The National FAA Safety Team Presents

Federal Aviation Administration

Topic of the Month – January

Human Performance and Safety Culture

Presented to: Safety Minded Aviators, Everywhere…

By: Stephen Bateman, CFI, AOPA Flying Clubs

Date: Tuesday 16th January 2024

Produced by:
The National FAA Safety Team (FAASTeam)
The Australian Civil Aviation Safety Authority (CASA)

Welcome

- **Steve Bateman, CFI; AOPA Flying Clubs; Instructor Professional Pilot Program, COCC; FAASTeam Lead Rep Portland FSDO; *WINGS*Pro**

- **Your monthly 33-minute dose of aviation safety**
- ***WINGS* Credit: Yes…!**

- ***Webinar email (ycfg2w2@aopa.org) is unmonitored—you will not get a reply!!!!***

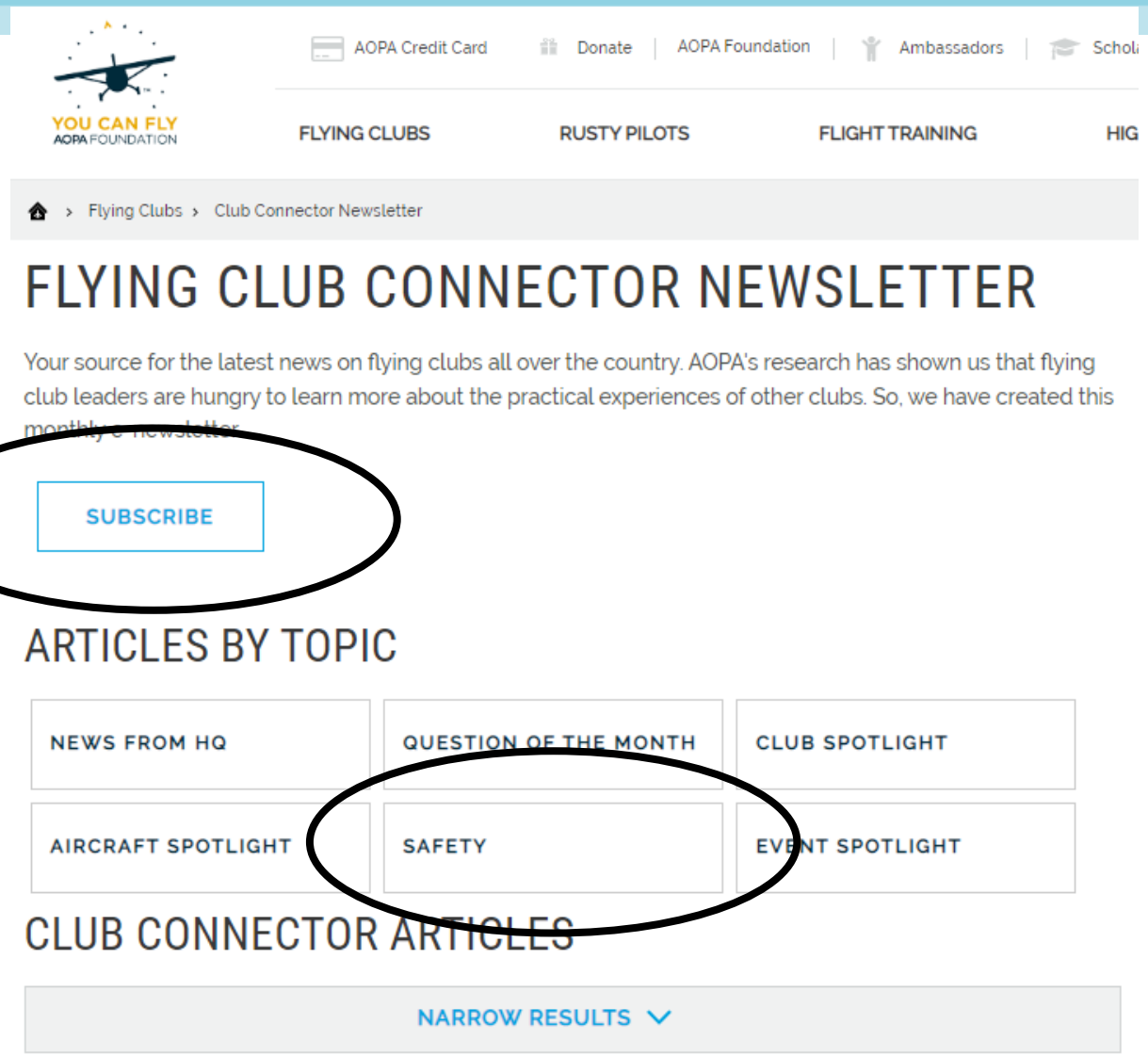
- **Send me email:**

  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!
  - January edition 1/21/2023



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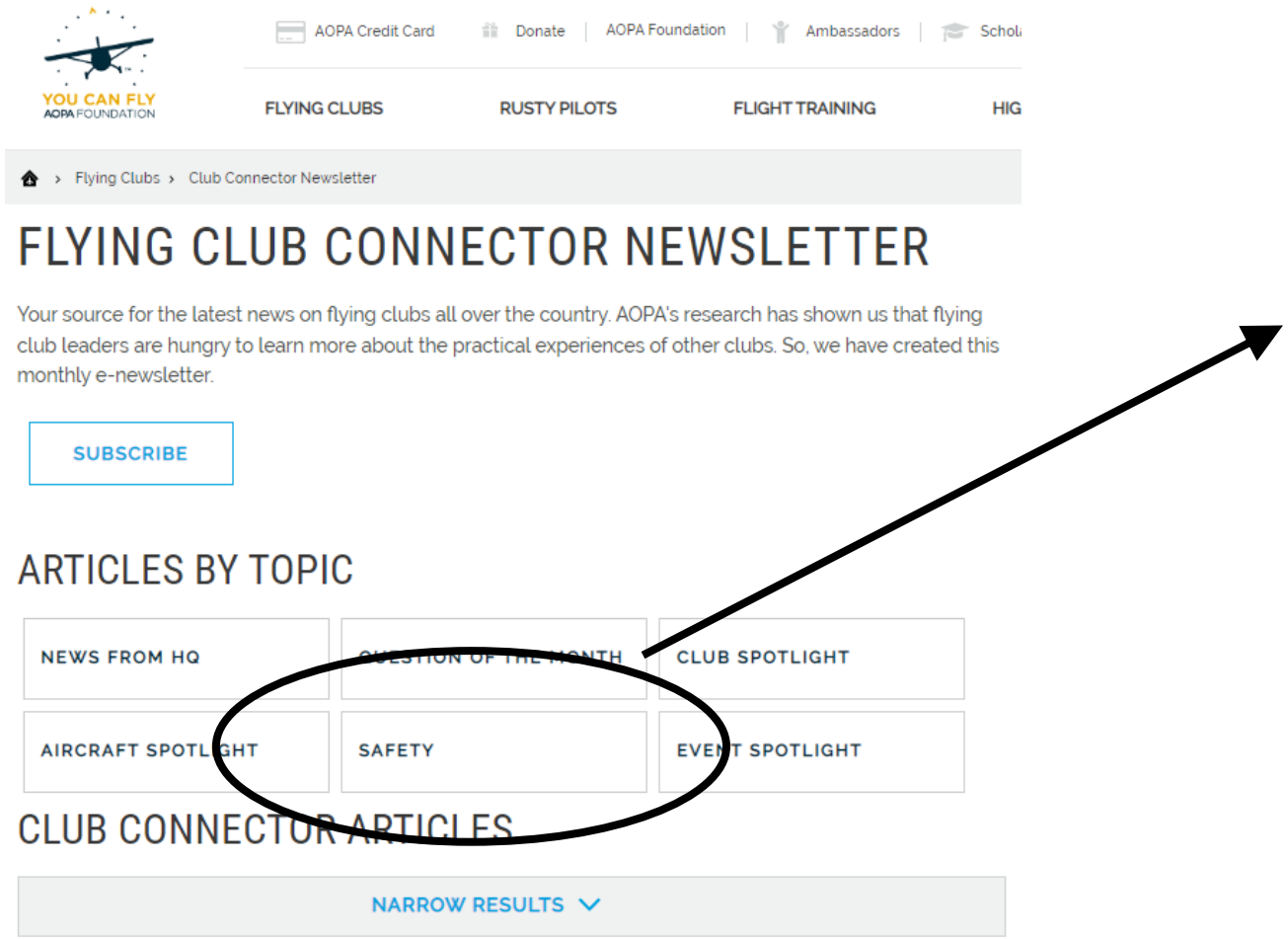

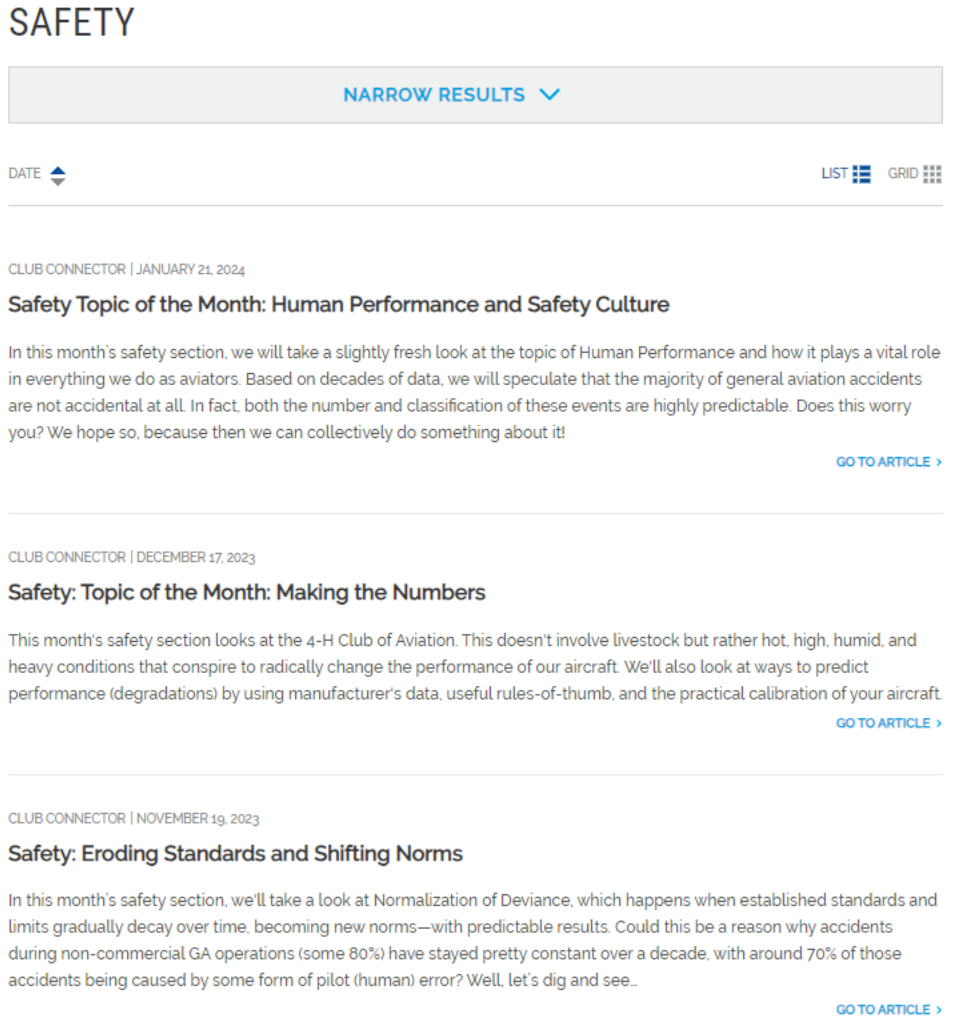

Overview : Human Performance and Safety Culture

- **Continue the theme from a couple of month's ago…**

  ….Human Factors, Safety Culture and Aviation Accidents

- **But…with very different approach to the subject…**

Overview : Human Performance and Safety Culture

- **Why**
  - Why is the non-commercial GA accident rate higher than commercial GA and airlines, and why has this been constant for more than a decade?
- **What**
  - What is “human factors” and why is it “the last frontier in accident reduction”?
- **How**
  - Understand our human selves, biases and behaviors
  - Relates to all regimes of flight and maintenance
  - Get over it – this is not psychobabble but, literally, reality
  - Doing something about it!

“GA is Safer than Ever” Is Not Good Enough

- **Non-commercial GA statistics are way higher than commercial GA and airline statistics**
- **What do they know that we don’t?**
- **What are they doing that we don’t?**

- **The non-commercial GA accident rate has been so consistent, for more than a decade, it has *become predictable***

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- **The non-commercial GA accident rate has been so consistent, for more than a decade, it has *become predictable***

- **WAIT…WHAT…complete contradiction!!!**
- **How can “accidents” become “predictable”?**

“Accident”

- **Accident: An event that happens unintentionally and unexpectedly, often resulting in damage or injury**
  - Chance, mishap, unforeseen, unplanned, unpredicted

- **“It happened by accident”**
- **“The tree accidentally fell on the house due to the storm”**

Let's Be Clear

- **Most aircraft crashes (and car wrecks) are not accidents at all, but are most often caused by pilot/driver error or attitudes, which, for whatever reason, are directly attributable to human behavior**
  - **Lack of good decision making, complacency, lack of training/skill, rage, entitlement…**
- **These are all fixable – whereas "accidents", are, by definition, chance events and random, therefore not deterministic**
- **Continued flight into IMC is not "accidental". The pilot decided to continue or at least did not make the decision to turn around**
- **Crashing after attempting the impossible turn from 500' is not an accident, it was due to pilot error based on poor decision making**

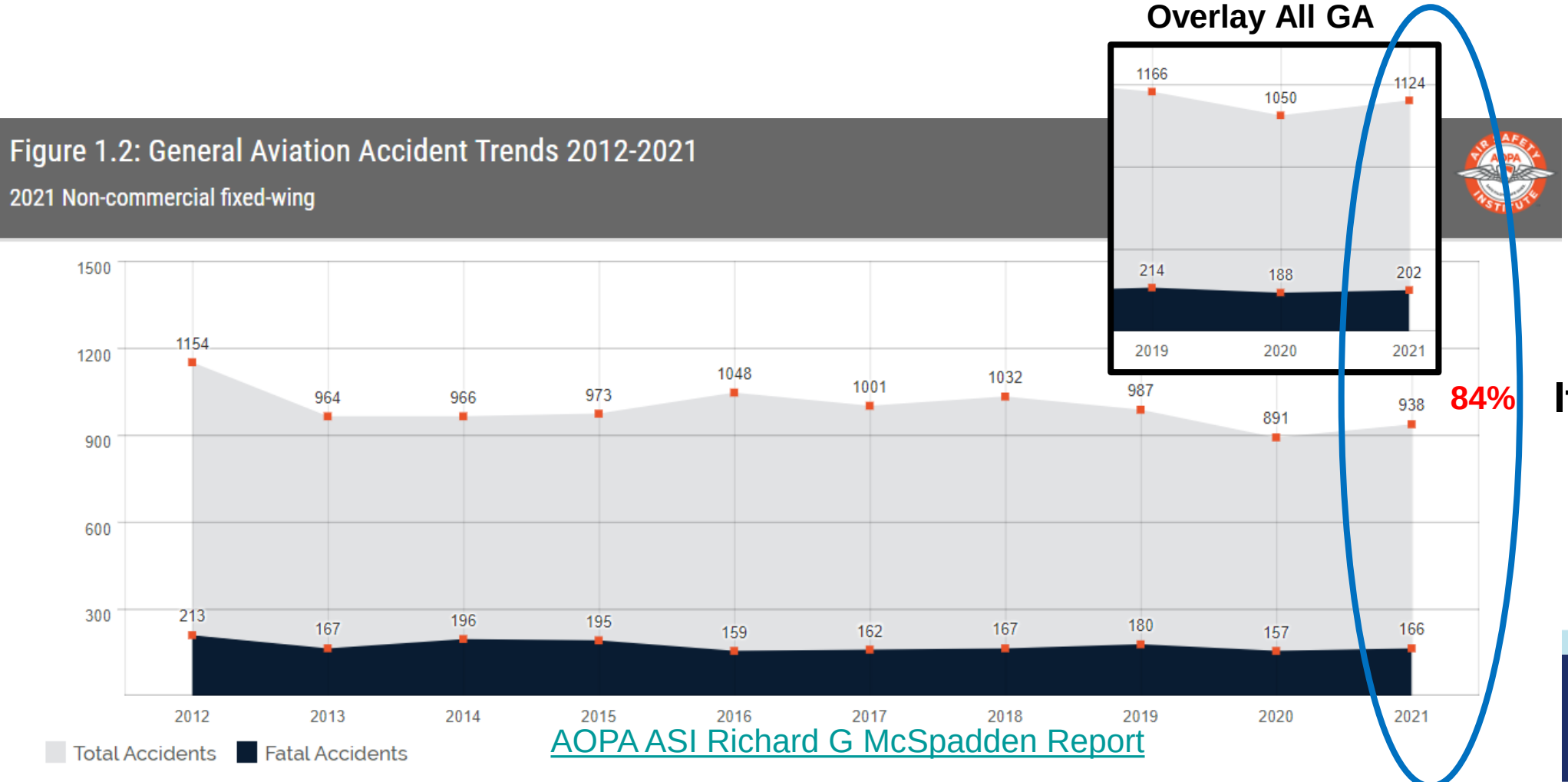
Let's Be Clear

- **Started years ago…car company marketing started using the work "accident"…softer, more forgivable than crash or wreck**
- **We now hiding being the word "accident":**
  - It wasn't my fault…it was an accident
  - I accidentally drove too fast and smashed into another vehicle
  - I jumped into a new-to-me aircraft without training and accidently crashed
  - I took off in a 30-knot direct crosswind with my family and was involved in an accident
  - Four people died in an airplane accident, after the pilot took off in zero-zero conditions

- **These are most definitively not "accidents"!**

Non-Commercial Fixed-Wing Trend:

Looking at the last decade of aircraft "accidents"—we can *predict* that this year and next year, and…will follow the same pattern, just involving different people



Overlay All GA

84%

It's mostly us!

AOPA ASI Richard G McSpadden Report

Who and When…

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

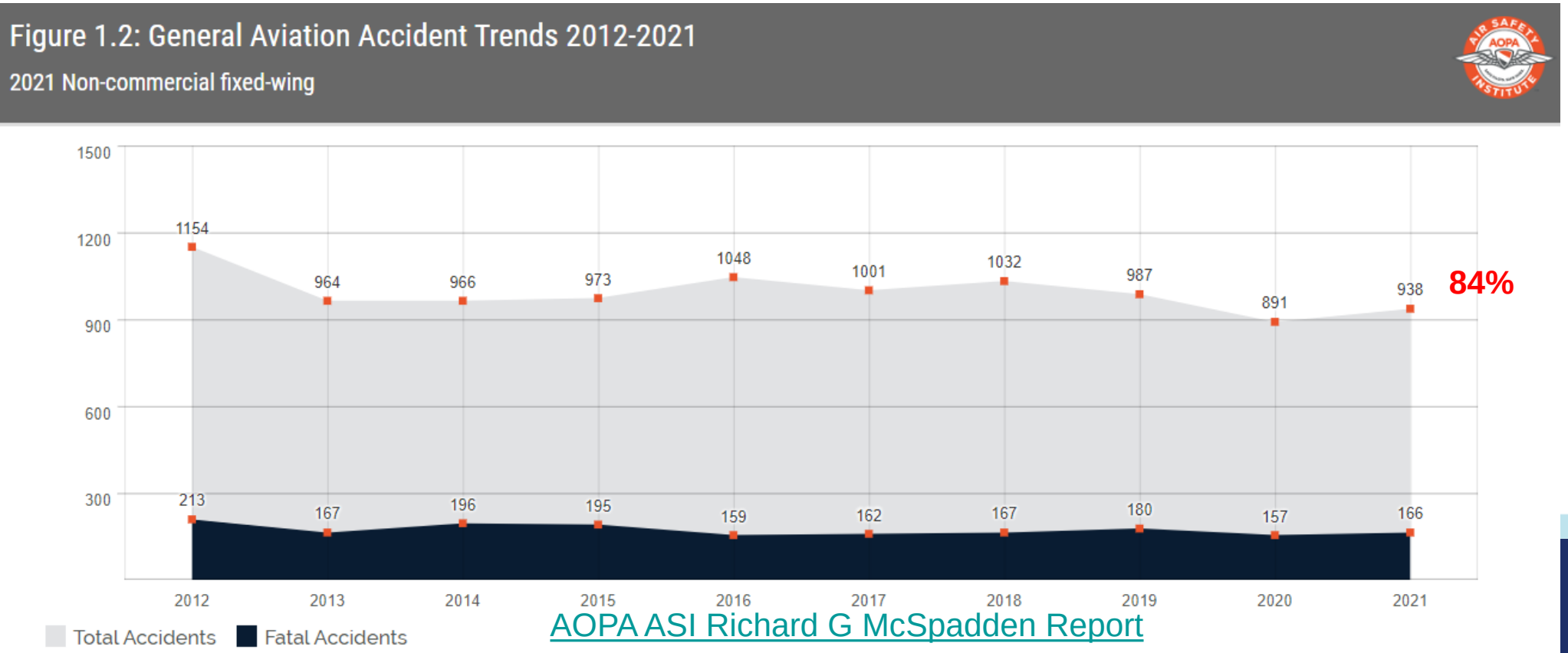
2021 Non-commercial fixed-wing

	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.*

Non-Commercial Fixed-Wing Trend:

Doing the same thing year after year and expecting a different result is…insane, completely insane…and yet this is what we have been doing in (non-commercial) general aviation for more than a decade



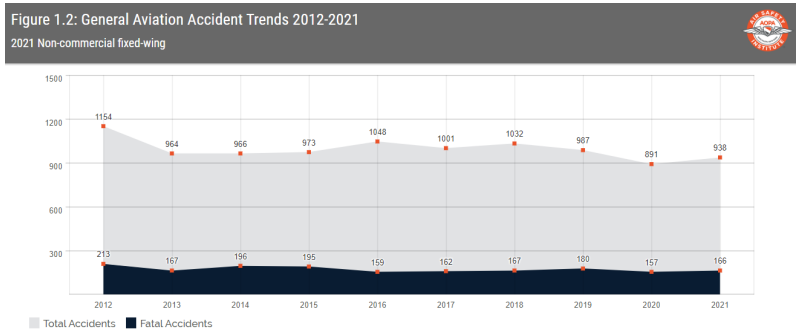
AOPA ASI Richard G McSpadden Report

“Accident”

- **We even know what the root causes of future accidents will be:**
  - LOC
  - CFIT
  - *FR into IMC
  - Unstable approach
  - Impossible turn
  - Pilot (human) error
  - Poor go around technique
  - Fuel mismanagement
  - Fly a new-to-me aircraft without any training
  - Incorrect response to situation
  - Poor ADM

“Accident”

- **Based on the data, and with simple linear regression, I hypothesize that in 2024:**
  - *The number of non-commercial GA occurrences will be 889*
  - *From these, there will be 142 fatalities*
  - *The rate of occurrences, per 100,000 flight hours will be 4.6*
  - *With the fatality rate per 100,000 flight hours at 0.7*



- **Is this making you a bit uncomfortable, yet?**
- **We can accurately foretell the number of accidents in 2024 and their causes…**
- **We don’t know who it will be…could be you, or me…or is it always someone else?**

The Odds

- The odds of you or me being involved in a non-commercial GA crash are not to do with accidents…it is not the same as the chance of being hit by lightening, or an engine failing in flight, or…

- We have skewed the risk to be much higher than simply being “accidental”
- We haven’t accepted that we, not the engine, not the weather, not other unpredictable factors, are the big, remaining issue…

- Put simply, we, our fallible human selves, are the cause of most “accidents”
- We are also the opportunity…if only we are smart enough to admit and then do something about it

Human Performance and Safety Culture

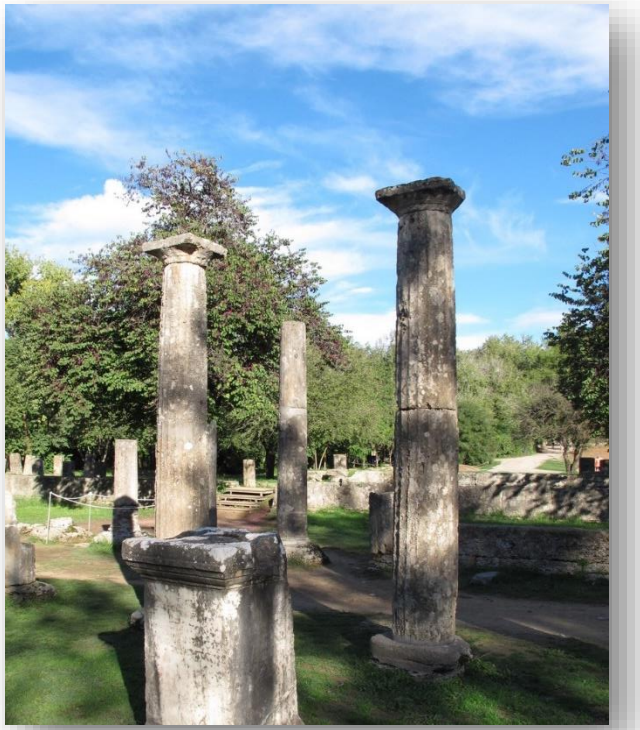
- **Here are some relevant references to earlier Safety Cultures" and "Human Performance ToM presentations:**
  - Eroding Standards and Shifting Norms
  - Eyes on the Prize—Fly the Aircraft First
  - Risk Management
  - Are There Rocks in Those Clouds?
  - Fit for Flight
  - The Startle Response - Surprise! Now What?

A Time of Transition

- **Reactive Cultures**
  - Wait for something to go wrong—then fix it
    - Blame, shame, retrain
    - Write another procedure
- **Proactive "Just" Cultures**
  - Ask *What*? rather than *Who*?
  - Identify hazards
  - Assess risk(s)
  - Eliminate or mitigate to acceptable levels
  - Instill *responsibility* and maintain *accountability*
  - No whining: *"Someone should do something"*

SMS for General Aviation

- **“Oh…this is for commercial operators not me…’**
- **Wrong – based on the data, we clearly needed it more than everyone else!**
- **Pillars:**
  - Safety Policy
  - Safety Risk Management
  - Safety Assurance
  - Safety Promotion
- **Does it apply to me?**
- **Yes…it is scalable!**



FAA General Aviation Safety Outreach Initiative

Foundational Elements of Safety

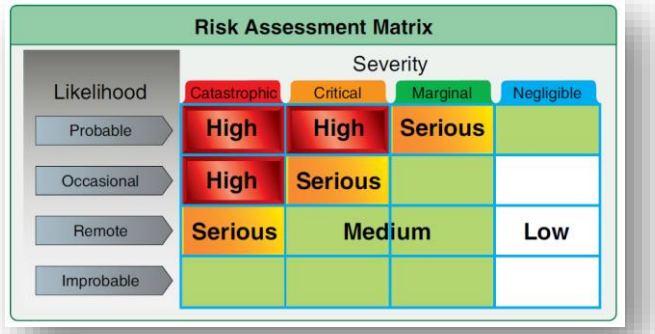
- **Safety Risk Management**
  - Hazard identification & risk mitigation
  - Learn from the mistakes of others
  - We actually *KNOW* what is biting us!
- **Pilot Proficiency**
  - The skills, knowledge and understanding to do the job
  - FAASTeam
  - Do something about the known causes
- **Technology**
  - Supporting safe decision making and aircraft operations

Definitions

- **Hazard – a condition, event, object, or circumstance that could compromise safety**

- **Risk – the future impact of hazards that are not eliminated or controlled**

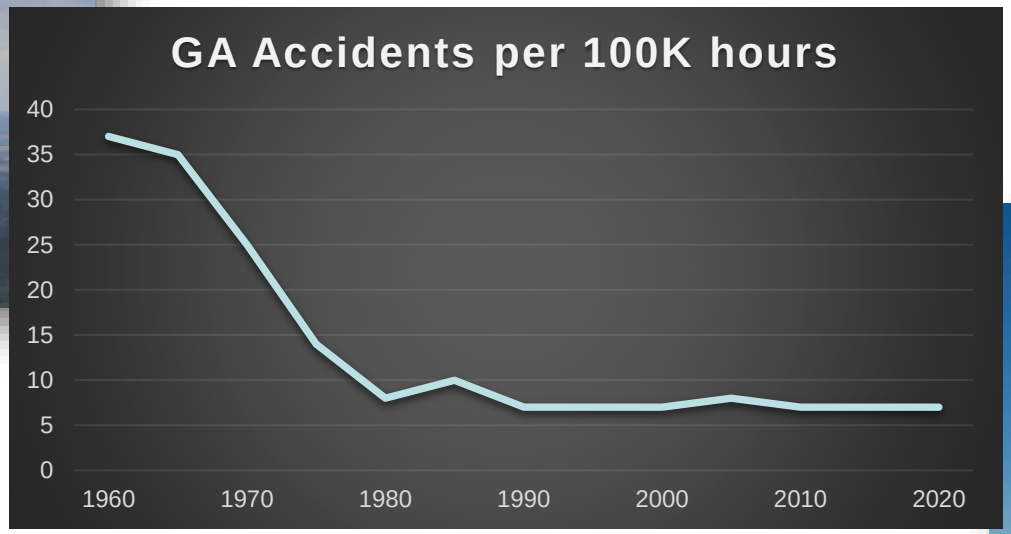
- **Risk assessment – considers the likelihood that a hazard will compromise safety and the severity of consequences if it does**



Risk Management

Risk Management	The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing:
PA.I.C.R1	Factors involved in making the go/no-go and continue/divert decisions, to include:
PA.I.C.R1a	a. Circumstances that would make diversion prudent
PA.I.C.R1b	b. Personal weather minimums
PA.I.C.R1c	c. Hazardous weather conditions to include known or forecast icing or turbulence aloft
PA.I.C.R2	Limitations of:
PA.I.C.R2a	a. Onboard weather equipment
PA.I.C.R2b	b. Aviation weather reports and forecasts
PA.I.C.R2c	c. Inflight weather resources

We’ve come a long way….

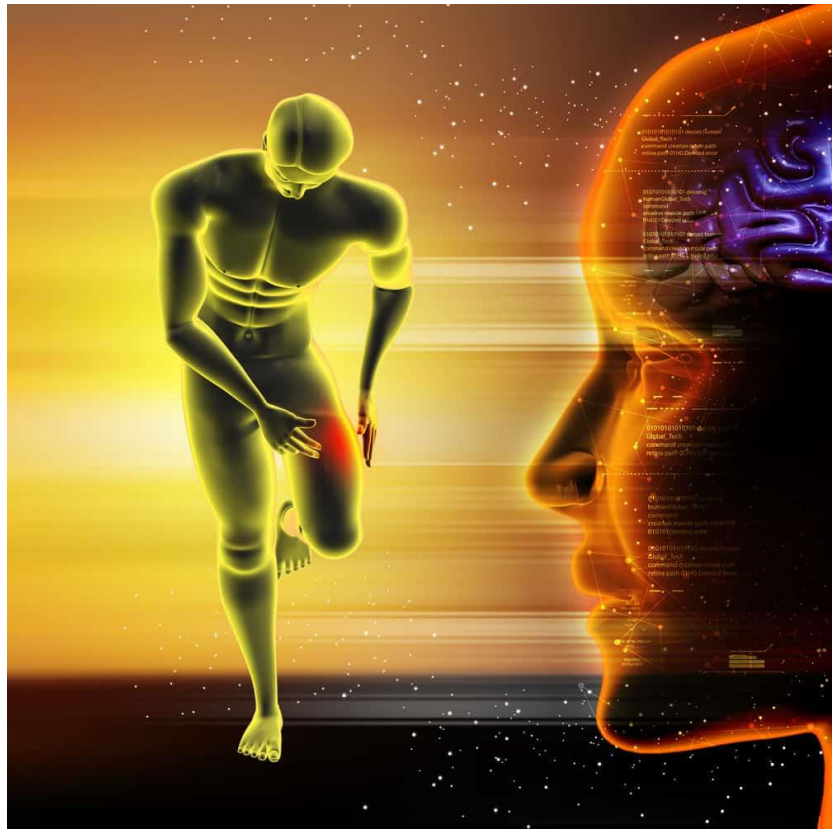


…but something has to change


Human Factors
The Final Frontier

Introduction to Human Factors

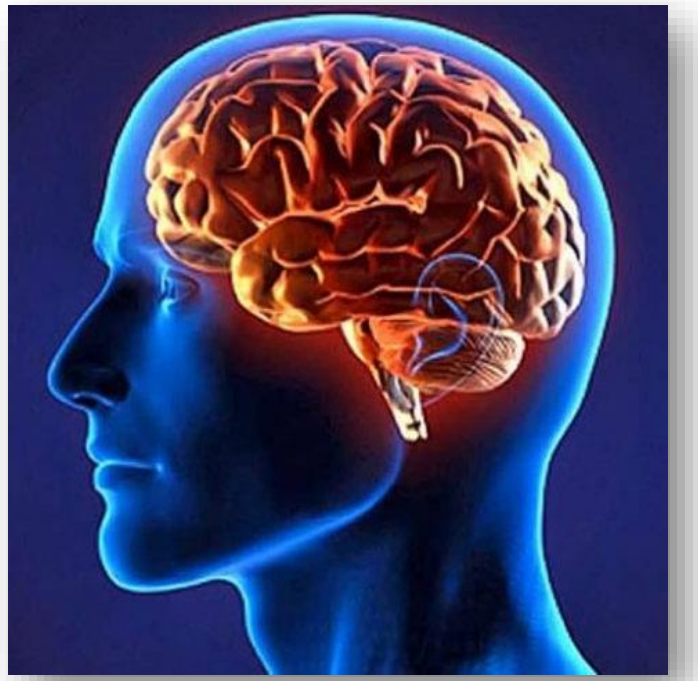
- **Factors that arise since pilots are human**
  - Human induced errors, not machines, reliability…
- **Human factors applies knowledge of the human mind and body to understand human behaviors, weakness, capabilities and limitations**
- **Embracing human factors drives human performance and the harmonizing of system and technology design**
- **Remember how ergonomics changed the way we designed things in the ‘90s?**



Understanding Human Factors

- Better communicators
- Better decision makers
- Better crisis managers
- Better teachers
- Better students

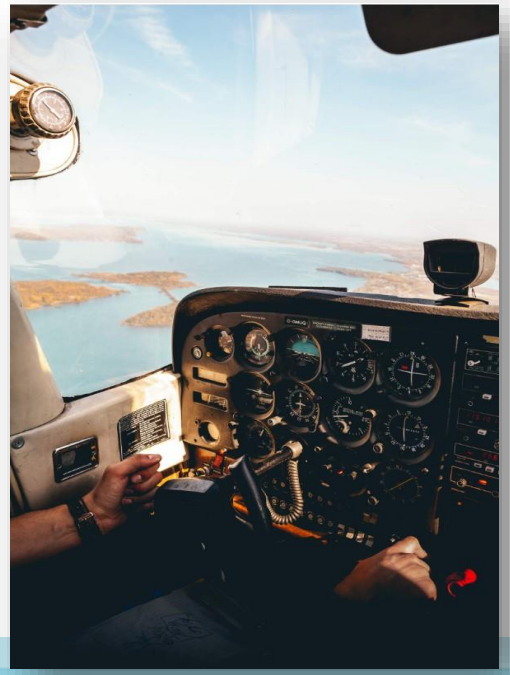
Safer Operations!



- This is why CFI training includes Fundamentals of Instruction
- To be effective instructors, we need to understand how people learn and what holds them back

The accident chain of events…

- Accidents are rarely the result of one catastrophic event
- Typically, a progressively complex chain reaction of errors
- Best solution is to not start the reaction at all!
- Tools such as PAvE, IMSAFE, IMAIRE, DECIDE are there to help



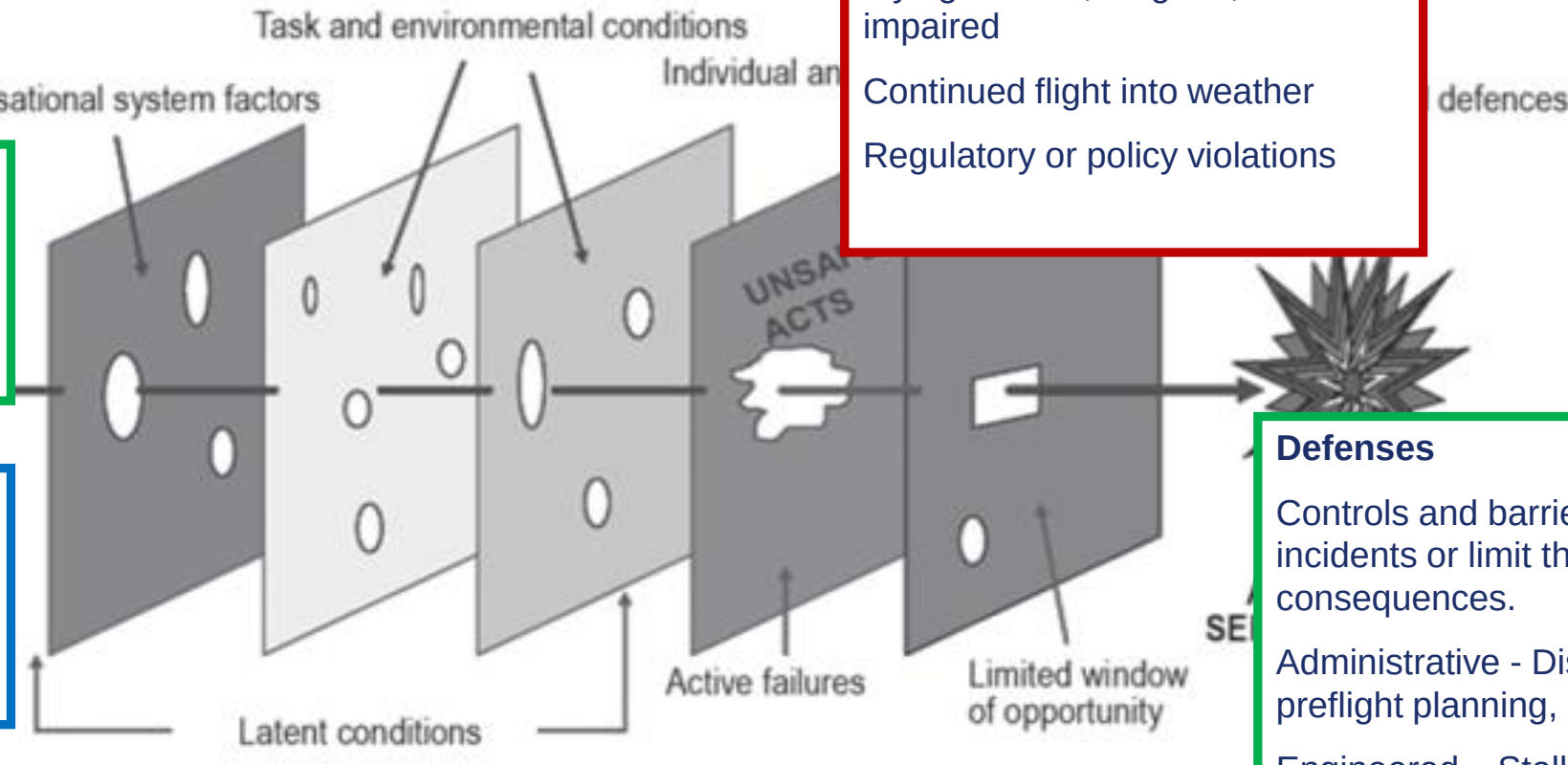
Dr. James Reason's Model of Accident Causation

Individual & Team Actions

Flying while ill, fatigued, or impaired

Continued flight into weather

Regulatory or policy violations



Organizational Factors

Training

Proficiency

Operational Policy & Procedures

Task & Environmental Conditions

Mission & schedule, Terrain, Weather, Time of day, Pilot health, nutrition, hydration & rest

Defenses

Controls and barriers to prevent incidents or limit their consequences.

Administrative - Dispatch, preflight planning, inspections

Engineered – Stall & gear warning systems, AOA etc.

Blockers and the alignment of consequences

Understanding Human Factors

- **Knowing when and where mistakes are likely to be made**
- **Understanding the system's tolerance to error**
- **Error-preventative systems**
  - Checks and balances
  - Complementary and assistive technology
  - CRM (more eyes and brains)

Challenges

- **Over-reliance on automation**
- **Expectation of system reliability**
- **Pilot shortage – pilot mills**
  - Get ‘em in and get ‘em out
  - Proliferation of bad habits and myths
  - Are “accelerated courses” counter productive?
- **The 1,500-hour requirement**
  - “Building hours” as a CFI
  - Read “Death by Time Builder”
- **Pace of modern life and mental health issues**
  - Rage, entitlement, unruly passengers…

We Must Come Together to Address This

- **We need a common framework, a shared set of standards, clearly defined acceptable behaviors and consequence for not complying**

- **This is a culture…a Safety Culture**

What is a Safety Culture?

How would you define it (pause for dramatic effect…)

Safety Culture:

Create an organization-wide effort that encourages reporting, rewards safe actions and behaviors, and keeps the entire organization (not just the leaders) engaged and involved in correcting issues

The Six Elements of Culture

- **What makes a Culture:**
  - Language: Common “vocabulary” and understanding
  - Norms: Expectations and rules of behavior
  - Values: Loyalty, work, compassion, social standards. Just, fair and good
  - Beliefs: Things considered to be true
  - Roles: The things which define a person's responsibilities and influence
  - Social collectives: Togetherness from belonging and common commitment

- **Culture is the multi-dimensional (collective) frames of reference adopted by “civilizations” to ensure acceptable and harmonious interactions, along with individual accountability and opportunity**

Example: Safety Culture For A Flying Club

- **Establishment of required behaviors and standards**
- **Based on an agreed framework and shared experience**
- ***Agreed and common frames of reference* for:**
  - Participation
  - Conformance
  - Performance
  - Measurement and reward
- **Defined and enforced through bylaws and operating rules**
- **Reward participation: Lower insurance premiums = lower dues = more flying**
- **Enforcement—loss of flying privileges**

Not My Job, Mate…

But I'm just one pilot….

"I don't fly for an airline, and I don't belong to a club. I don't have an organizational culture that influences my operational decisions."

Reality:

- **You are part of the GA culture, like or not**
- **Be a *WINGS* pilot,**
- **Set personal minimums**
- **Treat the flight review seriously**
- **…get it?**
- **You do have control!!**

Culture is a really big deal

- **Defines group ethics**
  - Identity
  - Work and safety ethics
  - What is acceptable and accepted
- **Rules**
  - May be unwritten or well documented
  - Are very powerful
  - Usually rewards “production”
  - Must be balanced with protection (safety)

“ A great safety culture is when people continue to work safely and do the right things… even when no one is watching.”

Learning Cultures

Are constantly evolving and improving in response to safety information gleaned from operations monitoring and robust reporting cultures.

Informed Cultures

Collect and act upon current knowledge about the human, technical, organizational, and environmental factors influencing the safety of the system.

Flexible Cultures

Encourage effective relationships that support mission objectives. They are often organized as groups of professionals working together to achieve common goals rather than hierarches of managers and employees.

Reporting Cultures

Reward reporting and discussion of errors and best practices. They use information discovered in the reporting process to improve safety processes and procedures.

Just Cultures

Foster an atmosphere of trust by encouraging and rewarding the disclosure of safety information while maintaining accountability and a clear distinction between acceptable and unacceptable behavior.

Learning Pilots …

Are constantly evolving and improving in response to safety information gleaned from operations monitoring and robust reporting cultures.

Informed Pilots …

gather all available information before flight and identify hazards that may compromise safety. They eliminate or mitigate the risks those hazards pose before takeoff and continuously update their assessments with new information en route.

Flexible Pilots …

are flexible in their relationships and in their mission planning and execution. The are willing to adapt to changing conditions and priorities but only if they can maintain an equivalent or higher level of safety.

Reporting Culture Pilots …

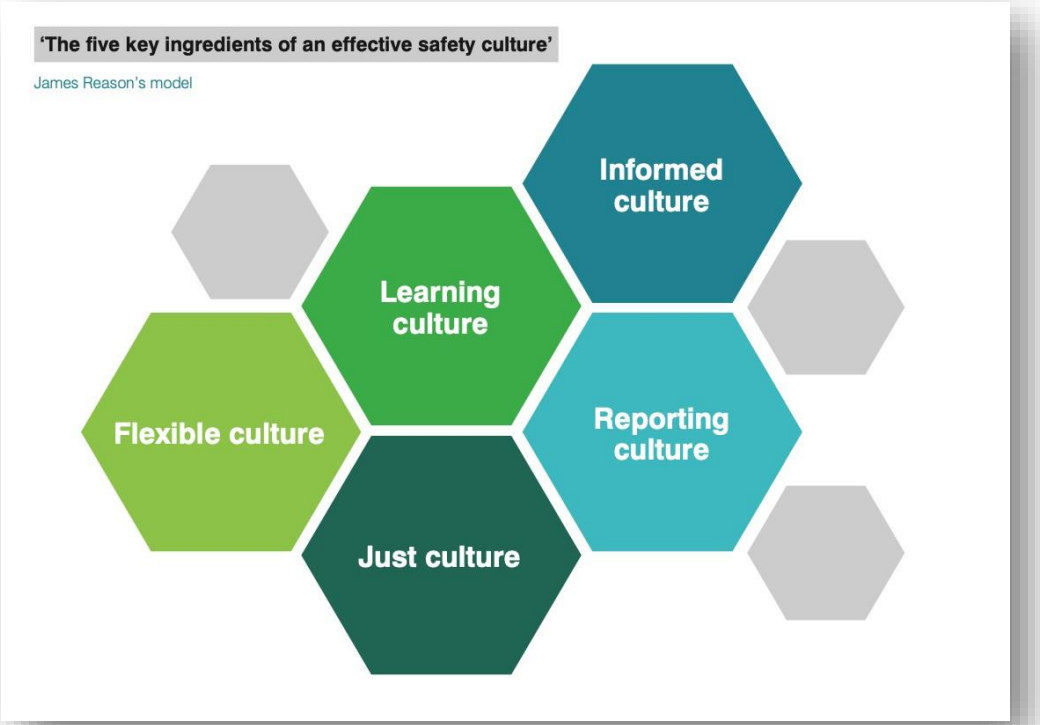
do not hesitate to discuss and learn from errors they make. They strive to report objectively and without bias. They seek guidance and coaching from flight instructors and peers.

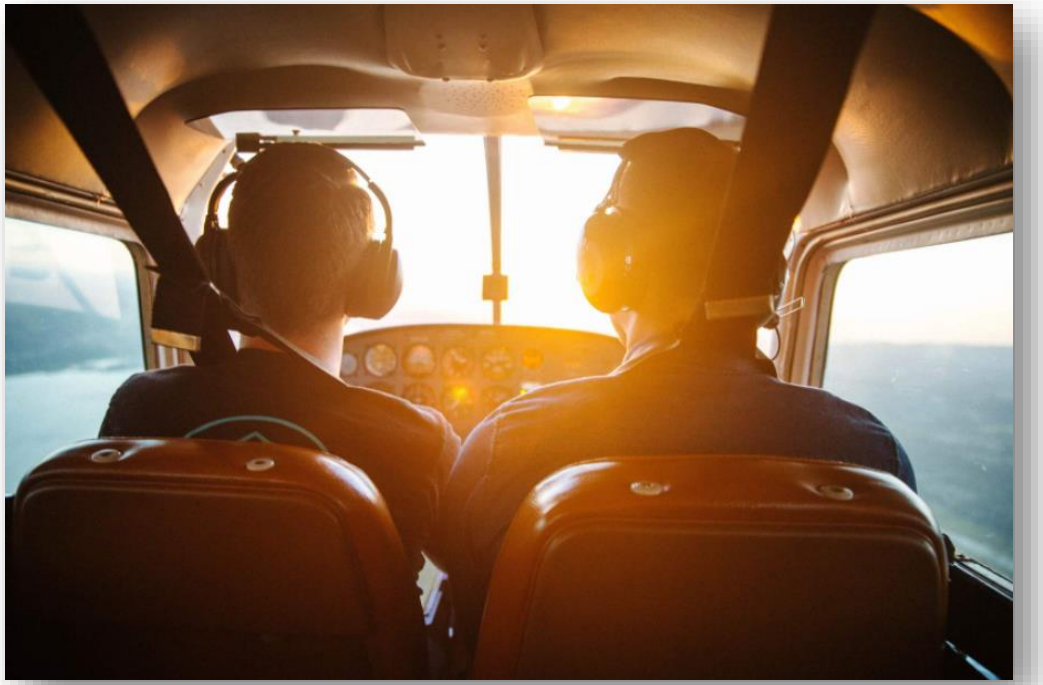
Just Culture Pilots …

understand that errors are inevitable and that they have a responsibility to disclose them in order to provide information useful to crafting more effective processes and procedures.

expect to be treated fairly but also to be held accountable for their actions - especially those that are violations of policy, procedure, or regulation.

What about our culture?





Address the fact that, "actions speak louder than words".

Pilots and flight instructors must constantly "walk the talk" and set the example with safety as a prime consideration, always…

Doing Something About It

- **Create a culture of safety at your airport, in your flying club, in your EAA chapter, etc.**
- **Be a leader. Work with your airport manager and the FAASTeam (program manager, reps, etc.).**

Doing Something About It

- **Call a meeting with all airport users and create an airport user's group:**
  - **Operations and safety**

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  - **Publish expected behaviors for operating at your airport**

Doing Something About It

- **Call a meeting with all airport users and create an airport user's group:**
  - Operations and safety
  - Training and education for all aviators
  - Educate frequent users, especially flight schools that come to your airport
  - Publish expected behaviors for operating at your airport
  - **Help with airport promotion, survival, events, and so on**

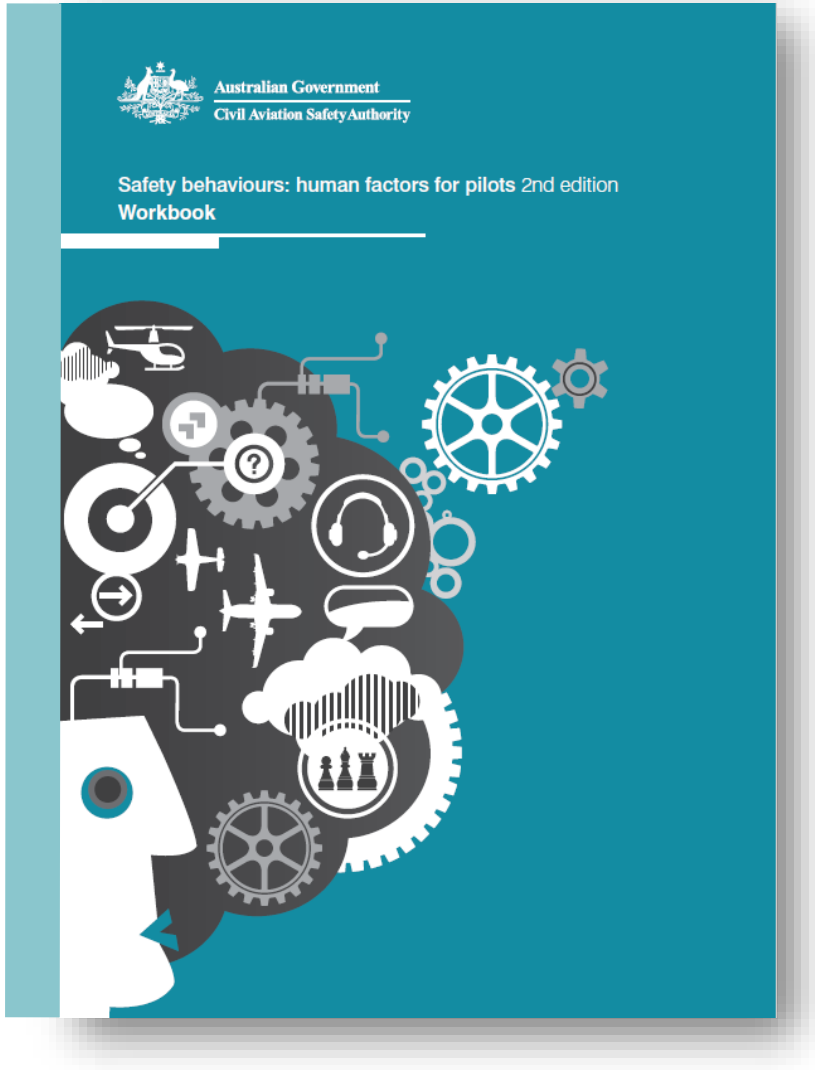
Doing Something About It

- **Draw on this exceptional work: Aviators Code of Conduct**
- **Review and adapt the FAA's considerable work on Safety Management Systems—scale for your own situation**
- **Develop an airport user's safety guide—the backbone for the emerging culture**

Here For Us To Use

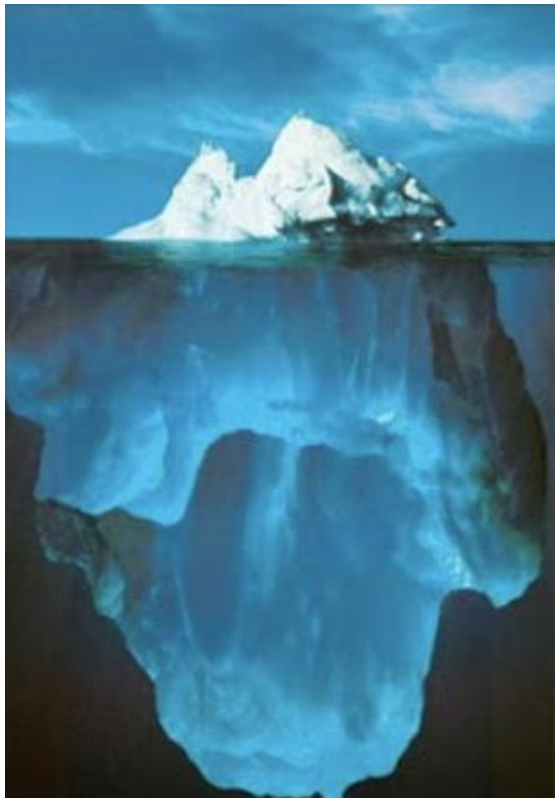
Australian Government
Civil Aviation Safety Authority

https://tinyurl.com/4mcvzjsw



Proficiency and Peace of Mind

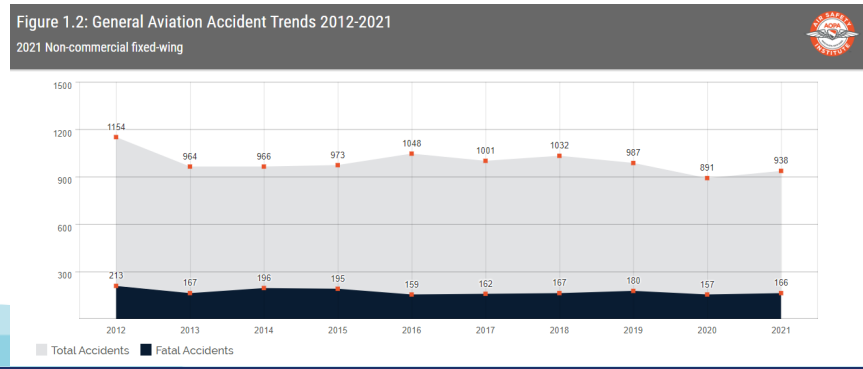
- **Regularly review WINGS courses and activities**
- **Fly regularly with your CFI—*WINGS* activities**
  - Do different things to become familiar
  - Do familiar things differently
- **"Revert to training"…only works if…?**
  a) You've seen it before
  b) You've done it recently
  c) Insist on scenario training during your flight 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



Human performance is huge!

Learning Points

- **General aviation accidents are not really accidents at all—they have become predictable in number and type**
- **In 2024…**
  - ❖ *The number of non-commercial GA occurrences will be 889*
  - ❖ *From these, there will be 142 fatalities*
  - ❖ *The rate of occurrences, per 100,000 flight hours will be 4.6*
  - ❖ *With the fatality rate per 100,000 flight hours at 0.7*

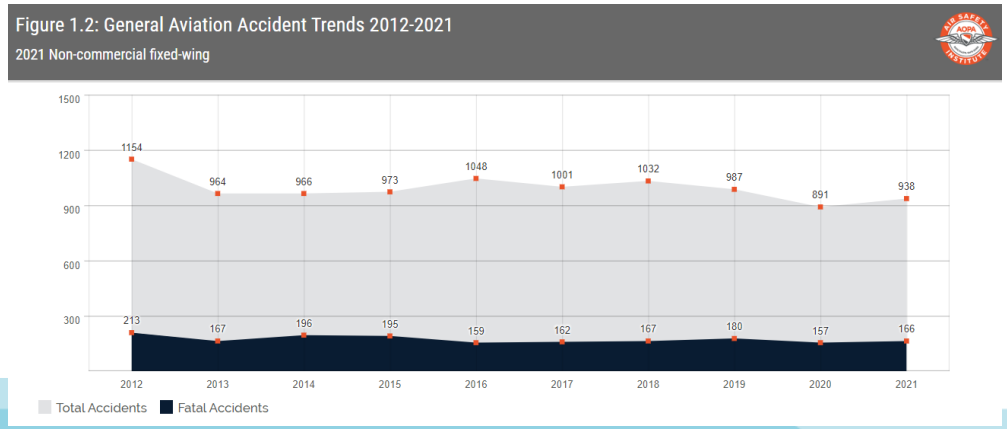


Learning Points

- **Mechanical reliability, available technology, safety education…all have driven the "accident" rate to a plateau**
- **Doing the same old thing will just keep the situation the same**
- **We can't stop doing what we are doing, but must do more**
- **Serious training:**
  - Commit to a culture of safety, even if you "only" fly on your own
  - Accept the things that will bite us in 2024 and…
  - Internalize risk assessment and mitigation against personal limits
  - Understand and act on our human foible
  - Meaningful flight reviews, not just checking a box
  - Fly like someone is watching, because they are…and we are not a shy group…

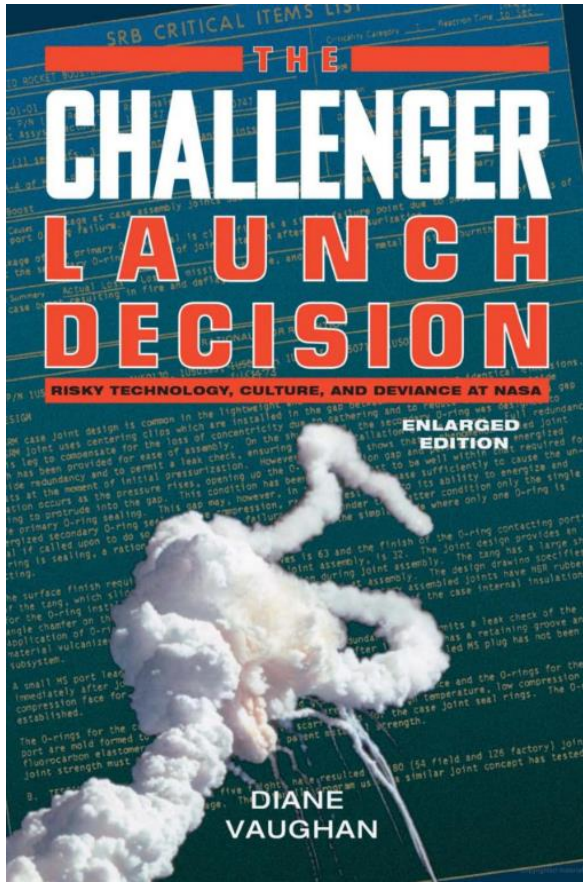
Homework—1

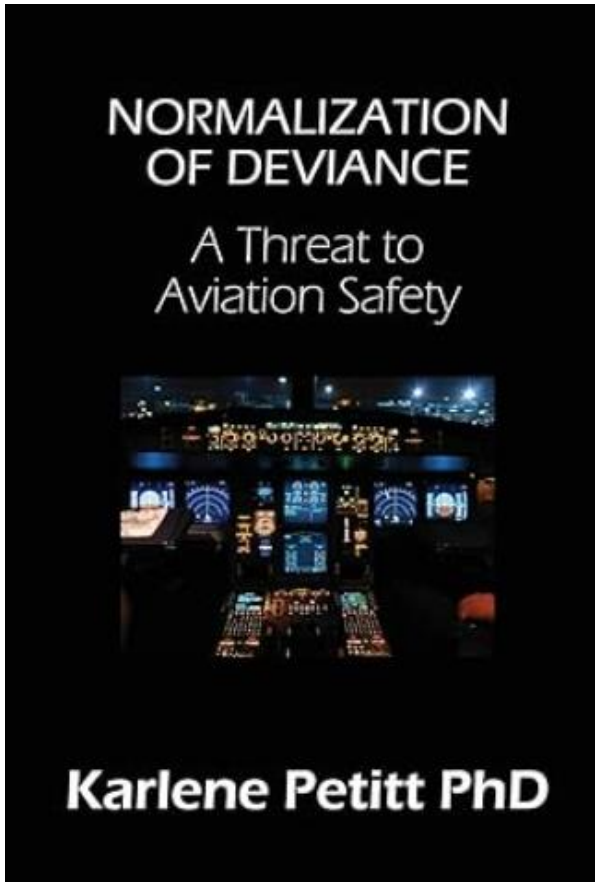
- **Are We Ready and Smart Enough to Accept It?**
- Hobbs, A. (2004). Human Factors: The Last Frontier of Aviation Safety? *The International Journal of Aviation Psychology, 14*(4), 335–341. https://doi.org/10.1207/s15327108ijap1404_1
- The argument is that, only once we have tackled the “easy” causes 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…

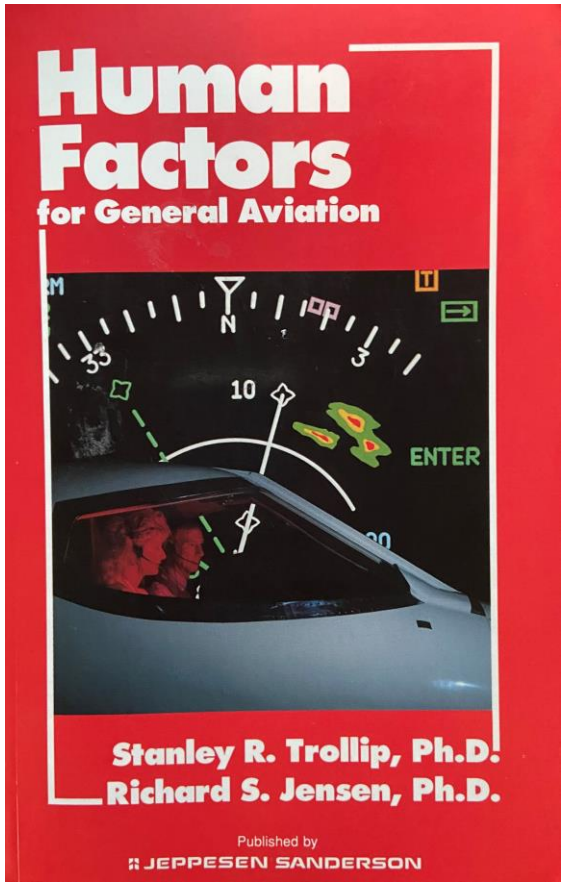


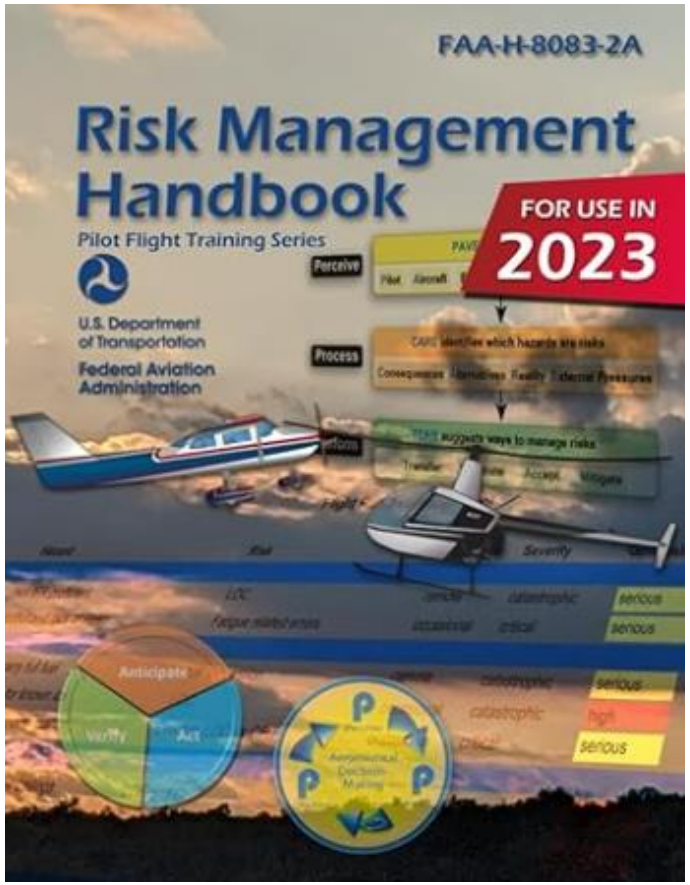
Homework—2a

- **Other “good reads”**



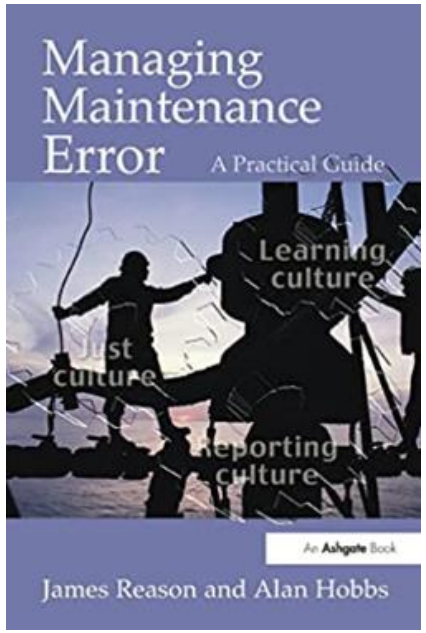


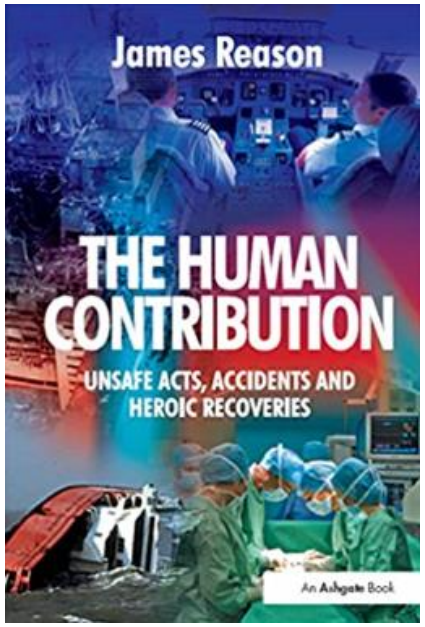


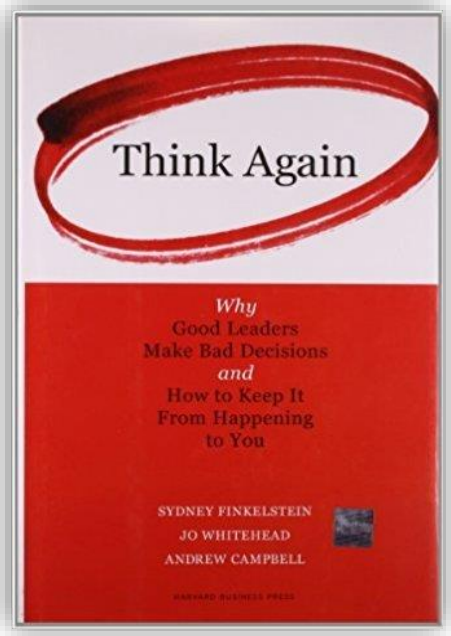


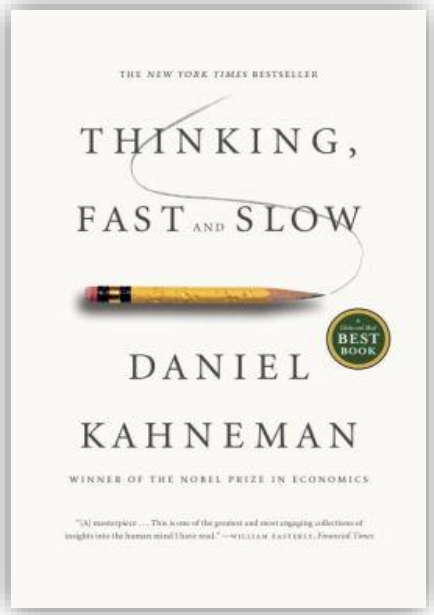
Homework—2b

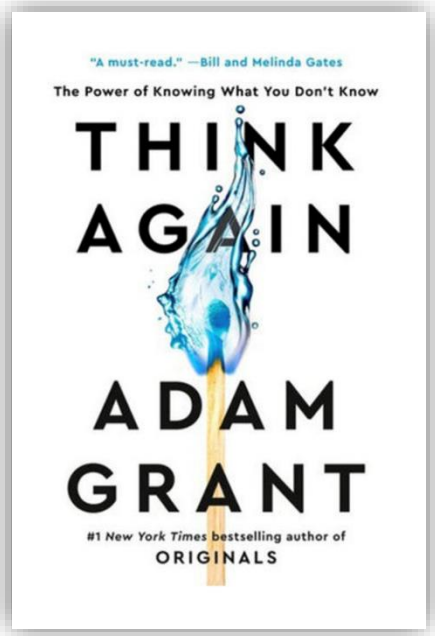
- **Yet more:**





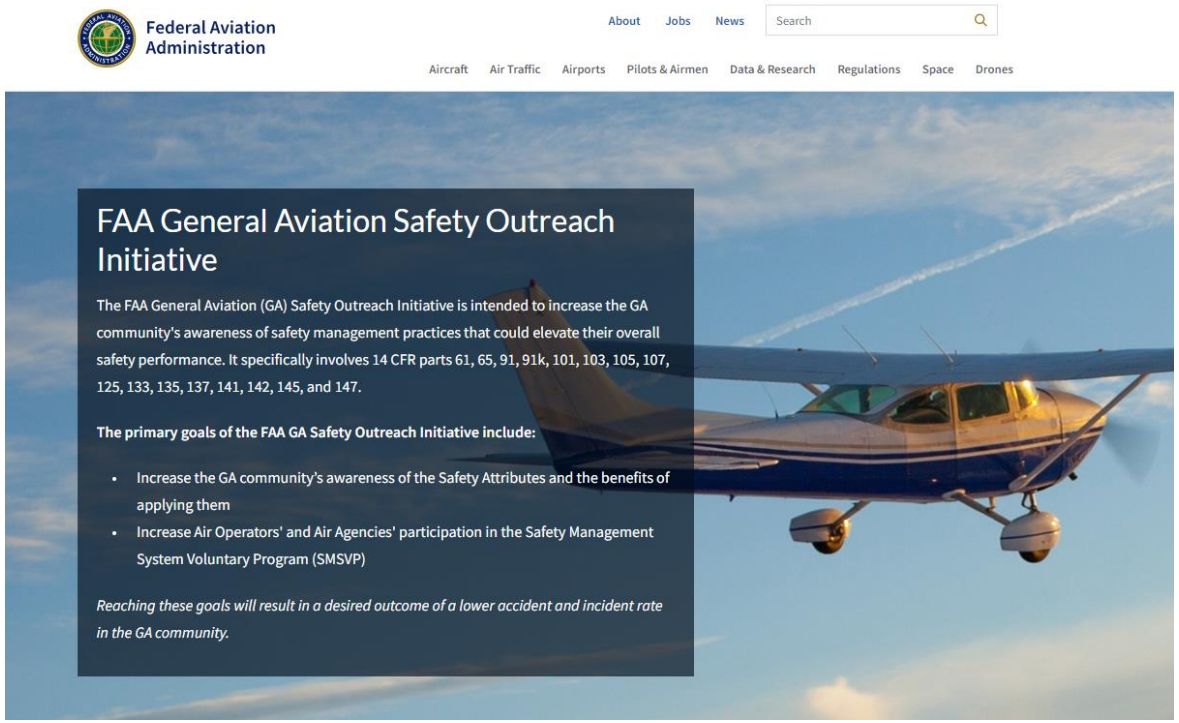






Homework-3: FAA

- **See what you are missing out on:**
- **Just like the *WINGS* program, it is there for us to use**

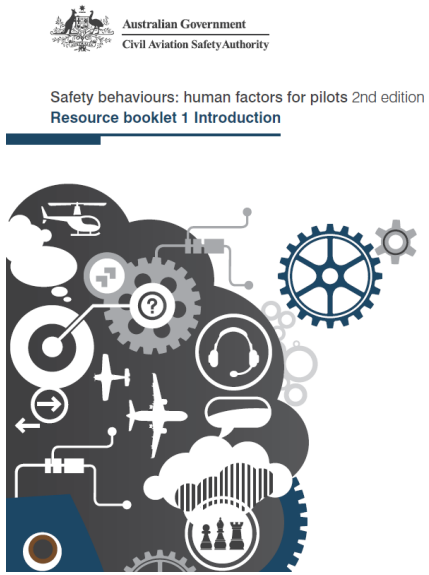


https://www.faa.gov/about/initiatives/gasafetyoutreach

Homework-4 (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-5: Resources - General

- **Spend some quality time with these resources:**
- A Closer Look at Personal SMS
- 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

Subscribe to Aviation Safety

https://www.aviationsafetymagazine.com

Homework-6: SLAP

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

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?**

Next Month…

The National FAA Safety Team Presents

Topic of the Month—February Community Outreach

- Preflight-in-a-Box
- 1st Responders Training

Presented to: Safety Minded Aviators, Everywhere…

By: Stephen Bateman, CFI, AOPA Flying Clubs

Date: Tuesday 20th February 2024

Produced by:
The National FAA Safety Team (FAASTeam)

Federal Aviation Administration

Thank you for attending!

You are vital members of our GA safety community!

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!
  - December edition 12/17/2023