

The National FAA Safety Team Presents



Federal Aviation
Administration

Introduction to Safety Risk Management (SRM)

Presented to: WAFC and Friends
By: Stephen Bateman, CFI
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Produced by:
The National FAA Safety Team (FAASTeam)



Welcome

- **Steve Bateman, CFI, AOPA Director of Flying Clubs**
- **WINGS Credit: Yes...but give me a day...**
- **Probably no time for questions, but please send me email:**

steve.bateman@aopa.org



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 - No – I do not record these webinars
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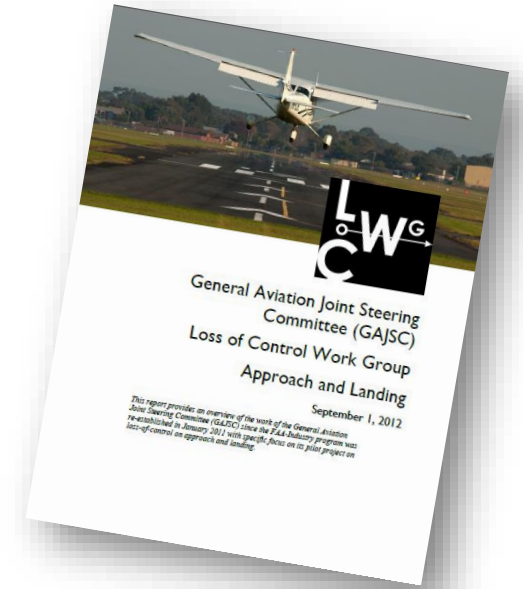
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Overview

- **What is Safety Risk Management?**
- **How do pilots use SRM?**
 - Every flight and every phase of flight!
 - Risk management is part of the ACS – so check rides, flight reviews, proficiency, etc.
- **SRM aids and technologies**
- **Case studies**



* General Aviation Joint Safety Committee



The Need for ADM

- **Staying alive**
- **Regulatory**
 - Safe flying
 - Know all there is to know
 - Fly within the privileges and limitation of your certificates and ratings
- **Human factors (decision making)**
- **Understanding (our) risk, for *this* flight**
- **Pre-flight**
- **In-flight**
- **Post-flight**

- **No-Go/Go decision**
- **Stop/Continue decision**





Introduction to Safety Risk Management

Civil aviation organizations, air carriers, and military aviation activities have embraced Safety Risk Management — a foundational component of all safety management systems. Single-pilot operations can also enjoy the benefits of safer, more efficient flying through the application of risk management processes.

Risk management is a formalized way of dealing with hazards. It is a logical process of evaluation where you weigh the potential costs of a risk against the potential benefits you might receive, if you allowed that risk to stand uncontrolled. In order to better understand risk management, the terms “hazard” and “risk” need to be understood.

A hazard is a present condition, event, object, or circumstance that could lead to or contribute to an unplanned or undesired event such as an accident. It is a source of danger. Examples of common aviation hazards include a nick in the propeller blade, improper refueling of an aircraft, pilot fatigue, and the use of unapproved hardware on the aircraft.

If pilots do not recognize a hazard and choose to continue, the involved risk is not managed.

Risk management is a three-step process that people use to:

- identify hazards,
- express how likely those hazards are to negatively impact their operations, and
- reduce the chances that those hazards will cause an accident.

Step 1: Hazard Identification

What conditions or circumstances could negatively affect your flight?

Step 2: Risk Assessment

How likely are the identified hazards to cause a problem and how severe will the consequences be if they do?

Step 3: Risk Mitigation

What can you do to reduce the risks to acceptable levels?

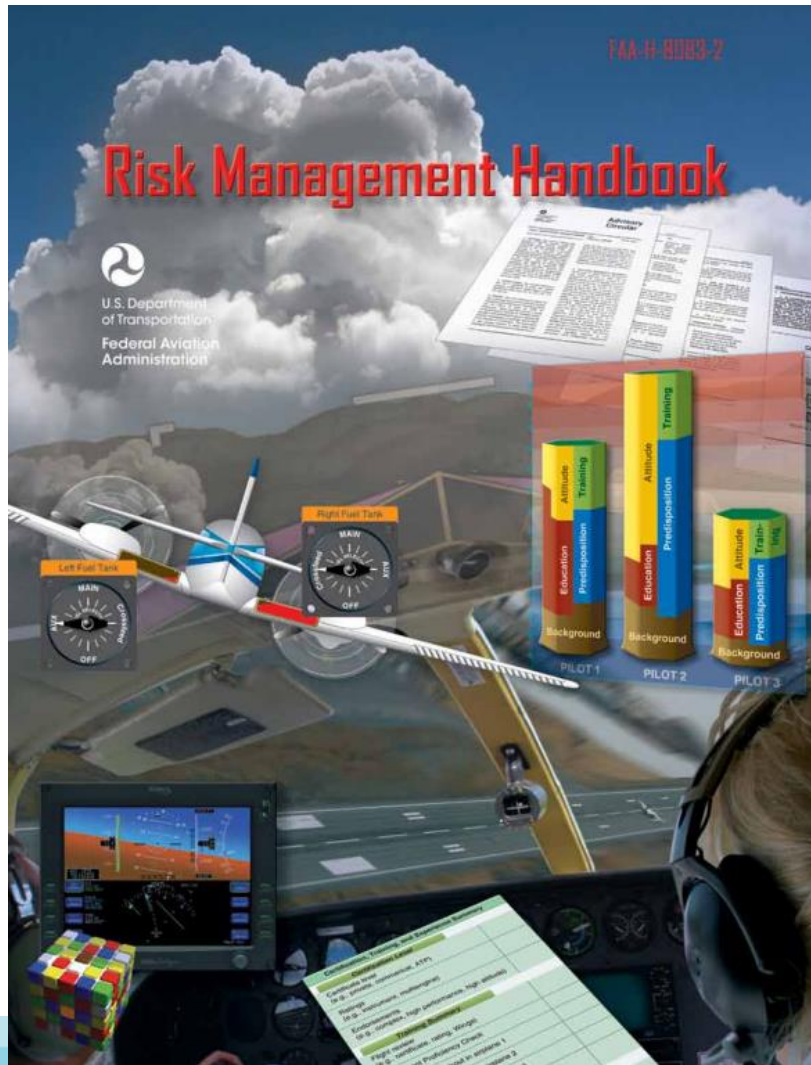
We need to constantly monitor the hazards and risks associated with our flight to make sure that the identified risks remain at an acceptable level.



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But Wait...There's A Whole Handbook On This...



“A key element of risk decision-making is determining if the risk is justified.”

- Flying is risky
- Can we “de-risk” to an acceptable level?
- What *is* that level?
- Tools can help, but will not give *the* answer



FAA SMS Policy

- **FAA Order 8000.369, Safety Management System**
- **Consists of four components:**
 - Safety Policy
 - **SRM**
 - Safety Assurance
 - Safety Promotion.
- **These components work together to enable the FAA to manage safety within the aerospace system.**



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
National Policy

**ORDER
8000.369B**

Effective Date:
03/18/16

SUBJ: Safety Management System

1. This order establishes the Safety Management System (SMS) policy for the Federal Aviation Administration (FAA) and requirements for FAA organizations incorporating SMS and/or International Civil Aviation Organization (ICAO) State Safety Program (SSP) frameworks to form the overall FAA SMS. Specifically, this order:

- a. Furthers safety management by evolving to a more process-oriented system safety approach with an emphasis on Safety Risk Management (SRM) and Safety Assurance.
- b. Sets forth basic management principles to guide the FAA in safety management and safety oversight activities.
- c. Requires adopting a common approach to implementing and maturing an integrated SMS, including fostering a positive safety culture and other attributes as applicable.
- d. Defines the roles and responsibilities of the FAA organizations, FAA SMS Executive Council, and FAA SMS Committee regarding safety management.



Federal Aviation
Administration

FAA SRM Policy



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
National Policy

ORDER
8040.4B

Effective Date:
05/02/17

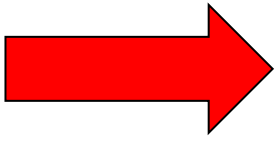
SUBJ: Safety Risk Management Policy

This order supports Federal Aviation Administration (FAA) Order 8000.369, *Safety Management System*, and establishes requirements for how to conduct Safety Risk Management (SRM) in the FAA. It formalizes SRM guidance for FAA Lines of Business (LOBs) and Staff Offices, and describes specific steps when performing and documenting SRM.

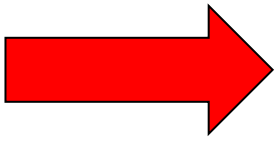
The FAA's mission is to provide the safest, most efficient aerospace system in the world. In support of this mission, the FAA uses a Safety Management System (SMS) to integrate the management of safety risk into operations, acquisitions, rulemaking, and decision making. The SMS enhances the safety of the flying public and strengthens the FAA's worldwide leadership in aviation safety.

The SMS consists of four components: Safety Policy, SRM, Safety Assurance, and Safety Promotion. The objective of SRM is to provide information regarding hazards, safety risk, and safety risk controls/mitigations to decision makers and to enhance the FAA's ability to address safety risk in the aerospace system. SRM consists of conducting a system analysis; identifying hazards; and analyzing, assessing, and controlling safety risk associated with the identified hazards. SRM as described in this order outlines standardized principles that enhance the FAA's ability to coordinate risk-based decision making across organizations. Safety Policy and Safety Promotion are not addressed in this order, but are discussed in detail in FAA Order 8000.369, *Safety Management System*. However, Safety Assurance is described in this order due to its importance in triggering SRM through the identification of potential hazards or ineffective safety risk controls, as well as its role in monitoring safety risk controls. All four components work together to enable the FAA to manage safety within the aerospace system.

FAA Order 8040.4B, Chapter 2; Safety Risk Management Process



2. Safety Risk Management Process.⁴ A thorough understanding of the components of safety risk must entail an examination of the factors that increase or decrease the likelihood of system events (errors or failures) that can result in unwanted outcomes (accidents or incidents). The analysis must also consider the type of outcomes possible in order to estimate potential severity. The steps of the SRM process are described below. While the steps of the process are described sequentially, they may be accomplished in parallel. The SRM requirements and concepts described in this order do not preclude FAA organizations from taking immediate interim action to mitigate existing safety risk prior to conducting SRM and identifying permanent mitigations.



- a. System Analysis.
- b. Identify Hazards.
- c. Analyze Safety Risk.
- d. Assess Safety Risk.
- e. Control Safety Risk.



Foundational Elements of Safety

- **Safety Risk Management**
 - Hazard identification, risk assessment, and risk mitigation
- **Pilot Proficiency**
 - The practiced skills to do the job
- **Technology**
 - Supporting safe decision making and aircraft operations



A matter of balance



Terminology...

- **Risk Management:**
 - Systematic approach to identify hazards, assess the degrees of risk and determine the best course of action
- **Hazard: *A current condition that could lead to unintended consequences***
- **Risk: *Future, uncontrolled impact of a hazard***
 - Not so much the percentage “chance” of something happening, but more the impact if it does...
- **We fly...there will always be some risk...how much is “okay”?**
- **Ways to mitigate risk**
 - Experience (not complacency)
 - But do we get more complacent as we gain experience?
 - Personal limits and minimums
 - Tools to guide us through the thought process (not a crutch...)



Choices, Choices...

- **Accept the risk**
 - It might work out...did the last time
- **Eliminate the risk**
 - Get rid of it...so don't have to deal with it at all
- **Mitigate the risk**
 - Work around it
 - Reduce the likelihood and impact



Severity of consequences (degree of risk)



Marginal



Catastrophic



Safety Risk Management

- Hazard Identification
 - Risk Assessment
 - Risk Mitigation
 - Monitoring
-
- **In and during ALL phases of flight!**



Everyday Example...

- **Remove pizza from hot oven**
- **Hazard...burns**
- **Risk...depends on removal method**



Risk Assessment

- **Remove pizza from hot oven...**

- Likelihood

- Probable
- Occasional
- Remote
- Improbable

- Severity

- Catastrophic
- Critical
- Marginal
- Negligible



Risk Assessment Matrix				
Likelihood	Severity			
	Catastrophic	Critical	Marginal	Negligible
Probable	High	High	Serious	
Occasional	High	Serious		
Remote	Serious	Medium		Low
Improbable				



Risk Assessment

- Hot oven, pizza pan, & pizza pie
- Use bare hands...



Risk Assessment Matrix					
Likelihood		Severity			
		Catastrophic	Critical	Marginal	Negligible
Probable	High	High	Serious		
Occasional	High	Serious			
Remote	Serious	Medium		Low	
Improbable					



Risk Assessment

- Hot oven, pizza pan, & pizza pie
- Use oven gloves...
- The risk of injury is reduced



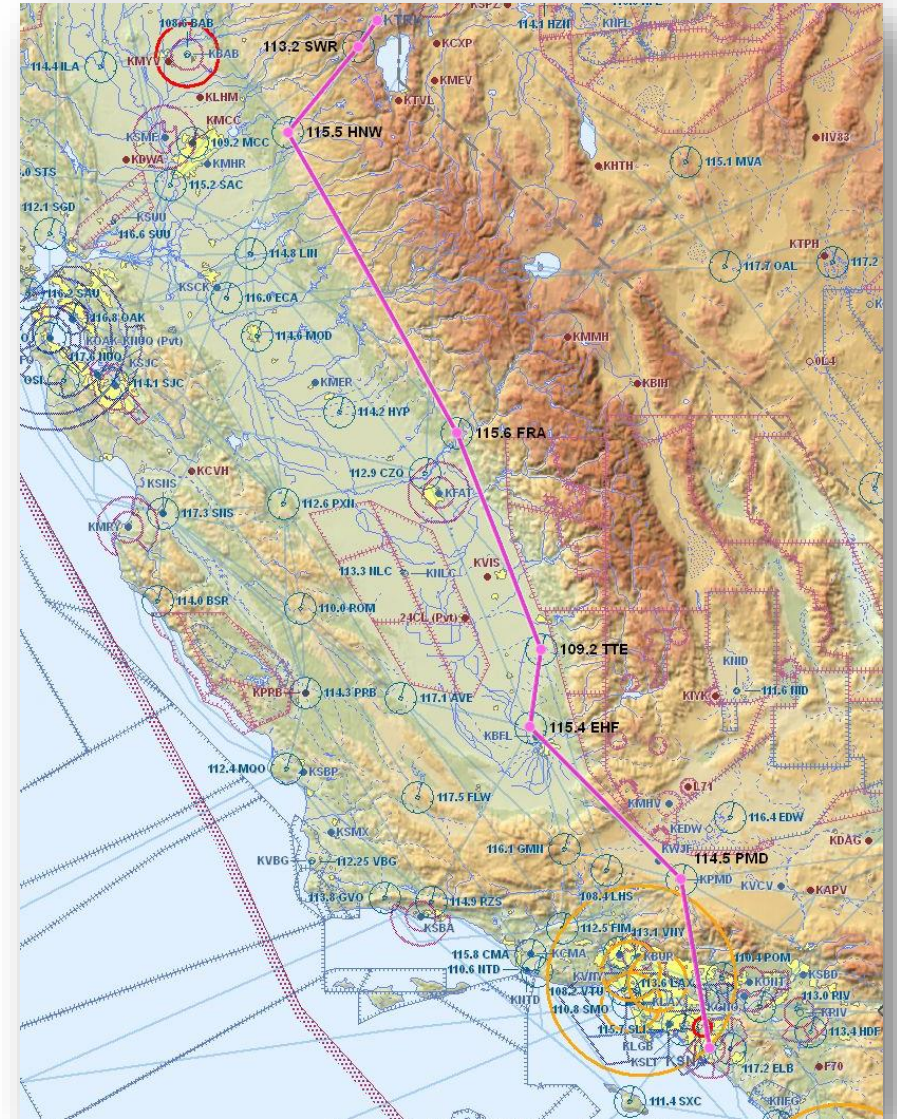
Risk Assessment Matrix

Likelihood	Severity			
	Catastrophic	Critical	Marginal	Negligible
Probable	High	High	Serious	
Occasional	High	Serious		
Remote	Serious	Medium		Low
Improbable				

A red arrow points to the 'Medium' risk cell in the matrix, which is located at the intersection of 'Remote' likelihood and 'Marginal' severity.

Hazard Identification

- **Mission – KSNA – KTRK**
 - 391 nm 3Hrs. 22 Min
 - Depart at 1800 Local Time
- **Pilot – Private, VFR**
 - 850 hrs. TT, 30 in last 6 months
 - Current medical, flight review, day/night currency
- **Aircraft – C-172-P**
 - 43 Gall Fuel, Day/Night VFR
- **Environment – DAY/Night/VFR**
 - Time of year?
 - Mountains
- **External Pressure (s) – Family Reunion**



We Need a Plan...

- **“The value of a plan is not the end result, but the thought process”**
 - Planning things out should raise questions and potential hazards and risks
 - We plan to succeed, so need to mitigate the risks
 - Will never be perfect...must continually revise the plan as more info (and time) progresses
- **In flying, something “always” will be different from the plan:**
 - Weather
 - Wind, time, fuel
 - An unexpected situation
 - The idiot...



Why ADM is Not Psycho-Babble

- **Lack of ADM in the wider sense is (still) a killer**
 - Pilot related accidents consistently around 70% of total
 - *FR into IMC
 - Beyond luck, we can only correctly respond to situations if we have seen them before—and practice them regularly = PROFICIENCY
- **FAA has created several “tools” to get us to focus on things that matter...let’s look at a some...**



ADM and SRM Tools

- **Aviate, Navigate, Communicate**
- **Situational awareness (uh...what's it doing now...?)**
- **Don't fight the crocodile (listen/feel the airplane)**
- **3 Ps (Perceive, Process, Perform)**
- **5 Ps (Plan, Plane, Pilot, Passengers, Programming)**
- **PAvE (identify hazards)**
- **IM SAFE**
- **IM AIR**
- **DECIDE**
- **Stop, think, analyze, act**
- **FRAT (evaluate the impact of hazards)**



Something Happens...

Options:

1. Headless chicken management



2. Squirrel head-in-a-can model



3. Smart brain: Organized method to determine best way to achieve the best outcome



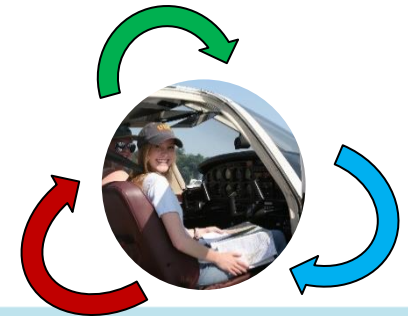
The 3 Ps

- **Perceive** –
 - Identify the hazard
- **Process** –
 - Assess the likelihood of occurrence
 - Assess the severity of consequences
 - Develop a plan to eliminate or mitigate
- **Perform**
 - Implement risk elimination or mitigation plan

Was it effective?

- **Perceive** –
 - Assess plan effectiveness
- **Process** –
 - Develop adjustments to the plan
- **Perform**
 - Implement plan adjustments

SRM is not a one-off
Revisit during all phases of flight
Change the plan as appropriate



DECIDE Model

- **D**etect change (or identify problem)
- **E**stimate significance (of the change)
- **C**hoose the (best) objective or outcome
- **I**dentify options (that meet objective or desired outcome)
- **D**o best option
- **E**valuate (the outcome—if the outcome is not what is desired then go around again)

- **R**epeat



It is Common Sense—I Don't Need a Model

Hazardous attitude, right here...!

These models give you:

1. **Structure...** *"A systematic approach to the mental process of..."*
2. **Stages to help come to an action**
3. **Alternatives:** Recognize that it might not work the first time—you now have more information to make a better-informed decision
4. **Time:** Helps you **SLOW DOWN** and consider, rather than poke-and-hope at a solution



PAvE Before and During Every Flight

- PAvE is an all-in-one check
- Pilot (Pilot, Aircraft, Environment, External)
- Only works if you are honest
- Do it in all phases:
 - Pre-flight
 - Taxi
 - Take-off
 - Climb
 - Cruise
 - Descent
 - Approach
 - Landing
 - Taxi



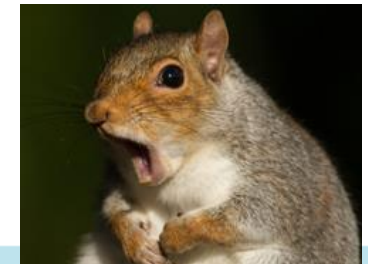
PAvE as a planning tool

- **Pilot:**
 - Current? (FR, medical, pax...)
 - Proficient (in type)
 - Proficient in *that* plane (systems, avionics, quirks...)
 - Up to it, *today*? (IM SAFE, IM AIR...)
 - Personal minimums (they're not for you dummy, but for your loved ones)
- **Aircraft:**
 - Legal for *this* flight (airworthy, inspections, squawks, habits...)
 - Systems (fuel management, make/model differences...)
- **Environment:**
 - WK-RAFT (91.103)
- **External pressures:**
 - The mission
 - The passengers
 - The expectations
 - The reality...
 - Not Go/No-Go, but No-Go/Go



IM SAFE...Today?

- From Brainiac Flying presentation...
- Same person responds differently to unexpected in-flight events on different days
- **Linked to “hyperness”**
 - Blood sugar levels
 - Emotional state
 - Hydration
- **Include your “level of hyperness” as part of IM SAFE**
 - Emotional state, stress levels and attentiveness
 - If you are feeling like a squirrel, don't fly!



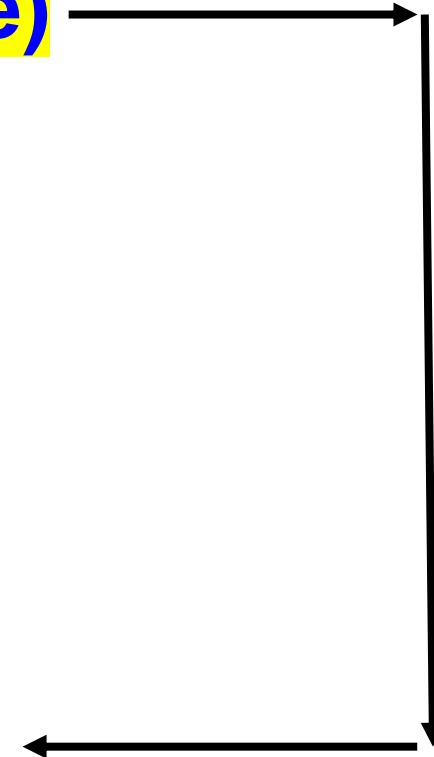
WK RAFT (91.103) know all there is to know...

- **W** **Weather (including density altitude)**
- **K** **Known issues: NOTAMs, TFRs**

- **R** **Runways of intended use**
- **A** **Alternatives**
- **F** **Fuel management**
- **T** **Take-off and landing performance**

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Every Flight is Different:

- This plane (and I) can easily handle 20-k^{ts} winds
 - Worked out OK last time
- Weather doesn't look too bad
 - Worked out OK last time
- Not much I can do about ceiling...
 - Worked out OK last time
- It is only *just* so nothing to worry about
 - Worked out OK last time
- If I get low, it will be alright
 - Worked out OK last time
- What happened to me as I did a flight review recently

Recognize These "Hunters"?

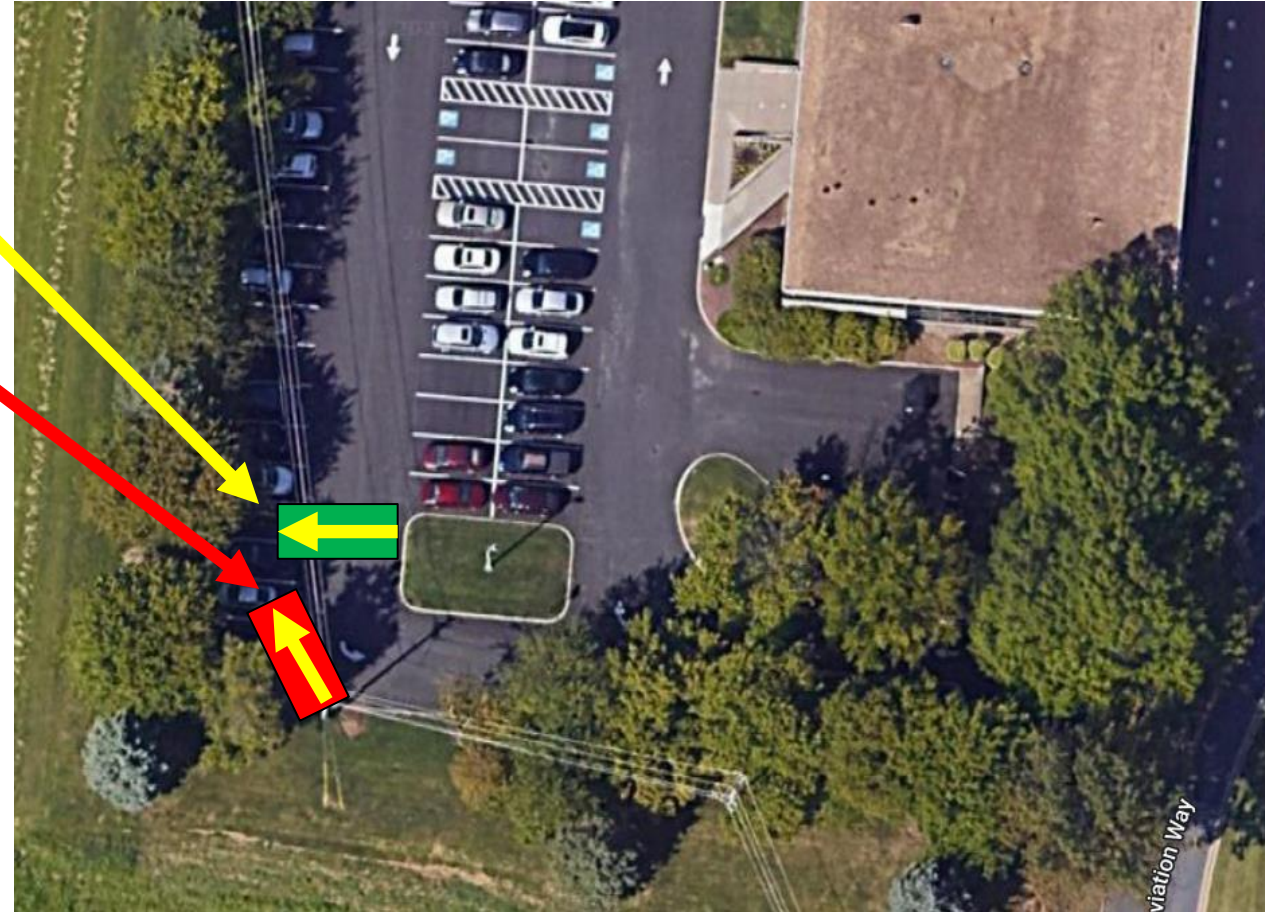
Let's Talk About Hazardous Attitudes...

- **This doesn't start/stop with aviation...**
- **In fact, "it begins at home"... and bad habits spill over into our flying**
- **Examples...?**
 - Drive at the speed limit?
 - Stop and yield signs are the same thing?
 - I can fix the brakes on my son's car...I've done it on bicycles before
 - I don't need gloves to take that pizza from the oven
 - I think my car will fail the smog test...
 - Oh, well, it's stupid anyway so I won't even bother about it...



Let's Talk About Hazardous Attitudes...

- AOPA car park
- One-way system. Note the arrows
- I'm reversing into a spot
- Colleague ignores the one-way and cuts behind
- Conversation:
 - Me: Didn't you see the one-way sign and arrows?
 - SP: Yeah...but its quicker to ignore that and go the wrong way
 - SP: We call that a hazardous attitude in aviation
 - SP: Oh...I wouldn't do that sort of thing when flying...
 - Me: Umm...who is your instructor?



The Five Hazardous Attitudes

IM AIR

	Attitude	Symptom	Antidote
I	Invulnerable		
M	Macho		
A	Anti-Authority		
I	Impulsive		
R	Resignation		

The Five Hazardous Attitudes

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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

Using a FRAT

- **Flight Risk Assessment Tool**
 - A planning tool that guides you to think
 - Will not give you “the answer”
 - Only useful if you are honest
 - Use it to understand and then mitigate risk
 - Siri is not a good FRAT...





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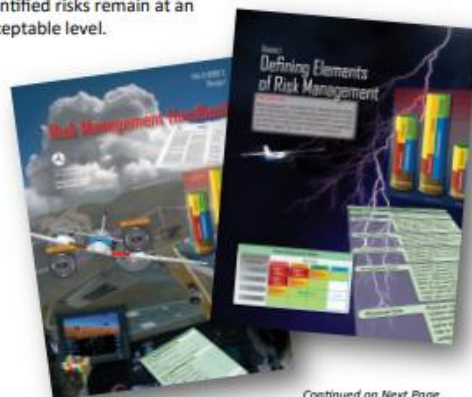
Step 2: Risk Assessment

How likely are the identified hazards to cause a problem and how severe will the consequences be if they do?

Step 3: Risk Mitigation

What can you do to reduce the risks to acceptable levels?

We need to constantly monitor the hazards and risks associated with our flight to make sure that the identified risks remain at an acceptable level.



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Flight Risk Assessment Tools (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, it 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.

Although designs can vary, FRATs generally ask a series of questions that help identify and quantify risk for a flight. The FAA Safety Team (FAASTeam) currently offers a FRAT tool that follows the PAVE checklist, covering questions on the Pilot, Aircraft, enVironment, and External Pressures.



For example, you may be asked how much rest you've had, how much time you've had in the aircraft, and what the weather conditions are for your destination. Based on the answers you supply, a total risk score is calculated.

No FRAT can anticipate all the hazards that may impact a particular flight, but there are some common hazards that GA pilots encounter regularly.

The FAASTeam's easy-to-use and GA-focused FRAT can get you started in effective safety risk management. The FRAT tool is currently available as an automated spreadsheet available at <https://go.usa.gov/xkhJK> or via an iOS app available on the App Store at <http://bit.ly/FAAST-FRAT>.



Resources

- ◆ **Risk Management Safety Minute Video**
<https://youtu.be/fSjN59ShMng>
- ◆ **Risk Management Training Video**
<https://youtu.be/luiIOUZeCWO>
- ◆ **FAA Risk Management Handbook**
<http://bit.ly/rm-handbook>
- ◆ **Flight Risk Assessment Tools (FRAT) Fact Sheet**
<http://bit.ly/2hk3omM>
- ◆ **January/February 2017 issue of FAA Safety Briefing**
 - ⇒ “Risky Business: The What, How, and Why of Risk Management”
<https://adobe.ly/2iBEi3h>
 - ⇒ “Say Ahh ... A Pilot’s Guide to Self-Assessing Risk”
<https://adobe.ly/2ibKIHO>
 - ⇒ “Is My Aircraft Right for Flight? The Importance of Preflight Prep”
<https://adobe.ly/2iePJ4p>
 - ⇒ “The Wild (Not So Blue) Yonder: Mitigating Risk in the Flight Operating Environment”
<https://adobe.ly/2hus9AX>
 - ⇒ “Are We There Yet? How External Pressures Can Affect Your Flight”
<https://adobe.ly/2ioBgQs>



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.

Why Should I Use It?

"In the thick" is no time to try to mitigate a potentially hazardous outcome. When preparing for a flight or maintenance task, operators and maintenance technicians should take time to stop and think about the hazards involved.

Attempting this task "in our heads" usually does not take into account actual risk exposure. The mind tends to compartmentalize the individual hazards which, in turn, fails to appreciate their cumulative effects. We may also allow our personal desires to manipulate our risk assessment in order to meet personal goals. The best way to compensate for these inherent shortcomings is to take the task to paper.

Putting everything on "paper" allows us to establish our risk limits in an atmosphere free from the pressure of an impending flight or maintenance task. It also gives a perspective on the entire risk picture that we cannot get in our heads. More importantly, it sets the stage for managing risk through proactive risk mitigation strategies that are documented.

Although designs can vary, FRATs generally ask a series of questions that help identify and quantify risk for a flight. The FAA Safety Team's current FRAT tool (an automated spreadsheet available at go.usa.gov/xkhJK) follows the PAVE checklist, covering questions on the Pilot, Aircraft, enVironment, and External Pressures. For example, you may be asked how much rest you've had, how much time you've had in the aircraft, and what the weather conditions are for your destination. Based on the answers you supply, a total risk score is calculated.

The form is titled "RISK ASSESSMENT" and includes sections for "PILOT'S STATE", "HOW IS THE DAY GOING?", "HOW DO YOU FEEL?", "WEATHER AT TERMINATION", and "PLANNED". It contains various questions with checkboxes and a final "TOTAL SCORE" section with a color-coded scale from 0 (Not Complex Flight) to 20 (Area of Concern).

Example Risk Assessment Form

Continued on Next Page

What Do I Do With My Score?

The FAASafety Team FRAT, like many other FRATs, produces a score that will fall within one of three risk categories: Green (low), yellow (medium), and red (high).



Green: Go fly!

With a clear in-the-green score, you might be tempted to blast off with unabated zeal. Not so fast. A FRAT is not meant to make your go/no-go decision for you. It is merely a tool to help you plan your flight and think through a more complete range of hazards and risks. When using a FRAT, it's a good idea to create numerical thresholds that trigger additional levels of scrutiny prior to a go/no-go decision for the flight. For example, a score that's on the high end of the green scale may still warrant further analysis. The pilot should discuss what the highest scoring risks are and attempt to mitigate those risks.



Yellow: Try to mitigate some of the higher scoring items.

If your score falls in the yellow, try to mitigate some of the higher scoring items. That might entail waiting for the weather to improve or switching to an aircraft you have more experience with. If the score is still in the yellow, bring in the opinion of a designated "contact" person such as a flight instructor or an FAASafety Team Representative. They may be able to help think of ways to further mitigate some of the risks for your flight.



Red: No-Go.

If your score falls in the red zone, you should seriously consider cancelling the flight unless the risks involved can be safely mitigated. It's important to not allow the external pressures involved with carrying on with the flight (e.g., attending your son's graduation ceremony) interfere with your go/no-go decision. You (and

your passengers) may be disappointed, but it's always better to be wishing you were in the air than wishing you were on the ground!

FAASafety Team FRAT

No FRAT can anticipate all the hazards that may impact a particular flight but there are some common hazards that GA pilots encounter regularly. The FAASafety Team's easy-to-use and GA-focused FRAT can get you started in effective safety risk management. The FRAT is currently available as an automated spreadsheet that will run on MS Windows or Apple computer operating systems, but a new smartphone app version is in the works and should be released later in 2017.

Learn More

FAA InFO 07015 — Flight Risk Assessment Tool
<http://bit.ly/2hkKTOM>

FAA Advisory Circular, AC 120-92A,
SMS for Aviation Service Providers
<http://bit.ly/2gc1p2x>

Risk Management Handbook (FAA-H-8083-2)
Chapter 4-2
<http://go.usa.gov/JAJk>

"You Can Take it With You," FAA Safety Briefing,
July/August 2012, page 4
<http://go.usa.gov/JAuV>



FAAST FRAT

- Navigate to [FAASafety.gov](https://www.faa.gov)
- Click on Resources then click on Library



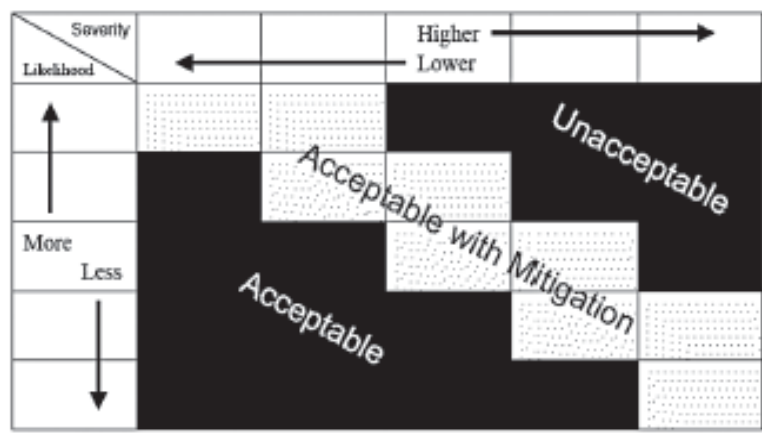
• https://www.faa.gov/gslac/ALC/lib_categoryview.aspx?categoryId=31

A screenshot of the FAA Safety Team website. The top navigation bar includes 'Home' and 'About the FAASafety Team'. Below this is a search bar with the text 'Searches Only Learning Center and Document Library' and a 'Search' button. A dark blue navigation bar contains 'Activities, Courses, Seminars & Webinars', 'Maintenance Hangar', 'Pilots', 'Resources', and 'Page Help'. The 'Resources' menu is open, showing a list of options: 'About the FAASafety Team', 'FAASafety Team Directory', 'FAQ', 'Library', 'News', 'Notices', 'Online Resources', 'RSS Web Feeds', 'Search', 'Support', and 'Training Providers'. A large red arrow points to the 'Library' option. The main content area features a 'Featured Courses' section with links like 'DC Special Flight Rules Area', 'Weather Wise: VFR into IMC', and 'Avoiding Loss of Control'. Other sections include 'Hot Topics' with 'WINGS Pilot Proficiency Program', 'Upcoming Seminars', 'AMT Awards Program', 'WINGS AC 61-91J', 'Instructor Portal', and 'WINGS Achievements'.



FAAST FRAT

- Flight Risk Assessment Tool
- FRAT usefulness depends on your attitude...
- Can't cover all possible flight hazards
- Useless if you cheat
- Safety Risk Management – 101
 - Recognize the severity of a risk FOR YOU and THIS FLIGHT

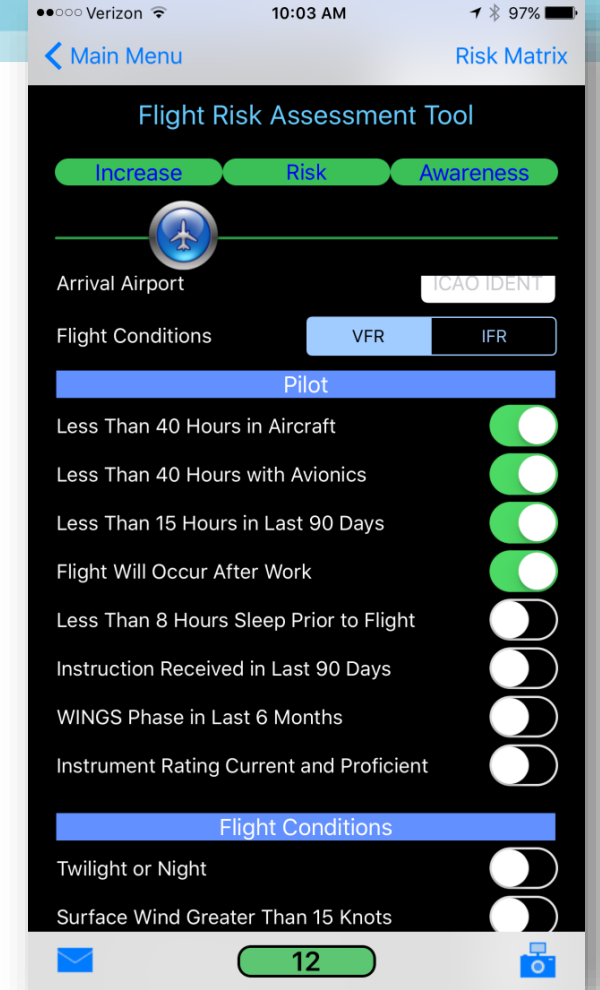


Pilot	Time in Type	Low	Moderate	High
VFR	<100	5 to 15	15 to 20	>20
VFR	>100	15 to 20	20 to 25	>25
IFR	<100	20 to 25	25 to 30	>30
IFR	>100	25 to 30	30 to 35	>35



FRAT Apps

- **Available for mobile devices**
 - Search for FRAT in your mobile App store
 - They will NOT give you the answer
 - Use as a tool to gain awareness
- **Not so much the presented result but the thought process behind your interpretation of the results**



Crew Resource Management (CRM)



ATC, Flight Dispatch, Flight Following & Flight Service



Automation Resources



Flight Service Online Portal

- Access at www.1800wxbrief.com
- “Official” briefing
- One stop shop...
- Can it be any easier...?
 - Weather products
 - Flight plan your route
 - Click to get a briefing – magic!
 - Then call a briefer for more details, questions, etc.
 - File and verification of acceptance

FlightService 1800wxbrief Better Briefings, Safer Flights

Home Pilot Dashboard Weather Flight Planning & Briefing Airports UAS Account Links Help Logout

Welcome FRED I STAHL Fri Sep 16 13:27:15 EDT | 17:27:15 Z

Optimize your experience [Learn & Register](#)

ACAS EasyActivate™ EasyClose™ Close Reminders ATC Notices SE-SAR Provide information for improved service [My Aircraft](#)

Activate, Close, Amend, Cancel, and View Alerts for your Flight Plans here Last updated at 17:26Z

No current flight plans

Weather and Airport Conditions [Edit Favorites](#)

U.S. WEATHER DEPICTION U.S. SURFACE ANALYSIS 12 HR SURFACE PROG 24 HR SURFACE PROG

Click Weather Graphic to enlarge

Plain Text [What's this?](#)

KFDK KMRB KIAD *Aircraft ID:

Airport	Condition	METARs	Density Altitude
KFDK	VFR	KFDK 161647Z 12005KT 10SM BKN042 BKN055 24/15 A3031	1213 ft
KMRB	VFR	KMRB 161653Z 13006KT 10SM OVC037 22/14 A3027 RMK AO2 SLP247 T02220139	1334 ft
KIAD	VFR	KIAD 161652Z 10007KT 10SM FEW024 BKN040 BKN055 23/13 A3028 RMK AO2 SLP250 T02330128	1115 ft

Airport	TAFs
KFDK	No data available for airport
KMRB	TAF KMRB 161721Z 1618/1718 14005KT P6SM BKN040 FM170400 00000KT P6SM BKN045 FM170700 00000KT 6SM BR BKN015 FM171500 17005KT P6SM BKN025
KIAD	TAF KIAD 161721Z 1618/1724 13006KT P6SM BKN050 FM170500 VRB03KT P6SM SCT020 BKN035 FM171500 18005KT P6SM BKN035 FM171800 18006KT P6SM BKN045

Airport	NOTAMs
KFDK	FDK 16/02008 KFDK AIRSPACE SEE FDC 1/1155 ZDC FLIGHT RESTRICTIONS TFR 1602091925-1701312359EST
KMRB	MRB 16/08021 KMRB OBST TOWER LGT (ASR 1236173) 392531.30N0775706.40W (2.ONM NE MRB) 704.1FT (234.9FT AGL) OUT OF SERVICE 1608210426-1609200426



Passengers



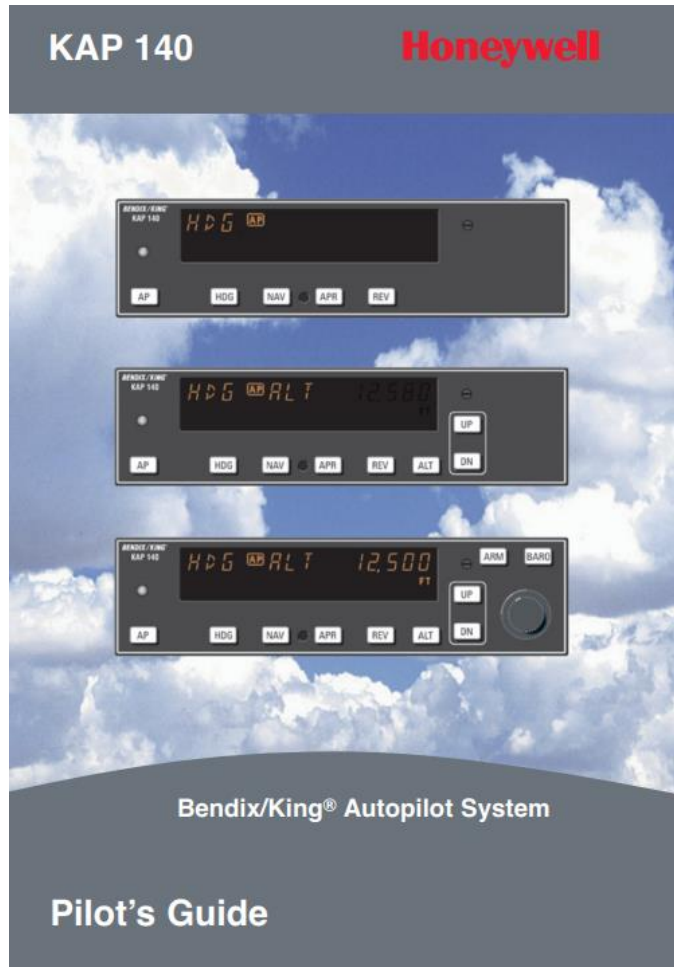
- **Set Pax Expectations**
 - Preflight brief
 - Safety items
 - Sterile cockpit
- **Give them jobs to do**
 - Traffic lookout
 - Chart holder
 - Checklist reader
 - Zoo-keeper



Tablet Apps



Autopilot Systems



GFC™ 500 Digital Autopilot

- Different models
- Practice with all modes & functions
- Don't neglect hand flying skills!

Flight Reviews

- Move beyond the tedious one hour of ground and one hour of stalls and slow flight...
- Expect your next flight review to include demonstration of your:
 - Knowledge
 - Skill
 - Risk Management
- Recognize these? The trifecta of the Airman Certification Standards



ADM Resources



RENEW

AOPA CREDIT CARD

MEMBERSHIP

TRAVEL

PILOT RESOURCES

NEWS & MEDIA

TRAINING & SAFETY

Home > Training & Safety > Air Safety Institute > Safety Centers > Aeronautical Decision Making

SAFETY CENTERS

Aerodynamics

Aeromedical

Aeronautical
Decision Making

Stress Scale

Aircraft Ownership
and Maintenance

Aircraft Systems
and Avionics

Back to Your
Roots

Collision
Avoidance

Emergency
Procedures

Flight Instruction

Flight Planning
and Preflight

Fuel Management

Icing and Cold
Weather Ops



AERONAUTICAL DECISION MAKING

Poor decision making is the root cause of many—if not most—aviation accidents. Good decision making, on the other hand, is about avoiding the circumstances that lead to really tough choices. The goal is very simple: Learn to make good choices every time you fly. This Safety Center brings together relevant safety courses and quizzes to help you hone this single most important safety skill.

Online Courses

- [Do the Right Thing](#)
- [Weather or Not: Thunderstorm Challenge](#)

Videos

- Risk Management Handbook FAA-H-8082-2
- AC 60-22 Aeronautical Decision Making
- FAA P-8740-69 Aeronautical Decision Making
- AOPA ASI ADM courses and quizzes

Safety Management Systems (SMS) Coming to General Aviation

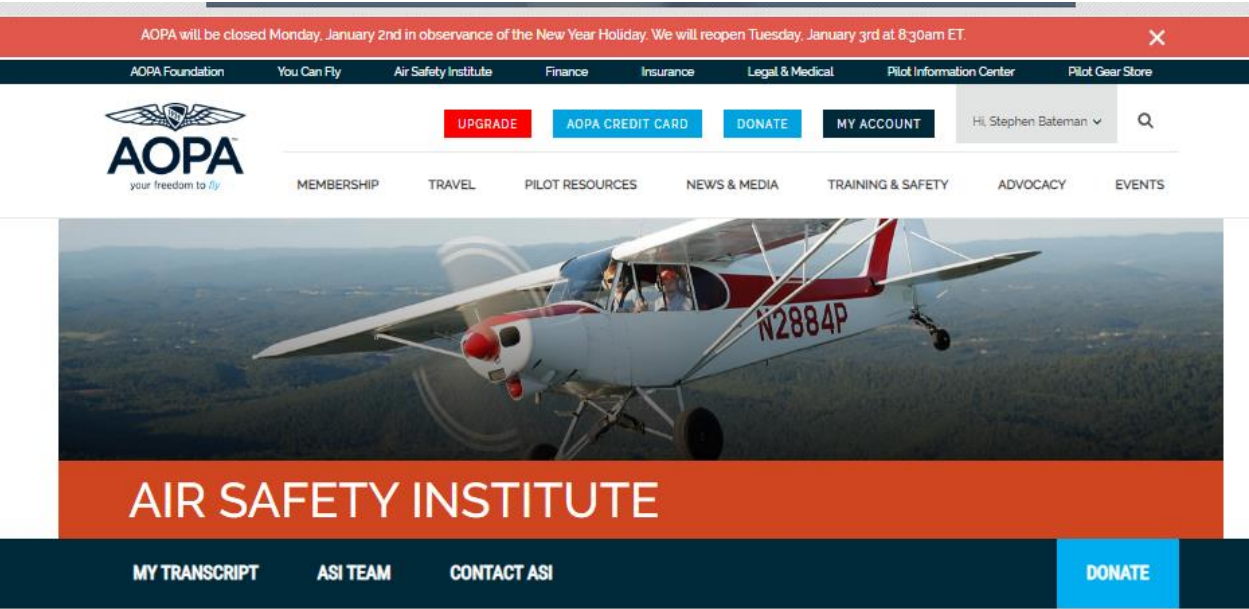


<https://www.faa.gov/about/initiatives/gasafetyoutreach>



Federal Aviation
Administration

Resources—ASI:



Do the Right Thing: Decision Making for Pilots

It's a sad fact of aviation that, every year, approximately 75 percent of all aircraft accidents are caused by pilot error, with a very large number the direct result of poor decisions. Good decision making, judgment, and risk management isn't a course—it's a way of life, particularly for pilots faced with critical choices. It means doing the right thing when nobody is watching, even though it might be inconvenient or expensive. This presentation looks at factors affecting poor decision making and offers advice on how to improve decision making before each flight.

[DOWNLOAD THIS PRESENTATION](#)



Air Safety Webinars

Our webinars bring you impactful, challenging topics to make you a safer pilot. Register for upcoming webinars or watch any you missed.

[REGISTER/VIEW WEBINARS](#)



Online FIRC (eFIRC)

The Air Safety Institute offers the most comprehensive FAA-approved renewal program available with our interactive online course.

[LEARN MORE](#)



Focused Flight Review

The profiles and preflight preparation materials were created to deal with historical problem areas and help make us all better pilots.

[SELECT A FLIGHT PROFILE](#)



Scalable Safety Framework

Are you part of a flying club or other aviation organization? Download the AOPA Air Safety Institute's Scalable Safety Framework (SSF) presentation—a PowerPoint with a supporting PDF—to help your group formulate, implement, and sustain a safety culture.

[DOWNLOAD PRESENTATION NOW](#)

Resources—ASI:




Good Judgement is No Accident

The choices we make play a major role in how safe we are. In this course we'll look at simple techniques for making better decisions both before and during flight.


Earn a certificate of completion after viewing the entire course and pass quiz with 80% or greater.

Enable sound for the best experience.




 [What Is ADM?](#)




 [Personal Minimums](#)




 [Go/No-Go Decisions](#)




 [In-Flight Decisions](#)



 [Practicing ADM](#)



 [Scenario Menu](#)



 [Conclusion](#)



 [Quiz](#)

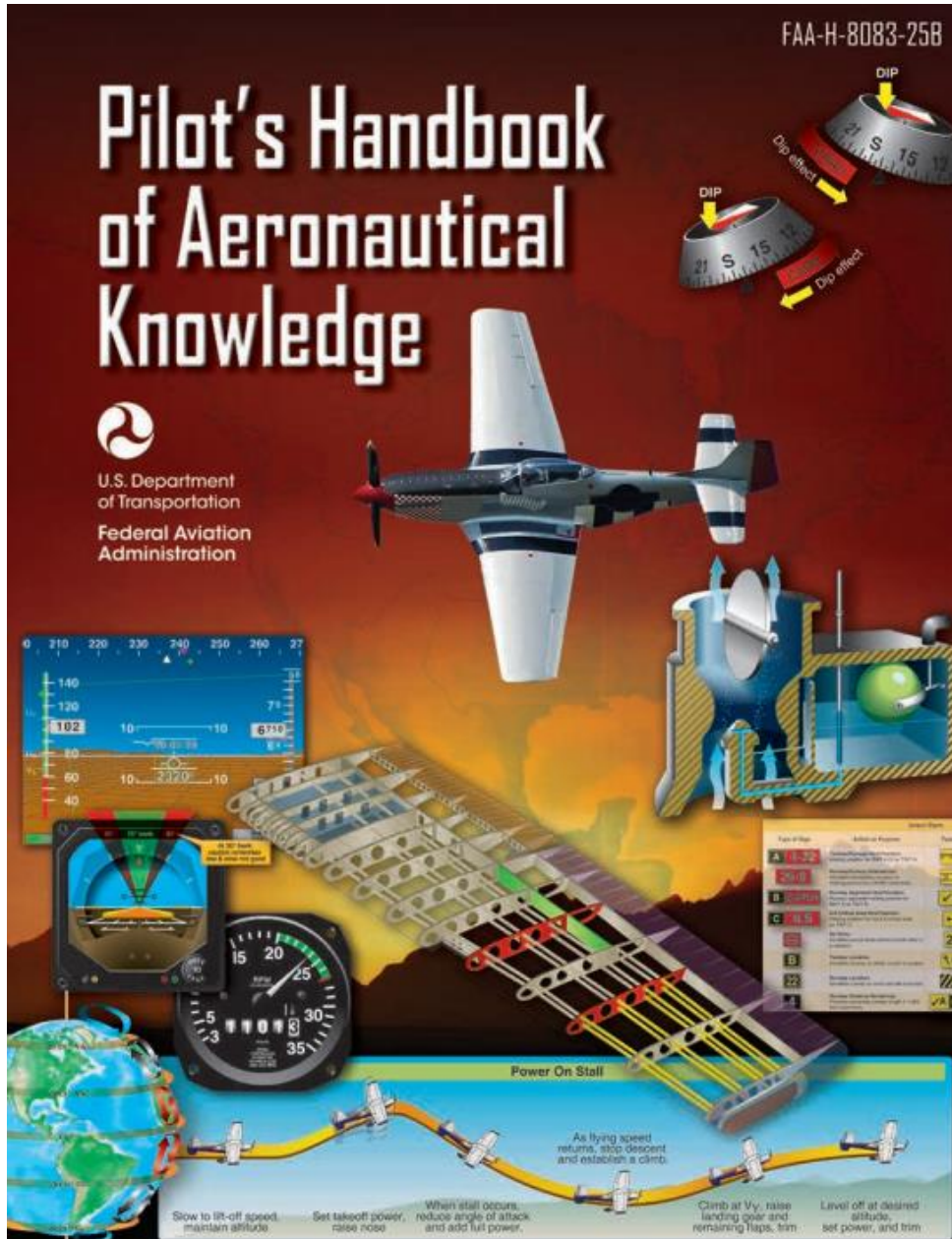


 [Certificate](#)

An interactive course brought to you by the [AOPA Air Safety Institute](#) and produced with the generous support of the [pilot donors](#) like you.

Satisfactory completion of this course qualifies toward [AOPA Accident Forgiveness](#) and [FAA WINGS](#).

Resources—FAA:



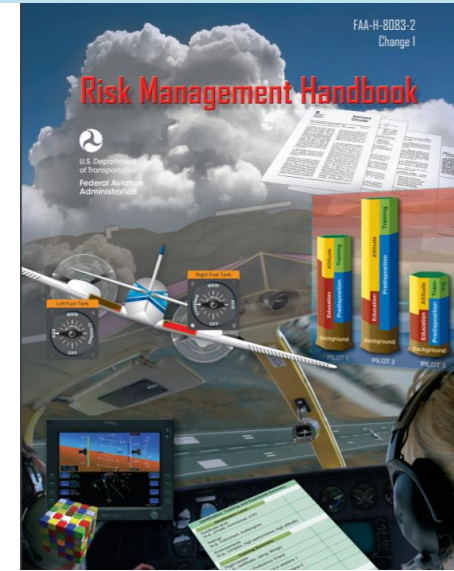
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Learn more about ADM and SRM

- FAA – Risk Management Handbook
- AC 60-22 Aeronautical Decision Making
- Magazines: FAA Safety Briefing, Aviation Safety, IFR Magazine, IFR Refresher...
- Aviation Safety Reporting System (ASRS...”the NASA report...”)
 - More than GOOJF...learn!
 - *CALLBACK*
 - <https://asrs.arc.nasa.gov/publications/callback.html>



CALLBACK
From NASA's Aviation Safety Reporting System

Issue 491 December 2020

VFR Flight Into IMC

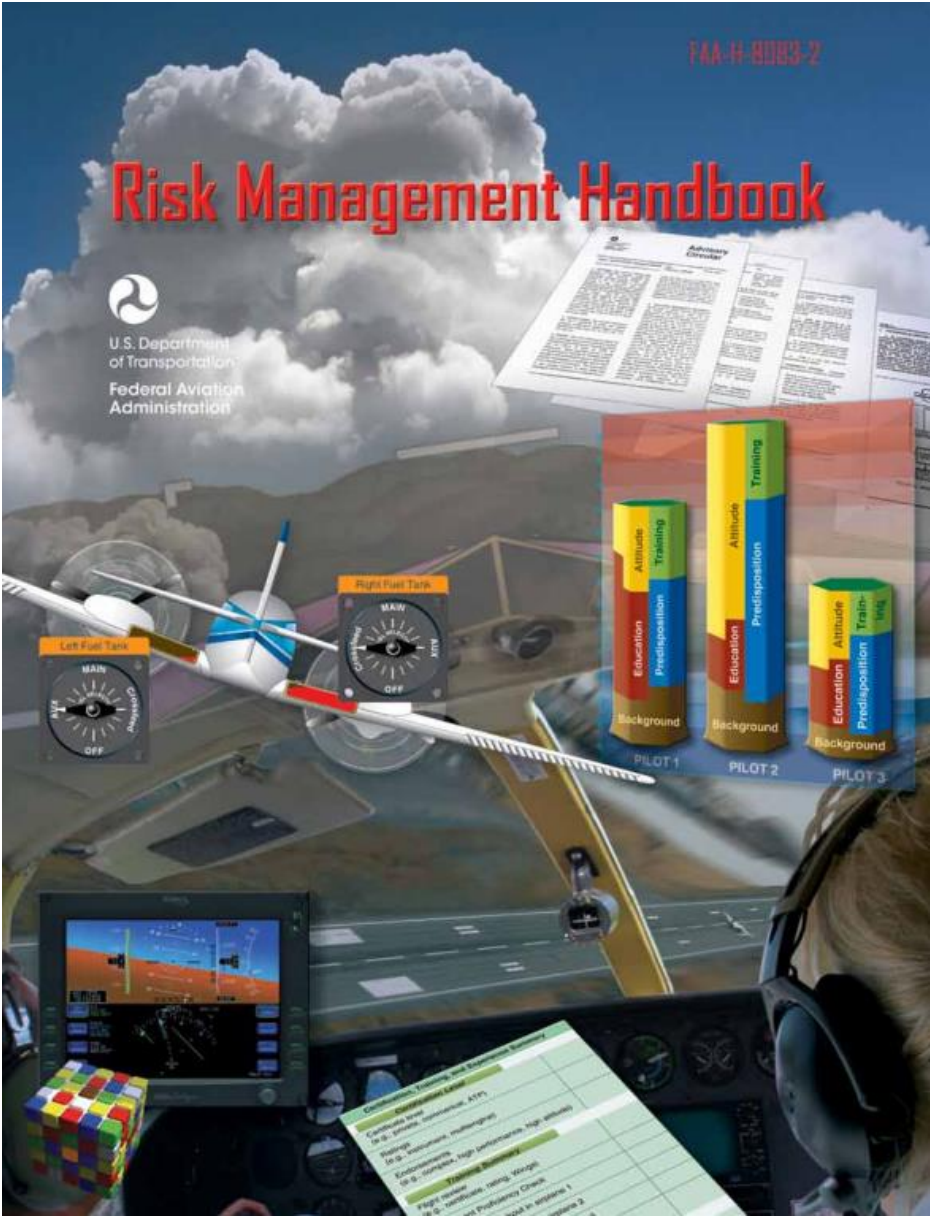
Every pilot, undoubtedly, has a story to tell about flying VFR into deteriorating weather. Whether or not a flying pilot is instrument-rated, FAA regulations specify minimum visibility and cloud clearance criteria for VFR flight that safeguard both IFR and VFR operations. An unauthorized or inadvertent transition from VFR to IMC jeopardizes both and can be stressful, particularly if the pilot is non-instrument-rated or non-current, or if the aircraft is not IFR

safely, and taxied to [the ramp]. Once back, I showed my instructor the icing and discovered moderate mixed icing along all leading edges. I was able to stay calm and make a quick decision with...my instructor's help.... This experience was very humbling, and the decision to go was probably wrong, but I trusted the forecast.

Revelation and Recovery



Resources—FAA:



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
National Policy

**ORDER
8040.4B**

Effective Date:
05/02/17

SUBJ: Safety Risk Management Policy



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
National Policy

**ORDER
8000.369B**

Effective Date:
03/18/16

SUBJ: Safety Management System

Introduction to Safety Risk Management

Civil aviation organizations, air carriers, and military aviation activities have embraced Safety Risk Management — a foundational component of all safety management systems. Single-pilot operations can also enjoy the benefits of safer, more efficient flying through the application of risk management processes.

Risk management is a formalized way of dealing with hazards. It is a logical process of evaluation where you weigh the potential costs of a risk against the potential benefits you might receive, if you allowed that risk to stand uncontrolled. In order to better understand risk management, the terms “hazard” and “risk” need to be understood.

A hazard is a present condition, event, object, or circumstance that could lead to or contribute to an unplanned or undesired event such as an accident. It is a source of danger. Examples of common aviation hazards include a nick in the propeller blade, improper refueling of an aircraft, pilot fatigue, and the use of unapproved hardware on the aircraft.

If pilots do not recognize a hazard and choose to continue, the involved risk is not managed.

Risk management is a three-step process that people use to:

- identify hazards,
- express how likely those hazards are to negatively impact their operations, and
- reduce the chances that those hazards will cause an accident.

Step 1: Hazard Identification

What conditions or circumstances could negatively affect your flight?

Step 2: Risk Assessment

How likely are the identified hazards to cause a problem and how severe will the consequences be if they do?

Step 3: Risk Mitigation

What can you do to reduce the risks to acceptable levels?

We need to constantly monitor the hazards and risks associated with our flight to make sure that the identified risks remain at an acceptable level.



Continued on Next Page

Flight Risk Assessment Tools (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, it 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.

Although designs can vary, FRATs generally ask a series of questions that help identify and quantify risk for a flight. The FAA Safety Team (FAASTeam) currently offers a FRAT tool that follows the PAVE checklist, covering questions on the Pilot, Aircraft, enVironment, and External Pressures.



For example, you may be asked how much rest you've had, how much time you've had in the aircraft, and what the weather conditions are for your destination. Based on the answers you supply, a total risk score is calculated.

No FRAT can anticipate all the hazards that may impact a particular flight, but there are some common hazards that GA pilots encounter regularly.

The FAASTeam's easy-to-use and GA-focused FRAT can get you started in effective safety risk management. The FRAT tool is currently available as an automated spreadsheet available at <https://go.usa.gov/xkhJK> or via an iOS app available on the App Store at <http://bit.ly/FAAST-FRAT>.



Resources

- **Risk Management Safety Minute Video**
<https://youtu.be/fSjN59ShMng>
- **Risk Management Training Video**
<https://youtu.be/luiIOUZeCWO>
- **FAA Risk Management Handbook**
<http://bit.ly/rm-handbook>
- **Flight Risk Assessment Tools (FRAT) Fact Sheet**
<http://bit.ly/2hk3omM>
- **January/February 2017 issue of FAA Safety Briefing**
 - ⇒ "Risky Business: The What, How, and Why of Risk Management"
<https://adobe.ly/2iBEi3h>
 - ⇒ "Say Ahh ... A Pilot's Guide to Self-Assessing Risk"
<https://adobe.ly/2ibKIHO>
 - ⇒ "Is My Aircraft Right for Flight? The Importance of Preflight Prep"
<https://adobe.ly/2iePJ4p>
 - ⇒ "The Wild (Not So Blue) Yonder: Mitigating Risk in the Flight Operating Environment"
<https://adobe.ly/2hus9AX>
 - ⇒ "Are We There Yet? How External Pressures Can Affect Your Flight"
<https://adobe.ly/2ioBgQs>

ADM/SRM Accident Case Studies



#1: Cirrus SR22: July 2019

- **NTSB ERA19FA234**
- **Departed in dark night IFR conditions. Cloudy and dark.**
- **Going to an airshow for the final weekend**
- **On take off:**
 - 180° left arc; climbed to 850' AGL; descended to 650' then crashed, high-speed impact. All in the first minute...
- **No evidence of mechanical failures**
- **No WX briefing recorded; no IFR plan filed; annual inspection overdue**
- **Both died on impact**
- **Get-there-it is? DGAS hazardous attitudes?**
- **Entitlement?**



#1: Cirrus SR22: July 2019

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 - Going to an airshow for the final weekend
 - On take off:
 - 1800ft arc; climbed to 850' AGL, descended to 650' then crashed high speed impact. All in the last minute...
 - No evidence of mechanical failures
 - No WX briefing recorded; no IFR planned; actual inspection overdue
 - Both died in impact
 - Get-there-it-is! DGAS hazardous attitudes?
 - Entitlement?
- Probable Cause:**
“The pilot’s decision to depart in dark IMC which resulted in spatial disorientation and subsequent loss of aircraft control.
Contributing to the accident was the pilot’s and pilot-rated passengers self-induce pressure to complete the flight, and the pilot’s anti-authority attitude”.



#2: Piper Malibu: April 2017

- **NTSB CEN21FA198**
- **IFR cross country planned at 23,000'**
- **Climbing through 18,600', ATC reported a gradual reduction in airspeed, then a descent. Airspeed decreased to 145 knots with erratic headings before radar contact lost**
- **Wreckage found in densely forested area**
 - Right wing, right horiz stab, right elevator...not located with wreckage
- **Examination showed wing and tail sections separated in flight due to overload**
- **WX forecast: Moderate icing up to 25,000', embedded CB, 2" hail**
- **Prob entered icing ~14,000'...freezing drizzle**
- **A/c equipped for FIKI...but POH warning about freezing drizzle**
- **The aircraft was deemed to be 361 lbs overweight...**
- **Four fatalities**



#2: Piper Malibu: April 2017

“A review of the pilot’s records revealed multiple certificate application failures for reason that included inadequate cross-country planning, a/c performance and stalls. Review of the pilot’s airmen knowledge written tests found areas answered incorrectly over multiple exams included meteorology, a/c performance, ADM and stalls”.

To ponder:

Did the system (CFI, DPE) fail this person?

Would they have flown anyway?



#2: Piper Malibu: April 2017

“A review of the pilot’s records revealed multiple certificate application failures for reason that included inadequate cross-country planning, a/c performance and stalls. Review of the pilot’s airmen knowledge written tests found areas answered incorrectly over multiple exams included meteorology, a/c performance, ADM and stalls”

Probable Cause:
“The pilot’s improper decision to continue flight in an area of moderate-to-heavy icing conditions, which resulted in exceedance of the a/c anti-icing system capabilities, a degradation of aircraft performance, and subsequent aerodynamic stall”.

To ponder:
Did the system (CFR or E) fail this person?
Would they have flown anyway?



#3: Cessna 172: April 2019

- **NTSB ERA19LA150**
- **IFR flight plan filed for approx. 3.5 hour flight**
- **ATC revised flight plan en-route...adding some 40-50 minutes to total flight time**
- **At destination, night IFR conditions**
 - Pilot attempted three precision instrument approaches, all resulting in missed approaches
- **Diverted to larger airport**
 - Two more approaches resulting in going missed due to weather
 - On the third approach, engine lost power
- **Pitched for best glide, aimed for road. Impacted a building and came to rest suspended in the power lines a few feet from the ground.**
- **Post accident examination revealed that the fuel tanks were devoid of fuel. No evidence of mechanical failure**
- **Pilot had about 80-hours of simulated instrument experience and one hour of flight in actual IMC.**
 - This was the pilot's first flight acting as PIC in an airplane, in actual IMC
- **Pilot did not obtain a formal weather briefing but “was aware of the weather”**
- **Passenger had to make an international flight the following day**
- **Three minor injuries**



#3: Cessna 172: April 2019

- NTSB ERA19LA150
- IFR flight plan filed for approx. 3.5-hour flight
- ATC revised flight plan en-route...adding some 40-50 minutes to total flight time
- At destination, night IFR conditions
 - Pilot attempted three precision instrument approaches, all resulting in missed approaches
- Diverted to alternate airport
 - Two more approaches, resulting in being missed due to weather
 - On the third approach, engine lost power
- Pitched for best glide, aimed for main impact area, came to rest suspended in the power lines 100 feet from the ground
- Post-accident examination revealed that the fuel tanks were devoid of fuel. No evidence of mechanical failure
- Pilot had about 800 hours of simulated instrument experience and one hour of flight in actual IMC.
 - This was the pilot's first flight acting as PIC in an airplane, in actual IMC
- Pilot did not obtain a formal weather briefing but "was aware of the weather"
- Passenger to make an international flight the following day

Probable Cause:
"The pilot's decision to initiate a flight into low IFR conditions, which resulted in six missed approaches at two airports, and a total loss of engine power due to fuel exhaustion. Contributing to the accident was the external pressure the pilot felt to complete the flight despite poor weather conditions"



#: Cessna 210L: December 2020

- **NTSB ERA21LA085**
- **Pilot departed on a VFR flight into night IMC conditions to an airport not equipped with any instrument approach procedures**
- **ADS-M data shows that in the last few minutes, pilot turned towards the airport, descended below the reported overcast layer and flew at altitudes between 100' and 300' MSL at groundspeeds of 100-115 knots.. Airport elevation is 10' MSL**
- **Descending aircraft impacted 80-100' pine trees about 5nm from the destination airport**
- **Post accident examination revealed no mechanical anomalies**
- **Wreckage site indicated near level flight at high forward velocity**
- **No indication that the pilot obtained a weather briefing and no ATC services requested/provided**
- **Was instrument rated, but did not file an IFR flight plan and flew VFR**
- **Decided to fly VFR in dark IMC over a dark swamp to an airport without an instrument approach procedure**
- **The low impact angle is consistent with CFIT rather than LOC**
- **Pilot regularly used a handheld personal electronic device for navigation and hazard avoidance**
- **Had just worked a 12-hour shift in a hospital emergency room**
- **Pilot was expected to work the next day**
- **One fatality**



#: Cessna 210L: December 2020

- NTSB ERA21LA085
- Pilot departed on a VFR flight into night IMC conditions to an airport not equipped with any instrument approach procedures
- ADS-M data shows that in the last few minutes, pilot turned towards the airport, descended below the reported overcast layer and flew at altitudes between 100' and 200' MSL at airspeeds of 100-115 knots.. Airport elevation is 10' MSL
- Descending aircraft impacted 80-100' pine trees about 5nm from the destination airport
- Post accident examination revealed no mechanical anomalies
- Wreckage site indicated near level flight at high forward velocity
- No indication that the pilot obtained a weather briefing and no ATC services requested/provided
- Was instrument rated, but did not file an IFR flight plan and flew VFR
- Decided to fly VFR in dark IMC over a dark swamp to an airport without an instrument approach procedure
- The low impact angle is consistent with CFIT rather than LOC
- Pilot regularly used a handheld personal electronic device for navigation and hazard avoidance
- Had just worked a 12-hour shift in a hospital emergency room
- Pilot was expected to work the next day
- One fatality

Probable Cause:
“The pilot’s intentional VFR flight into instrument meteorological conditions, which resulted in controlled flight into terrain. Contributing to the accident was the pressure to complete the flight”



Proficiency and Peace of Mind

- Fly regularly with your CFI
- “Revert to training” ...only works if...?
 - a) You've seen it before
 - b) You've done it recently
- **Practice, practice...**
 - Get in your head
 - ...and keep it there...
- Document in **WINGS**



Next Month's TOM...

The National FAA Safety Team Presents

Topic of the Month February 2023
Transition Training

Presented to: WAFC and Friends
By: Stephen Bateman, CFI
Date: Monday February 13th, 2023

Produced by:
The National FAA Safety Team (FAASTeam)



Federal Aviation
Administration



Federal Aviation
Administration

Thank You For Attending!

**You are vital members of
our GA safety community!**

