IFR TRAINING THAT FITS

As new avionics and airplanes become more complex, the FAA and industry are developing the next evolution of IFR flight training.

By Harry Kraemer

Advancements in avionics and aircraft systems have rapidly outgrown our current flight training materials and our approach to flight training. These advancements have found their way into general aviation airplanes and the average pilot can now fly with avionics similar to what's found in large corporate or airliner-type aircraft.

The problem is that the way we train to fly these high-tech airplanes has basically been unchanged in more than 60 years, when the concept of formalized flight instruction became more organized.

This year, the FAA has introduced a new training concept known as the FAA/Industry Training Standards program or FITS. It is a partnership between the FAA, industry and academia designed to reduce the total number of general aviation accidents. The materials created through FITS focus on technically advanced aircraft and are a big change from the skill-based instructional and examining type of training that has saturated the industry. FITS does this by introducing real world scenario-based training designed to integrate risk management, aeronautical decision-making, situational awareness, and single-pilot resource management. Unlike our current flight training system, which hasn't changed much in the last 60 to 70 years, FITS will continue to evolve as necessary to keep up with advancements in technology and training.

As of mid-December, FITS has already produced three modules designed to help CFIs incorporate FITS concepts into their curriculum. One of these modules, titled *Volume 2 — System Safety Course Developers' Guide*, introduces several checklists designed to assist pilots and instructors in risk management and risk management training.

So how will FITS fit in the next time you go for an instrument proficiency check or upgrade to a more-capable airplane? The following example is a "time-critical" real-world scenario that I have developed to help illustrate these new concepts.

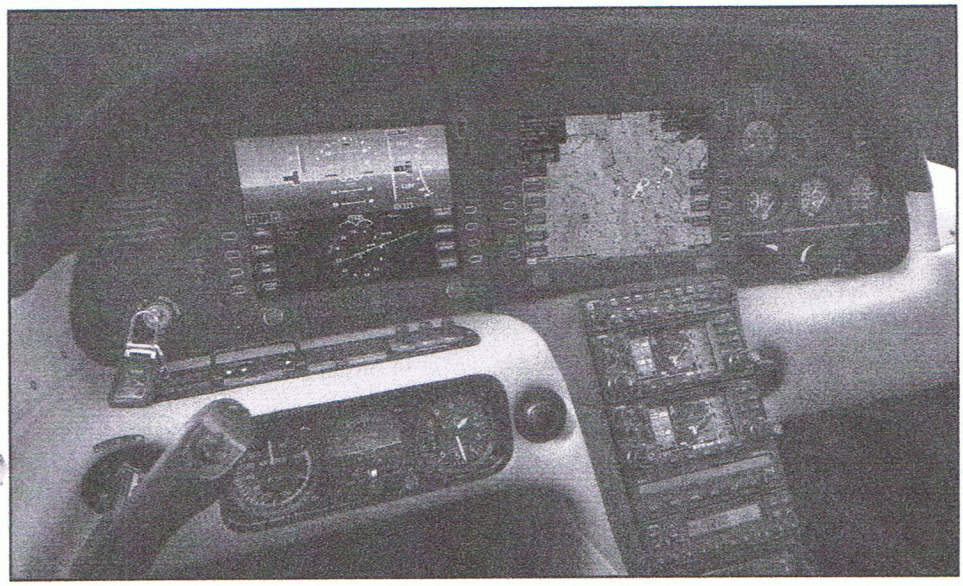
First, there are a couple of terms that need to be defined: A *hazard* is a present condition, event, object or circumstance that could lead to or contribute to an unplanned or undesired event while a *risk* is the future impact of a hazard that is not controlled or eliminated. As defined by FITS, system safety is the application of special technical and managerial skills in a systematic forward-looking manner to identify and control hazards throughout the life cycle of a project, program or activity.

Perceive The Hazard

The first step in risk management is to identify the potential hazards that are out there. To help us remember these areas of hazard, FITS uses the acronym PAVE, which stands for Pilot, Aircraft, enVironment and External pressures. Here's how PAVE would work:

Pilot: Let's take a look at Bob, our fictitious aviator. Bob is a 100-hour, newly instrument-rated private pilot. To date, all of Bob's time has been in a Cessna 172 equipped with conventional steam gauges. Bob is a successful business owner and plans to use his flying skills to expand his sales territory. He has just purchased a brand new Cirrus SR-22 with all the bells and whistles —two flat panel screens with dual GPS — and leaves within a week to pick it up.

Bob's primary hazard is his lack of experience with glass cockpits. In addition, Bob has never used a GPS. Soon, he'll be flying one of the most advanced single-engine pistons on the market and



Cirrus helped pioneer the glass cockpit in GA airplanes and now offers it in all its models. (Photo: Cirrus Aircraft)

this technology presents some hazards to the inexperienced.

While hazards exist due to his lack of familiarity with the aircraft, the risks to him while flying the aircraft can be kept to a minimum. For example, Bob can limit his flying to VMC conditions until he gains experience and confidence with the avionics in his new plane.

Aircraft: The SR22 is a very capable cross-country machine, complete with lightning detection, datalink weather, and terrain warning. The immediate hazards to Bob associated with the aircraft include its speed, which is considerably faster than the C-172 Bob has been flying, and the advanced avionics. It will be easy for Bob to get behind the aircraft.

Never let an aircraft take you somewhere you mind hasn't been a few minutes earlier. In Bob's case, the speed of the aircraft presents a hazard that could lead to or contribute to an unplanned or undesired event. Mentally he may have a hard time keeping up with the airplane. If the hazards are not controlled, the risks include complete lost of positional awareness, spatial disorientation, encounters with severe weather, loss of control and ultimately an accident. These are just a few of the risks presented by the hazards.

CFIIs can help pilots like Bob by properly training them to get comfortable with the aircraft and its equipment. This can be accomplished by breaking down each task to its simplest components: Let the pilot master smaller, individual tasks to build a good foundation for future training before bringing him or her into the big picture.

In our example, Bob's transition from steam gauges with no GPS to a glass cockpit with GPS will be overwhelming when he discovers the options that are at his disposal. It's safe to say that he'll be behind the aircraft the first few times he shoots an approach. The solution is to introduce approaches by just flying the courses without worrying about the descent profile, perhaps with the autopilot on. In Bob's case, you may want to start by only using the GPS since he hasn't flown with one before and later add the advanced features of the glass panel to the picture. Allowing the pilot to fly only the plan view exposes him or her to the GPS and glass without having to fly all of the altitudes. I will often do this at a higher altitude than the altitudes published on the approach so as not to interfere with traffic that's actually flying the approach.

I also prefer to use the autopilot for this plan view-only approach. This gives plenty of time for the student to fully understand the process. You can evaluate his or her progress and add individual task to keep it challenging.

Environment: Upon completion of Bob's initial training, he has a 1,000-mile cross-country flight to return to his home airport. The weather for his return trip is forecast to be low IFR with widely scattered embedded thunderstorms. Besides the other factors already mentioned, the weather itself presents a large hazard. To keep the hazards from turning into risk, Bob could employ an experienced Cirrus instructor to join him on his return flight. Two pilots can share the added workload brought by the weather and Bob will gain some valuable experience.

External Pressures: Bob's business is thriving. In fact, he has several large business deals to close when he returns with his new airplane. He has a tight schedule and doesn't have any time to spare getting back to work. While he is concerned about the weather, he also knows that he has to be back to close the deals. This pressure to get home also presents a hazard.

As pilots, we can use the above PAVE checklist to evaluate our flight profile. We must not accept any unnecessary risks. And while flying has both hazards and risks involved, we can keep both to a minimum with training and familiarity with the equipment.

Minimize the risk

Step 2 will determine the risks involved and decide what risk controls to implement. To assist us we will use the TEAM checklist from the FITS program. TEAM looks at four critical areas of risk assessment: Transfer — Should this risk decision be transferred to someone else, like a chief flight instructor or someone with more experience in that area of flight? Eliminate — Is there a way to eliminate the hazard? Accept — Do the benefits of accepting risk outweigh the cost? And Mitigate — What can you do to mitigate the risk?

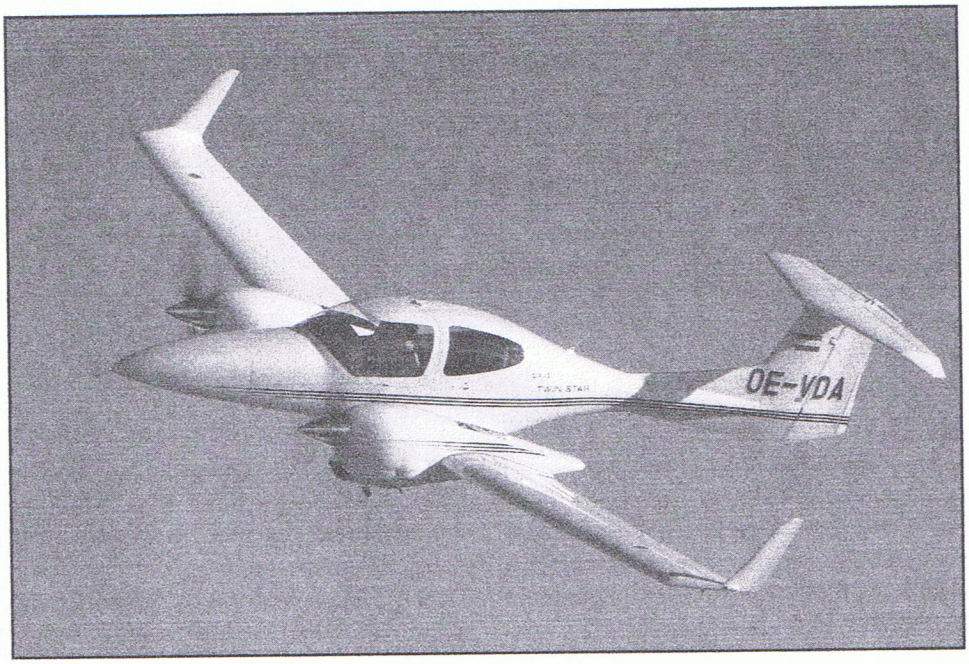
Let's see how TEAM fits in with our earlier hazard assessment.

Pilot: Bob's risks include not understanding the display presentations, lack of adequate knowledge of the advanced systems on the SR22 and not being able to utilize the equipment to his advantage. Bob could:

- *Transfer* the risk by utilizing an experienced Cirrus flight instructor to join him for the return flight. This will almost eliminate any risk associated with the hazards that affect Bob.
- *Eliminate* the risk by canceling the return flight home in the Cirrus. Bob has many external pressures due, in part, to his business and his tight time frame to return home from training. He has the option of just attending the factory training and traveling home via the airlines.
- *Accept* the risk and make the return flight home. However, there are too many variables working against Bob to make this a desirable option.
- *Mitigate* the risk by rearranging his business schedule so the pressure is off to get home by a certain time. Or he could reschedule his delivery and training dates so they don't conflict with his business schedule.

Aircraft: The aircraft is a very capable cross-country machine. In the hands of an experienced pilot, the weather associated with the return trip posses very little risk. Bob could:

- *Transfer* the risk associated with the unfamiliar aircraft by employing an experienced pilot, one who understand the airplane and its avionics.
- *Eliminate* the risk by flying VFR



New entrants like Diamond's TwinStar bring unique challenges to an out-dated flight training curriculum. (Photo: Diamond Aircraft)

and in VMC until he gains more real-life experience with the aircraft and feels comfortable with its systems.

• *Accept* the risk and fly the aircraft home. However, accepting unnecessary risk is not worth the consequences.

• *Mitigate* the risk by complying with any or all of the already mentioned options such as flying VFR, staying in VMC, employing an experience pilot or instructor, or by having a more flexible schedule.

Environment: Flight conditions pose a large percentage of the risk involved with any flight and its level of impact is directly related to the experience level of the pilot. Since Bob is still a low-time pilot, he could:

• *Transfer* the risk associated with the weather by postponing the trip. Avionics manufacturers recommend that one gets familiar with any new avionics in VFR weather before attempting a flight in IMC.

• *Eliminate* the risk by utilizing a second experienced pilot or instructor, flying a much longer route to avoid most of the weather, or simply wait for good VFR weather.

• *Accept* the risk. But due to the IMC conditions and thunderstorms on the return trip, the risks are high for an inexperienced pilot.

• *Mitigate* the risk by utilizing a series of analytical steps: Identify the hazard, assess the risk, analyze the controls available, make control decisions, use the control and monitor the results. For example, identify a thunderstorm (a hazard) either by onboard equipment or visually and classify it as a high risk. Look at your different options for deviating around it and decide on a route. Stick with your plan unless it turns out to be a bad choice and monitor the results.

External Pressures: Those are the things that can really cloud someone's judgment. Although Bob is faced with many business pressures, he could:

• *Transfer* the risk by making alternate plans for his business meetings or arranging for someone else within the company to close the deals. This will transfer the risks associated with the pressure to return within a certain amount of time.

• *Eliminate* the risk by, as previously mentioned, postponing the trip so it doesn't interfere with his business. By omitting the external pressures, the decision making process isn't influenced in the wrong direction.

• *Accept* the risk. However, the risks, in this case, don't outweigh the cost or consequences.

• *Mitigate* the risk by having several alternate plans. A wise choice is to have several options for each segment of the flight.

The final step is to perform with CARE. This is an evaluation of the Consequences, Alternatives, Reality and External Pressures that are associated with any hazards and risks.

Consequences: Throughout the flight home, Bob should continuously evaluate the consequences or risks associated with the hazards of himself, the aircraft, his environment, and his external pressures.

Alternatives: There are many alternatives for this trip, most of which have been discussed here. But always have several options and alternatives available and avoid getting into a situation which limits your alternatives or which forces you to take unnecessary risk.

Reality: Avoid wishful thinking, like the thunderstorm won't be too bad or the weather isn't as low as the ATIS is reporting. There may be a time in Bob's return trip where he just has to admit that he will not get back in time.

External Pressures: As hard as it may be, external pressures often need to be ignored. Remember that you really don't need to be somewhere that bad. Ask yourself, "Would I press on in these weather conditions if I didn't have be anywhere?"

While there are both hazards and risk involved with almost any activity, we can learn to control the hazards and not to take unnecessary risk. And that's the message that FITS is trying to teach. For more information, point your web browser to **www.faa.gov/avr/afs/fits/**.

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