MODULE 5	RISK MANAGEMENT
OBJECTIVE:	**The participant will be able to describe risk management as being intrinsic to effective decision making and, as a result, will recognize the need to be proactive.**
TRAINING TIME:	**30 minutes**
KEY TEACHING POINTS:	**DEFINITIONS** **RISK MANAGEMENT PROCESS** **RISK MANAGEMENT FOR PILOTS**

[Slide # 1 at opening]

LINK

So far we have examined the pilot decision-making model, the factors that can affect each step in that process, and the countermeasures that can be used to offset their effects. We also had a look at the HFACS model to acquire more insight in to how various players in an organization come to cause errors in the operating core.

AIM

As much as we may have hinted at it in past modules, we have yet to examine another methodology we can use to help us make better decisions. And that process is risk management.

MOTIVATON

Risk management is preventive in nature and is best used in an "ample-time" type decision-making situation. It will help you make preventive decisions by identifying hazards and risks, ranking them in terms of probability, consequence and exposure, and, based on certain criteria, will help you determine which course of action is best given your or your company's risk tolerance.

OUTLINE

{Slide # 2]

1. **Definitions**
2. **Goal**
3. **Risk Management Process**
4. **Risk Assessment**
5. **Risk Scoring**
6. **Risk Criteria**
7. **Risk Options**
8. **Risk Management for pilots**

[Slide # 3] **1. Definitions**

TP 13095 (03/2001)
*Risk Management and
Decision-Making in Civil
Aviation*

Risk is the chance or likelihood of injury or loss. Injury or loss is usually caused by the presence of a hazard that manifests itself when the conditions are right.

Risk management introduces the idea that the likelihood of an event happening can be reduced, or its negative consequences minimized. In civil aviation, the term is

frequently used in the context of making decisions about how to handle situations that affect aviation safety.

[Slide # 4]   **2. Goal of risk management**

Risk management concerns itself with:
- The elimination, reduction and/or control of pure risks; or
- The enhancement utility/benefit and avoid detriment from speculative risks.

[Slide # 5]   **3. Risk management process**

Risk management is the process of
- Identifying hazards;
- Analyzing/assessing risks
- Making a decision
- Implementing the decisions (risk strategy)
- Monitoring results

As you can see, this is similar to the decision-making model introduced in module 2.

[Slide # 6]   **4. Risk Assessment**

To assess risk, we not necessarily apply sophisticated mathematical formulae. Risk is equal to the probability times the consequences times the exposure.

[Slide # 7]   **5. Risk Scoring**

If we use a scoring regime like the one on slide # 7, we can arrive at any number between 1 and 125.

[Slide # 8]   **6. Risk Criteria**

The way to decide on a course of action will largely depend on you or your company's risk criteria. In the example shown on slide # 8, this company will deal with any situation on a top priority basis if a score of 75 or higher is reached. But what action must be taken? What are our options?

[Slide # 9]   **7. Risk Strategy Options**

Depending on your risk tolerance, there are largely 4 risk strategies to choose from:
- Terminate the operation –eliminate the hazard - as it is too dangerous for you or your company to undertake;
- Treat it –choose from a variety of strategies to mitigate the effects of the risk;
- Transfer the risk – buy some of insurance; or
- Tolerate the risk - as you or your company is prepared to assume the risk without further preventive measures.

Human Factors for Aviation—Basic Handbook, Chapter 10, page 157

8. Risk management for pilots

When we decide to go flying, we are implicitly accepting risk. The same is true of driving a car, taking a bus, riding a bicycle, or walking across a busy street. Much of what we do involves risk. There are hazards in our lives with associated risks.

There is a hazard in taking an aircraft aloft: it can crash back to earth. Risk is measured in the likelihood (probability), consequences (severity), and how often the hazard is encountered (exposure). Where the total or aggregate risk (R) is equal to Probability (P) times the consequence (C) times the exposure (E).

Sometimes the risk is such that avoiding it entirely is the only right way of dealing with it. But we cannot always decide simply to stay on the ground or leave the car in the garage. Living requires that we manage risk well by learning to make good decisions.

Flying is a continuous process of decision making involving the pilot, the aircraft, the environment in which the flight is taking place, the operation itself, and the flight situation. To discuss how to assess and manage associated risks, let us look at each of these risk elements in turn.

Risk after the licence.While under training, student pilots are constrained and their exposure to risk is controlled by lesson plans and the supervision of the instructor. Once they are licenced, however, pilots are not as constrained and are able to encounter more risks. They will encounter weather they may have never seen before, fly more complex aircraft, and undertake more complex trips that are longer and over quite different terrain than what they encountered in training. In short, they will gain experience, but in the early going they may not recognize some hazards, nor will they have as rich a set of rule-based behaviour patterns as more experienced pilots. Because of their lack of experience, they will not be as well prepared to deal with some situations they may encounter.

[Slide # 10]

Countermeasures for risk.

Pre-flighting oneself.
According to good risk management practice, every time we fly, we make a point of pre-flighting the aircraft to check whether it is airworthy. But why stop at the aircraft? Being a pilot, too, has associated risks, and pilots may vary in their own airworthiness. Good risk management, in fact, demands that pilots extend their pre-flight check to themselves.

Before any flight, pilots need to consider a number of factors: whether they are competent to undertake it; whether they are unhealthy or tired or taking medicine; whether any lack of flying time over the past months might affect their sharpness; and assess the stress load they are carrying. The fact is, in pre-flighting themselves, pilots might notice many things, any one of which could cause them to doubt the wisdom of carrying on with the flight. At the very least, a pre-flight self-check may serve to alert a pilot that he or she is not likely to perform at peak level.

The "I'm safe" checklist.
This "I'M SAFE" checklist summarizes the most important factors that can affect a

pilot's ability to perform well. We suggest you make a short checklist (rule-based knowledge) from it and add it to your normal pre-flight checks. If you answer yes to any of the questions, you can re-evaluate your decision to fly.

Answering a question in the affirmative does not necessarily mean that you are unfit to fly, but it does indicate that your performance is likely to be impaired in some way. If you are aware of this likelihood, you can at least put in place some procedures to help minimize any detrimental effects. For example, if you are under stress, you may want to inform other crewmembers or your boss, once alerted to the fact that you are not in top form, he or she can keep a closer eye on what and you are doing and how you are doing it. If you are fatigued, you may want to set different minimums for an instrument approach because you know that fatigue has an adverse effect on your ability to perform complex tasks.

Decide ahead.
One strategy for countering risk is to make as many decisions as possible ahead of time. For example, if you are planning a trip that risks flying at night when you are not qualified to do so, try planning backwards from the goal. "If I want to arrive at place B before night, I will have to depart place A before such-and-such a time. If I am not airborne before this time, I do not depart, or I plan to only go part way."

Apply a general rule.
A general rule or orientation could state "If I am nor sure what to do, I do the safest thing." This is good, but a novice pilot might not know what the safest thing really is.

Human Factors for Aviation— Basic Handbook, Chapter 10, page 157

Aircraft.
Critical decisions about the aircraft must be made on the ground during the pre-flight planning. Such decisions involve weight and balance, take-off and landing performance, crosswind limits, and cruise performance. Pilots do a walk-around to see for themselves the condition of the aircraft. Aircraft assessment must continue throughout the flight with monitoring of temperatures and pressures, ammeter, fuel state, suction, etc.

Environment.
Environment is an important subject area to be considered when assessing risk. The most obvious environmental concern is weather, especially given its high incidence of involvement in fatal general aviation accidents. But weather is not the only environmental concern. For example, pilots must be mindful of potential risk when they choose airports they might use during a flight. Runway length and width, runway surface, obstacles, and landing aids can all be seen as components of the environment in which the pilot and aircraft will operate.

Operation.
The interaction of the pilot, aircraft and environment is influenced by the purpose of each flight. Thus, the other risk elements must not be considered in isolation from the type of operation intended. For example, a pilot on critical air ambulance mission might assess risk differently than a pilot out for a Sunday afternoon pleasure flight would.

Situation.
A situation is a set of circumstances present at a given time. When assessing risk, pilots must look at the circumstances affecting the four other risk elements—pilot, aircraft, environment, and operation—and appreciate that the situation itself can become a risk element.

How pilots assess risk.

A matter of probabilities.
In the decision-making process, assessment of risk is an assessment of probability. For example, given deteriorating weather, what is the probability that it will get even worse, get better, or stay the same? Getting more information by contacting a flight service station may help you refine your estimate of what will happen, but it still amounts to gauging probability. You do the same when you contemplate a particular action: if I do A, what is the likelihood that B will happen, or C or D? How well you estimate the "odds" depends on many things. In fact, all the same factors that influence pilot decision-making influence your ability to predict outcomes.

Identifying areas of risk.
Some pilots view a flight as an event that has identifiable area of risk to be taken into account. For example, a pilot planning a cross-country flight might notice several likely areas of traffic—uncontrolled airports, airway intersections, training areas—and either plan to fly around these areas or take note of the necessity for extra vigilance when encountering them. Think of a game of golf. The idea is to stay on the fairway and avoid the rough and the sand traps. If you can't, you must have the skill and knowledge to get out of these places. Above all, stay out of the trees and water!

Leaving an "out."
The most important rule of risk management may be this: Always leave yourself an "out." For example, if you are approaching bad weather, make sure it isn't closing in behind you as well. If you are on final approach, don't let your airspeed get too low. Sometimes the regulations prescribe an "out," such as the requirement for fuel reserve on a cross-country flight or the restrictions on over-water flights by single-engine aircraft.

OVERALL REVIEW

In this course, we have attempted to create an awareness of the factors that can influence pilot decision-making. We have also attempted to provide with you with a variety of tools – countermeasures matrix, HFACS, risk management – to help you make better decisions.

We hope you enjoyed this course and will make use of some or all of the tools we have discussed here.