### Automation Management

Automation management is the demonstrated ability to control and navigate an aircraft by means of the automated systems installed in the aircraft. One of the most important concepts of automation management is knowing when to use it and when not to use it. Ideally, the goal of the flight instructor is to train the learner until he or she understands how to operate the aircraft, using all the available automation. However, the flight instructor should ensure the learner also knows how and when to operate the aircraft without the benefit of the automation.

No one level of automation is appropriate for all flight situations, and the learner should know how to set the level of automation. It is important for a learner to know how to operate the particular automated system being used. This ensures the learner knows what to expect, how to monitor for proper operation, and promptly take appropriate action if the system does not perform as expected.

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 learner needs to verify that armed functions (e.g., navigation tracking or altitude capture) engage at the appropriate time. Automation management is a good place to practice the callout technique, especially after arming the system to make a change in course or altitude.

## Aeronautical Decision-Making

Aviation training and flight operations are now seen as a system rather than individual concepts. The goal of system safety is for pilots to utilize all four concepts (ADM, risk management, situational awareness, and SRM) so that risk can be reduced to the lowest possible level.

ADM is a systematic approach to the mental process used by aircraft pilots to consistently determine the best course of action in response to a given set of circumstances. Risk management is a decision-making process designed to systematically identify hazards, assess the degree of risk, and determine the best course of action associated with each flight. Situational awareness is the accurate perception and understanding of all the factors and conditions within the four fundamental risk elements that affect safety before, during, and after the flight. SRM is the art and science of managing all resources (both onboard the aircraft and from outside sources) available to a single pilot (prior and during flight) to ensure the successful outcome of the flight.

These key principles are often collectively called ADM. The importance of teaching learners effective ADM skills cannot be overemphasized. While progress is continually being made in the advancement of pilot training methods, aircraft equipment and systems, and services for pilots, accidents still occur. Despite all the changes in technology to improve flight safety, one factor remains the same—the human factor. It is estimated that approximately 80 percent of all aviation accidents are human factors related.

By taking a system approach to aviation safety, flight instructors interweave aeronautical knowledge, aircraft control skills, ADM, risk management, situational awareness, and SRM into the training process.

Historically, the term “pilot error” has been used to describe the causes of these accidents. Pilot error means that an action or decision made by the pilot was the cause of, or contributing factor to, the accident. This definition also includes the pilot’s failure to make a decision or take action. From a broader perspective, the phrase “human factors related” more aptly describes these accidents since it is usually not a single decision that leads to an accident, but a chain of events triggered by a number of factors.

The poor judgment chain, or the error chain, describes this concept of contributing factors in a human factors-related accident. Breaking one link in the chain is all that is usually necessary to change the outcome of the sequence of events. The best way to illustrate this concept to learners is to discuss specific situations that lead to aircraft accidents or incidents. The following is an example of the type of scenario that can be presented to illustrate the poor judgment chain.

A private pilot with 100 hours of flight time made a precautionary landing on a narrow dirt runway at a private airport. The pilot lost directional control during landing and swerved off the runway into the grass. A witness recalled later that the aircraft appeared to be too high and fast on final approach, and speculated the pilot was having difficulty controlling the aircraft in high winds. The weather at the time of the incident was reported as marginal VFR due to rain showers and thunderstorms. When the aircraft was fueled the following morning, 60 gallons of fuel were required to fill the 62-gallon capacity tanks.

By discussing the events that led to this incident, instructors can help learners understand how a series of judgmental errors contributed to the final outcome of this flight.

- Weather decision—on the morning of the flight, the pilot was running late and, having acquired a computer printout of the forecast the night before, he did not self-brief or obtain a briefing from Flight Service before his departure.