Topic of the Month
January
Fly the Aircraft First!

Federal Aviation Administration

Presented to: Salem Area Pilots

By: Thomas Gorski CFI

Date: January 3rd, 2015

2014/08/29-061(I) PP Original Author, FAASTeam; POC Kevin Clover, AFS-850 Operations Lead, Office 562-888-2020; reviewed by John Steuernagle, 08/29/2014.

Modified by Tom Gorski CFI on 12/29/2014 for Seminar/Webinar presentation in Salem, Oregon.

Set the Tone- being warm and welcoming the people to my hangar for an Interactive presentation. My style is getting you comfortable with asking relevant questions frequently. It is important to address your concerns and your questions. We have a holding pattern for unanswered questions. We can learn much from each other. Questions and answers are very important, so frequent Q/A interaction is encouraged.

Restrooms, exits, evacuation.

Acknowledge Sponsors.

Seminar / Webinar engineering with priority on Seminar. Webinar is running in the background.

10 Min break.

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Outline

- **Presenter's Background**
- **Brief Overview of FAASTeam**
- **1st Hour: Fly the Aircraft First!**
- **2nd Hour: Practical ADM Scenarios**
  (Based on FAA Risk Management Handbook)

Presenter's Background

Brief Overview of FAASTeam

1st Hour: Focus

2nd Hour: Focus

(Next Slide)

Presenter's Background

- **1976 – US Army Avionics Technician**
- **1984 – 2008 CFI & Charter C414A, LR-JET, CE-500**
- **2008 – 2013 Evergreen Airlines B-747-200, LCF, 400 Director of Flight Standards**
- **2013 – Present CFI, Volunteer for FAA Safety Team**

Discussion of my background.

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Activities of the FAASTeam are organized and indexed through the Website FAASAFETY.GOV

Faasafety.gov is a portal between the FAA and the aviation community.

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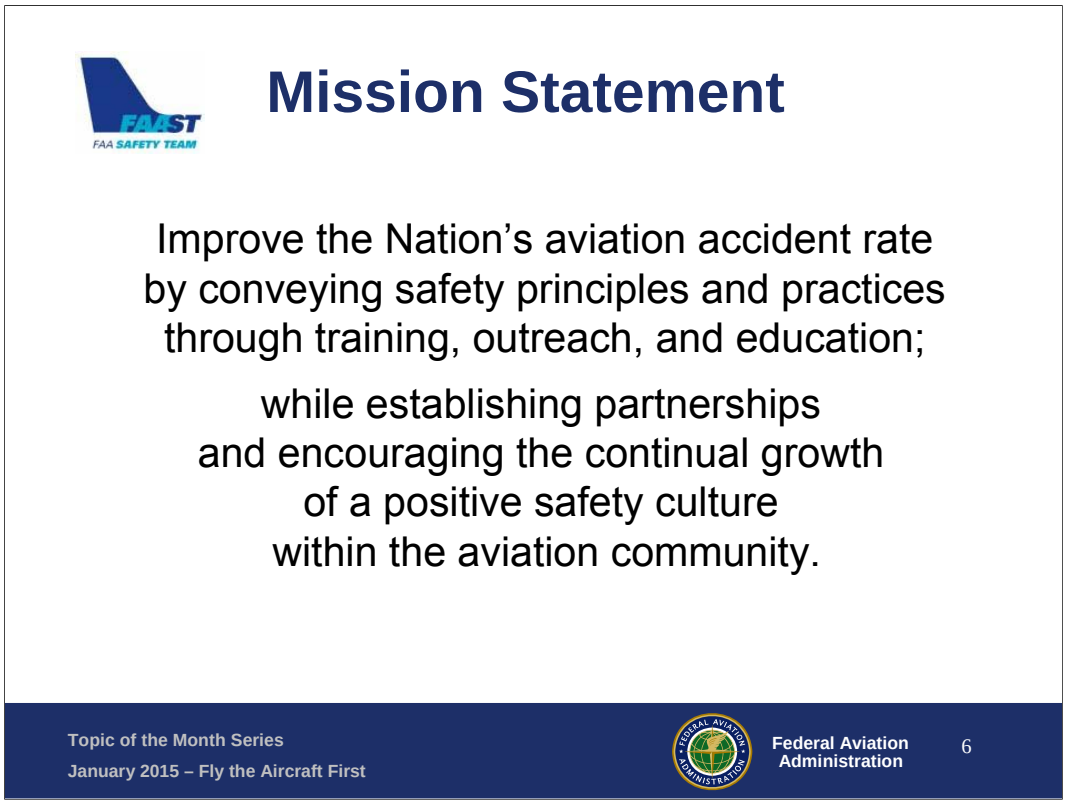

Mission Statement:
Improve the Nation's aviation accident rate
by conveying safety principles and practices
through training, outreach, and education;
while establishing partnerships
and encouraging the continual growth
of a positive safety culture
within the aviation community.

(Next Slide)

Our relationship with the aviation community is made up of individuals who make an effort to promote aviation safety. Those people become part of the shift in the safety culture.
I am talking about Pilots who participate in the WINGS Pilot Proficiency Program.

Mechanics - AMT

Everyone who Attends Safety Seminars
On behalf of the FAA Safety Team I want to thank each one of you who are here today. Thank you!

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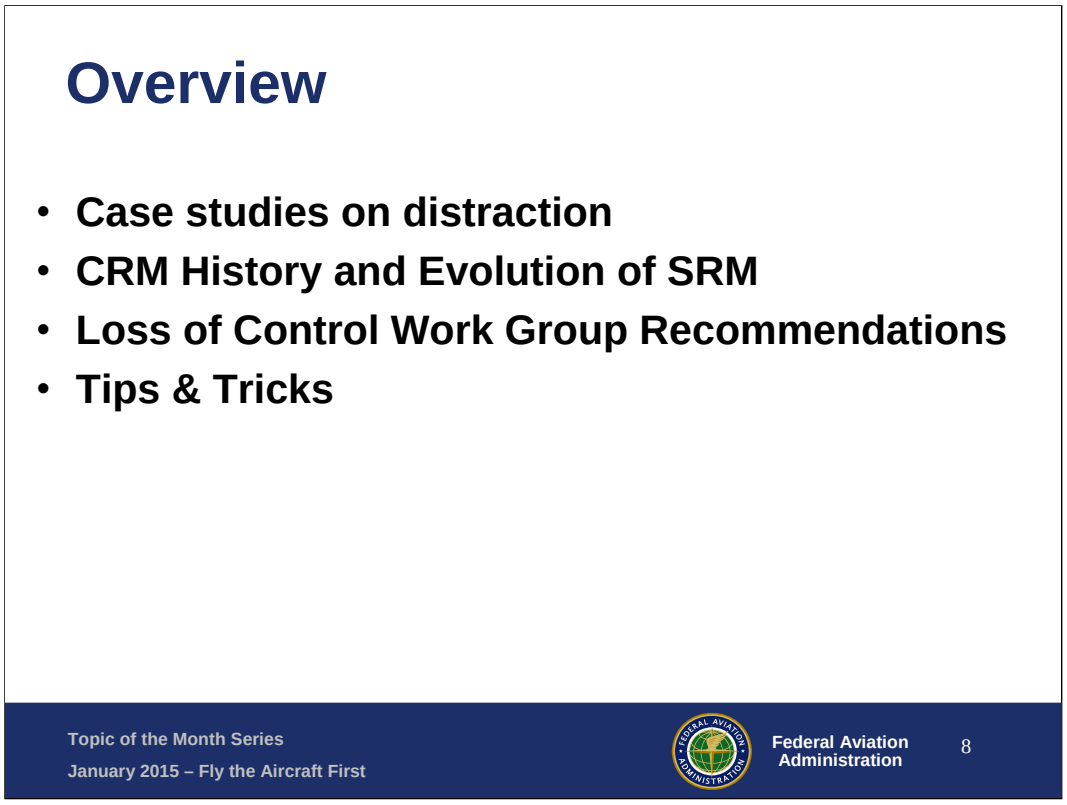

In the first half of the presentation we'll talk about distractions and how they contribute to accidents. We'll also look at the history of CRM and the evolution of SRM.

Does anyone not know what CRM or SRM is?

We will also look at recommendations from a work group that studies loss of control. Finally we'll offer a few tips & tricks to help you manage distractions in flight.

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EA 401

- **29 December 1972**
- **JFK – MIA**
- **3 Flt. Crew 1 Non Rev.**
- **Nose Gear Light Out**
- **CWS Mode Engaged**
- **99 Fatalities**
- **Systems**

In December 1972 Eastern Airlines Flight 401 was flying from New York to Miami. A brand new, and beautiful Lockheed L-1011. Does anyone remember anything about this accident?

3 flight crew and one non-revenue company employee were in the cockpit as the flight began the approach. After extending the landing gear the first officer noticed the nose wheel down & locked light was not illuminated. The approach was aborted and the aircraft entered a 2,000 foot holding pattern west of the airport The crew engaged the autopilot while all 4 cockpit occupants engaged in trouble shooting the problem. When the autopilot was engaged it was inadvertently placed in Control Wheel Steering (CWS) mode. In this mode the airplane would maintain the attitude last commanded by the pilot. One of the pilots – most likely the Captain – bumped the control column as he turned to speak with the flight engineer. The airplane was placed in a shallow descent that was maintained all the way to the ground. Four professional aviators – any one of whom could have detected the descent – were so focused on a non-critical task that they failed to detect and arrest the descent. ATC failed to query the crew regarding an observed altitude deviation because the radar equipment often indicated intermittently unreliable altitude indications.

Light Test Checked-OK

FE Could not see Nose Index- Compartment light was switched off

Question: How could this accident have been prevented?

(Next Slide)

UAL 173

- **28 December 1978**
- **DEN – PDX**
- **181 pax 8 Crew**
- **Gear Light Out**
- **10 Fatalities 23 Seriously Injured**
- **Breakdown in cockpit management and teamwork**

Six years after EAL 401 in December 1979 UAL 173, a DC-8, was flying from DEN to PDX. After extending the landing gear on final approach a loud thump was heard, accompanied by abnormal vibration and yaw. **The right main landing gear retract cylinder assembly had failed due to corrosion, and that allowed the right gear to free fall.** Although it was down and locked, the free fall of the gear damaged a micro switch so severely that it failed to complete the circuit to the cockpit green light that tells the gear is down and locked. The flight crew became so absorbed with diagnosing the gear problem that they failed to monitor their fuel state and calculate a time when they needed to land or risk fuel exhaustion. The captain had significantly more overall flying time, as well as much more time in this type of aircraft, than either the first officer or the flight engineer. This may have made subordinate crew members more likely to rely upon the captain, and less likely to openly question his decisions. At this point in history, a serial "chain of command" was more the norm than CRM. This also may have led to greater reliance on the captain's decision making. This accident played a pivotal role in identifying the need for a more parallel "team" approach to resource management as well as greater assertiveness on the part of subordinate crew members. Gear down and locked indication is above the wing and was visually confirmed. There was anecdotal information following the accident that some of the surviving passengers were able to find taxis from the crash site to the airport, and were later found waiting in the baggage claim area of PDX. As a result, their absence at the crash site reportedly made it difficult for emergency first responders to determine how many passengers had been on the airplane and how many had survived the accident. Question: How could this accident have been prevented?

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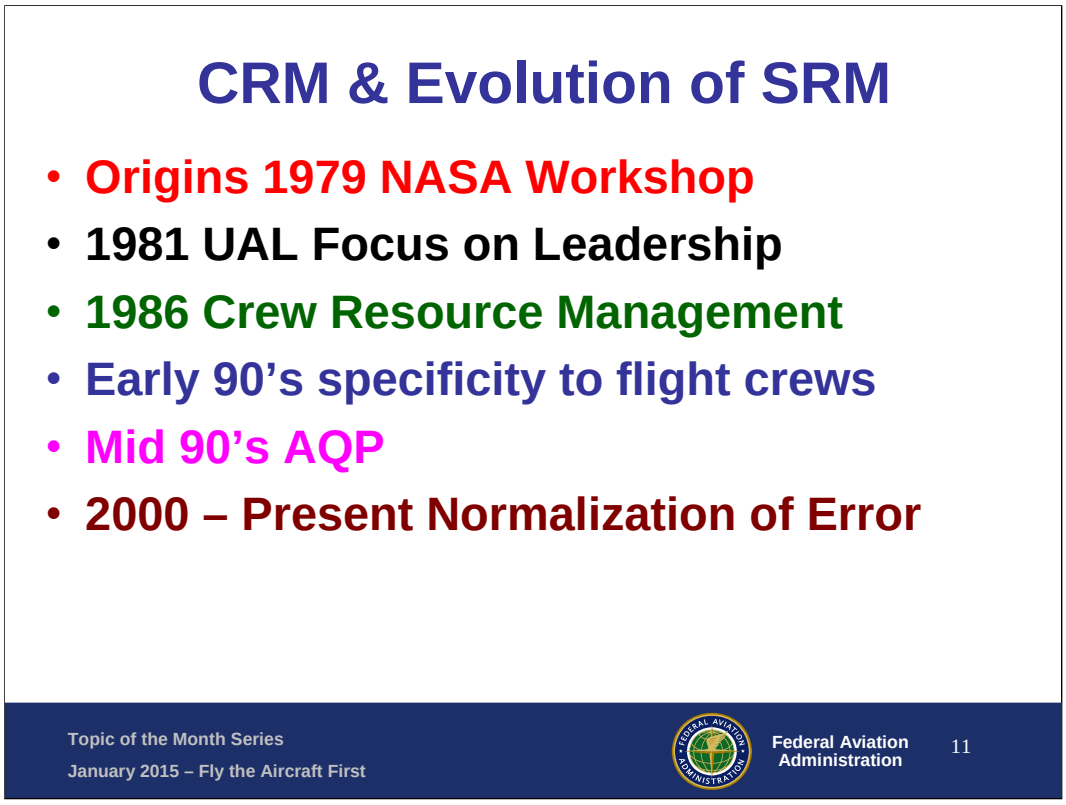

Origins of CRM are traced to a workshop sponsored by NASA in 1979 called "Resource Management on the Flight Deck." The workshop identified the human error aspects of the majority of air crashes: **Failures of interpersonal communications, decision making, and leadership.** The workshop singled out the Captain of UAL 173 in his failure to accept input from junior crewmembers and lack of assertiveness by FE. The failure to accept input from junior crew= The Wrong Stuff. **(Click) 1st Gen: 1981** FRM now Cpt. R.M. initiated by United Airlines. Focus on psychological testing and general leadership. Many airlines adopted a form of CRM and employed games and exercises unrelated to aviation to illustrate concepts. Pilots denounced courses as "charm school" or attempts to manipulate their personalities. **(Click) 2nd Gen: 1986** More specific concepts related to flight operations. CRM became more team oriented. Criticisms remained that training was heavily laced with "psycho-babble" ex: 'synergy' in group dynamics was condemned by participants as representative of irrelevant jargon. **(Click) 3Rd Gen: Early 1990's** Greater specificity in training for flight crews, CRM extended to flight attendants, dispatchers, and maintenance. A number of carriers also developed specialized CRM training for new captains to focus on the leadership role that accompanies command UAL's CLT. **(Click) 4th Gen: Mid 1990's** Advanced Qualification Program (explain what it is and how it works) **(Click) 5th Gen: 2000-Present** Human error is ubiquitous and inevitable. If error is inevitable, CRM can be seen as a set of error countermeasures: Avoidance; Trapping and Mitigating the consequences of those errors which occur and are not trapped. CRM is not and never will be the mechanism to eliminate error and assure safety in high risk endeavors, such as aviation. Error is an inevitable result of the natural limitations of human performance and the function of complex systems. CRM is now one of an array of tools that organizations can use to manage error. **(Next Slide)**

“What is CRM?”
A typical response is “Training to make us work together better.”
or in the case of SRM “Training to make us fly safer”

Many CRM principles have been successfully applied to single-pilot aircraft and led to the development of single-pilot resource management (SRM). SRM is defined as **(Click)** the art of managing all the resources (both onboard the aircraft and from outside sources) available to a pilot prior to and during flight to ensure a successful flight.

SRM includes the concepts of ADM Aeronautical Decision-Making, Risk Management, Controlled Flight Into Terrain Awareness, and Situational Awareness. SRM training helps pilots maintain situational awareness by managing automation, associated aircraft control, and navigation tasks. This enables pilots to accurately assess hazards, manage resulting risk potential, and make good decisions.

In the process of teaching SRM we risk loosing sight of why it is important.

The overarching rationale for SRM & CRM is reducing the frequency and severity of errors that are pilot/crew-based. This concern is addressed in the RMH. It is more important to know why we are teaching this than to recite definitions and processes flows regarding SRM.

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This model makes the discussions easier to follow! These are the barriers that could be used for example during a go-around to catch errors and prevent an accident. **(Click)** ATC **(Click)** Automation is a double edged sword… it can both increase and decrease task loading. GPS, and TAWS are examples of automation, **(Click)** Autopilot. **(Click)** Risk Management, **(Click)** ADM **(Click)** Human Interaction, Training, **(Click)** Flows, habits, Use of Checklists. **Task Management and Situational Awareness** are two of six items in the areas of SRM, in the PTS. The four others are ADM, RM, CFITA, and AM.

A matter of priority

- **Fly the Aircraft First!**

We've all heard it many times, "when your flight plan is unraveling and you're trying to decide where to go and how to get there while dealing with passengers and ATC; the most important thing to do is always," **(Click)**

That's right. Fly the Airplane!

(Next Slide)

Expressed another way the 3 things pilots must do in order of priority are: **(Click)**

Aviate – maintain aircraft control at all times. **(Click)**

Navigate – manage navigation systems and tasks including fuel reserves **(Click)**

Communicate – with passengers and ATC

That's good advice. Loss of Control is the number one cause of fatal aircraft accidents. It doesn't matter if we're navigating and communicating perfectly if we lose control of the aircraft and crash.

That's why the General Aviation Joint Steering Committee recommends this awareness raising program.

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Fly the Aircraft First!

- **High stress**
- **Short time frame**
- **Limited options**
- **Off airport landing?**

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I know we all talk the *Fly the Aircraft First* talk but can we walk the talk? By that we mean of course; are we really prepared to fly the airplane under high stress to a safe – perhaps off airport – landing?

(Click)

The pilot of this aircraft had a total engine failure – mechanical – not fuel related – while en route at low altitude in Alaska. ANC13LA085

Navigation was simple – we'll be on the ground in a minute or two - well before we can get to anything that even remotely resembles an airport.

Communication was also simple – there was no one within radio range to talk to.

We're not as likely to be successful as this pilot unless we think about what we're going to do in various possible emergency situations and unless we prepare do deal with problems.

(Next Slide)

Preparing for Problems

- **Prepare**
  - Performance numbers, weather, route, flight plan, survival gear
- **Plan**
  - Runway data, climb & descent profiles, escape routes, go no-go points & alternates
- **Practice – at mission weight**
  - Short & soft field T.O. s & Ldgs.
  - Power off Appchs. & Ldgs.

How do we prepare for problems? **(Click)**

Well we make sure we know our performance numbers including best power off glide speed for the aircraft & environment we're going to fly in. We have a good weather brief and we update along the route so we always know where the best weather is. We plan our route with alternate landing areas in mind. This means we may elect to take a longer route that offers better alternatives for off airport landings. We file a flight plan and request flight following service We have survival gear appropriate to the mission on board and we know how to use it. **(Click)**

We plan and brief each takeoff, approach, and landing to include climb & descent expectations, go no-go points, escape routes, and alternates. En route we keep within gliding distance of suitable landing areas for as much of the flight as possible **(Click)**

And we practice emergency procedures, short and soft field takeoffs and landings; power off approaches and landings. It's important to practice these maneuvers at our expected mission weight. An aircraft with a solo pilot and half tanks performs much better than one at close to max gross weight. Pilots need to be comfortable at the higher weights in order to be successful in real emergencies.

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Tips & Tricks

- **Fatal Distractions**
  - Set passenger expectations
  - Sterile Cockpit
  - Give passengers a job
- **Let George do it**
  - Use the autopilot
    - Wing leveling only in Turbulence
- **Proficiency Training**

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Passengers – and in some cases animals - have been known to provide fatal distractions so pilots must set expectations before flight. In addition to the standard seat belts, exits, and emergency equipment. Take time with the Passenger briefing, take time to explain your role and the role of the passengers. Insist on a sterile cockpit – no conversation that is not directly related to safety of flight during critical times. Give your passengers a job to do such as scanning for traffic. We know of one pilot who pays his kids a dollar for each aircraft they spot before he does. After one flight alone he had to visit an ATM to pay off his debt. **(Click)**

When your workload is increasing, by all means use the autopilot if you have one. Practice with and without the autopilot. If you never use the autopilot you won't have confidence in it while dealing with an emergency. If you always use the autopilot you won't have confidence in yourself. One more caveat here. Don't engage altitude hold if you're in significant turbulence. Basic wing leveling is what you want. That way the autopilot won't overstress the airplane or disengage while trying to maintain altitude. **(Click)**

And finally, seek regular proficiency training with your CFI.

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Proficiency & Peace of Mind

There's nothing like the feeling you get when you've just completed a proficiency training session. You've worked hard on some maneuvers and procedures you hope you'll never have to use but it's all been worth it. You know you're ready for anything and you're confident that no matter what happens – you'll Fly the Airplane First!

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Questions?

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Office Hours: 7:30 a.m. to 4:00 p.m., Monday - Friday

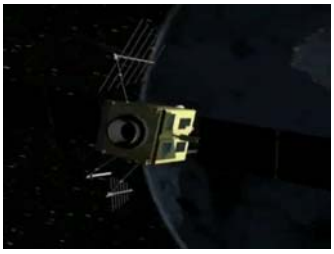
Office visits appointments only recommended

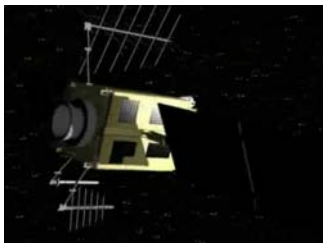
Tom Gorski
503.551.1700

Break

10

Minutes Remaining





Practical ADM



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TAA's = Some or all of the following:

- **Moving map / GPS / Glass flight deck.**
- **Automated engine and systems mgmt., and / or Integrated autopilot systems.**

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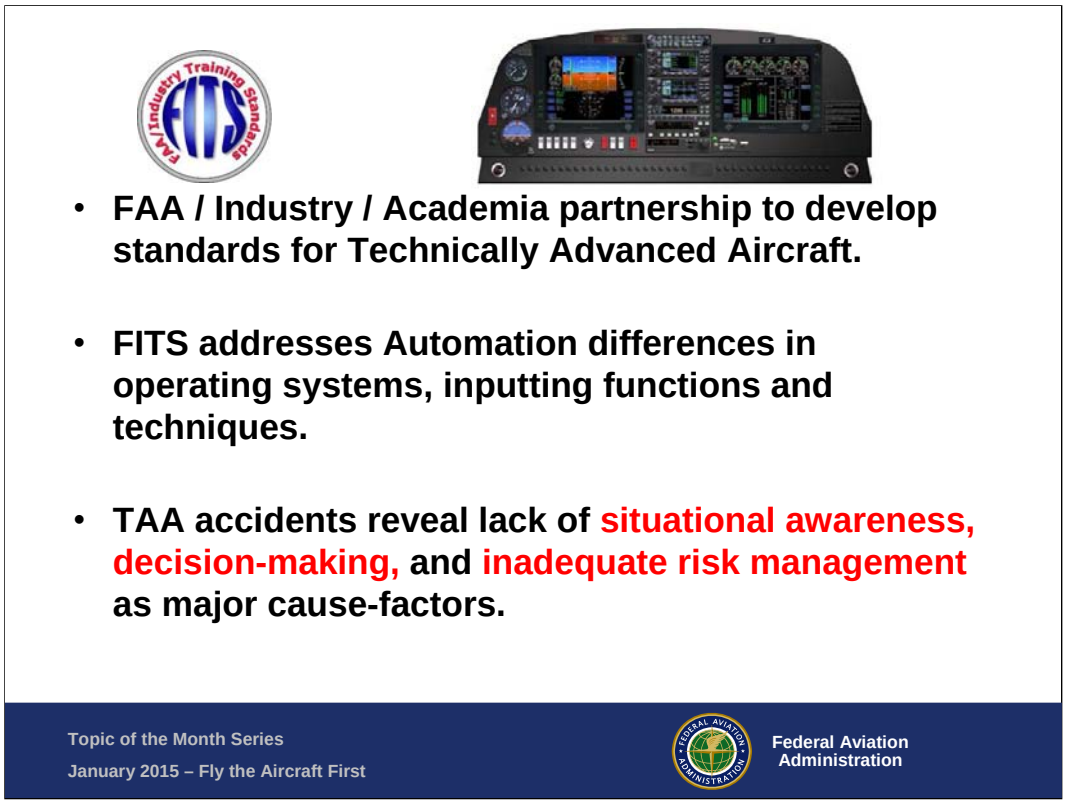
TAA's are helpful in terms of information available to pilots but also can be a source of distractions.



The FAA along with Industry and Academia developed partnerships to address training standards for Technically Advanced Aircraft.

FITS addresses Automation differences in operating systems, various differences in inputting functions and differences in training techniques.

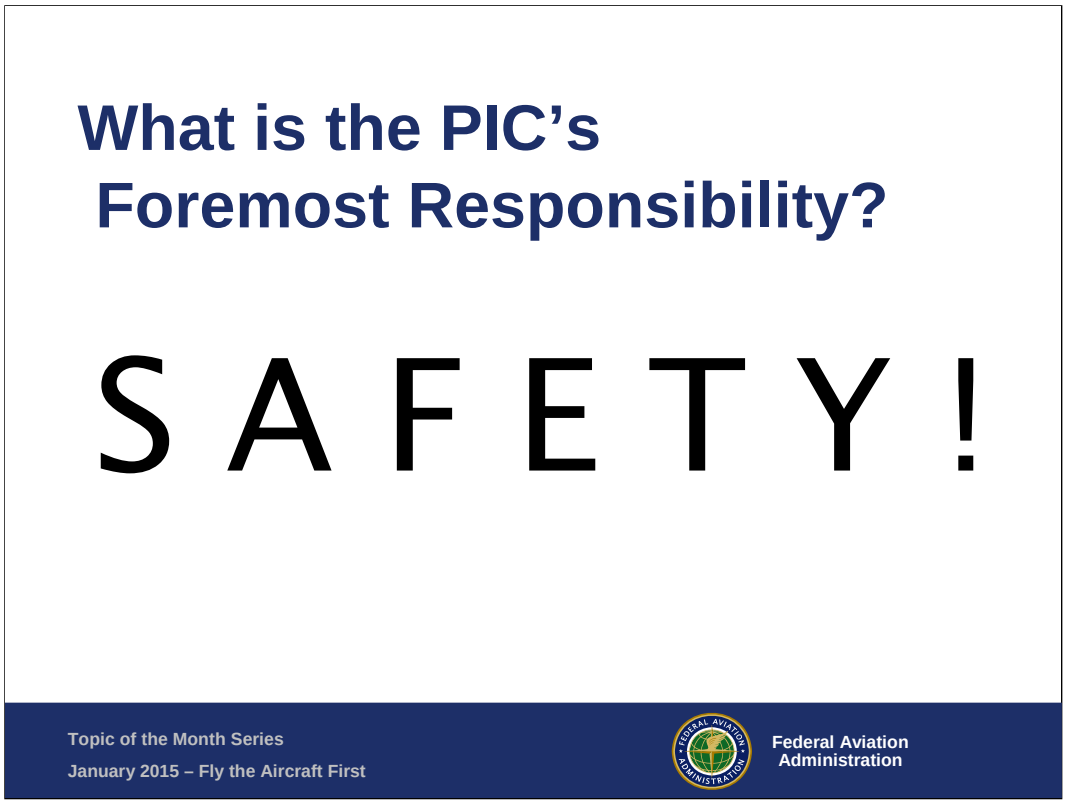
TAA accidents major cause-factors reveal lack of situational awareness, lack of or ignorance regarding decision-making, and inadequate risk management.

Remember the workshop sponsored by NASA in 1979 after UAL 173? It was called "Resource Management on the Flight Deck."
The workshop identified the human error aspects of the majority of air crashes as failures of:

(Click)

Interpersonal communications,
Decision making, and

Leadership.



Among all the concerns of PIC's are dynamics regarding integrity, service concerns, and the desire to help keep expenses low. This tends to get lost amidst all those other concerns. Now, introduce cultural dynamics, and a new breed of accident causal factors begins to emerge.

What is the PIC's foremost responsibility?

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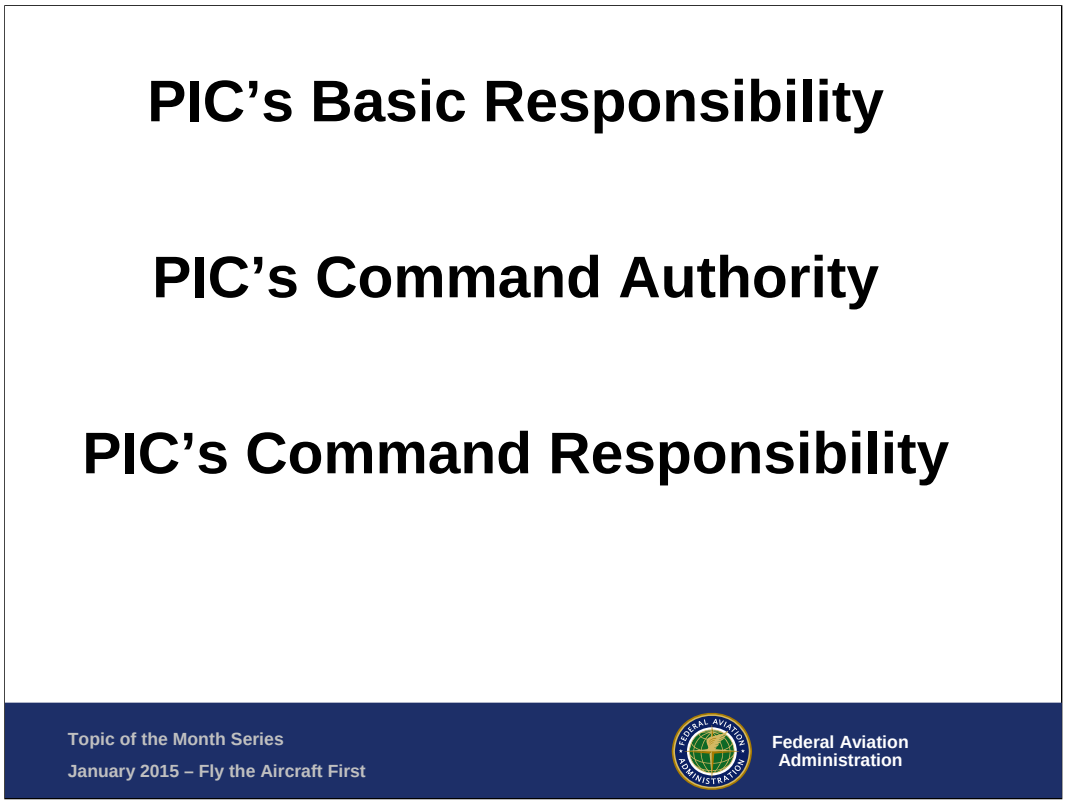

Let’s take a look at three elements of every PIC. All of us share a common experience with these three elements every time we fly.

Basic Responsibility

The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.

14CFR 91.3

Each pilot in command of an aircraft is, during flight time, in command of the aircraft and crew and is responsible for the safety of the passengers, crewmembers, cargo, and airplane.

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14CFR 91.3 States The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.
Each pilot in command of an aircraft is, during flight time, in command of the aircraft and crew and is responsible for the safety of the passengers, crewmembers, cargo, and airplane.

Command Authority

Legally mandated and ethically required authority and accountability of PIC's.

Exercised by PIC's Authority:
Responsibility
Accountability, and
Coordination (operation) of the flight.

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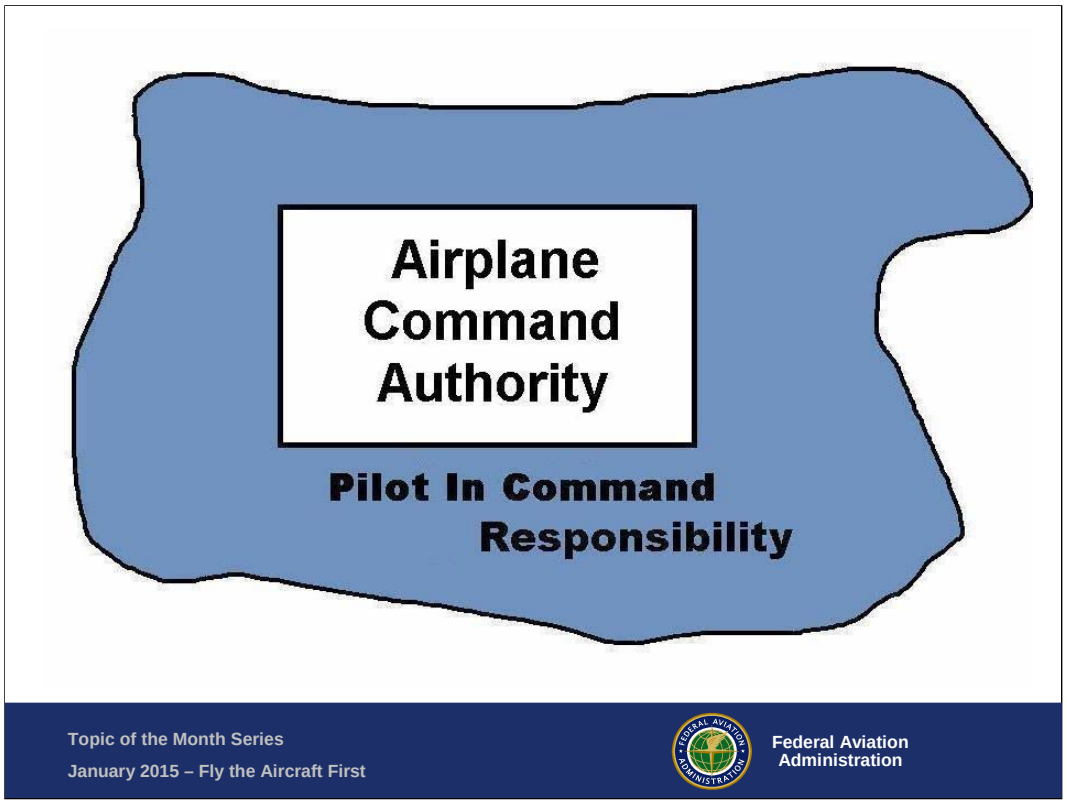
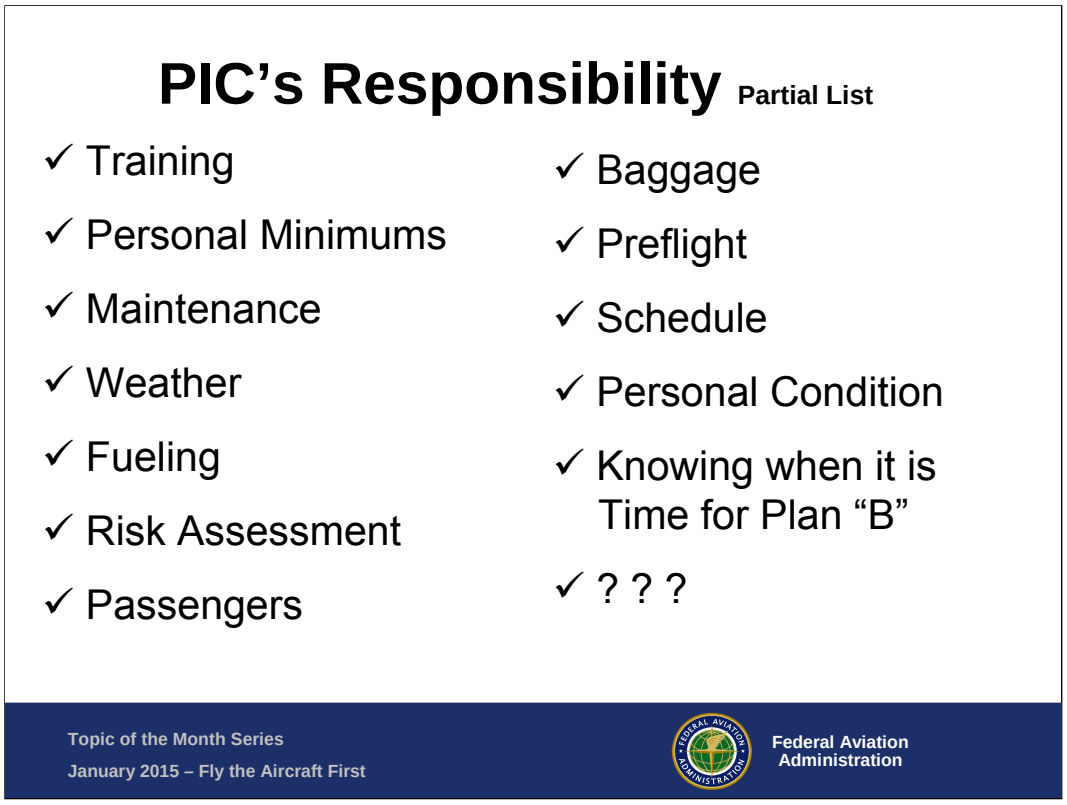
Command authority is Legally mandated and ethically required. Command authority has built-in accountability of PIC's.
Command authority is exercised by the PIC's authority in thee areas:
Responsibility, Accountability, and Operation of the flight.



Command authority is nicely defined, and very clear. The PIC's Airplane Command Authority is legally mandated 14CFR 91.3 and ethically required.

(Click)

What is not as easily defined are the various responsibilities that encompass and are integral to command authority. PIC responsibility is not as evenly and not nearly as clearly defined. The PIC's responsibility has uneven boundaries and extend well beyond the borders of command authority.



Ask the question: What are some of the PIC's responsibilities?

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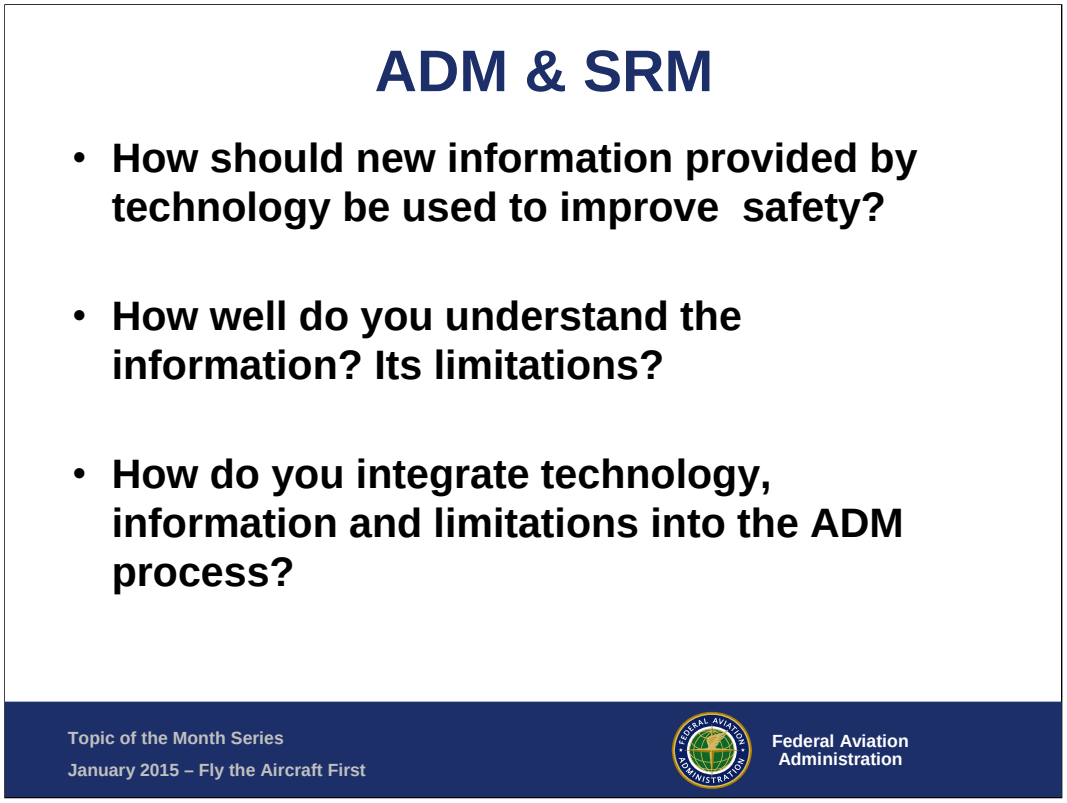
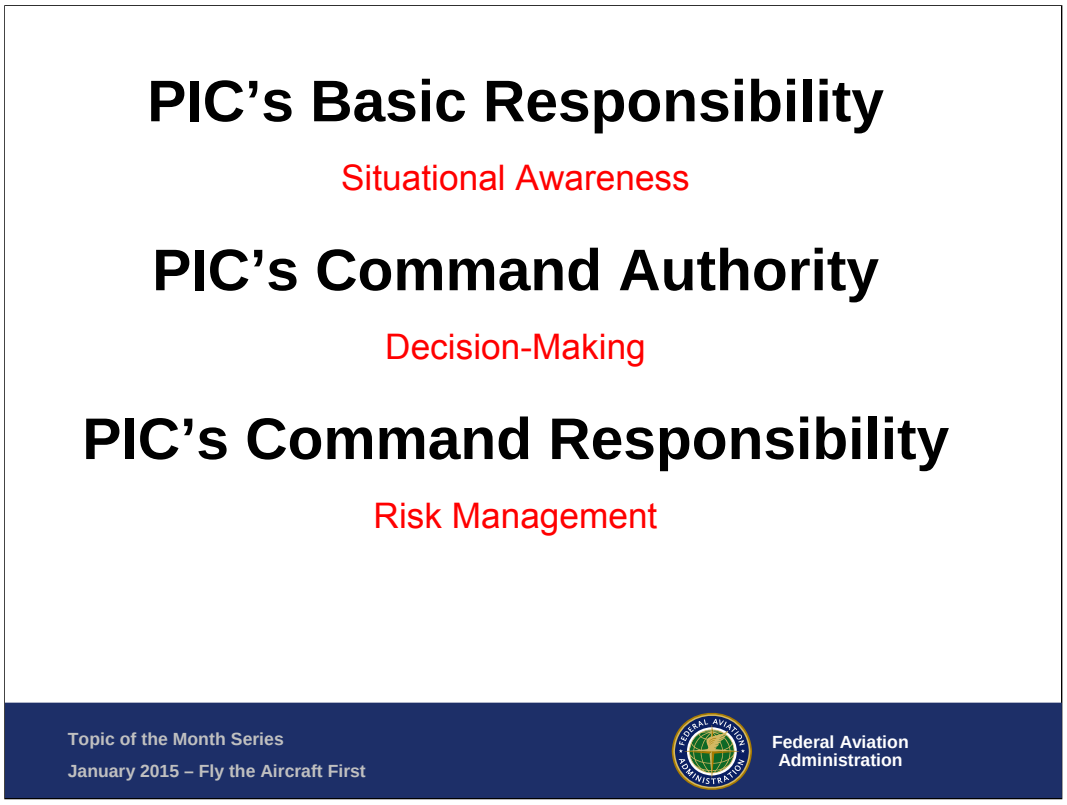


Here are questions all of us should be asking ourselves.

How should new information provided by technology in flight be used to improve safety of flight operations?

How well do you understand the information?
How well do you understand its limitations?

How do you integrate technology, information and limitations into the ADM process?



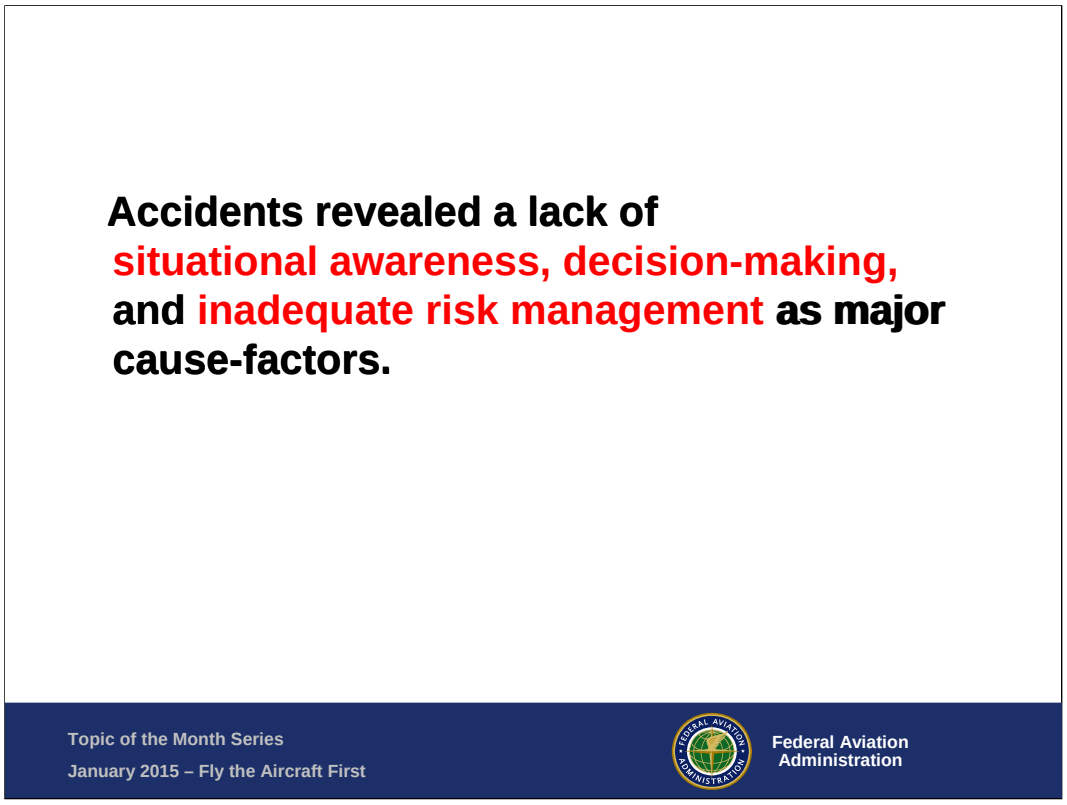
Understand that the PIC's basic responsibility is Situational awareness. **(Click)**

How else can you be responsible for the safety of the passengers, crewmembers, cargo, and airplane?

Understand that as PIC you are legally mandated to make decisions. **(Click)**

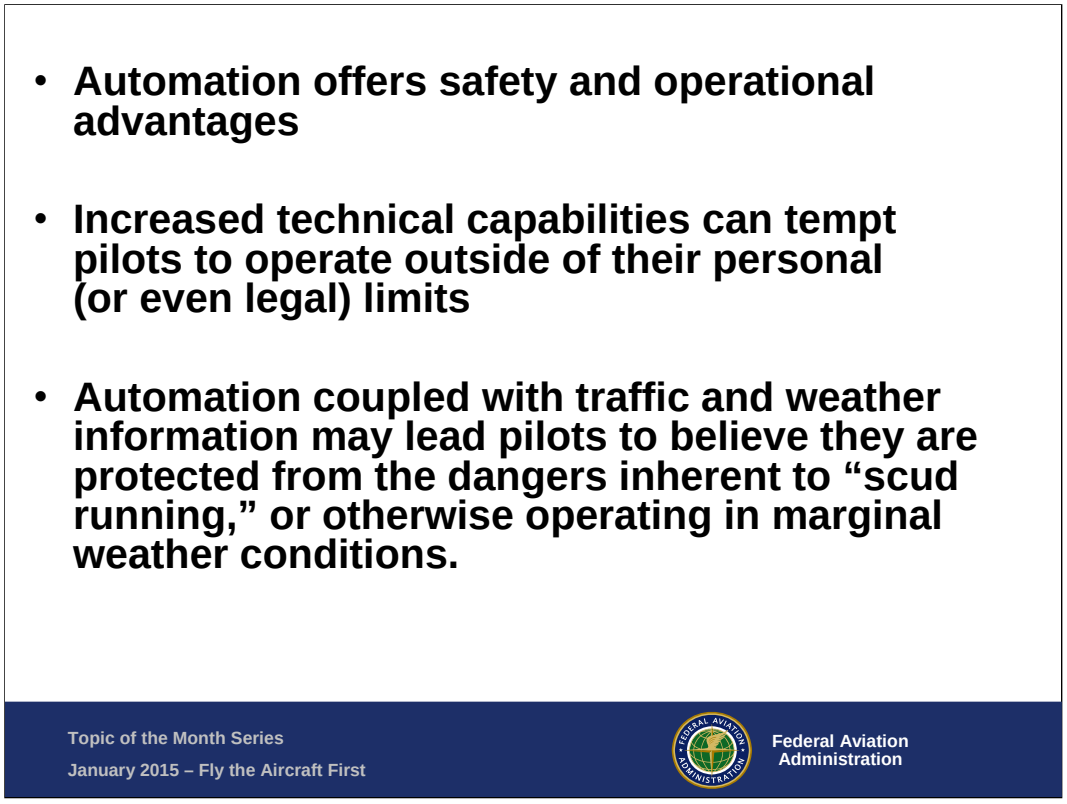
Remember the long list of responsibilities? Each one of those responsibilities can be a resource to trap and prevent errors. **(Click)**

That's called risk management.



Why are we talking about this?

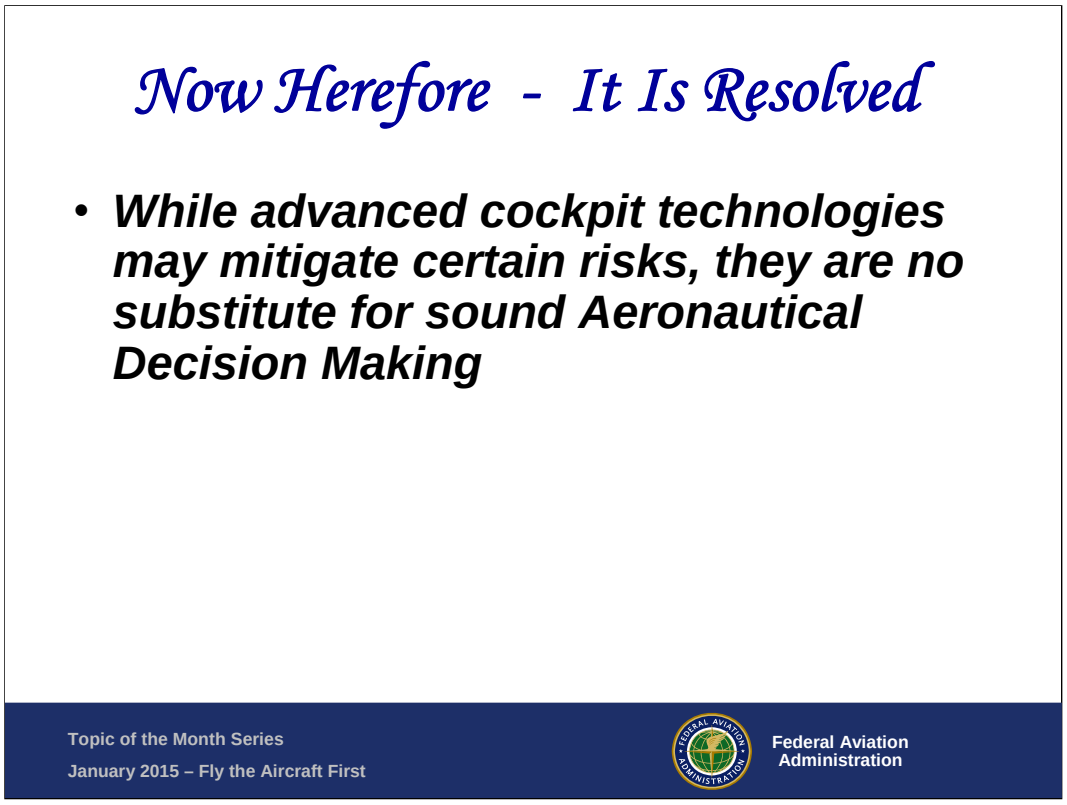
Because accident statistics revealed a lack of
situational awareness, decision-making, and inadequate risk management
as major cause-factors.



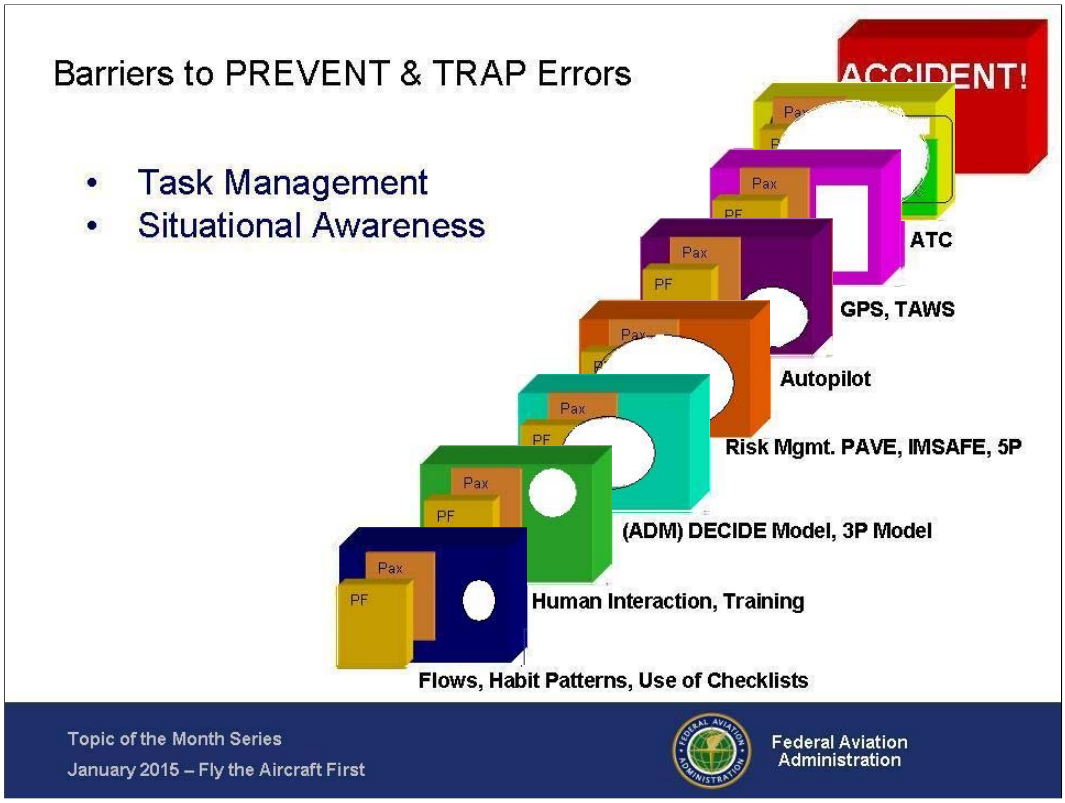
Automation offers safety and operational advantages

Increased technical capabilities can tempt pilots to operate outside of their personal (or even legal) limits

Automation coupled with traffic and weather information may lead pilots to believe they are protected from the dangers inherent to “scud running,” or otherwise operating in marginal weather conditions.



Advanced cockpit technologies and automation may mitigate certain risks, they are no substitute for sound ADM



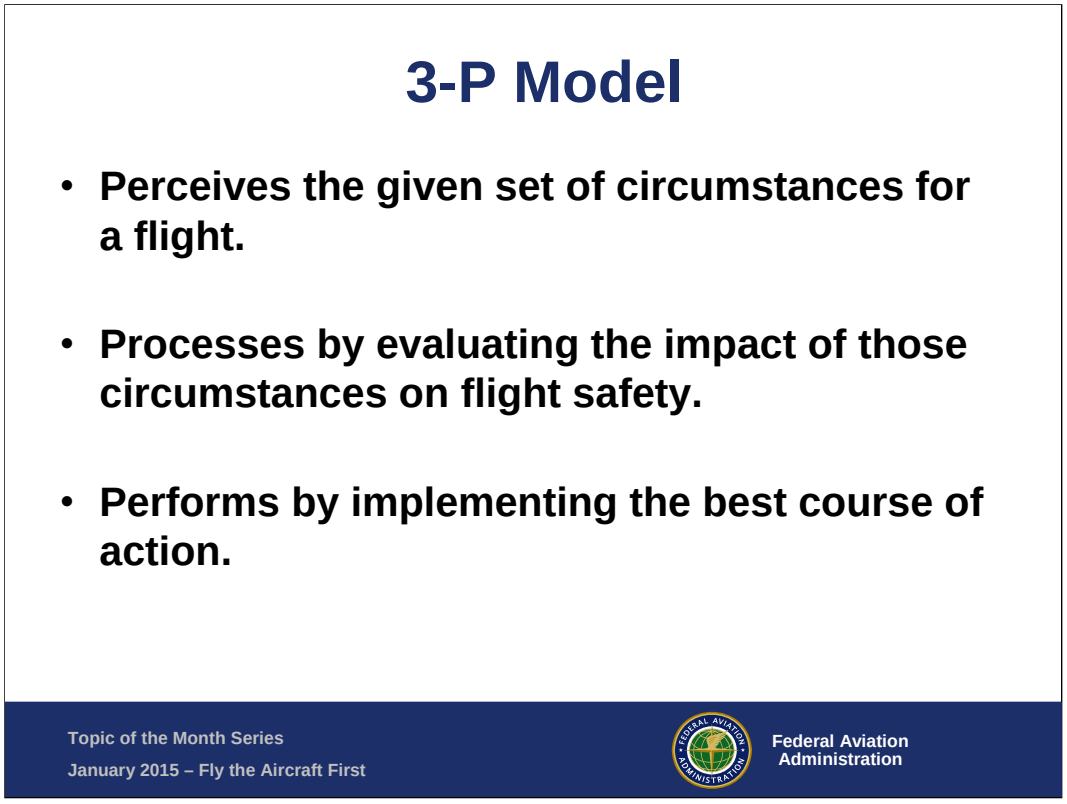
Remember this slide?

PAVE=Pilot, Aircraft, enVironment, External Pressures. IMSAFE=Illness - Is the pilot suffering from any illness or symptom of an illness which might affect them in flight, Medication - Is the pilot currently taking any drugs (prescription or over-the-counter), Stress - Psychological or emotional factors which might affect the pilot's performance, Alcohol -pilots should consider their alcohol consumption within the last 8 to 24 hours, Fatigue - Has the pilot had sufficient sleep and rest in the recent past, and Eating - Is the pilot sufficiently nourished? Some sources give Emotion. **5 Ps=P**lan, **P**lane, **P**ilot, **P**assengers, **P**rogramming.

ADM DECIDE model=**D**etect, **E**stimate, **C**hoose, **I**dentify, **D**o, **E**valuate: **3P Model=Perceive** the given set of circumstances for a flight. **Process** by evaluating their impact on flight safety. **Perform** by implementing the best course of action, or similar process when making critical decisions that will have an effect on the outcome of the flight. pilots exercise the 3P process continuously, while the DECIDE model and naturalistic decision-making result from the 3P process.

3-P Model

A simple, practical, and structured way for pilots to manage risk



The 3 P's stand for:
Perceive.
Process.
Perform.

Risk management is a decision-making process designed to

Systematically perceive hazards

Assess the degree of risk associated with a hazard, and

Determine the best course of action

In the FIRST step, the goal is
to develop situational awareness
by perceiving hazards

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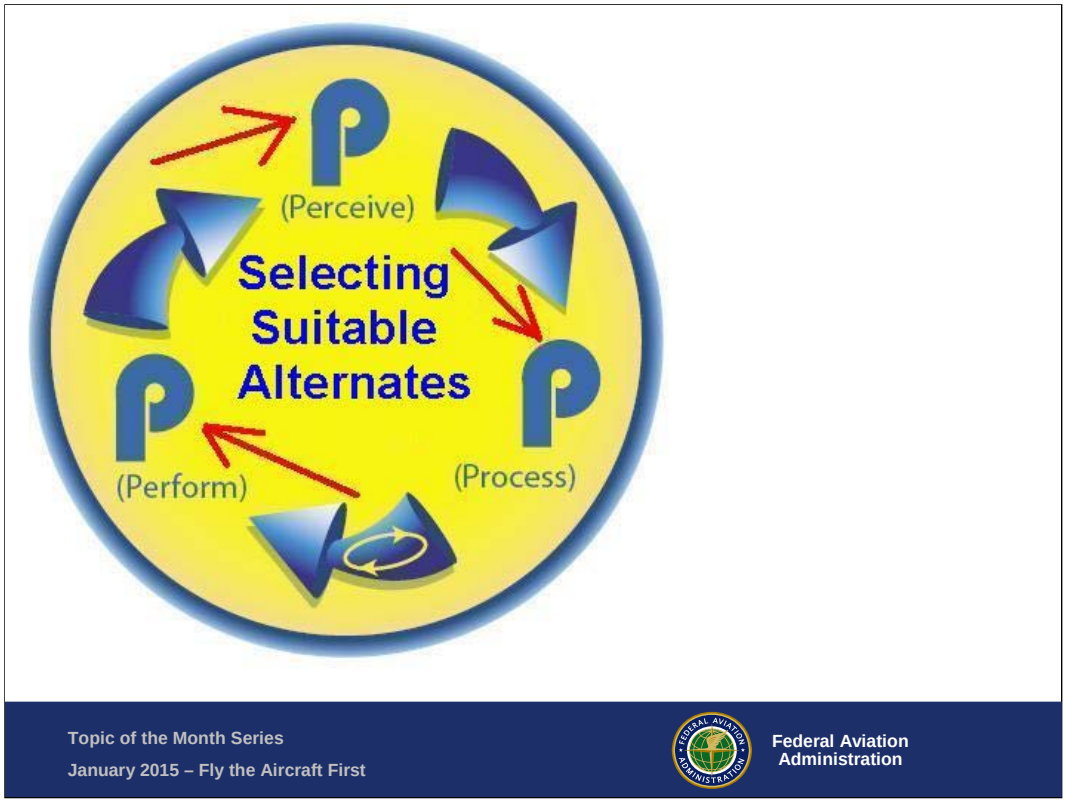
Let’s take a look at the goals for each step of the 3-P model
This shows the goals of each step:

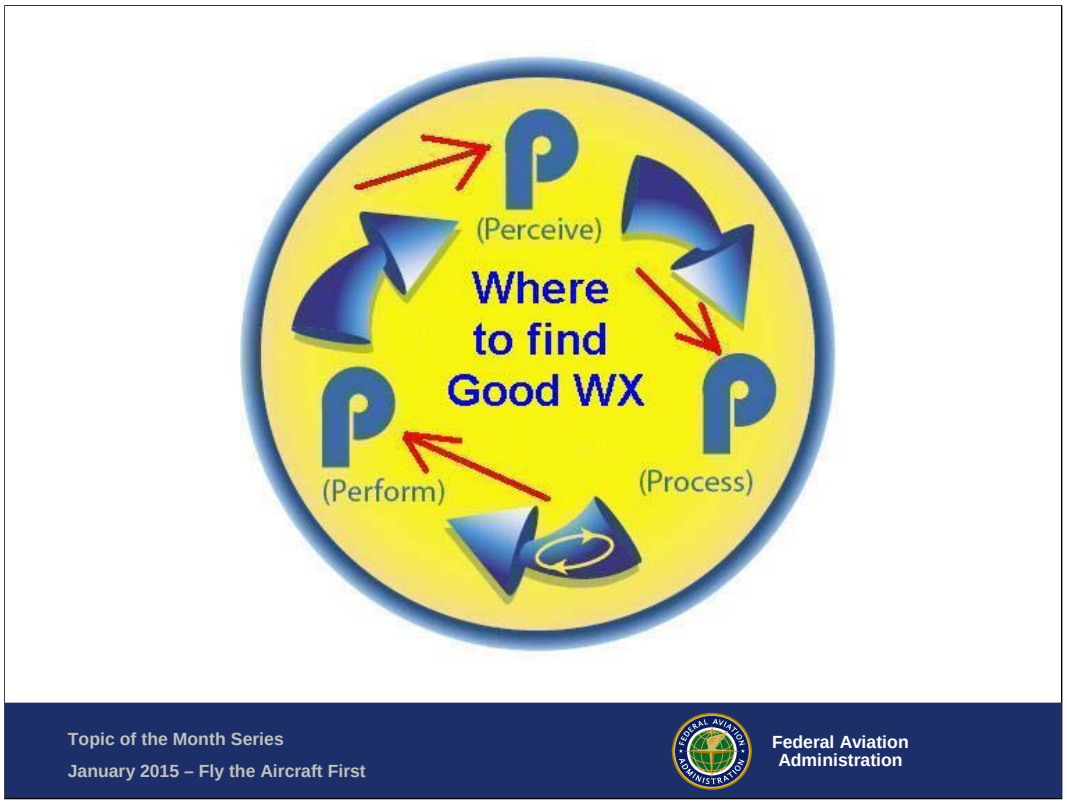
SECOND step goal is to process this information to determine whether the identified hazards constitute risk

THIRD step goal is to perform. Taking action to eliminate hazards or mitigate risk.

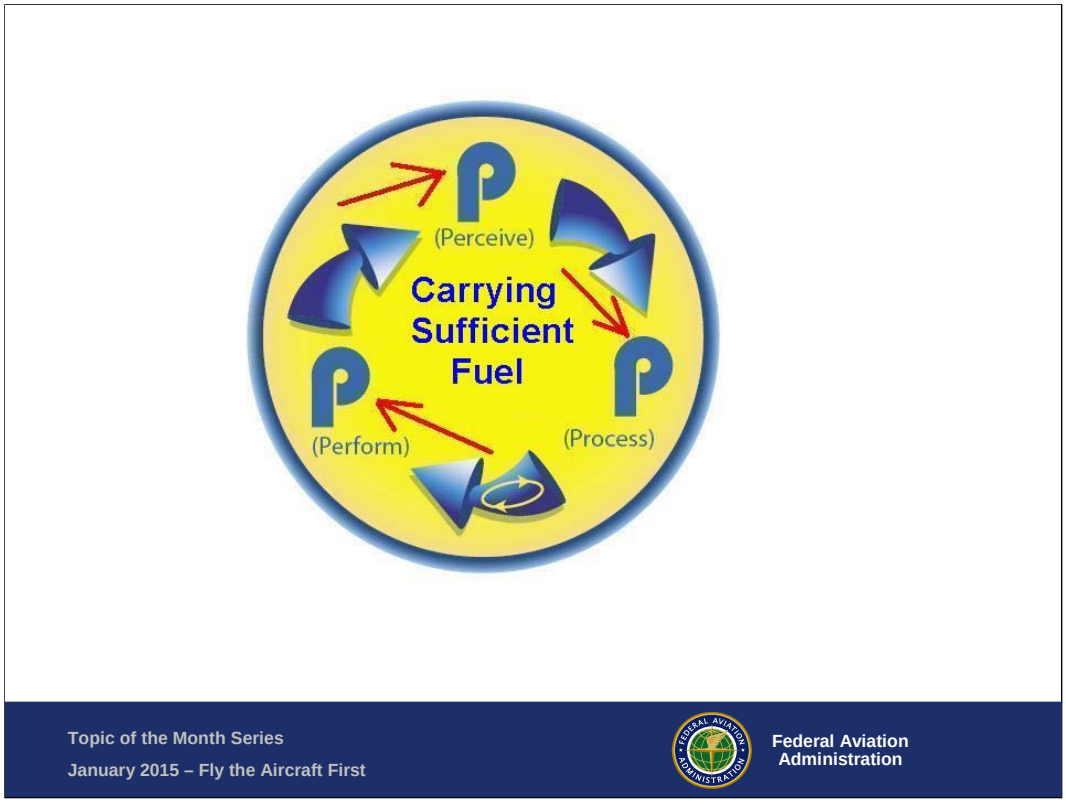
Then continuously evaluate
the outcome of this action.



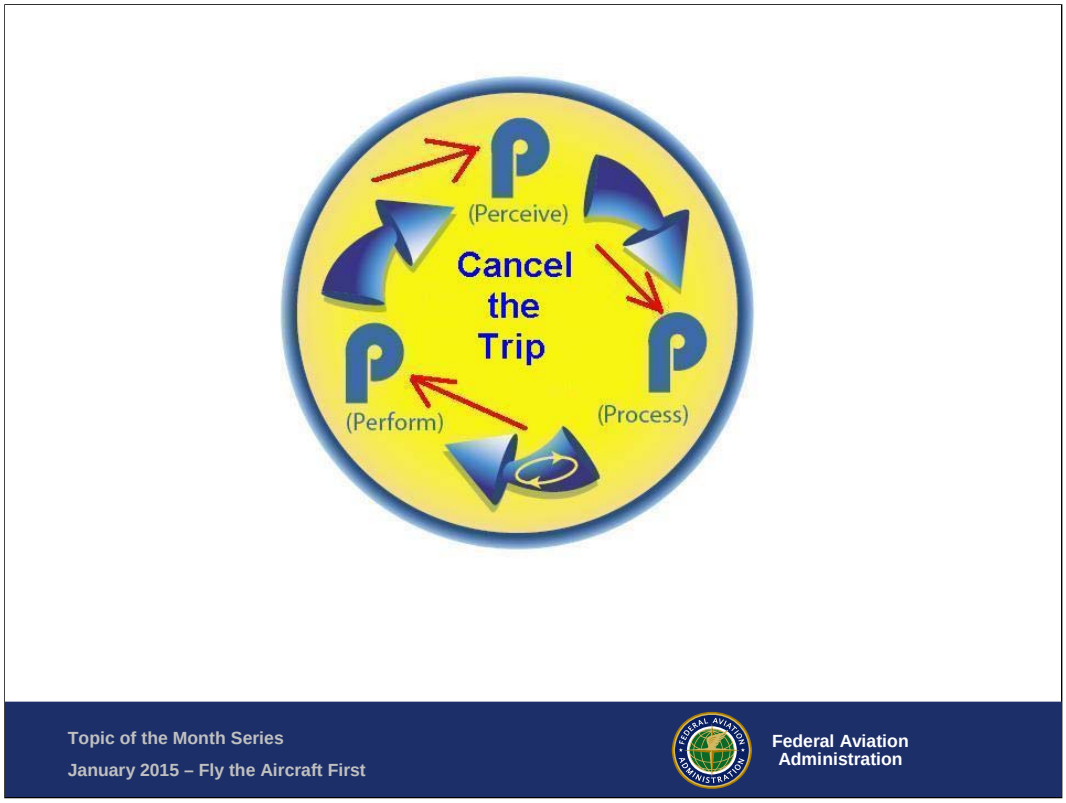
Selecting Suitable Alternatives



Where to find Good Weather



Carrying Sufficient Fuel



Cancel or delay the trip

Scenario Exercise #1 VFR

On a cross-country flight,
one of your passengers gets ill.

This forces you to divert to an alternate for which you have not planned.

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This forces you to divert to an alternate for which you have not planned.

The new destination airport
has two runways,
the longest of which
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The remaining runway is short, but
while less than ideal, should prove
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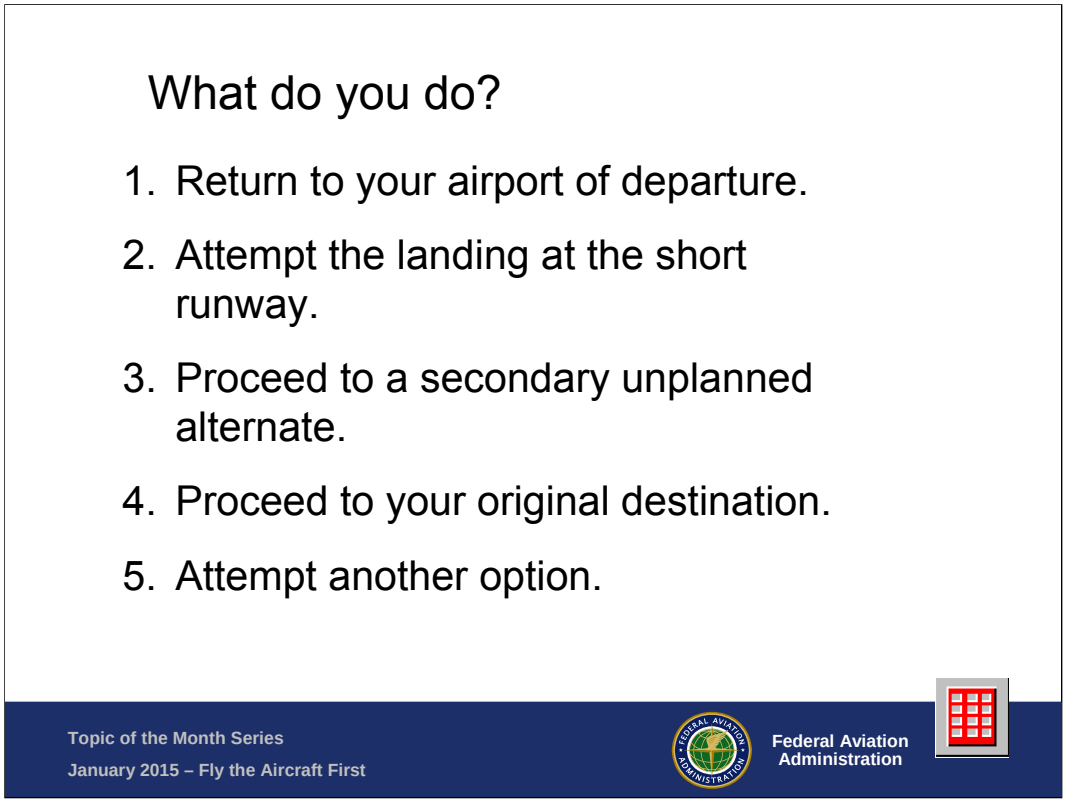

What do you do?

Return to your airport of departure.

Attempt the landing at the short runway.

Proceed to a secondary unplanned alternate.

Proceed to your original destination.

Attempt another option.

Scenario Exercise #2 VFR or IFR

You are PIC on a personal 2-1/2 hour flight.

Your passenger in the front
seat is a licensed pilot,
current and qualified
in the same make and
model aircraft you are flying.

You tell your passenger that he is permitted to operate the radio.

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You tell your passenger that he is permitted to operate the radio.

As you are getting closer to your destination, ATC asks if whether or not you are able to accept a
particular Re-Routing?

Your passenger keys
the radio and replies
"Affirmative" without first asking you, and
ATC immediately issues the clearance.

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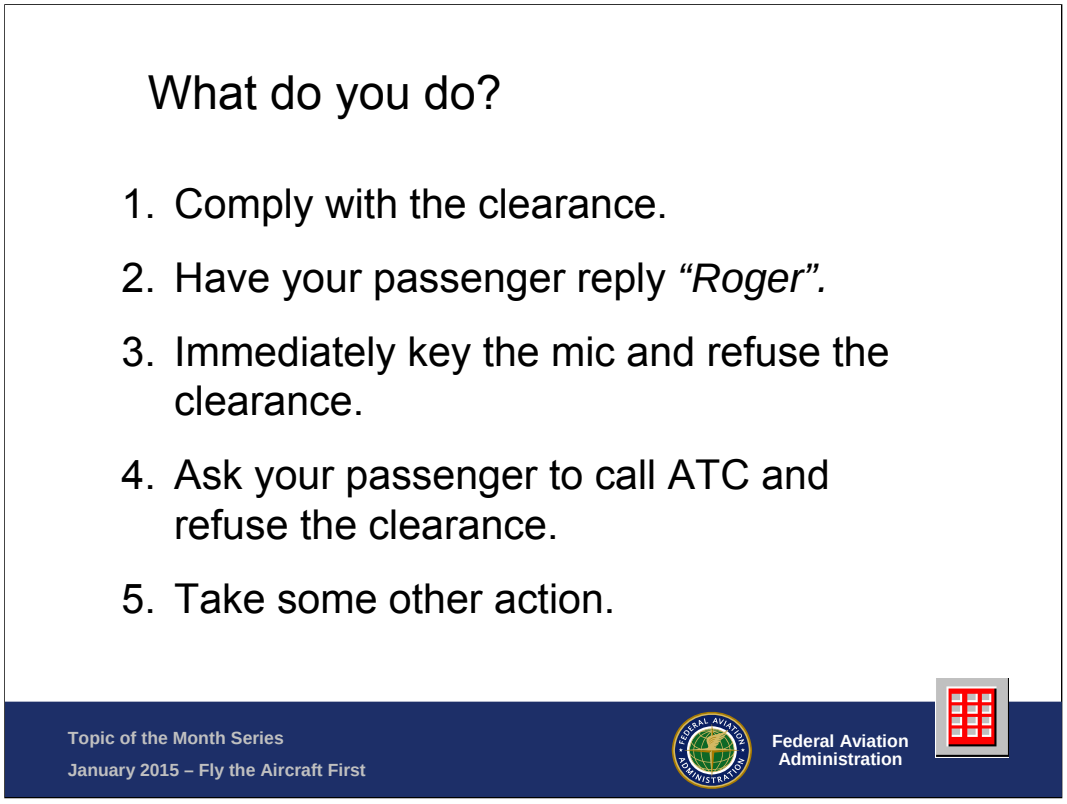

What do you do?

Comply with the clearance.

Have your passenger reply *"Roger"*.

Immediately key the mic and refuse the clearance.

Ask your passenger to call ATC and refuse the clearance.

Take some other action.

Scenario Exercise #3 IFR

You are going to fly to an airport about 30 minutes away to pick up a package for your business partner.

Your partner is away on an important business trip and you need to bring the package back so that the company president can complete negotiations on a new contract for your company.

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You are going to fly to an airport about 30 minutes away to pick up a package for your business
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Your partner is away on
an important business trip and you need to bring the package back so that the company president can complete negotiations on a new contract for your company.

The airplane you have originally scheduled, and usually fly, is not available and you are going to take another one, which is the same make and model.

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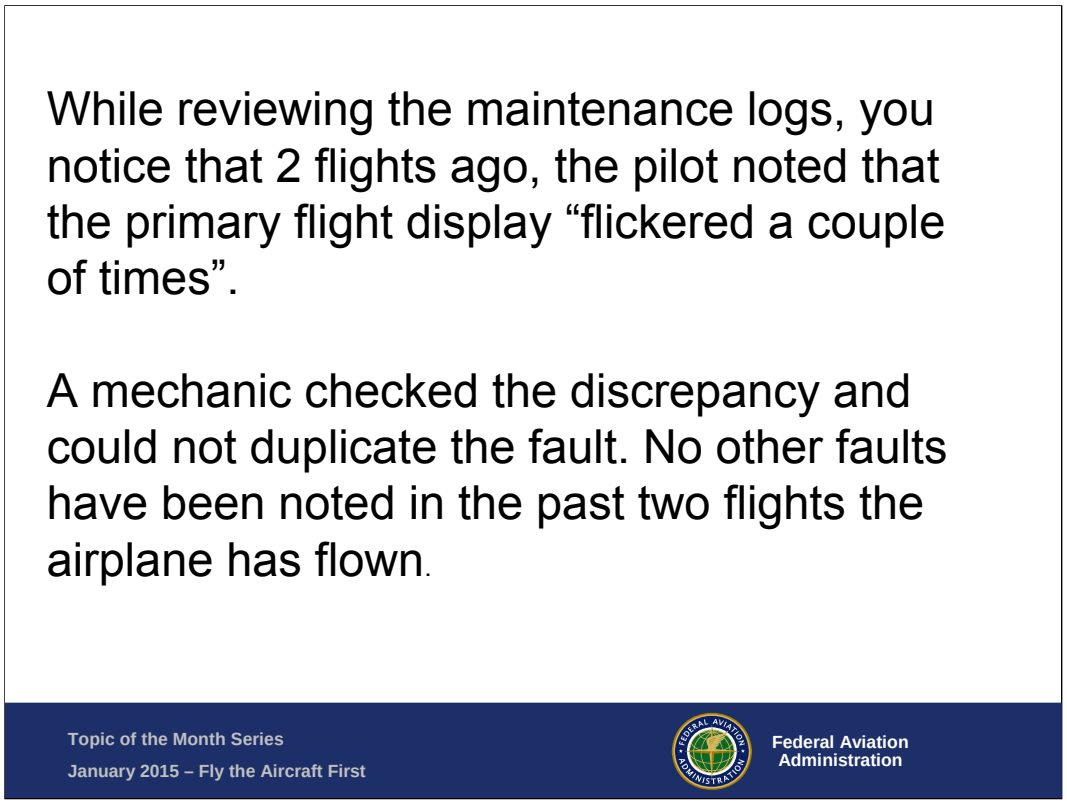
The airplane you have originally scheduled, and usually fly, is not available and you are going to take another one,
which is the same make and model.



While reviewing the maintenance logs, you notice that 2 flights ago, the pilot noted that the primary flight display “flickered a couple of times”.

A mechanic checked the discrepancy and could not duplicate the fault. No other faults have been noted in the past two flights the airplane has flown.

The weather is such that the approaches you will fly might be down to or near minimums at both
your home airport
and your destination.

No SIGMENT or AIRMETS. Winds are forecast to be calm.

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your home airport and your destination.

No SIGMENT or AIRMETS. Winds are forecast to be calm.

What are your actions?

1. **Cancel the flight.** X
2. **Take the flight.** ✓
3. **Take the flight and invite another qualified pilot to come along.**

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1. Cancel the flight.
2. Take the flight.
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Scenario Exercise #3 (continued)

After the flight departs and gets established enroute, a failure of the primary flight instruments occurs, requiring flight on the standby instruments.

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After the flight departs and gets established enroute, a failure of the primary flight instruments occurs, requiring flight on the standby instruments.

ATC issues a hold prior to executing the approach after stating the weather is below minimums but improving.

An EFC time in the holding clearance is 20 minutes. Your fuel is enough for 2 hours of holding.

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Once in the holding pattern, a loss of communications occurs. You leave holding to begin an approach at the EFC.

During the approach,
you re-establish communications
and learn the weather is
right at minimums, setting
the stage for a possible
missed approach.

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missed approach.

After executing the approach the required visual references are not visible, and you execute a missed approach, during which time the weather goes well above minimums, and you are cleared for another approach to a full stop landing.

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time the weather goes well above minimums,
and you are cleared for another approach
to a full stop landing.

After the landing, maintenance found loose connectors on the radio and PFD and repairs them both.

You have regaining full
panel and radio operations
for the flight home. (Discussion)

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After the landing, maintenance found loose connectors on the radio and PFD and repairs them both.

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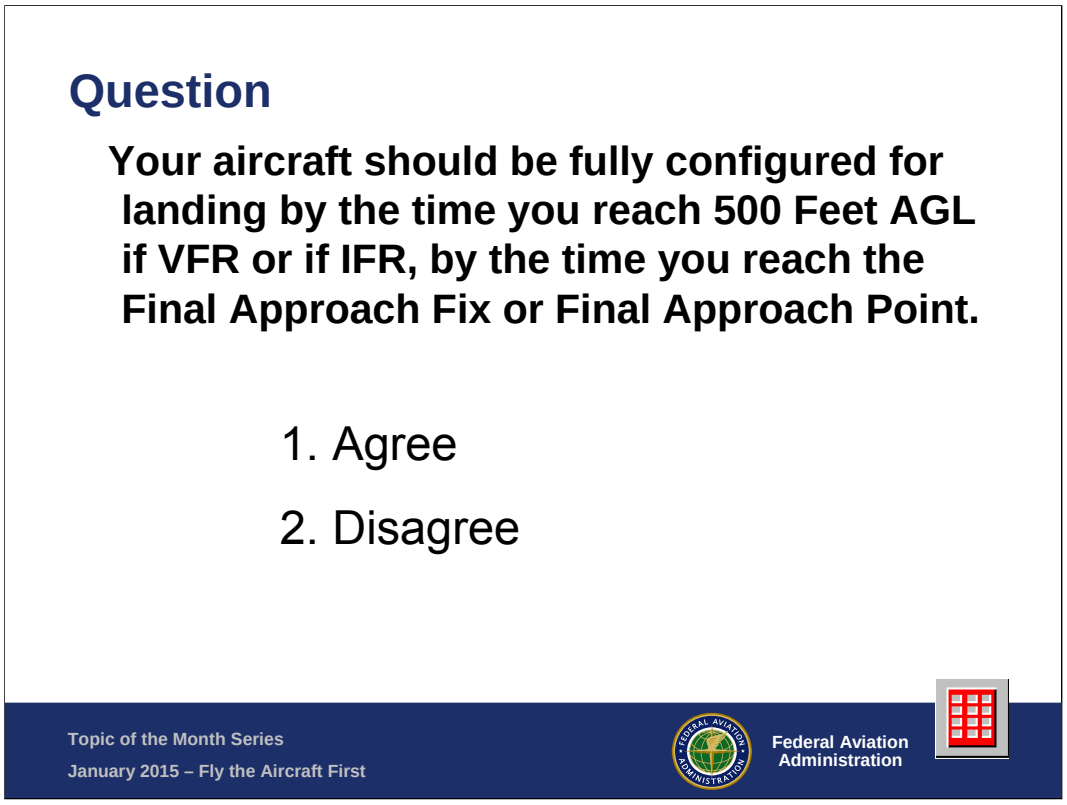

Your aircraft should be fully configured for landing by the time you reach 500 Feet AGL if VFR or if IFR, by the time you reach the Final Approach Fix or Final Approach Point.

Agree

Disagree

IFR Scenario 4

You are a 2,000-hour instrument rated pilot flying turbo-charged, complex single to a three-day seminar you're conducting.

After departing a mid-point fuel stop for the final 2-½ hour leg, and climbing to VFR conditions on top of an overcast, the generator fails.

The destination weather is forecast for overcast clouds at 1,000 feet and 3 miles visibility. You expect to arrive at your destination shortly before sunset.

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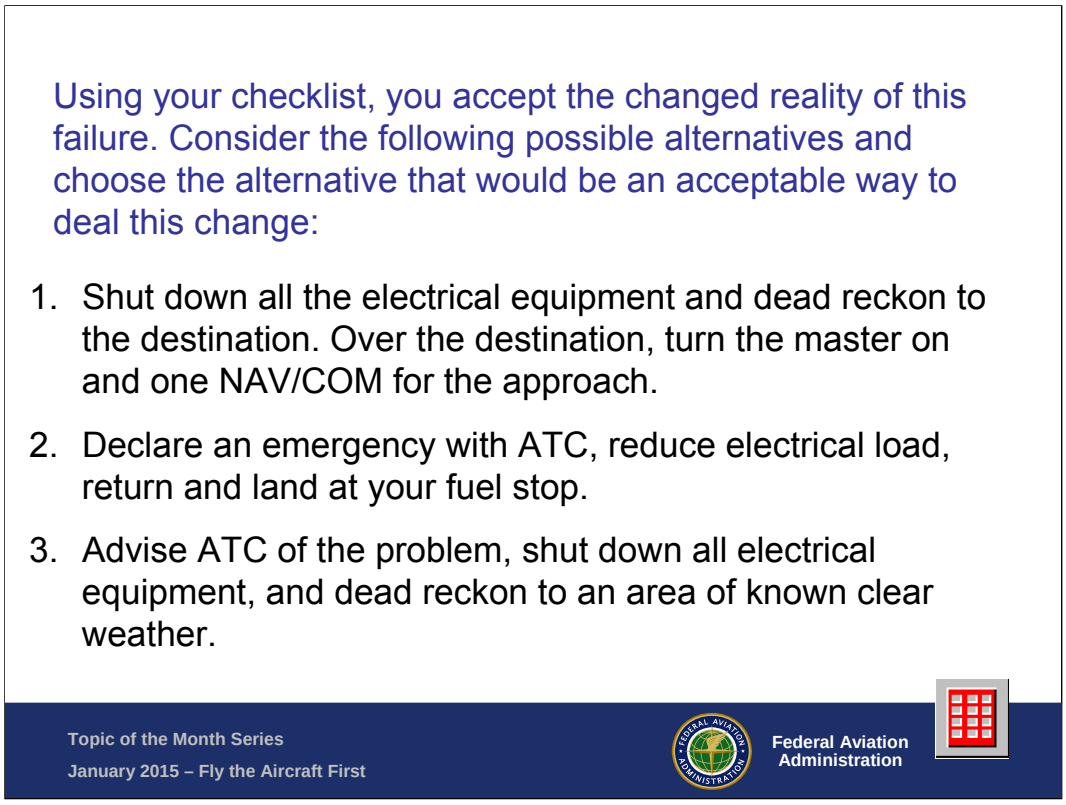

Shut down all the electrical equipment and dead reckon to the destination. Over the destination, turn the master on and one NAV/COM for the approach.

Reality is that the airplane has changed, and you need to come to terms with these changes. You must change your plans.
There are many possible consequences of continuing to the destination including worsening weather and a significant
possibility that you might have no battery power by the time you get there. Since your planned arrival is just before sunset,
any delay will mean that you will arrive in the dark.

Declare an emergency with ATC, reduce electrical load, return and land at your fuel stop.

You would get ATC's full attention by declaring an emergency and have a better chance of landing with some

electrical power.

Advise ATC of the problem, shut down all electrical equipment, and dead reckon to an area of known clear weather.

If you have good information on clear weather areas and plenty of fuel to get there, dead reckoning to such an area is a good alternative.

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Presented to: Salem Area Pilots

By: Thomas Gorski CFI

Date: January 3rd, 2015

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