FAA Aviation News

AVIATION SAFETY FROM COVER TO COVER

JANUARY/FEBRUARY 2006

Our 45th Anniversary

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The Office of Management and Budget has approved the use of public funds for the printing of *FAA Aviation News*.

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JANUARY/FEBRUARY 2006 ISSN: 1554-0249

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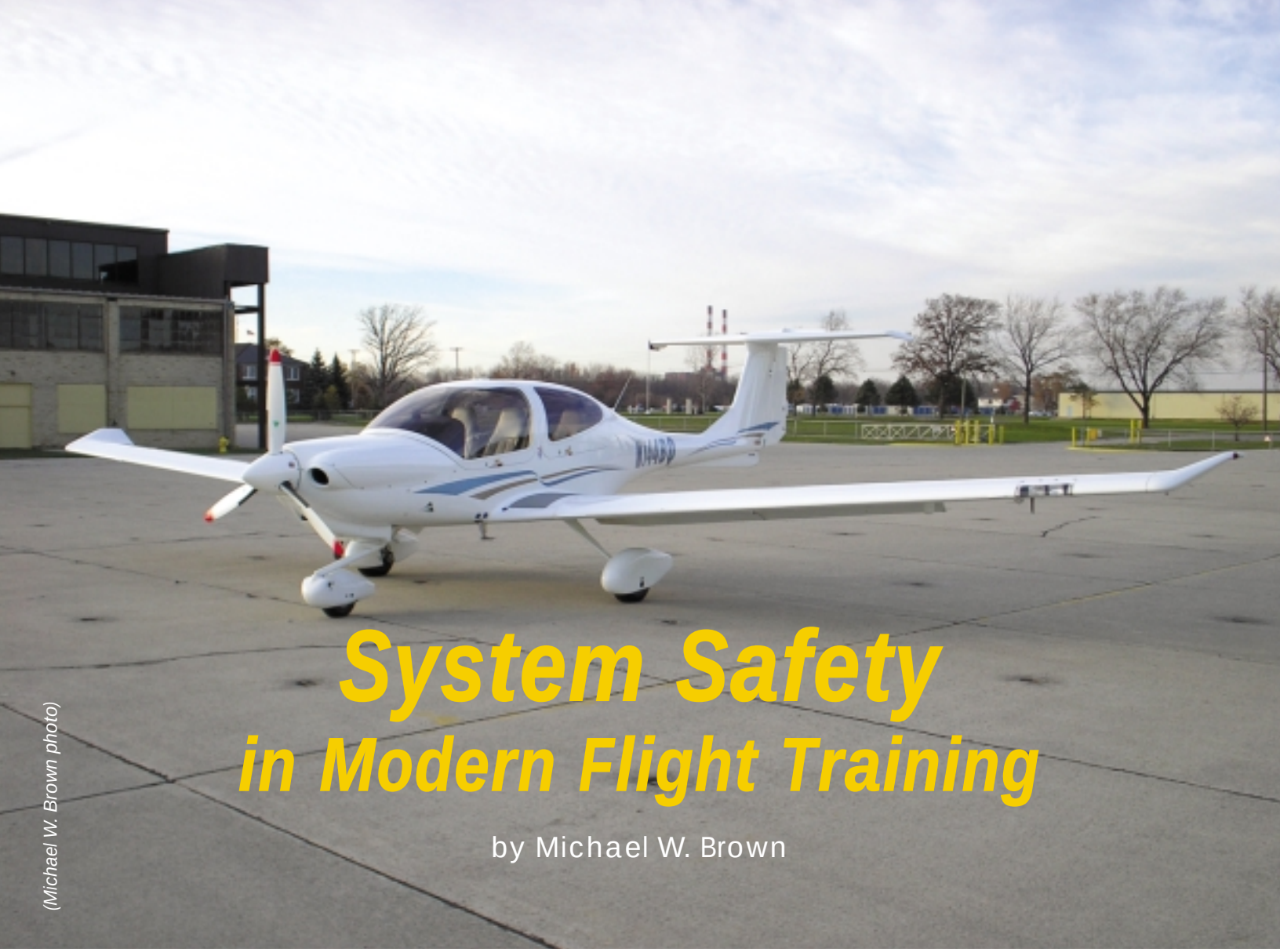
BACK COVER: A moment at the 2005 Reno Air Race. (H. Dean Chamberlain photo)



(Michael W. Brown photo)

System Safety in Modern Flight Training

by Michael W. Brown

General aviation (GA) pilots enjoy a level of flexibility and freedom unrivaled by their aeronautical contemporaries. Airline, corporate, and even military flight operations are all strictly regulated, and each employs a significant degree of oversight and operational control to ensure safety. For better or worse, GA has relatively few of these encumbrances. As a result, the immediate opportunity to improve safety would seem to lie in the development of the individual pilot's internal "system" for quantifying and managing risk. Unfortunately, traditional training materials provide very little direction on how best to achieve this end. Moreover, the GA instructional dynamic affords little opportunity to reinforce these skills once the pilot has left the training environment. Because most pilots receive minimal structured training after earning their airmen certificates, it is imperative that instructors emphasize these skills during initial and recurrent training.

In the parlance of modern airmanship, the aforementioned skills comprise the "system safety" approach to flight training. While the migration of technically advanced, increasingly capable aircraft into the GA market is generally credited with driving this new focus; a change in our training paradigm was long overdue. The fact is that flight training, for the most part, has changed very little since the dawn of regulated aviation. For example, a private pilot trained to standards outlined in the Civil Aeronautics Regulations, circa the 1940's, would likely do quite well in most operations required by today's practical test. This is because many of the basic skills needed to pilot an aircraft have changed very little. As a result, the development of new technologies and a rapidly evolving airspace system have outpaced current training methods. With over a century's worth of experience upon which to draw, we certainly have a thorough understanding of how best to impart the necessary stick and rudder skills. However, what's been lacking is a comprehensive training technique that looks beyond the simple mechanics of flight by giving new emphasis to system safety.

System Safety Philosophy

When introducing the concept of "system safety" to pilots, their thoughts immediately turn to algorithms, safety modeling, statistical analysis, etc., subjects that are largely academic and have little to do with practical matters of flight. However,

(Michael W. Brown photo)

despite this perception, the goal of system safety is quite tangible and easy to quantify. Put simply, system safety looks to reduce the severity and likelihood of risk inherent in all aeronautical activities to lower, acceptable levels. To build upon this further, system safety in aviation involves embracing disciplines such as risk management, aeronautical decision-making, single pilot resource management, and situational awareness, thus reducing risk to the lowest possible levels.

To do this, we must not only understand what it means to be safe, but also the system that provides a framework for our discussion. In aviation, the term "system" is intended to address every element of a flight operation from conception to completion; from the time the flight planning begins to the time a pilot leaves the airport after reaching his or her destination. A system involves the mechanic who maintains the aircraft and the line personnel responsible for refueling operations, as well as the flight service specialist who provides a briefing and the air traffic controller who issues the landing clearance. In short, if it impacts the flight in any perceptible manner, it is part of the system.

Understanding the system, that is the human, environmental, and mechanical aspects of any flight, is the first critical step in identifying hazards. The extent to which we can control these hazards often dictates level of risk. In short, the less control a pilot has over a given hazard, the greater the risk of a critical or even catastrophic event. Such circumstances often demand greater risk control measures to reduce the possibility of an accident. An excellent example of this concept involves weather. The elements around us are something over which we have no control, yet we have absolute control over the weather in which we fly. This control is the result of risk mitigating strategies, such as thorough preflight planning and sound judgment.

Hazard Versus Risk

The terms "hazard" and "risk" are often used interchangeably, particularly within the aviation community. While both are factors of concern, they are two very unique principles and each must be addressed individually. To demonstrate this further, each may be illustrated in the context of a true-to-life scenario. For example, a pilot is planning to undertake a flight in instrument meteorological conditions (IMC). The minimum en route altitude along much of the route is 6,000 feet, and the freezing level is reported to be 4,000 feet. The ceiling is 2,000 feet, thus the pilot correctly concludes that airframe and induction icing are very real hazards for this flight.

This all-too-possible scenario highlights a condition that exists in the present, one that could lead to an incident or accident. In short, icing is a classic example of a hazard. The risk posed by this hazard is the aircraft will accumulate a dangerous level of ice, possibly leading to a loss of control. That risk exists only in the future and requires a triggering event before it poses any danger. In this case, the triggering event could simply be departing in an aircraft not certified for flight in such conditions. Sound judgment and aeronautical decision-making are key mitigation strategies. An-

other triggering event could be an in-flight failure of the aircraft's deicing system, or an engine failure that necessitates prolonged single-engine flight in severe icing conditions. These emergencies would require a far more sophisticated level of planning, yet each must be addressed prior to flight if safety is to be optimized.

This same hazard versus risk model may also be applied to a maneuver required of all certificated pilots, a power on stall. In this example, the hazards are quite evident, and each may be covered succinctly within an instructional exercise. The primary hazard is the possibility of an inadvertent spin. The risk is that a spin will result in a fatal loss of aircraft control. The possibility of a spin may be completely eliminated by not stalling the aircraft. However, because stalls are required as part of the pilot certification process, risk management strategies must be employed. The first risk control measure is an emphasis on coordinated flight during all phases of training. The second is a thorough review of proper stall/spin recovery techniques. Altitude is yet another consideration that can reduce risk. Attention to each element will ensure the requisite degree of safety is maintained.

In addition, system safety may be applied to important safety lessons with less quantifiable performance standards. For example, controlled flight into terrain, or CFIT, is an issue of concern to all pilots. In general aviation, CFIT normally results from a combination of factors including weather, unfamiliar environment, nonstandard procedures, breakdown or loss of communications, loss of situational awareness, and lack of sound risk management techniques. Collectively, these conditions are difficult to replicate in most flight-training environments. However, the subject may still be covered effectively during ground school and cross-country flight operations by using system safety methodology. Because CFIT is always the final "link" in the accident chain, it must be taught within the context of other flight operations; operations that increase the likelihood of a CFIT accident. This will not only help illustrate how easily these accidents can occur, it also highlights the conditions under which such accidents most often take place.

While the differences between hazards and risks may seem largely academic, the distinctions will become increasingly important as we move further along in our discussions of system safety.

Risk Assessment

The first challenge any pilot faces involves the identification of every possible failure involving the flight "crew," the aircraft, and the environment in which he or she operates. Because hazards can vary greatly with each unique flight operation, pilots of all experience levels may find themselves at greater risk when first entering "uncharted" territories. For example, the wake created by passing boats poses a unique hazard to the seaplane pilot, something a transitioning land-based aviator may not have considered. The risk of capsizing or damaging float hardware must be mitigated. An instructor would, therefore, emphasize these and other mission–critical items prior to departure.

Keep in mind that because some hazards are present in most every flight, this often leads to a level of complacency that is difficult to overcome. For example, every take-off in a powered aircraft carries with it the possibility of an engine failure. However, pilots of most single-engine aircraft take little time in the moments prior to departure to consider all known risks, along with specific mitigation strategies. When was the last time you performed a pre-departure briefing for an engine failure in your piston single?

Once a pilot identifies everything that can go wrong, it is time to carefully consider the consequences of these failings. These consequences, or risks, must then be analyzed with an eye toward determining both likelihood (or exposure) and severity. Combined, these factors help quantify the level of risk. However, it should be noted that risk is often measured on a sliding scale. In other words, the level of risk may vary even when considering the same hazard. Certainly the aforementioned engine-out scenario constitutes a hazard. Still, the risk involved varies greatly depending on a myriad of factors. For example, is the aircraft turbine-powered? If so, the likelihood of a failure (all things being equal) is significantly less than if flying a piston-powered aircraft. Does the aircraft have one or two engines? In the case of the latter, you have doubled the likelihood of an engine failure (exposure increases). However, you may have also limited the potential severity of such an event. Of course, if you are not proficient in managing a light piston twin that has suffered an engine failure, the severity portion of the equation will increase dramatically, elevating risk to an unacceptably high level.

In this scenario, both equipment and training is key to assessing the overall level of risk. Each is an element over which a pilot has a superior level of control. Unfortunately, this is not always the case. For example, when engines do fail, they tend to do so at their own convenience. In many small aircraft, if an engine failure were to take place at an altitude of 100 feet with 5,000 feet of runway remaining, the risk is considerably less than if that same engine failure occurred at 300 feet above the ground with no remaining runway. This also speaks to the correlation that exists between risk and options. The more options you have, the easier it is to manage risk. However, as with all aviation risks, the better the training, the more options that are available.

One last point of discussion. For clients who ask their instructors to provide a sound litmus test (to go or not to go), consider offering these questions and discussion points. "Do you have the ability to safely complete this flight if everything were to go right?" If yes, then move on to ask, "Do you have the ability to safely complete this flight, if everything were to go wrong?" If the answer is no, ask them to identify those things that could fail, and outline how (or if) the

(Michael W. Brown photo)

likelihood or severity can be reduced. If the student is unable to keep all elements of the flight within an acceptable range of risk, perhaps it's best to stay grounded that day or consider an alternative to the proposed flight.

An Integrated Approach to Training

When introducing system safety to flight instructors, the discussion invariably turns to the loss of traditional stick and rudder skills. The fear is that emphasis on items such as risk management, aeronautical decision-making, single pilot resource management, and situational awareness will detract from the training so necessary in developing safe pilots. Also, because the FAA's current practical test standards place so much emphasis on stick and rudder performance, there is concern that a shifting focus would leave their students unprepared for that all-too-important check ride.

However, system safety envisions flight training that occurs in three phases. First, there are the traditional stick and rudder maneuvers taught today. In order to apply the critical thinking skills that are to follow, pilots must first have a high degree of confidence in their ability to fly the aircraft. Next, the tenets of system safety will be introduced into the training environment. In the manner outlined previously, students will begin to learn how best to identify hazards, manage risk, and use all available resources to make each flight as safe as possible. This will be accomplished through scenarios that emphasize the skills sets being taught. Finally, the student will be introduced to more complex scenarios demanding focus on several safety-of-flight issues.

Developing Training Scenarios

System safety encourages the use of a scenario-based approach to impart knowledge during flight training. This methodology, as time tested as any used throughout civil or military aviation, is advantageous for several reasons. First, it acknowledges that while experience is the best teacher, it is often difficult to acquire in sufficient quantity during the prescribed training regimen. Because experience is a key variable in the risk management equation, instructors must devise ways to infuse numerous lessons within a relatively short period of training. Scenario-based training allows you to do this more efficiently. Next, the consistent use of system safety principles within the context of realistic training scenarios helps to cultivate critical thinking skills. Finally, the use of scenario-based training adds a level of fun and excitement to aviation training that is difficult to achieve solely through repetitive practice. This helps keep students engaged and interested, and also illustrates the value of their training beyond preparing for a FAA practical test.

Using the CFIT example provided previously mentioned, let's take a look at a lesson plan and training scenario using system safety methodology.

Lesson Plan (Example 1)

1. Type of training: Recurrent/ proficiency

2. Maneuver or training objectives: Introduce student to CFIT hazards and risk management strategies during a cross-country flight.

3. Possible hazards or considerations (These examples are provided for training purposes only. Items may be added or omitted as necessary to reflect your unique operation.):

a. Lack of airport lighting (available visual/vertical guidance, VASI or PAPI)
b. Lack of pilot familiarity with airport
c. Surrounding terrain and topography
d. Precipitous terrain
e. Lack of available approaches
f. Lack of published departure/arrival procedures
g. Lack of alternates
h. Lack of air traffic radar/communications coverage
i. Differences in pilot/controller language

4. Mitigation strategies and resources (Every hazard or consideration should be addressed through the use of some mitigating strategy or resource. Those provided below serve only as an example to illustrate the system safety methodology.):

Airport lighting: The availability of a complete/operational approach lighting system may serve as a significant mitigating factor in reducing the risk of a CFIT accident. Based on experience and a careful review of the *Airport/Facility Directory* (A/FD), the pilot in command should determine the adequacy of the approach lighting system prior to departure. If the system is inadequate, and the consequences of using the airport are determined to be unacceptable, an alternative (see item 5 of this lesson) must be considered.

Also, the pilot in command must anticipate the possibility of an airport lighting system failure while attempting to land, particularly if a lighting system is a factor in mitigating other risks. The probability of such an occurrence may increase when flying into a non-tower controlled facility. This event should be anticipated during the preflight planning process, and an alternate plan of action developed. Notices to Airmen (NOTAMs) should also be reviewed to help identify any existing difficulties prior to launch.

Pilot familiarity with airport: While experience flying in to or out of a given airport offers no guarantee of increased safety, it very often does help to reduce pilot workload. Familiarity with air traffic and approach procedures, terrain, etc., all help to reduce the potential for confusion, allowing the pilot to perform more critical cockpit tasks.

While it is difficult to quantify the CFIT risk presented by flying into an unfamiliar airport, such considerations are often used as risk control measures to counter other safety issues presented in this lesson. During the preflight planning process, the pilot should review all available materials referencing the intended airport of arrival. This preparation will pay dividends should other unanticipated risks materialize during the flight.

Surrounding terrain and topography: CFIT accidents are often associated with mountainous terrain. However, there are many other potential hazards of which a pilot should be aware. For example, the pilot should know if the airport is surrounded by buildings, cell phone towers, or transmission lines that create potential risks. Sectional/terminal charts, the A/FD, approach plates, and NOTAMs may prove useful in making this determination. Because striking any object in flight rates as severe or catastrophic on the risk assessment scale, the only way to effectively manage risk is by reducing the probability of an occurrence. In this case, knowledge and thorough planning are the best tools.

Another potentially significant topographical hazard is the “black-hole” night- time approach. Unless the pilot is familiar with the destination airport, this hazard may not be known prior to arrival. There are, however, clues that may foreshadow the possibility of such conditions. For example, if flying into a small airport located outside a major metropolitan area or population center, the pilot should be aware that a black-hole approach is more likely. If an airport is located on an island, this too may create difficulties. Also, a lack of ambient (moon) light may contribute greatly to the black hole phenomenon.

In any case, a pilot flying into an unfamiliar airport at night should review chapter 15 of the *Pilot’s Handbook of Aeronautical Knowledge* as part of his or her planning process. Pilots may also wish to adopt an altimeter cross-check procedure when these conditions exist. Finally, should a pilot find himself succumbing to the effects of this illusion, good judgment should be demonstrated by immediately terminating the approach. If able, another runway could be used, or the pilot may elect to proceed to an alternate airport.

Precipitous terrain: This is one of the most obvious hazards contributing to CFIT accidents. Accidents such as the one involving a Gulfstream III attempting a night instrument approach into Aspen, Colorado, are tragic reminders of just how dangerous flying can be. Again, because the severity of CFIT accidents due to precipitous terrain always occupies the high end of our risk assessment scale, the only way to reduce the risk is to lower the probability of an occurrence. This may be done by first familiarizing the student with all available airport and topographical information prior to the flight. If there are lingering concerns, consider one of the alternatives listed in item 5 of this lesson plan.

Available approaches: While all published approach procedures are designed to ensure adequate terrain clearance, some present greater challenges than others. For example, most pilots would prefer the precision guidance offered by an instrument landing

Mario Toscano photo)

system (ILS) approach when arriving at an unfamiliar airport, at night, under instrument meteorological conditions. In fact, weather conditions may demand the lower minima facilitated by such an approach. In any case, if the flight requires the conduct of an instrument approach procedure, selecting the best one may help in reducing workload, along with possible risks. Approach construction is also a consideration when assessing risk. For example, does the procedure have an atypically shallow/steep approach angle? Does the procedure contain several intermediate step-downs? Is the approach aligned with the runway, or does it require a circling maneuver? While approach availability may only be viewed as a risk control measure when discussing other hazards, approach construction may, in fact, be considered a hazard necessitating its own unique mitigating strategies. Carefully reviewing approach plates prior to departure may stave off potential difficulties. Under some circumstances, the pilot may elect to execute another procedure, fly to an alternate airport, or wait for visual conditions to prevail.

Speaking of instrument approaches, why not stay at or above instrument approach minimum altitudes, even when flying a visual approach.

Published departure/arrival procedures: The main advantage offered by a published departure or arrival procedure is that of predictability. Because a published procedure allows a pilot to more precisely anticipate his or her route of flight, situational awareness is increased. This is particularly valuable (and perhaps critical) during high-workload phases of flight, such as when operating in a terminal environment. Again, while the presence or absence of a published arrival/departure procedure might not factor into a pilot's list of hazards, it may be considered a risk control measure when viewed along side other workload issues. However, the only way to realize a benefit in this case is to carefully review these procedures as part of the preflight preparation.

Availability of alternates: Depending on the rules under which a pilot operates, the type and availability of alternates may be governed by part 91 regulatory requirements. However, in most cases, both IFR and VFR pilots have at least some latitude in selecting alternate airports. When operating IFR, it is important not only to understand the legal requirements for selecting an alternate, but also the availability and types of approaches. Certainly no pilot would want to select an alternate that increases the opportunity for a CFIT accident. Accordingly, if the only alternate available is an airport surrounded by high terrain, and weather dictates that a diversion is possible, a pilot may want to consider planning his or her flight to a different airport (if practical) or simply waiting until conditions improve.

When quantifying the implications of an alternate during preflight planning, consider availability to be a risk control measure, while the absence of an alternate airport may be a hazard, depending on other conditions (weather, approach type, etc.).

Air traffic radar/communications coverage: When evaluating the role air traffic radar and communications coverage will play in a proposed flight, the pilot is likely to view it in a manner similar to quality alternate airports. Having radar and communications coverage to the surface certainly helps in mitigating other risks, however, the absence of one or both of these services may constitute a new set of hazards, and with them serious risks. This may be particularly true when viewed in conjunction with other operational factors. If flying into an area that may not have adequate radar or communications coverage, pay special attention to minimum en route and obstacle clearance altitudes, as well as published missed approach procedures.

Differences in pilot/controller language: Because most GA pilots in this country will confine their flight operations to English-speaking countries, this factor may never become a consideration. However, if planning a flight south of the border, or flying with another pilot for whom English is a second language, take time to consider the potential implications. Pay particular attention to factors such as obstacle clearance and minimum safe altitudes, if being vectored by a controller whose native language is other than English. A misunderstood vector or altitude assignment can, and has, led to catastrophic results.

5. Alternatives:

Time: When planning a training exercise, time is always a variable to consider. For example, the pilot and/or instructor may determine that based on forecast weather conditions, it would be prudent to delay a training exercise (or other mission) until the winds, ceiling, or visibility improve.

Location: If airport conditions do not allow the planned training or operational exercise to be conducted safely, another venue should be chosen. This flexibility should be stressed during the planning/instructional process.

Abort training exercise: This alternate is included to emphasize there are times when aborting a flight or choosing not to perform a particular maneuver or operation is an appropriate and prudent course of action.

6. Requisite skill sets: Proficiency in cross-country flight planning and operations, as well as skill in managing the aircraft and its systems.

7. Scenario-based training methodology: The instructor will integrate two or more of the identified hazards into a cross-country flight operation. The choice of hazards will be made so as to realistically highlight risks likely encountered under similar circumstances. This will force the student to use both mechanical and cognitive skills in a dynamic environment—one that contains the distractions, challenges, and potential hazards found in a typical GA mission.

8. Training materials: Aircraft pilot operating handbook/ flight operations manual (POH/FOM, AF/D), sectional/terminal area charts, approach plates, NOTAMs, *Pilot's Handbook of Aeronautical Knowledge*, and any other necessary flight planning tools.

Clearly CFIT is a complex issue with many operational considerations, only a few of which are presented here. This lesson plan highlights many of the CFIT hazards that could materialize on any given flight. To illustrate the importance of addressing these issues during the preflight planning process, this lesson may be reviewed as part of a cross-country scenario. Ground school lessons may also incorporate accident/incident scenarios using data from the National Transportation Safety Board <http://www.ntsb.gov/ntsb/query.asp>, the Federal Aviation Administration <http://www.faa.gov/avr/aai/iirform.htm>, and the National Aeronautics and Space Administration's Aviation Safety Reporting System <http://asrs.arc.nasa.gov/> web sites.

The flight portion could use the same resources. For example, to illustrate the dangers of high density altitude, the instructor could limit engine power and simulate high terrain on all sides of the aircraft. This may force the pilot to choose between a CFIT or possible stall/spin accident, and a forced landing into an off-airport location. This lesson plan also allows an instructor to clearly illustrate how the cumulative effects of several hazards may add up to an unacceptable risk. For example, while a pilot may be prepared to shoot an instrument approach down to minimums, he or she may not be prepared to shoot a circling NDB approach down to minimums, at night, in mountainous terrain, single pilot, with an inoperative autopilot system after flying six hours. In such cases, sound judgment and aeronautical decision-making are the most valuable risk control measures available.

Final Thoughts

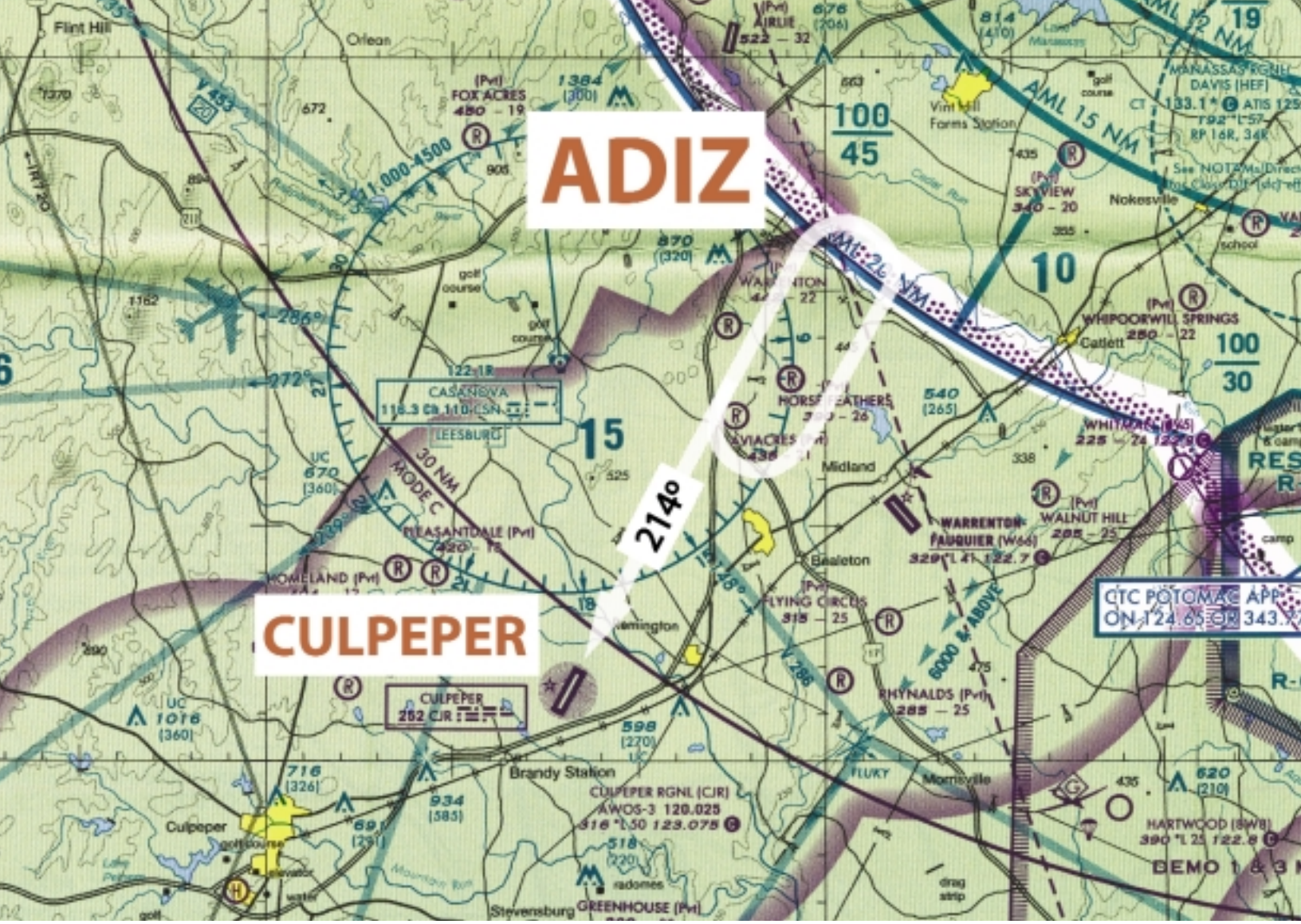
When training students, imparting this level of awareness represents a formidable challenge. Because not all risk is visible, the system safety methodology must be integral to every lesson taught. While a pool of oil under an engine cowl may provide evidence of an obvious hazard posing immediate risks, others will take experience and keen insight to uncover. As an instructor, the most important goal is to teach these critical thinking skills. Only then can the student apply the aeronautical decision-making techniques required to optimize safety. Always remember…

Experience + Analysis = Situational Awareness

Situational Awareness + Aeronautical Decision Making = Risk Management

Michael W. Brown is the manager of the General Aviation Operations and Certification Branch in Flight Standards' General Aviation and Commercial Division.

(Mario Toscano photo)



A "Three Strike" ADIZ Violator

Name withheld by request

First of all, the Air Defense Identification Zone (ADIZ) established around Washington, DC, after September 11, 2001, is designed to protect sensitive government facilities from airborne terrorist attacks. I'm far from a terrorist, but learned the hard way about the location of the ADIZ and how easy it was to become distracted and penetrate the ADIZ, not once, but three times on the same flight.

Here's how it all transpired. I had some radio and instrument repair work completed on my PA-30, *Twin Comanche*, and wanted to check the repairs. I planned an Instrument Flight Rules (IFR) flight from the aircraft's base in Culpeper, Virginia, to Martinsburg, West Virginia, to check things out. The weather was good visual meteorological conditions (VMC). I found myself running late and decided I didn't have the time to go all the way to Martinsburg, so I decided to stay local at Culpepper and fly the RNAV Runway 22 Approach under Visual Flight Rules (VFR).

Culpeper is outside of the ADIZ, so I wasn't thinking about the special procedures when I called air traffic control (ATC) after departure and told them I wouldn't need the IFR clearance to Martinsburg. They thanked me for the call.

I then proceeded to fly the RNAV approach—still no problem. But the full approach contains a holding pattern in lieu of a procedure turn. This holding pattern extends off the final approach course to the northeast (see diagram) and enters the ADIZ that extends all the way to the ground. There's no slipping under the layers of the "upside down wedding cake" of Class B airspace. The Instrument Approach Procedure chart does not show the ADIZ boundaries, so there I was inside of the ADIZ on a 1200 transponder code. I've learned pilots in the local area have come up with a saying that you're going to be "Talkin'and Squawkin' (an assigned code)" when in the ADIZ. I was doing neither!

Fortunately, this didn't cause the stir that some other well-publicized events that other ADIZ violations have—complete with fighter aircraft intercepts and prime time television coverage showing panicked masses running from federal buildings in the District of Columbia near the White House and U.S. Capitol.

After landing, the FBO manager at Culpeper said Potomac Approach wanted me to call them. I didn't really know why. I had completed my flight uneventfully. When I called, they told me what the radar showed. I admitted it was my aircraft they had seen. I'm an officer and a gentleman, and I wouldn't compromise my honor and bicker about the facts of the case.

The instrument approach chart had no indications of the ADIZ in the area of the RNAV approach to runway 22. This is an issue that I think must be addressed. There are many instrument approaches that reflect restricted areas. Why then don't they indicate the ADIZ areas as well? If the ADIZ had been depicted on the chart, I would have avoided it.

I filed an Aviation Safety Reporting System (ASRS) form that can provide limited immunity from the civil penalty or suspension action resulting from a violation.

Enter the Enforcement Action

I called the local FSDO and talked to people I knew there about the event. I'm an aviation safety counselor and have written numerous safety articles for commercial publications. This was my first violation after 67 years of flying. I felt my situation was best described by the popular phrase, "One aw shucks eliminates 100 attaboys."

I even thought about selling my airplane and being done with it all. That would show them! Well, maybe not. I had been shot down in a C-47 (civil DC-3) in World War II and escaped capture and recovered from injuries to return to flight duties. To this day I have shrapnel in my leg from the incident. Someone told me, "If the Emperor of Japan couldn't bring you down, don't let the FAA."

I learned I would be receiving a Letter of Investigation (LOI). It took a long time to arrive and I couldn't help but think that maybe they just forgot about it. No such luck. The LOI arrived by registered mail. I responded that I, in fact, had been the pilot-in-command (PIC) on the flight in question.

Soon a letter of proposed enforcement action followed with a 30-day certificate suspension. It was alleged I had committed three violations, including careless and reckless operation. With the ASRS report on file, I would not suffer any penalty, but would have the violation on my record for five years.

The Hearing

At this point, I opted for an informal hearing to resolve the issue. The jurisdiction for the DC ADIZ resides with the FAA's Eastern Region, based in New York. For convenience, my informal hearing was set up in the FAA's Washington Headquarters.

I brought up the issue of the lack of ADIZ depiction on the instrument approach plate and one of the FAA reps said it would increase the workload in preparing the charts. I responded by remarking that the charts are revised every 56 days. So why can't we make sure our customers will be able to see the no-fly zones? I also replied to a remark that the NOTAMS indicated the location of the ADIZ, I responded to that by saying you cannot fly instrument approaches with NOTAMS. It isn't safe. Restricted areas are shown on the charts, such as Tangier Island, Virginia, and other locations in the west such as Albuquerque, New Mexico, and Las Vegas, Nevada.

The hearing was fair and I was treated well. I learned one thing and have followed it since then. I will not fly VFR anywhere there exists an ADIZ, unless ATC has me under control. IFR is the way I fly these days.

Online ADIZ Training

You'll find an on-line course at <http://www.faasafety.gov> entitled "Navigating the DC ADIZ, TFRs, and Special Use Airspace." It contains helpful information on all types of Special Use Airspace (SUA). So there's application even for those pilots who do not plan on flying near the DC ADIZ. Temporary flight restrictions can pop-up anywhere. A little time spent brushing up on airspace and procedures can be time well spent.

There is a pending rule that would require pilots based within 100 miles of Washington, DC to complete the training and carry the completion certificate with them when operating near Washington, DC. We'll have more on this when the final rule is issued.

Attention "Auto" Transponder Users

Most newer transponders have the "one-button" feature that allows selecting a 1200 code without entering the code through individual selection. If the "auto VFR" code is inadvertently selected while operating in Special Use Airspace (i.e., the Washington, DC, ADIZ), the flight crew could be violated. One manufacturer is committed to offering a software modification to his transponder to require that a "confirmation" action (like a second button push) to acknowledge that the selection to the 1200 code is intentional. It's good to be extra vigilant in selecting the assigned transponder codes and especially important to remain on the assigned code until landing, even after leaving the assigned ATC communications frequency to contact an airport advisory.

Tales from an FAA Inspector

by Al Peyus

Use It or Loose It

Hangar Talk and Currency

It is that time of the year again when we "get" to look forward to the great flying weather just a few more months off. In the meantime, we have to deal with winter! Weather settles in for the long stay bringing fog, rain, snow, or ice (or all the above!) to take all the fun out of flying. This is the time we need a means by which to maintain those practiced and gained skills that allows us to "break those surly bonds of earth" and get us up where we belong! Remember, if we do not use it, we loose it!

'Tis the season we must find ways to stay at least mentally current. Of course, there are always the simulators, flight training devices (FTD), and home computer programs we can use. They are great and each does a fantastic job for its intended use. The one area of our flying skills that does not get the opportunity to be used as much is our flight procedures. Procedures are the basics of all our flying and should be maintained, although we cannot get into the air.

As always, full-motion simulators are the best tools for our overall skills and knowledge when we are grounded. They provide identical and realistic kinetic feelings and sights as our own favorite "bird." They give us the ability to run abnormal and emergency problems that we would never consider doing in our aircraft high above the ground. Whoever heard of deliberately failing a vacuum pump to see if we can spot the failing gyro before it tumbles while in actual IFR?

Even using an FTD or home computer, we can still accomplish training that keeps our procedures, knowledge, and skills sharp and current. We need to do anything and everything we can to keep ourselves as current as possible. The best way to achieve that is through constantly challenging and testing ourselves. The fun part of "testing" ourselves is that we, as a group, really do love being challenged.

So, you say there are no "inexpensive" or available simulators or FTD's available. Your personal computer has suddenly died. So, what can a diligent pilot do but sit out the weather and await the "bluer pastures" to come? Have I got a suggestion for you!

As with everything in this wondrous flying world we so enjoy, there are other ways to keep our procedures, skills, and knowledge up to our high standards. Here are a couple of options available to all of us who live near an airport or other pilots. In each case, these normally do not cost much more then your time and a little gas money for the car.

Option One:

One of the most enjoyable places for a pilot to be, when not able to be in the air, is at the airport with other pilots! The comradeship definitely gives one a peace of mind and a belonging that no other place on this earth can provide. Being in a group of same-minded people is always an interesting way to spend part of the day. And, it can be a great learning tool, if you willing to listen and ask questions.

Ever sit around an FBO when the weather has grounded flight instruction for the day and listen to the instructors talking? It can be an entertaining experience as well as a fantastic learning classroom!

Inspectors in the Flight Standards District Offices (FSDO) can always tell the weather around the nation by the telephone calls that arrive during the winter months. A group of flight instructors (CFI's) are sitting around waiting for the weather to clear and have started asking each other ques-

tions. This is the "I bet you don't know…!" debate that always follows bad weather. CFI's love to show their knowledge, love to be challenged on their knowledge, and thoroughly enjoy challenging other CFI's (or anyone standing near by!).

When the question comes up that no one can agree on the answer hits the floor, as it always does, the FSDO gets called. It is always put as a "clarification of the regulations" or "There is some confusion about …." But, the background sounds give the caller and question away. (It is the hooting and laughing that does it!)

One of the more popular questions that I have received, too many times to count, is about the ILS Decision Height (DH). When can a flight descend below DH? What about a missed approach at DH? Does the regulation allow for going below DH before starting the missed approach? What if the airport approach environment is then spotted while below the DH and after starting the missed approach, can an approach be continued? (The answers are at the end of this article.)

No matter what aviation subject is being discussed, as a party to this group, it is a delight to sit and listen to the CFI's. Yes! Somewhere along with all the questions, comments, and commentary, you will be called upon to offer an answer or opinion. But that is OK! In fact, that is great! You will be participating in an age-old activity that has been around since the Wright Brothers sold their first airplane! By listening and participating in these discussions, we learn. We all get to stretch our minds and wrap the ideas around real matters of interest: aviation.

Normally, some time into the "hangar talk" session, a CFI will ask what your questions are or what issues you have. This is great because all the CFI's present will have an answer for you! Each will have his/her own way of explaining the same issue. Someone will have the perfect balance of knowledge and expertise that best fits your learning methodology! They are all correct. But, because we all learn and understand differently, not every response makes sense to each of us. This is learning! This is practicing our tradecraft! This is fun! This helps us to stay current!

As each of us responds to questions or comments, we start to "fly" the answer. We are suddenly placed back in the cockpit doing or responding to what ever is up for discussion/question. It really works! In most cases there is no charge because no one has been assigned a ground session. What a great deal—instruction on a wide variety of aviation topics, multiple instructors with varied opinions, and we get to sit there and not only offer our "two-cents worth" but we can now decide which of the opinions best fits our flying and will work best for us!

Isn't that part of staying current? Aren't we working our gray matter and keeping the information "up-front" and exercised? Well, DUH! And it saves on the wallet/pocketbook!

Pilots do the same thing! Sit around the hangar on a bad weather day. As soon as there are three or more pilots gathered, it will start. For some strange reason, ego I guess (Yes! Pilots have egos!), pilots like to have a "gathering" before the questions or stories start in earnest. One pilot will ask a question about an aircraft's system, regulations, charts, airspace, or some limitation, and the ball is rolling. Soon, everyone in the group will be asking questions, providing answers, or telling their stories. Some ask only to see if they can stump the next pilot and some to get new information, and then there are those that want to tell of their experiences that either scared the devil out of them or the one that they learned from and hope that you will also.

No matter the reason for the questions or the stories, the idea that everyone is now thinking aviation, procedures, rules, and systems is the best parts of the experience. If you keep your mind and ears open, the knowledge is there for the taking! Each of us learns a portion of the massive regulations, the airspace system, aircraft systems, or environment in different ways and in different degrees. None of us know it all.

Just when you thought you heard all of the stories, someone always has that new question or new slant on a regulation that gets everyone thinking. And thinking is what is needed for all of us! By keeping our knowledge fresh and in the conscious part of our brain, we accomplish the same thing as sitting in a classroom, but have more fun getting there.

Even those that have the opportunity to fly during those dreary winter months can still accomplish the same objective while flying to the famous Saturday pancake breakfast. While sitting down to the warm and tasty flapjacks, ask the person across from you a system or regulation question. Within short order, the game is on!

It will take no time to get a gathering of other pilots joining in on the question and answer game. It is always great fun! The best part of this fun is the practical side of it. Everyone has their mind back into flying and all its aspects! This keeps that knowledge flowing into the brain instead of slowly slipping away!

One of the best parts of all hangar talk is that it is not restricted to only the winter season. Pick a rainy day and you have the perfect combination: a group of pilots and the questions, comments, stories, and "I'll bet you don't know" conversation starters. And the fun, information, knowledge, experiences, and learning start anew.

Some of the stories that are the best to learn from are those that could easily end up in the *Flying* magazine under, "I learned about flying…." That time when the engine seized because the pilot failed to make sure the oil cap was secure before takeoff, or the engine quit because the fuel cap came off in flight, make us all stand up and take notice. If we are willing to admit it, which could well have been any one of us that day when we were in a hurry to get off the ground and beat that incoming weather!

We all have had days that we gained the experience because of something we forgot to do, or failed to do correctly, or failed to plan com-

(H. Dean Chamberlain photo)

pletely. For most of us, it was nothing more then a mild scare when we found the potential problem when we got back on the ground. For a few of us, it was the scare of a lifetime and a damaged aircraft that gave us the hard learned experience that hopefully others will hear and learn how to avoid the same pitfalls.

Everyone has had a problem at some time in his/her flying career. Whether it was a landing gear, electrical, or engine problem, something happened that challenges our expertise and knowledge. These are the type of stories that come out during the "hangar talks." These types of stories are the basis for learning. Many of us have already been there once, but with knowledge and training, we hope no one else will join our group!

It is through these discussions with other pilots, those same-minded aviators that are our peers, that we can keep our knowledge, procedures, and skills uppermost in our minds. We need to be able to share that information while it is most readily available. The sheer excitement of "talking flying" is, in itself, a learning tool. The experience of the simple act of talking with fellow aviators allows us to refresh, review, maintain, and learn all about skills, our knowledge, procedures, and us.

Option Two:

Here is a way fixed-based operators (FBO's) and flying clubs can keep their flying members active in aviation. How about sponsoring a weekday night or weekend day once a month during the winter months for a gathering of all your customers or club members. You can get three or four of your instructors to participate in a great "hangar talk" session. (Three or more is always more fun. Just think of all the various methods of accomplishing the same task that can be presented. And all of them legal, safe, and acceptable!) All the FBO or club would have to provide is the space and maybe a little expense for refreshments. It can even turn into a "Pot Luck" event!

Provide your customers or members a theme or agenda and a location and time to get them all together. After a brief discussion of the main topic area, all that is then necessary to start the ball rolling is ask the first question. It takes little to keep things going save to ask another question once in a while. Having the CFI's around helps to stimulate everyone's interest and provides the expertise needed to support the answers provided or to correct an incorrect answer that has come from the group.

Another available asset for a night or day of "hanger talk" is the local FSDO. Contact the local Safety Program Manager (SPM) at the FSDO. SPM's love their job, and they love the opportunity to discuss aviation safety and be able to bring everyone up to date on the latest and greatest in regulations, temporary flight restrictions (TFR's), best practices, and learning tools. The SPM may help in arranging the meeting, or, if given sufficient time, the SPM may be able to even plan a safety meeting at your location!

We all need to keep current.

When we cannot get into the aircraft for whatever reason, we need to at least continue talking aviation no matter what the season. Winter is that time of the year when our flying seems to fall apart. The weather is bad. It is cold, snowy, icy, rainy, and no one wants to venture out because we cannot fly! Our skills slowly slip away! Our knowledge fades away from our conscious mind like an evaporating ghost! Our procedures get very rusty the longer we stop thinking of them!

There are three great reasons to take positive action! Get off the couch and push away from the dinner table (well, at least those shaped like me!)! Get a group going! Visit the airport! Talk to your local FBO or flying club. Arrange for a "hangar talk" session. In order to keep aviation active in our minds, we need to talk about it. Aviation needs to be discussed and tossed around. We need the knowledge, skill, and procedures to stay with us.

It is this constant communication between ourselves and our fellow aviation folks that help us retain all that "aviation stuff" we worked so hard to learn in the first place. Why allow the weather to dictate when we can "participate" in aviation? We can always enjoy another cup of coffee or tea with others of the pilot or maintenance world and play the "Do you know…?" game challenging ourselves.

Remember, if we do not use it, we loose it!

The Answer

By the way, here is the answer to the most frequently asked winter questions. According to the regulations, Title 14 Code of Federal Regulations, § 91.175(c), the DH is a hard altitude. At that altitude the pilot must look out. If one of the required airport visual references listed in this section for the intended runway is not distinctly visible and identifiable to the pilot, the pilot may not continue the approach below the authorized DH. Category II and Category III operations have their own requirements.

In real life, the pilot has set the aircraft up for a smooth and stable descent. For an aircraft in the 110 KIAS approach range, that is about a 500 foot a minute descent rate. The aircraft will be trimmed, power set, flaps as required, gear down and locked, and localizer centered. At DH, without touching a thing, the pilot looks out the windscreen and checks for the required airport visual reference. If at least one is not in sight, the missed approach is started. It is extremely difficult to stop the aircraft from descending below DH once the decision is made at the DH to go around. This descent below the DH is calculated into the procedure. The actual descent below the DH limit should be MINIMAL!

After the missed approach procedure is started, there is no option to revert back to the approach mode just because the airport environment came into view during the initiation of the missed approach!

Remember, the visibility requirement for the approach is a SLIDING WINDOW. If it requires a '½' statute mile, that '½' statute mile must be there all the way to the touchdown. If you loose that visibility the required action is a missed approach.

Al Peyus is an Aviation Safety Inspector in Flight Standards' General Aviation and Commercial Division.

What You Do in Systems Thinking

by Steve Biedermann

Have you thought about enrolling in a Systems Thinking course? Are you hesitating because you need a better idea of the skills involved to determine whether you need them? Here's one way to think about systems thinking in an aviation context.

When a storm closes O'Hare Airport, it is an event. If we respond simply by circling the planes, we are reacting. We've done nothing to prevent future occurrences. We haven't addressed the implications of circling planes on the rest of aviation.

If our reaction is to circle the planes and then do research into when and where this phenomenon occurs, we are paying attention to patterns. We might notice that certain airports require more frequent holding patterns. If we identify nearby airports into which inbound planes can be diverted rather than circling, we are "adapting." But, we still haven't done anything to prevent future incidents.

Suppose we take a step back and look at the "big picture"—at the system that influences these patterns of events. If we examine existing rules and structures and create procedures to ground-hold planes at departure airports, such that they will arrive at destination airports when the weather will allow, we have created change and done something to prevent future weather-related holding patterns!

As systems thinkers, our students look at the big picture. They learn to identify solutions to their issues, to consider how these solutions might play out over the long run, and to maximize the benefits and minimize any unintended adverse consequences.

If these are skills you could use, then Systems Thinking is for you. The course is offered at the FAA Center for Management & Executive Leadership (CMEL) in Palm Coast, Florida. If you are not an FAA employee and would like to enroll in Systems Thinking, contact Student Services at (386) 446-7223.

Beware V-Squared: Friend or Foe Measure of Risk in Aviation

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ABSTRACT

The old phrase of not being able to see the forest for the trees has many applications. In education, there are often so many pages (trees!) in books, for example, that connections between concepts often remain hidden; admittedly, the writer finds this to be true in his own book (*AVIATION METEOROLOGY UNSCRAMBLED: For VFR & IFR Operations/Certificates & Ratings*). Of course, each concept should be developed fully, but afterwards there are ways that concepts can be presented in a briefer manner, especially when the concepts can be shown to have a much closer relationship with each other than would have been anticipated when first encountered. This paper will attempt to describe some close relationships between flight and meteorological dynamics through "conceptual or intuitive physics," rather than "precise physics." That said, this writer fully acknowledges and appreciates the fact that precise physics is the ultimate final test of any theory that employs physics concepts. In any event, the "bonus" that comes from exploring concept relationships is the development of a relative measure of risk, with applications in aircraft operations and in understanding weather principles.

INTRODUCTION

By way of introduction, the FAA is advocating "three Ps" — Perceive, Process, and Perform. The writer of this article wholeheartedly supports this effort, and he has already been doing this through his own COVERED approach for many years — in teaching, presentations, and writings. **CO**mprehend and **V**isualize correspond to Perceive, **E**valuate corresponds to Process, **R**espond corresponds to Perform, and re**E**valuate and **D**etermine are additional considerations. Comprehending (understanding) and Visualizing — Perceive — is something that can be accomplished through actual pictures, analogies, and formulas. Ultimately, understanding and "seeing with the mind's eye" is the first goal, in order to then effectively Process and Perform. With the COVERED approach, emphasis is also placed on the ED, that is, reEvaluating and Determining a new course of action, in the event that the first response does not work out — weather does change, for example! So we begin with COV, or the first P (Perceive), in order to explore the nature and the effects of v-squared.

PRE-TEST

Joe Pilot is taxiing his wife's aircraft at 5 knots when he runs into a concrete hangar. How much more damage would the aircraft likely incur, had the aircraft been moving at 15 knots? Do not consider divorce/attorney fees — his wife told her lawyer that he should have stopped and asked for directions!

(a) one-third as much
(b) same amount
(c) three times as much
(d) six times as much
(e) nine times as much

Joe is a CFI — he would not have run into the hangar!

BASIC CONCEPT

In order to answer the above question, we introduce a concept that is often not fully utilized. As one walks along a floor, one possesses energy of motion, called kinetic energy. If a person walks into a very soft, elastic wall (think of the wall as a large rubber band), then the force of that motion will be spread out over the distance that the wall stretches (thus, the kinetic energy is being "stored" as potential energy), so there will likely be no damage to the person. After the elastic wall stops stretching and starts to move back toward its original position, kinetic energy will be returned in the form of motion of the person, eventually away from the wall. However, had the wall been very rigid, say made out of concrete, then the force of the person's movement into the wall would have resulted in the energy of motion causing damage to the person. So whether or not there is significant damage to the person depends largely on the distance that the wall moves/stretches.

The above example illustrates the equivalence of kinetic energy with a force acting through a distance, that is, the ability of energy to do work. If Joe Pilot taxies his aircraft at 5 knots and hits a concrete wall, then since the wall will have little damage/displacement, then most of the kinetic energy of the aircraft upon impact with the wall will result in that energy being manifested in damage to the aircraft (an approximation to the law of conservation of energy, although some of the kinetic energy will be realized as heat energy upon impact), or equivalently, the reactive force of the wall to the aircraft will impose considerable damage (a consequence of Newton's third law). The actual equation for kinetic energy is, in words, kinetic energy equals one-half times the mass times the square of the velocity of the object. If Joe hits a solid wall going at a velocity of 10 knots, then the energy, realized as a force through a very short distance, would be increased by a factor of four — note that the square of ten is one-hundred, which is four times as large as the square of five — the short way to obtain the factor of four is to just square two (since ten is twice as large as five). If Joe hits the wall going at 15 knots, then his "damage risk" goes up by a factor of nine (since 15 is three times as large as five and the square of three is nine). It is important to note that just telling Joe not to taxi too fast is a bit vague without the formula for kinetic energy, for the formula specifies the specific damage risk that Joe incurs. So while "v" usually gets Joe where he wants to go, v-squared is the "liability" that he

carries along with him when his airplane is in motion. Thus, BEWARE V-SQUARED when taxiing! At this point, it should be clear that selection (e) is the correct answer in the above pretest question.

FLIGHT APPLICATIONS

Another formula, and one which looks a lot like the formula for kinetic energy, is the formula for dynamic pressure, which will turn out to be very important (contributes to lift, crosswinds, etc.). The formula for dynamic pressure is one-half times density times the square of the velocity of the object, so this formula is the same as the one for kinetic energy except with density in place of mass. However, since density is mass per unit volume, then we replace density by mass divided by volume in our formula for dynamic pressure; thus dynamic pressure becomes one-half times mass times the square of the velocity divided by volume, that is, kinetic energy divided by volume. At this point, we can already say that dynamic pressure, symbolized by q, is the kinetic energy possessed by one cubic inch of air in motion. However, since we are calling q dynamic presure, we now see if we can put q in the usual units of pressure, so many pounds per square inch, for example.

All we need to do in our formula for q is to replace kinetic energy in the numerator by force times distance, say pounds times inches, so then the inches unit in the numerator divides out one of the inch factors in the denominator, leaving pounds per square inch — one of the typical forms of pressure (force per unit area). We are certainly interested in the flow of air over the wing, because as dynamic pressure increases over the wing due to the increase in velocity of the air flowing into the constricted area between the curved shape of the wing and the boundary layer of air above, then static pressure acting downward is decreased — a form of the Bernoulli Principle. Thus v-squared, which is now a hidden factor in our pounds per square inch units for dynamic pressure, is usually a pilot's "friend" whenever v is increased over the wing — recall that dynamic pressure was one-half times density times the square of the velocity of the airflow before we changed the formula to pounds per square inch. Thus, lift is increased either by increasing the velocity or the density of the airflow over the wing.

The equation of lift is given by the product of the coefficient of lift times the dynamic pressure times the wing area. Thus, doubling the wing area would double the amount of lift, for example. The coefficient of lift is determined primarily by the angle of attack and the shape of the wing. These additional sources of lift are mentioned here only for completeness. We are particularly interested in the velocity of the flow of air over the wing, for increasing v (acceleration of the airflow) increases v-squared. An increasing headwind is usually good, for an accelerating headwind enhances an already accelerated airflow over the wing due to the shape of the wing; of course, this is not good if it results in overshooting an approach to the runway. A decreasing headwind is not usually a friend, however, for it diminishes the acceleration of the airflow over the wing. Whether an aircraft has a constant 20 knot or a 10 knot headwind makes a difference only on groundspeed. But "in the act" of decreasing from a 20 knot headwind to a 10 knot headwind, there is a loss in lift as described, and hence a decrease in IAS while the headwind is decelerating.

Similarly, a decreasing (decelerating) tailwind is usually good, but an increasing (accelerating) tailwind is not; also, a wind that shears from a tailwind to a headwind is usually good, but the reverse is not. Again, these effects are registered as changes in IAS only while the accelerations or decelerations are taking place. One flight technique for dealing with an increasing tailwind is to do a 180, which will make the wind become an increasing headwind; however, the initiation of such a turn will increase the stall speed, so care must be taken, especially at low altitudes. Larger aircraft caught in thunderstorm microbursts (intense radial downdrafts, possibly with wind speeds in excess of 150 knots, in which an aircraft encounters an initial increasing headwind that quickly changes to a downdraft and then to an increasing tailwind) is assumed to be largely responsible for the loss of over 100 lives in major airline accidents in the 1980s in New Orleans and Dallas-Fort Worth. Of course, any kind of wind shear when taking off or landing is a concern, and that is why pilot recognition (Evaluate/Process) and action (Respond/Perform) is time-critical in such situations, that is, when encountering decelerating or accelerating headwinds or tailwinds.

V-squared is not a pilot's friend when dynamic pressure is applied as a crosswind in the takeoff/landing environment, for the crosswind can be up to 90 degrees. While this is not as bad as Joe Pilot hitting a wall (sudden stop), the same v-squared principle applies, that is, with the wind impacting the side of the aircraft, this makes the aircraft up to nine times as difficult to control in a 30 knot, 90 degree crosswind as in a 10 knot, 90 degree crosswind. It is recommended that an extra margin of airspeed be carried during operations near the ground, say one-half of the wind gust speed. So again, beware v-squared! And keep in mind that the strength of the crosswind increases with an increase in the density of the air — hence, density altitude is also an important factor!

And what about a wind that is coming not from the side but rather from the top of an aircraft, such as with a thunderstorm downdraft? The same principle applies as for the crosswind, that is, a 45 knot downdraft will exert up to nine times as much force downward per square inch on the upper surface of the aircraft as a 15 knot downdraft. At low altitudes, the implications are obvious — little altitude margin in which to recover, and double trouble if the aircraft stalls. As an aircraft is forced downward due to the dynamic pressure of a strong downdraft, the relative wind is upward (opposite the flight path), so the angle of attack is suddenly increased — nosing down in order to decrease the

angle of attack and adding all available power at this point in order to generate lift could easily be too late. Once more, beware v-squared! "Unfavorable wind" is a cause/factor in approximately one out of every three weather-related accidents (especially in the takeoff/landing environment). Also, while microbursts extend radially outward to about 2.5 miles, macrobursts can extend much farther, and gust fronts (non-radial thunderstorm downdrafts) can extend even farther. As a Wing Weather Officer at the former Carswell AFB in Fort Worth, Texas, this writer observed a gust front from a cluster of thunderstorms that extended over 500 miles!

Certainly, practicing take-offs and landings in "reasonable" crosswinds is an appropriate Scenario Based Training (SBT) activity in the FITS program, while penetrating a thunderstorm is not (even with the best of radars, in this writer's opinion). As Susan Parson stated in her article "Hedging Their Bets: How to Teach Practical Risk Management" (NAFI Mentor, March 2005, v7, i3, p 10-13), flight always involves some level of risk — hence, risk management needs to be a part of all aviation planning, unnecessary risk should be avoided. Risk is only accepted when the benefits outweigh the potential dangers, and risk decisions need to be made by the appropriate person (flight instructor or student pilot, for example). Crosswind practice with 40% of the POH maximum 90-degree crosswind component might be appropriate for most mid-program beginning student pilots, but more than 80% of maximum probably would not, which should be clear from the relative risk analysis presented in this paper — 80% is twice 40%, which means that the relative risk factor would go up by a factor of four! In the context of Susan's article, the greater the consequences and the greater the frequency of an encounter (with strong crosswinds, for example), the greater the risk (from Low to Medium to Serious to High). This writer would suggest even a fourth "P," for without a Proper or Positive attitude, neither the 3P nor the COVERED models is likely to be fully utilized.

METEOROLOGICAL APPLICATIONS

At this point, we describe another relationship that needs to be emphasized. Recall that dynamic pressure was defined as one-half times density times the square of the velocity and that by replacing density by mass per unit volume (say, cubic inches), we were able to express dynamic pressure as the amount of kinetic energy possessed by a cubic inch of moving air. Thus, as highs and lows move horizontally, energy is being transferred, and conversely, that is, if there is a change in the transfer of energy, there will be a change in pressure. What is the "link" between energy and pressure? Well, again, recall that at one point that we had force times distance involved in our formula for q, that is, force is the link between kinetic energy and dynamic pressure. Horizontally, this "pressure force" involves both the pressure gradient and Coriolis forces, that is, the pressure gradient and Coriolis forces are responsible for the velocity, v, of air in motion, and v-squared contributes to both kinetic energy and dynamic pressure (hence to the pressure force).

What about vertical changes? Well, pressure can and does change vertically as well as horizontally. Whenever there is mass movement of air (upward in a low, downward in a high), there is a change in potential energy; hence on constant pressure charts, contours are lines of constant geopotential height. Of course, there are other ways than pressure systems that affect horizontal and/or vertical motion, namely, fronts, topography, daytime heating (convection), gust fronts from thunderstorms, converging/diverging winds, and jet streams, all of which provide the force(s) that results in pressure changes/energy transfers. And of course, there is always the energy that is released when water vapor condenses to liquid drops (latent heat of condensation), which will increase the internal pressure of a gas. Thus, it should be clear that pressure changes involve energy transfers and vice versa, with "force(s)" being the "link" between pressure and energy.

CONCLUSION

We conclude by emphasizing the importance of v-squared, which is a part of the formulas for kinetic energy, dynamic pressure, and the equation of lift. The reader may wish to extend the use of symbols used here (such as v and q) in order to write more formal equations that represent the development presented. However, the choice in this paper has been to show that appropriate descriptive (rather than subjective) words can be used — many pilots are intimidated by the use of too much formal symbolism. We have seen how v-squared can be either a friend or foe when it comes to increasing or decreasing lift, respectively, and how it is definitely not a friend when it comes to crosswinds and thunderstorm downdrafts. Again, it is too vague for one to just say "be careful with crosswinds or thunderstorms today," especially when one considers that v-squared can be applied as a relative measure of risk that can be determined, or at least approximated. Certainly, a formula does not communicate without descriptive words, but just as importantly, subjective words alone do not adequately convey risk. Hopefully, "beware v-squared," or "be aware of the power of v-squared," will become a good operational guide for determining relative flight risk (as well as for ground operations, such as taxiing), and in facilitating a better understanding of weather phenomena in general, for more and more meteorologists (especially on television) are now often using "energy" in their weathercasts — for example, the "energy" for our current weather is being supplied by an upper level low pressure system moving in from off the coast."

Ken McCool, PhD, CCM,is the President of Meteorological Associates. He is also an FAA Aviation Safety Counselor and is an AGI, IGI, and a former CFI. (mccool@ntin.net)

Distant versus Local NOTAMs

Editor's Note: The following letter was received by FAA Aviation News *concerning an error in an article published in the November/December issue discussing NOTAMs. In our opinion, the letter also contained an error. Please read the letter and the reprinted section from the* Aeronautical Information Manual *(AIM) concerning NOTAMs.*

The November/December 2005 issue of *FAA Aviation News* features an article by Adrian Eichhorn titled "N.I.G.H.T." This article contains an error that has a direct impact on aviation safety and needs a correction as soon as possible.

According to the article: "If your flight is to a distant airport the NOTAMS you receive typically will include information on navigational facilities, frequency changes, and regulatory amendments. But, it will not include information contained in local NOTAMS. For instance, local NOTAMS include such information as runway or taxiway closures and airport lighting outages."

The above paragraph is factually incorrect and perpetuates a misunderstanding of the terms "distant" and "local" as applied to NOTAMS. These terms refer to the manner of dissemination, NOT the information itself. A NOTAM D is defined in FAA Handbook 7930.2J as "A notice distributed by means of telecommunications containing information concerning the establishment, condition, or change in any facility, service, procedure, or hazard, the timely knowledge of which is essential to personnel concerned with flight operations." A Local NOTAM, on the other hand, is not disseminated but only retained by the tie-in flight service and does not contain information pertinent to flight safety. A runway closure, a taxiway closure, and an airport lighting outage are all classified as a NOTAM D.

I discovered this misinformation today when I briefed a student pilot who was emphatic about wanting only "local NOTAMS," but when I questioned him about what he thought a local NOTAM was he gave me the same erroneous definition and quoted your article as the source! With more and more pilots switching to self-briefing options it is important that you publish a correction before this misinformation results in an aircraft accident.

Gregory D. McGann
RDU AFSS

FAA Aviation News uses the *FAA Aeronautical Information Manual* (AIM) as the basis for information available to the public concerning flight in the National Airspace System. The following information was copied on December 14, 2005, from the FAA's online, electronic version of the AIM. Based upon the AIM, there was one error in the article titled "N-I-G-H-T." The author said local NOTAM's included "…such information as runway or taxiway closures and airport lighting outages."

The AIM states in part that local NOTAMs in subparagraph 5-1-3 (b)(2)(a) "NOTAM (L) information includes such data as taxiway closures, personnel and equipment near or crossing runways, and airport lighting aids that do not affect instrument approach criteria, such as VASI." This section does not say "runway closures" are included in local NOTAMs.

5-1-3. Notice to Airmen (NOTAM) System

a. Time-critical aeronautical information which is of either a temporary nature or not sufficiently known in advance to permit publication on aeronautical charts or in other operational publications receives immediate dissemination via the National NOTAM System.

NOTE-

1. NOTAM information is that aeronautical information that could affect a pilot's decision to make a flight. It includes such information as airport or primary runway closures, changes in the status of navigational aids, ILSs, radar service availability, and other information essential to planned en route, terminal, or landing operations.

2. NOTAM information is transmitted using standard contractions to reduce transmission time. See TBL 5-1-1 for a listing of the most commonly used contractions. **(FAA Aviation News Editor's Note: TBL 5-1-1 was not copied from the AIM for this discussion.)**

b. NOTAM information is classified into three categories. These are NOTAM (D) or distant, NOTAM (L) or local, and Flight Data Center (FDC) NOTAMs.

1. NOTAM (D) information is disseminated for all navigational facilities that are part of the National Airspace System (NAS), all public use airports, seaplane bases, and heliports listed in the Airport/Facility Directory (A/FD). The complete file of all NOTAM (D) information is maintained in a computer

database at the Weather Message Switching Center (WMSC), located in Atlanta, Georgia. This category of information is distributed automatically via Service A telecommunications system. Air traffic facilities, primarily FSSs, with Service A capability have access to the entire WMSC database of NOTAMs. These NOTAMs remain available via Service A for the duration of their validity or until published. Once published, the NOTAM data is deleted from the system.

2. NOTAM (L)

(a) NOTAM (L) information includes such data as taxiway closures, personnel and equipment near or crossing runways, and airport lighting aids that do not affect instrument approach criteria, such as VASI.

(b) NOTAM (L) information is distributed locally only and is not attached to the hourly weather reports. A separate file of local NOTAMs is maintained at each FSS for facilities in their area only. NOTAM (L) information for other FSS areas must be specifically requested directly from the FSS that has responsibility for the airport concerned.

3. FDC NOTAMs

(a) On those occasions when it becomes necessary to disseminate information which is regulatory in nature, the National Flight Data Center (NFDC), in Washington, DC, will issue an FDC NOTAM. FDC NOTAMs contain such things as amendments to published IAPs and other current aeronautical charts. They are also used to advertise temporary flight restrictions caused by such things as natural disasters or large-scale public events that may generate a congestion of air traffic over a site.

(b) FDC NOTAMs are transmitted via Service A only once and are kept on file at the FSS until published or canceled. FSSs are responsible for maintaining a file of current, unpublished FDC NOTAMs concerning conditions within 400 miles of their facilities. FDC information concerning conditions that are more than 400 miles from the FSS, or that is already published, is given to a pilot only on request.

NOTE-

1. DUATS vendors will provide FDC NOTAMs only upon site-specific requests using a location identifier.

2. NOTAM data may not always be current due to the changeable nature of national airspace system components, delays inherent in processing information, and occasional temporary outages of the U.S. NOTAM system. While en route, pilots should contact FSSs and obtain updated information for their route of flight and destination.

c. An integral part of the NOTAM System is the Notices to Airmen Publication (NTAP) published every four weeks. Data is included in this publication to reduce congestion on the telecommunications circuits and, therefore, is not available via Service A. Once published, the information is not provided during pilot weather briefings unless specifically requested by the pilot. This publication contains two sections.

1. The first section consists of notices that meet the criteria for NOTAM (D) and are expected to remain in effect for an extended period and FDC NOTAMs that are current at the time of publication. Occasionally, some NOTAM (L) and other unique information is included in this section when it will contribute to flight safety.

2. The second section contains special notices that are either too long or concern a wide or unspecified geographic area and are not suitable for inclusion in the first section. The content of these notices vary widely and there are no specific criteria for their inclusion, other than their enhancement of flight safety.

3. The number of the last FDC NOTAM included in the publication is noted on the first page to aid the user in updating the listing with any FDC NOTAMs which may have been issued between the cut-off date and the date the publication is received. All information contained will be carried until the information expires, is canceled, or in the case of permanent conditions, is published in other publications, such as the A/FD.

4. All new notices entered, excluding FDC NOTAMs, will be published only if the information is expected to remain in effect for at least 7 days after the effective date of the publication.

d. NOTAM information is not available from a Supplemental Weather Service Locations (SWSL).

FAA's Safety Hotline 1-800-255-1111

FAA's Safety Hotline operates Monday through Friday (except holidays) from 8 am to 4 pm ET. It provides a nationwide, toll-free telephone service, intended primarily for those in the aviation community having specific knowledge of alleged violations of the federal aviation regulations. Callers' identities are held in confidence and protected from disclosure under the provisions of the Freedom of Information Act.

Dr. Jon Jordan, the Federal Air Surgeon, Retires

Dr. Jon L. Jordan, M.D., J.D. is retiring as the Federal Air Surgeon. He has held this position since 1991 and has been with the FAA for 36 years. When the newly discharged U.S. Army Major joined the FAA in 1969, he had thought he would work a few years with the FAA before moving onto the private sector. However, he soon found that the fascinating and diverse issues he had to deal with and the opportunity to use his training in two professional disciplines (medicine and law) a good reason to stay. His new job was head of the Office of Aviation Medicine's Project Development Branch and in 1976 he was promoted to Chief of the Medical Standards Division. In 1979 he became Deputy Federal Air Surgeon.

Dr. Jordan was born in Oak Hill, West Virginia, and earned his medical degree in 1963 from the Medical College of Virginia and his law degree in 1967 from the University of Virginia School of Law. He says his career in aerospace medicine was "largely happenstance." Shortly after finishing law school, he was invited to join the U.S. Army and was undergoing basic medical officer orientation when he was offered the opportunity to take flight surgeon training. He found the invitation too interesting and challenging to pass up. He spent almost two years as a flight surgeon at Fort Lewis, Washington. His next career move was to the FAA.

Another reason for his long stay with the FAA is that he likes and respects the people he has worked with throughout the FAA. He said, "One could not hope to find a more dedicated, competent, and professional bunch of people."

Dr. Jordan summed up his feelings on his retirement in his column in the *Federal Air Surgeon's Medical Bulletin* by saying, "I leave the FAA with a sense of accomplishment. Looking at the folks who make up the Office of Aerospace Medicine, we have the strongest and most competent staff ever. We have efficiently and effectively managed multiple complex programs and dealt with difficult issues. We adopted a philosophy of medical oversight that prolongs and promotes the careers of airmen and air traffic controllers and at the same time contributes to the remarkable aviation safety record in the United States. We have developed new systems for data management that improved our effectiveness in all program areas. We have contributed to aviation safety through a variety of important research initiatives and we have met new challenges and program responsibilities with enthusiasm and effectiveness. To leverage our resources and promote safety, we have built a system of aviation medical examiners that serves as a model for the world.

Dr. Jon L. Jordan, M.D., J.D.

For the future of aerospace medicine, Dr. Jordan believes that the world of aviation is and will undergo dramatic changes and foresees significant new challenges with commercial space operations, use of unmanned aerial vehicles, larger capacity commercial airplanes, longer distance flights, and the ever evolving medical diagnostics and treatments that make medical certification decision making more complex. These issues will have to be met and accommodated by the

aerospace medical community, but he is confident that FAA will meet the challenge.

Nick Sabatini, Associate Administrator for Aviation Safety, will miss Dr. Jordan's expertise. The Federal Air Surgeon and Office of Aerospace Medicine are part of the FAA's Aviation Safety organization. When asked by *FAA Aviation News*, Associate Administrator Sabatini said, " Dr. Jordan is and continues to be the consummate professional. He is the person you go to in his area of expertise because you knew he had the knowledge and ability to lead through some very complicated issues. He has been a leader with the Age 60 Rule, and we continue to face that challenge even today as it is being addressed again up on the Hill. He will be very much missed by me and the people in this organization."

As for his own future, Dr. Jordan said his only plans at the moment are to enjoy his retirement and being a private citizen. His only concern is whether his wife will enjoy his being retired.

Aircraft Registration Starts Heating Up

by Michael Lenz

Those pilots who have signed up for automatic electronic mail from the FAA Safety Program (FAASTeam) recently received a message titled: **Aircraft Owners and Operators – Check your Registration**

This is causing quite a stir!

The *Federal Register* (December 9, 2005, volume 70, Number 236, Page 73323) gave the background on this effort. In 2003, a change was made to the FAA's Aircraft Registration system that changed the status of records containing information that would render a certificate of registration ineffective, if true, to reflect a status of "In Question." In most cases, this is due to the owner failing to update the aircraft registration with any changes at least every three years, as required. In other cases, incomplete information may have been submitted, such as after the sale of an aircraft. There are thousands of aircraft that are now "In Question."

The *Federal Register* notice reads (and this is where the heat gets turned up) "On [February 1, 2006] operators of identified aircraft with questionable registrations and or no Transportation Security Administration (TSA) required security measures/waivers will be: (1) Notified of the deficiency, (2) a pilot deviation will be filed on the operator, (3) operator may be denied access to the National Airspace System (NAS) [emphasis added]. In the event the operator is not the owner, the operator and owner will be notified of the deficiency and both will be subject to any action deemed warranted by the agency in accordance with local, state and federal regulations." Pilot Deviations and being denied access to the NAS are strong stuff! Why now?

Some Background

The FAA and TSA believe that it is in the interests of national security and aviation safety to ensure that only properly registered aircraft operate within the NAS. Consider all of the emphasis of special use airspace after 9/11 and specifically Temporary Flight Restrictions (TFR's) and the Washington, DC, Air Defense Identification Zone (ADIZ) procedures. Add in the well publicized events where this airspace has been violated, and you can see why the heat is being turned up and having thousands of aircraft of "questionable" registry can no longer be tolerated.

For the years prior to 9/11, the shortcomings number of aircraft in questionable status of in the FAA's Aircraft Registry wasere treated as an administrative deficiency and with limited FAA resources; it was not a top priority when compared to safety-related efforts. That has changed. In the public's eye, having thousands of aircraft operating with questionable registration is not acceptable. Aviation, and that's all of us, must have our house in order – even at the administrative level. "Pretty close" isn't good enough any more!

Finally Some Good News

Pilots can check the registration of the aircraft they will be flying, whether it's rented or owned, quite easily. Log on at http://registry.faa. gov/aircraftinquiry/ and click on the inquiry by "N-Number," and type in your N number.

The information that will be provided on your N number includes a "Status" which is shown in the right hand column. If the status is shown as "Valid," then the aircraft registration is okay. However, if the status is shown as "In Question," "Certificate Terminated," "Undeliverable Triennial," or any other status besides "Valid" then the aircraft is very likely not properly registered. If after reviewing this information you have further questions about the validity of your aircraft registration you can contact the Aircraft Registration branch toll free at 866-762-9434. People in the Oklahoma City area, international customers and government FTS users should call 405-954-3116.This is probably an excellent time to make sure that all your information is correct and up to date.

The details on how this will all be implemented are still being finalized. The FAA is working closely with the other security agencies involved. We need everyone's help to make this work. Pass this information on to other aviators, particularly aircraft owners.

TEACHING KIDS TO FLY WITH A JOYSTICK

story by Mike Gaffney, photos courtesy of St. Louis Science Center

What do you get when you mix two seasoned flight instructors, an outspoken advocate of personal space travel, a world renowned Science Center, and a room full of curious kids equipped with computers and joysticks? Among several possible answers is the birth of the Flight Academy Training Program at the St. Louis Science Center. You might then ask what this has to do with you. The answer is "everything," if you have a vested interest in the survival of general aviation, as we know it. Let me explain. Many of us in general aviation have watched our numbers fall and our fleet age over the years since general aviation was king in the mid-70s. As we look at the average age of the people who walk in the door at the local flight school and commit to learning to fly, we are watching that average age steadily rise into the lower-thirties compared to early-twenties 30 years ago. If we look further at statistics of the average age of pilots in general, we see an even more disturbing trend. The average age of active pilots is rapidly rising which indicates a lack of young pilots moving in to fill in the ranks as the older pilots lose their medicals or simply give it up after retirement. The program that I am about to describe offers an amazing possibility that we can jumpstart the future of general aviation in the U.S. at a grassroots level.

The Flight Academy program was the brainchild of XPRIZE Executive Director Greg Maryniak, who had recently taken on the role of Director of the St. Louis Science Center Division of Aviation and Astronautics. The premise was a simple one. He, along with many of us in the industry, had observed a fundamental drop in aviation interest from kids. But he noticed that their interest was still high when hovering around static displays of aircraft and control systems at the Science Center, especially when reinforced with interactive computer displays and joysticks that they could touch. He was determined to explore this trend to see if this observation could be used to reverse the trend at the airport. He came to me to see if we could work together on the project.

When Greg and I first met, he was looking for a place to rent an aircraft for his frequent business trips and the two of us were brought together almost by chance. Greg is a huge supporter of the race to space, but while on earth, he longed to come out to a clean, professionally run flight school and rent brand new aircraft to take his trips with people like Erik Lindbergh and other executives of the XPRIZE

Foundation. He was discouraged because, over the years, the aircraft available became less and less like the glorious machines being built for the XPRIZE competition and more and more like aged antiques that had been lost in the wilderness for 30 years. My partner Julie and I had been trying to change the rules and build a modern flight school and rental facility made up of brand-new Cessna leaseback aircraft surrounded by the computer technology I had come to love through my 25-year career at Texas Instruments, Oracle, and KPMG Peat Marwick.

As it is in aviation, this was how we came together and how the original idea was born. We seemed to suit each other's fancy for a modern general aviation, but what about the others that needed to follow in our footsteps? Where were the kids who would become the pilots of tomorrow's aircraft, and for that matter tomorrow's spacecraft? How could we possibly compete against Xbox®, Ipod®, and computer games that barely require kids to leave their room? But wait, maybe that was the answer! What if we could build a flight training introduction program that incorporated some of their favorite technology and make it fun? What if we could help them learn while achieving our ulterior motive of coaxing them to love aircraft supported by technology that they already took for granted?

Our initial observation was that kids were presented with so many activities to do with their time, that flying aspirations had fallen among the possible choices to one which required more time, energy, and studying than they were willing or able to give. Whatever we came up with had to be creative, build upon what kids already knew, and must be an experience that fostered a love for aviation that would last a lifetime and draw this youthful interest forward with the support of their parents.

After this objective had been set out, we sat on several occasions trying to plan out how this Flight Academy program would work and how we could get the parents of these kids to support it. We would reminisce about the days when we were kids and we would sit at the airport for hours peering over the fence watching the aircraft going up and down wishing that it were us, simply hoping that someone would invite us to ride along. With all of the new distractions for kids and the higher, more forbidding, fences built around our airports thanks to the tragic events of 9/11, there simply was not the opportunity for kids to do this anymore. We then reasoned that if kids were not taking a fundamental interest in coming to the airport, then where were tomorrow's pilots going to come from once our flying generation drifted into the sunset years? It dawned on Greg that we could use the Science Center as a central magnet to draw families who would bring their kids to see the fabulous Omnimax® Theater, Planetarium star show and the moving dinosaurs so that they could be exposed to general aviation in the best possible light. We would bring the airport to them, so to speak.

The mission control room at the Science Center was originally designed for XPRIZE launches and Erik Lindbergh's historic trip across the Atlantic following in his grandfather's steps many years before. It had become largely unused until Greg showed up and decided to turn it into an aviation education center. Simply putting interesting displays and wallboards was not enough to accomplish the goal. Greg and his team installed 16 computers and 16 copies of Microsoft® Flight Simulator 2004 with joysticks and high-resolution displays. Two of the displays delivered their output to a video display screen on the wall in front of the console, so it had that "cool mission control" look that kids would be interested in. It was certain that we needed to formalize the process so we could create an assembly line of sorts to take the kids energy and eventually lead them back to the local airport where a professional aviation training program could take over the process of grooming these pilots and astronauts of tomorrow.

Now, if you have never had a chance to see Microsoft® Flight Simulator 2004, you are going to marvel at what I am going to tell you about how realistic that it is. You will only then come to the conclusion that if a kid can do it in the computer simulator, they are half way home to doing it in the real aircraft and this sense of accomplishment is what we needed. This computer program is truly aston-

ishing, not only from a realism of flight standpoint, but also from a realism of accuracy of flight instruments, gauges, and views in and out of the cockpit. It was apparent to us that Microsoft® used pilots to perfect the imagery, views, cockpit instruments reactions to various flight conditions—even down to the way the aircraft reacts to extending flaps and landing gear. It was a natural for the Flight Academy program and it was only $29 at the local electronics store, well within the Science Center's budget.

Now came the creative part. We needed to layout a four to six hour ground school that would take a curious person with zero aeronautical experience and teach them to "fly" this simulator by the end of the class as if they were flying a real aircraft based upon a minimal amount of information that we would teach them in the class. This had to be done in such a way that we would teach like we were in a "super-cool" science class, so we could hold their interest. We further upped the ante and decided that the goal was to have the "kid-pilot in training" be able to virtual-solo the aircraft using the simulator by the end of the day and then complete a guided cross-country so they would walk away feeling like they really accomplished something.

We then finalized a series of ground school topics, which kept the program fun, upbeat, and directed towards the end goal. Keeping in mind that the class was aimed at children with an age range of 11 – 15 with an average age of 13, we had to arrange relevant topics such as flight controls and basic aerodynamics in a way that would not bore or lose the kids, but would leave a working knowledge in their minds that they could use later in the day and hopefully take home with them. Several Cessna 172 models from a local pilot store and lots of examples, like the classic "sticking your hand out mom's car window," would do the trick. Most any kid could understand this approach.

Equipped with the completed lesson plan, Greg sent out the invitation for a "Summer Flight Academy" day camp to a youth group already affiliated with the Science Center that made an ideal first target group to test response to the program. To our surprise, 30 kids responded that they were interested in trying the program. This meant splitting the group into two days. Perfect! We could test the program on day 1 and then tweak it on day 2.

The first day of the program, the kids showed up and under the watchful eye of their parents, began to hover around the control room waiting to begin. Greg asked Terry Dwyer, one of his team members (a retired flight instructor and now planetarium control technician) to join us as a team instructor so we could quickly move from station to station ensuring that each progressive concept was understood. We later found that eight stations and 16 kids provided exhausting work for the three of us. We invited the kids to find a partner and take a seat at a computer and we started the program out by talking about the fun of flying and what it was like to learn to fly. We discussed the different aircraft models that were stationed around the room and what it was like to be their pilot. We talked about what made the aircraft fly and stay in the air, then moved quickly into the flight controls using the models to show control surface movement. We wanted to make sure we got their hands on the computer quickly wanting to avoid the demise of a short attention span. It was a race against the clock and we were determined to win.

We showed the teams how to turn on the simulator and quickly covered how to change the views of Microsoft® Flight Simulator 2004. We went through the concepts of throttle, flaps, engine start, lights, and brakes and reviewed each flight instrument asking each group to read to us the altimeter and the airspeed that we had just taught them about. Some of the kids seemed to relate right away. Others were a little more cautious, perhaps because they suspected that this was a little too much like school that had gotten out only weeks before. We decided to make the delivery light and airy, playfully challenging the kids with questions. Several kids quickly related to the concept that if they asked a good question (all of the

questions were quickly deemed "good") they would get to be the first to get to go to lunch at the "Lunar Café" ("Great food, no atmosphere"). Pretty soon, we had all the kids at the computers willingly moving all of the flight controls with the joystick and taxiing around the starting airport, St. Louis Downtown airport, which we chose because the "Arch" was in the background and the kids could readily identify their surroundings. We then decided it was time to get the aircraft in the air. Terry, Greg and I went around each station and got the aircraft back to the ready position on runway 30L. We then did the "watch me" demonstration on the huge wall projection screens and, after a quick trip around the pattern, returned to the ground.

It was time. With carefully simplified instructions, we urged them to try it. With my best ATC voice, I cleared them for takeoff on runway 30L and wished them all luck. One by one, they each started the initial wobbling down the runway (caused by rudder over control, of course!) and were soon in the air. We quickly ran from station to station coaching them on how to climb to pattern altitude and then pull the power back to cruise. We showed them how to change the heading bug on their Heading Indicator and then started them doing rectangular courses approximating the traffic pattern legs. We also showed them how to change the view out the window to simulate the pilot's scan and situational awareness. Just out of curiosity, I showed them how to bring out the Garmin 530® screen showing the "kid-pilots in training" how to find the airport in the simulator so they could realign the aircraft on a two-mile final. We then started the process of guiding them back to the ground for their first landing by making small power reductions, deploying flaps, and making trim adjustments to hold an airspeed of 70 knots in our Cessna 172. Soon each aircraft was on the ground. Wow! That almost felt like we were flying didn't it? That was just the point. Other than having a couple wayward kids who wanted to taxi across the grass at the airport rather than waiting on the runway for the next turn, it turned out pretty well! By now it was time to switch kids and let the other kid take a turn. Now some of the things were getting to be routine. Some of the kids were already in the air before my ATC voice cleared them for takeoff, but that is all right. Greg, Terry, and I walked around and quizzed the kids about altitude, airspeed, and power settings and received a pleasing set of nearly correct responses.

The cross-country portion of the lesson was particularly interesting. We sat down at a table and did some quick planning on a State of Missouri donated sectional chart and prepared the kids for a 30-mile flight from one local airport to another. After takeoff, the kids pulled up the Garmin 530® screen in the simulator so they could gain situational awareness to the destination. I reminded them to use the heading bug to help them keep their heading while they glanced around the aircraft cockpit and changed views to outside the aircraft looking for other traffic. As I walked around, I noticed that most of the kids had trimmed the aircraft to hold their altitude, were within roughly 200 feet of their assigned altitude, and all but one had properly set the engine at a cruise RPM. One by one, the kids all raised their hands indicating that they saw the airport on the horizon. We would run over to their workstation and start to give them some recommendations on when to start their descents and prepare to enter the pattern. Yes, we had them enter a downwind entry to the airport. One by one, they all landed. We then switched kids and did another cross-country so the flight partner got a chance to fly. We observed much the same results. Amazing, huh?

The final part of the Flight Academy consisted of a free form 45 minutes that we allowed them to experiment with the simulator and do whatever their creative minds wanted to do. One team switched the display to an Extra 300 and when I walked by, they were doing knife-edge turns in between trees and a barn. Another group decided they were going to fly through the St. Louis Arch. Still another switched to an F15 and I watched with amazement as they did barrel rolls.

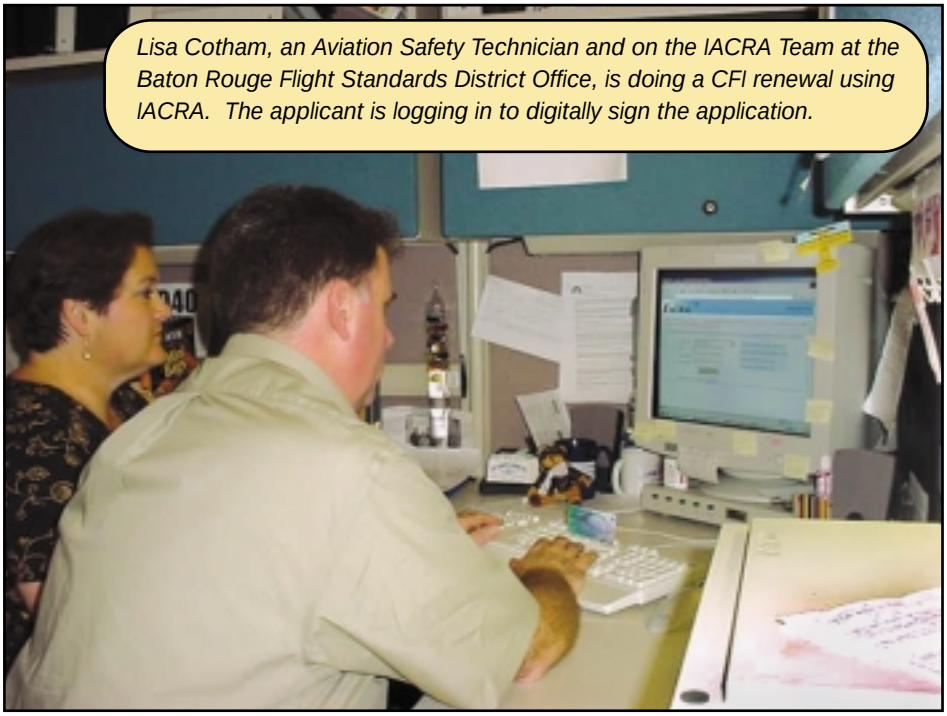
Soon, the parents started to show up as it neared 4:00 pm. This is what I was waiting to see. The kids would not move. They wanted their parents to come and see them fly. I listened intently as some of the kids explained what the aircraft they were flying could do. We then moved to the conclusion of the program and presented each kid-pilot with a Flight Academy Completion Certificate, proudly emblazoned with the logo of our flight school and the St. Louis Science Center. Attached was a certificate inviting them to come to the airport for an Introductory Discovery Flight lesson in a "real" aircraft. As the room eventually emptied, Greg Terry and I stood marveling at what was accomplished. We were exhausted, but exhilarated nonetheless.

What we accomplished with these kids was truly amazing considering the circumstances. Think about it. We were able to achieve our goals of providing the kids with an appreciation for flight in one day, with the endorsement of their parents, without coming near an airport and it did not really cost the kids a penny. Will this lead them to be pilots? Will this bring them to the airport to become the students of tomorrow? Will this program and ones like it that could be started all over the country save the insidious decline of grassroots general aviation? One can only wonder and hope.

Mike Gaffney is an FAA Aviation Safety Counselor, A&P mechanic, ATP pilot with a CFI, CFII, and CFMEI and over 3000 hours to his credit and is a Cessna and Diamond Factory Authorized Flight Instructor (CFAI) for Garmin 1000 equipped aircraft. He was designated a Master CFI by the National Association of Flight Instructors, and is the President for Skyline Aeronautics at Spirit of St. Louis Airport and can be reached at <mgaffney@skylineaero.com>.

Your Guide to IACRA

by David Fosdick



Lisa Cotham, an Aviation Safety Technician and on the IACRA Team at the Baton Rouge Flight Standards District Office, is doing a CFI renewal using IACRA. The applicant is logging in to digitally sign the application.

The Integrated Airman Certification and/or Rating Application (IACRA) software was released in 2003. It electronically captures and validates airman information required to complete the airman application. IACRA can be accessed from any location with Internet connectivity.

WHAT DOES IACRA DO?

IACRA is a web-based system. You don't have to install or download any software to access the application. During data entry, IACRA automatically ensures that applicants meet regulatory and policy requirements real time. It then uses digital signatures throughout the certification process in order to verify that no data is changed. Finally, the application is electronically forwarded to FAA's Airman Registry for final processing.

IACRA currently supports Student Pilot through Airline Transport Pilot,

Certificated Flight Instructor, Repairman Experimental Builder, Letters of Authorization – Original through Authorized Aircraft, Authorized Instructors, Ground Instructors, 141 schools, and 142 training centers. The fall 2005 release added Inspection Authorization, Flight Instructor Renewal Examiner, and Part 142 private, commercial, and ATP certifications. Future enhancements will include sport pilots and mechanics.

IACRA is replacing ACRA

IACRA is replacing the "ACRA CD," a stand-alone computer-based PC program that initially automated the application process allowing the user to enter data in a rules-based program and then print out the completed form for mailing. IACRA integrates critical elements of multiple FAA program databases.

ACRA, though a viable program, is not built on a computer technology that would allow for the broad expansion of the program. Plus, it would become very costly for the FAA to maintain. With IACRA, all the functionality of ACRA exists and more. Realizing that supporting two similar programs is not efficient and is very costly, the FAA is phasing out the ACRA program. This is occurring in several steps to provide the least impact on our user base. A brief timeline of the ACRA program follows:

1. On November 1, 2004, the FAA stopped producing ACRA CDs and downloads of the ACRA software. We will not authorize any new installations nor will any bug fixes be available;

2. There will be no continuing updates to the last released version of ACRA. If you are currently using the software, you may continue using it as long as the airmen certification paths in ACRA are valid; and

3. All Temporary Certificates, Student Certificates, and Notices of Disapproval produced by the ACRA program must be printed on the official ACRA watermarked paper. The FAA will not be producing this paper and once supplies are gone, they will not be replaced. Users of the program may obtain approval from Flight Standards' General Aviation and Commercial Division to produce their own paper by calling (202) 267-8212 for details on submission requirements. All user-produced ACRA paper must be of the same grade, type, and design as the paper produced by the FAA. Additionally, the FAA must review and approve the paper prior to use.

The nationwide release of IACRA and the FAA's effort to reduce the cost of maintaining the ACRA program are the basis for this action. Today IACRA has over 22,000 users. The IACRA website includes Desktop Instructions and frequently asked questions (FAQ's) to help users.

For more information regarding IACRA, the AVS Support Central can be contacted by public customers at 1-866-285-4942, government employees call (405) 954-7272, or send an email to <9-AMC-AVS-Support-Central@faa.gov>.

David Fosdick recently retired from the FAA. He was an Aviation Safety Inspector and the IACRA Program Manager.

IACRA Desktop Instructions

Start by opening your Internet Explorer web browser (version 5.5 or higher) and browse to <http://acra.faa.gov/iacra> to access the IACRA site. You are now at the IACRA home page.

You can access complete details on the software by clicking on "IACRA Desktop Instructions". Here you will learn how to register, log in, get the latest news and events, report a bug, and find FAQ's and descriptions of IACRA roles.

FAQ's

The IACRA Team meets weekly to review the calls to the Help Desk. The Team determines if the software needs modification or if a FAQ is needed for clarification. Here is just a sample of our FAQ's:

I've heard that IACRA uses digital signature. What is digital signature?

A digital signature is a technology used to ensure that the original content of an electronic message or document is unchanged. Digital signatures are: Easily transportable, cannot be imitated by someone else, and can be automatically time-stamped. Digital signature gives the ability to ensure that the originally signed message has not been altered, thus creating a scenario where the "signatory" cannot easily repudiate the authenticity of that signed document.

What information will I need to in order to register as an applicant and complete an IACRA application?

If you currently hold a pilot certificate, you will need information from the pilot certificate in order to register as an applicant. Please enter the certificate number and date of issuance exactly as they appear on your certificate. If you do not hold a pilot certificate, answer "no" to the question, "Do you currently hold an airman certificate?" If you currently hold a pilot certificate, you will need information from your pilot and/or instructor certificate(s) in order to complete an IACRA application. When completing Step 3 of your application (Certificate Held Data), please enter ALL certificates and ratings held.

What are the minimum system requirements for using IACRA?

- *A PC with an Internet connection*
- *Windows Operating System*
- *56k modem*
- *Microsoft Internet Explorer version 5.5 or greater*
- *Cannot block cookies - Internet Options, Privacy tab*
- *Java scripting must be enabled - Internet Options, Advanced tab*
- *Popup blocker cannot be enabled*
- *Acrobat Reader version 5.0 or greater*

I am trying to log into IACRA, but it is asking for my FTN. What is an FTN?

The FTN is your FAA Tracking Number assigned to you by the FAA. You need to register first, and then your FTN will be displayed to you. Please record this number. You will need your FTN, user name, and password each time you log in to IACRA.

What is the Designation Code and how do I locate it?

A designation code is a four-digit alphanumeric code that 141/142 flight schools use in several ways to make associations between the school, the school curriculums, and flight school representatives (School Administrators, Airman Certification Representatives, Training Center Evaluators, etc.) The designation code with which an application is started must be the same one with which the application is finished. Therefore, a participant in the application process (school administrator, Chief Flight Instructor, Recommending Instructor, Airman Certification Representative, etc.) must be assigned to and use initial designation code.

IMPORTANT: If you do not know the school's designation code, you must contact your local Flight Standard District Office (FSDO) and ask for the designation code as it appears in the National Vitals Information System (NVIS).

Should the 141 school graduation certificates be mailed to Oklahoma City when using IACRA?

No, IACRA retrieves this information during the application process and forwards it electronically to the Airman Registry with the other certification documentation.

Aviation Maintenance Alerts

Agusta; A 109E; Cracks in Vertical Stabilizers; ATA 5530

An operator describes finding a four-inch crack in the leading edge spar doubler of this helicopter's lower vertical fin. Further inspection reveals two additional cracks in the upper vertical fin with approximate measures of five and seven inches. "(Neither) a detail breakdown of this assembly...(or)...the part numbers of the individual cracked components are available to this operator. The approximate location of the damaged area is station 9141, WL (water line) 1625. This tail boom (P/N 109-0370-17-115) is being returned to the manufacture for repair evaluation." (See the next entry for similar defects and a mechanical drawing.) Part Total Time: 1391.6 hours.

Agusta; A 119; Cracks in Vertical Stabilizer; ATA 5530

A repair station mechanic submitted a similar defect report as the last entry. He states, "This is to report cracks in the frames on the vertical fin (P/N 109-0373-01) in the areas at W.L. 2145.0 and 2520.0. These cracks are occurring approximately between F.S. 9350.0 to 9850.0. Agusta Aerospace has a repair for these cracks referenced in Agusta A119/A109 Series Structural Repair Manual, Chapters 4-2-23 and 4-2-24." (The report includes two Agusta manual drawings, both of which have been cropped and spliced together to show stabilizer crack locations in one picture.)

Ayres: S2R-T34; Cracked Wing Rib; ATA 5712

"The wing mid-chord rib (P/N 00241T004) just forward of the outboard aileron hinge was found cracked where it is riveted to the rear spar," states a mechanic. (This defect was found on both the left and right wings.) "This (crack) is not easy to see due to the position of the existing inspection holes, but it can be seen if you are looking for it. Service Bulletins SB-AG-22 and –30 address problems with the aileron hinge brackets and rear spar cracking in this same location—and due to the same stress. The probable cause is rear spar twisting due to aileron loads. A vertical stiffener at this location would reduce this load to the spar and rib." Wing station is noted as 221 inches. [The Service Difficulty Reporting System (SDRS) data base reflects a 1993 report of a similar aircraft having 13 cracked ribs on the left wing, 14 on the right! Airframe time was 1,766.0 hours.] Part Total Time: 6,922.0 hours.

Beech: 58; Landing Light Switch Burned; ATA 3340

A mechanic describes the sequential steps in the failure of this aircraft's landing light switch, P/N 35-380132-43. "Internally, (to the switch, proper) the upper braided conductor on the line side failed and separated from its contact or weld. The spring mechanism for the switch (now) becomes the conductor. This spring is not heavy enough to handle the current of the landing light circuit and it overheats. Overheating of the spring caused the nylon toggle assembly to fail. The toggle assembly is rendered useless and the switch loses all mechanical function. The switch continues to complete the circuit and (increasing) heat melts the switch housing. As this housing and other internal components fail, the switch looses its circuit protection feature, and smoke is emitted into the cockpit. This process will only discontinue when all power is removed from the ship. Once power is removed, the switch will cool, allowing the upper contact to open—which opens the circuit. "The circumstance in which this failure occurred: normal operation. Recommendations: all Polter & Brumfield circuit breaker switches of this design, and any other circuit breaker switches of this design be removed from service. The switch should be redesigned to insulate the spring mechanism from all conductors. Any switch of this type of design is a possible hazard. There have been similar, confirmed failures (...in other aircraft: three switches total). These aircraft are utilized in a night freight operation, and the landing light switches have a very high utilization. All failures were Polter & Brumfield switches, P/N W31-X1005-10 (manu-

facturer's part number)." [SDRS records at least three other occurrences of this type of switch hanging/burning, etc. Prudence might encourage this item to be changed frequently, depending on cycles.] Part Total Time: unknown.

Cessna: 172 Series; Cracked Rear Wing Spar; ATA 5711

"During replacement of an inboard flap track a crack was found in the rear wing spar as reported in Cessna Pilot Association magazine on page 7962, dated August 2005. A search of the SDRS database found three airplanes where cracked spars were detected. These cracks were reported at and between December 15, 2004 and February 1, 2005. The total time in service (TIS) for these three airplanes ranged between 12,000 and 16,000 hours of operation. The cracks are difficult to detect as they are hidden between the lower skin and the flap track support rib. Use of a magnifying glass and a bright light or Borescope® will assist the inspection. If the cracks found were allowed to grow, they could ultimately lead to loss of a wing. "It is recommended the rear wing spar be thoroughly inspected at the next regularly scheduled inspection on airplanes that have 12,000 hours or more time in service."

[This was published as received from the Associate Aircraft Certification Office Manager in Wichita, Kansas. Further inquiry may be directed to: FAA, Aircraft Certification Office (ACE-118W), Gary Park, Aerospace Engineer, 1801 Airport Road, Room 100, Mid-Continent Airport, Wichita, Kansas. 316-946-4123.]

Cessna; 172S; Stall Warning Horn Failure; ATA 3418

"A new student pilot was flying a flight school aircraft with a CFI (certified flight instructor)," says this submitting mechanic. "During the student's first stall practice the warning horn failed to operate through full stall, and the CFI halted the maneuver. Troubleshooting by maintenance personnel confirmed the warning horn assembly (P/N 0713348-1) was defective. The (failed) unit was replaced with a new (assembly), and a maintenance operational check and test flight were completed. This part had 311.7 hours TSN (time since new) and was a replacement for the original, factory installed part...(which failed after 651.0 hours).

"A second 172 aircraft (of three) had the identical problem...at 491.5 hours. In this case the part was replaced twice because the first new part failed during (its) test flight. Aircraft number three has 417.6 hours TSN and has been recently checked: it is okay at this time. (The) probable cause (for these failures) has not been determined. (I) suggest at least a one time check of all new aircraft be conducted and reported to determine the scope of the problem and to raise awareness of a possible unknown safety problem." Part Total Time: 311.7 hours.

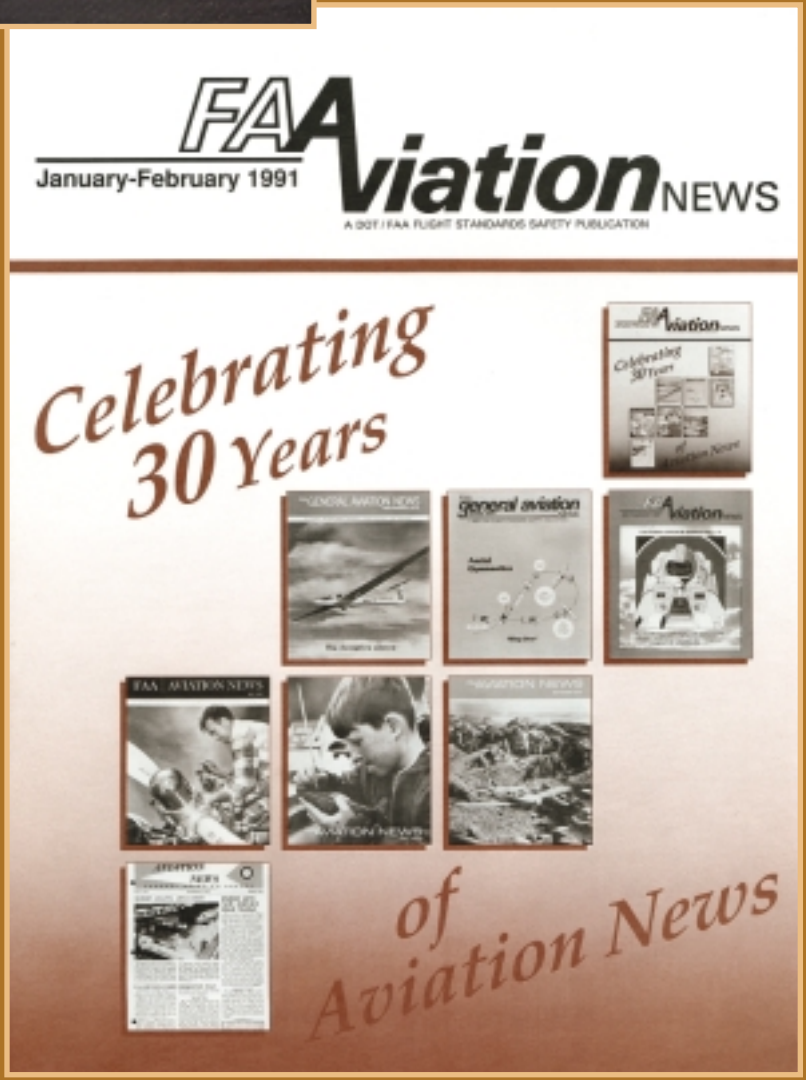
Cirrus; SR22; Chafed Hole in Fuel Supply Line; ATA 2820

(This very short defect report was submitted by a mechanic on August 19. It's subject warrants close scrutiny by owners and operators of this aircraft.)

"The main fuel supply line (P/N 11443-004) from the fuel selector valve to the firewall had a hole chafed in it. The wire bundle to the circuit breaker panel was chafing this line." Part Total Time: 750.0 hours.

The Aviation Maintenance Alerts provide a common communication channel through which the aviation community can economically interchange service experience and thereby cooperate in the improvement of aeronautical product durability, reliability, and safety. This publication is prepared from information submitted by those who operate and maintain civil aeronautical products and can be found on the Web at <http://www.faa.gov/avr/afs>. Click on "Maintenance Alerts" under Regulations and Guidance. The monthly contents include items that have been reported as significant, but which have not been evaluated fully by the time the material went to press. As additional facts such as cause and corrective action are identified, the data will be published in subsequent issues of the Alerts. This procedure gives Alerts' readers prompt notice of conditions reported via Malfunction or Defect Reports, Service Difficulty Reports, and Maintenance Difficulty Reports. Your comments and suggestions for improvement are always welcome. Send to: FAA; ATTN: Aviation Data Systems Branch (AFS-620); P.O. Box 25082; Oklahoma City, OK 73125-5029.

Our 45th Anniversary



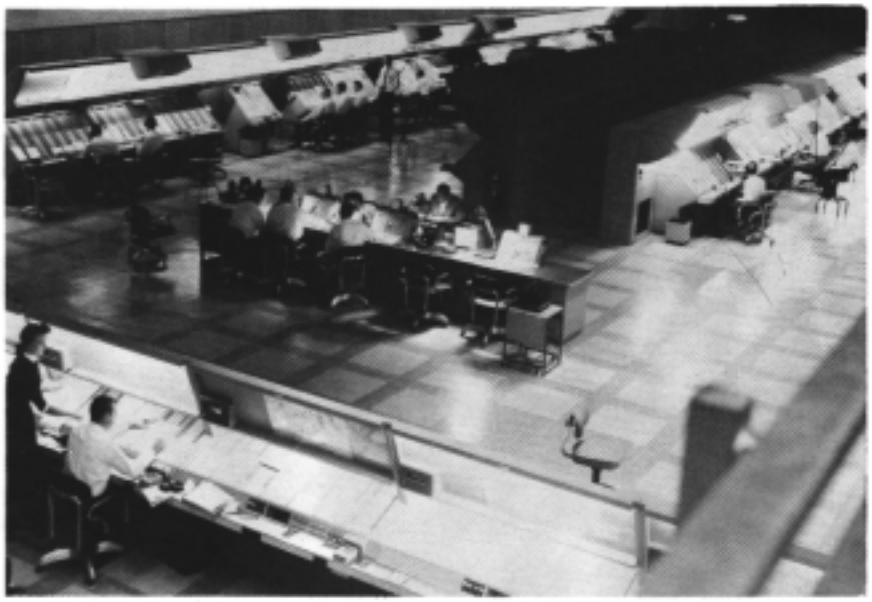
On the following pages is a reproduction of the first FAA Aviation News. Please, refer to the Editor's Runway for a historical summary of our 45 years in support of aviation safety.

AVIATION NEWS

FEDERAL AVIATION AGENCY

Vol. I, No. 1 | Washington 25, D.C. | January 1961

MODERN ATLANTA ARTCC OPENS



In sharp contrast to the cramped obsolete quarters of the old control room at the Atlanta Airport is this spacious wing of the new $4,000,000 ARTCC at Hampton, Ga., which opened officially last month. The Atlanta Center is the second of FAA's new centers to go into operation. (The first was the Oakland, Calif. facility.) Others scheduled in the current center building program are Jacksonville, San Antonio, Cleveland, Indianapolis, Kansas City, Fort Worth, Chicago, Salt Lake City, Memphis, Minneapolis, Denver, Seattle, Albuquerque and Washington.

FAA REVISES RADIO FREQUENCY PLAN

The Federal Aviation Agency's revision of its Very High Frequency Deployment Plan extends to January 1, 1966, the date when the FAA will implement unrestricted channel assignments using 50 kc. separation. A Technical Standard Order (TSO) will not be adopted as a requirement for communication transmitters and receivers for general aviation aircraft.

Instead of a TSO, FAA said, a guide for general aviation communications equipment manufacturers is under development by Special Committee No. 93 of the Radio Technical Commission for Aeronautics. FCC requirements for transmission stability and quality govern general aviation communications equipment.

Revised Plan

The revised Plan provides for continuing communications service for both VFR and IFR below 24,000 feet on the 100 kc. channels between 118 and 127 mcs. until January 1, 1966 to the extent feasible. It also would continue to provide service on 50 kc. channeling in the 127–135 mcs. band for users with this tuning capability. Starting January 1, 1961, frequency assignments of 50 kc. separation will be progressively implemented below the 127 mc. band on a case by case basis

(See **RADIO** *page 2)*

FLIERS GIVE NEW SERVICE HIGH MARKS

The recently inaugurated Flight Following Service has won the enthusiastic approval of general aviation pilots for whom it was designed.

This new service, which began operating October 15, provides pre-flight and in-flight services comparable to those available to air carriers. It is available to any pilot with two-way radio who files a VFR flight plan. En route, the pilot can request information on local conditions and NOTAMS which the station keeps continuously current. Flight Following augments the work of the 360 FSS which provide weather advisories, forecasts, and other pertinent information.

If a pilot using the Flight Following Service does not report within his ETA, the station expecting him will start a communications search, assuring a prompt search and rescue operation if it should later become necessary.

The fact that watch stations along the route, each within one hour's flying time from one another, are on the alert for a pilot gives him more confidence.

Approvals Voiced

W. B. Fitzgerald, a Denver physician, flying his Cessna Skyland to a Memphis business meeting early in November reported that heavy weather delayed his report to his final watch station. "It was very reassuring to hear the Memphis station calling me," he said. "They gave me up-to-the-minute information and I came in without any trouble."

(See **FLIERS** *page 4)*

Aviation News will be published monthly to acquaint readers with the policies and programs of the Federal Aviation Agency. The editors welcome comments and suggestions.

EDITORIAL

"Willing Compliance"

Only a small minority of pilots do not comply with safety regulations. The vast majority, recognizing the importance of safety, do comply. Thus, a policy of weak enforcement amounts to favoritism to the irresponsible few and undermines the benefits of safety achieved by the responsible majority.

Enforcement is merely the tool by which the Federal Aviation Agency tries to obtain compliance with the standards and rules which have been established in the interests of safety. And FAA's underlying philosophy in the area of enforcement can be summed up in a phrase: Willing compliance.

The Congress sought to encourage willing compliance and to insure that this enforcement tool would be used fairly and wisely by carefully protecting individual rights in the Federal Aviation Act of 1958.

Under the Act, the Administrator may amend, modify, suspend, or revoke any airman's certificate or file a civil action. Prior to doing so, however, the law requires that FAA follow certain procedures designed to protect the legal rights of the alleged violator:

- The airman receives notice in writing of the charges and is given an opportunity to reply in writing or be heard in person.
- The airman has the right to reject the Administrator's suggestion of a compromise civil penalty and have the issue determined in court by a judge and jury where the burden of proof rests upon the government.
- In cases involving certificate action, the airman is entitled to a hearing on the merits before a CAB examiner.
- He has further appeal to the full Civil Aeronautics Board.
- He can appeal still further to the U. S. Court of Appeals.
- In every instance, the legal rights of individuals are fully protected; the government has the burden of proof in formal hearings or appeals.

"Willing compliance" seeks to achieve safety once standards have been established. And in promoting safety, FAA is also promoting the progress of aviation in the U.S.

Rules and Regulations

In the future: Safety regulations are going to have a new look. There will be no revision or substantive changes in the regulations themselves, but they will be easier to read and understand, and will be combined into a single simplified unit for easy reference. The project, initiated by the FAA, will take about two years.

* * *

Under consideration: FAA is reviewing comments on a proposed new rule to standardize all flight operations in the airspace below 2,000 feet within a radius of 5 miles of the center of all tower-equipped airports. The proposal calls for: (1) limiting airspeed of these aircraft to not more than 180 miles per hour or the minimum necessary for safe aircraft operation; (2) two-way radio or prior tower takeoff and landing authorizations for NORDOs; (3) specific procedures (speed, clearance, altitude, etc.) for both fast and slow aircraft, as well as helicopters, when operating within the airport traffic area. Objectives: Make terminal areas safer for aircraft operations; reduce aircraft noise affecting local communities.

* * *

Under consideration: November 18 was closing date for comments on proposed major revision of rules on restricted areas. Some major points: (1) designation of a "using agency" for each restricted area which would submit an annual utilization report to FAA; (2) a requirement that the using agency schedule activities and authorize transit within the area whenever feasible; and (3) simplification of the numbering of all restricted areas to make them more easily identifiable.

All comments are being considered before taking final action.

* * *

Reminder: An FAA ruling issued September eased requirements for issuance of flight instructor certificates. An applicant now becomes immediately eligible for a full flight instructor certificate after training five successful candidates for pilot certificates or intrument rating. He previously had to train five candidates and serve one year under his limited certificate before becoming eligible for the full certificate.

FAA reports civil aircraft production numbered 8,672 in fiscal 1960, an increase of 16 per cent over the 7,447 produced in fiscal 1959. Dollar value reached an all time high of $1,216,000,000, an increase of 113 percent over the $572,000,000 of the previous year.

RADIO—(*Continued from page 1*)

as may be required for both terminal and en route services. However, until January 1, 1966, 50 kc. channel assignments will in most cases be installed in the high density traffic areas.

The Plan provides that starting in 1966 unrestricted assignments using 50 kc. separation will be implemented for all communications as may be dictated by air traffic control considerations.

50-Kc. Equipment Beneficial

The FAA made it clear that the plan provides for VFR communication services from airport traffic control towers and Flight Service Stations on the 100 kc. channels to accommodate limited equipment aircraft to the extent feasible. It was pointed out that the pilot with communication equipment not capable of 50 kc. channeling throughout the 118–135 mc. band will, in some cases, find himself operating in an increasingly difficult radio communications environment due to his inability to tune appropriate ATC channels and to reject interference from adjacent frequencies as the 50 kc. assignments are implemented.

The revised Very High Frequency Deployment Plan evolved after numerous meetings with the General Aviation Council and a general meeting with representatives of the aviation industry. FAA considered industry suggestions in preparing the revised Plan and believes it more closely achieves the objectives of both the air traffic control system and the users.

AVIATION NEWS
Office of Public Affairs
Federal Aviation Agency
Washington 25, D. C.
Use of funds for printing this publication approved by Director, Bureau of the Budget, Dec. 29, 1960.

IMPROVEMENTS NOTED UNDER MEDICAL EXAMINER PROGRAM

The rapid increase in the number of designated Aviation Medical Examiners—a jump of more than 50 per cent in five months—has resulted in a better geographical distribution of examiners and a marked improvement in airmen's examination reports which were returned to the Agency.

"Numerically, we are in a relatively good position," said Dr. James L. Goddard, Civil Air Surgeon, "but we recognize that we still have some problem areas. In those areas where we have poor geographic distribution, we are trying to fill the gaps."

"There should be no delays under this new system," Dr. Goddard continued, "since the Aviation Medical Examiners are now empowered to issue or deny certificates immediately following the examination."

Errors Reduced

With the list of medical examiners now past the 4,000 mark (see chart), a survey of all medical forms returned in recent weeks shows that fewer than 3 percent had to be returned for corrections. Before the Aviation Medical Examiner system was resumed in June 1960, the number of faulty medical forms in Class III ran about 20 percent.

"This improvement," stated Dr. Goddard, "can be directly related to FAA's new system which provides proper direction and more effective supervision of medical examiners."

Moreover, he went on, by getting accurate information on medical forms at the outset, we can collect reliable data which should lead to further improvements in the entire medical program of benefit to airmen.

Excessive Fees Barred

When asked about cases of overcharging, the Civil Air Surgeon stated that "FAA will not stand idly by and ignore any abuse of recognized fee practices. If any Aviation Medical Examiner overcharges, FAA will take appropriate action if the case is brought to our attention."

Dr. Goddard added that the examiners, a significant proportion of whom have experience as flight surgeons and/or pilots, take a keen interest in their work which utilizes both their aviation and medical training.

Under this medical procedure, designated examiners are responsible for maintaining detailed knowledge of published standards, periodic directives and the FAA manual of instruction. In addition, they must possess the equipment and facilities necessary to carry out the prescribed examinations.

Appeal Procedures

An additional outgrowth of the medical procedures is a new system of appeals: One part provides for thorough review; the other provides machinery for exemption from regulations.

An applicant who is denied a certificate by an Aviation Medical Examiner may petition the Civil Air Surgeon for reconsideration by the Medical Review Board. The applicant may present his appeal in an informal letter, appear in person, or be represented by counsel.

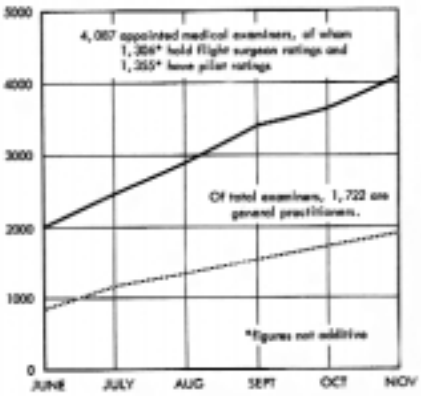
If this review results in denial of certification, the applicant has two courses. He may petition the CAB (first to a hearing examiner; then, upon appeal, to the entire Board) for a review of the denial of certification. Otherwise, if he recognizes that he is disqualified under the medical standards, he may petition the Administrator for exemption from the standards.

At this point his petition for exemption will be referred to the Medical Advisory Panel—a group of nationally-recognized, nongovernment medical specialists—which recommends to the Administrator whether or not an exemption should be granted.

When these administrative procedures have been exhausted, an applicant then has recourse to the normal appeal machinery of the Federal courts.

Dr. Goddard said that taken as a whole, the Aviation Medical Examiner program will provide a more efficient system that will benefit all concerned.

AVIATION MEDICAL EXAMINERS



NAVAIDS, ATC PROGRAM TO HELP GENERAL AVIATION

General aviation will benefit significantly from the current air navigation and air traffic control improvement program of the Federal Aviation Agency. In the $163 million program, 8 of the 13 airport control towers to be added will be placed at airports designated solely for general aviation.

Moreover, even those improvements and facilities of the Federal Airways System designed primarily for air carriers and the military benefit general aviation, since the facilities exist for all aviation to use.

Major items in the program are long range radar, improved ARTCC's, airport traffic control towers, radio communications equipment, approach lights for airports, instrument landing systems for bad weather approaches and improved teletype systems to relay weather information.

General Aviation landings and takeoffs in 1959 accounted for 57 percent of the total operations at airports having FAA control towers. Most of the airport improvements in the program, such as approach lights, are at these fields which serve this majority of general aviation flights.

The following new facilities of interest to general aviation (specific locations subject to some change) are planned:

Airport traffic control towers at an average cost of $160,000 will be established at:

Alton, Ill., Dallas (Addison), Decatur (DeKalb-Peachtree), Ga., Islip, N. Y., Minneapolis (Crystal), Minneapolis (Flying Cloud), San Diego (Gillespie), San Diego (Montgomery).

An Instrument Landing System (approximate cost: $269,000) will be installed at:

Cincinnati (Lunken).

At an approximate cost of $36,000, FAA will establish sequenced flashing lights on an existing high intensity approach lighting system at:

Bedford, Mass.

At an approximate cost of $26,000, additional threshold lights will be installed at:

Burbank, Calif.

At an average cost of $104,000 each, very high frequency omniranges (VOR) will be installed for approach to airport at:

Decatur, Ala., Milwaukee (Timmerman), Minneapolis (Flying Cloud), San Antonio (Stinson), Santa Monica, Calif., Shreveport (Downtown).

At an average cost of $14,400 each, Weather Bureau teletypewriter service is to be installed at one new location (indicated by an asterisk) while improved FAA equipment will replace leased equipment at other locations:*

Appalachicola, Fla.*, Clayton, Mo., Eureka, Calif., Sault Ste. Marie, Mich.

The Alaska teletypewriter circuit covering 43 installations will be modernized with 100 word-per-minute machines at an average cost of $60,000:

Anchorage, Angoon, Aniak, Annette, Bethel, Bettles, Big Delta, Cordova, Duncan Canal, Fairbanks, Farewell, Galena, Gulkana, Gustavus, Haines, Hinchinbrook, Homer, Iliamna, Juneau, Kenai, King Salmon, Kodiak (Woody Island), Kotzebue, McGrath, Middleton Island, Minchumina, Moses Point, Nenana, Nome, North Nenana, Northway, Point Barrow, Rogers Point, Sisters Island, Sitka, Skwentna, Summit, Sunset Cove, Talkeetna, Tanana, Unalakleet, Kakataga, Yakutat.

Two Flight Service Stations will be established at:

Hibbing, Minn. (cost: $89,500) and at Fort Yukon, Alaska (cost: $373,100).

FAA will consolidate (Average cost: $86,000) the control of 11 Flight Service Stations. Service will be remoted to the location given in parentheses:

Battle Mountain, Nevada (Elko, Nev.), Bryce Canyon, Utah (Cedar City, Utah), Drummond, Montana (Missoula, Montana), Dubois, Idaho (Idaho Falls, Idaho), Dyersburg, Tennessee (Jackson, Tenn.), Eagle, Colorado (Grand Junction, Colorado), Hanksville, Utah (Grand Junction, Colorado), La Grange, Georgia (Anniston, Ala.), Lamoni, Iowa (Des Moines, Iowa), Otto, New Mexico (Albuquerque, N. M.), Phillip, South Dakota (Pierre, S. D.).

An extended instrument runway and a parking and refueling apron will be built at:

Cold Bay, Alaska, at an estimated cost of $1,687,000.

FLIERS—(*Continued from page 1*)

K. G. Paddock, returning to Denver from a charter flight to Omaha in a twin-engine Beechcraft, declares he would have missed his chance to vote in the Presidential election except for the Flight Following Service. A storm moving in on Denver over his original route might have forced him to cancel; certainly he would have been delayed. However, because he knew what was ahead, he was able to change his flight plan and get home before the polls closed.

J. F. Putnam of Utilities Service Corporation, Atlanta, who uses a Bonanza in his business, says the Service makes a great deal of difference to him when flying at night, giving him more confidence than he otherwise enjoys in such circumstances.

Safety Enhanced

From the far west, in the San Francisco area, the story is repeated. James T. Nieukirk, a corporate pilot of long experience who flies a twin-engine Lockheed Lodestar, volunteered the information that in the mountainous country where he did most of his flying things were going to be better for him this winter. "Makes for safety, ease of mind," he said. Says R. W. Lane, business pilot: "Makes the whole flight look better . . . more confidence getting started."

Kamil A. Skappa, who took his Cessna 172-single engine airplane from New York to Oakland via New Orleans observes: "Could not have made the flight so comfortably without this Service. Never had any doubt as to whether I should stay or go and was able to enjoy the trip."

At the Washington, D.C. Station, which averages 65 to 70 flight plans every day, the response was the same. "Now that we have it, how did we get along without it?" is the attitude of even the most seasoned veterans.

"PIREPS" Contribute

Pilots themselves are contributing a great deal to the success of the Service by reporting the weather aloft. These reports, known as "PIREPS," are broadcast immediately if conditions are hazardous. If routine they are included in the summaries made 15 and 45 minutes past the hour by all Flight Service Stations, and cranked into the tapes updated every hour and broadcast around the clock.

• Mode C Correction

You have undoubtedly received numerous comments regard the error in the Equipment Suffix Table on page 36 of September/October 2005 issue. The /I suffix reads, "with no transponder with Mode C." It should read, "Transponder with Mode C" according to AIM page 5-1-11. I spotted that and thought you'd like to know.

Dale House
ASI Ops

Thanks for the information. The complete list of aircraft suffixes is available in the Aeronautical Information Manual *(AIM) in chapter 5.*

• Transforming Science

Your *FAA Aviation News* article, "Transforming Science into Art" in the July/August 2005 issue is both interesting and thought provoking, but misses a few very important points that must be considered by instructors and examiners. The Practical Test Standards (PTS) should be used by instructors as a focal point from which to develop a comprehensive training program.

1) No PTS task is ever dealt with as a stand-alone or isolated mechanical maneuver. All tasks should be presented as a piece of the larger puzzle that ultimately describes a complete flight profile.

2) Instructors need to consider that the first objective of each task requires the applicant to "exhibit knowledge of the elements related to…" This is the most significant element of the each PTS task that, if properly used by an examiner, will aid in determining of an applicant qualifies as a "complete aviator." Hopefully, our "gatekeepers" will use their evaluation skills to decide if the applicant possesses those pilot skills necessary to continue his/her learning process beyond initial certification.

With the most recent changes, the practical tests standards are evolving into well-structured and well-worded documents that can be effective when used as intended. The standards describe the "worse" pilot we would want in an aircraft and instructors should be setting their standards far above those listed in the applicable PTS so that, on the applicant's worst day, he/she will not perform below the minimum acceptable standards.

Careful reading of each PTS task will reveal the writer's efforts to overcome long-held opinions and incorrect techniques of achieving a task. Examples include Soft-Field Takeoff and Landing, Short-Field Takeoff and Landing, Crosswind Takeoff and Landing and Ground Reference Maneuvers. Deficient pilot skills in these areas have a direct link to "root causes" of aircraft accidents and incidents.

Although it's not a perfect world, and the PTS's are not the perfect solution to a comprehensive evaluation completed within a reasonable amount of time, it is what it is and it's all we have at this time. When a flight instructor combines the guidance provided by a PTS with its associated references and expands the instruction beyond those pages, good results can be achieved.

Clyde B. O'Neill, ASI
Baton Rouge
(BTR) FSDO, Louisiana

You are right. The PTS set the minimum standards for flight training. Instructors are responsible for training students to at least those standards. The FAA/Industry Training Standards (FITS) scenario-training concept is one-way instructors can go beyond the minimum training required by the PTS.

• Subscriptions by E-mail

I just stumbled across the *FAA Aviation News* publication and found that you offer hardcopy subscriptions. Do you have plans to offer email subscriptions? Other publishers establish systems where subscribers submit email addresses and the publisher either mails the document or a link to the document when a new edition is available. I would use such a system if it were available.

Tony Ficker
Via the Internet

The magazine does not offer email subscriptions. However, the magazine is available electronically both through the FAA's home page <www.faa.gov> and the FAA's Safety Program that can be found through the FAA's homepage link. You just have to follow the links. I hope this answers your question. Thank you for your interest in the magazine.

FAA AVIATION NEWS welcomes comments. We may edit letters for style and/or length. If we have more than one letter on the same topic, we will select one representative letter to publish. Because of our publishing schedules, responses may not appear for several issues. We do not print anonymous letters, but we do withhold names or send personal replies upon request. Readers are reminded that questions dealing with immediate FAA operational issues should be referred to their local Flight Standards District Office or Air Traffic facility. Send letters to H. Dean Chamberlain, Editor, FAA AVIATION NEWS, AFS-805, 800 Independence Ave., SW, Washington, DC 20591, or FAX them to (202) 267-9463; e-mail address:

Dean.Chamberlain@faa.gov

WASHINGTON DC AREA FLIGHT RESTRICTIONS REVISITED

The FAA has reopened the comment period until February 6, 2006, on its proposal to make the various Washington DC area flight restrictions permanent. In a notice of proposed rulemaking (NPRM) published in the *Federal Register*, Volume 70, Number 149, on August 4, 2005, the NPRM outlined the various options the Government is considering for protecting the greater Washington DC Metropolitan area. This reopening is in response to requests from members of Congress and industry associations.

The NPRM's formal title is Docket No. FAA-2004-17005, Notice No. 05-12, 14 CFR Part 93, Washington, DC Metropolitan Area Special Flight Rules Area, Proposed Rule. Anyone interested in reading the complete NPRM can find it on the FAA's Internet site at <http://www.faa.gov/regulations_policies/rulemaking/recently_published/> Once you are at the site, you only have to click on the NPRM's title to link to the document.

The document is also available for viewing at the FAA's Public Document room in Washington DC. A copy of the NPRM can also be obtained by submitting a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Ave. SW, Washington DC 20591 or by calling (202) 267-9680. Anyone requesting a copy must include the docket number, notice number, or amendment number of the NPRM.

February 6, 2006, is the deadline for submitting comments on the proposal. The NPRM states how and where comments are to be submitted. It also tells how public comments can be read. The NPRM reminds readers not to submit Sensitive Security Information to the Public Docket. The Notice explains how someone may submit sensitive information.

NTSB SAFETY ALERT ON AIRCRAFT ICING

The National Transportation Safety Board (NTSB) *published* Safety Alert (SA-006, March 2005) on aircraft icing that is a good reminder for pilots this winter season.

Pilots are urged to beware of aircraft upper wing surface ice accumulation before takeoff. The problem:

• Fine particles of frost or ice, the size of a grain of table salt and distributed as sparsely as one per square centimeter over an airplane wing's upper surface can destroy enough lift to prevent a plane from taking off.

• Almost visually imperceptible amounts of ice on an airplane's wing upper surface during takeoff can result in significant performance degradation.

• Small, almost visually imperceptible amounts of ice distributed on an airplane's wing upper surface cause the same aerodynamic penalties as much larger (and more visible) ice accumulations.

• Small patches of ice or frost can result in localized, asymmetrical stalls on the wing, which can result in roll control problems during lift off.

• It is nearly impossible to determine by observation whether a wing is wet or has a thin film of ice. A very thin film of ice or frost will degrade the aerodynamic performance of any airplane.

• Ice accumulation on the wing upper surface may be very difficult to detect from the cockpit, cabin, or front and back of the wing because it is clear/white.

• Accident history shows that nonslatted, turbojet, transport-category airplanes have been involved in a disproportionate number of takeoff accidents where undetected upper wing ice contamination has been cited as the probable cause or sole contributing factor.

• Most pilots understand that visible ice contamination on a wing can cause severe aerodynamic and control penalties, but it is apparent that many pilots do not recognize that minute amounts of ice adhering to a wing can result in similar penalties.

• Despite evidence to the contrary, these beliefs may still exist because many pilots have seen their aircraft operate with large amounts of ice adhering to the leading edges (including the dramatic double horn accretion) and consider a thin layer of ice or frost on the wing upper surface to be more benign.

What should pilots know and do to fly safely in icing conditions?

• Pilots should be aware that no amount of snow, ice or frost accumulation on the wing upper surface should be considered safe for takeoff. It is critically important to ensure, by any means necessary, that the upper wing surface is clear of contamination before takeoff.

• The NTSB believes strongly that the only way to ensure that the wing is free from critical contamination is to touch it.

• With a careful and thorough preflight inspection, including tactile inspections and proper and liberal use of deicing processes and techniques, airplanes can be operated safely in spite of the adversities encountered during winter months.

• Pilots should be aware that even with the wing inspection light, the observation of a wing from a 30- to 40-foot distance, through a window that was probably wet from precipitation, does not constitute a careful examination.

• Pilots may observe what they perceive to be an insignificant amount of ice on the airplane's surface and be unaware that they may still be at risk because of reduced stall margins resulting from icing-related degraded airplane performance.

• Depending on the airplane's design (size, high wing, low wing, etc.) and the environmental and lighting conditions (wet wings, dark night, dim lights, etc.) it may be difficult for a pilot to see frost, snow, and rime ice on the upper wing surface from the ground or through the cockpit or other windows.

• Frost, snow, and rime ice can be very difficult to detect on a white upper wing surface and clear ice can be difficult to detect on an upper wing surface of any color.

• Many pilots may believe that if they have sufficient engine power available, they can simply "power through" any performance degradation that might result from almost imperceptible amounts of upper wing surface ice accumulation. However, engine power will not prevent a stall and loss of control at lift off, where the highest angles of attack are normally achieved.

• Some pilots believe that if they cannot see ice or frost on the wing from a distance, or maybe through a cockpit or cabin window, it must not be there—or if it is there and they cannot see it under those circumstances, then the accumulation must be too minute to be of any consequence.

Need more information?

• Visit the NTSB's web site at <http://www.ntsb.gov>.

• For additional information, see <http://www.ntsb.gov/recs/letters/2004/A04_64_67.pdf>.

• Refer to the Safety Board's final and factual reports listed in this Safety Alert at <http://ntsb.gov/alerts/SA_006.pdf> for more details on specific icing accidents.

NEW RUNWAY SAFETY SYSTEM FOR MAJOR AIRPORTS

The FAA announced that 15 airports, including some of the nation's busiest, will soon receive an advanced runway safety system.

The new system, called Airport Surface Detection Equipment, Model X (ASDE-X), helps air traffic controllers spot potential collisions by integrating data from a variety of sources, including radars and airplane transponders, to create a continuously updated map of all airport-surface operations.

The first deployment for airport sites where ASDE-X can deliver the most immediate safety benefits will begin in January 2006 in Seattle. The major airports scheduled to receive ASDE-X include:

- Baltimore-Washington International Thurgood Marshall Airport
- Boston Logan International Airport
- Chicago Midway Airport
- Chicago O'Hare International Airport
- Detroit Metro Wayne County Airport
- George Bush Intercontinental Airport (Houston, TX)
- Los Angeles International Airport
- John F. Kennedy International Airport (New York)
- LaGuardia Airport (New York)
- Newark International Airport
- Ronald Reagan Washington National Airport
- Seattle Tacoma International Airport
- Washington Dulles International Airport
- William P. Hobby Airport (Houston, TX)
- Minneapolis St.-Paul International Airport

Additional major airports sites are being evaluated and will be announced soon.

"Reducing the risk of runway incursions is one of our top safety initiatives," said FAA Administrator Marion Blakey. "The FAA is deploying new technology to these large airports to make sure the traveling public receives the most immediate and greatest safety benefit."

Consisting largely of off-the-shelf commercial products, ASDE-X was designed originally as a solution for the smaller of the top-tier airports. The first ASDE-X was activated for operational use and testing at General Mitchell International Airport in Milwaukee, Wisconsin, in June 2003, and declared ready for national deployment in October 2003. In addition to Milwaukee, ASDE-X also is operational now at the Theodore Francis Green State Airport in Providence, Rhode Island; Orlando International Airport in Orlando, Florida; and the William P. Hobby Airport in Houston, Texas.

The FAA had already deployed a system called Airport Movement Area Safety System (AMASS) at the country's largest airports. However, ASDE-X's capabilities, especially in helping controllers at night or during bad weather when visibility is poor, led the FAA to prioritize where ASDE-X could be deployed to deliver the most immediate safety benefits. The FAA considered factors such as passenger traffic and runway and taxiway complexity, which can lead to an increased risk for runway incursions.

ATTENTION TWIN CITIES SECTIONAL AND MSP TAC USERS

The scheduled publication dates for the next edition of the Twin Cities Sectional and Minneapolis-St. Paul TAC has been changed to February 16, 2006. The current 70th edition of the Sectional and the 64th edition of the TAC will remain in effect until February 16, 2006. This change in print date is due to the Class B airspace revision at the Minneapolis-St. Paul International Airport (MSP). Consult the Chart Bulletin Section of North Central and East Central Airport/Facility Directories for chart changes effective December 22,2005.

Please consult NACO's web site < http://www.naco.gaa.gov >for this and other Special Notices.

Editor's Runway

from the pen of H. Dean Chamberlain

45 Years And Counting

As highlighted in another section of this issue, *FAA Aviation News* is celebrating its 45th anniversary. Published by the then Federal Aviation Agency, the first four-page *Aviation News*, Vol. I, No. 1, was dated January 1961. A note in that first issue said the Office of Public Affairs would print the *Aviation News* each month to "… acquaint readers with the policies and programs of the Federal Aviation Agency." Although the newsletter did not include the names of those who worked on that first issue, Donald R. Foxvog's name first appeared as Editor in the April 1966 issue. L. David Gelfan was listed as Editor starting in the May 1967 issue. After his retirement in 1990, Phyllis Anne Duncan's name first appeared as Editor in the November/December 1990 issue. Duncan had served as a writer on the magazine staff several years earlier. Following Duncan's acceptance of a new job in 2002, her last issue as Editor was the September/October 2002. Louise Oertly, Mario Toscano, and I served as Acting Editor until my selection as Editor was reflected in the September/October 2003 issue. Holding the magazine together for more than half its life has been Senior Associate Editor Louise Oertly whose name first appeared in the magazine as an Editorial Assistant in the September 1973 issue following her hiring by Public Affairs in July 1972.

Reviewing copies of the magazine starting with that first, four-page newsletter, the magazine has evolved from a black and white newsletter format to a 16-page, two-color publication up through the early 1990's to a 28-page full color publication that now has become the 36-page magazine of today. And as shown in our special section highlighting the changes that have occurred in the publication, the magazine's name has changed several times. It has been the *Aviation News*, the *FAA Aviation News*, and the *FAA General Aviation News* over the years.

Although the staff and magazine format and title have changed over the years, a quick review of that first issue seems consistent with today's magazine. Airspace, funding, a revised radio frequency plan involving new radio channels, navaids, and an air traffic control program to help general aviation were a few of the articles in that first newsletter. That first issue also had a story about improvements noted in the medical examiner program and fees charged for examinations. The newsletter reported that in Fiscal Year 1960, 8,672 civil aircraft were produced. This was a 16 percent increase over the 7,447 civil aircraft produced in Fiscal Year 1959. If you were an aspiring flight instructor applicant in 1961, you could now become a full-fledged flight instructor by training five successful pilot or instrument rating applicants. Before a September 1960 change, a new flight instructor had to train five applicants and serve one year with a limited flight instructor certificate before becoming eligible for a full-fledged certificate.

Although staff members have come and gone, titles and layout have changed, and the number of pages have increased from four to 36 per issue, we hope as we start our 46th year, the *FAA Aviation News* of today still meets the goal established for it in 1961 by "…acquainting readers with the policies and programs of the Federal Aviation Agency," now the Federal Aviation Administration. Although the magazine has changed over the past 45 years, our goal is still to serve our readers. And to ensure we are still doing our job, one of the comments published in that first issue is as valid today as it was then, "The editors welcome comments and suggestions." So tell us if we are making the grade, and if we are not, how to improve.

Our 45th Anniversary

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