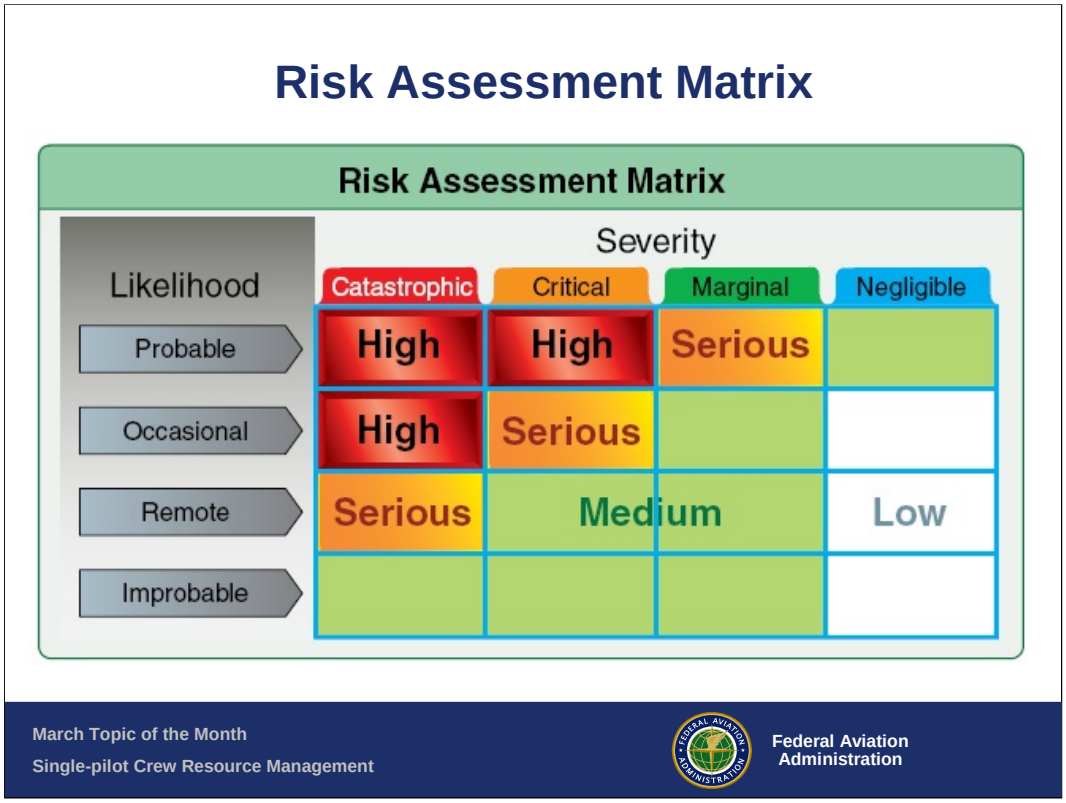
During this second hour, we are going to take a look at the practical side of Risk Management, also we are going to talk about ADM and SRM and finally we will participate in risk management scenarios. Let's begin by looking at what is called a Risk Assessment Matrix. **(Next Slide)**

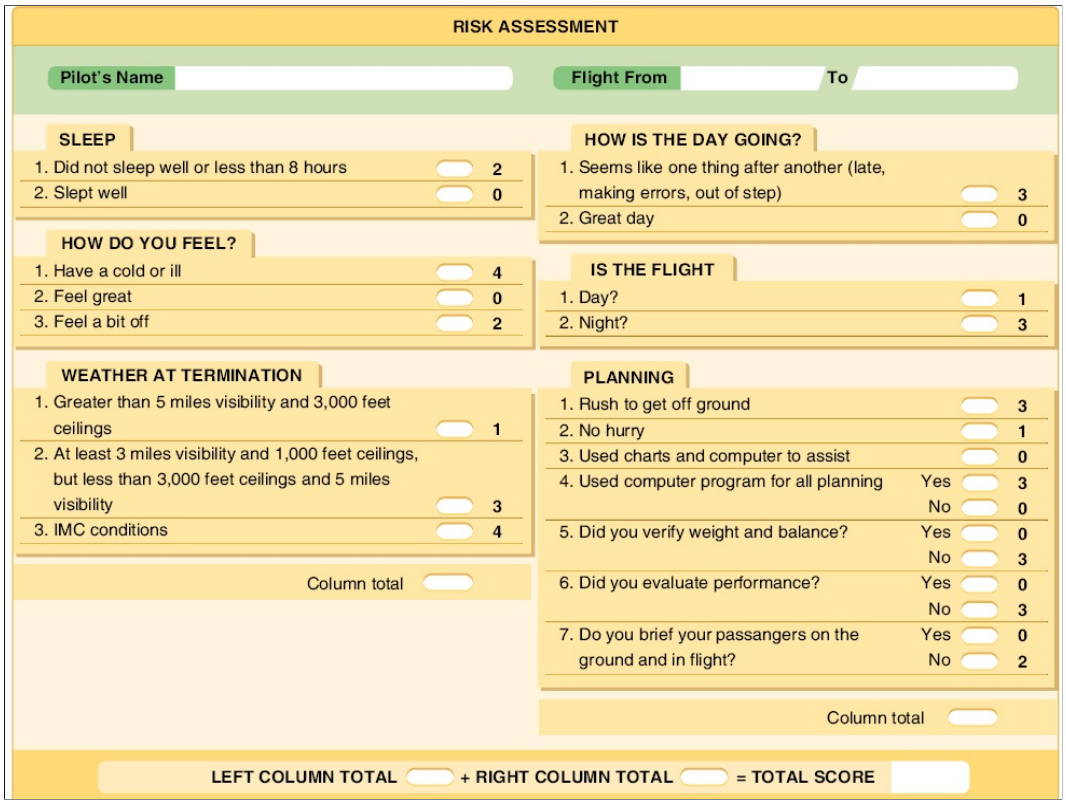


The most basic tool is the risk matrix. It assesses two items: the **likelihood** of an event occurring and the **consequence (Severity)** of that event. Likelihood is nothing more than taking a situation and determining the probability of its occurrence. It is rated as probable, occasional, remote, or improbable. For example, a pilot is flying from point A to point B (50 miles) in marginal visual conditions. The likelihood of encountering potential instrument conditions is the first question the pilot needs to answer. The experiences of other pilots coupled with the forecast might cause the pilot to assign “occasional” to determine the probability of encountering IMC. • Probable—an event will occur several times. • Occasional—an event will probably occur sometime. • Remote—an event is unlikely to occur, but is possible.• Improbable—an event is highly unlikely to occur.

Severity of an Event

The other item in the matrix is the severity or consequence of a pilot’s actions. It can relate to injury and/or damage. If the individual in the example above is not an IFR pilot, what are the consequences of encountering inadvertent IMC conditions? In this case, because the pilot is not IFR rated, the consequences are potentially catastrophic.

The following are guidelines for this assignment. • Catastrophic—results in fatalities, total loss • Critical—severe injury, major damage • Marginal—minor injury, minor damage • Negligible—less than minor injury, less than minor system damage Simply connecting the two factors as shown in the figure indicates the risk is high and the pilot must not fly, or fly only after finding ways to mitigate, eliminate, or control the risk.



RISK ASSESSMENT

Pilot's Name _____ Flight From _____ To _____

SLEEP

1. Did not sleep well or less than 8 hours — 2
2. Slept well — 0

HOW DO YOU FEEL?

1. Have a cold or ill — 4
2. Feel great — 0
3. Feel a bit off — 2

WEATHER AT TERMINATION

1. Greater than 5 miles visibility and 3,000 feet ceilings — 1
2. At least 3 miles visibility and 1,000 feet ceilings, but less than 3,000 feet ceilings and 5 miles visibility — 3
3. IMC conditions — 4

Column total _____

HOW IS THE DAY GOING?

1. Seems like one thing after another (late, making errors, out of step) — 3
2. Great day — 0

IS THE FLIGHT

1. Day? — 1
2. Night? — 3

PLANNING

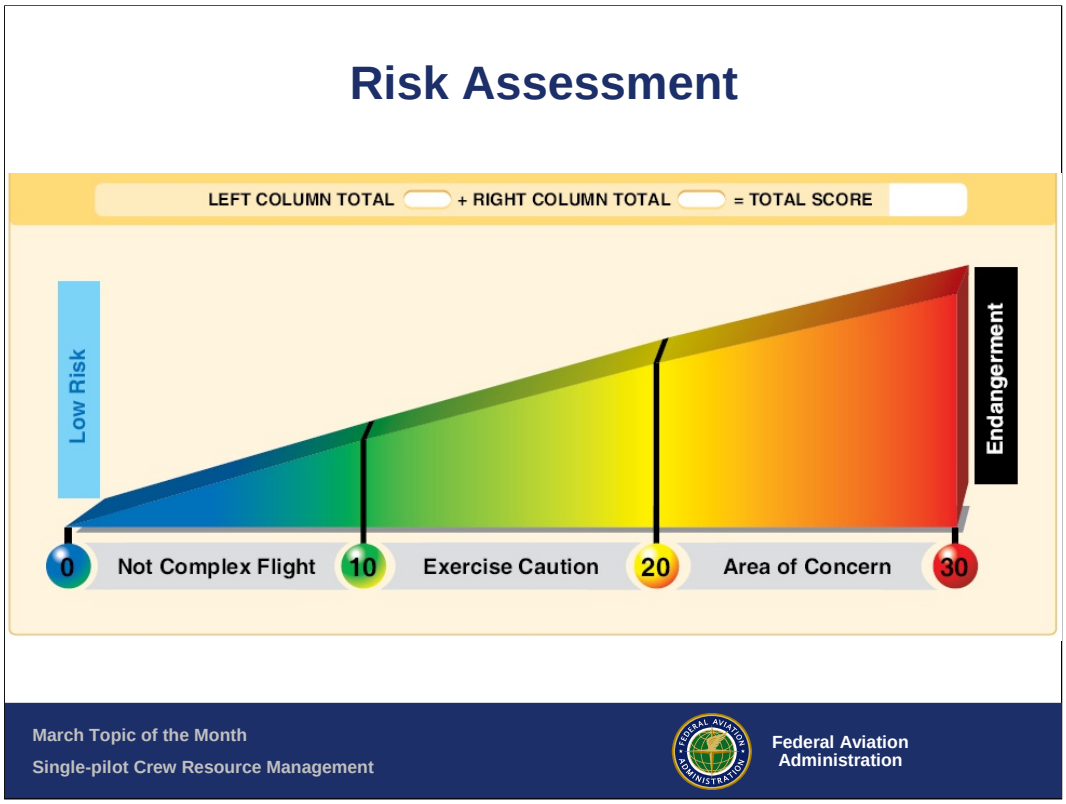
1. Rush to get off ground — 3
2. No hurry — 1
3. Used charts and computer to assist — 0
4. Used computer program for all planning — Yes 3 / No 0
5. Did you verify weight and balance? — Yes 0 / No 3
6. Did you evaluate performance? — Yes 0 / No 3
7. Do you brief your passangers on the ground and in flight? — Yes 0 / No 2

Column total _____

LEFT COLUMN TOTAL _____ + RIGHT COLUMN TOTAL _____ = TOTAL SCORE _____

Although the matrix provides a general viewpoint of a generic situation, a more comprehensive program can be made that is tailored to a pilot's flying.

This figure includes a wide array of aviation related activities specific to the pilot and assesses health, fatigue, weather, capabilities, etc. The scores are added and the overall score falls into various ranges, with the range representative of actions that a pilot imposes upon himself or herself.



Risk assessment is only part of the equation. After determining the level of risk, the pilot needs to **mitigate the risk.** For example, the VFR pilot flying from point A to point B (50 miles) in marginal flight conditions has several ways to reduce risk:

• Wait for the weather to improve to good VFR conditions.

• Take a pilot who is more experienced or who is certified as an instrument flight rules (IFR) pilot.

• Delay the flight.

• Cancel the flight.

• Drive.

UN Flying in Africa and the Middle East required a risk assessment be completed prior to each and every flight. The crew filled out a form and took a look at the factors which would constitute certain levels of risk, such as weather and the complexity of the mission requirements.

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.

- **FAA / Industry / Academia partnership to develop standards for Technically Advanced Aircraft.**
- **FITS addresses Automation differences in operating systems, inputting functions and techniques.**
- **TAA accidents reveal lack of situational awareness, decision-making, and inadequate risk management as major cause-factors.**

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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.

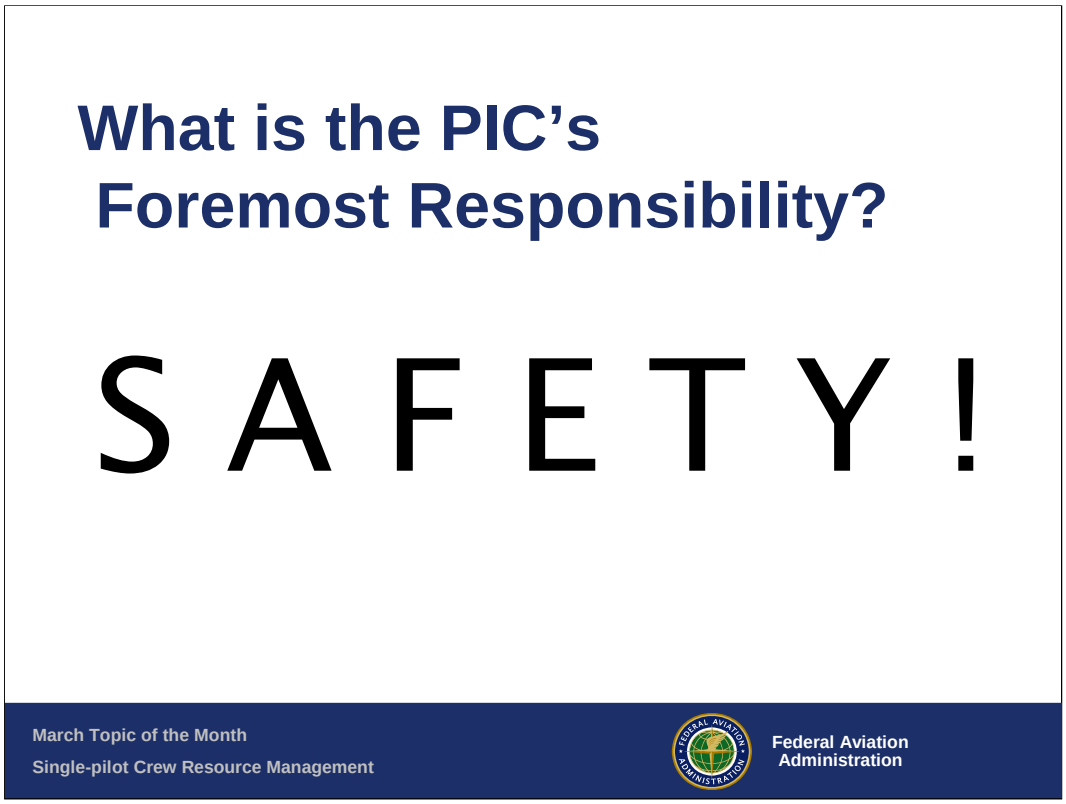
TAA accidents major cause-factors reveal lack of **situational awareness**, lack of or ignorance regarding **decision-making**, and inadequate **risk management**.

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

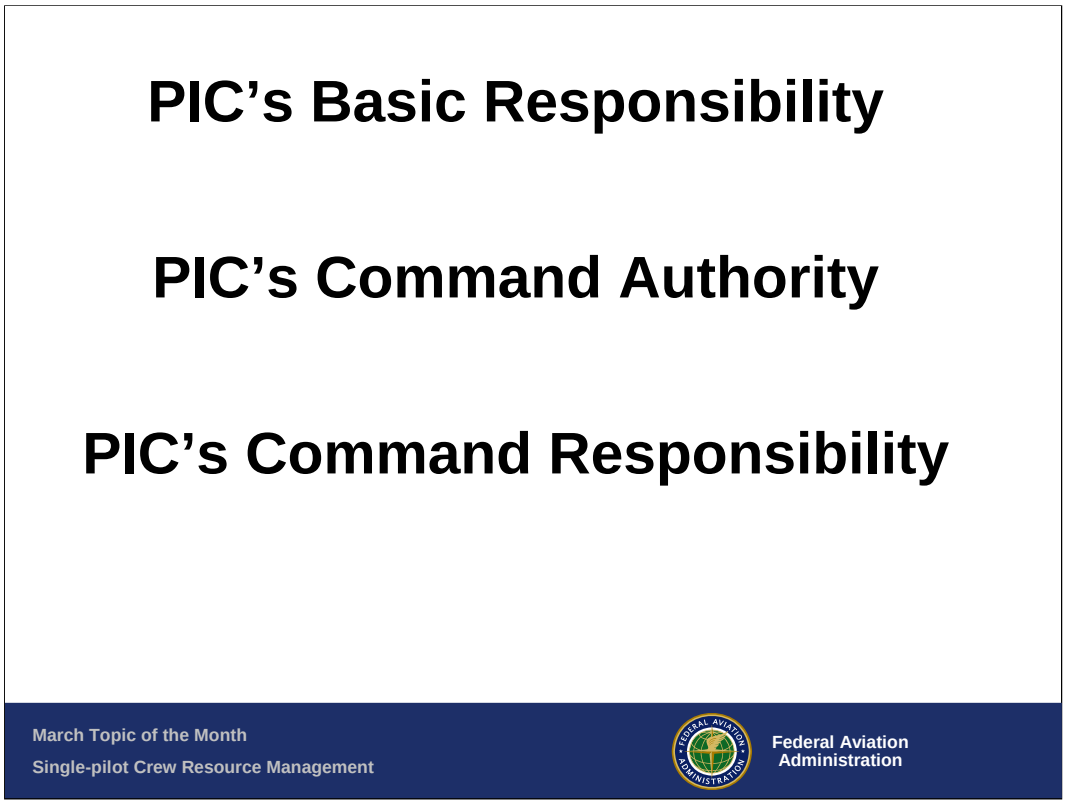
Leadership.



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?

(Click)



Let’s take a look at the three building blocks, the foundational elements shared by each and every PIC.
Our common experience as pilots revolves around each of these three elements every time we fly.

Let’s take a close-up look at Command Authority **(Next Slide).**

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.

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.

Stated another way, *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. That is the basic responsibility of the PIC.*

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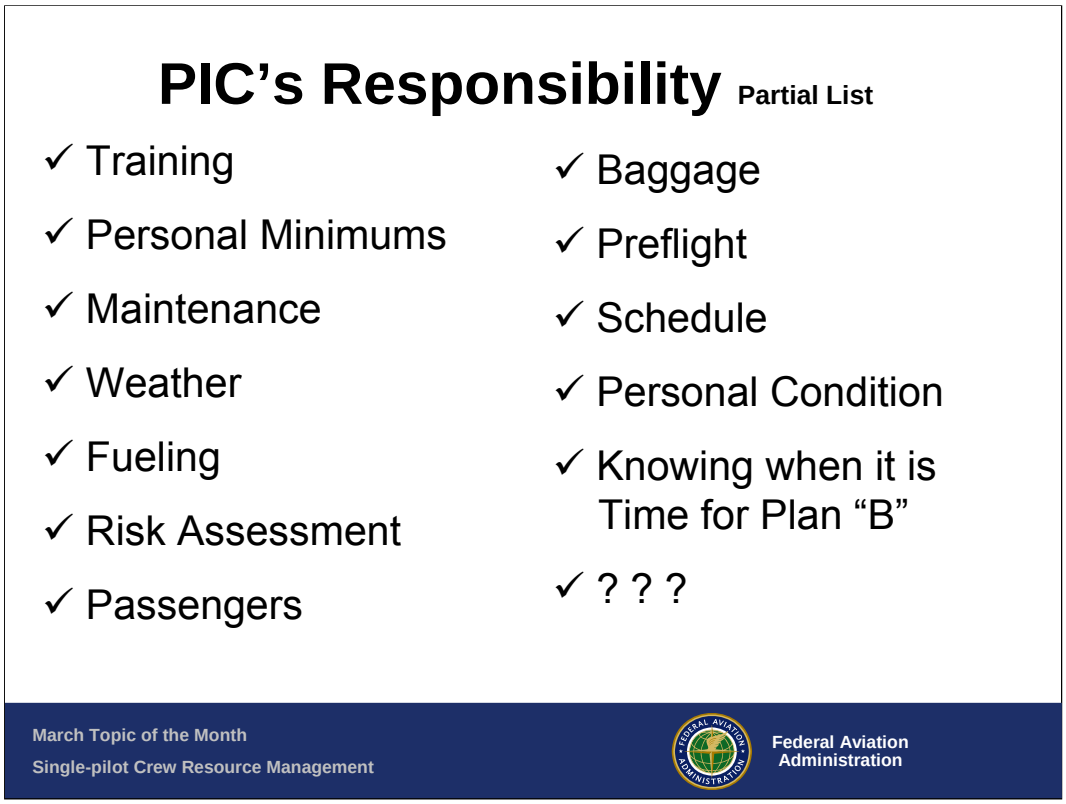
Command authority is Legally mandated and ethically required. Command authority has built-in accountability of PIC's.
Command authority is exercised by the PIC's authority in thee areas:
Responsibility, Accountability, and Coordination or Operation of the flight.

What does Airplane Command Authority look like?

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

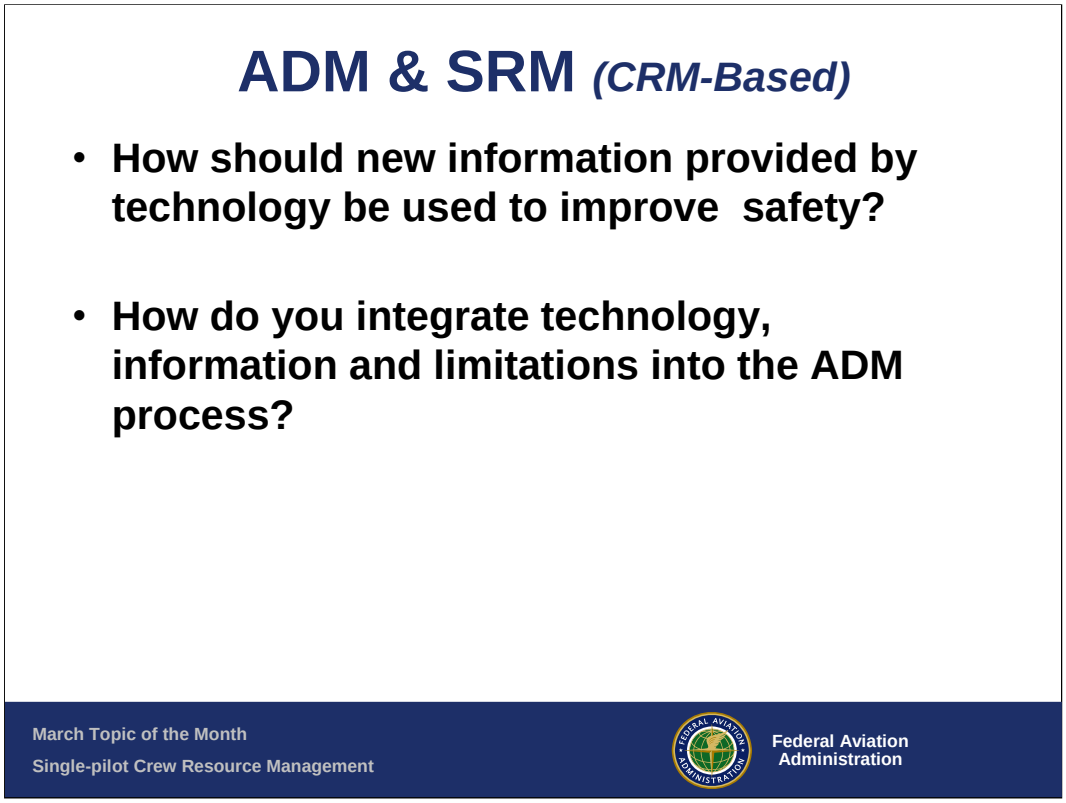
(Click)

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?

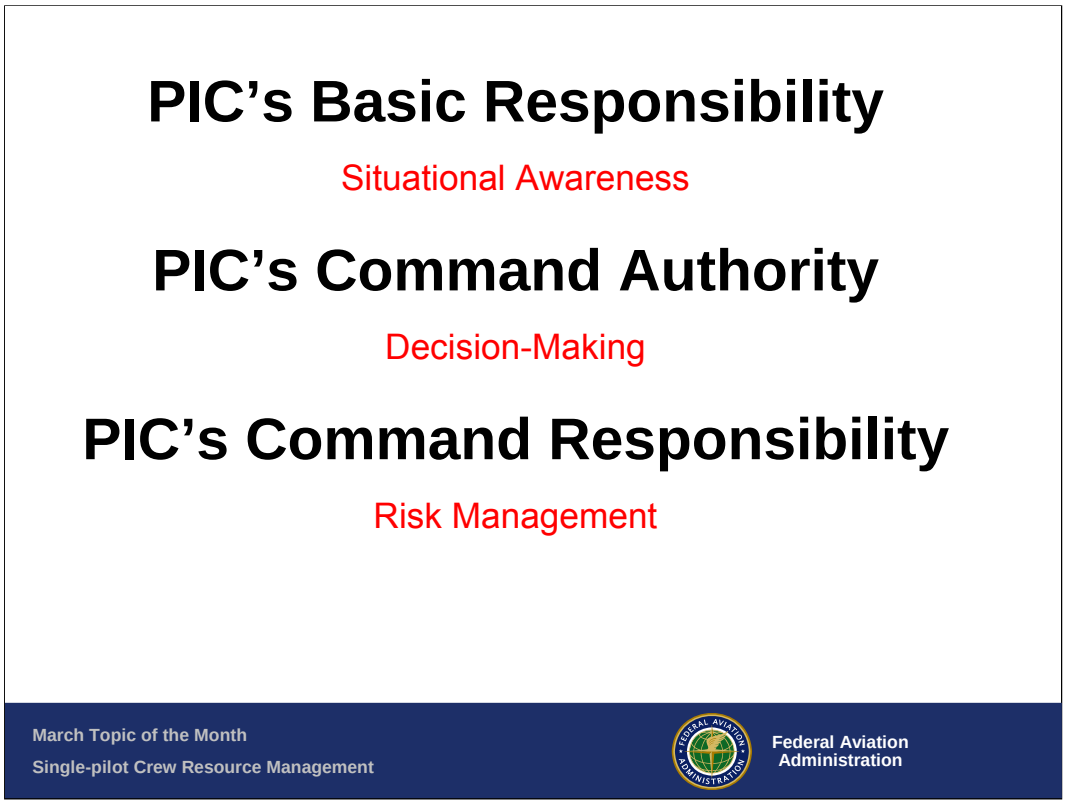
(Click)



Here are two questions we should be asking ourselves:

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

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



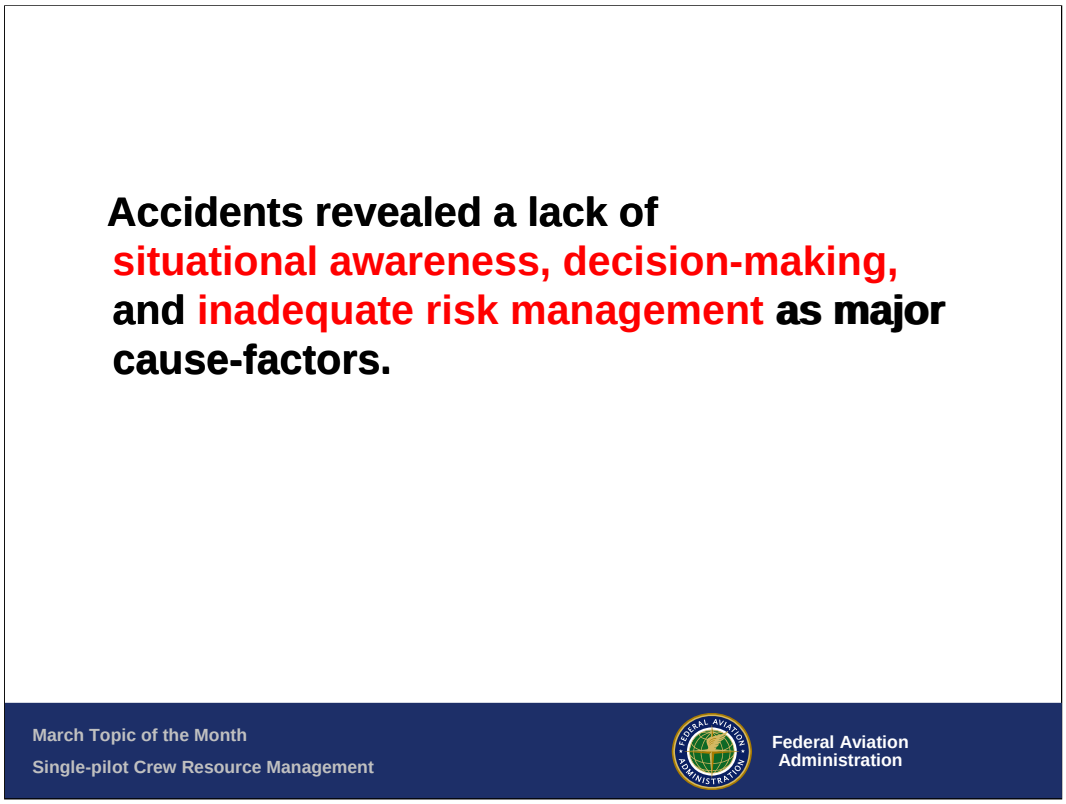
Understand that the PIC's basic responsibility is Situational awareness. **(Click)**

In order to be responsible for the safety of the passengers, crewmembers, cargo, and airplane.

Understand that as PIC your decision making is legally mandated and ethically required. **(Click)**

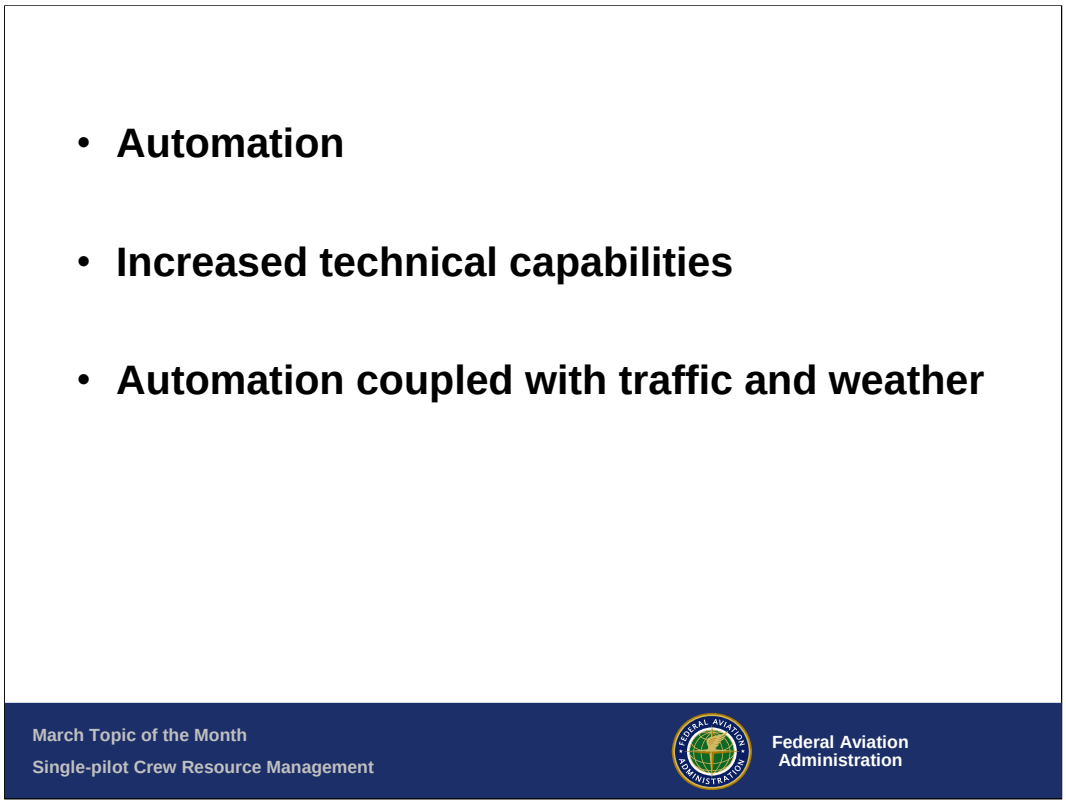
Remember the long list of responsibilities? Each one of those responsibilities can be a resource to trap and prevent errors. **(Click)**

That is the practical application of what is called risk management.



Why are we talking about this?

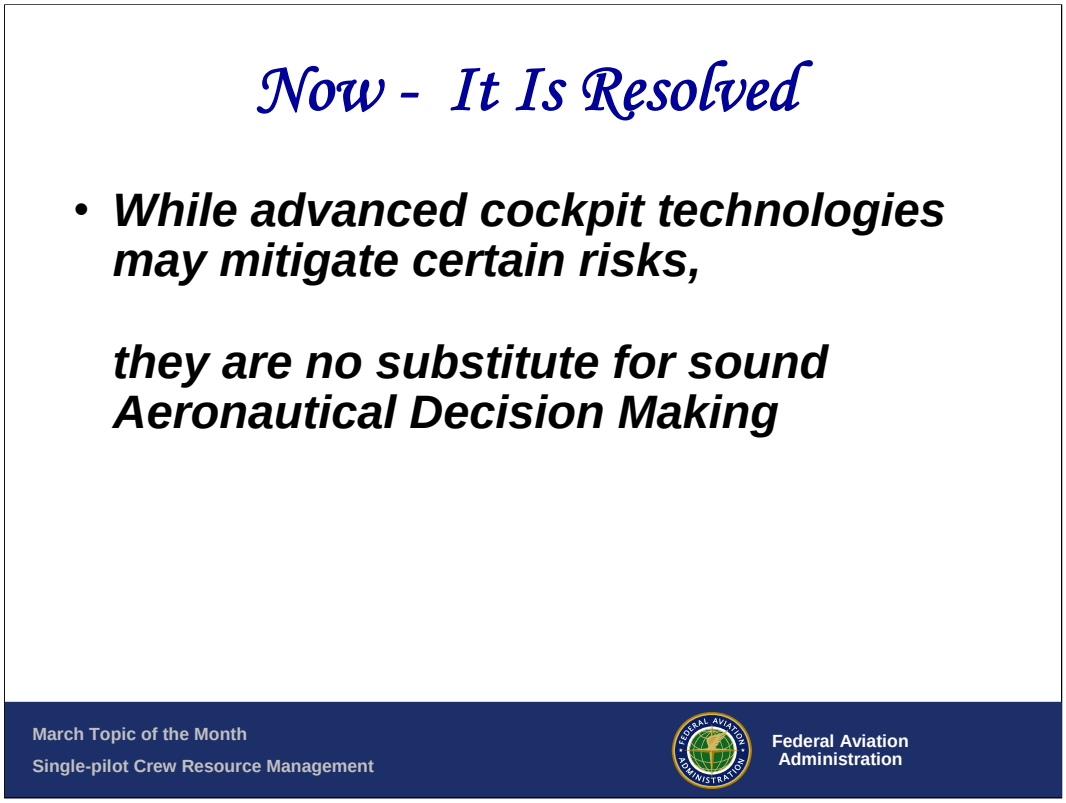
Because accident statistics revealed a lack of **situational awareness**, **decision-making**, and **inadequate risk management** as major cause-factors.



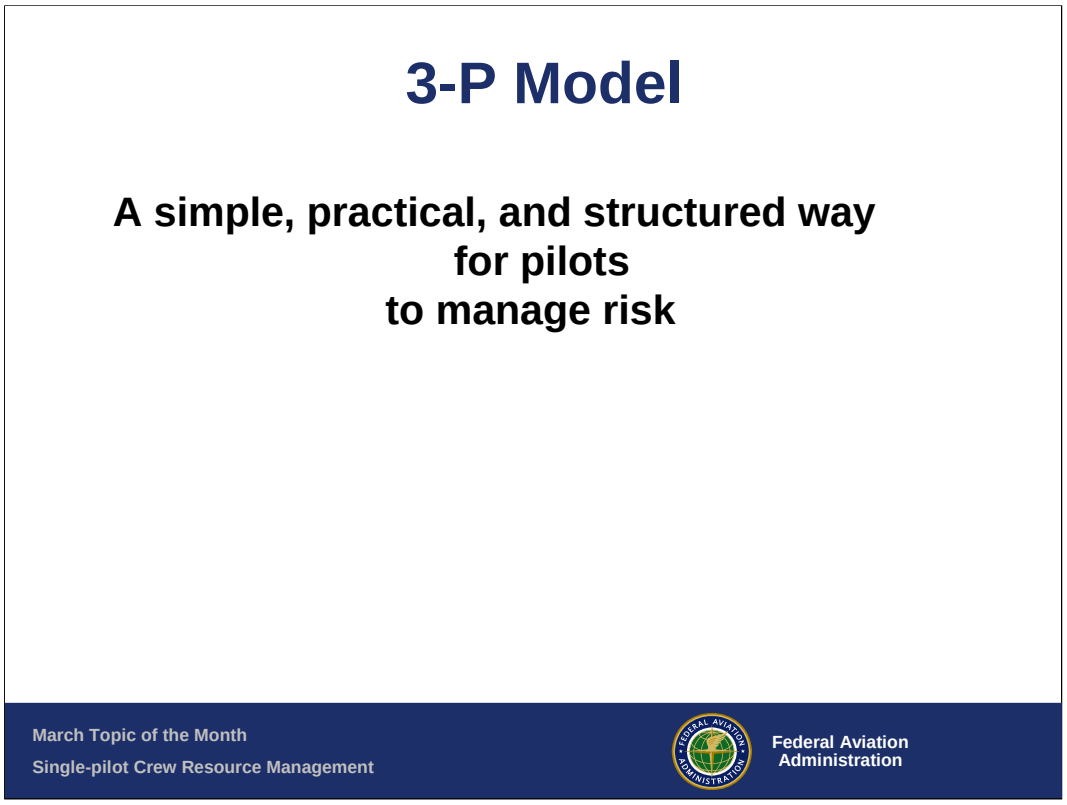
Automation offers safety and operational advantages

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.

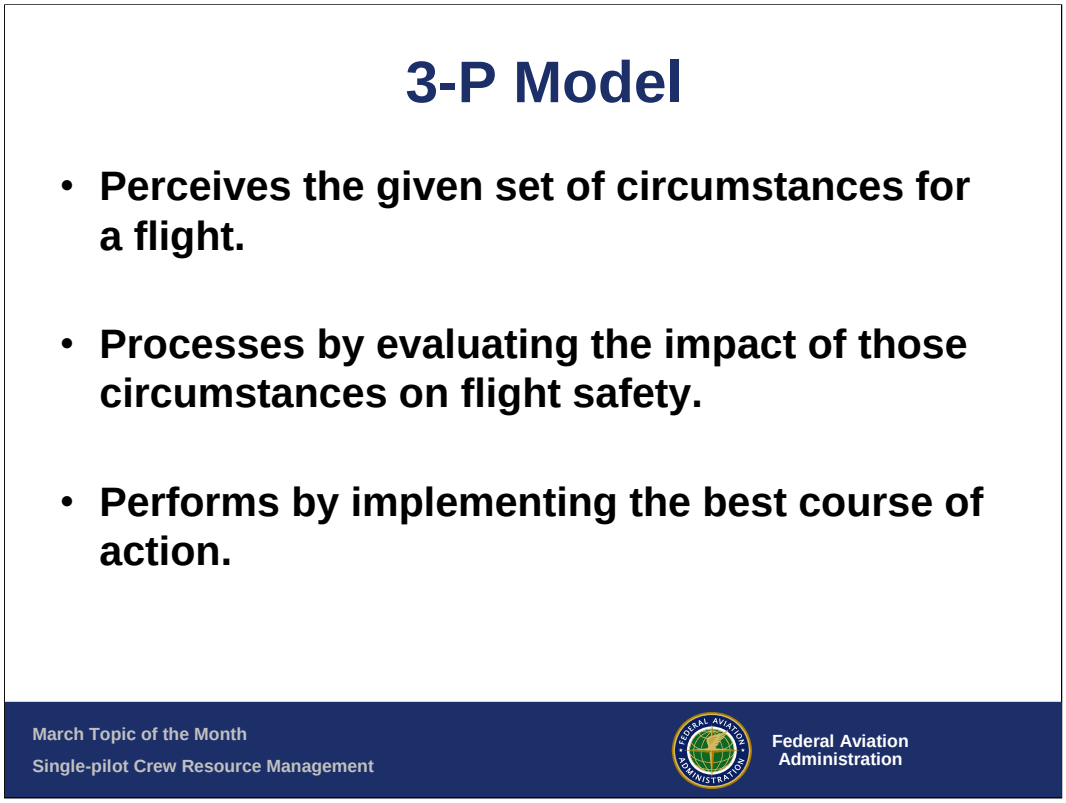


Advanced cockpit technologies and automation may mitigate certain risks, they are no substitute for sound ADM



The 3-p MODEL

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



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

This model of risk management is a decision-making process designed to

Systematically help you to perceive hazards

Help you to assess the degree of risk associated with a hazard, and

Help you perform the best course of action.

Let’s take a look at the goals for each step of the 3-P model
This shows the goals of each step:
In the FIRST step, the goal is
to develop situational awareness
by perceiving hazards

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

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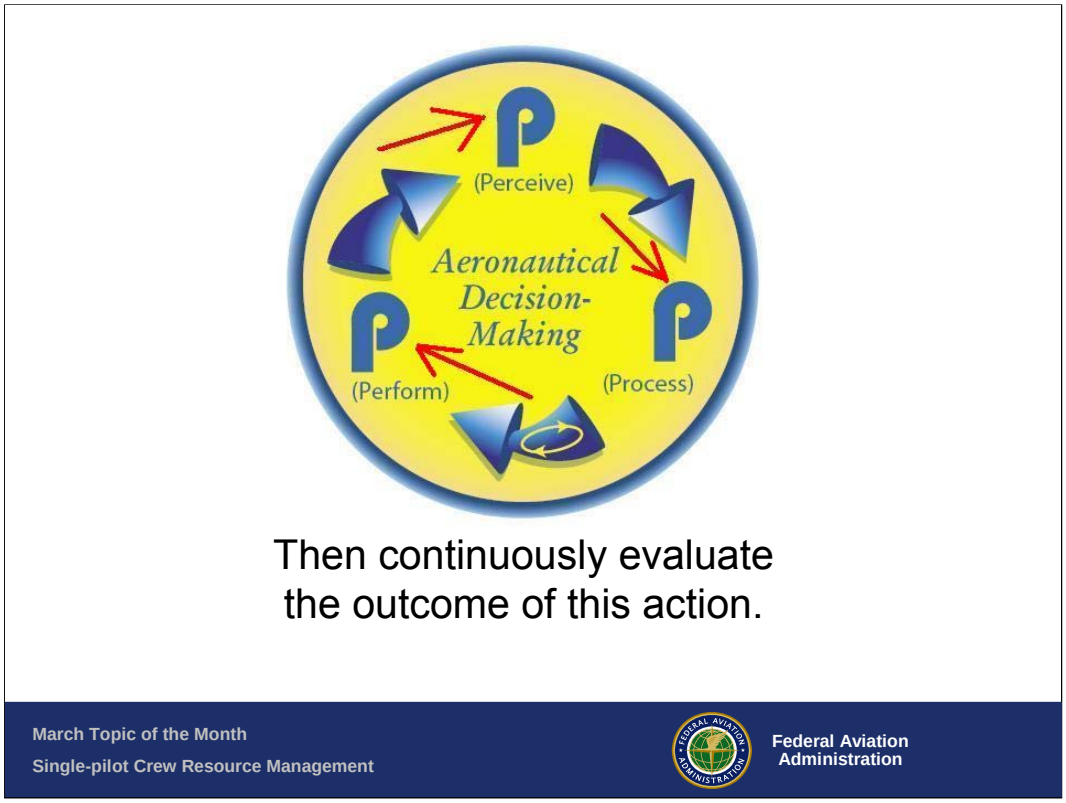
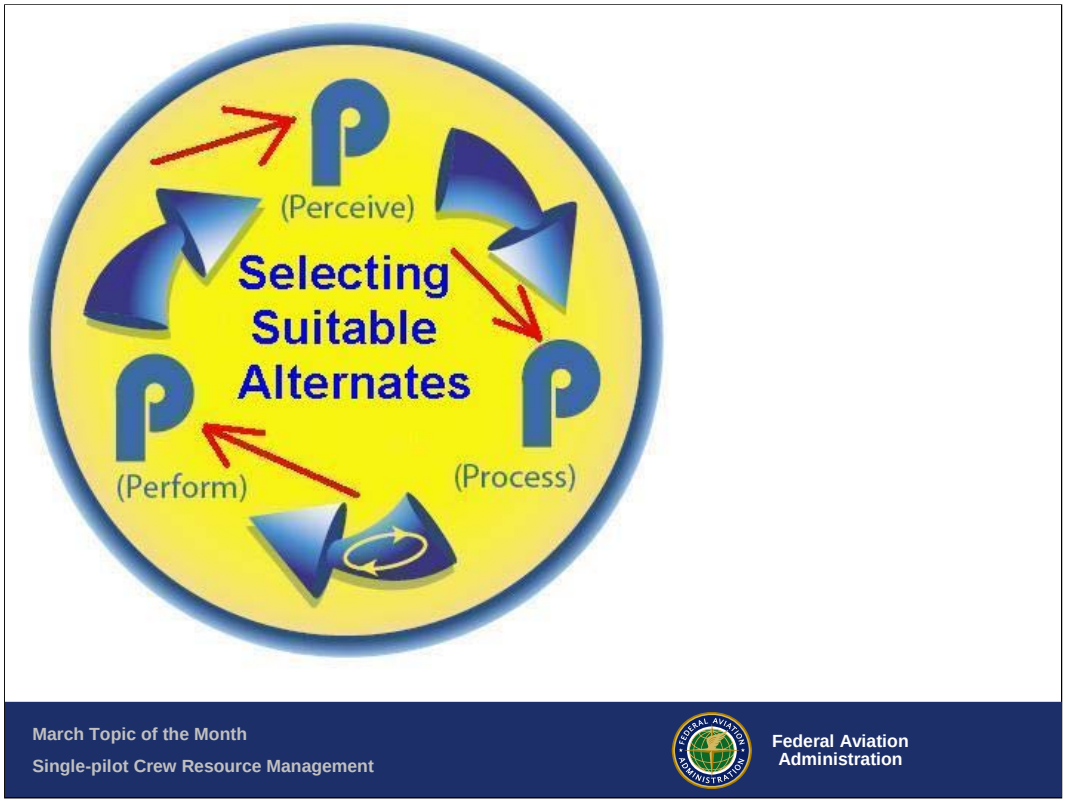
SECOND step goal is to process this information to determine whether the identified hazards constitute risk

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

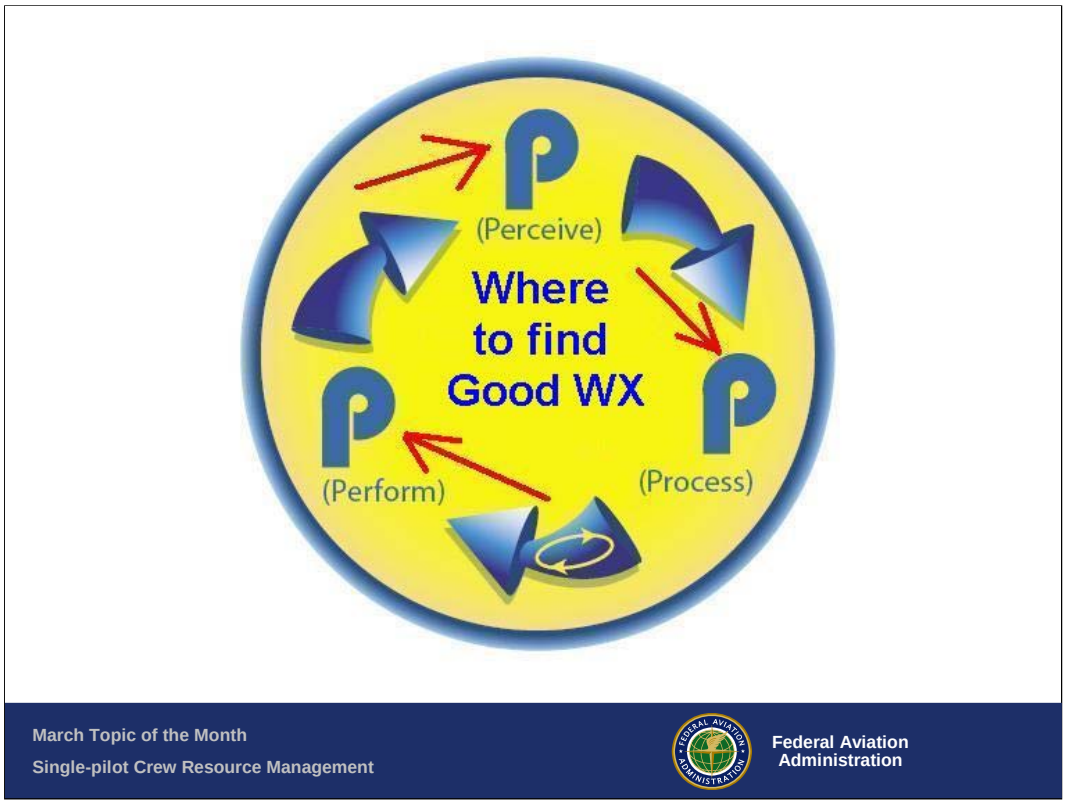


Then continuously evaluate the outcome of this action.

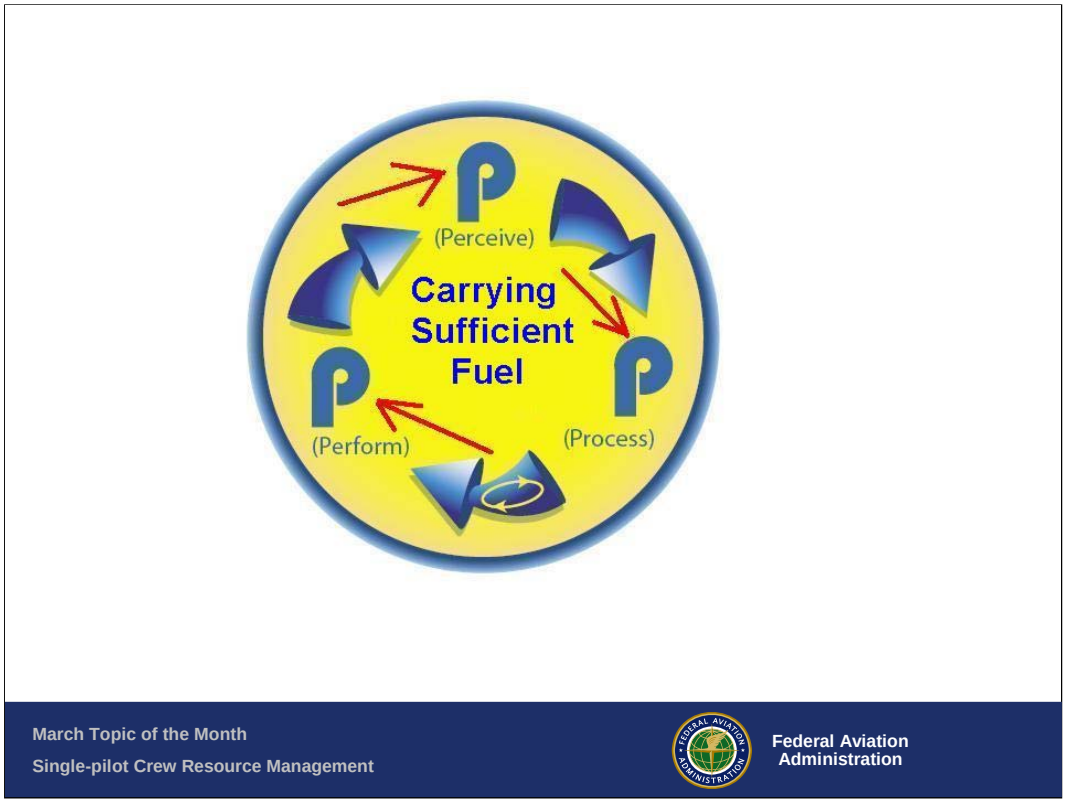


The continuous evaluation may require actions such as:

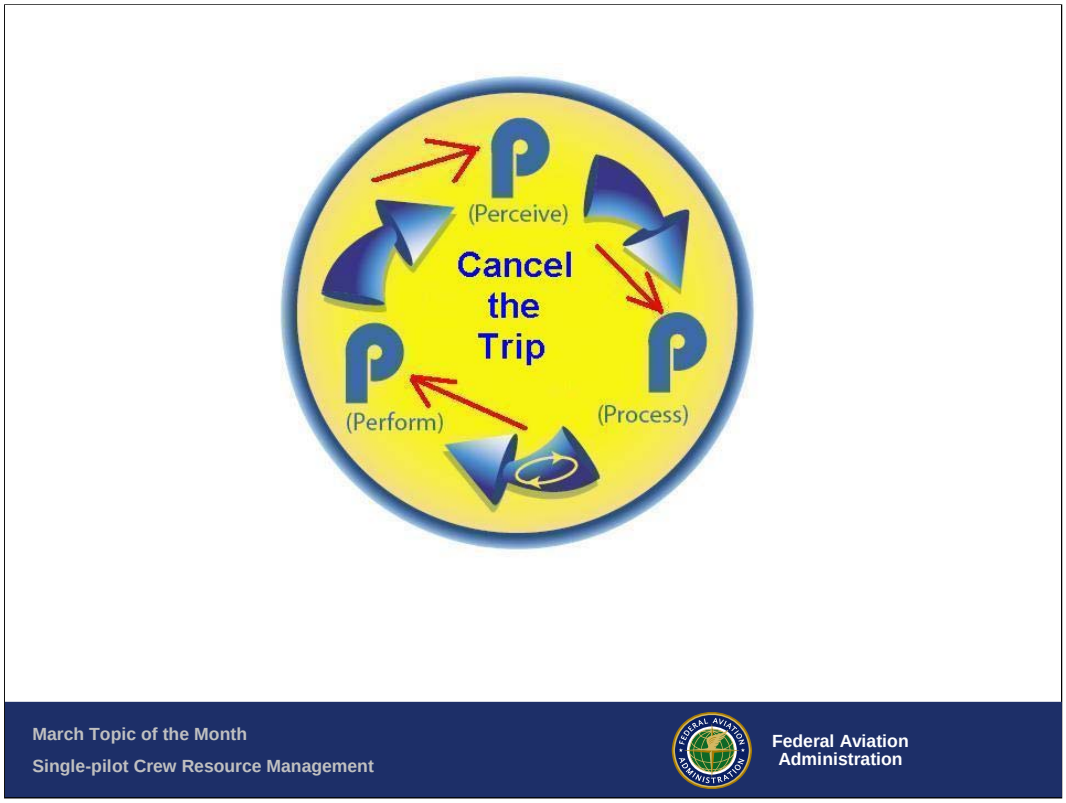
The Selecting of Suitable Alternatives



Where to find Good Weather



Carrying Sufficient Fuel, planning a fuel stop, or choosing a course of action requiring an unplanned intermediate stop.



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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one of your passengers gets ill.

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
is closed due to construction.

The remaining runway is short, but
while less than ideal, should prove
suitable for landing.

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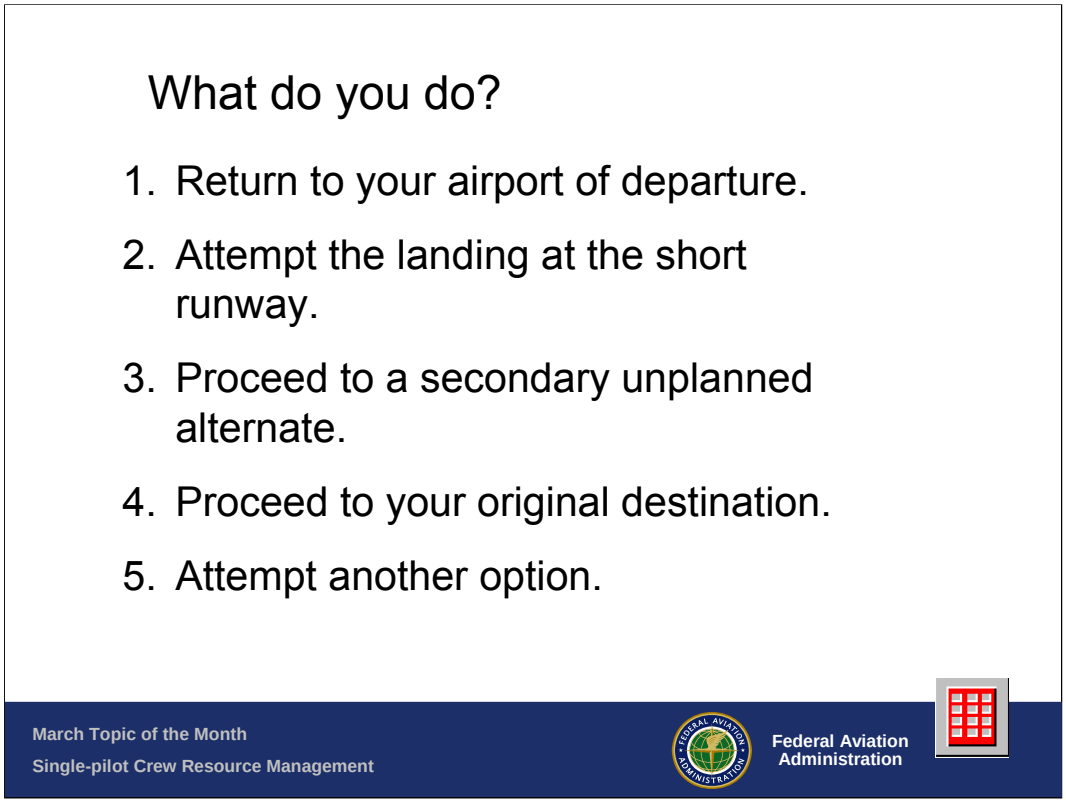

What do you do?

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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in the same make and
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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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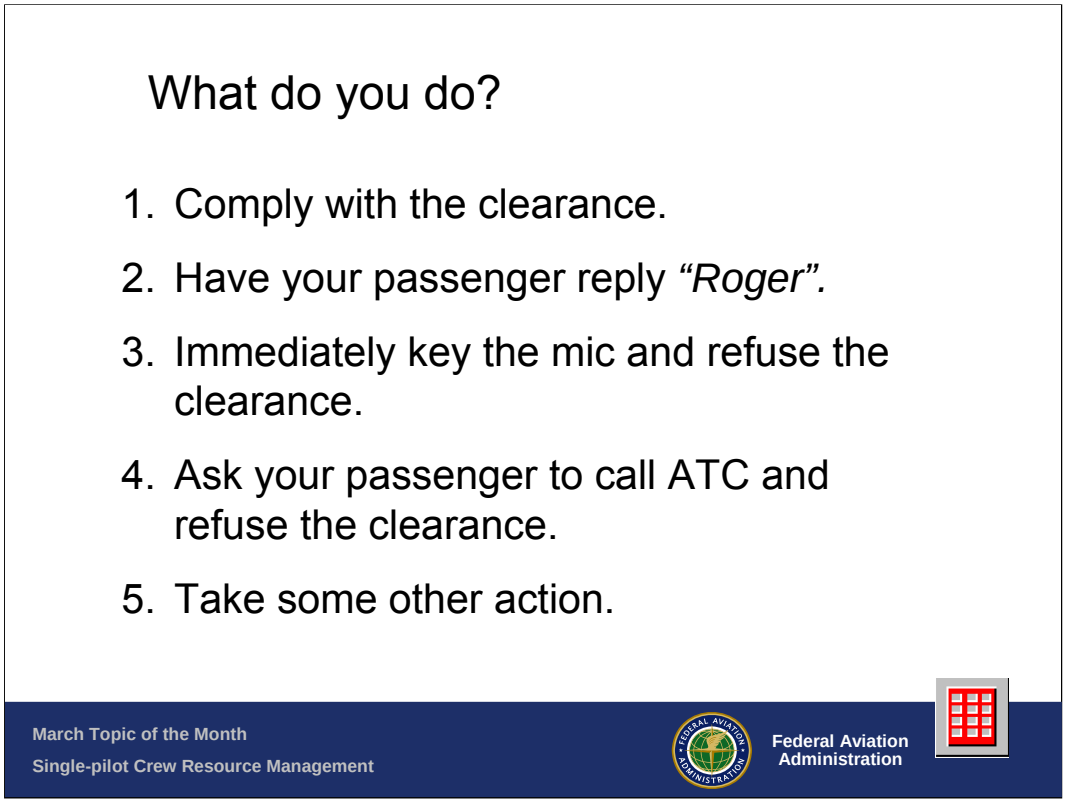

What do you do?

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

After work, you are going to fly to an airport about 2 hours 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
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.

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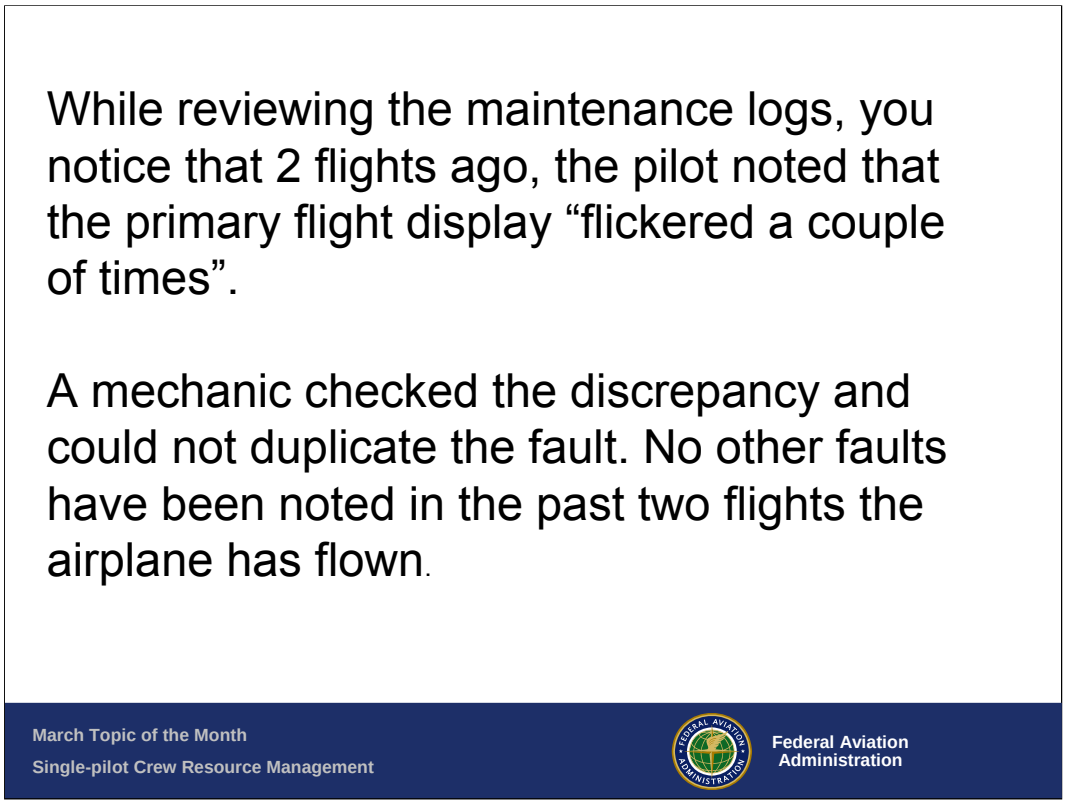
The airplane you have originally scheduled, and usually fly, is not available and you are going to take another one,
which is the same make and model.



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 at your destination.

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

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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.

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.
3. Take the flight and invite another qualified pilot to come along.

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

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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.

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.

After the landing, maintenance found loose connectors on the radio and PFD and after waiting an additional 5 hours for service, the shop repairs them both.

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

What do you do now.

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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)

Question

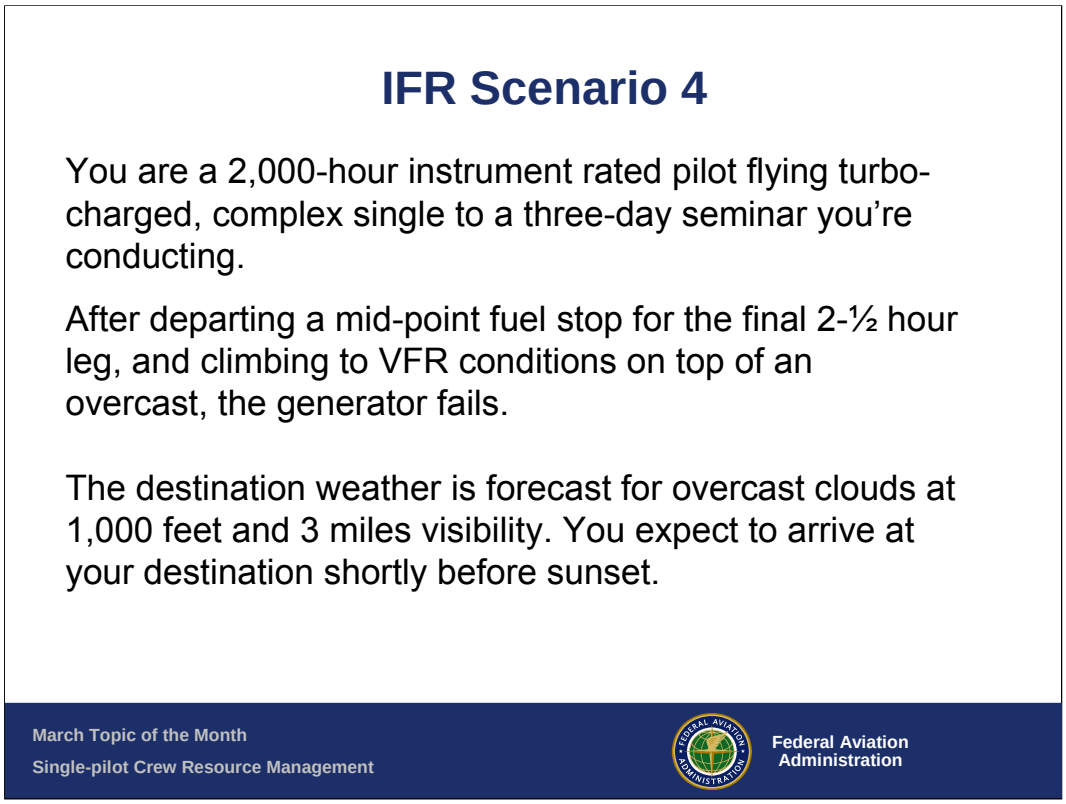
1. Take the flight
2. Stay overnight and leave first thing in the morning
3. Ask your friend to fly back and you be the pilot who works the radios (Pilot Monitoring)
4. Take some other action

Take the flight

Stay overnight and leave first thing in the morning

Ask your friend to fly back and you be the pilot who works the radios (Pilot Monitoring)

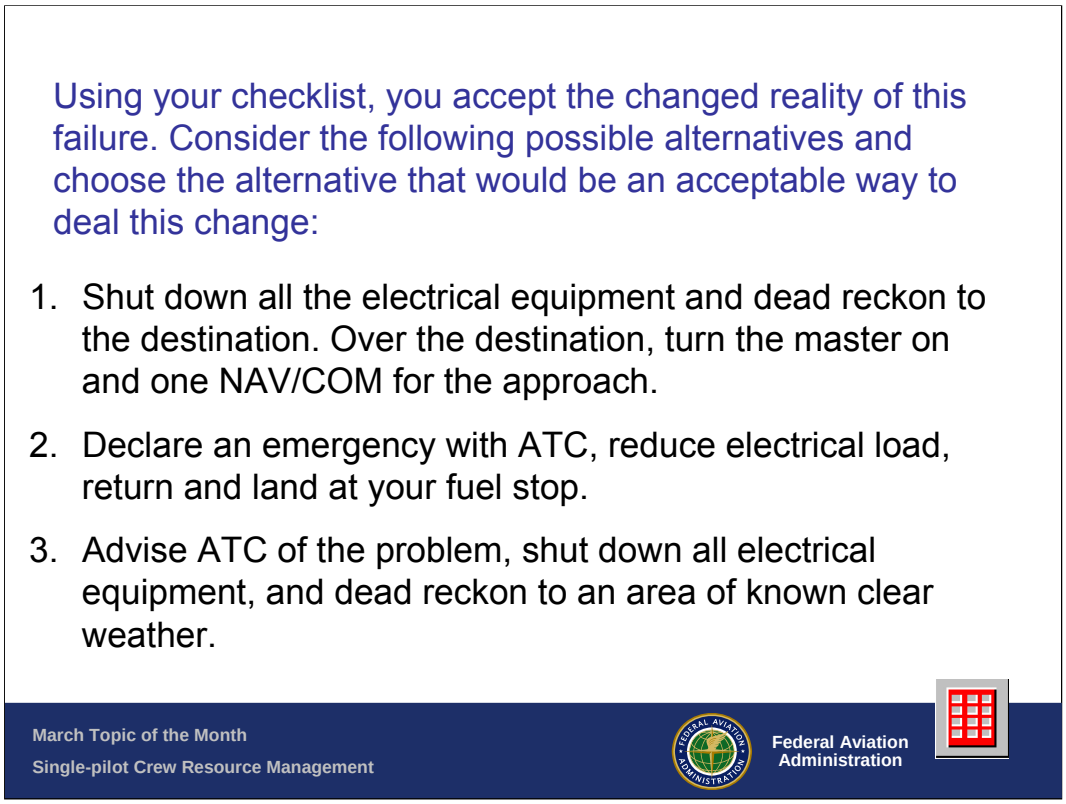
Take some other action



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.



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.