826, 827, 828, 829, 830
  - Here is a handy QR code to get you to 730 (modules 1 and 2):



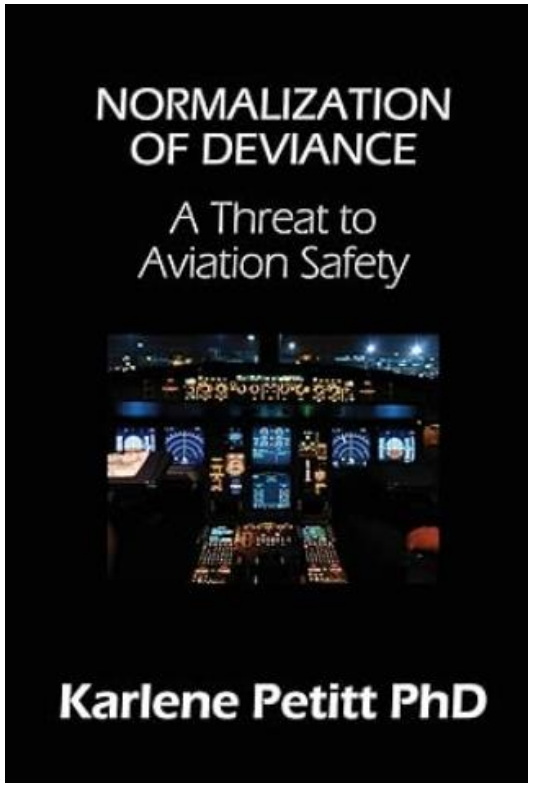
Homework-3a: Read the Book on Normalization of Deviance

"*The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA"; by* Diane Vaughan



Homework-3b: Read Another Book on Normalization of Deviance

"This book is the result of the author's doctoral research—Safety Culture, Training, Understanding, Aviation Passion: The Impact on Manual Flight and Operational Performance."



Homework-4: Internalize AC90-66C

- **It's risky enough even when people follow the rules!**
  - 13-mile straight in runway 34
  - 7-mile extended base for runway 29
- **The catalyst for the 6th hazardous attitude (E = Entitlement)**
  - Why is this so difficult?
  - Because people get away with it:

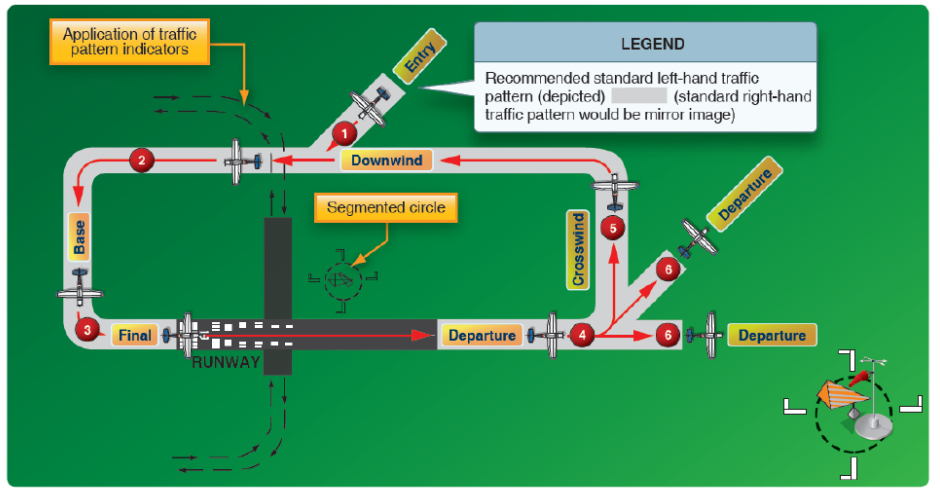
Normalization of Deviancy

U.S. Department of Transportation
Federal Aviation Administration

Advisory Circular

Subject: Non-Towered Airport Flight Operations
Date: 6/6/23
AC No: 90-66C
Initiated by: AFS-800
Change:

1 **PURPOSE OF THIS ADVISORY CIRCULAR (AC).** This AC calls attention to regulatory requirements, recommended operations, and communications procedures for operating at an airport without a control tower or an airport with a control tower that operates only part time. It recommends traffic patterns, communications phraseology, and operational procedures for use by aircraft, lighter-than-air aircraft, gliders, parachutes, rotorcraft, and ultralight vehicles. This AC stresses safety as the primary objective in these operations. This AC is related to Title 14 of the Code of Federal Regulations (14 CFR) part 1, § 1.1 (traffic pattern), and part 91, § 91.13 (Careless or Reckless Operation), § 91.113 (Right-of-Way Rules: Except Water Operations), and § 91.126 (Operating On or In the Vicinity of an Airport in Class G Airspace). The contents of this document do not have the force and effect of law and are not meant to bind the public in any way, and the document is intended only to provide information to the public regarding existing requirements under the law or agency policies.



Homework-5: Resources

- **Spend some quality time with these resources:**
- https://www.aopa.org/training-and-safety/air-safety-institute
- Safety to Go
- faasafety.gov
- Pilot Minute
- 57 Seconds To Safer Flying
- FAA Safety Briefing Magazine
- From the Flight Deck
  - https://www.youtube.com/playlist?list=PL5vHkqHi51DSNpsBC8nb8Q8gFcGVmWhGA
  - https://www.youtube.com/watch?v=303Pd_2UAmU

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Homework-6: SLAP

After every flight, *SLAP* yourself and create actions for the next flight:

S: **How were my *S*kills today?**

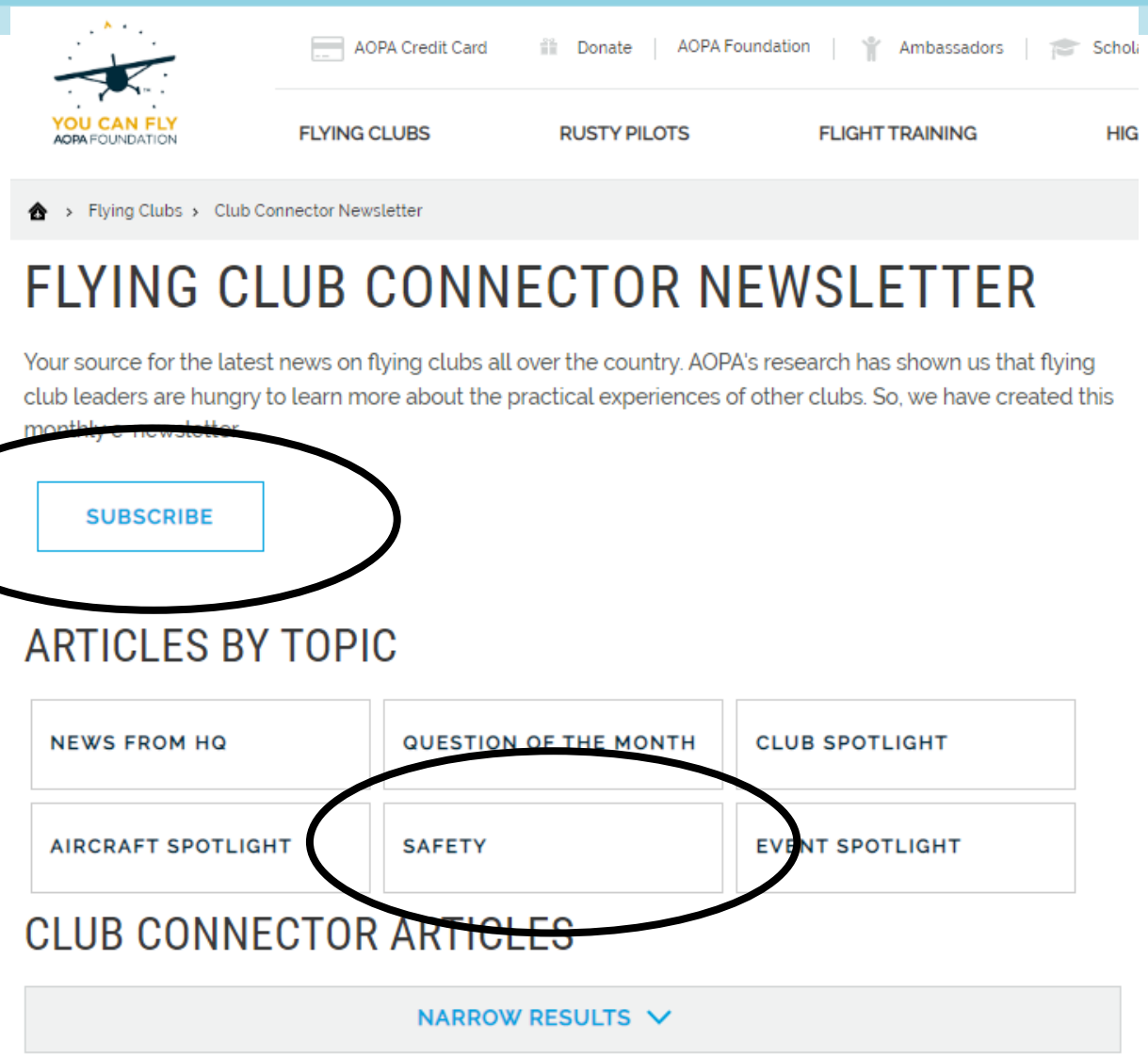
L: **What did I *L*earn today?**

A: **How was my *A*DM today?**

P: **How was my *P*lanning today?**

So…

- **No recording…but even better…**
  - https://youcanfly.aopa.org/flying-clubs/flying-club-newsletter
- **You can download the presentation!**
  - This and earlier ToM presentations are available…
  - Sign-up now!
  - November edition 11/19/2023



Next Month…

The National FAA Safety Team Presents

Topic of the Month – December

Making the Numbers

Presented to: Safety Minded Aviators, Everywhere…

By: Stephen Bateman, CFI, AOPA Flying Clubs

Date: Tuesday 19th December 2023

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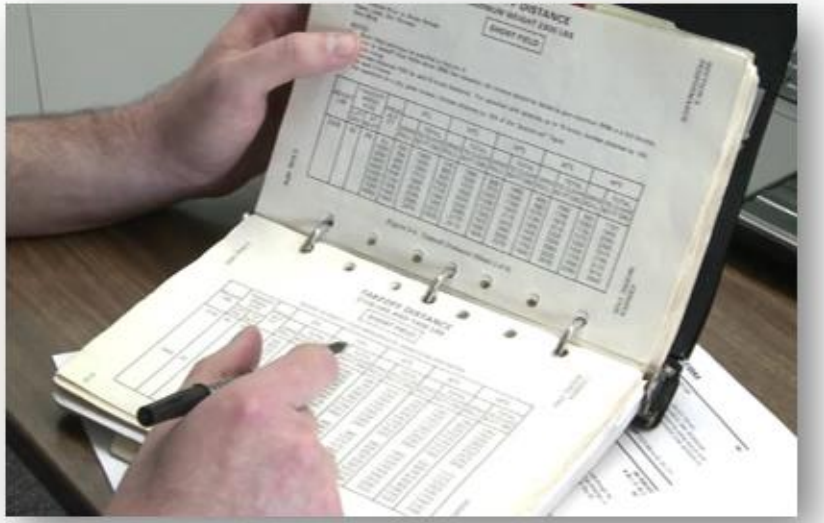

Federal Aviation Administration

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Thank you for attending!

You are vital members of our GA safety community!