Private Pilot (ASEL) Ground School Course

Lesson 26 | Aeronautical Decision Making

Chester County Aviation

Lesson Overview

Lesson Objectives:

- Develop knowledge of what Aeronautical Decision-Making is and how to effectively make safe decisions.
- Develop an understanding of how to use the PAVE decision making model.

Lesson Completion Standards:

- Student demonstrates satisfactory knowledge of ADM by answering questions and
- actively participating in classroom discussions.

History of ADM

- For over 25 years, the importance of good pilot judgment, or aeronautical decision-making (ADM), has been recognized as critical to the safe operation of aircraft, as well as accident avoidance.
- Research in this area prompted the FAA to produce training directed at improving the decision-making of pilots and led to current FAA regulations that require that decision-making be taught as part of the pilot training curriculum

History of ADM

- Most of the modern ADM concepts and theory have been lessons learned from accidents or incidents.
- CRM was a result of many accidents. Crew Resource Management has saved many lives since its implementation.

History of ADM

- Contrary to popular opinion, good judgment can be taught.
- Tradition held that good judgment was a natural by-product of experience, but as pilots continued to log accident-free flight hours, a corresponding increase of good judgment was assumed.
- Building upon the foundation of conventional decision-making, ADM enhances the process to decrease the probability of human error and increase the probability of a safe flight.

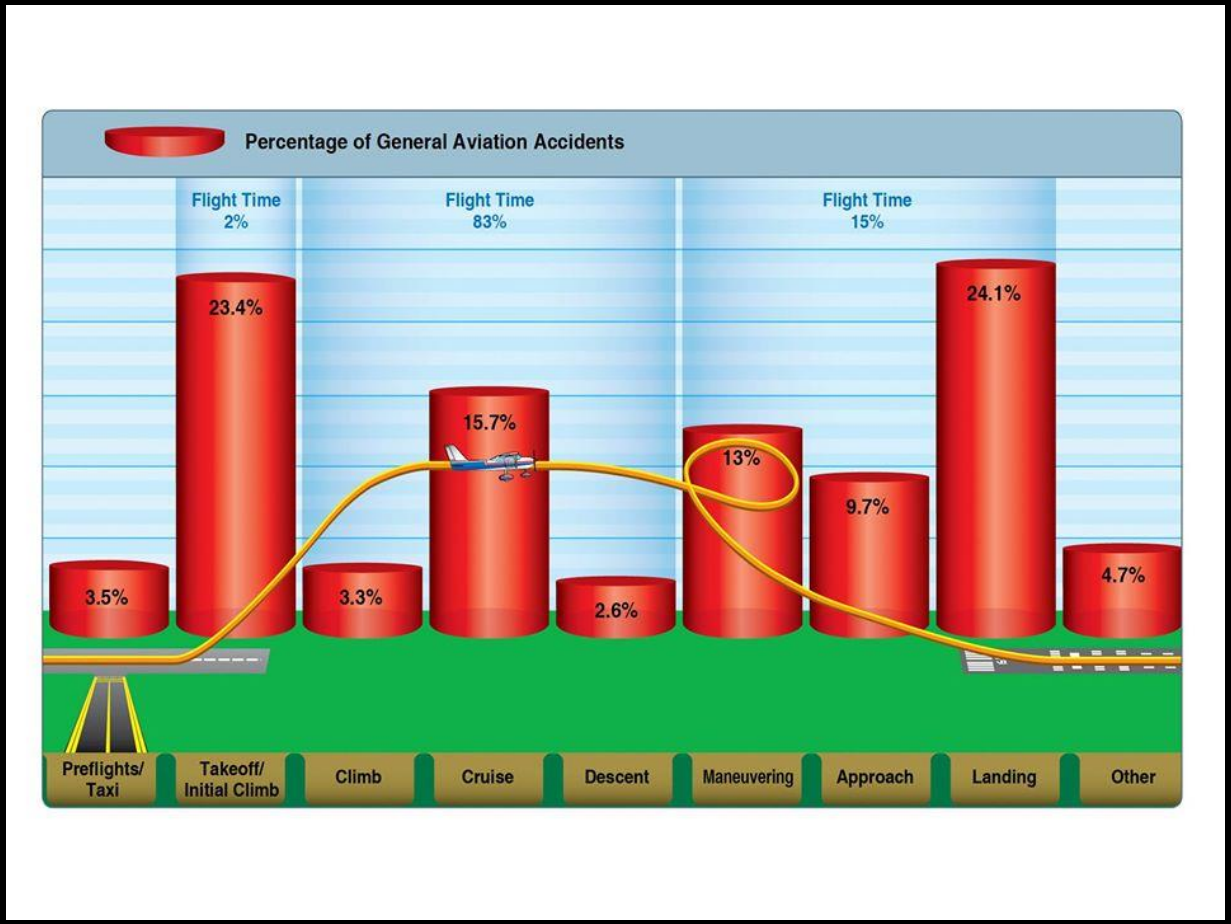
Risk Management

Aeronautical Decision Making

Aviation Accidents

- Over 80% of all aviation accidents are related to human factors
- The vast majority of these accidents occur during takeoff and landing
- Primary cause:

PILOT LACK OF KNOWLEDGE



Why you need to know ADM & Risk Management

- To fly the aircraft safely
- FAA: Private, Instrument, Commercial, CFI, ATP knowledge exams and practical test orals
- Airlines: Interview, training, and all subsequent line operations
- ATC: Controller Responsibilities

Single-Pilot Resource Management

- Human factors-related accidents motivated the airline industry to implement Crew Resource Management (CRM) training for flight crews
- The training helped crews recognize hazards and provided tools for them to eliminate the hazard or minimize its impact

Single-Pilot Resource Management

- CRM training provided the foundation for SRM training
- Applying SRM means using hardware, information, and human resources, such as dispatchers, weather briefers, maintenance personnel, and air traffic controllers, to gather information, analyze your situation, and make effective decisions about the current and future status of your flight

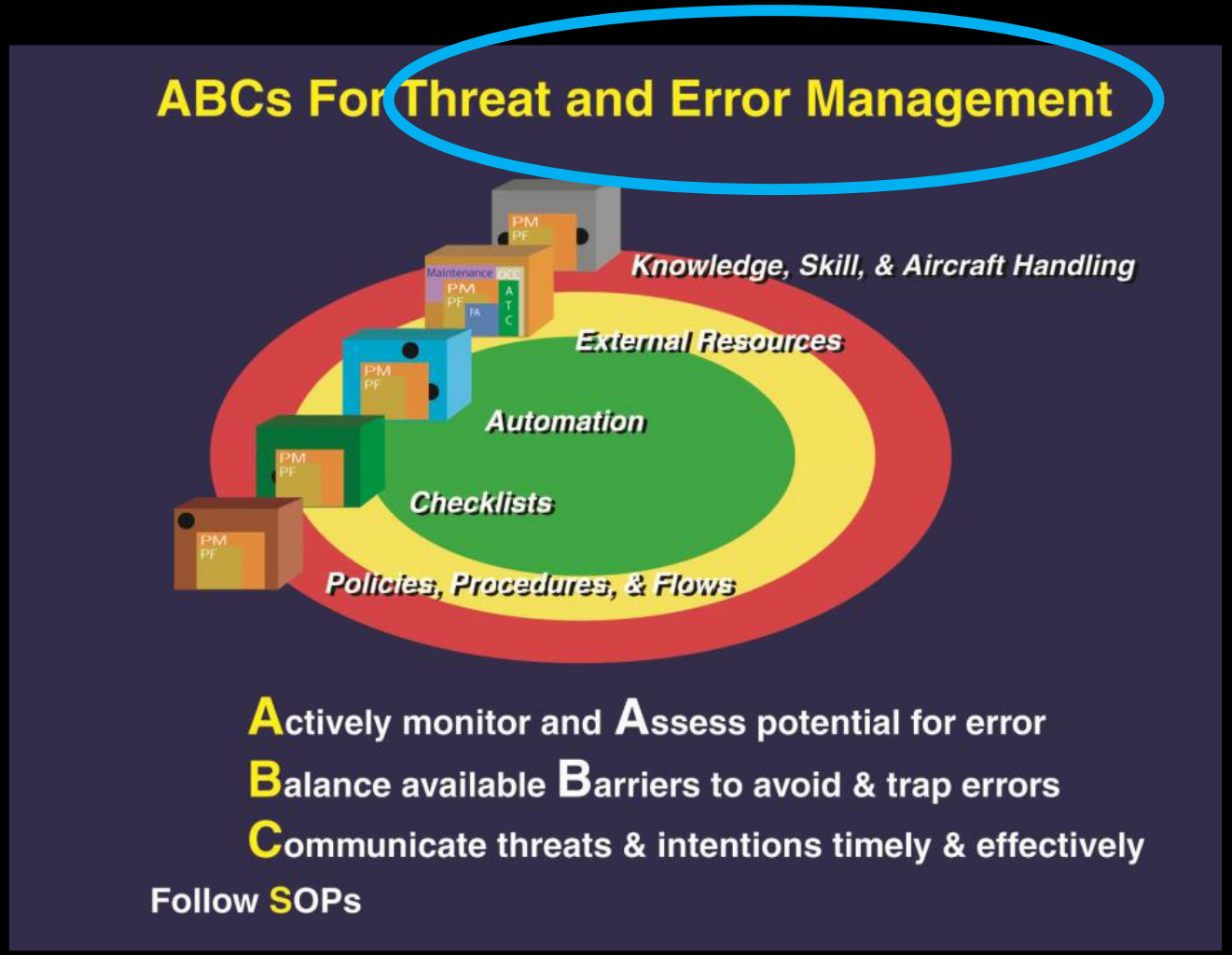
Single-Pilot Resource Management (SRM)

- How to gather information, analyze it, and make decisions
- Learning how to identify problems, analyze the information, and make informed and timely decisions is not as straightforward as the training involved in learning specific maneuvers
- Learning how to judge a situation and “how to think” in the endless variety of situations encountered while flying out in the “real world” is more difficult – comes with experience

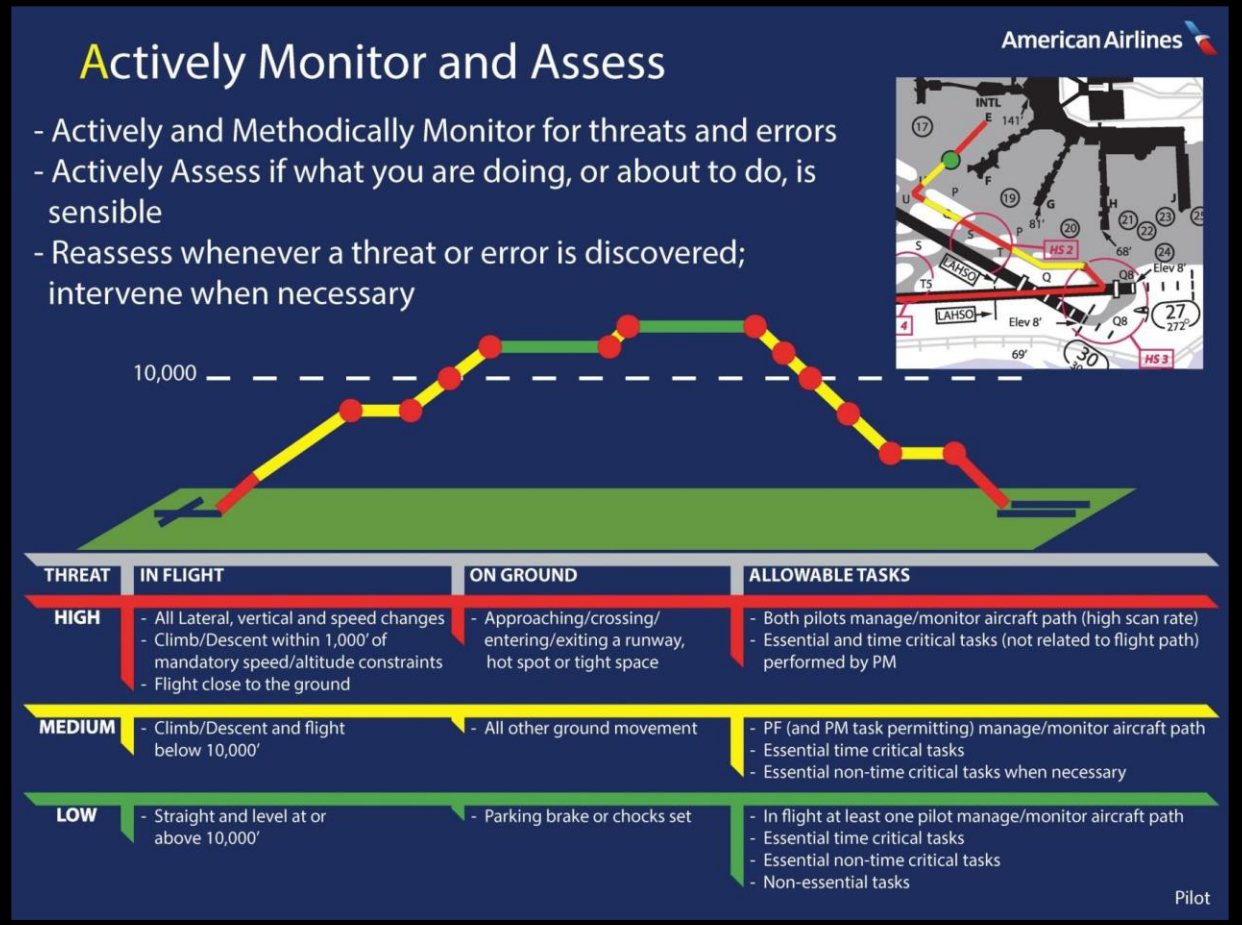
SRM Concepts

- Aeronautical Decision Making
- Risk Management
- Task Management
- Situational Awareness
- Controlled Flight Into Terrain Awareness
- Automation Management

American Airlines Threat and Error Management

- 

American Airlines Threat and Error Management



American Airlines Threat and Error Management

American Airlines

Balance Available Barriers

- Multiple barriers = layers of defense = greater margin of safety

- Include everyone who can add barriers (PF, PM, ATC, IOC, Jumpseat Rider, F/A, etc.)

- With 1 pilot out of the loop, effectiveness of barriers is cut in half

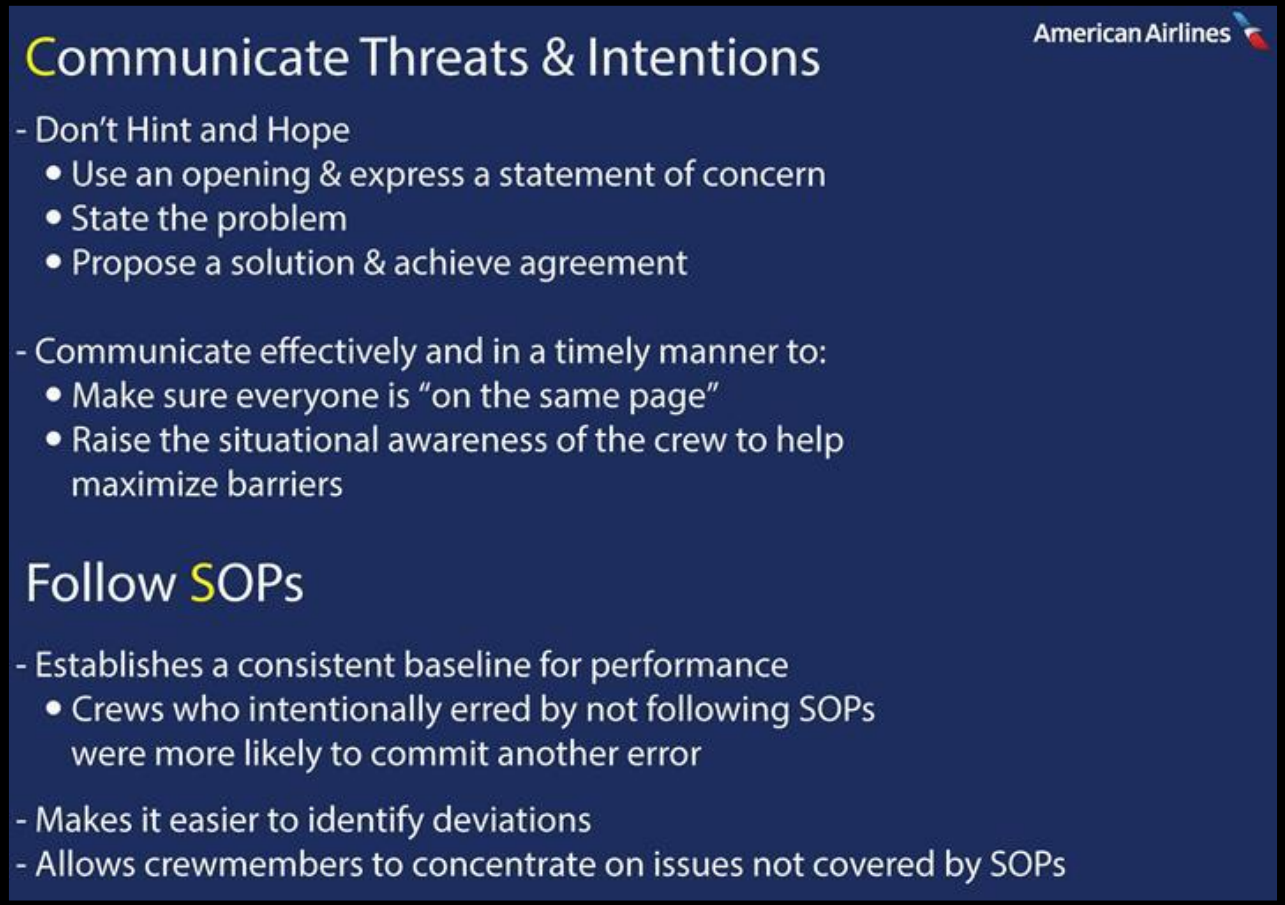
$$\text{Task Loading} = \frac{\text{Task}}{\text{Time}}$$

Balance Barriers to reduce task loading when necessary:

- ✓ Increase available time (slow down or plan ahead)
- ✓ Delegate tasks to other pilot or other resources, and/or
- ✓ Accomplish non-essential tasks in a lower workload period

Pilot

American Airlines Threat and Error Management



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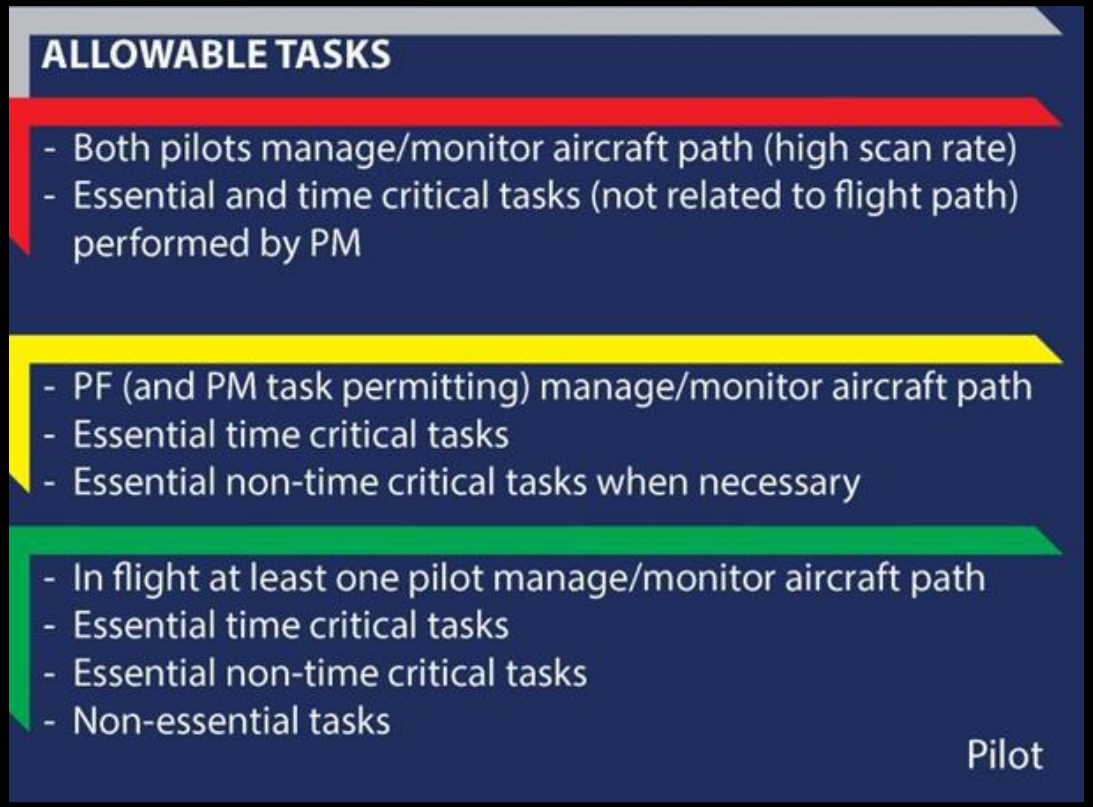


American Airlines Threat and Error Management

- ***Knowledge***, Skill, & Aircraft Handling
- Application of the underlying ***knowledge***, skills and prior experiences
- The final barrier!

Aeronautical Decision Making (ADM)

- A systematic approach to the mental process used by pilots to consistently determine the best course of action in response to a given set of circumstances
- It is what a pilot intends to do based on the latest information he or she has

ADM Process

- Some situations, such as emergencies, require you to respond immediately using established procedures with little time for detailed analysis
- This reflexive type of decision making is referred to as naturalistic or automatic decision making

ADM Process

- However, typically you have time to recognize changes that occur, gather information, examine options, and assess risk before reaching a decision
- Then, after implementing a course of action, you determine how your decision could affect other phases of the flight
- To make an analytical decision, you use the ADM process

3P Model

Aeronautical Decision Making

3P Model - Perceive, Process, Perform

- The 3P model for ADM offers a simple, practical, and systematic approach that can be used during all phases of flight
- To use it, the pilot will:
  - ***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

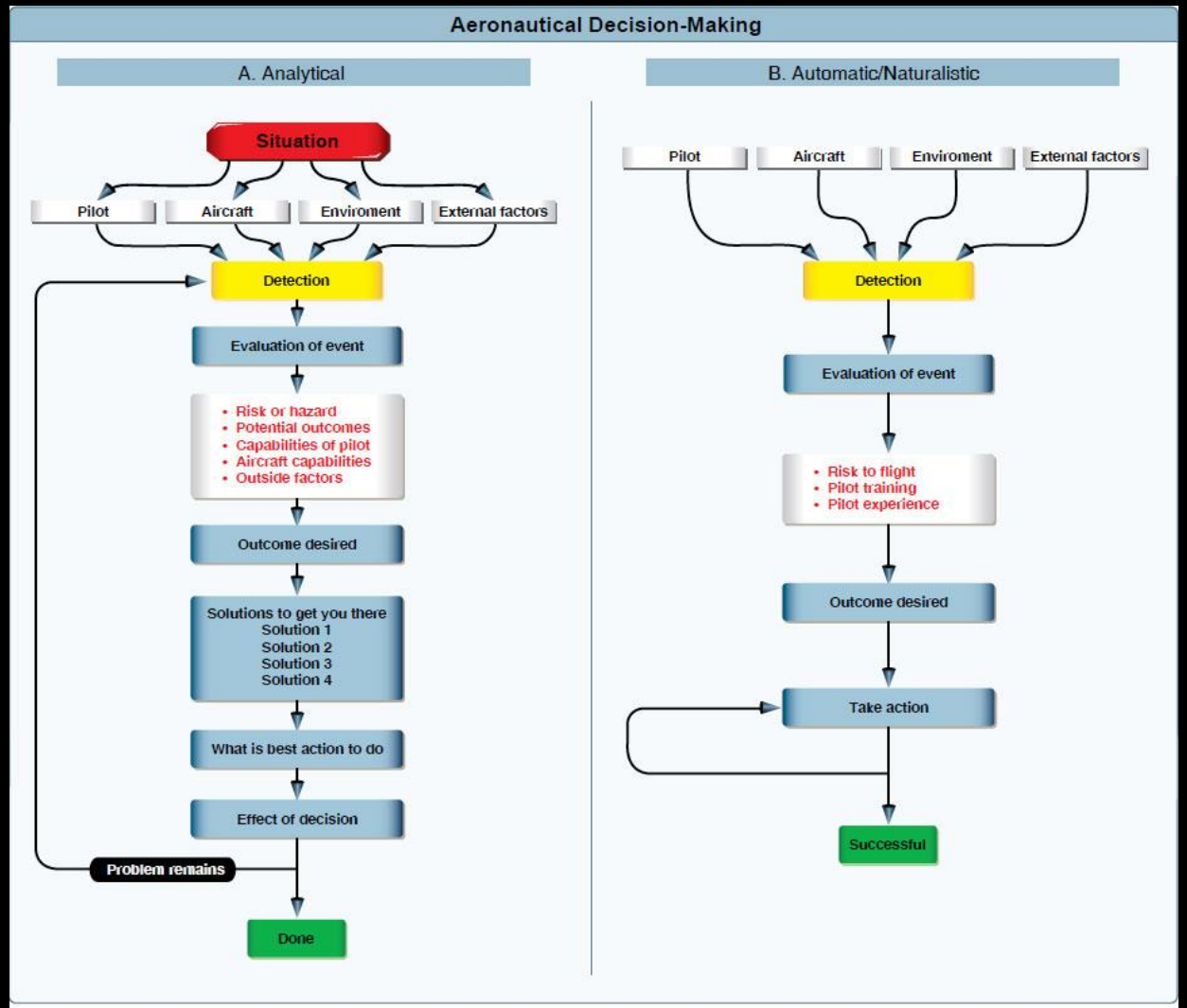
Decide Process

Aeronautical Decision Making

FAA's DECIDE Model

- 1. *Detect* the fact that a change has occurred
- 2. *Estimate* the need to counter or react to the change
- 3. *Choose* a desirable outcome for the success of the flight
- 4. *Identify* actions that could successfully control the change
- 5. *Do* the necessary action to adapt to the change
- 6. *Evaluate* the effect of the action

DECIDE Model



The DECIDE model

1. **Detect.** The decision maker detects the fact that change has occurred.
2. **Estimate.** The decision maker estimates the need to counter or react to the change.
3. **Choose.** The decision maker chooses a desirable outcome (in terms of success) for the flight.
4. **Identify.** The decision maker identifies actions which could successfully control the change.
5. **Do.** The decision maker takes the necessary action.
6. **Evaluate.** The decision maker evaluates the effect(s) of his/her action countering the change.

Self Assessment

- As PIC you are the ultimate decision maker, and your choices determine the outcome of the flight
- You must evaluate your own fitness for flight
- Your general health, level of stress or fatigue, attitude, knowledge, skill level, and recency of experience are several factors that affect your performance

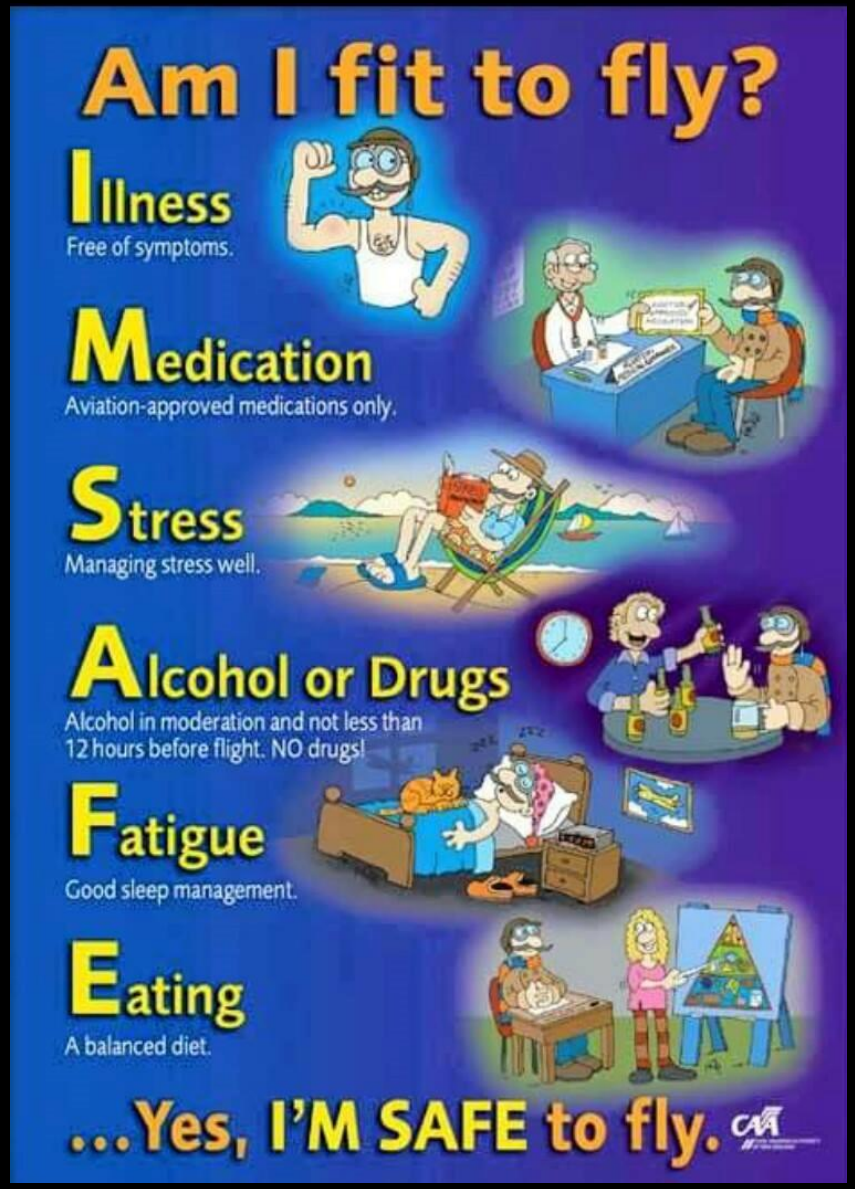
Self Assessment

- Establish personal limitations for flight and create a checklist to help you determine if you are prepared for a particular flight
- Determine your own weather minimums and set limitations that you are comfortable with
- Use the I’M SAFE Checklist to further evaluate your fitness for flight

I'M SAFE Checklist

- Illness
- Medication
- Stress
- Alcohol
- Fatigue
- Emotion/Eating

I’M SAFE


Am I fit to fly?
Illness
Free of symptoms.
Medication
Aviation-approved medications only.
Stress
Managing stress well.
Alcohol or Drugs
Alcohol in moderation and not less than 12 hours before flight. NO drugs!
Fatigue
Good sleep management.
Eating
A balanced diet.
...Yes, I’M SAFE to fly.

Hazardous Attitudes

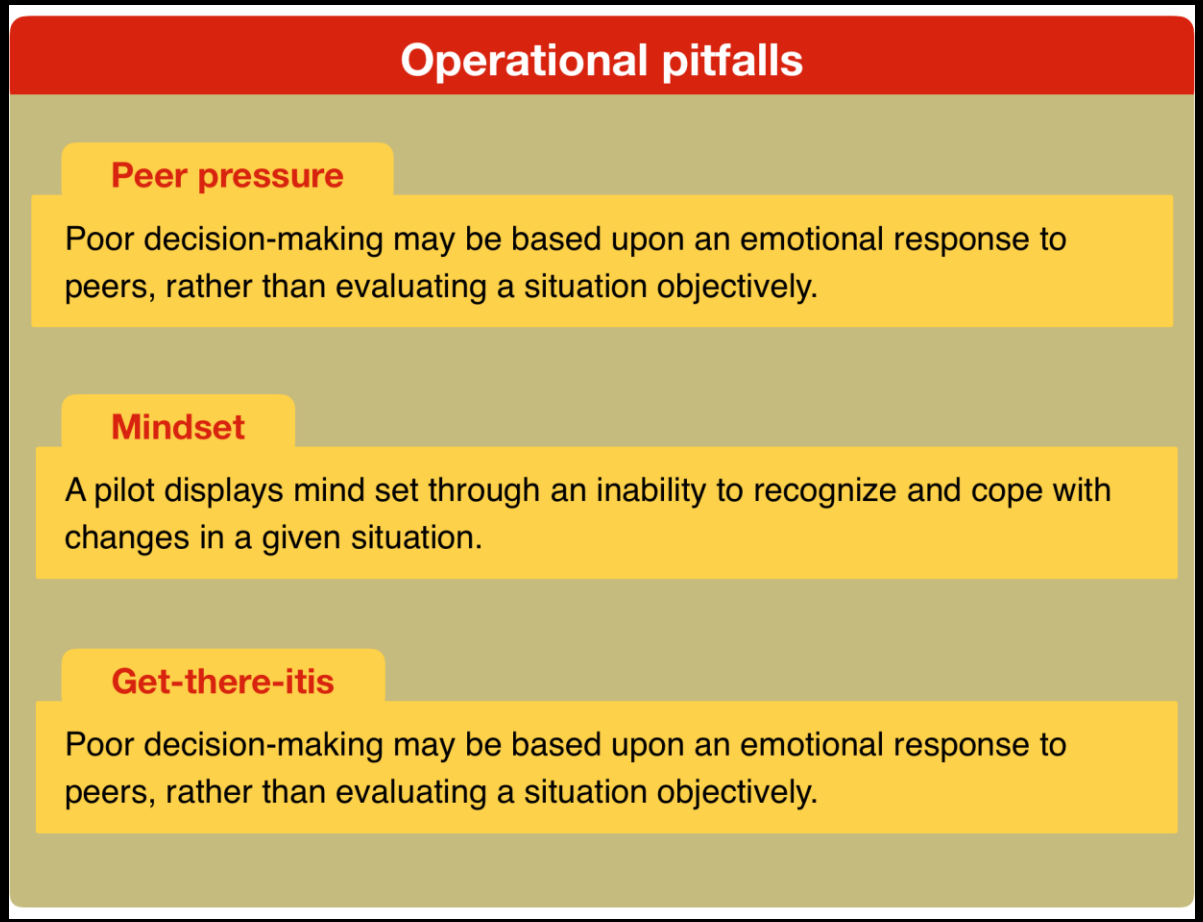
- Whether you are fit to fly depends on more than your experience and physical condition
- Your ***attitude*** also affects the quality of your decisions
- https://www.youtube.com/watch?v=IoYeRkvm0os

The Five Hazardous Attitudes	Antidote
Anti-authority: "Don't tell me." This attitude is found in people who do not like anyone telling them what to do. In a sense, they are saying, "No one can tell me what to do." They may be resentful of having someone tell them what to do or may regard rules, regulations, and procedures as silly or unnecessary. However, it is always your prerogative to question authority if you feel it is in error.	**Follow the rules. They are usually right.**
Impulsivity: "Do it quickly." This is the attitude of people who frequently feel the need to do something, anything, immediately. They do not stop to think about what they are about to do, they do not select the best alternative, and they do the first thing that comes to mind.	**Not so fast. Think first.**
Invulnerability: "It won't happen to me." Many people falsely believe that accidents happen to others, but never to them. They know accidents can happen, and they know that anyone can be affected. However, they never really feel or believe that they will be personally involved. Pilots who think this way are more likely to take chances and increase risk.	**It could happen to me.**
Macho: "I can do it." Pilots who are always trying to prove that they are better than anyone else think, "I can do it—I'll show them." Pilots with this type of attitude will try to prove themselves by taking risks in order to impress others. While this pattern is thought to be a male characteristic, women are equally susceptible.	**Taking chances is foolish.**
Resignation: "What's the use?" Pilots who think, "What's the use?" do not see themselves as being able to make a great deal of difference in what happens to them. When things go well, the pilot is apt to think that it is good luck. When things go badly, the pilot may feel that someone is out to get them or attribute it to bad luck. The pilot will leave the action to others, for better or worse. Sometimes, such pilots will even go along with unreasonable requests just to be a "nice guy."	**I'm not helpless. I can make a difference.**

Hazardous Attitudes

Hazardous Attitude Antidotes	
Attitude	**Antidote**
Anti-authority—Don't tell me.	Follow the rules. They are usually right.
Impulsivity—Do something quickly.	Not so fast. Think first.
Invulnerability—It won't happen to me.	It could happen to me.
Macho—I can do it.	Taking chances is foolish.
Resignation—What's the use?	I'm not helpless. I can make a difference.

Operational Pitfalls



Operational Pitfalls

Operational pitfalls

Duck-under syndrome

A pilot may be tempted to make it into an airport by descending below minimums during an approach. There may be a belief that there is a built-in margin of error in every approach procedure, or a pilot may want to admit that the landing cannot be completed and a missed approach must be initiated.

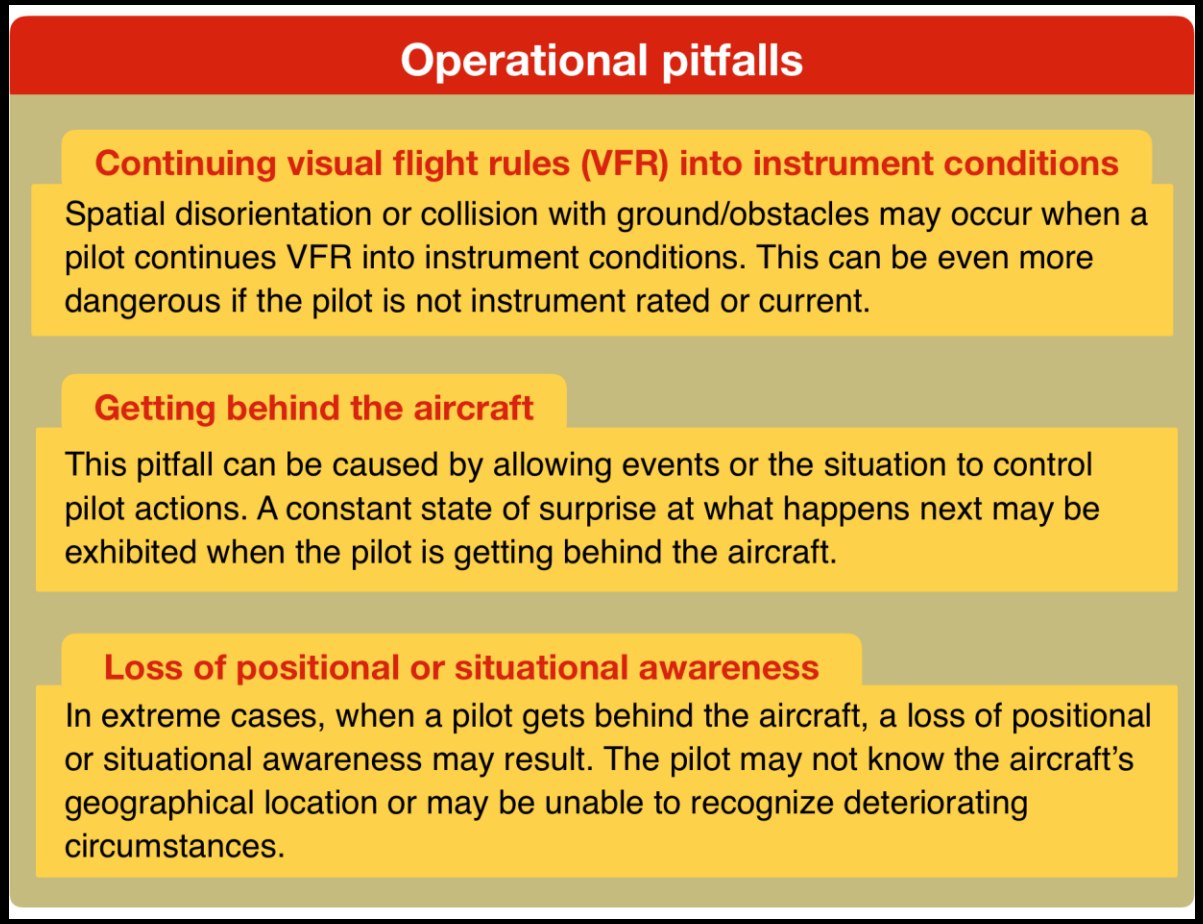
Scud running

This occurs when a pilot tries to maintain visual contact with the terrain at low altitudes while instrument conditions exist.

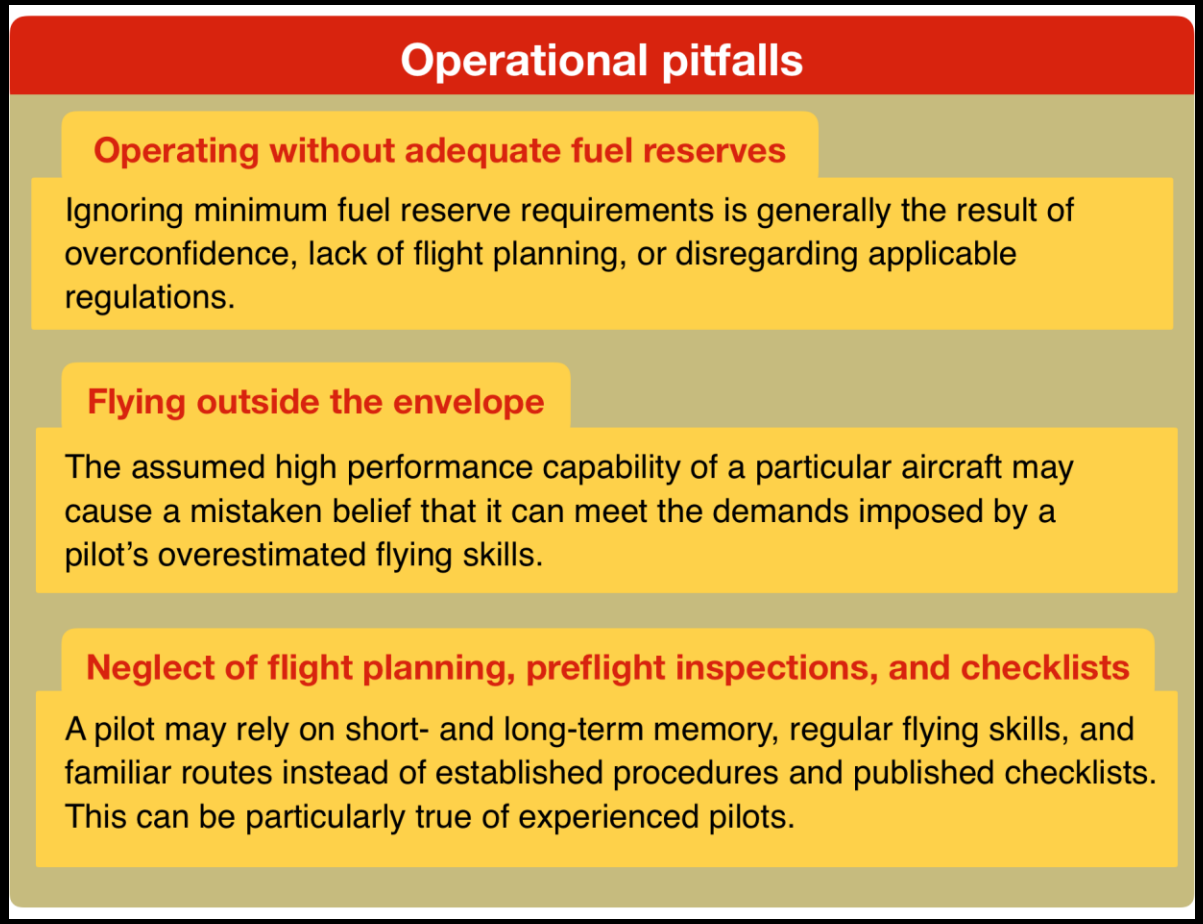
Descent below the minimum en route altitude

The duck-under syndrome, as mentioned above, can also occur during the en route portion of an IFR flight.

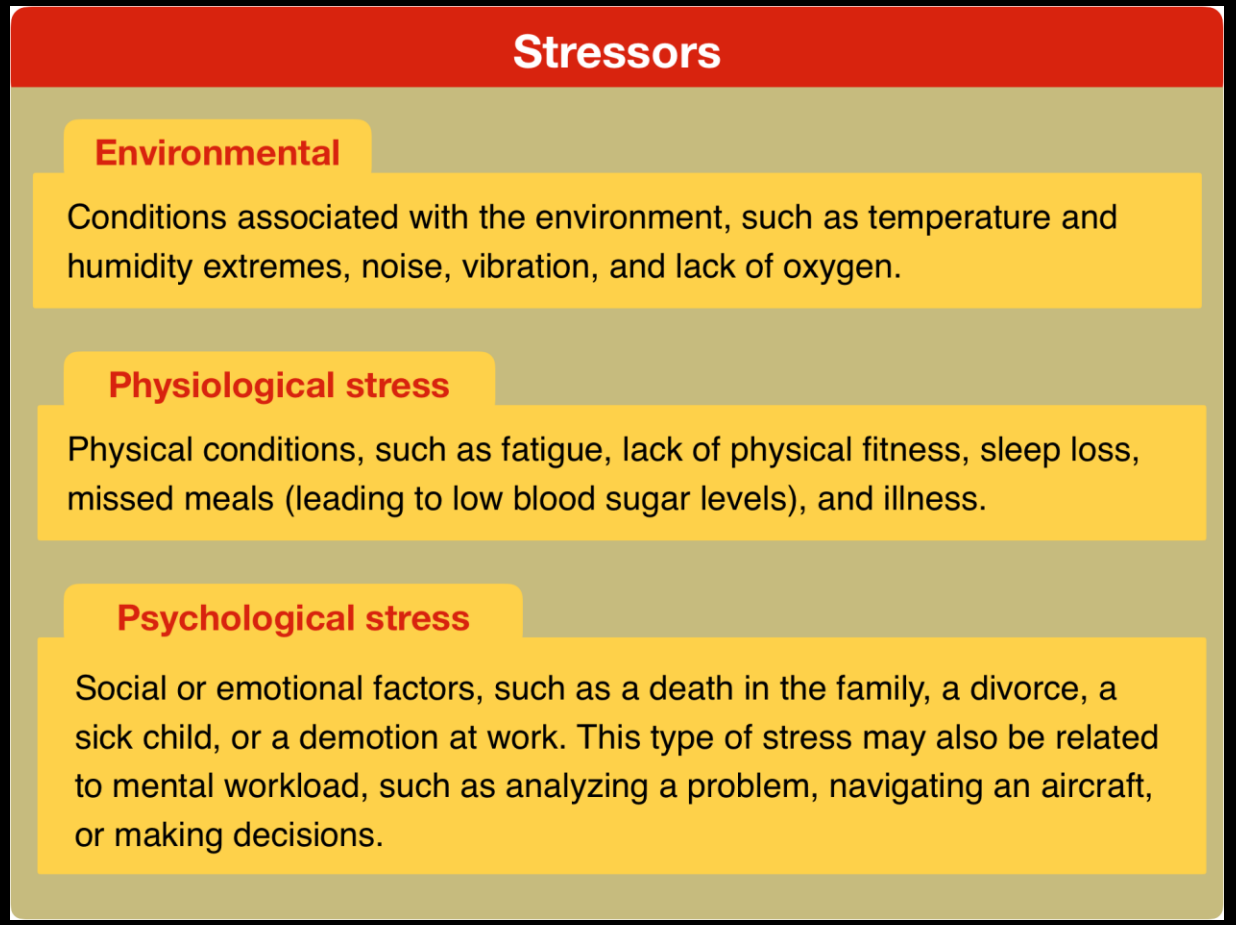
Operational Pitfalls



Operational Pitfalls



Stressors


Stressors
Environmental
Conditions associated with the environment, such as temperature and humidity extremes, noise, vibration, and lack of oxygen.
Physiological stress
Physical conditions, such as fatigue, lack of physical fitness, sleep loss, missed meals (leading to low blood sugar levels), and illness.
Psychological stress
Social or emotional factors, such as a death in the family, a divorce, a sick child, or a demotion at work. This type of stress may also be related to mental workload, such as analyzing a problem, navigating an aircraft, or making decisions.

Risk Management

- Critical to making effective decisions
- During each flight, you are required to make decisions that involve four fundamental risk elements: the pilot, the aircraft, the environment, and the type of operation
- Pilots use a variety of tools to identify, assess, and mitigate risks associated with the risk elements
- Two frequently-used tools are PAVE and the 5Ps

PAVE Checklist

Aeronautical Decision Making

The PAVE Checklist

- **P**ilot – Training, experience, currency, and fitness
- **A**ircraft – Airworthiness, performance, proper configuration
- En**V**ironment – Weather, airport conditions, terrain, airspace
- **E**xternal Pressures – How critical to maintain schedule

Managing External Pressures

- Management of external pressure is the single most important key to risk management because it is the one risk factor category that can cause a pilot to ignore all the other risk factors
- External pressures put time-related pressure on the pilot and figure into a majority of accidents

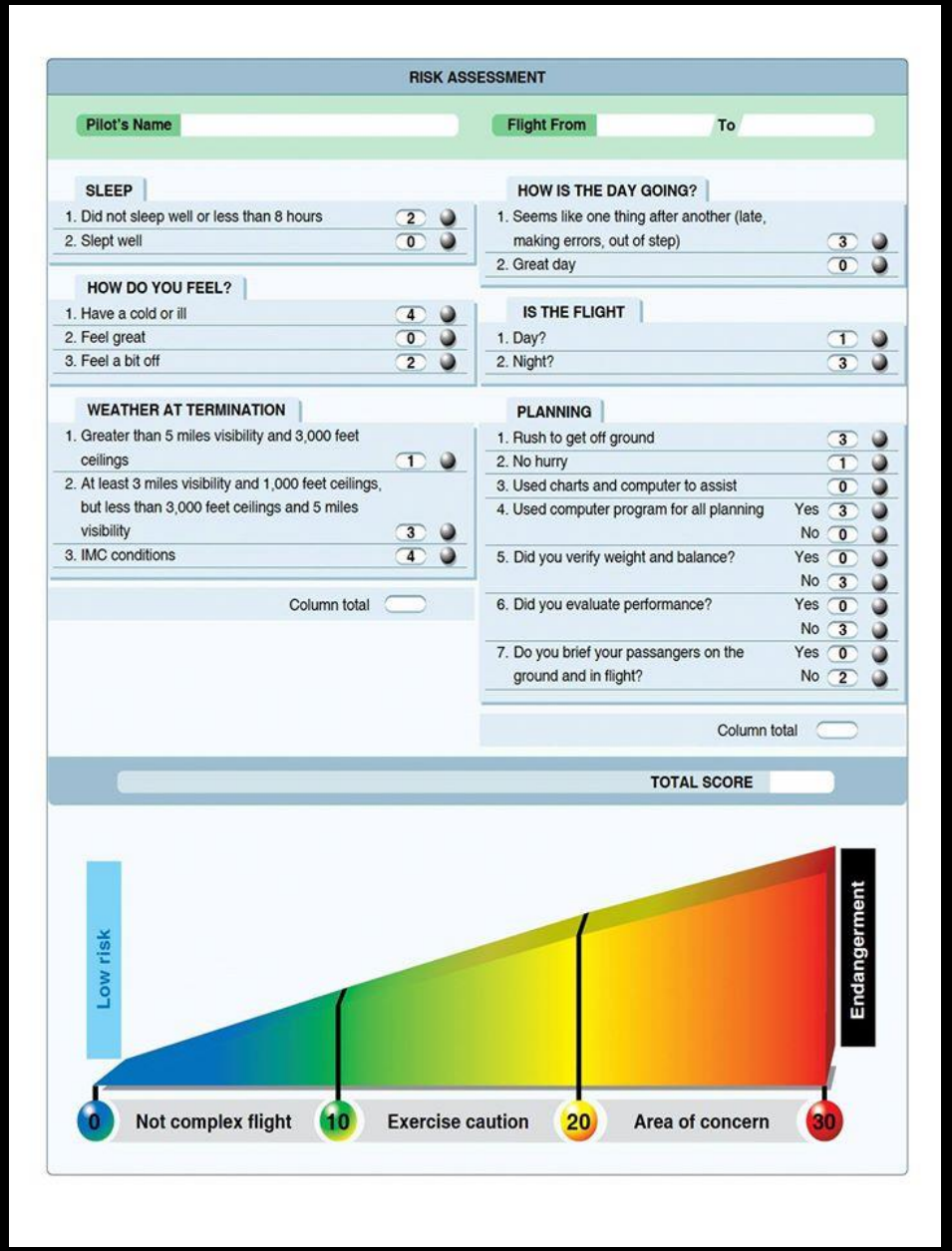
5P's Checklist

- Pilot – Evaluate training, experience, fitness (I'M SAFE)
- Passengers – Consider experience, flexibility, and fitness
- Plane – Airworthiness, performance, proper configuration
- Programming – Avionics airworthiness, operation, configuration
- Plan – Airport conditions, terrain, airspace, weather

Using PAVE or the 5Ps During Flight Planning

- Risk management tools are used to help you make an effective Go/No-Go decision during flight planning
- Provide guidelines on the risk factors to consider as you prepare for a flight
- Used to identify and mitigate risks prior to flight

Risk Factor Assessment



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

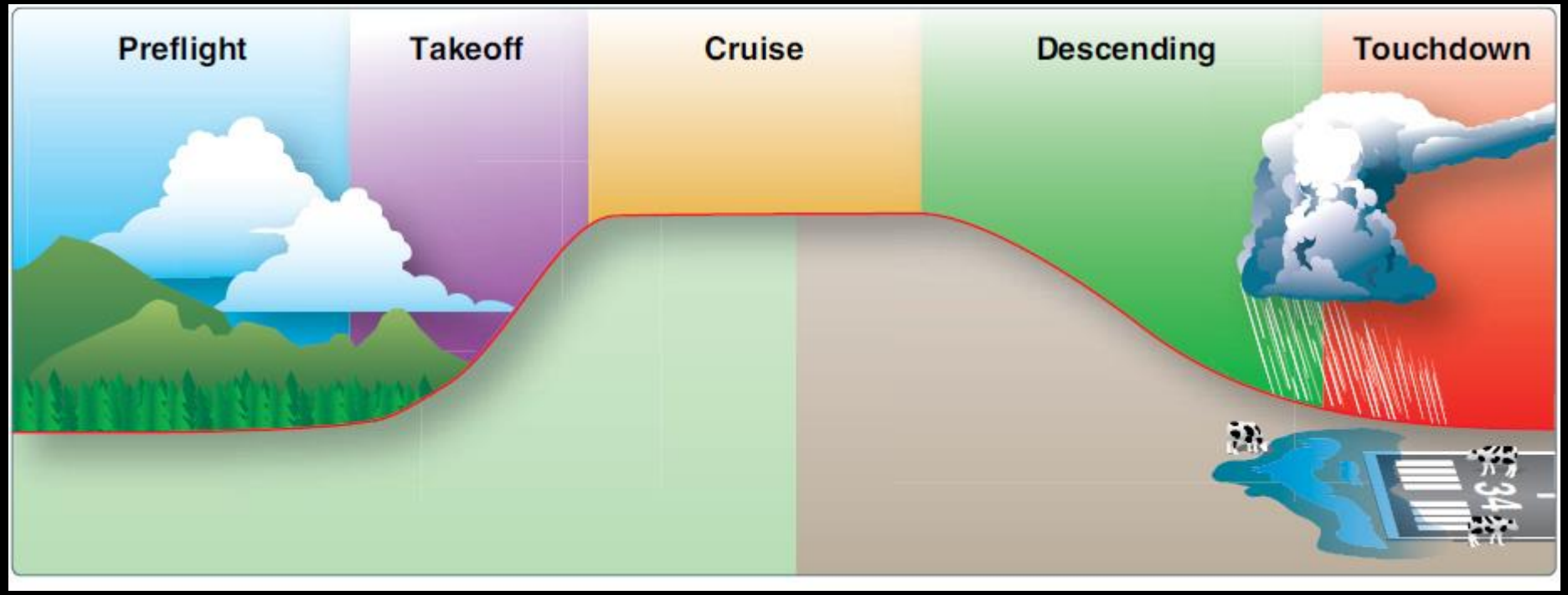
TOTAL SCORE

Using PAVE or the 5Ps in Flight

- Managing risk does not end with a “Go” decision
- You must continue to assess risk to make effective decisions *during* the flight
- The risk management process continues as you evaluate the situation using the checks at decision points that correspond to the phases of flight

At Each Decision Point Reevaluate Situation

- What is the situation?
- What has changed since my last decision?
- Is the risk associated with a chance acceptable?
- What can I do to mitigate risk?



Risk Management Decision Making Process

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Task Management

- Involves planning and prioritizing tasks to avoid work overload, identifying and using resources to accomplish tasks, and managing distractions
- When you are effectively managing tasks, you avoid fixating on one task to the exclusion of others and maintain positive control of the airplane

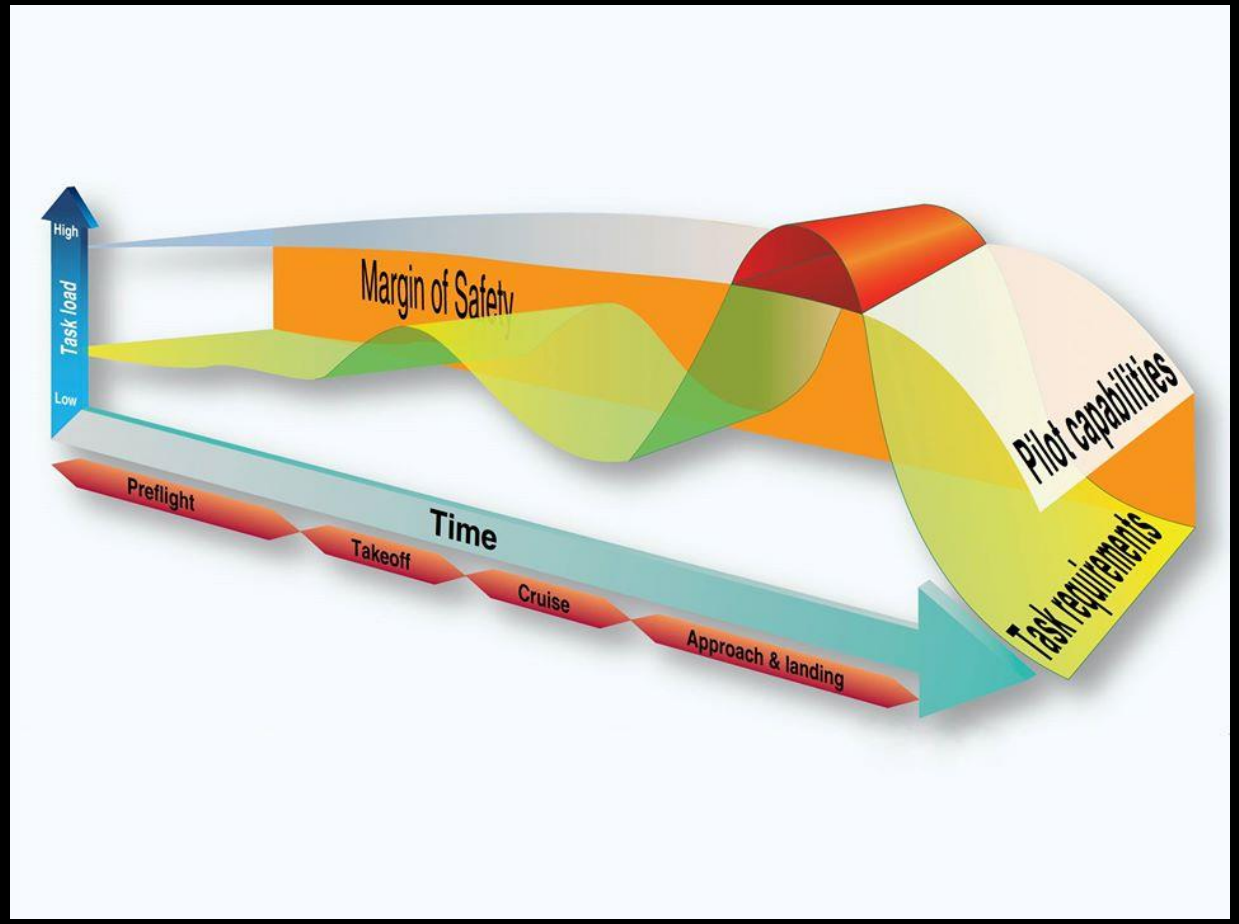
Planning and Prioritizing

- When flying an airplane, your tasks are not evenly distributed over time
- By planning ahead and prioritizing tasks, you can prepare for high workload periods during times of low workload

Planning and Prioritizing

- As you gain experience, you realize which tasks you can accomplish ahead of time, and which tasks you need to leave until the moment
- Tasks such as organizing charts in the order of use, setting radio frequencies, and planning a descent to an airport help you prepare for what comes next

Task Requirements Each Phase of Flight



Resource Use

- Because tools and sources of information are not always readily apparent, you must learn to recognize all the resources available to you and use them effectively
- A wide variety of resources both inside and outside the airplane can help you manage tasks and make effective decisions

External Resources

- Air Traffic Controllers
- Maintenance Technicians
- Flight Service Briefers
- Flight School / FBO
- Airline Dispatchers

Internal Resources

- Your ***knowledge*** and skills
- CFI / Other Pilots
- Passengers
- Aircraft Equipment (MFD/Autopilot)
- ForeFlight
- Aeronautical Charts
- Pilot’s Operating Handbook
- Checklists

Checklists

- *Flow Pattern* - guides you through the cockpit in a logical or as you perform each item from memory, then follow up with a checklist
- *Do-List* - you read the checklist item and associated action, then perform the action. Used when you have time and completing each step in order is critical
- *Emergency Checklists* - items you must perform from memory immediately before referring to the checklist

Situational Awareness

- Is the accurate perception of all the operational and environmental factors that affect flight safety before, during, and after the flight
- At any period of time, you should be able to accurately assess the current and future status of the flight
- This includes the status of operational conditions, such as airplane systems, fuel, autopilot, and passengers, as well as the status of environmental conditions, such as your relationship to terrain, traffic, weather, and airspace

Situational Awareness

- Using SRM, including risk management tools such as the 5Ps, task management, and available resources, enables you to maintain situational awareness
- Resources, such as navigation, traffic, terrain, and weather displays are particularly valuable for maintaining situational awareness *if* you understand how to use them properly
- You are maintaining situational awareness when you have a solid mental picture of the condition of the pilot, passengers, plane, programming, and plan

Briefings

An effective tool to help maintain SA by preparing for the critical phases of flight

- Passenger Briefing (FAA required)
- Pre-takeoff Briefing
- Approach Briefing after obtaining airport information

Passenger Briefing (SAFETY)

- Safety belts
- Air Vents
- Fire Extinguisher
- Egress and Emergency
- Traffic and Talking
- Your (passenger) Questions

Takeoff Briefing

- Wind direction and velocity
- Runway length
- Takeoff performance
- Takeoff and climb speeds
- Initial heading, altitude, and fix
- Departure procedure
- Emergency plan for engine failure

Approach Briefing

- Airport info and weather
- Airport / TDZ elevation
- Active approach
- Approach plate briefing
- NAV setup
- Terrain and obstacles
- Landing considerations

AA Potential Threat Briefing Checklist

Table 2b.1 Potential Threats

Airport	Weather/Terrain	ATC
• Unfamiliar airport • Ramp congestion • Ground conditions/signage • Equipment inside of the line • SID/STAR/approach/airport diagram design	• IMC • Terrain • Turbulence • Icing (ground or airborne) • Convective weather • Visual conditions • Extremes (hot or cold)	• Radio congestion • Non-standard phraseology • Similar call signs • Language/accent • Clearance/reroute/ challenging restriction • Slam dunk
Aircraft	**Time Pressure**	**Crew**
• MEL/CDL • QRH non-normal • Supplemental normal	• Time pressure/delay • Late crew arrival • Late aircraft arrival • Holding • Missed approach	• Fatigue • Food • Low experience • Complacency • Distraction

Obstacles to Maintaining Situational Awareness

- Fatigue, stress, and work overload can cause you to fixate on one aspect of the flight and omit others from your attention
- A contributing factor in many accidents is a distraction that diverts the pilot's attention from monitoring the instruments or scanning outside the aircraft
- A minor problem has the potential to become a major problem if you divert your attention to the perceived problem and neglect to properly control the airplane

Obstacles to Maintaining Situational Awareness

- Complacency presents another obstacle to maintaining SA
- When activities become routine, you can have a tendency to relax and put less effort into your performance
- Cockpit automation can lead to complacency - you could assume that the autopilot or GPS is doing what you expect, and neglect to cross check the instruments or the airplane’s actual position

Situational Awareness During Ground Operations

- In addition to keeping track of your status while in flight, you must maintain situational awareness during ground operations
- Must correctly follow taxi instructions, to know your position on the airport in relation to runways and other aircraft, and to minimize your workload

Controlled Flight Into Terrain Awareness

- CFIT occurs when an aircraft is flown into terrain or water with no prior awareness on the part of the crew that the crash is imminent
- Normally results from a combination of factors including weather, unfamiliar environment, nonstandard procedures, breakdown or loss of communication, loss of situational awareness, lack of perception of hazards, and lack of sound risk management techniques

CFIT Risk Mitigation

- You ***must*** always maintain positional awareness
- Plan flight to avoid terrain and obstacles
- Use current charts and procedures
- Monitor terrain awareness and navigation displays
- Determine aircraft performance

Automation Concerns

Automation Management

- Cockpit automation has the potential to increase or decrease the flight safety, depending on how well you use the equipment
- The concept of automation management typically applies to an airplane with an advanced avionics system that includes digital displays, GPS equipment, a moving map, and an integrated autopilot

Managing Workload

- Cockpit automation can reduce your workload and increase situational awareness
- Use of an autopilot can free your attention to handle tasks during high-workload phases of flight and enable you to manage abnormal and emergency situations more effectively

Managing Workload

- However, if you are unfamiliar with your airplane's equipment, trying to program and interpret advanced avionics and automation systems might be distracting, lead to misinterpretation, and cause programming errors
- You must thoroughly understand how to operate your avionics and plan ahead to program equipment during periods of lower workload to avoid falling behind or becoming distracted during high-workload periods

Mode of Operation

- You must be able to correctly interpret your system's annunciations and recognize when the automation is operating in a different mode than you expect
- To effectively manage automation, monitor the current mode, anticipate the next mode, and verify that mode changes occur as expected

Automation Considerations

- Relying too heavily on automation can lead to complacency and a loss of situational awareness
- Always monitor aircraft displays, use charts to verify information, and confirm calculations if you use electronic databases for flight planning
- Equipment failure can have serious consequences if you become overly dependent on automation
- You must maintain your flight skills and your ability to maneuver the airplane manually

Automation Considerations

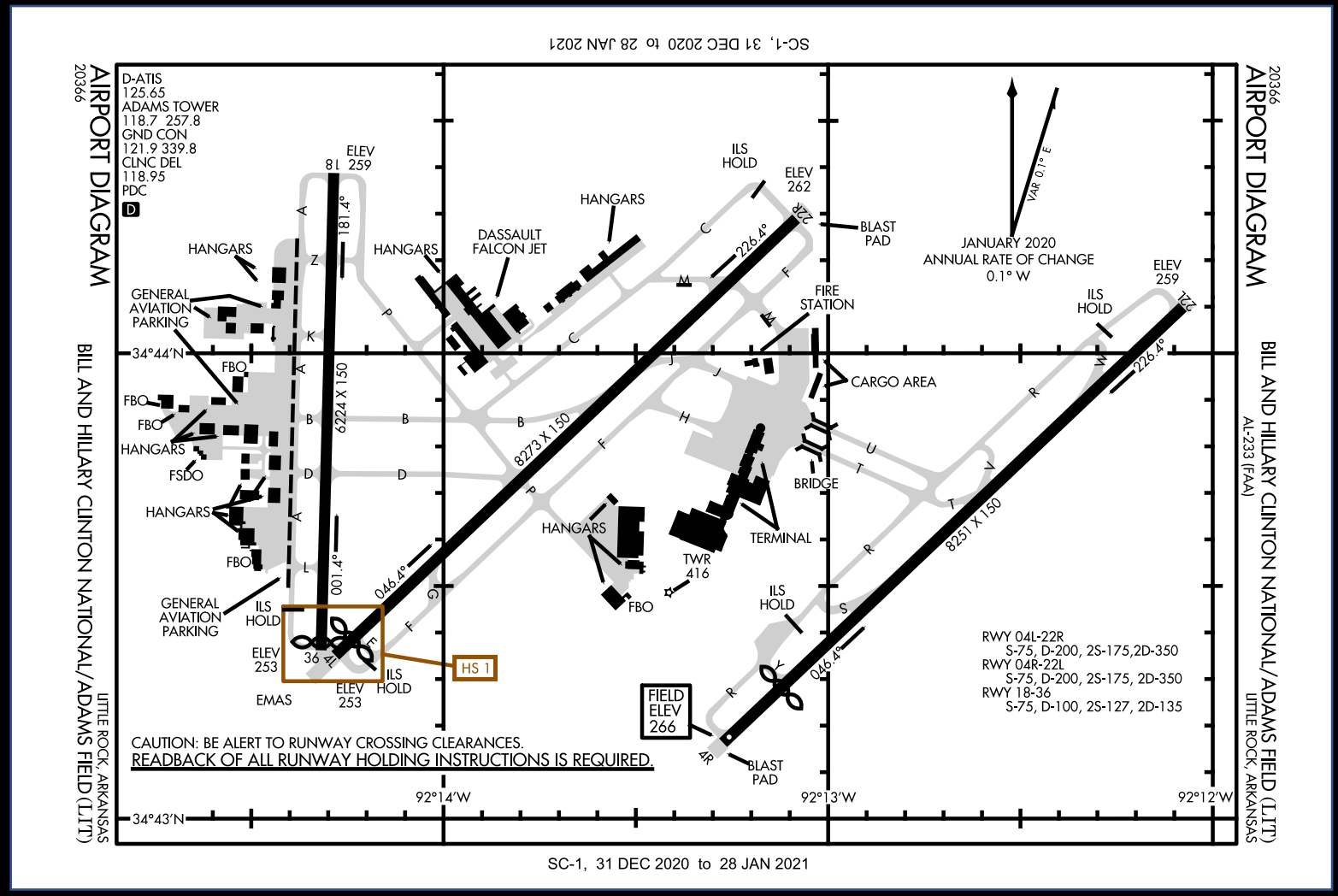
- You also need to recognize when automation is increasing your workload and switch to a simpler mode or turn equipment off
- For example, if trying to program the GPS equipment or engage the autopilot starts to overwhelm you, flying the procedure manually might be safer
- To help you manage automation and other avionics equipment, you can consider using one of three equipment operating levels during flight operations

Automation Levels

- Level 1 - Control aircraft manually (hand fly)
- Level 2 – Use autopilot for basic heading/altitude control
- Level 3 – Control airplane through autopilot managed flight

AA Flight 1420
KDFW – KLIT
June 1, 1999

KLIT


SC-1, 31 DEC 2020 to 28 JAN 2021
AIRPORT DIAGRAM
20366
BILL AND HILLARY CLINTON NATIONAL/ADAMS FIELD (LIT)
LITTLE ROCK, ARKANSAS
D-ATIS
125.65
ADAMS TOWER
118.7 257.8
GND CON
121.9 339.8
CLNC DEL
118.95
PDC
D
ELEV 259
181.4°
001.4°
6224 X 150
8273 X 150
8251 X 150
046.4°
226.4°
HANGARS
GENERAL AVIATION PARKING
FBO
FSDO
DASSAULT FALCON JET
ILS HOLD
ELEV 262
BLAST PAD
FIRE STATION
CARGO AREA
BRIDGE
TERMINAL
TWR 416
ELEV 259
JANUARY 2020
ANNUAL RATE OF CHANGE
0.1° W
VAR 0.1° E
AL-233 (FAA)
34°44'N
34°43'N
92°14'W
92°13'W
92°12'W
EMAS
ELEV 253
HS 1
FIELD ELEV 266
RWY 04L-22R
S-75, D-200, 2S-175,2D-350
RWY 04R-22L
S-75, D-200, 2S-175, 2D-350
RWY 18-36
S-75, D-100, 2S-127, 2D-135
CAUTION: BE ALERT TO RUNWAY CROSSING CLEARANCES.
READBACK OF ALL RUNWAY HOLDING INSTRUCTIONS IS REQUIRED.
SC-1, 31 DEC 2020 to 28 JAN 2021

American Airlines QRH

Wind Limitations

A319/320/321 Takeoff and Manual Landing

Component	Visibility	Limitation	
		Takeoff	Landing
Any (including gusts)	All	50 knots	50 knots
Crosswind (including gusts)	≥ 4000 or ¾	35 knots	35 knots
	< 4000 or ¾		15 knots
Tailwind	All	10 knots (A320 IAE/ A321 IAE)	10 knots (non-sharklet)
		15 knots (All A319s and CFM A320/CFM A321)	15 knots (sharklet)

A319 Auto Landing

Component	Visibility	Limitation
Headwind (including gusts)	All	20 knots (two engines)
		15 knots (single engine)
Crosswind (including gusts)	≥ 4000 or ¾	20 knots (two engines)
		10 knots (single engine)
	< 4000 or ¾	15 knots (two engines)
		10 knots (single engine)
Tailwind	All	5 knots Sharklet 10 knots Non-Sharklet *(If landing elevation below 5750' MSL and in CONF FULL. Otherwise 5 knots.)*

A320 and A321 Auto Landing

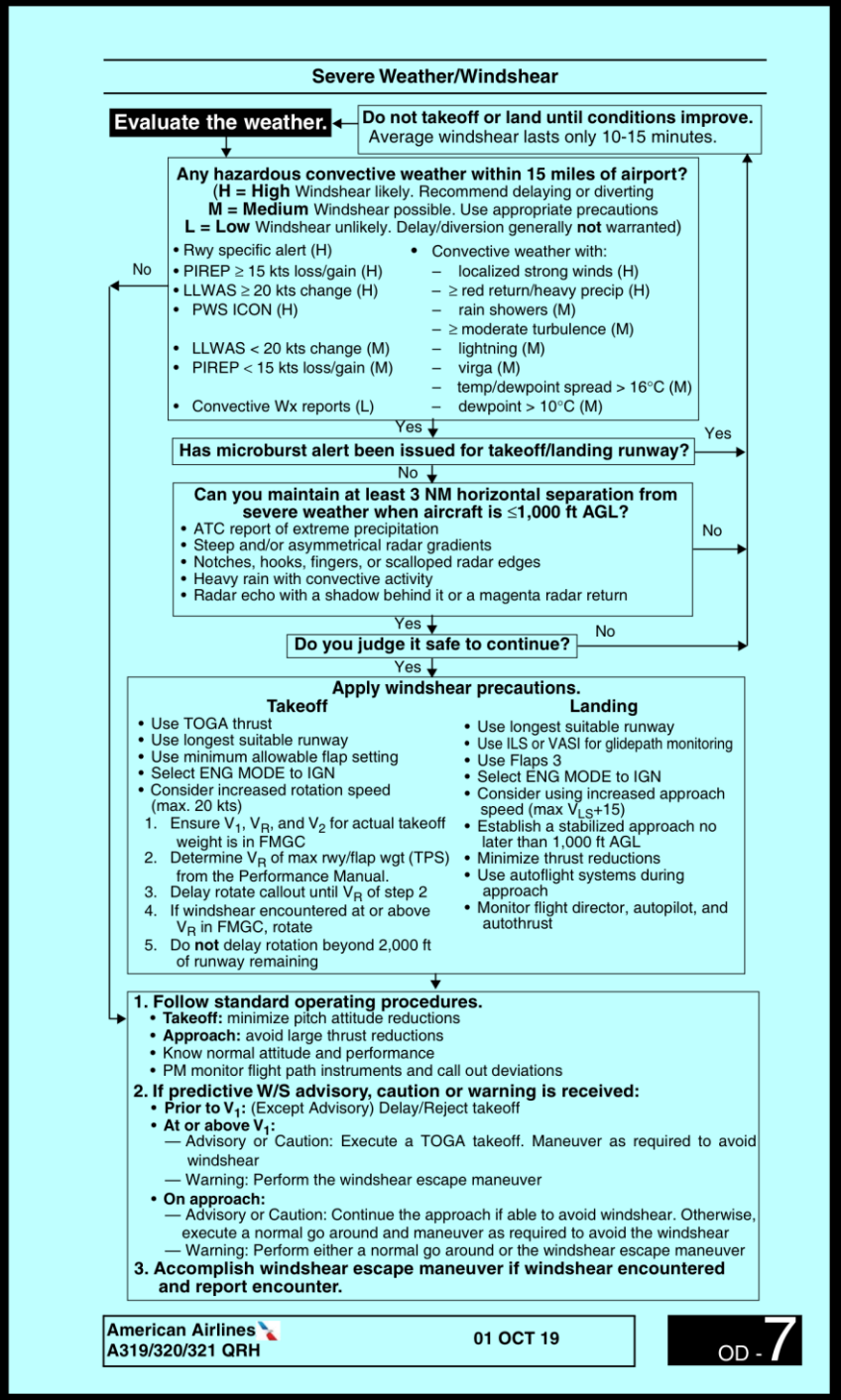
Component	Visibility	Wind
Headwind (including gusts)	All	• 30 knots (except A321NX) • 15 knots (A321NX)
Crosswind (including gusts)	≥ 4000 or ¾	• 20 knots (except A321NX) • 10 knots (A321NX)
	< 4000 or ¾	• 15 knots (except A321NX) • 10 knots (A321NX)
Tailwind	All	• 10 knots

Runway Condition - Takeoff and Landing Recommended Max Crosswind

Takeoff	
Condition	Max Rec. X-Wind
Standing Water/Slush	20
Snow (Wet, Dry, or Compacted)	25
Ice	15

Landing	
Condition	Max Rec. X-Wind
6 - Dry	35
5 - Good	35
4 - Good to Medium	29
3 - Medium	25
2 - Medium to Poor	20
1 - Poor	15

American Airlines QRH



Severe Weather/Windshear

Evaluate the weather. ← **Do not takeoff or land until conditions improve.** Average windshear lasts only 10-15 minutes.

Any hazardous convective weather within 15 miles of airport?
(**H = High** Windshear likely. Recommend delaying or diverting
M = Medium Windshear possible. Use appropriate precautions
L = Low Windshear unlikely. Delay/diversion generally **not** warranted)

- Rwy specific alert (H)
- PIREP ≥ 15 kts loss/gain (H)
- LLWAS ≥ 20 kts change (H)
- PWS ICON (H)
- LLWAS < 20 kts change (M)
- PIREP < 15 kts loss/gain (M)
- Convective Wx reports (L)
- Convective weather with:
  - localized strong winds (H)
  - ≥ red return/heavy precip (H)
  - rain showers (M)
  - ≥ moderate turbulence (M)
  - lightning (M)
  - virga (M)
  - temp/dewpoint spread > 16°C (M)
  - dewpoint > 10°C (M)

No

Yes

Has microburst alert been issued for takeoff/landing runway? Yes

No

Can you maintain at least 3 NM horizontal separation from severe weather when aircraft is ≤1,000 ft AGL? No

- ATC report of extreme precipitation
- Steep and/or asymmetrical radar gradients
- Notches, hooks, fingers, or scalloped radar edges
- Heavy rain with convective activity
- Radar echo with a shadow behind it or a magenta radar return

Yes

Do you judge it safe to continue? No

Yes

Apply windshear precautions.

Takeoff

- Use TOGA thrust
- Use longest suitable runway
- Use minimum allowable flap setting
- Select ENG MODE to IGN
- Consider increased rotation speed (max. 20 kts)

1. Ensure V_1, V_R, and V_2 for actual takeoff weight is in FMGC
2. Determine V_R of max rwy/flap wgt (TPS) from the Performance Manual.
3. Delay rotate callout until V_R of step 2
4. If windshear encountered at or above V_R in FMGC, rotate
5. Do **not** delay rotation beyond 2,000 ft of runway remaining

Landing

- Use longest suitable runway
- Use ILS or VASI for glidepath monitoring
- Use Flaps 3
- Select ENG MODE to IGN
- Consider using increased approach speed (max V_{LS}+15)
- Establish a stabilized approach no later than 1,000 ft AGL
- Minimize thrust reductions
- Use autoflight systems during approach
- Monitor flight director, autopilot, and autothrust

1. Follow standard operating procedures.
- **Takeoff:** minimize pitch attitude reductions
- **Approach:** avoid large thrust reductions
- Know normal attitude and performance
- PM monitor flight path instruments and call out deviations

2. If predictive W/S advisory, caution or warning is received:
- **Prior to V_1:** (Except Advisory) Delay/Reject takeoff
- **At or above V_1:**
  - — Advisory or Caution: Execute a TOGA takeoff. Maneuver as required to avoid windshear
  - — Warning: Perform the windshear escape maneuver
- **On approach:**
  - — Advisory or Caution: Continue the approach if able to avoid windshear. Otherwise, execute a normal go around and maneuver as required to avoid the windshear
  - — Warning: Perform either a normal go around or the windshear escape maneuver

3. Accomplish windshear escape maneuver if windshear encountered and report encounter.

Racing The Storm

- https://www.dailymotion.com/video/x6ujwvm

Racing The Storm

- Hazardous Attitudes?
- Operational Pitfalls?
- Situational Awareness?
- PAVE?
- Risk Management?

Knowledge Check

80% of all aviation accidents are a result of?

A. Human Factors
B. Weather
C. Mechanical
D. Regulations

Knowledge Check

80% of all aviation accidents are a result of?

A. Human Factors
~~B. Weather~~
~~C. Mechanical~~
~~D. Regulations~~

Knowledge Check

The first step to risk management is?

A. Solving hazards
B. Identifying threats
C. Evaluating alternative options
D. None of the above

Knowledge Check

The first step to risk management is?

A. ~~Solving hazards~~
B. Identifying threats
C. ~~Evaluating alternative options~~
D. ~~None of the above~~

Knowledge Check

Which of the following is a boundary to good Situational Awareness (SA)?

A. Complacency
B. Fatigue
C. Distractions
D. All of the Above

Knowledge Check

Which of the following is a boundary to good Situational Awareness (SA)?

A. ~~Complacency~~
B. ~~Fatigue~~
C. ~~Distractions~~
D. All of the Above

Knowledge Check

Automation has greatly increased safety but only when used properly and human limitations are known?

A. True
B. False

Knowledge Check

Automation has greatly increased safety but only when used properly and human limitations are known?

A. True

B. ~~False~~

Knowledge Check

“I have done this a million times and nothing bad has ever happened,” is an example of what hazardous attitude?

A. Macho
B. Invulnerability
C. Anti-Authority
D. Impulsivity

Knowledge Check

"I have done this a million times and nothing bad has ever happened," is an example of what hazardous attitude?

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C. ~~Anti-Authority~~
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