AMERICAN FLYERS

FIRC Stage 5

Chapter 1

What is FITS?

Flight training within the general aviation (GA) community has reached a critical juncture; while the industry as a whole enjoys an admirable safety record, recent statistics show an increase in both total and fatal accidents rates. Coupled with the proliferation of advanced technologies in small aircraft cockpits, this has led the FAA to take a critical look at how pilots are trained.

FAA/Industry Training Standards (FITS) is a partnership between the FAA, academia and the general aviation industry to develop new training standards for Technically Advanced Aircraft (TAA). Since its introduction, FITS has evolved into one of the most important safety initiatives undertaken by the general aviation community. The FITS program is designed to address the changes introduced by the global positioning system and the differences in the units and their operating systems.

Recent evaluations of accidents in TAAs and training accidents identified a lack of situational awareness, decision-making and inadequate risk management as major causal factors. General aviation's current skill-based training and testing will be changed to address these leading accident causes and further reduce the number of GA fatal accidents.

FITS will focus on the segment of general aviation that uses single-pilot, small reciprocating or turbojet/turbofan-powered technically advanced aircraft for personal transportation. The new training standards will incorporate scenario-based training and emphasize risk management and aeronautical decision-making. While FITS may offer advantages beyond this narrow scope, the justification for this focus is clear: air carriers and larger, crew-served corporate operators currently have in place extensive training requirements; these communities enjoy a record of safety that is unsurpassed. While operational and regulatory differences pose unique challenges for GA, statistics have shown that structured, scenario-based training is the key to achieving the high level of safety enjoyed by the airlines and larger corporate operators.

For FITS instructional resources, visit the webpage below.

Adams A500

Related Links:
FITS instructional resources webpage : http://1.usa.gov/hSoajt

What FITS is Not

Realizing the need for support within the GA community, the FITS program has been carefully developed to avoid placing additional burden on the flying public. Therefore, FITS will not encumber pilots with additional regulations and policies that make flying more difficult or costly. Instead, FITS will take a non-regulatory, incentive-based approach to improving flight training through superior guidance and innovative instructional programs. FITS is intended to raise the level of aviation safety by improving the quality of flight training. For this reason, it is important that all instructors actively participate and embrace the FITS philosophy.

What can FITS do for me?

FITS concepts are as applicable to visual flight rules operations in a GPS-equipped Cessna 172 as they are to the Cirrus SR-22 pilot flying under instrument flight rules. Because FITS promotes a more realistic approach to flight training, the FAA will be able to offer FITS users a host of new benefits including streamlined flight reviews and instructor renewals, as well as transition and recurrent training programs that more effectively meet the need of GA pilots. By offering a FITS alternative, pilots will receive the training they need in less time and with less expense. Insurance companies, recognizing the benefits of such training, will be in a position to offer lower rates because they recognize and reward structured training that addresses the causal factors associated with many GA accidents, regardless of the aircraft type.

Chapter 2

Scenario-Based Training

Scenario-Based Training (SBT) is a training system that uses a structured script of "real world" scenarios to address flight training objectives in an operational environment. Such training can include initial training, transition training, upgrade training, recurrent training, and special training. The appropriate subset of training should appear with the term "Scenario-Based," e.g., Scenario-Based Transition Training, to reflect the specific application.

The objective of scenario-based training is a change in the thought process, habits and behaviors of the students during the planning and execution of each scenario. Since the training is student-centered, success is measured in the following desired student outcomes.

Describe - At the completion of the scenario, the student will be able to describe the physical characteristics and cognitive elements of each activity.

Explain - At the completion of the scenario, the student will be able to describe the training exercise and understand the underlying concepts, principles, and procedures comprising each activity.

Practice - At the completion of the scenario, the student will be able to practice the activity with little input from the instructor. The student, with coaching and/or assistance from the instructor, will quickly correct minor deviations and errors.

Perform - At the completion of the scenario, the student will be able to perform the activity without assistance from the instructor. The student will quickly identify and correct any errors and deviations. At no time will the successful completion of the activity be in doubt. "Perform" will be used to signify the student is satisfactorily demonstrating proficiency in traditional piloting and systems operation skills.

Manage/Decide - At the completion of the scenario, the student will be able to correctly gather the most important data available both within and outside the cockpit, identify possible courses of action, evaluate the risk inherent in each course of action, and make the appropriate decision. "Manage/Decide" will be used to signify the student is satisfactorily demonstrating acceptable single-pilot resource management skills.

SBT should be used throughout the syllabus in accordance with the guidance contained in the appropriate Generic Master Syllabus (Transition, Instructor, Recurrent, Private/Instrument, etc.) that can be found on the FAA FITS website. Scenarios should be adapted to the aircraft, its specific flight characteristics, and the likely flight environment. The scenarios used should always require the pilot to make real-time decisions in a realistic setting. After the first flight or two, when the student has developed the required skills, the scenarios should be planned and led by the student.

Related Links:
FITS Training and Curriculums: http://1.usa.gov/hSoajt

FITS Curriculum Acceptance Criteria

Training material being submitted for FITS acceptance must meet the specific FITS Criteria for the type of training. There are four levels of FITS acceptance that correspond to the type of training: Flight Syllabus, Non-Flight Syllabus, Self-Learning Programs, and Supporting Material. FITS acceptance must be solicited at the appropriate level for the type of training being provided. The criteria for FITS acceptance follow a description of the four levels.

Related Links:
FITS Documents & Guidance: http://1.usa.gov/gkN8uu

Levels of Accepted FITS Training

Accepted FITS Flight Syllabus: Contains all the criteria as defined below and includes flight in an aircraft or at least an Advanced Aviation Training Device. Examples of this type of syllabus include initial, transition, and recurrent training syllabi.

Accepted FITS Ground Syllabus: Is not intended to teach the pilot-in-training (PT) psychomotor pilot skills or full cockpit/aircraft integration in a specific aircraft. It's intended to enhance certain skill sets of the PT. Application of this level of acceptance may be to teach the PT how to use a new glass cockpit display or develop better SRM skills. A FITS-Accepted Syllabus will also contain all the criteria as defined below. A live instructor will lead the training.

Accepted FITS Self-Learning Program: May be either an interactive computer software program or online course on a specific application or subject. The purpose of this training is for the PT to learn about specific equipment or systems, or to enhance a specific higher order thinking skill such as judgment or critical thinking. Scenario-based training or another form of problem-based learning and testing is required. Since a live instructor is not required, Learner Centered Grading is not applicable. Thus, a FITS Self-Learning Program will contain all the Criteria except Learner Centered Grading.

If the program is for a piece of equipment (i.e. specific GPS unit), the program should act like the actual piece of equipment during the interaction with the program, i.e. basic error inputs should result in the program reacting the same way the piece of equipment would act. After basic training on the equipment, scenarios or problems should be used to practice or demonstrate Pilot in Training (PT) proficiency, knowledge and judgment. The program should allow PT errors and demonstrate the consequences of those errors.

For non-equipment programs (i.e. Aeronautical Decision Making development), scenarios with multi-string testing should be used.

Accepted FITS Supporting Material: These products do not need to meet the FITS criteria (i.e. may not include learner-centered grading and may not be scenario based but must include one or more problems or tasks as a basis for learning). For these products the subject is integral to FITS and the training must include an additional objective of enhancing or developing judgment skills including analysis, synthesis, and evaluation. These products may be accepted on their own technical merit, but only as a part of an accepted FITS flight syllabus or FITS Syllabus. For example, Computer-Based Instruction on risk management could be accepted and used as a module in a FITS-accepted transition syllabus. Original equipment manufacturers (Cessna, Cirrus, Eclipse, etc.) or developers of training materials (Sporty's, Jeppesen, King Schools, etc.) normally develop accepted FITS supporting material.

For FITS acceptance, the training curriculum and syllabus must include three concepts: scenario-based training (SBT), single-pilot resource management (SRM), and learner-centered grading (LCG), except as noted above. In general, these concepts provide the PT an enhanced learning environment and the opportunity to practice, drill, and then reflect on the problems and tasks encountered in training. If the training curriculum does not provide for learning in context and for judgment training, it does not meet the basic FITS-acceptance criteria. Additionally, FITS syllabi and curricula should not be delivered unless the flight instructor has reviewed and understands the "FITS Master Instructor Syllabus" available on the FAA FITS website.

Learner-Centered Grading

Desired Pilot in Training (PT) Scenario Outcomes

The objective of scenario-based training is a change in thought processes, habits and behaviors of students during the planning and execution of the scenario. Since the training is learner centered, the success of the training is measured by the following desired student outcomes.

Maneuver Grades (Tasks)

Describe - At the completion of the scenario, the PT will be able to describe the physical characteristics and cognitive elements of the scenario activities. Instructor assistance is required to successfully execute the maneuver.

Explain - At the completion of the scenario the learner will be able to describe the scenario activity and understand the underlying concepts, principles, and procedures that comprise the activity. Instructor assistance is required to successfully execute the maneuver.

Practice - At the completion of the scenario the student will be able to plan and execute the scenario. Coaching, instruction, and/or assistance from the CFI will correct any deviations or errors.

Perform - At the completion of the scenario, the PT will be able to perform the activity without assistance from the CFI. Errors and deviations will be identified and corrected by the PT in an expeditious manner. At no time will the successful completion of the activity be in doubt.

Not Observed - Any event not accomplished or required.

Single-Pilot Resource Management (SRM) Grades

Explain - The student can verbally identify, describe, and understand the risks inherent in the flight scenario. The student will need to be prompted to identify risks and make decisions.

Practice - The student is able to identify, understand, and apply SRM principles to the actual flight situation. Coaching, instruction, and/or assistance from the CFI will quickly correct minor deviations and errors identified by the CFI. The student will be an active decision maker.

Manage/Decide - The student can correctly gather the most important data available both within and outside the cockpit, identify possible courses of action, evaluate the risk inherent in each course of action, and make the appropriate decision. Instructor intervention is not required for the safe completion of the flight.

Grading will be conducted independently by the student and the instructor, and then compared during the postflight critique.

Learner centered grading (outcomes assessment) is a vital part of the FITS concept. Previous syllabi and curricula have depended on a grading scale designed to maximize student management and ease of instructor use. Thus the traditional grades of "excellent, good, fair, poor" or "exceeds standards, meets standards, needs more training" often meet the instructor's needs, but not the student's. The learner centered grading described above is a way for the instructor and student to determine the student's level of knowledge and understanding. "Perform" is used to describe proficiency in a skill item such as an approach or landing. "Manage/Decide" is used to describe proficiency in the SRM area such as ADM. The terms "Explain" and "Practice" are used to describe student learning levels below proficiency in both.

Grading should be progressive; during each flight the student should achieve a new level of learning (e.g. flight one, the automation management area might be an "explain" item, by flight three a "practice" item, and by flight five a "manage/decide" item).

Generic FITS syllabi, instructor and course developer's guides can be found on the FAA FITS website. If these guides and syllabi are followed, training providers should have little difficulty gaining FITS acceptance.

Related Links:
FITS Documents & Guidance: http://1.usa.gov/gkN8uu

Single-pilot Resource Management

Single-Pilot Resource Management (SRM) is the art and science of managing all resources available to a single pilot (prior to and during flight) to ensure that the successful outcome of the flight is never in doubt. The primary emphasis will be on developing, through the enhancement of the mental process, the underlying thinking skills needed by the pilot to consistently determine the best course of action in response to a given set of circumstances. SRM integrates all of the following concepts:

- Aeronautical Decision Making
- Risk Management
- Task Management
- Information Management

- Automation Management
- Flight Management
- Situational Awareness
- Controlled Flight into Terrain (CFIT) Awareness

SRM should be a part of every scenario. While a manufacturer's curriculum may only utilize a preflight risk management form or system, SRM will be a graded item during pre-flight, pre-takeoff, takeoff, climb, cruise, descent, approach, and landing. Those parts of SRM appropriate to each phase of flight will be graded during each segment. The specific desired outcomes must be included in the "FITS Master Learning Outcomes List" contained toward the end of all FITS generic syllabi.

Chapter 3

1. Type of training:

Transition

2. Maneuver of training objective:

Familiarize student with high-performance flight operations: short field take-offs and landings in a Beechcraft A-36 Bonanza

3. Possible hazards or considerations:

(These examples are provided for training purposes only. Items may be added or omitted as necessary to reflect your unique operation)

a. Runway surface conditions
b. Runway length/width
c. Wind conditions
d. Ground-based obstructions/hazards
e. Visibility/ceiling
f. Gear extension/retraction difficulties
g. Engine-out procedures
h. No-flap landings
i. Alternate landing locations
j. Airport traffic
k. Rejected/balked landings/go-arounds
l. Touch and go landings
m. Land and Hold Short Operations (LAHSO)
n. Variations in approach speed (such as when required by ATC)

4. Mitigation strategies and resources:

(Every hazard or consideration should be addressed though the use of some mitigating strategy or resource. Those provided below serve only as an example to illustrate the system safety methodology)

Runway surface conditions: Short-field operations will not be conducted on contaminated (standing water, snow, ice) runways or runways with surfaces comprised of gravel or other loose sediment. Should such conditions be encountered, the pilot will divert to a suitable alternate. Current and forecast weather, Notices to Airmen (NOTAMs), the Pilot's Operating Handbook/Flight Operations Manual (POH/FOM), Airport/Facility Directory (A/FD), and Pilot Reports (PIREPs) will be reviewed to determine a runway's suitability.

Runway length/width: Short-field operations will not be conducted on runways that are less than "x" (insert appropriate length) feet in length. The distance will be a function of runway configuration and surface, aircraft performance, weather conditions, plus any additional margin for safety deemed appropriate by the pilot in command. For training purposes, a runway of at least x feet (or other figure deemed appropriate by the pilot in command) will be used.

Wind conditions: Short-field operations will not be performed when the crosswind/tailwind component exceeds x knots. The instructor and student will use the aircraft POH/FOM and assess the runway environment prior to making a determination. This would also be an excellent catalyst for a discussion of personal minimums and any additional training requirements.

Ground-based obstructions/hazards: The instructor and student will review all available resources, including sectional/terminal area charts, A/FD, and Notices To Airmen. Using aircraft performance data found in the POH/FOM, the potential impact of any obstructions or hazards will be assessed and a strategy developed to address any concerns.

Visibility/ceiling: The instructor and student will discuss the impact of visibility/ceiling as it relates to short-field landing operations. For example, if circumstances demand the conduct of a circling approach under marginal VFR conditions, does the student have the confidence and proficiency to fly a tight pattern while managing airspeed, aircraft coordination, etc? Under such circumstances, would it be more desirable to conduct a straight-in approach with a slight tailwind? How much wind would be too much? What other variables/options should be considered: perhaps a diversion to a more suitable airport?

Gear extension/retraction difficulties: While not a problem specific to short-field operations, certain airports/runway environments may be more conducive to landings with a partial/complete landing gear failure. Factors to be discussed should include runway length, surface type, availability of emergency equipment, repair facilities, and any other safety-of-flight issues deemed appropriate.

Engine-out procedures: Should an engine failure or partial loss of power necessitate the unplanned use of a short field, a much higher degree of precision will be required to land the aircraft safely. Perhaps an emergency off-airport landing into a long, flat field would be more advantageous than a power-off landing into a short runway flanked by obstructions? The student and instructor should discuss and simulate, in a manner consistent with safety, engine out procedures as part of a comprehensive training program.

No-flap landings: Using the aircraft POH/FOM, the instructor and student will determine the aircraft's landing performance should a partial or no-flap landing become necessary. A student-led discussion should also take place to determine personal minima for the conduct of such operations. Attention will also be given to how other factors, such as deteriorating weather or a mechanical abnormality, may precipitate a change in landing minima.

Alternate landing locations: There are numerous circumstances that may necessitate the use of an alternate landing site. These include diversions made for changing weather conditions, mechanical anomalies, or even a medical emergency. The instructor and student, using the aircraft POH/FOM, should discuss how runway length and aircraft performance impact the selection of alternates during cross-country flight operations. Methods for determining a proper alternate under a variety of normal, abnormal, and emergency conditions must be emphasized as part of the pre-flight planning process.

Airport traffic: Traffic at both towered and non-towered airports often necessitates wide variations in landing patterns. Changes in the pilot's "sight picture," particularly when transitioning to a new aircraft, could lead to approaches that are too fast and/or too high to allow a successful short field landing. While issues stemming from airport traffic may largely be addressed through sound flying techniques, the instructor can take an otherwise routine lesson and introduce other risk elements, thus promoting the student's development of critical decision-making skills.

Rejected/balked landings/go-arounds: Even the most proficient pilots will occasionally make less than ideal landings. While such events usually result in nothing more than a bruised ego, a mishandled balked landing can have tragic consequences. This is particularly true when other potential hazards are present. It isn't difficult to imagine a scenario in which a pilot lands long on a relatively short runway. This is followed by a bounced landing. Instead of conducting an immediate go-around, the pilot attempts to salvage the landing, and in the process consumes more valuable runway. Now the pilot, who has failed to dissipate excess speed, finds the runway end quickly approaching. Unfortunately, the high density altitude and tall trees off the runway's departure end now conspire to make an attempted go-around extremely dangerous. Instructors should introduce students to such a scenario in a controlled environment--one that is safe, yet makes clear how quickly a routine landing can deteriorate into a catastrophic event.

Touch and go landings: Touch and go operations will not be conducted on runways that are less than x feet in length. This length will vary depending on the runway environment, meteorological conditions, pilot currency, proficiency, comfort, etc. As part of this training exercise, each of the aforementioned elements, and their potential impact on touch and go operations, should be discussed in detail.

Land and Hold Short Operations: While not often thought of as a GA issue, some smaller regional airports do have approved LAHSO procedures. The acceptance of a LAHSO clearance carries with it certain operational considerations including landing distances, runway length, configuration, distance, and other airport traffic. The A/FD, NOTAMs, and aircraft POH/FOM will be used to determine when, or if, a LAHSO clearance will be accepted. The student and instructor will then review how to conduct this procedure safely.

Variations in approach speed: Due to air traffic considerations, it is often desirable to fly a higher-than-normal approach speed for a given aircraft. This requires additional skill and proficiency in transitioning from an approach to the landing phase of flight. It also potentially complicates the short-field landing process, particularly when combined with other elements such as a touch and go landing or a LAHSO clearance. While technique is an important element, a frank discussion of aircraft performance, pilot skills, and personal minima should also be included in this lesson.

5. Alternatives:

Time: When planning a training exercise, time is always a variable to consider. For example, the pilot and/or instructor may determine that based on forecast weather conditions, it would be prudent to delay a training exercise or other mission until the winds, ceiling, or visibility improve.

Location: If airport conditions do not allow the planned training or operational exercise to be conducted safely, another venue should be chosen. This flexibility should be stressed during the planning/instructional process.

Abort training exercise: This alternate is included to emphasize there are times when aborting a flight or choosing not to perform a particular maneuver or operation is an appropriate and prudent course of action.

6. Requisite skill sets:

The student receiving training should be familiar with the basic handling characteristics of the Beechcraft A-36. In addition, the student should be able to demonstrate proficiency in the conduct of normal landings.

7. Scenario-based training methodology:

The instructor will integrate two or more of the identified hazards into a cross-country flight operation. The choice of hazards will be made so as to realistically highlight risks likely encountered under similar circumstances. This will force the student to use both mechanical and cognitive skills in a dynamic environment--one that contains the distractions, challenges, and potential hazards found in a typical GA mission.

8. Materials:

Aircraft POH/FOM, FITS Generic Transition Syllabus, A/FD, Aeronautical charts, etc.

Chapter 4

General

Notice the elements included in the lesson plan are less technique-oriented, focusing instead on risk management and decision-making. Initially, the instructor may take the lead in identifying risks and developing mitigation strategies. However, as the training progresses, the student will ideally assume this role, demonstrating an optimal level of understanding and application. Moreover, using these tactical elements as the basis for all training maneuvers establishes the desired system safety mindset. A further review of the lesson plan will illustrate this point.

First, every maneuver has a series of risk factors and/or considerations that must be identified. A person with limited flying experience may only recognize a fraction of these items. As an instructor, you should develop scenarios that highlight all known risk factors and other considerations associated with a given maneuver. The goal is to expand the student's zone of competence and confidence to cover any foreseeable challenge.

Next, FITS benefits can most quickly be realized by reviewing the mitigation strategies discussed in Item 4. Students should be taught to employ these strategies for each possible hazard/consideration using the four tenets of system safety: risk management, aeronautical decision-making, situational awareness, and single-pilot resource management. If a risk factor or consideration (Item 3) cannot be addressed through a mitigation strategy or resource (Item 4), then an alternative must be considered (Item 5). The ultimate goal is not the development of yet another checklist. Instead, this process should be used as a framework through which critical thinking and judgment are integrated into each of the items covered in the PTS. From there, pilots should have the ability to take the next logical step in the evolution of their flying: the ability to bring this level of analysis and insight to every flight they make.

Along with the basic mechanics of a short-field landing, you have also introduced your student to other safety-of-flight issues using FITS instructional techniques. From here you may move to the final step, the development of an integrated training exercise that allows your student to apply what he or she has learned. For additional examples of how this may be accomplished, instructors are encouraged to visit the FAA's FITS homepage and review other FITS-accepted curricula.

Related Links:
FAA FITS website: http://1.usa.gov/oZ8yuG

Using Scenario-based Training

The instructor should next use scenario-based training (SBT) to highlight both the hazard identification and risk management elements of this training exercise. For example, a VFR cross-country flight could be initiated. While en route, deteriorating weather (or another simulated condition) could force a diversion. The student will quickly experience increased workloads while determining an appropriate alternate, navigating, communicating with ATC, managing aircraft systems, etc. At this juncture, runway length or condition is but one of many concerns the student faces. These realistic distractions will not only test the student's stick and rudder skills, but also their judgment in safely managing the flight.

Ideally, the scenario will provide the student with several choices, each with its own unique operating challenges. One airport may have a short grass runway, while another has a paved runway that is shorter still, with an obstacle at the approach end. As conditions continue to deteriorate, the student may be forced to select an airport that is less than ideal for their aircraft. Once they've entered the airport traffic pattern, they may find the flaps will not extend. This forces them to make yet another decision. Do they risk a landing at a short field, or press on into deteriorating weather conditions? Each decision carries with it consequences which will become apparent as the flight continues.

Obviously such a scenario would be inappropriate for a student in the early phases of training. However, the three-step process identified above allows FITS to be introduced at a reasonably early phase of training. As the student matures, increasingly complex scenarios may be used to test the student's ability to expertly manage the flight. The scenario used in this example not only tests the student's ability to make a short-field landing, it also forces him or her to use all available resources, manage risk, exercise judgment, and demonstrate situational awareness. In addition, as part of a comprehensive training program, such a scenario may also be used to teach preflight planning and cross-country flight operations, weather avoidance, ATC communications, avionics and autopilot usage, emergency procedures, etc., while reinforcing the stick and rudder skills so important to safe flight. To view it another way, FITS is an essential element to a balanced flight-training program.

For the sake of exercise, we will take one more item from our list of hazards/considerations. In this case, let's review balked landings. While a major consideration during any flight, aircraft performance is particularly critical while maneuvering close to the ground. If your student lands long on a short runway, bounces or begins to porpoise and finds it necessary to apply power and go around, then this event could quickly turn into a very dangerous situation. Add factors such as high-density altitude and an obstruction at the runway's departure end, and things could quickly go from bad to worse. Fifteen hundred feet down an 1,800-foot runway while traveling at 45 knots is a bad time to begin reviewing options. The student should identify ways to avoid placing him or herself in such a situation.

Perhaps that means finding another airport under certain conditions. It may also entail additional practice to gain proficiency. Executing a go-around is also a valid option, but this too should precipitate a discussion of the elements involved in such a maneuver. For example, the student should be able to determine the point beyond which a touch and go, even one instigated by a balked landing, will not be attempted unless a prescribed airspeed has been reached. If these conditions are not met, the pilot must be committed to remaining on the ground, even if it results in some aircraft damage. If a series of events places you somewhere you'd rather not be, just remember it's better to address such matters on the ground than to strike a tree and crash on an ill-advised go-around. Ideally, FITS training will help prevent your student (or you) from setting such events into motion. Again, a pilot who can identify potential hazards and mitigate them through preflight planning is well equipped to handle most in-flight challenges.

FITS Summary

In covering these scenarios, we have demonstrated how to introduce system safety principles to traditional flight maneuvers using FITS. However, those same objectives and methods need not be confined to those items covered during the practical test. Instructors could easily develop a FITS syllabus to enhance the quality of flight reviews, instrument proficiency checks, the training of pilots to handle unusual emergencies, complex and/or high performance checkouts, etc. The possibilities are endless and the FAA encourages instructors to be innovative in developing training strategies. The example provided is but one of an infinite number of methods for developing a FITS training program.

If you are not comfortable with creating such materials, or have concerns over how your students will be tested, there is good news. The FAA, along with its industry partners, is continuing to develop resources to help maximize the benefits offered through FITS. In addition, as enhancements are made to each PTS, the FAA will provide guidance to Aviation Safety Inspectors, Designated Pilot Examiners, pilots and flight instructors to ensure the necessary standardization takes place.

General aviation now includes everything from ultralight and sport aircraft to single-pilot crew-served jets capable of operating above 40,000 feet. Systems that were once the exclusive domain of airline cockpits are now readily available in many small piston-powered aircraft. The pace of development no longer affords us the luxury of an unprogressive approach to flight training. This is why the success of FITS is so crucial to flight instructors: it will be an indispensable tool in reducing aircraft accidents.

Chapter 5

Overview

Risk management/risk intervention is much more complex than the definitions of the terms might suggest. Risk management and risk intervention are decision-making processes designed to systematically identify hazards, assess the degree of risk, and determine the best course of action. These processes involve the identification of hazards followed by assessments of the risks, analysis of the controls, making control decisions, using the controls, and monitoring the results.

When considering risk management, one should keep the terms *hazard* and *risk* in mind. A hazard is a present condition, event, object or circumstance that could lead to or contribute to an unplanned or undesired event such as an accident. Risk is the future impact of a hazard that is not controlled or eliminated; it is the future uncertainty created by the hazard.

Flight training activities take place in a "time-critical" framework for risk management and decision making. Instructors should have a system their students can use that is effective and timely. These concepts are relatively new in the general aviation training world but have been shown to be extraordinarily useful in lowering accident rates in the world of air carriers. Instructors should be well versed in these concepts.

Assessing Risk and Decision Making

Many factors influence a pilot's decision making process. Knowledge, reasoning ability and skills are all important, as is the individual's emotional make-up, his or her personality and attitudes. Personality traits are deeply ingrained behavioral characteristics that are usually established in childhood. These personality traits are highly resistant to change and are beyond the scope of the judgment training presented in this manual.

Attitudes

Attitudes are defined as mental positions or feelings regarding facts or states, and are less deeply ingrained and may be changed by training. We are constantly inundated by attempts to change our attitudes by advertisers, politicians, peers, superiors, etc.

Most of our attitudes regarding flying are developed through experience. We listen to and observe instructors and other pilots, thereby developing attitudes concerning risk taking, and decision-making. We also learn pilot behavior through informal methods, e.g., "hangar flying," movies, etc. These attitudes continue to be developed with experience. The exercises in this manual can help you establish safe attitudes towards flying.

Headwork

Headwork is the intellectual process used when formulating decision making strategies and is important in aeronautical decision making. The necessary ingredients in good headwork are knowledge, vigilance, selective attention, risk identification and assessment, information processing and problem solving abilities. Headwork, when properly applied, minimizes the negative influence of attitudes and personality traits. If it were possible to separate the headwork aspect of decision making from the attitudinal part (which it is not), pilots would be able to solve all problems in much the same manner as a computer. Since the two cannot be separated, an objective of this manual is to help you develop and apply good headwork that augments or controls other aspects of decision making in the cockpit.

Skills and Procedures

A third factor related to decision making is airmanship or "stick and rudder" abilities. This refers to the procedural, psychomotor and perceptual skills that are used to control an aircraft and its systems. These skills are learned during the conventional training process until they become automatic reactions. These skills are highly specific to the type of aircraft and are taught in traditional flight training programs using a variety of materials.

Stress Management

Pilots must learn how to deal with the various stress levels associated with flying, and must recognize the cumulative effects which stress can have on headwork at critical times. Stress coping must occur in three areas.

Life Stress Management - This is the long-term approach to mental and physical health. This includes items such as diet, exercise, lifestyle, etc., as well as recognizing the negative effects of change-in-life situations e.g., death of a loved one, job change, divorce or financial problems.

Preflight "fitness to fly" - The pilot needs to ensure physical well being, e.g., the effects of illness or medication on performance, stress from outside pressures, the influence of alcohol, fatigue and eating habits.

Inflight Stress Coping - This includes recognizing the importance of controlling panic, focusing primarily on aircraft control and, secondarily, on navigating and communicating while not permitting fear or anxiety to paralyze decision-making capabilities.

Deliberate Risk Management

Although most of your risk management activities are likely to fall into the "time-critical" sphere, you should also encourage your students to practice Deliberate Risk Management. Deliberate risk management uses experience and brainstorming to identify hazards, assess risks, and develop controls for planning operations and tasks.

The 3P Model for Practical Risk Management

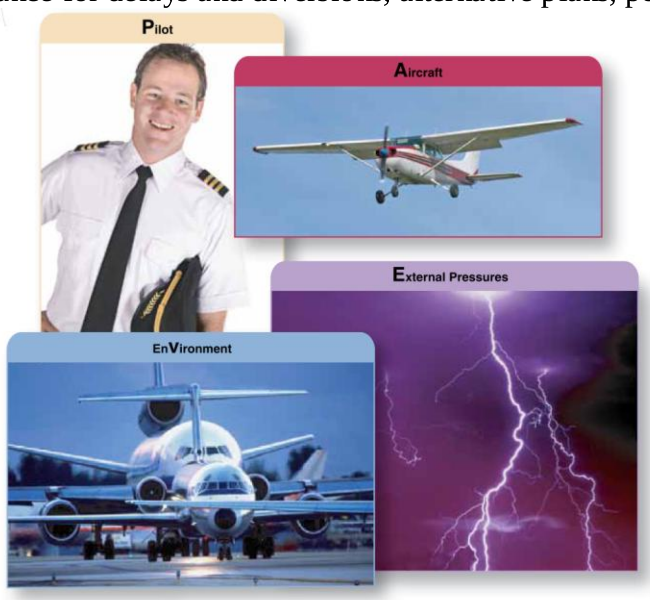
The following model combines the six formal steps of risk management into an easy-to-remember and easy-to-use model for practical risk management:

- *Perceive* hazards, factors and conditions that might create risk, by using the PAVE checklist.
- *Process* hazards to assess the level of risk involved and use the TEAM checklist to determine risk controls for each hazard.
- *Perform* by implementing controls and monitoring results with the CARE checklist.

3P Model

PAVE Checklist

Pilot - experience, recency, currency, physical and emotional condition
Aircraft - fuel reserves, experience in type, aircraft performance, aircraft equipment
enVironment - airport condition, weather, runways, lighting, terrain
External pressures - allowance for delays and diversions, alternative plans, personal equipment



PAVE Checklist (graphic)

Pilot

- A pilot must continually make decisions about competency, condition of health, mental and emotional state, level of fatigue, and many other variables. For example, a pilot may be called early in the morning to make a long flight. If a pilot has had only a few hours of sleep and is concerned that the sinus congestion being experienced could be the onset of a cold, it would be prudent to consider if the flight could be accomplished safely.
- A pilot had only 4 hours of sleep the night before being asked by the boss to fly to a meeting in a city 750 miles away. The reported weather was marginal and not expected to improve. After assessing fitness as a pilot, it was decided that it would not be wise to make the flight. The boss was initially unhappy, but was later convinced by the pilot that the risks involved were unacceptable.

Aircraft

- A pilot frequently bases decisions on evaluation of the airplane, such as performance, equipment, or airworthiness.
- During a preflight, a pilot noticed a small amount of oil dripping from the bottom of the cowling. Although the quantity of oil seemed insignificant at the time, the pilot decided to delay the takeoff and have a mechanic check the source of the oil. The pilot's good judgment was confirmed when the mechanic found that one of the oil cooler hose fittings was loose.

EnVironment

- The environment encompasses many elements that are not pilot or airplane related, including such factors as weather, air traffic control (ATC), navigational aids (NAVAIDS), terrain, takeoff and landing areas, and surrounding obstacles. Weather is one element that can change drastically over time and distance.
- A pilot was landing a small airplane just after a heavy jet had departed a parallel runway. The pilot assumed that wake turbulence would not be a problem since landings had been performed under similar circumstances. Due to a combination of prevailing winds and wake turbulence from the heavy jet drifting across the landing runway, the airplane made a hard landing. The pilot made an error when assessing the flight environment.

External Pressures

- The interaction between the pilot, airplane, and the environment is greatly influenced by the purpose of each flight operation. The pilot must evaluate the three previous areas to decide on the desirability of undertaking or continuing the flight as planned. It is worth asking why the flight is being made, how critical it is to maintain the schedule, and if the trip is worth the risks.
- On a ferry flight to deliver an airplane from the factory, the pilot calculated the groundspeed and determined he would arrive at the destination with only 10 minutes of fuel remaining. A check of the weather revealed he would be flying into marginal weather conditions. By asking himself whether it was more critical to maintain the schedule or to arrive with an intact aircraft, the pilot decided to schedule a refuel stop even though it would mean he would not be able to keep to the schedule. He chose not to "stretch" the fuel supply in marginal weather conditions which could have resulted in an emergency landing.

PAVE Checklist (text)

TEAM Checklist

Transfer - Should this risk decision be transferred to someone else (e.g., consult the chief instructor?)
Eliminate - Is there a way to eliminate the hazard? (e.g., cancel the flight)

Accept - Do the benefits of accepting the risk outweigh the costs?
Mitigate - What can you do to mitigate the risk? (e.g. fly with another pilot)

CARE Checklist

Consequences - Continuously evaluate the consequences of hazards that arise while enroute. Throughout the flight, review the status of each risk. For example, check with Flight Watch for weather updates.
Alternatives - Continuously evaluate all available options and alternatives. (e.g., have alternate airports and alternate arrangements available if a diversion is necessary).
Reality - Acknowledge and address the reality of your situation and avoid wishful thinking. (e.g., recognize that the destination weather is not improving and establish a continue/diversion point to turn to the alternate airport).
External pressures - Be mindful of external pressures, especially tendencies toward "get-home-itis."

Risk Management

Risk Management is a decision-making process designed to systematically identify hazards, assess the degree of risk, and determine the best course of action. Recall that the hazard is a present condition, and risk is the degree of uncertainty created by the hazard.
The level of risk posed by a given hazard is measured in terms of consequences (extent of possible loss) and probability (likelihood that a hazard will cause a loss). Exposure (number of people or resources affected) can also be considered in risk assessment.
The principles of operational risk management recognize that all human activities, especially those involving technical devices or complex processes, entail some element of risk.
Make risk decisions at the appropriate level. Since you are training students to act as pilot-in-command, you should give them the opportunity to learn and practice risk management on every flight.
Accept risk when benefits outweigh dangers. Decide only after careful assessment of the risk and implementation of appropriate risk controls.
Integrate risk management into planning at all levels. Because risk is an unavoidable part of every flight, safety requires the use of appropriate and effective risk management before every flight.

Risk Management Process

The formal Risk Management (RM) decision-making process involves six steps:

- Identify hazards
- Assess risks
- Analyze controls
- Make control decisions
- Use controls
- Monitor results

Chapter 6

Overview

Recall that identifying hazards and associated risk is essential to preventing risk and accidents. If a pilot fails to search for risk, it is likely that he or she will neither see it nor appreciate it for what it represents. Therefore, pilots need to have a systematic way of knowing where to look for risk. The five elements of risk in flying are:

- Pilot
- Aircraft
- Environment
- Operation
- Situation

Each of these risk elements applies not only to the flight itself, but also to the mission, or reason for the flight. For example, some risks such as unexpected precipitation may be encountered during flight, but other risks such as the desire to reach home on a Sunday night prior to a big day at work are part of the flight before it ever leaves the ground.

When evaluating risk, a developing or potential hazard must first be detected, then the five risk elements must be reviewed. At this point, it would be useful to consider what makes up each risk element in greater detail.

Pilot

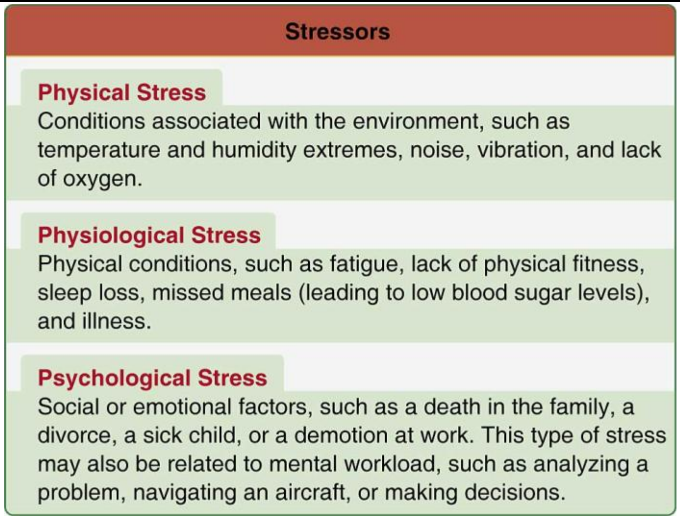
A pilot's performance may be affected in many ways during a flight. The "risk raisers", or things that affect pilots by raising the degree of risk, are called "stressors." The three types of pilot stressors are:

Physical stress - Conditions associated with the environment such as temperature and humidity, 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, a demotion at work, etc. This type of stress may also be related to mental workload such as analyzing a problem, navigating an aircraft, or making decisions.

Pilots must evaluate their stress level and their ability to conduct a flight feeling adequately prepared and qualified.



Stressors

Aircraft

This risk element focuses on the aircraft equipment: its condition and its suitability for the intended purpose of the flight. The obvious time to make this assessment is on the ground during preflight planning. For example: Do all of the radios work properly? Does the engine still develop adequate horsepower? Will the fuel endurance enable the flight to reach the intended destination with adequate reserve? These and other questions which relate to the aircraft form part of a pilot's assessment of the aircraft. Although many pilots already make such an assessment during the preflight planning, few recognize it as part of a risk assessment process.

In flight, the assessment needs to be done continuously since conditions change with time, even if nothing dramatic appears to be happening. For example, no matter what the flight circumstances, fuel is being burned every instant the engine runs. A safe pilot frequently compares the fuel on board with the fuel required to bring the plane to a safe landing at the intended destination or at a diversion airport.

Preflight

Environment

This risk element is wide-reaching and includes situations outside the aircraft which might limit, modify or affect the aircraft, pilot and operational elements. One environmental "risk-raiser" which pilots usually consider is weather. Considering the high involvement of weather in fatal general aviation accidents, this definitely deserves attention.

The regulations governing aircraft operations are another less obvious risk-raiser that should be considered; pilots must fly safely and legally in compliance with all applicable regulations. Another environmental aspect would be airports which may be used during the flight. Items such as density altitude, runway length, obstacles, landing aids, etc., must be considered before and during the flight.

Operation

The interaction of the pilot, aircraft and environment are influenced by the purpose of each flight operation. The three other risk elements must be evaluated in the context of the desirability of undertaking or continuing the flight as planned, e.g., pressure to arrive by a certain time, an advancing weather front, or fuel being consumed.

The passage of time can also be easily overlooked as a pilot sits in the cockpit totally involved in a problem, wondering how to cope with a worsening situation. If time is short or perceived to be short, impulsive and inappropriate actions may result. Time can complicate an already complex situation. The less time available, the greater the negative effect on the pilot.

Situation

The circumstances regarding a flight, when combined with the previous four risk elements, can increase the probability that an unsafe outcome will result. The combined effects of these risk elements lead into the overall situation which must be continuously evaluated. For example, a pilot feels pressured into keeping an appointment that is already scheduled, or return home from a trip after traveling for several days. The weather is marginal and not improving. After reassessing the first four risk elements the pilot decides to delay the flight, not allowing the pressure of the situation to lead into an unsafe outcome.

How Pilots Assess Risk

Within each of the five risk elements, the individual risks which accumulate are called "risk raisers" since they work to raise the level of risk for the flight. In assessing risk, pilots must be aware of the possibilities for risk accumulation so they can determine the need for neutralizing or balancing the risk raisers. Risk can be assessed in a number of ways. One way to become aware of risk in flying is to look at accident statistics. This can increase your awareness when evaluating the five risk elements during a particular flight.

Top Ten causes for all Fixed-wing Aircraft Accidents *(Source NTSB)*

1. Pilot - Failed to maintain directional control.
2. Undetermined.
3. Pilot - Failed to maintain airspeed.
4. Pilot - Misjudged distance.
5. Fuel exhaustion.
6. Pilot - Inadequate preflight preparation and/or planning.
7. Pilot - Selected unsuitable terrain.
8. Pilot - Inadequate aircraft preflight.
9. Pilot - Inadequate visual lookout.
10. Pilot - Misjudged airspeed.

Chapter 7

Recognizing Hazardous Attitudes

Attitude can be defined as a personal and motivational predisposition to respond to persons, situations, or events in a given manner. Studies have identified five hazardous attitudes that can interfere with the ability to make sound decisions and exercise authority properly.

The Five Attitudes

Anti-Authority: *"Don't tell me!"*
This thought is found in people who do not like anyone telling them what to do. They think, "Don't tell me!" They are saying, "No one can tell me what to do." These people may either be resentful of having someone tell them what to do, or may just 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.
Impulsivity: *"Do something--quickly!"*
This is the thought pattern 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--they do the first thing that comes to mind.
Invulnerability: *"It won't happen to me."*
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, but they never really feel or believe that they will be the one involved. Pilots who think this way are more likely to take chances and run unwise risks, thinking all the time, "It won't happen to me!"
Macho: *"I can do it."*
People who are always trying to prove that they are better than anyone else think, "I can do it!" They "prove" themselves by taking risks and by trying to impress others. While this pattern is thought to be a male characteristic, women are equally susceptible.
Resignation: *"What's the use?"*
People who think, "What's the use?" do not see themselves as making a great deal of difference in what happens to them. When things go well, they think, "That's good luck." When things go badly, they attribute it to bad luck or feel that someone is "out to get them." They leave the action to others--for better or worse. Sometimes, such individuals will even go along with unreasonable requests just to be a "nice guy."

The Five Antidotes

Hazardous attitudes can lead to poor decision making and actions that involve unnecessary risk. The pilot must examine decisions carefully to ensure that the choices made have not been influenced by hazardous attitudes and be familiar with positive alternatives to counteract the hazardous attitudes. These substitute attitudes are referred to as *antidotes*.
Anti-authority: *"Follow the rules. They are usually right."*
Impulsivity: *"Not so fast. Think first."*
Invulnerability: *"It could happen to me."*
Macho: *"Taking chances is foolish."*
Resignation: *"I'm not helpless. I can make a difference."*

Hazardous Attitude	Antidote
Anti-authority: Don't tell me.	Follow the rules. They are usually right.
Impulsivity: Do something quicky.	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.

Hazardous Attitudes and Antidotes

Chapter 8

Overview

This element of decision making refers to the effective management of all resources available to a flight crew and is a concept used in multi-person crews. Cockpit resource management emphasizes effective interpersonal communication among crew members and other resources that may be available.

Pilot Responsibility

When the government certifies a pilot, it grants that pilot the privilege to use public airspace and air navigation facilities. In accepting this privilege, the pilot is expected to adhere to the rules and refrain from any activities which might infringe on the rights and safety of others. The regulations require the pilot-in-command to be the final authority for the safe operation of an aircraft. Although the pilot should always conduct safe aircraft operations, his or her operation of the aircraft is influenced by events and conditions, some of which have nothing to do with aircraft operation, e.g., personal problems, controllers, weather, etc.

When licensed, a pilot is presumed to be responsible in behavior and is expected to use good judgment to understand and interpret the rules in individual situations. However, accident statistics indicate that pilots do not always fulfill that expectation. Nearly 85 percent of all general aviation accidents may be attributed in part, or in whole, to "pilot errors." To determine why pilots make these errors, it is useful to classify pilots' activities into three categories:

- ***Procedural activities*** - management of the power plant, fuel, aircraft configuration, autopilot, displays, navigation and communication.
- ***Perceptual-motor activities*** - aircraft control, judgment of distance, speed, altitude, hazard detection and geographic orientation.
- ***Decisional activities*** - self-assessment of skill, knowledge, physical and psychological capabilities, hazard assessment, navigation planning and flight priority adjustment.

Pilot-Induced Accidents

Below is an analysis of data for fatal and non-fatal accidents, attributed to pilot error during a five-year period. The data is divided into the three pilot activity categories mentioned above and the number and percentage of accidents in each category are listed below.

Category	**FATAL Accidents**	**NON-FATAL Accidents**
Decisional	2,940 (51.6%)	9,081 (35.1%)
Perceptual-motor	2,496 (43.8%)	14,561 (56.3%)
Procedural	264 (4.6%)	2,230 (8.6%)

The majority of fatal pilot-induced accidents (51.6%) are the result of decisional behavior, also known as cognitive judgment. Cognitive judgment describes the decisional activities involved in choosing a course of action from several alternatives.

Chapter 9

Overview

A popular belief is that good judgment is simply common sense applied to the making of decisions, especially correct ones. Sense involves an intense awareness, realization, and understanding of all the factors involved in making a decision. It is generally seen as a person's ability to act effectively and positively in any given situation.

The most significant aspect of pilot judgment and decision making is the *outcome*. Judgment is not an end in itself, but involves both a decision to act and a response--be it an action or inaction. Before taking action, pilots must consider all relevant interpersonal, aircraft and environmental factors which may or may not have an influence upon his or her decision making. Pilot judgment is thus a process which produces a thoughtful, considered decision relating to the aircraft's operation along with the ensuing, action/inaction, related to that decision.

ADM Defined

Aeronautical Decision Making 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.
- The ability to search for and establish the relevance of all available information regarding a flying situation, to specify alternative courses of action, and to determine expected outcomes from each alternative.
- The motivation to choose and authoritatively execute a suitable course of action within the time frame permitted by the situation. The word "suitable" means an alternative consistent with societal norms, and "action" includes no action, some action, or action to seek more information.

The first part of this definition refers to intellectual abilities. It relies on the pilot's capabilities to sense, store, retrieve and integrate information. This part of judgment is purely rational and if used alone, would allow problem solving in much the same manner as a computer.

The second part of the definition is where the decision is made and indicates that it can be affected by motivations and attitudes. It implies that pilot judgment is based in part on tendencies to use non-safety-related information when choosing courses of action. Pilots often consider non-safety items such as job demands, convenience, monetary gain, self-esteem, adventure, commitment, etc., before taking action. If properly developed, this part of pilot judgment would eliminate information unrelated to flight safety and direct the pilot's decision to the use of more rational processes.

The term "pilot error" is often used to describe an accident cause and is an oversimplification implying that the pilot intended to have an accident. Pilots usually intend to fly safely, but they sometimes make decisional errors. Their skill or luck is often sufficient to get them out of situations resulting from poor judgment (a term for the general concept of decisional errors). The objective of this manual is to teach flight instructors the techniques to avoid situations that require luck or skill greater than their capabilities. Good judgment means avoiding situations that require superior skill to overcome.

Decision-making Process

Conventional flight training prescribes the knowledge, experience, and skills necessary to conduct a flight within operational constraints. For the low-time pilot, the instructor attempts to teach good judgment, behavior, and performance through a set of limited, but supervised flight situations. In doing so, the flight instructor not only teaches the necessary aviation knowledge and skills required to execute specific flight maneuvers, but also encourages the student to apply previously learned knowledge and skills to subsequent situations. Since the student cannot be taught how to handle every possible situation he or she may encounter, the instructor tries to provide a representative range of learning experiences that the prospective pilot can later apply to similar situations.

As the novice pilot displays competence in training situations, there is an increase in ability to perform safely. In new situations, the pilot's decision will be based upon two considerations: what the pilot had previously learned which may be applicable to the new situation, and what the pilot chooses to consider as relevant information for arriving at a new decision while operating in unknown territory.

Normally, the need for a decision is triggered by a recognition that something has changed or an expected change did not occur. The search for recognition of change provides the opportunity to evaluate and control the change in order to produce a safe flight outcome.

Failure to search for or recognize change reduces the chance of controlling it. As time progresses the alternatives available may decrease, and the option to select the remaining alternatives may decrease until no option remains. For example, if a pilot elects to fly into hazardous weather, the alternative to circumnavigate that weather is automatically lost.

In the conventional decision making process, a change may indicate some action by the pilot is required. A change from normal events, from expected events or from desired events should alert the pilot to the action. There sometimes is a difference between what you expect to happen (implying certainty) and what you hope will happen (implying uncertainty). For example, you depart on a flight into marginal weather, hoping that conditions will improve.

The occurrence of change must be detected before a response can be selected. There can be instances when a change may remain undetected for some time. A good example is a pilot who fails to compare actual groundspeed with the planned groundspeed from the flight log. A change has occurred even though it is not detected until later when the situation becomes critical, and the aircraft runs low on fuel.

Selection of the proper response relies on a number of elements that affect every pilot’s level of situational awareness. These include a pilot's physical flying skills, knowledge, experience and training.

Experience and Training

Experience is practical knowledge, skill, or practice derived from direct observation of, or participation in, events or activities. We draw upon our experience every time we fly. Experience creates a mental file that helps pilots establish how to interpret conditions and events and how to respond to them. Instructors must provide a representative range of learning experiences that students can later apply to similar situations.

Many of the actions taken while flying are based on experience. Pilots constantly rely on experience to determine the correct action required for a given situation. In this way, experience allows them to solve problems quickly and therefore devote more time to other problems requiring their attention.

Many problems faced by pilots are solved before boarding the aircraft. By constantly reviewing emergency procedures, problems are solved simply by using experience to select the appropriate solution. The procedures associated with an engine failure on takeoff become automatic to the carefully trained pilot.

Experience and training are closely related. Training is more than simply an effort to perfect our systems knowledge and physical flying skills. Training is highly structured and represents the most efficient way to build experience.

However, conventional training programs tend to focus on skills and procedures (how to manipulate controls, performing the specific procedures for operating installed equipment, etc.) with only a minimal emphasis on decision-making ability or headwork. Unfortunately, headwork is often developed informally by listening to "hangar flying" sessions, and many times through narrow escapes (experience). In addition to this informal "training," better instructors and training programs always discuss previous accidents in the form of case studies so pilots can learn from the mistakes of others. Most of this training is intended to provide a systematic approach to improved decision-making and information management skills.

Inadequate skills and procedures or inadequate headwork in conventional decision-making leads to mishaps. Review of accident data reveals that there are several categories of pilot error. These include errors of *omission*--failing to do something one should have done, *commission*--doing something one should not have done, *timing errors*--doing something too soon or too late, and errors involving *degrees of response*--overreacting or underreacting. It is worth keeping these types of mistakes in mind when examining the decision making process.

Aeronautical decision-making builds upon the foundation of conventional decision-making, but modifies and enhances the process to decrease the probability of pilot error. ADM provides a structured approach to our reaction to change during a flight. This structured approach addresses all aspects of decision making in the cockpit and identifies the elements involved in good decision making. These include:

- Identifying personal attitudes which are hazardous to safe flight.
- Learning behavior modification techniques.
- Learning how to recognize and cope with stress.
- Developing risk assessment skills.
- Considering all resources available in a multi-crew situation.
- Evaluating the effectiveness of your ADM skills.

As in conventional decision-making, such decision-making skills start with recognition of change, assessment of impact/alternatives, decision to act (or not) and response.

Chapter 10

Overview

The instructor profoundly affects the student as a role model and as an opinion shaper. Instructor attitudes toward safe flying and toward this material may influence the student much more than actual flight training. Furthermore, instruction is greatly improved when the instructor acts as a coach and consistently uses effective educational principles.

Use of the decision-making concepts to guide conversations with the student focuses the instruction on judgment-related training and increases the student's ability to provide self-generated feedback upon which good judgment depends.

Knowing how to recognize and respond to hazardous attitudes and high stress is very important to exercising good pilot judgment. The instructor should encourage the student to develop these skills, but in doing so should never attempt to analyze or modify the student's personality.

The student learns concepts and behavioral techniques, then repeatedly applies this learning to relevant flight situations during ground and flight training. Through repeated reinforcement and continued student involvement this program builds new intellectual and behavioral habits. Continual practice which includes repetition, feedback, and positive reinforcement is essential to the success of this training program.

Are You Fit to Fly?

Assessing mental readiness to fly is an important part of your preflight. Just as important is to consider any physiological factors. Remember the acronym, I'M SAFE.

I'M SAFE Checklist

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