Chapter 2
Operational Decision Making in Aviation

ABSTRACT

Operational decision making, sometimes referred to as decision making in operational systems, is singular among all other classes of decisions. The type of decision used in operational systems is known as an operational decision and is addressed by the theory and practice of operational decision making (ODM). ODM is a body of knowledge and a system of thought, similar in many respects to critical thinking, but with some important differences. They are that a decision must often be made under increased time compression, it must be made with incomplete of conflicting information, and the consequences of a poor decision could be catastrophic. This chapter provides a brief overview of this important subject. More in-depth treatments follow in later chapters.

INTRODUCTION

Pilots rely on their working memory to hold and manipulate information cognitively, but the capacity and the length of time information can be held decreases under stress. When working memory capacity is exceeded, an individual’s ability to analyze and devise solutions is drastically impaired.

When experiencing stress and high workload, crews are vulnerable to missing important cues related to their situation. They are likely to experience difficulty pulling together disparate pieces of information and making sense of them. This is
especially true when some of that information is incomplete, ambiguous, or contradictory. We have first described the pilot as a risk manager, but he or she is also a problem solver. Each situation met is a problem to solve. However, under high workload, problem-solving abilities may be impaired and pilots will generally have difficulty performing mental calculations (Hendy, Farrell, & East, 2001), such as figuring out landing distances on a wet runway.

Pilots can also be affected by a psychological trait called preservation syndrome. This is defined as either excessive focus on a single item of display or excessive focus of the pilot’s reasoning on a single task or objective. Once entangled in preservation, pilots do everything to succeed in their objectives (for example, in 1999, when two pilots flying a MD-82 slid off a runway in a thunderstorm in Little Rock, Arkansas) even it is a dangerous option. Worse, their reasoning capabilities suffer from confirmation bias, which leads them to neglect any cues that could question their reasoning (such as identifying a tail wind).

Crew workload and limited reasoning capabilities are not only affected by system complexity and automation, but also by the environment. The environment can embed unexplained, ambiguous events complicating the situation assessment.

**Uncertainty**

Despite simulated sessions, crews are confronted by unpredictable real-life situations. In order to assess a level of risk, pilots are also “uncertainty managers” and must categorize ambiguous and unpredictable situations they encounter.

One danger for pilots is to follow a traditional approach to view uncertainty in a binary way—to assume that the world is either certain, and therefore open to precise predictions about the future, or uncertain and therefore completely unpredictable. If the latter view is held, crews can abandon the analytical rigor on which their strategic decisions are based. But to mitigate uncertainty, one must understand it, or at least to be able to categorize it in order to respond most effectively.

First we will define the different levels of uncertain situations and then we will explain what tools and cognitive strategies pilots deploy.

Even the most uncertain environment contains relevant information. Initially, it is often possible to identify clear trends, drifts, failures, and low signals. Then, there are usually a host of factors that remain unknown unless the right analysis is done —identifying pertinent variables. The uncertainty that remains after the best possible analysis is residual uncertainty; this could be weather trends, airport capabilities, or other conflicting traffic. The residual uncertainty facing flight crews falls into three different groups:
The Influence of Aviation Companies’ Perceived Websites Quality on E-Trust: An Exploratory Study


[www.igi-global.com/article/influence-aviation-companies-perceived-websites/58943?camid=4v1a](www.igi-global.com/article/influence-aviation-companies-perceived-websites/58943?camid=4v1a)