



## Decision Making

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Somewhere in the past, when the hills were mountains and a cluster of trees looked like a forest, I remember sitting on the dock with my skinny legs dangling over the water throwing stones and watching them skim the water surface until they sank into their wet resting place. The afternoon morphed into evening with the bulging dark clouds and the first of the small raindrops fell on the lake. I watched as the color of the afternoon turned into an olive green. Transfixed, I watch this transformation without fear. I had no reference. All hell broke loose soon after with wind, rain, hail and whatever the pregnant clouds could throw down. Needless to say I learned about weather and ever since avoid flying when clouds have even the appearance of anger across their brow. It is as a result of past experience, and the memory recall, that the present and future decisions are made. Does everyone have to suffer the ignominious wrath of nature to learn a lesson? No, it is easier to learn from others' experiences. Pilots tell tall tales but the FAA writes regulations – built on the foundation of other's misery – for our safety. Decision-making is an amalgam of past experiences, understanding the rules, following them and limiting the consequences of human frailty.

Humans are a peculiar species. They can face a hurdle, imagine a concept, and change the world. 1912 saw the first powered flight by the Wright Brothers and now we see an imaginary Highway In The Sky.

**Decisions are an everyday part of life.** The ebb and flow of life is dependent on decision-making. Every time you think of a plan to fly somewhere there is a decision. But a lot more goes into it than meets the eye. There is a whole host of complex thoughts that converge before you declare, "I will go to XYZ airport with two of my buddies for breakfast."

A flight is a launch into empty space where you are propelled through air and supported on an invisible aerodynamic mechanism created by the geometry of the wings and the fuselage. The push-pull and the lift-weight that comprises the basic elements of flight are only a miniscule of the entire realm. Various manifestations of mental cognition come into play in every flight.

**Learning and the exploration** of the process of flight: Although a majority of people think that learning is only relegated to when one is receiving instructions from a CFI during their primary training. There can be nothing further from the truth. In fact my Designated Examiner for the Instrument rating made a comment that has stuck with me, he said; "This certificate is just the beginning of your lessons." At the time I did not comprehend the significance of his statement, but now more and more I realize the importance of those words. Every time you takeoff you have begun a journey. If your preflight is just a light-the-fire-and-kick-the-tire affair then a day-of-reckoning is coming. A thorough pre-flight is a must for safety and not doing one can teach you a harsh lesson



if you survive to remember it. So a good and properly learned behavior will get you to be an-old-pilot.

**Exploration**, on the other hand, does not imply wandering off in the ADIZ or Restricted airspace, it means exploring the manageable boundaries of your experience. By manageable I mean knowing your limits and pressing them only with an experienced CFI in the right seat. It's important that the instructor is comfortable with the limits you intend to explore, otherwise, even a CFI's blood can run cold. Exploration is a memory-making ritual compressed and processed in the bank for later retrieval. The more experience you have as a pilot the better decision making you are able to make. For instance, a cross-country flight of five – six hundred miles planned with adequate reserves in good weather can turn ugly if you do not prepare for a front and headwinds encountered over a hilly terrain. Exploration can mean improving your abilities with the help of a good CFI in the right seat such as precision landings, slow flight, timed turns and a whole host of wonderful things that we aviators love to do to retain our abilities. Exploration can also mean learning about an airport and then flying to it and enjoying the capabilities of aviation. Besides the Christopher Columbus type of exploring, one can explore the outer reaches of one's capabilities in an acrobatic aircraft, again with a seasoned, competent pilot so a new learning process of upset recovery can be incorporated in your dossier.

**Memory Retrieval** is another phase in decision making. The brain part located right behind the forehead called the Anterior Prefrontal Cortex (APC) is charged with the ability to juggle between previous experiences, current data from the six senses and potential threats. The brain, assimilating all that, has to run a risk-reward scenario on each previous experience and the current situation to achieve the best-case solution. These computations that occur at a million bits per second barely take a few seconds to reach a conclusion. The back and forth between the APC is like a single lane highway but with speeds more like those on the Autobahn. A pilot in the throes of an instrument failure has to make decisions based on the information available and then decide which instrument is telling the truth and which has given up the ghost. And then, after weeding out the bad apple, he has to keep the aircraft under control, control his nerves and recall from past simulated exercises the best course of action to get his or her passengers on the ground in one piece.

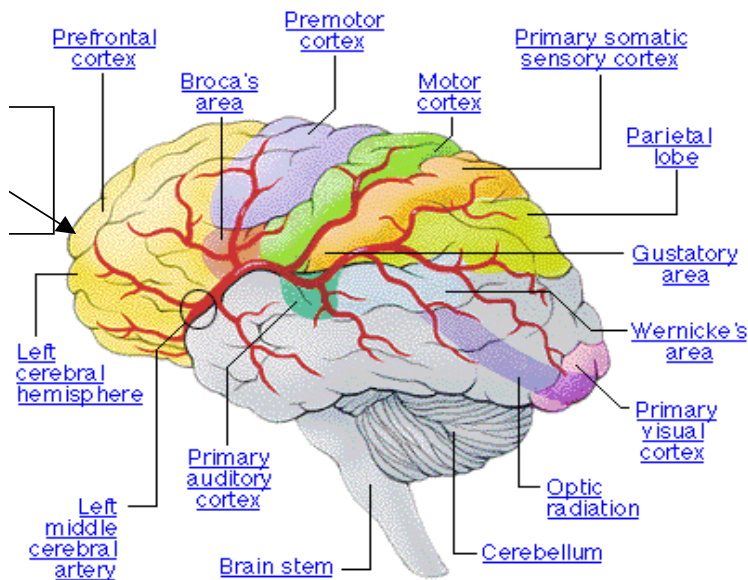
A third piece to the decision process is called **Relational Reasoning**. A pilot with a large task load of multiple inference paradigms has to use his selection model based on guess. This 'guess' is actually intuition which is related to previous experience, both knowledge based and self-learned. The raw multiple subsets of information have to be collated and then the potential outcome mapped with reasoning for the best guess.

**Multitasking**. This branch requires the full throughput between various parts of the frontal cortex of the brain, and the objective processing as a physical job is completed and then held in limbo while another job is performed in order for the whole task to be completed successfully. This is an action selection process where multiple tasks are prioritized based on acuity and intensity. A pilot under stress from a deteriorating



weather condition has to maintain position awareness, change frequencies per ATC and then communicate his problem all the while making sure that the aircraft is flying at maneuvering speed and is under his or her control.

Thoughts, like the white cumulus clouds that float overhead, can sometimes coalesce into a decision of a mean cumulonimbus and all hell breaks loose. Or they can part and allow the bright sun to filter through like a clear thought.

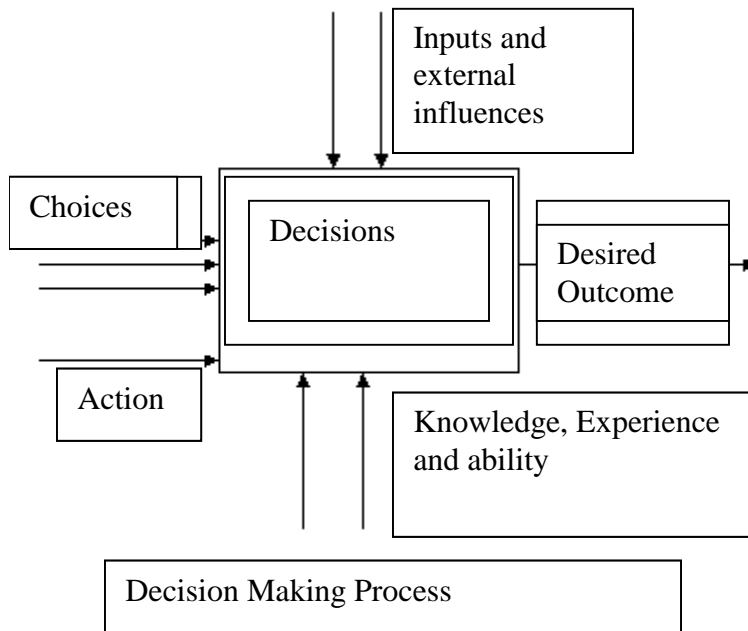


Decisions are a product of the aviation environment. We are faced with the need to make decisions during every aspect of a flight. To reach a solution we have to be aware that a problem exists. Here are a few simple clues to follow when problems arise. Decisions are based only on facts, not on beliefs, which are culturally based, opinions that are rooted in dogma and rumors. Henri Poincare said, “Doubt everything or believe everything: these are two equally convenient strategies. With either, we dispense with the need to think.”

1. Simplify the problem: On an IFR approach with strong cross winds and having difficulty with the localizer – find the wind correction angle and be sure there is altitude below you. A missed approach is a valid and real option to exercise.
2. Do not base a decision on a single instrument unless you have all instruments in concert and you are managing the situation.
3. Do not Reason: Reasoning is not a fact or a proof. If I do this (which I have never done before) it will get me out of this mess. No! Don't do it!
4. Failure to define the problem: To circumvent this issue, practicing with an instructor will add to the experience for future recall.
5. Accept responsibility and then base your decisions on rational experience and knowledge. Do not try to be a test pilot in an emergency. Over-confidence, fear and hope have no place in the cockpit.



6. Misattribution of success or failure. Do not gloat over a decision nor regret a bad outcome. A decision once made on appropriate knowledge and understanding will have its outcome. Do not be bound by the results.
7. Turn every problem into an opportunity to learn and experience.
8. There are no absolutes in life only decisions which are the paths to their outcome.



Now for the times when you should not place yourself in a position when you have to make decisions.

1. Depression: The brain is over-riden with internal stimuli and the APC will not allow rational memory recall and, if forced, the decision will be a bad one.
2. Medications: Do not use Anxiolytics (Anti-anxiety drugs), Sedative or Sleeper medications prior to any flight. These medications cast a shadow on the interpretative ability of the brain.
3. Multiple decisions made without clear thought and experience can create new problems. So analyze each situation on its own merit. Resident in us is a capacity to evaluate, hazardous, uncertain and conflicting information. It is by virtue of knowledge, experience and practice that we are able to make good decisions.
4. Never change the perception of a problem to suit a pre-conceived desirable decision. The results may not coincide with the problem and potentially create another ugly problem. Humans have tendency to lie to themselves more than to others.
5. Never squander time with negative thoughts. Time is scarce and a valuable commodity, use it carefully to evaluate your thoughts to allow a decision to emerge. Decision-making is a step-ladder process that begins with: "Problem-Recognition," then requires the individual to think ("Immerse") about the



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problem, which leads to “Insight” based on logical previous experience and known information, which ultimately leads to a “Verified Decision”.

One wonders why a pilot subjects himself or herself to ‘fuel starvation’? Is it an effort to save pennies while operating several thousand dollars worth of equipment? And why does another individual try to ‘stretch a glide’ to land at an airstrip and only end up boring an unkind hole 500 feet before the threshold of a runway. These decisions address the human frailty elements of wish, hope and fear – all three denizens of the fiction world. A pilot needs to stick with facts from the moment he plans to launch to the time he shuts down the engine. All aspects of flight must have coordinated decisions based on known elements with a built-in strong fudge-factor for safety. Anticipating that things do go bump on the ground and in the air, the built-in safety factors allow for a ‘way out’.

Consider the following (a list, not complete by any stretch of the imagination):

1. A runway diagram for taxiing.
2. Read back taxi instructions and if confused ask for ‘progressive instructions’.
3. Head winds mean a slower, more fuel consuming, trip.
4. An engine failure on take-off-- And a safe place to land.
5. Worse weather conditions than forecast.
6. Icing in clouds.
7. Convective activity in clouds.
8. Maneuvering speeds in turbulence.
9. Nearest airport in case of engine failure.
10. Expect to have to go-around on every landing and to make a ‘Missed-Approach’ on every approach.
11. Cross-Winds and the aircraft’s limits.
12. And no limousine to pick you up with a banner of the ‘Worlds greatest pilot’.
- 13.

Clearly, a look at the limit of aerodynamics, the laws of nature, and a critical understanding of one’s own frailty will lead to a many years of membership in the aviation society.

From all the foregoing issues it becomes obvious that a calm, experienced, educated mind needs to be in the cockpit on every flight.

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