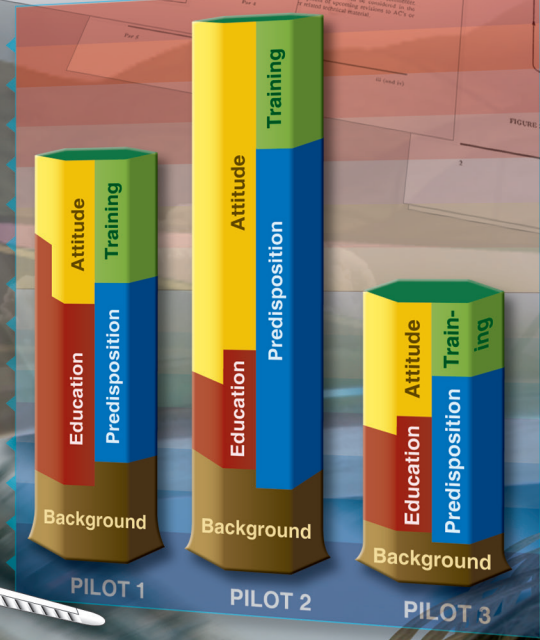
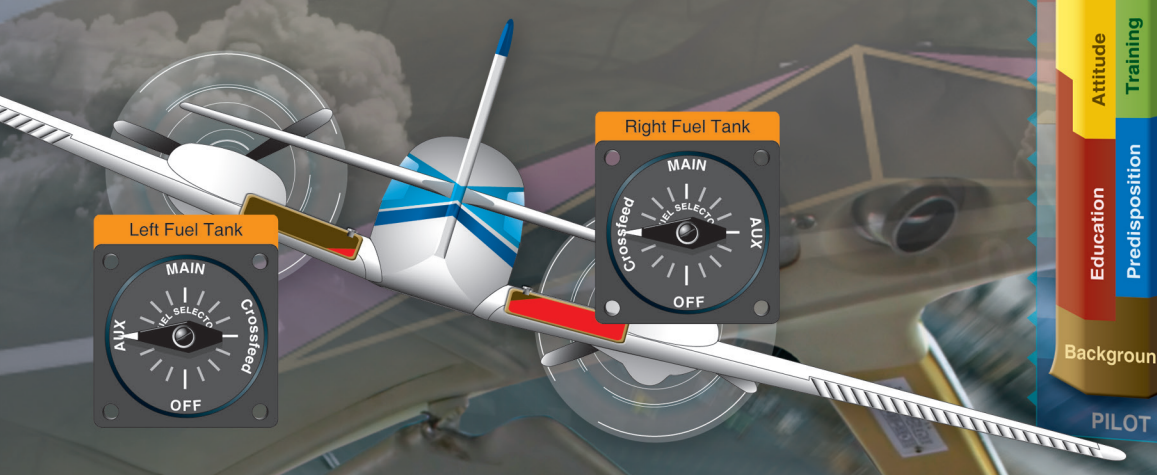
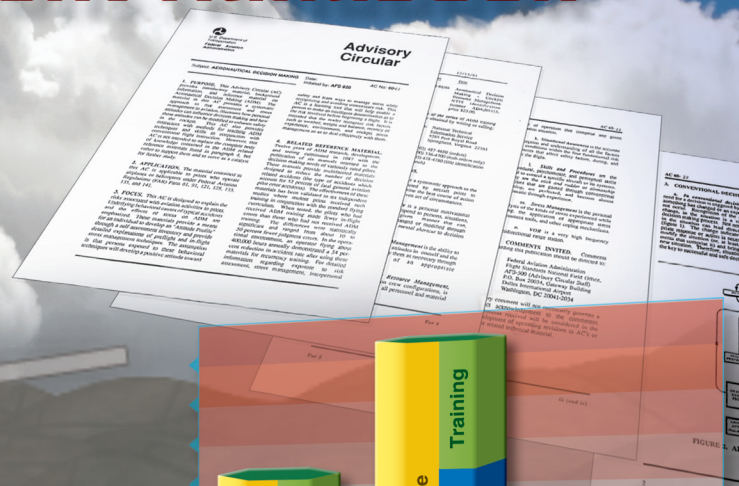


Risk Management Handbook



U.S. Department of Transportation
Federal Aviation Administration



Certification, Training, and Experience Summary	
Certification Level	
Certificate level (e.g., private, commercial, ATP)	
Ratings (e.g., instrument, multiengine)	
Endorsements (e.g., complex, high performance, high altitude)	
Training Summary	
Flight review (e.g., certificate, rating, Wings)	
Instrument Proficiency Check (e.g., certificate in airplane 1, checkout in airplane 2, in airplane 3)	

Risk Management Handbook

2009

Change 1 (January 2016)

U.S. Department of Transportation
FEDERAL AVIATION ADMINISTRATION
Flight Standards Service

Record of Changes

Change 1 (January 2016)

This is an updated version of FAA-H-8083-2, Risk Management Handbook, dated January 2016. This version contains error corrections, revised graphics, and updated performance standards. All pages containing changes are marked with the change number and change date in the page footer. The original pagination has been maintained so that the revised pages may be replaced in lieu of repurchasing or reprinting the entire handbook. The changes made in this version are as follows:

- Updated Table of Contents page numbers (page ix).
- Revised the bottom paragraph of the right column of page 1-2, "...which lists cloud clearance in Class E airspace as 1,000 feet below, 500 feet above, and 2,000 feet horizontally...": changed to "...which lists cloud clearance in Class E airspace as 1,000 feet above, 500 feet below, and 2,000 feet horizontally...."
- Revised Figure 1-1 (page 1-4): changed "nautical" to "statute."
- Revised the third sentence of the third paragraph in the left column of page 3-9: changed "access" to "assess."
- Revised the third paragraph of the right column of page 7-3 to include "or Airman Certification Standards (ACS)."
- Revised the first paragraph of the left column of page 7-4 to include "or Airman Certification Standards (ACS)."
- Revised the second paragraph of the right column of page 7-4 to include "...or ACS..."
- Revised the first paragraph on page 8-1 to include "or Airman Certification Standards (ACS)."
- Revised the Glossary (page G-1) to include a definition of "Airman Certification Standards (ACS)."
- Revised the Index (page I-1) to include "Airman Certification Standards (ACS)."

Table of Contents

Preface	iii	Airport	3-6
Introduction	v	Airspace.....	3-6
Acknowledgments	vii	Nighttime.....	3-6
Record of Changes	ix	Visual Illusions.....	3-7
Table of Contents	xi	E = External Pressures	3-9
Chapter 1		Chapter Summary	3-9
Defining Elements of Risk Management	1-1	Chapter 4	
Introduction.....	1-1	Assessing Risk	4-1
Hazard	1-2	Introduction.....	4-1
Defining Hazard.....	1-2	Quantifying Risk Using a Risk Matrix	4-2
Recognizing the Hazard.....	1-2	Likelihood of an Event.....	4-2
Tools for Hazard Awareness	1-3	Severity of an Event	4-2
Risk.....	1-5	Mitigating Risk.....	4-4
Defining Risk	1-5	Chapter Summary	4-4
Managing Risks	1-5	Chapter 5	
Chapter Summary	1-8	Aeronautical Decision-Making:	
Chapter 2		A Basic Staple	5-1
Human Behavior	2-1	Introduction.....	5-1
Introduction.....	2-1	History of ADM.....	5-2
Chapter Summary	2-5	Analytical Decision-Making.....	5-3
Chapter 3		Automatic Decision-Making.....	5-4
Identifying Hazards and Mitigating Risk	3-1	Operational Pitfalls	5-4
Introduction.....	3-1	Scud Running	5-6
P = Pilot in command	3-3	Get-There-Itis	5-6
The Pilot's Health.....	3-3	Continuing VFR into IMC	5-7
Stress Management.....	3-4	Loss of Situational Awareness	5-8
A = Aircraft	3-4	Flying Outside the Envelope.....	5-9
V = Environment.....	3-5	3P Model.....	5-9
Weather	3-5	Rate of Turn.....	5-10
Terrain	3-5	Radius of Turn.....	5-11
		Perceive	5-11
		Process.....	5-11
		Perform.....	5-13
		Chapter Summary	5-13

Chapter 6	
Single-Pilot	
Resource Management	6-1
Introduction.....	6-1
Recognition of Hazards.....	6-2
Use of Resources.....	6-6
Internal Resources	6-6
External Resources	6-7
SRM and the 5P Check	6-8
Plan	6-11
Plane	6-11
Pilot	6-11
Passengers	6-12
Programming	6-13
Chapter Summary	6-13

Chapter 7	
Automation.....	7-1
Introduction.....	7-1
Cockpit Automation Study	7-3
Realities of Automation	7-4
Enhanced Situational Awareness.....	7-6
Autopilot Systems.....	7-8
Familiarity	7-8
Respect for Onboard Systems	7-8
Reinforcement of Onboard Suites	7-8
Getting Beyond Rote Workmanship	7-8
Understand the Platform	7-8
Flight Management Skills.....	7-9
Automation Management	7-9
Information Management.....	7-9
Risk Management.....	7-10
Chapter Summary	7-10

Chapter 8	
Risk Management Training.....	8-1
Introduction.....	8-1
System Safety Flight Training	8-2
Setting Personal Minimums.....	8-3
Step 1—Review Weather Minimums.....	8-3
Step 2—Assess Experience and Comfort Level.....	8-3
Step 3—Consider Other Conditions.....	8-4
Step 4—Assemble and Evaluate	8-5
Step 5—Adjust for Specific Conditions	8-5
Step 6—Stick to the Plan!	8-6
Chapter Summary	8-6

Appendix A	
Personal Assessment and	
Minimums.....	A-1

Appendix B	
Sample Risk Management Scenarios.....	B-1

Appendix C	
CFIT Checklist.....	C-1

Glossary	G-1
-----------------------	------------

Index	I-1
--------------------	------------

Hazard

Defining Hazard

By definition, 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. It is a source of danger. Four common aviation hazards are:

1. A nick in the propeller blade
2. Improper refueling of an aircraft
3. Pilot fatigue
4. Use of unapproved hardware on aircraft

Recognizing the Hazard

Recognizing hazards is critical to beginning the risk management process. Sometimes, one should look past the immediate condition and project the progression of the condition. This ability to project the condition into the future comes from experience, training, and observation.

1. A nick in the propeller blade is a hazard because it can lead to a fatigue crack, resulting in the loss of the propeller outboard of that point. With enough loss, the vibration could be great enough to break the engine mounts and allow the engine to separate from the aircraft.
2. Improper refueling of an aircraft is a hazard because improperly bonding and/or grounding the aircraft creates static electricity that can spark a fire in the refueling vapors. Improper refueling could also mean fueling a gasoline fuel system with turbine fuel. Both of these examples show how a simple process can become expensive at best and deadly at worst.
3. Pilot fatigue is a hazard because the pilot may not realize he or she is too tired to fly until serious errors are made. Humans are very poor monitors of their own mental condition and level of fatigue. Fatigue can be as debilitating as drug usage, according to some studies.
4. Use of unapproved hardware on aircraft poses problems because aviation hardware is tested prior to its use on an aircraft for such general properties as hardness, brittleness, malleability, ductility, elasticity, toughness, density, fusibility, conductivity, and contraction and expansion.

If pilots do not recognize a hazard and choose to continue, the risk involved is not managed. However, no two pilots see hazards in exactly the same way, making prediction and standardization of hazards a challenge. So the question remains, how do pilots recognize hazards? The ability to recognize a hazard is predicated upon personality, education, and experience.

Personality

Personality can play a large part in the manner in which hazards are gauged. People who might be reckless in nature take this on board the flight deck. For instance, in an article in the August 25, 2006, issue of *Commercial and Business Aviation* entitled *Accident Prone Pilots*, Patrick R. Veillette, Ph.D., notes that research shows one of the primary characteristics exhibited by accident-prone pilots was their disdain toward rules. Similarly, other research by Susan Baker, Ph.D., and her team of statisticians at the Johns Hopkins School of Public Health, found a very high correlation between pilots with accidents on their flying records and safety violations on their driving records. The article brings forth the question of how likely is it that someone who drives with a disregard of the driving rules and regulations will then climb into an aircraft and become a role model pilot. The article goes on to hypothesize that, for professional pilots, the financial and career consequences of deviating from standard procedures can be disastrous but can serve as strong motivators for natural-born thrill seekers.

Improving the safety records of the thrill seeking type pilots may be achieved by better educating them about the reasons behind the regulations and the laws of physics, which cannot be broken. The FAA rules and regulations were developed to prevent accidents from occurring. Many rules and regulations have come from studying accidents; the respective reports are also used for training and accident prevention purposes.

Education

The adage that one cannot teach an old dog new tricks is simply false. In the mid-1970s, airlines started to employ Crew Resource Management (CRM) in the workplace (flight deck). The program helped crews recognize hazards and provided tools for them to eliminate the hazard or minimize its impact. Today, this same type of thinking has been integrated into Single-Pilot Resource Management (SRM) programs (see chapter 6).

Regulations

Regulations provide restrictions to actions and are written to produce outcomes that might not otherwise occur if the regulation were not written. They are written to reduce hazards by establishing a threshold for the hazard. An example might be something as simple as basic visual flight rules (VFR) weather minimums as presented in Title 14 of the Code of Federal Regulation (14 CFR) part 91, section 91.155, which lists cloud clearance in Class E airspace as 1,000 feet above, 500 feet below, and 2,000 feet horizontally with flight visibility as three statute miles. This regulation provides both an operational boundary and one that a pilot can use in helping to recognize a hazard. For instance, a VFR-only rated pilot faced with weather that is far below that of Class E airspace

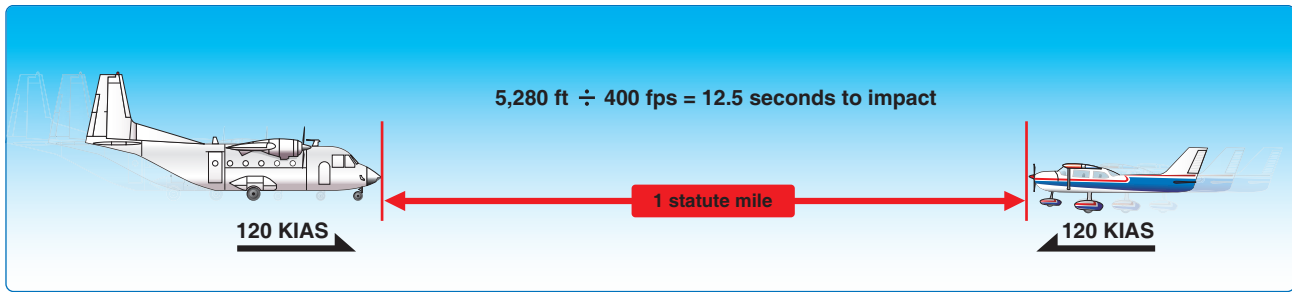


Figure 1-1. Head-on approach impact time.

Understanding the Dangers of Converging Aircraft

If a pilot sees an aircraft approaching at an angle and the aircraft's relationship to the pilot does not change, the aircraft will eventually impact. If an aircraft is spotted at 45° off the nose and that relationship remains constant, it will remain constant right up to the time of impact (45°). Therefore, if a pilot sees an aircraft on a converging course and the aircraft remains in the same position, change course, speed, altitude or all of these to avoid a midair collision.

Understanding Rate of Climb

In 2006, a 14 CFR part 135 operator for the United States military flying Casa 212s had an accident that would have been avoided with a basic understanding of rate of climb. The aircraft (flying in Afghanistan) was attempting to climb over the top ridge of a box canyon. The aircraft was climbing at 1,000 feet per minute (fpm) and about 1 mile from the canyon end. Unfortunately, the elevation change was also about 1,000 feet, making a safe ascent impossible. The aircraft hit the canyon wall about ½ way up the wall. How is this determined? The aircraft speed in knots multiplied by 1.68 equals the aircraft speed in feet per second (fps). For instance, in this case if the aircraft were traveling at about 150 knots, the speed per second is about 250 fps (150 x 1.68). If the

aircraft is a nautical mile (NM) (6,076.1 feet) from the canyon end, divide the one NM by the aircraft speed. In this case, 6,000 feet divided by 250 is about 24 seconds. [Figure 1-2]

Understanding the Glide Distance

In another accident, the instructor of a Piper Apache feathered the left engine while the rated student pilot was executing an approach for landing in VFR conditions. Unfortunately, the student then feathered the right engine. Faced with a small tree line (containing scrub and small trees less than 10 feet in height) to his front, the instructor attempted to turn toward the runway. As most pilots know, executing a turn results in either decreased speed or increased descent rate, or requires more power to prevent the former. Starting from about 400 feet without power is not a viable position, and the sink rate on the aircraft is easily between 15 and 20 fps vertically. Once the instructor initiated the turn toward the runway, the sink rate was increased by the execution of the turn. [Figure 1-3] Adding to the complexity of the situation, the instructor attempted to unfeather the engines, which increased the drag, in turn increasing the rate of descent as the propellers started to turn. The aircraft stalled, leading to an uncontrolled impact. Had the instructor continued straight

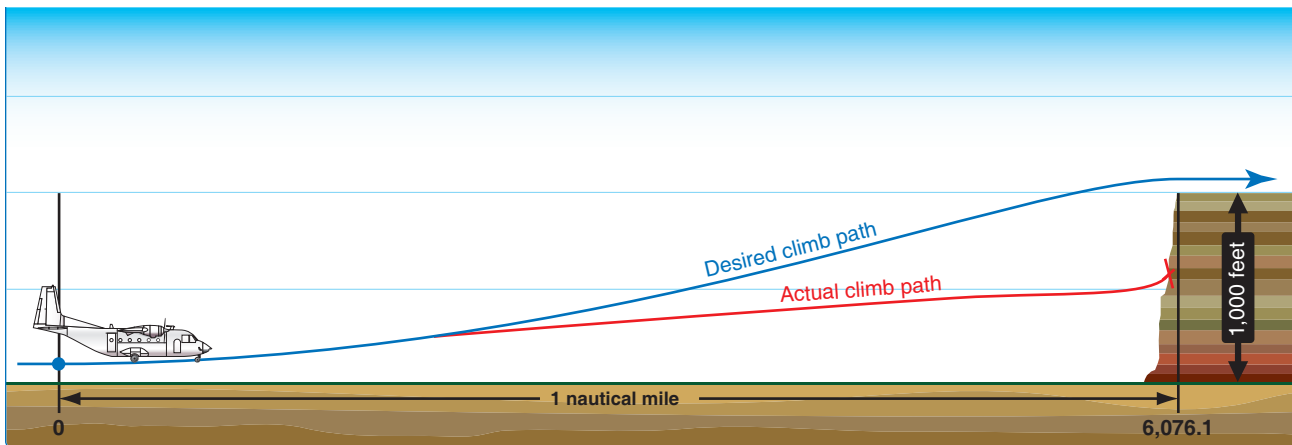


Figure 1-2. The figure above is a scale drawing of an aircraft climbing at 1,000 fpm, located 1 NM from the end of the canyon and starting from the canyon floor 1,000 feet below the rim. The time to cover 6,000 feet is 24 seconds. With the aircraft climbing at 1,000 fps, in approximately ½ minute, the aircraft will climb only 500 feet and will not clear the rim.

E = External Pressures

External pressures are influences external to the flight that create a sense of pressure to complete a flight—often at the expense of safety. Factors that can be external pressures include the following:

- Someone waiting at the airport for the flight’s arrival
- A passenger the pilot does not want to disappoint
- The desire to demonstrate pilot qualifications
- The desire to impress someone (Probably the two most dangerous words in aviation are “Watch this!”)
- Desire to satisfy a specific personal goal (“get-home-itis,” “get-there-itis,” and “let’s-go-itis”)
- A pilot’s general goal-completion orientation
- The emotional pressure associated with acknowledging that skill and experience levels may be lower than a pilot would like them to be. (Pride can be a powerful external factor.)

The following accident offers an example of how external pressures influence a pilot. Two pilots were giving helicopter demonstrations at an air show. The first pilot demonstrated a barrel roll in front of the stands. Not to be outdone, the second pilot (with passengers) decided to execute a hammerhead type maneuver. Flying past the stands at 90 knots, the pilot pulled the helicopter into a steep climb that ended at about 200 feet. When the speed dissipated to near zero, he rolled back to the ground in a nose-low attitude to regain airspeed with the obvious intention of pulling the aircraft out of the dive near the ground. An error in judgment led to the pilot being unable to pull the helicopter out of the dive. The helicopter struck the ground, killing all onboard.

The desire to impress someone can be a powerful external pressure, especially when coupled with the internal pressure of pride. Perhaps the pilot decided to perform a maneuver not in his training profile, or one in which he had not demonstrated proficiency. It appears there was nothing in this pilot’s experiences to help him effectively assess the high risk of this maneuver in an aircraft loaded with passengers. It is not uncommon to see people motivated by external pressures who are also driven internally by their own attitude.

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 other risk factors. External pressures place time-related pressure on the pilot and figure into a majority of accidents.

Helicopter Emergency Medical Service (HEMS) operations, unique due to the emergency nature of the mission, are an example of how external pressures influence pilots. Emergency medical services (EMS) pilots often ferry critically ill patients, and the pilot is driven by goal completion. In order to reduce the effect of this pressure, many EMS operators do not to notify the EMS pilot of the prospective patient’s condition, but merely confine the location of the patient pickup and restrict the pilot’s decision-making role to the response to the question “Can the pickup and transportation to the medical care center be made safely?” Risking three or four lives in an attempt to save one life is not a safe practice.

The use of personal standard operating procedures (SOPs) is one way to manage external pressures. The goal is to supply a release for the external pressures of a flight. These procedures include, but are not limited to:

- Allow time on a trip for an extra fuel stop or to make an unexpected landing because of weather.
- Have alternate plans for a late arrival or make backup airline reservations for must-be-there trips.
- For really important trips, plan to leave early enough so that there would still be time to drive to the destination.
- Advise those who are waiting at the destination that the arrival may be delayed. Know how to notify them when delays are encountered.
- Manage passenger expectations. Ensure passengers know that they might not arrive on a firm schedule, and if they must arrive by a certain time, they should make alternative plans.
- Eliminate pressure to return home, even on a casual day flight, by carrying a small overnight kit containing prescriptions, contact lens solutions, toiletries, or other necessities on every flight.

The key to managing external pressure is to be ready for and accept delays. Remember that people get delayed when traveling on airlines, driving a car, or taking a bus. The pilot’s goal is to manage risk, not increase it.

Chapter Summary

Risk can be identified and mitigated by using checklists such as PAVE and IMSAFE. Accident data offers the opportunity to explain how pilots can use risk management to increase the safety of a flight.

More pilots now rely on automated flight planning tools and electronic databases for flight planning rather than planning the flight by the traditional methods of laying out charts, drawing the course, identifying navigation points (assuming a visual flight rules (VFR) flight), and using the pilot's operating handbook (POH) to figure out the weight and balance and performance charts. Whichever method a pilot chooses to plan a flight, it is important to remember to check and confirm calculations.

Most of the aviation community believes automation has made flying safer, but there is a fear that pilots fail to see that automation is a double-edged sword. Pilots need to understand the advantages of automation while being aware of its limitations. Experience has shown that automated systems can make some errors more evident while sometimes hiding other errors or making them less obvious. In 2005, the British Airline Pilots Association (BALPA) raised concerns about the way airline pilots are trained to depend upon automation. BALPA felt the current training leads to a lack of basic flying skills and inability to cope with an inflight emergency, especially mechanical failures. The union believes passenger safety could be at risk.

Cockpit Automation Study

Concerns about the effect of automation on flight skills are not new. In 1995, the erosion of manual flight skills due to automation was examined in a study designed by Patrick R. Veillette and R. Decker. Their conclusions are documented in "Differences in Aircrew Manual Skills and Automated and Conventional Flightdecks," published in the April 1995 edition of the Transportation Research Record, an academic journal of the National Research Council. In the February 2006 issue of Business and Commercial Aviation (BCA), Dr. Patrick R. Veillette returned to this topic in his article "Watching and Waning."

The Veillette-Decker seminal study on automation came at a time when automated flight decks were entering everyday line operations and concern was growing about some of the unanticipated side effects. Deterioration of basic pilot skills was one of these concerns. While automation made the promise of reducing human mistakes, in some instances it actually created larger errors. When this study was undertaken, the workload in an automated flight deck in the terminal environment actually seemed higher than in the older conventional flight decks. At other times, automation seemed to lull the flight crews into complacency. Fears arose that the manual flying skills of flight crews using automation

deteriorated due to an overreliance on computers. In fact, BALPA voiced a fear that has dogged automation for years: that pilots using automation have less "stick and rudder" proficiency when those skills were needed to resume direct manual control of the aircraft.

Thus, the Veillette-Decker study sought to determine what, if any, possible differences exist in manual flight skills between aircrews assigned to conventional and automated flight decks. Limited to normal and abnormal operations in terminal airspace, it sought to determine the degree of difference in manual flying and navigational tracking skills. Commercial airline crew members flying the conventional transport aircraft or the automated version were observed during line-oriented flight training.

The data set included various aircraft parameters such as heading, altitude, airspeed, glideslope, and localizer deviations, as well as pilot control inputs. These were recorded during a variety of normal, abnormal, and emergency maneuvers during 4-hour simulator sessions. All experimental participants were commercial airline pilots holding airline transport pilot certificates. The control group was composed of pilots who flew an older version of a common twin-jet airliner equipped with analog instrumentation. The experimental group was composed of pilots who flew newer models of that same aircraft equipped with a first generation electronic flight instrument system (EFIS) and flight management system (FMS).

When pilots who had flown EFIS for several years were required to fly various maneuvers manually, the aircraft parameters and flight control inputs clearly showed some erosion of flying skills. During normal maneuvers, the EFIS group exhibited somewhat greater deviations than the conventional group. Most of the time, the deviations were within the Practical Test Standards (PTS) or Airman Certification Standards (ACS), but the pilots definitely did not keep on the localizer and glideslope as smoothly as the conventional group. The differences in hand-flying skills between the two groups became more significant during abnormal maneuvers such as steeper than normal visual approaches (slam-dunks).

Analysis of the aircraft data consistently had pilots of automated aircraft exhibit greater deviations from assigned courses and aircraft state parameters, and greater deviations from normal pitch and bank attitudes, than the pilots of conventional flight deck aircraft. *[Figure 7-2]* The most

significant differences were found to occur during the approach and landing phases. It is industry practice to tolerate very little air speed deviation from the recommended value during approach and landing. The FAA's Practical Test Standards (PTS) or Airman Certification Standards (ACS) for the airline transport rating allow a final approach speed of no more than five knots faster than recommended.

Another situation used in the simulator experiment reflected real world changes in approach that are common and can be assigned on short notice. While a pilot's lack of familiarity with the EFIS is often an issue, the approach would have been made easier by disengaging the automated system and manually flying the approach.

The emergency maneuver, engine-inoperative instrument landing system (ILS) approach, continued to reflect the same performance differences in manual flying skills between the two groups. The conventional pilots tended to fly raw data and when given an engine failure, they performed it expertly. When EFIS crews had their flight directors disabled, their eye scan began a more erratic searching pattern and their manual flying subsequently suffered. According to Dr. Veillette's 2005 article, those who reviewed the data "saw that the EFIS pilots who better managed the automation also had better flying skills."

While the Veillette-Decker study offers valuable information on the effects of cockpit automation on the pilot and crew, experience now shows that increased workloads from advanced avionics results from the different timing of the manual flying workloads. Previously, the pilot(s) were busiest during takeoff and approach or landing. With the demands of automation programming, most of the workloads have been moved to prior to takeoff and prior to landing. Since Air Traffic Control (ATC) deems this the most appropriate time to notify the pilot(s) of a route or approach change, a flurry of reprogramming actions occurs at a time when management of the aircraft is most critical.

Reprogramming tasks during the approach to landing phase of flight can trigger aircraft mishandling errors that in turn snowball into a chain of errors leading to incidents or accidents. It does not require much time to retune a VOR for a new ILS, but it may require several programming steps to change the ILS selection in an FMS. In the meantime, someone must fly or monitor and someone else must respond to ATC instructions. In the pilot's spare time, checklists should be used and configuration changes accomplished and checked. Almost without exception, it can be stated that the faster a crew attempts to reprogram the unit, the more errors will be made.

Since publication of the Veillette-Decker study, increasing numbers of GA aircraft have been equipped with integrated advanced program avionics systems. These systems can lull pilots into a sense of complacency that is shattered by an inflight emergency. Thus, it is imperative for pilots to understand that automation does not replace basic flying skills. Automation adds to the overall quality of the flight experience, but it can also lead to catastrophe if not utilized properly. A moving map is not meant to substitute for a VFR sectional or low altitude en route chart. When using automation, it is recommended pilots use their best judgment and choose which level of automation will most efficiently do the task, considering the workload and situational awareness.

Pilots also need to maintain their flight skills and ability to maneuver aircraft manually within the standards set forth in the PTS or ACS. It is recommended that pilots of automated aircraft occasionally disengage the automation and manually fly the aircraft to maintain stick-and-rudder proficiency. In fact, a major airline recommends that their crews practice their instrument approaches in good weather conditions and use the autopilot in the bad weather conditions and monitor the flight's parameters.

More information on potential automation issues can be found at the flight deck automation issues website: www.flightdeckautomation.com. This website includes a searchable database containing over 1,000 records of data that support or refute 94 issues with automated flying.

Realities of Automation

Advanced avionics offer multiple levels of automation from strictly manual flight to highly automated flight. No one level of automation is appropriate for all flight situations, but in order to avoid potentially dangerous distractions when flying with advanced avionics, the pilot must know how to manage the course deviation indicator (CDI), navigation source, and the autopilot. It is important for a pilot to know the peculiarities of the particular automated system being used. This ensures the pilot knows what to expect, how to monitor for proper operation, and promptly take appropriate action if the system does not perform as expected.

For example, at the most basic level, managing the autopilot means knowing at all times which modes are engaged and which modes are armed to engage. The pilot needs to verify that armed functions (e.g., navigation tracking or altitude capture) engage at the appropriate time. Automation management is another good place to practice the callout

Chapter 8

Risk Management Training

Introduction

When introducing system safety to instructor pilots, the discussion invariably turns to the loss of traditional stick and rudder skills. The fear is that emphasis on items such as risk management, aeronautical decision-making (ADM), single-pilot resource management (SRM), and situational awareness detracts from the training that is so necessary in developing safe pilots. Also, because the Federal Aviation Administration's (FAA) current Practical Test Standards (PTS) or Airman Certification Standards (ACS) place so much emphasis on stick-and-rudder performance, there is concern that a shifting focus would leave flight students unprepared for that all-too-important check ride.



Experience and "Comfort Level" Assessment			
IFR & LIFR			
Weather Condition	IFR		LIFR
	Ceiling	500-999	< 500
Day	800	—	
	999	—	
Night	1-3 miles	< 1 mile	
	1 mile	—	
	3 miles	—	

Experience and "Comfort Level" Assessment			
Performance Factors			
	SE	ME	Make/Model
Performance	2,500	4,500	
Shortest runway	6,000	3,000	
Highest terrain	3,000	3,000	
Highest density altitude			

Certification, Training, and Experience Summary	
Certification Level	
Certificate level	(e.g., private, commercial, ATP)
Ratings	(e.g., instrument, multiengine)
Endorsements	(e.g., complex, high performance, high altitude)
Training Summary	
Rating, Wings	Check
airplane 1	
airplane 2	
airplane 3	
equipment	
instructors, autopilot)	
Experience	
Total flight time	
Years of flying experience	
Recent Experience (last 12 months)	
Hours	
this airplane	

If you are facing	Adjust baseline personal minimums by
Pilot Illness, use of medication, stress, or fatigue; lack of currency (e.g., have not flown for several weeks)	Add At least 500 feet to ceiling
Aircraft An unfamiliar airplane or an aircraft with unfamiliar avionics or other equipment.	Add At least 1/2 mile to visibility
enVironment Unfamiliar airports and airspace; different terrain or other unfamiliar characteristics	Subtract At least 500 feet to runway length
External Pressures "Must meet" deadlines, pressures from passengers, etc.	Subtract At least 5 knots from winds

Glossary

14 CFR. See Title 14 of the Code of Federal Regulations.

Acceptable risk. That part of identified risk that is allowed to persist without further engineering or management action. Making this decision is a difficult yet necessary responsibility of the managing activity. This decision is made with full knowledge that it is the user who is exposed to this risk.

ADM. See aeronautical decision-making.

Aeronautical decision-making. A systematic approach to the mental process used consistently by pilots to 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.

Aerodynamics. The science of the action of air on an object, and with the motion of air on other gases. Aerodynamics deals with the production of lift by the aircraft, the relative wind, and the atmosphere.

Aircraft. A device that is used, or intended to be used, for flight.

A/FD. See Airport/Facility Directory.

Airman Certification Standards. A holistic, integrated presentation of specific knowledge, skills, and risk management elements and performance metrics for each Area of Operation and Task. The ACS defines what an applicant must know, consider, and do to pass the knowledge and practical tests for a certificate or rating.

Airplane Flight Manual (AFM). A document developed by the airplane manufacturer and approved by the Federal Aviation Administration (FAA). It is specific to a particular make and model airplane by serial number, and it contains operating procedures and limitations.

Airport/Facility Directory (A/FD). An FAA publication containing information on all airports, communications, and NAVAIDs.

ATC. Air Traffic Control.

Attitude management. The ability to recognize hazardous attitudes in oneself and the willingness to modify them as necessary through the application of an appropriate antidote thought.

Automated Surface Observing System (ASOS). Weather reporting system which provides surface observations every minute via digitized voice broadcasts and printed reports.

Automated Weather Observing System (AWOS). Automated weather reporting system consisting of various sensors, a processor, a computer-generated voice subsystem, and a transmitter to broadcast weather data.

Automatic terminal information service (ATIS). The continuous broadcast of recorded non-control information in selected terminal areas. Its purpose is to improve controller effectiveness and relieve frequency congestion by automating repetitive transmission of essential but routine information.

Autopilot. An automatic flight control system that keeps an aircraft in level flight or on a set course. Automatic pilots can be directed by the pilot, or they may be coupled to a radio navigation signal.

Aviation medical examiner (AME). A physician with training in aviation medicine designated by the Civil Aerospace Medical Institute (CAMI).

Aviation Routine Weather Report (METAR). Observation of current surface weather reported in a standard international format.

AWOS. See Automated Weather Observing System.

Checklist. A tool that is used as a human factors aid in aviation safety. It is a systematic and sequential list of all operations that must be performed to accomplish a task properly.

Index

Symbols

3P model5-10
5P check6-8

A

accident prone pilot.....2-2
Advisory circular (AC)3-8
Aeronautical decision-making (ADM) 5-1, 6-1
Aircraft.....3-4
Airman Certification Standards (ACS)..... 7-3, 7-4, 8-1
Airport.....3-6
Airspace3-6
Air traffic control (ATC)6-2
Analytical decision-making5-3
Automated flight service stations (AFSS)6-2
Automatic decision-making.....5-3
Automatic Terminal Information Service (ATIS)6-6
Automation7-1
 Management7-9
Autopilot Systems.....7-8

B

Baune, Helen B.2-2

C

Checklists6-7
Cockpit Automation Study7-3
Controlled flight into terrain (CFIT)..... 2-4, 6-1, 8-2
Course deviation indicator (CDI).....7-4
Crew resource management (CRM) 2-4, 6-1

D

Decision-making 1-6, 5-3, 6-10
Decker, R.7-3

E

Electronic flight display (EFD)..... 7-1, 7-8
Electronic flight instrument system (EFIS)7-3
Environment..... 3-1, 3-5
External pressures 3-1, 3-8
External resources6-8

F

Familiarity.....7-8
Federal Aviation Administration (FAA)..2-2, 2-3, 5-2, 8-1
Flight management skills7-9
Fuller, Elizabeth Mechem.....2-2

G

Global Navigation Satellite System (GNSS)7-6
Global positioning system (GPS).....7-1

H

hazard..... 1-1, 1-2, 3-4, 4-1, 5-1, 6-1, 6-2
helicopter emergency medical services (HEMS)... 3-9, 4-2
Helmreich, Robert L.2-4
Human
 behavior2-2
 error2-5
 factors related2-2
 performance.....2-1
Hypoxia.....6-10

I

IMSAFE checklist..... 3-3, 6-4
Information management7-9
Instrument flight rules (IFR).....3-5
Instrument landing system (ILS)3-6
Internal resources6-6

M

Maximum elevation figures (MEF)3-5
Mitigating risk.....4-4
Multifunction flight display (MFD).....7-1

N

National Airspace System (NAS)6-8
National Transportation Safety Board (NTSB) 4-2, 6-4
Naturalistic decision-making5-3
Nighttime3-6
Notices to Airmen (NOTAM)..... 3-6, 6-8