



Commercial Pilot Ground School

Day 16
Decision Making



Agenda

- Aeronautical Decision Making
- Commercial Operation
- Applying the Decision Making Process
- CRM
- PIC Responsibility
- Crew Relationships
- Communication
- Barriers to Effective Communication
- Resource Use, Internal and External
- Workload Management
- Planning and Preparation
- Prioritizing
- Situational Awareness
- CFIT
- ACS review

Commercial Decision Making

No matter what your reasons are for pursuing a commercial pilot certificate, the additional knowledge you acquire during commercial training will make you a more competent pilot. The advanced skills and experience that you gain will hone your decision-making abilities and enhance your flight safety.

Here we will explore decision making from the perspective of a pilot flying for a commercial operation; however, the decision-making skills involved are essential for all pilots. Since commercial operations are often conducted under IFR.



Commercial Operations

As a commercial pilot, decision making can be complex as you balance public perceptions of aviation, your company's schedule, and your desire to conduct safe flight operations. Previously, your motivation to fly safely was based on your own personal expectations. Now, you have passengers and company personnel to consider when you make choices regarding each flight. You also may rely upon flying for your income, and this could impinge upon your ability to make sound decisions if you are not conscientious.



Commercial Operations

- Your priority as pilot in command is to stay focused on the continuous safety of the flight. You may need to make the sometimes difficult and unpopular choice to cancel a flight or divert to an alternate.
- You assume this responsibility when you contract to work for a commercial operator, so you should fully research such concerns before you accept a position with a particular company.
- A conscientious employer will factor in these issues as a part of doing business. You should never make an inflight decision based on whether it will affect your career.



Commercial Operations

- In addition to the demands of your employer, you may encounter changing personal expectations. By obtaining your commercial certificate, you have developed a higher level of skill, but along with this skill may come the temptation to take more risks.
- Although it is true you possess a greater level of expertise than you did earlier in your training, the increased knowledge and practiced judgment that you have gained throughout your flying career should keep you from having to exercise extraordinary flying skills.
- To make effective decisions, you must stay honest with yourself about your capabilities and limitations, and those of your aircraft.





Applying the Decision Making Process

By now, you have applied the decision-making process many times as pilot in command. With experience, you become more adept at making effective choices and reducing the risks associated with each flight. Each step in the decision-making process is critical to making sound inflight judgments.

DECIDE MODEL

- D**etect the fact that a change has occurred.
- E**stimate the need to counter or react to the change.
- C**hoose a desirable outcome for the success of the flight.
- I**dentify actions which could successfully control the change.
- D**o the action necessary to adapt to the change.
- E**valuate the effect of the action.

Applying the Decision Making Process

The ability to gather and interpret information becomes essential during aeronautical decision making. This is illustrated by research which separated crews flying simulators into higher and lower performing groups for comparison.

During emergency situations, the higher performing crews engaged in more information gathering, monitoring, and planning. These crews requested significantly more data, such as weather conditions, from ATe. In addition, to allow more time for making decisions and accomplishing necessary tasks, higher performance crews requested ATC assistance in the form of radar vectors and clearances for holding or long final approaches.



Crew Resource Management

Crew resource management (CRM) training is in part responsible for the marked increase in the safety of Part 121 operations. New regulatory requirements outline similar programs for certain Part 135 operators, as the FAA has recognized the success of CRM training.

The investment in CRM training is no longer viewed as a luxury, but as an important part of all pilot training. If your company does not provide CRM training or you would like to prepare in anticipation of working in a crew environment, you should consider attending a CRM workshop conducted at a local college or flight school. If this is not possible, you may practice inflight scenarios with other pilots.



Pilot in Command Responsibility

You may feel a great deal of pride when you obtain your first job as a commercial pilot, but with the job comes the responsibility to fly as a professional. As pilot in command of an airplane in a commercial operation, you remain the final authority as to the safe conduct of each flight. However, you will share some of the decisions with management and crew as to where, how, and when each flight will take place.



Pilot in Command Responsibility

You may be required to refer to an flight operations manual, which outlines company procedures regarding such elements as crew member duties and responsibilities, enroute flight, navigation and communication, weight limitations, emergencies, operating in hazardous weather, and obtaining aircraft maintenance, as well as many other company operations.



Pilot in Command Responsibility

The flight operations manual also includes the operations specifications, or ops specs, which are the conditions under which your company must operate in order to retain approval from the FAA. Ops specs include information such as the authorized areas of operations, aircraft, crew complements, types of operations (IFR, VFR, day, night, etc.), and any other pertinent information.



Crew Relationships

- If you pursue a career as a pilot, you most likely will transition from acting as sole authority in the cockpit to operating as part of a crew.
- While some airplanes require a second officer to operate and monitor the airplane's systems, your first experience in the crew environment normally is as the first officer, or second in command.



Crew Relationships

- Although the captain has the final authority as pilot in command, your experience and skill are a vital part of the cockpit resources. In certain situations, you may have information that the captain does not possess which is essential to the safety of the flight.
- You should voice your opinions in a respectful yet confident manner, and express your concern regarding any practices you deem unsafe.
- Depending on the procedures specified by your employer, you should expect to fly the airplane roughly 50% of the time that you are in the cockpit, so you can maintain proficiency and gain the experience necessary to eventually act as PIC.



Crew Relationships

- When you make the transition to the left seat, you should provide leadership and exercise authority in a manner which encourages and supports an open exchange of opinions. Since it is your responsibility to provide direction for the other crew members, you must be assertive in your actions.
- However, you must be careful to avoid a domineering attitude. By allocating duties, as well as soliciting and accepting feedback from crewmembers, you will facilitate a professional and effective working environment.



Communication

Effective cockpit communication is the cornerstone of safe commercial crew operations. When you fly as a single pilot, you are in charge of all duties during the flight, and your only communication generally is with ATC. In two-pilot crew operations, each person is responsible for completing specific tasks, and you both need to be informed of the other's actions. You also need to be able to discuss upcoming procedures and any problems that may arise.



Communication

- One way to facilitate effective communication is through departure and approach briefings. Before takeoff, you should go over the proposed departure routing, either given by ATC or through published procedures.
- Determine who will be the pilot flying (PF) and who will be the pilot not flying (PNF). The PF generally is in charge of manipulating the controls, while the PNF is responsible for communication with ATC and navigation.
- During the departure briefing you should note any obstructions or terrain which may be a factor on climbout. Depending on the situation, an approach briefing might include a discussion of terrain features, minimum altitudes to be used and an approach chart review if an IAP is necessary.



Barriers to Effective Communication

You can avoid a breakdown in communication with crew members by recognizing some of the barriers to effective communication that exist in the commercial environment. These problems include failing to establish open communication with crewmembers, misunderstanding and conflict in the cockpit, and the distraction caused by nonessential conversation.



Barriers to Effective Communication

Of these barriers, failing to establish communication may be the easiest to correct. By simply knowing that you need to keep an open dialogue in the cockpit, you can reasonably ensure that one will exist. Both pilots should be included in critical decisions when possible, not just in emergencies, but in routine practices such as programming electronic equipment and setting autopilot functions.



Barriers to Effective Communication

Anytime you change a course, or enter a new frequency or identifier into onboard equipment, you should verify the process out loud with the other crew. Both crewmembers should feel comfortable to question, scrutinize, or investigate any discrepancies which may arise during the flight and should feel an obligation to express reservations about a current or planned course of action. It is the pilot-in-command's responsibility to seek out viewpoints from the second in command and to listen to alternative courses of action.



Barriers to Effective Communication

You may have the opportunity to fly with wide variety of pilots who have had different training experiences than yours. To avoid misunderstandings, listen carefully to your fellow crew members, and clarify any procedures or instructions that you do not understand. Although you may try to maintain a positive environment, at times, conflict is inevitable. Crewmembers enter the cockpit with their own expectations and biases.



Barriers to Effective Communication

Whether actual or perceived, differences in thoughts, opinions, values, or actions can lead to disagreements. Conflict can reveal unexpressed thoughts or feelings which may have been adversely affecting performance, and successful conflict resolution can strengthen team effectiveness. However, if steps are not taken to resolve conflict, the atmosphere in the cockpit can degrade to a point where effective communication is impossible and the safety of flight is at risk.



Barriers to Effective Communication

Another barrier to effective communication occurs when a flight crew's attention is diverted by conversation unrelated to the tasks at hand. A significant number of accidents have occurred when the crews were engaged in unnecessary dialogue and overlooked important procedures or checklist items, such as setting the flaps properly for takeoff or extending the landing gear. To help prevent these types of accidents, the FAA issued FAR 121.542 and FAR 135.100. Commonly referred to as the sterile cockpit rule, these FARs specifically prohibit crewmember performance of nonessential duties or activities while the aircraft is involved in taxi, takeoff, landing, and all other flight operations conducted below 10,000 feet MSL, except cruise flight.



Resource Use

The amount of resources available to you most likely will multiply when you work as a professional pilot. Depending upon the type of operations your company conducts, you may have more advanced aircraft equipment, additional crewmembers in the cockpit or cabin, and more personnel on the ground to support each flight. The efficiency of the flight depends on your ability to effectively utilize these resources.



Internal Resources

- Your first experience with a more complex aircraft may come during your commercial training. A thorough understanding of the systems and operation of all equipment on board the aircraft is crucial to flight safety.
- A number of systems are considered vital to safe commercial operations, and their use is required during certain stages of flight under FAR Parts 121, 125, or 135.
- For example, the use of an autopilot is required for certain aircraft to be operated under IFR with a single pilot, as stated in FAR 135.105.



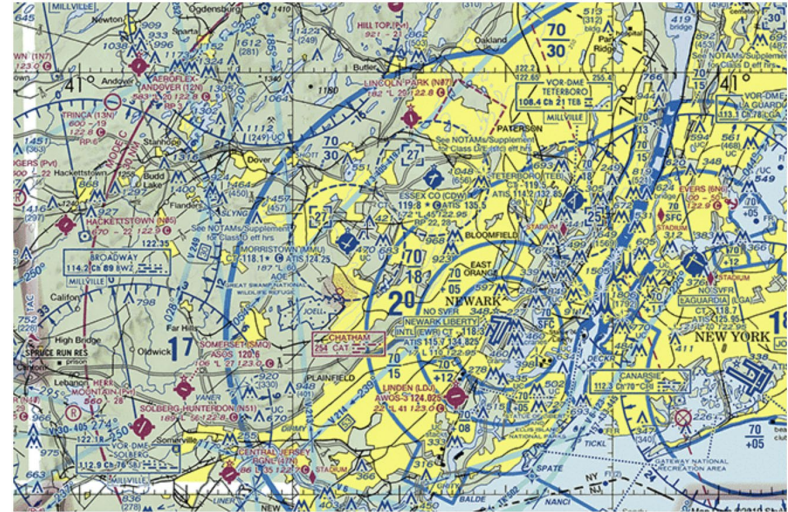
Internal Resources

The autopilot frees you from holding the aircraft on a heading and altitude during cruise, and, when coupled with a navigation system, responds to course changes as programmed into the system. You can simply monitor the system to ensure that the course is correct, a task that is far less physically demanding than hand-flying the airplane.



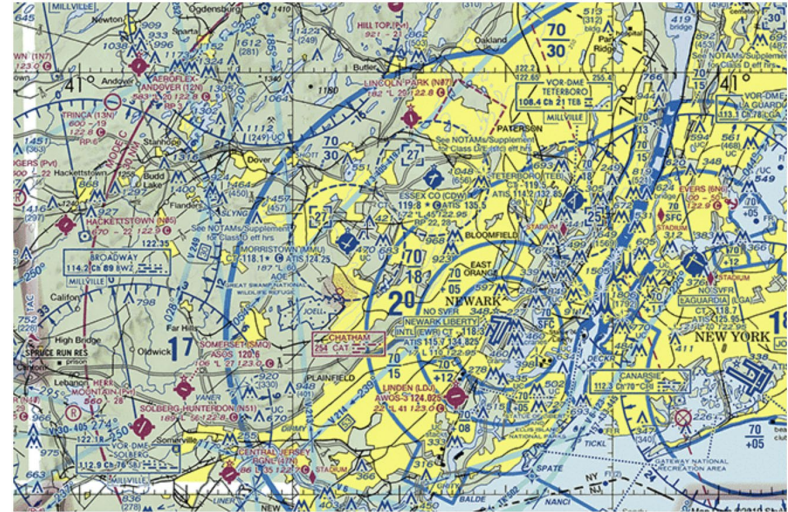
Internal Resources

Another resource to consider is your company's supply of aeronautical charts. For VFR operations, you should be provided with the appropriate sectional and terminal area charts for the region in which you fly. You should also consider carrying IFR charts, even if you are not approved for IFR operations. In an emergency, they could prove invaluable.



Internal Resources

If you conduct IFR operations, there should be at least one set of charts for the region on board the airplane, and though it is standard for crews to rely on one chart between two pilots, you may want to carry a second set. Whether you use Jeppesen or FAA charts, make sure that updates are completed on schedule, so that you are not caught in IFR conditions with outdated charts.



External Resources

Being a professional pilot often means that others are available to take over some of the duties that you normally did as a private pilot. Your company may employ dispatch personnel, who are responsible for planning the trip and collecting weather information for your route of flight. Company maintenance technicians can answer questions about aircraft systems and, if a company frequency is established, aid you during an inflight emergency.



External Resources

You may have baggage handlers to load the airplane and gate personnel to assist with passengers. Though these people are there so that you can focus on flying the airplane, you still are responsible as PIC to check all weather, route, and airport information concerning the flight, as well as ensure the aircraft is airworthy.



Workload Management

In a crew that is functioning efficiently, workload is divided between the pilots so that every necessary task is accomplished even during the highest workload periods. However, you need to remain vigilant to ensure that one pilot is not doing too much and excluding the other pilot from sharing the workload. By managing workload so that it does not become excessive, you can avoid situations that lead to cockpit stress.



Planning and Preparation

If you work for a large commercial operation, much of your preflight workload is assumed by other personnel, but you should not use their presence as an excuse to become complacent. Your job may shift from one of doing the actual flight planning to one of supervising and ensuring that the information presented to you is timely and correct.



Planning and Preparation

You can also focus on rehearsing the flight, and preparing for any contingencies that may arise. When you work for a smaller company, however, your preflight workload may increase above what you were responsible for as a private pilot. In addition to the normal required preflight duties, you may also be responsible for preparing a load manifest, if you fly multi-engine aircraft.

The load manifest lists the number of passengers, the origin and destination of the flight, the registration number of the airplane, weight and balance information, and center of gravity limits.



Planning and Preparation

Because of the high demand on your time, you need to be organized and familiar with your current aircraft and operation. FAR Parts 121 and 135 list specific flight time limitations and rest requirements for flight crews. In addition to specifying the maximum number of hours pilots can be scheduled to fly in a given time period, these regulations limit the amount of time a pilot can be on duty without a rest period.



Prioritizing

You are experiencing the hurry-up syndrome when your performance is degraded by a perceived or actual need to hurry or rush tasks or duties for any reason. For commercial operations, errors caused by rushing are most likely to occur in high workload operational phases, especially during preflight and taxi.

Understanding
the problem

Assessing the
problem

Actions to
adapt

Communication
and
collaboration



Prioritizing

Time-related pressures experienced by professional flight crews include the need of a company agent or ground personnel to open a gate for another aircraft, pressure from ATC to expedite taxi for takeoff or to meet a restriction in clearance time, the pressure to keep on schedule when delays have occurred due to maintenance or weather, or the inclination to hurry to avoid exceeding duty-time regulations.

Understanding
the problem

Assessing the
problem

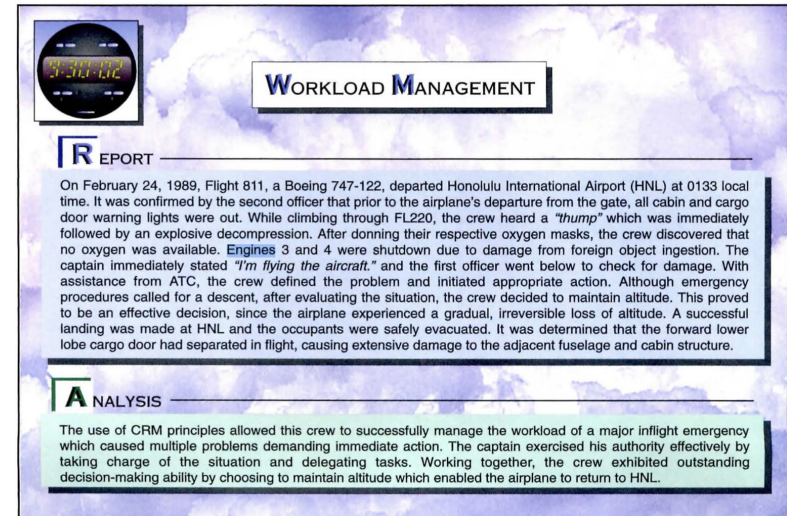
Actions to
adapt

Communication
and
collaboration

Prioritizing

During preflight, numerous tasks must be accomplished, but normally a logical sequence does not exist for performing these tasks as it does during other phases of flight. For example, prior to a flight you may have to handle flight planning, weather information, fuel loading, dispatch manifests, last-minute maintenance or MEL items, aircraft de-icing, and duty-time requirements.

Trying to accomplish these duties without establishing priorities can lead to error. Paperwork and nonessential tasks can be relegated to low workload operational phases. Following checklists and adhering to the sterile cockpit rule also can aid in establishing priority for performing necessary tasks.



WORKLOAD MANAGEMENT

R EPORT

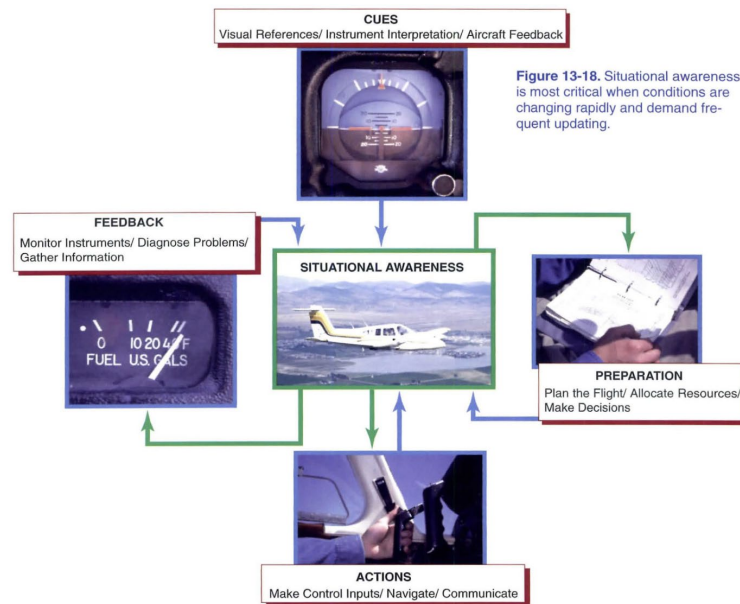
On February 24, 1989, Flight 811, a Boeing 747-122, departed Honolulu International Airport (HNL) at 0133 local time. It was confirmed by the second officer that prior to the airplane's departure from the gate, all cabin and cargo door warning lights were out. While climbing through FL220, the crew heard a "thump" which was immediately followed by an explosive decompression. After donning their respective oxygen masks, the crew discovered that no oxygen was available. Engines 3 and 4 were shutdown due to damage from foreign object ingestion. The captain immediately stated "I'm flying the aircraft," and the first officer went below to check for damage. With assistance from ATC, the crew defined the problem and initiated appropriate action. Although emergency procedures called for a descent, after evaluating the situation, the crew decided to maintain altitude. This proved to be an effective decision, since the airplane experienced a gradual, irreversible loss of altitude. A successful landing was made at HNL and the occupants were safely evacuated. It was determined that the forward lower lobe cargo door had separated in flight, causing extensive damage to the adjacent fuselage and cabin structure.

A NALYSIS

The use of CRM principles allowed this crew to successfully manage the workload of a major inflight emergency which caused multiple problems demanding immediate action. The captain exercised his authority effectively by taking charge of the situation and delegating tasks. Working together, the crew exhibited outstanding decision-making ability by choosing to maintain altitude which enabled the airplane to return to HNL.

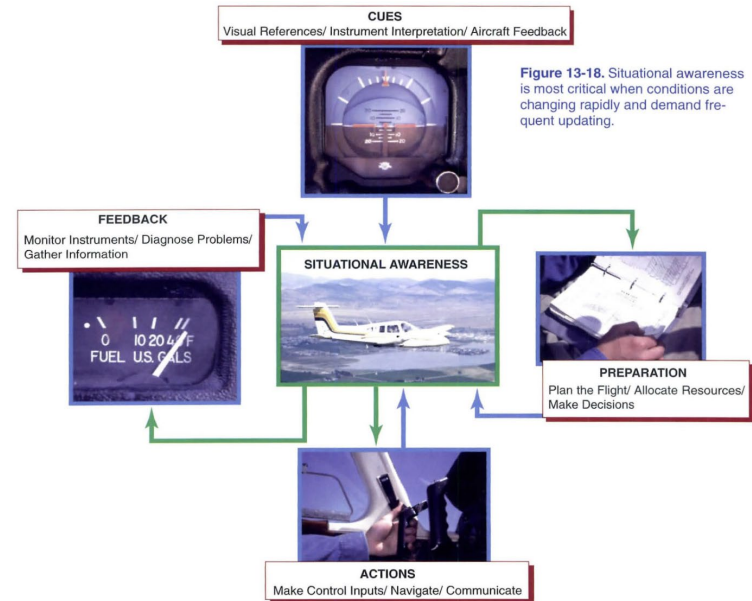
Situational Awareness

Although having a second pilot will generally aid your overall situational awareness, there are issues unique to being part of a two-pilot crew that can detract from your knowledge of your position and the state of the aircraft. One concern is that you may have trouble maintaining an awareness of operations that are not under your direct control.



Situational Awareness

For example, if you are not responsible for communicating with ATC, you may not be immediately aware of a radio problem. You need to ensure that you maintain an awareness of the entire flight situation by eliciting information from other crewmembers and keep the other pilot informed of the status of operations that you are responsible for. There is a flow to gathering information and subsequent actions that helps you to stay informed of the state of the aircraft, weather conditions, and ATC communication, throughout the flight.



Controlled Flight Into Terrain - CFIT

The special demands of some commercial operations under FAR Parts 91, 121, and 135 make them especially vulnerable to controlled flight into terrain (CFIT) accidents. When you first begin flying commercially, you may be hired by a company that does scenic flights and commuter operations in places like Alaska, Hawaii, or the Grand Canyon. The rugged terrain in these areas, and the additional duties which are required in the commercial environment can prove challenging. You can avoid becoming involved in a CFIT accident by strictly adhering to VFR/IFR requirements and maintaining a high degree of knowledge about the terrain over which you are flying.

