Risk Management for Aviators

Presented by
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What is risk management?

Aviation safety is more than a clean accident record and simple compliance with FAR’s. Flying safely demands good risk management skills.

Risk management requires taking all measures possible to reduce the risks or hazards associated with each flight. Risk management is an intentional process.
Effective Risk Management Involves:

• Identifying the risk factors
• Evaluating the risk factors
• Eliminating the risk factors
• Controlling the risk factors
Some Other Important Definitions

**Risk** involves uncertainty or an element of danger; a risk is any type of potential hazard to flight.

**Aeronautical Decision Making (ADM)** is 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.

**Judgment** is the mental process of recognizing and analyzing all pertinent information in a particular situation, rationally evaluating alternative actions in response to it, and making a timely decision on which action to take.
Risk Management requires the following:

- Situational awareness – the accurate perception and understanding of all the factors and conditions within the four fundamental risk elements (PAVE)
- Problem recognition
- Good judgment (which involves assessment/evaluation of the problem)
Operational Hazards Associated with Flight

• Mindset or attitude
• Social or peer pressure
• Get-there-it is
• Scud running
• Inadvertent IFR
• Getting behind the airplane
• Loss of positional or situational awareness
• Inadequate fuel reserves
• Inadequate flight planning
• Inadequate aircraft performance for the terrain and/or mission
• Technology challenges
• Equipment malfunctions
• Cockpit distractions (too hot, too cold, an unhappy child, etc.)
Four Basic Risk Components Present in All Flight Operations

- **P** = Pilot
- **A** = Aircraft
- **V** = EnVironment
- **E** = External pressures
Pilot

• What kind of shape are you in?
• Are you up to the challenge of flight?
• Are you current and proficient?
• Are you familiar with the aircraft AND the avionics?
I AM SAFE

I = Illness  
A = Attitude  
M = Medication  
S = Stress  
A = Alcohol  
F = Fatigue  
E = Emotions / Eating
Stressors

**Physical Stress** – Conditions associated with the environment, such as temperature, humidity extremes, noise, vibration, and lack of oxygen.

**Physiological Stress** – Physical conditions, such as fatigue, lack of physical fitness, sleep loss, illness, missed meals (leading to low blood sugar levels).

**Psychological Stress** – Social or emotional factors, such as a death in the family, a divorce, 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.
P-A-V-E (continued)

Aircraft
• Is aircraft legal to be flown?
• Do all the radios and lights work?

EnVironment
• Weather (current and forecast, including winds aloft)
• Terrain
• Day or night
• VFR or IFR
• Notams
• Survival gear

External Pressures
The Decision Making Path (3 P’s)

Perceive → Process → Perform
The Decision Making Path

Step 1 – **Perceive**
- Assess current situation
- Anticipate future problem or concern

Step 2 – **Process**
- Define problem as accurately as possible
- Evaluate the need to react
- Consider possible solutions / alternatives

Step 3 -- **Perform**
- Implement the decision
- Evaluate the outcome
NTSB reports indicate 75% - 80% of all aircraft accidents are the result of human error.
The DECIDE Model

D - Detect the fact that a change has occurred.
E - Estimate the need to counter or react to the change.
C - Choose a desirable outcome for the success of the flight.
I - Identify actions which could successfully control the change.
D - Do the necessary action to adapt to the change.
E - Evaluate the effect of the action.
Accidents often occur when the flying task requirements exceed pilot capabilities. The difference between these two factors is called the **margin of safety**.
Three Types of Human Error

- **Perceptual** (relying on your five senses, including postural and intuition)
- **Procedural** (policy and process)
- **Decisional** (thinking errors or simply poor judgment)
Can the human brain be trusted?

The human brain can only process 4 bits per second. Our working memory can only process 7 bits (+/-2) pieces of information at any one time.

The human brain looks for patterns when trying to make sense of a large amount of information or a new scenario.
How safe a pilot are you based on hours?

• The least likely pilot to have a night VFR accident is a 10,000 hour pilot.

• The most likely pilot to have a night VFR accident is a pilot (presumably a student pilot) with less than 51 hours total flight time.
Aviation accidents that are attributed to pilot error (i.e., human factors) occur for just six reasons:

Do / Not Do

Do Too Much / Do Too Little
Do Too Early / Do too Late
Knowing what to do, when to do it, and how much to do it requires:

• Knowledge
• Proficiency (i.e., skills)
• Experience
• Situational awareness
• Good judgment
Factors Affecting Human Decision Making

• Personality Traits and Personal Bias
• Levels of Training and Experience
• Laws of Learning (i.e., Primacy, Intensity, Recency)
• Remembering and Forgetting
• Stress and Fatigue
• Social Influences
|   | Anti-Authority:  
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<th></th>
<th>&quot;Don't tell me.&quot;</th>
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<td></td>
<td>This attitude is found in people who do not like anyone telling them what to do. In a sense, they are saying, &quot;No one can tell me what to do.&quot; 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.</td>
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|   | Impulsivity:  
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<th>&quot;Do it quickly.&quot;</th>
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<td>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.</td>
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|   | Invulnerability:  
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<th>&quot;It won't happen to me.&quot;</th>
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<td>Many people feel that accidents happen to others, but never to them. They know accidents can happen, and they know that anyone can be affected. 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.</td>
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<th></th>
<th>&quot;I can do it.&quot;</th>
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<td>Pilots who are always trying to prove that they are better than anyone else are thinking, &quot;I can do it—l'll show them.&quot; 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.</td>
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|   | Resignation:  
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<th>&quot;What's the use?&quot;</th>
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<td>Pilots who think, &quot;What's the use?&quot; 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 me, 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 &quot;nice guy.&quot;</td>
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When making a GO / NO GO decision, always look at the TOTAL picture.

• PAVE
• I AM SAFE
• DECIDE
• PPP
Risk Management Resources for Aviators

• [http://www.free-online-private-pilot-ground-school.com/Aeronautical_decision_making.html](http://www.free-online-private-pilot-ground-school.com/Aeronautical_decision_making.html) (a very comprehensive document covering Aeronautical Decision Making)

• NTSB video on risk management for pilots (5 minutes); [https://www.youtube.com/watch?v=Zs-fcFPtt7g&feature=ytoutu.be](https://www.youtube.com/watch?v=Zs-fcFPtt7g&feature=ytoutu.be)


• Free private pilot ground school course provided by Embry Riddle Aeronautical University: [http://goto.erau.edu/aviation101/index.html](http://goto.erau.edu/aviation101/index.html)