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FAA Aviation news

AVIATION SAFETY FROM COVER TO COVER

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INTO THE NIGHT

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FAA Aviation news

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VOLUME 38 - NUMBER 7

FEATURES

DEPARTMENTS

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BACK COVER: Beech Baron 58 (Beech photo)

INTO THE NIGHT

Part 1

by Phyllis Anne Duncan

The accident which occurred on July 16, 1999, and which took the lives of John F. Kennedy, Jr., Carolyn Bessette Kennedy, and Lauren Bessette is one of those unfortunate reminders that we might need to take a look at our night VFR proficiency. This is the first of a two-part series on VFR night operations. In part one, we'll discuss preflight planning and preparation for a VFR night flight, taking into consideration some areas that are not usually heeded. Part two, which will appear in the November/December 1999 issue, will cover night operations and spatial disorientation. None of the information in either article should be construed as having any bearing on the as yet to be determined probable cause of the Kennedy accident. —Editor

In my salad days—which are longer ago than I care to admit—when I was accumulating hours, I accepted a "commission" from a friend to fly along to ferry an aircraft from the east coast to the middle of the country. My friend knew I wanted to build time since I was, at the time of the offer, a private pilot with not quite 100 hours. I was to do the planning for the nearly 2,500+ mile roundtrip flight, the flying, the navigating, etc., and he would sit there and relax, occasionally critique. The expenses were being paid by the aircraft's owner, so who would turn down that opportunity?

The next goal in my aviation career was an instrument rating, and in the early 1980's you had to have 200 hours total time before you could even apply for an instrument rating. In my mind, I had a dismally long way to go, so the prospect of some real cross-country experience in a complex aircraft and the addition of a good chunk of "free" time to my logbook was too much to pass up. (In 1986, FAA changed the requirement to 125 hours total time and a private pilot certificate, and in 1997 the requirements changed again to only having a private pilot certificate.)

It turned out that getting my complex airplane endorsement was the least complicated event during this trip. Literally, everything that could go wrong did go wrong, from a blown magneto to being weathered in. The best lesson for me was that I realized I was in an airplane I wasn't really famil-

iar with, in weather conditions I wasn't ready for, on a trip that was more than following a line marked on a chart. I had the benefit of an experienced pilot with me so that those lessons weren't learned the hard way.

The one leg that stands out in my mind is a night-time takeoff from somewhere in Mississippi and crossing Louisiana in the dead of a nearly moonless, hazy, summer night. The countryside we flew over was sparsely populated—no city lights—and this was after midnight. It was like being immersed in an inkwell. It was black out the windows, black when I looked down. If I twisted and looked up through the windscreen I could see stars, but ground and sky met and fused so completely that the natural horizon was obscured, hidden, nonexistent, or, in the parlance of my youth, "it warn't there." The weather reports and forecasts dutifully checked before flight indicated VMC from Mississippi across to Texas.

That was my lesson in how insidious the onset of spatial disorientation can be, not to mention that the weather is never what you want it to be. Obviously, this night flight was successful because, well, I'm here nearly 20 years later to talk about it. Would I be if I hadn't had that experienced pilot along? Speculation, of course, but it's something I've wondered about every time I've read or written about or heard of an accident attributable to spatial disorientation or during a night VFR flight.

Is night VFR flight inherently dangerous? The answer is a qualified "No." To explain this, read the following quote from an article we published seven years ago called "Doing it in the Dark" and written by FAA Aviation Safety Inspector and Safety Program Manager Bruce Edsten:

> "Probably the most important item to be considered in planning a night flight is YOU, the pilot. Flying at night requires a bit more attention to the task at hand than flying in the daytime, so you want to be sure you are up to it." [Emphasis added.]

A night VFR flight can be completed safely with good and careful preflight planning and preparation and with an attitude en route that you will either 180 to a safe harbor if something deteriorates or call for assistance. Some people like flying at night—less traffic at the airport, smoother air, less workload on controllers so you have greater access for practicing night landings or instrument approaches. There are many advantages. And there are always disadvantages: a lack of visual cues for navigation, inability to "see" weather, not to mention the possibility (unlikely as it is) of the spine-tingling engine-out or other aircraft emergency at night.

To assure a safe night VFR flight, take advantage of those advantages and address the disadvantages before you leave the ground. To do that there are essentially four areas you need to consider and plan for: the pilot, the aircraft, the environment, and the pressure of external influences. Failing to consider or to prepare fully for any one of these can be a recipe for grief. Accidents, day or night, are seldom a single, catastrophic occurrence—despite the media portrayals. They are the result of a chain of events that accumulate to the point where pilot and aircraft can be overwhelmed. Break any link in that chain, and you don't hang yourself.

Before we go into the planning and preparation for a successful night, VFR flight, let's consider why we're talking about this in the first place.

Statistics and Accident Data

For the five years between January 1, 1994, and December 31, 1998, there were 886 total general aviation accidents at night. That is approximately 170 per year or about one-fifth of the total general aviation accidents. Of those nearly 900 accidents, we selected 10 at random which specifically cited "night VFR" in the accident's narrative or as a cause or factor. Of those 10 random accidents, eight were fatal, with 12 fatalities. Even if this random sample can be extrapolated to all night accidents, you can see that just like continued VFR flight into IMC, night accidents appear to have a high fatality rate.

The probable causes for these accidents read like a primer on what not to do and nearly everything that can go wrong on a night VFR flight:

- "The pilot's inadequate clearance above an unlighted ridgeline in clouds and fog at night, and his decision to not file an IFR flight plan and his VFR flight into IMC conditions."
- "The pilot's failure to maintain clearance from terrain. Factors include the pilot inadvertently becoming lost/disoriented, the dark night (minimum ambient light), and mountainous/hilly terrain."
- "Continued VFR flight by the pilot into instrument meteorological conditions, and his failure to maintain altitude and/or clearance from high terrain. Factors relating to the accident were: darkness, low ceiling, fog, and high (mountainous) terrain along the route."
- "Failure of the pilot to maintain sufficient altitude and/or clearance from terrain while on a cross-country flight at night. Factors relating to the accident were: darkness, the prevailing low ceilings, and mountainous/hilly terrain."
- "The pilot's decision to attempt a takeoff with the runway lights inoperative, and his failure to maintain runway alignment during an aborted takeoff, after failure of the landing light. Factors relating to the accident were: darkness, inoperative runway lights, failure of the landing light, and the encounter with soft terrain." This accident was not fatal, though there was substantial damage to the Cessna-152.
- "The pilot's inadequate preflight planning/preparation by not obtaining a preflight weather briefing, his VFR flight into instrument meteorological conditions, and his failure to maintain control of the aircraft after becoming spatial disoriented [sic]. Factors relating to the accident were: darkness and the pilot's lack of recent experience in the type of operation (night and actual instrument meteorological conditions)."
- "The pilot becoming lost and disoriented during a night VFR flight in marginal weather conditions. Factors in the accident were: the pilot's lack of night flying experience, his failure to obtain a preflight weather briefing, low ceilings, and his failure to reverse course to known clear weather conditions when he first encountered the low ceilings."
- "The pilot's failure to maintain proper altitude in the visual flight rules (VFR) traffic pattern. Contributing to the accident were the pilot's failure to follow dispatch procedures, the dark night conditions, and the unavailability of the airport's pilot-controlled runway and precision approach path indicator lights."
- "Failure of the chase helicopter to maintain clearance from the lead helicopter during a night approach to land. Possible factors relating to the accident were: darkness and inadequate radio coordination between flight crews of the two helicopters."
- "Fuel exhuastion [sic] as a result of the pilots [sic] improper fuel calculation and improper use of fuel mixture."

We've taken the time to quote the probable causes of these 10 accidents for two reasons. In every case, the pilot was included as a probable cause or factor. Remember the quote we used earlier? Second, you'll see as you read on that we address nearly every one of the probable causes with something you can do to keep from its happening to you.

Of the pilots involved in these 10 accidents, seven were private pilots, two were commercial pilots, and three were ATP's. (The numbers don't add up to 10 because some pilots had dual privileges, i.e., commercial privileges for some category and class of aircraft, ATP or private for another.) Total pilot time ranged from a low of 75 hours (private pilot) to nearly 18,000 hours (commercial, CFI). Coincidentally, neither accident involving the low-time pilot or the high-time pilot was fatal, but of the eight fatal accidents, five involved private pilots, only two of whom had instrument ratings. Of those two, one instrument rated pilot's lack of IFR proficiency was cited as a factor in the fatal accident.

Again, these 10, random accidents are but a snapshot of night VFR, but they do serve to show that the margin of error at night is very slim if you are unprepared.

FAA Regulatory Requirements for Night Flight

To conduct a flight VFR at night, you must have specific fuel reserves that exceed what is required for day VFR. Namely, you must have sufficient fuel to fly to the point of intended arrival and to fly for another 45 minutes after that at normal cruising speed. (FAR § 91.151)

If you're already a certificated pilot, to be pilot in command of an aircraft carrying passengers at night (one hour after sunset to one hour before sunrise), you must have had three takeoffs and landings to a full stop at night within the preceding 90 days. You have to have been the sole manipulator of the controls during those three takeoffs and landings, and they have to have been accomplished in an aircraft of the same category and class and type, if a type rating is required, as the flight you're about to take. For example, if you're about to fly at night in a helicopter but your three night takeoffs and landings in the past 90 days were in an airplane, you do not meet the requirements for recent flight experience. The three takeoffs and landings to qualify for night recency of experience can be accomplished in a flight simulator that is approved for takeoffs and landings and used in accordance with a course conducted by a FAR part 142 training center. (FAR § 61.57)

Night training requirements for private pilot certification were increased when FAR parts 61 and 141 were changed in 1997. Now, in order to receive a private pilot's certificate, during your primary training you must have received at least three hours in night flight training, including one cross-country flight of over 100 nautical miles and 10 takeoffs and landings to a full stop at an airport. Each landing must have involved a flight in the traffic pattern at an airport. "To a full stop" means no touch-and-go's.

This begs the differentiation once more between currency and proficiency. The more often you do something, the better you become at it. That's proficiency. As a pilot you can opt to meet the minimum standards in the regulations, and you will be considered current as far as the requirements go. But are you proficient if all you do every 90 days is three takeoffs and three landings at night? Are you proficient if your last night cross-country was the one you took to quality for your private pilot certificate? Are you proficient if your only night experience in the past two years consists of questions asked by an instructor during a flight review?

Only you can answer those questions based on your time and experience. I know what my answers are. Do you?

We've all heard the old adage that a boat is a hole in the water you pour money into, and a new aircraft owner here in the editorial offices has extended that to the air: His *Tripacer* is a hole in the air that he pours money into. To me, that's part of the fun, but why not put some of that money to another use? The new bells and whistles are fine, but an hour of dual once a month or so that includes some night flying, a night cross-country, or some hood time might be a better long-term investment. If you have to choose between buying currency (recency of experience, that is) or buying proficiency,

proficiency is a sure profit.

International Comparison

How do the U.S. requirements measure up against international ones? That is a somewhat difficult comparison on a country by country basis. Ninety percent of the world's general aviation pilot population has access to VFR at night. (Half of the world's pilot population is in North America.) But the conditions under which night VFR can be conducted do vary.

Annex 1 of the International Civil Aviation Organization (ICAO) requires extra training for night flight (minimum three hours, maximum 10) that involves takeoffs and landings and navigation training. The requirements are similar to the U.S. There is no ICAO requirement for a night rating or an endorsement. Some signatories to ICAO do not permit VFR at night in controlled airspace. Some require an instrument rating before a pilot can fly VFR at night.

Our neighbor to the north, Canada, requires the filing of a flight plan for VFR at night, but Canada has a great deal more sparsely settled territory than the U.S. Canadian regulations also require a night "rating," which consists of 10 hours of flight instruction at night—five hours dual, five hours solo. Two hours of the dual must be cross-country, and during the five solo hours there must be 10 takeoffs and landings. The pilot must also have 10 hours of instrument training. Canada also raises its VFR weather minima for night flight.

In France, for another example, to fly at night a pilot must have had night training and an endorsement from a flight instructor and three to five night landings in the past six months. There are two types of night flight: local airport flights and night VFR cross-country. For the latter, a flight plan is required, and the flight must be conducted in a positive control environment. Pilots are also required to follow a designated route (VFR and IFR traffic have separate routes) that has specific reporting points.

Other European countries have similar or more restrictive requirements. Italy and Switzerland are said to have the most restrictive requirements for general aviation, period, not just at night. The significant reason for Europe's more restrictive stance stands out when you study a topographical map. Most of Europe's geographic area is mountainous, unlike the U.S. which has a huge tract of flat space between its two major mountain ranges.

The Pilot

If you turn back to the quote we cited fairly early in this article, you'll note that THE most important aspect of a night VFR flight is the pilot. As my primary flight instructor used to say, "The airplane is metal and plastic and has no brain. You do." The very first aspect of planning your VFR night flight is to sit down and realistically assess YOU—your total experience and recency of experience as well as your physical condition. Ask yourself the following questions, bearing in mind the fact that you'll be flying at night, VFR.

Experience/Recency

How many night takeoffs and landings have you had in the last how many days?

How many hours do you have in the make and model aircraft you're about to fly? How recent is that time?

If you're instrument rated, how many instrument approaches have you made recently? Were they simulated or actual? When was the last time you made an approach? Was it to minimums?

How many instrument flight hours do you have? How recent is the time? Was it simulated or actual?

How familiar are you with the terrain you'll be flying over at night? How familiar are you with the types of airspace along your route or at your arrival?

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Why all the questions about instrument time if this is a VFR at night flight? One of your key skills in assuring a safe night VFR flight is the ability to transition smoothly from flying using visual cues outside the cockpit to flying solely by reference to instruments. Night flying can mean an obscured or apparently nonexistent natural horizon as well as the risk of flying into "unseeable" clouds, and an artificial horizon and other associated instruments in the cockpit are useless to you unless you have proficiency in interpreting them. An instrument rating may not be required to fly at night VFR in the U.S., but proficiency in flying solely by reference to instruments is tremendous insurance. And it comes cheap—a few hours flown regularly with a flight instructor, and you have a skill that can literally save your life.

Physical Condition

The possession of your medical certificate means that you met the standards for medical certification on the date that the certificate was issued. Whether you are physically capable of safely operating the aircraft is a day-to-day, perhaps hour-to-hour self-assessment. Even after you've determined that your experience and your currency are appropriate for a VFR night flight, ask yourself the following questions.

How much sleep have you had in the past 24 hours? Was it restful, uninterrupted?

How much food and water have you had recently? Will you be able to make the flight without hypoglycemia or dehydration?

When was your last alcoholic beverage? The rules say eight hours from "bottle to throttle," but some people metabolize alcohol differently and may require more time for their blood alcohol level to be within the requirements.

Are you taking any drugs or medications, prescribed or over-the-counter? When was the last time you took them? Did your aviation medical examiner approve their use?

When was your last illness? By illness we mean colds, flu, upset stomach, etc., as well as long-term conditions.

What about the stressful events in your life? Did an employee upset you at work? Did an important project fall through? Was the car ready from the repair shop when it was supposed to be? Did you have a row with your spouse or a child? Were you late to the airport? Was there traffic gridlock on the way? Was a passenger late? The questions in this area are infinite because at any time, any event can be a stressor, and stress can diminish your physical performance.

The important thing to remember here is that you want all of these areas—experience and currency and physical condition—to be optimum. You might feel great, be stress-free, but you haven't flown at night in a couple of months. You might not only be current but also proficient at night flight, but you had a bad day at work or at home. Obviously, in your planning you want to set standards for yourself that may actually exceed what the FAA requires. You may not be 100% in both the above areas, but if you meet the limits you've established for yourself then don't exceed them, the pilot is probably ready to go.

The Aircraft

We'll concede that your aircraft is airworthy and equipped for a VFR night flight. (If you're not certain of what equipment is required for a night flight, check FAR § 91.205.) Let's take a look at, again, possibly extending those standards a bit.

Fuel Reserves

Above, we paraphrased the fuel requirements for VFR at night. The first thing you need to consider is planning your fuel stops if you don't carry sufficient fuel to make the destination in one leg. Every person you add to the cabin and every piece of luggage to the baggage area reduces the amount of fuel you can carry. You might want to increase your fuel reserves beyond what is required for VFR at night, unless, of course, you get a kick out of those night time, engine-out landings in the middle of Nowheresville.

The night VFR fuel requirements and reserves in the FAR are minimum requirements, remember. If you exceed them, then you have increased your safety margin. For example, if this is your personal aircraft you're flying, you're very familiar with its fuel burn, and your night navigation skills are top notch, maybe a 45-minute reserve is sufficient.

But what if you were to plan the night VFR flight as if it were an IFR flight? For an IFR flight, day or night, you need enough fuel to fly to your intended destination, from the intended destination to an alternate (if required), then to fly for another 45 minutes at normal cruising speed. Think of the safety margin if you plan your VFR flight with an alternate, even if it's one you never intend to land at. That would mean enough fuel to land at your destination, then fly to the alternate, with a 45-minute reserve above that! Think of the comfort factor as well with that extra fuel. Your alternate could be any airport along your route—an airport which you have confirmed has your type of fuel and will be open during your night flight.

Yes, fuel is expensive, but accidents cost more. Moreover, the FAA doesn't care if you exceed a standard. And if you're within your weight and balance considerations, there is no such thing as too much fuel, especially for a night VFR flight.

Experience in Type

How many takeoffs and landings have you had recently in the make and model aircraft you want to fly at night? How many days ago was that? Even among aircraft that are the same make and model, wear and tear on the control rigging can mean slightly different takeoff and landing characteristics. You may be accustomed to a particu-

lar make of communications equipment or even to using a headset and find yourself with an aircraft that has a different radio stack and no intercom.

Of course, not having a headset when you want it doesn't necessarily mean that is a show-stopper to your flight, unless that lack is so significant to you that it becomes a stressor. See, you, the pilot, could have arrived at the airport experienced, current, and in good physical condition, only to find something you weren't expecting with the airplane. It may not even be something that renders the aircraft unairworthy. The key is to assess and reassess how this will affect your VFR night flight. If flying with a headset makes you more comfortable, relaxed, and aware, then you might want to reconsider your night flight if you can't use one.

This may seem overly simplistic, but in this day and age when the slightest alteration in your driving speed can induce road rage, you can see how extrapolating something that may seem trivial to the aviation environment can create a situation in the pilot's mind that may block good judgement. And recall, too, we've talked about the accident chain. That lack of an intercom could be the first link in that chain, especially if you aggravate yourself about it the entire flight. Not being able to concentrate because you've wrapped yourself around a figurative axle over something minor is bad enough during the day. Add the pressure of night flight, and you may have pushed yourself beyond even the raised limits you've set for yourself.

Aircraft Performance

Do you really want to take off on a night VFR flight on a hot, humid night with your aircraft so close to its maximum gross weight that if you have a burger before you depart, you'll be overgross? Simplistic again, but as the old aviation adage goes, always leave yourself an out.

Have you distributed that load appropriately? Have you calculated the density altitude and determined you're within the performance of your aircraft? When was the last time you used the performance charts, anyway? Familiarizing yourself with "all available information" before a flight, as required by FAR § 91.103, is an important and necessary part of any flight, but expanding your personal definition of what is "all available information" beyond that listed in the FAR may be more necessary and important for a night VFR flight. Again, you're establishing a personal limit above that required by the FAA, and when you make a commitment to stay within that limit, you're self-assuring your safety.

Aircraft Equipment

Are you familiar with the avionics package on the aircraft you're about to fly at night? How much time do you have using an autopilot? How familiar are you not only with GPS but also with the GPS unit in this aircraft? Checking yourself out on new avionics or on a GPS you're not familiar with in the middle of a night VFR flight is not the right time nor the place. It may be as simple a decision as using the VOR or NDB instead of the GPS.

Is the NAV/COM appropriate for your flight? Are you familiar with its operation? Are there any "squawks" concerning it?

Do you have current charts? On a day flight with no weather problems you might "get away" with out of date charts, but why take the chance, not to mention that pesky FAR § 91.103 again? For a night flight, what if an unlighted powerline has been added along your route and it's not depicted on your out-of-date chart? Did you remember to check the *Airport/Facility Directory* for changes to the chart? Did you check NOTAM(L) and NOTAM(D)?

Have you checked NOTAMS for your route and destination? Are all the airport lights in operation, all the NAVAID's working that you'll need? Have you checked the *Airport/Facility Directory* to determine how you might turn on the pilot-operated lights if you're going to a non-towered airport? Wow, that "all available information" again. Obviously, the FAA put it there for a reason, and it's not to catch pilots in non-compliance but to help you set those limits for yourself. Now, that's not to say we look the other way if an accident or incident occurs because you did not obtain "all available information" as outlined in that regulation.

For example, if you're computer-literate and use an on-line weather briefing service that does not provide NOTAMS or facility information, is that obtaining "all available information?" Depends. If that NOTAM contained information that you needed to assure a safe flight, maybe not. All the pretty radar pictures in the world won't help if you get to a non-towered airport and don't know how to turn on the pilot-operated lights or didn't know the airport was closed because a big construction crane is sitting at the end of the runway. Daytime cuts you some slack in that scenario; night time doesn't.

Under aircraft equipment, you also need to think about a couple of other things you may not associate with your aircraft. For example, what does one wear to the airport these days? We're not talking haute couture, but is what you're wearing conducive to perhaps a chilly (or sweltering) night-time preflight so that you won't be tempted to cut it short? Or are you dressed for a special occasion and don't want to get sweaty on a hot ramp while preflighting for a night flight? Dress in something that is both comfortable and not worrisome for your preflight, and for the flight as well. We're constantly going back to your physical condition. If your clothes are too tight, too hot, too binding, too scratchy while you're trying to fly, you won't have your full concentration on your night flight.

You have to balance your comfortable clothing against your survival considerations. This is the other "aircraft equipment" you may not give much thought to. What type of survival gear do you have on board? And are you dressed comfortably but for the terrain you might have to walk out of if you make an emergency night landing? Do you have a flash light in case the bulb burns out on your landing light or your cockpit lights fail? We can't go into a discussion of survival gear here (this is getting long enough after all), but there are plenty of information sources available to determine what you might need for a night VFR flight over the mountains, over sparsely populated country, or over water. Expand your limits and tap those resources.

The Environment

All right, you, the pilot, are set to go, and the aircraft is set to go. What's next? The flight environment.

Airport Conditions

What are the environmental conditions not only at your destination airport but at your departure airport? Is there a crosswind? Is the crosswind component within your aircraft's capability? When was the last time you practiced crosswind takeoffs and landings?

Have you calculated whether you have sufficient runway length for landing? One tendency of pilots landing at night is to stay high. If you land long, will there be sufficient runway for braking? For a night flight you might want to add a "fudge" factor to your takeoff and landing distances. If the POH says 500 feet for landing and rollout over a 50-foot obstacle, at night, you might want to increase that, again, as a personal limit that you're not willing to cross. Remember to use your altimeter to verify your altitude in the pattern and on final.

Weather

VFR weather minima are the same for day or night VFR flights in Class A through E airspace. In Class G airspace, the night VFR visibility requirements increase from one statute mile to three statute miles. Below 1,200 feet AGL, the cloud clearance requirement increases from clear of clouds in the daytime to 500 feet below, 1,000 feet above, and 2,000 feet horizontal at night.

Above 1,200 feet AGL but below 10,000 feet MSL, the night cloud clearance requirements are the same as day—500 below, 1,000 above, 2,000 horizontal. An exception to this is when you're remaining in the traffic pattern of an airport at night and within one-half mile from the runway: You can operate clear of clouds and with visibility less than three miles, but not less than one mile. For any flight away from any airport, you must obtain weather reports and forecasts. The old aviation adage, "If you want the weather to change, just wait a minute," is more truth than fiction. Departing with a weather report or forecast that is hours old is not good judgement, and having current and frequently updated weather reports during a night flight is essential.

The en route weather information services are abundant—as close as Flight Watch on your radio, but during preflight preparation, the key to safe planning for a VFR night flight is to observe trends. If you begin obtaining weather information during the day time, and you notice that visibility continues to lower throughout the day as haze increases, you can safely bet that with the diminishing light, the haze or other obstruction to visibility will still be there—you just can't see it. We can fly above haze or a marine layer of fog and have excellent visibility. The problem arises when you have to descend through it to land. You may still be perfectly legal and have your three miles at night, but you can abruptly go from having a visible horizon to not having one. Again, if you are night or instrument proficient, you can transition easily to using your instruments to supplement the diminished visual cues.

Again, if the rules say three miles but you're not night proficient or inexperienced at flying solely by reference to cockpit instruments in an emergency, five or seven or 10 miles might give you a safety margin. If the weather reports and forecasts don't support the personal limits you've established for yourself and your VFR night flight, the safest solution might be alternative transportation.

If, for whatever reason, you opt not to communicate verbally to update your weather information, you can always listen. Tune in Flight Watch, and you're bound to hear other pilots along your route requesting updates. You can also tune in ATIS at towered airports along your route. As you get closer to your destination, and you "hear" from several ATIS that visibility is diminishing at towered airports along your route, you can extrapolate that visibility is likely doing the same at your destination, especially if it's being affected by the same weather system. Now's the time for that not-required-for-VFR alternate. Bypassing airports that you can safely get into to press on to your destination, only to find yourself in a black hole is another example of bad judgement. At the least, you land short of your destination and rent a car. At the worst, your executor gets to read your will at an impromptu family gathering.

This reference to "press-on-itis" or "get-home-itis" is just a clever segue into our next subject area.

The Pressures of External Influences

Trip Planning

When a friend and I used to plan vacations via general aviation, we always tacked a day on at either end. We didn't promise anyone that we'd show up for a specific time, and we didn't schedule work events until after that extra day. That way, there was no pressure on us to have to arrive someplace at the beginning or ending of the trip. If something happened at work, and we couldn't depart as planned, then we'd fly part way and plan to arrive the next day—or we didn't leave until the next day. In personal flying, this requires more flexibility than we sometimes allow ourselves. Particularly, if we're driven, Type A personalities at work, it is diffi-

cult to admit that we can't make everything happen on cue for a flight. Again, in the day time, you have a built-in margin of safety, but if your late departure for an event you simply must attend pushes you into a night flight that you're not prepared for (see all of the above), you could miss more than a family get-together. You could miss the rest of your life.

Diversion or Cancellation

To alleviate some of that external pressure, make certain everyone knows that you'll do your best to get there. Explain this as well to any passengers you're carrying, and make sure they do not make concrete plans for themselves that they try to hold you to. If they insist, remember you are the pilot in command, the sole authority for the safe conduct of the flight. Explain as well that, if necessary, you might have to land short of your destination and find alternative means to arrive. If you're going on vacation, this can mean lost money in terms of canceled hotel reservations and so forth, or could cost you more if you have to buy a last minute airline ticket, but all that can be recouped. Lost lives can't.

The external pressures of friends and family can be just as wrenching as bosses or charter passengers who don't understand a pilot's decision not to push into weather or a flight environment he or she is not prepared for. Again, you are the sole authority for the safe operation of that aircraft, and don't let anyone take that from you. If you have to assert yourself for safety considerations, and a friend decides never to fly with you again, you don't need that kind of friend. The more important the trip is to you or to a passenger who has influence over you, the more tendency there is to compromise the limits you've worked hard to set for yourself. In that case, it is just as important to make sure you have an alternative in mind. Always leave yourself an out, even if it's before you leave the ground.

Personal Equipment

To further ease some of that external pressure, always go prepared to stay longer than you expected. Bring contact lens solution along, extra medication, credit cards, and telephone numbers of people you might have to contact and tell you're going to be late. Pressing onward into deteriorating weather or into a night flight you're not prepared for because you don't have a phone number to call and say you're going to be late could be the final link in that accident chain.

Personal Minimums Checklist

The concept of planning for the **P**ilot, the **A**ircraft, the en**V**ironment, and **E**xternal pressures-**PAVE**—may seem familiar to some of you who have participated in a seminar featured in the FAA's Aviation Safety Program for the past two years. Called "Personal Minimums Checklist," this program, through guided discussion, gets a pilot to think about each of those four factors and set personal limits for his or her flying. Each participant gets a checklist and is taken through a discussion of each item, then the pilot sets his or her personal minimums. We call it practicing conservatism without guilt, and we've given it quite a bit of emphasis. The program was developed with the assistance of industry trainers and psychologists who specialize in aviation human factors. Although not developed specifically for night VFR flying, you could develop two such sets of limits—one for day and one for night.

For further information or to see when a "Personal Minimums Checklist" presentation is scheduled for your area or to get a copy of the checklist, contact the operations Safety Program Manager at your local FAA Flight Standards District Office. The presentation is also on the web at <http://www.faa.gov/avr/news/asphome.htm>.

Summary

In part one we've discussed how important it is to plan ahead for a night VFR flight, but planning is only part of a successful VFR night flight. Next comes the conduct of the flight itself, which we'll go over in part two, next issue.

RUNWAY INCURSION IS NO ACCIDENT

by H. Dean Chamberlain

Five simple words, but together they define one of the FAA's hottest safety topics. Although most runway incursions do not result in an accident, the potential is always there, especially in low visibility situations. In most cases, an air traffic controller, the pilot, or a person on the ground resolve the incident before it results in an accident. But the fact that the number of runway incursions has been increasing over the years has caused FAA Administrator Jane Garvey to make runway incursions one of the agency's top priority safety items.

"I am concerned about the number of runway incursions because according to the National Transportation Safety Board and FAA data, runway incursions continue to increase. There has been a 73 percent increase in the number of reported incidents from 1993 through last year. There were 186 reported in 1993. In 1998, that number was 325. The rate increased from 0.30 per 100,000 airport operations to 0.52 incursions per 100,000 airport operations. We must reduce that rate," Garvey said.

In 1996, FAA established the Runway Incursion Program office. The name has since been changed to the National Runway Safety Program, however, program responsibilities remain as initially outlined. The Program's task is to oversee and coordinate all of the FAA's runway incursion prevention efforts. The Program's goal, established in 1998, is to reduce the number of runway incursions by 15 percent of the 1997 baseline of 292 by the end of calendar year 2000. To accomplish that goal, the Runway Safety Program is focusing its efforts on three major operational areas. Those are air traffic control (ATC) operational errors and deviations; pilot deviations; and vehicle and pedestrian deviations.

According to the Runway Safety Program Manager Sue O'Brien, reducing runway incursions requires a concentrated effort on the part of all concerned; FAA, the aviation community, and all ground support personnel. The Runway Safety Program, consisting of representatives from Air Traffic Control, Airports, and Flight Standards, directly addresses awareness, training, and education initiatives while working hand-in-hand with the Runway Incursion Reduction Program on technological solutions. Additionally, the program promotes awareness at numerous aviation seminars, activities, and exhibits throughout the year.

For those not familiar with the term, *runway incursion*, and its potential risks, one of the worst aviation accidents in history resulted from a runway incursion when two Boeing 747 jumbo jets collided at Tenerife, Canary Islands in 1977. Because of fog and missed communications one of the B-747's started its takeoff roll while the other was on the runway. In the resulting collision, 583 people died.

As the number of aircraft operations increase the potential for a runway incursion accident increases with any mistake made by a pilot, air traffic controller, or vehicle operator during operations conducted within the runway safety area.

If the term *runway safety area* (RSA) is new for some readers, the *Aeronautical Information Manual* (AIM) Pilot-Controller Glossary contains the complete term. In part, the AIM defines runway safety area as a defined surface surrounding the runway prepared, or suitable, for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. The dimensions of the RSA vary and can be determined by using the criteria contained within Advisory Circular (AC) 150/5300-13, Airport Design, Chapter 3. Figure 3-1 in AC 150/5300-13 depicts the RSA.

FAA defines *runway incursion* (in part) as, "Any occurrence at an airport involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in a loss of separation with an aircraft taking off, intending to takeoff, landing, or intending to land."

To complete our definitions, FAA defines an *occurrence* as:

A. A pilot deviation is any action of a pilot that results in violation of a Federal Aviation Regulation.

B. An operational error is an occurrence attributable to an element of the ATC system which results in: 1) less than the applicable separation minima between two or more aircraft, or between an aircraft and obstacles. Obstacles include vehicles, equipment, personnel on runways; or 2) an aircraft landing or departing on a runway closed to aircraft after receiving air traffic authorization.

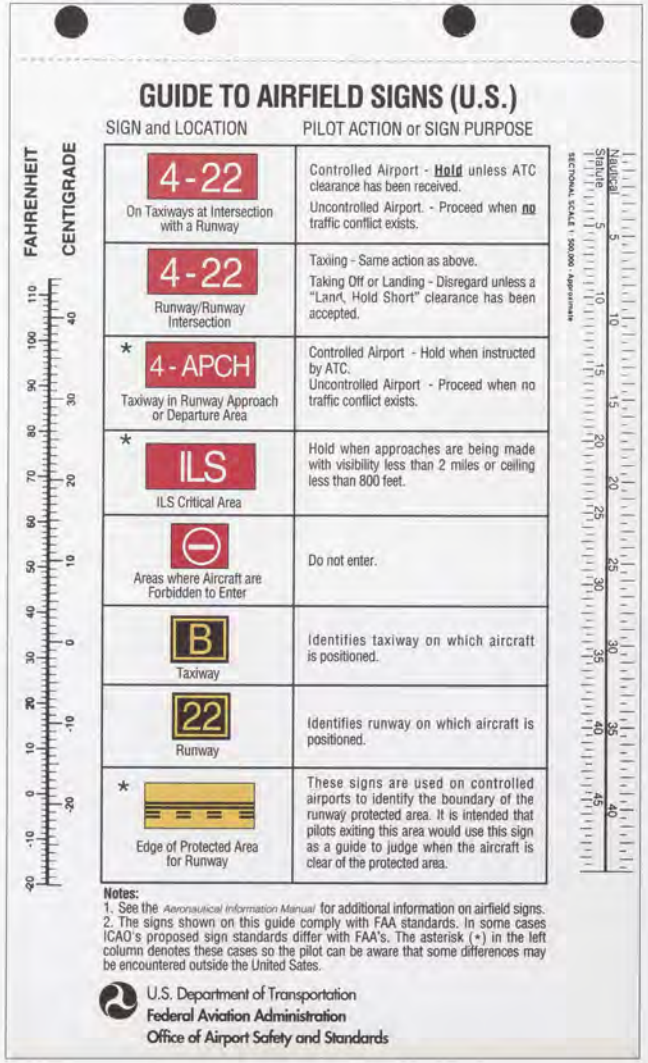
C. A vehicle or pedestrian deviation results from a vehicle operator, non-pilot operator of an aircraft, or pedestrian who deviates onto the movement area including the runway without ATC authorization.

Now that we all have a basic understanding of what a runway incursion is, let's look at some things everyone can do to combat the problem.

First a big picture technical solution: FAA is in the process of deploying an Airport Movement Area Safety System (AMASS) at major airports. AMASS is a software program designed to provide more surface information for air traffic controllers (ATC). AMASS is designed to use the current Airport Surface Detection Equipment (ASDE) radar to monitor the airport surface areas. AMASS would alert an air traffic controller if an aircraft for ex-

ample taxied onto a runway. But ATC's ability to better "see" aircraft and vehicles within the runway safety area and its taxiways and runways in low visibility conditions with surface radar is only part of the solution.

In addition to surface radar, FAA is also looking at other technical systems such as ground loop systems, GPS transponder based systems, and similar technologies to detect potential runway incursions. FAA is also looking at better airport design and operational procedures.



GUIDE TO AIRFIELD SIGNS (U.S.)

SIGN and LOCATION	PILOT ACTION or SIGN PURPOSE
4-22 On Taxiways at Intersection with a Runway	Controlled Airport - **Hold** unless ATC clearance has been received. Uncontrolled Airport. - Proceed when **no** traffic conflict exists.
4-22 Runway/Runway Intersection	Taxiing - Same action as above. Taking Off or Landing - Disregard unless a "Land, Hold Short" clearance has been accepted.
* 4-APCH Taxiway in Runway Approach or Departure Area	Controlled Airport - Hold when instructed by ATC. Uncontrolled Airport - Proceed when no traffic conflict exists.
* ILS ILS Critical Area	Hold when approaches are being made with visibility less than 2 miles or ceiling less than 800 feet.
Areas where Aircraft are Forbidden to Enter	Do not enter.
B Taxiway	Identifies taxiway on which aircraft is positioned.
22 Runway	Identifies runway on which aircraft is positioned.
* Edge of Protected Area for Runway	These signs are used on controlled airports to identify the boundary of the runway protected area. It is intended that pilots exiting this area would use this sign as a guide to judge when the aircraft is clear of the protected area.

FAHRENHEIT / CENTIGRADE

Statute / Nautical

SECTIONAL SCALE 1: 500,000 - Approximate

Notes:
1. See the *Aeronautical Information Manual* for additional information on airfield signs.
2. The signs shown on this guide comply with FAA standards. In some cases ICAO's proposed sign standards differ with FAA's. The asterisk (*) in the left column denotes these cases so the pilot can be aware that some differences may be encountered outside the United Sates.

U.S. Department of Transportation
Federal Aviation Administration
Office of Airport Safety and Standards

There are also non-technological alternatives. The simplest answer is for air traffic controllers, pilots, vehicle operators, and yes, pedestrians, to don't do anything to cause a runway incursion. Runway incursions are a people problem. Whether an air traffic controller makes a mistake and puts two aircraft on the same runway, or an airline or general aviation pilot lands on the wrong runway or taxies onto a runway without authorization or by mistake, or a construction worker drives across an active runway, people are involved in and cause this problem, and until people stop making these kinds of mistakes, we are going to have runway incursion problems. One of the more common factors associated with runway incursions is pilots or vehicle operators entering the active runway without air traffic authorization.

According to Tom McSweeney, Associate Administrator for Regulation and Certification, "I think two of the best answers to solving this problem are training and education. Our Flight Standards Service is responsible for pilot training and certification and how those pilots operate their aircraft once they are certificated. Whether they are flying a simple, single-engine, two-place training aircraft, or if they are flying a state of the art Boeing 777, they have had to meet a Flight Standards training requirement. Working with the national Runway Safety Program office, Flight Standards is looking at how training can become part of the solution.

"Education is another part. For example, our Aviation Safety Program reaches thousands of pilots, maintenance technicians, and the general public across America every year. In conjunction with the Runway Safety Program office, we are going to work with our Aviation Safety Inspectors and our Aviation Safety Program Managers to increase the safety awareness of everyone who works on or operates a vehicle or aircraft on a runway safety area about the importance of this problem. I want to thank the national Runway Safety Program office for its support in providing guidance and materials, pamphlets, and other materials to support our mutual efforts. I also want to thank the many aviation industry groups that are also working on this vitally important safety project.

"We will also work within our certification system to make sure everyone who is preparing for any type of FAA certificate that will give that person access to an airport operating area is made aware of the danger of runway incursion. In fact, Flight Standards has written a special runway incursion letter that will be sent to all certificated flight instructors and designated pilot examiners. The letter outlines the problem and the important role flight instructors and examiners play in reducing the number of runway incursions," McSweeney said.

Training and education are part of the solution. The hardest part of the job is getting the many training and education materials being produced through the efforts of the Runway Safety Program office out to those who need it the most. Although, it may take some time to reach the new people entering aviation, that may be the easiest part of the job. The question of how can the FAA reach those airmen already certificated or those non-airmen operating on airports today such as support of construction employees is one we must constantly work on.

The special flight instructor and designated pilot examiner letter is a start. But since many certificated pilots only see a flight instructor when the pilot has to take his or her required flight review, there may be some delay in reaching these pilots through CFI's. And some people who may be involved in runway incursions never have to do any type of training or recurrent training such as a new construction worker repairing a taxiway at a small airport. So what else can be done?

One way is through the FAA's Aviation Safety Program. The Program's Safety Program Managers (SPM) will be discussing this hot topic in their regular safety meetings and newsletters, but the problem they face is not every airmen attends FAA safety meetings. In fact some SPM's say, "Those who need us the most, don't attend

PROCEED WITH CAUTION!

The following are some of the common terms taken from the *Aeronautical Information Manual*'s Pilot-Controller Glossary that have the potential to be involved in incursion type incidents:

BACK-TAXI- A term used by air traffic controllers to taxi an aircraft on the runway opposite to the traffic flow. The aircraft may be instructed to back-taxi to the beginning of the runway or at some point before reaching the runway end for the purpose of departure or to exit the runway.

CLEAR OF THE RUNWAY-

a. A taxiing aircraft, which is approaching a runway, is clear of the runway when all parts of the aircraft are held short of the applicable holding position marking.

b. A pilot or controller may consider an aircraft, which is exiting or crossing a runway, to be clear of the runway when all parts of the aircraft are beyond the runway edge and there is no ATC restriction to its continued movement beyond the applicable holding position marking.

c. Pilots and controllers shall exercise good judgement to ensure that adequate separation exists between all aircraft on runways and taxiways at airports with inadequate runway edge lines or holding position markings.

HOLD-SHORT POINT- A point on the runway beyond which a landing aircraft with a LAHSO clearance is not authorized to proceed. This point may be located prior to an intersecting runway, taxiway, predetermined point, or approach/departure flight path.

LAHSO- An acronym for "Land and Hold Short Operation." These operations include landing and holding short of an intersecting runway, a taxiway, a predetermined point, or an approach/departure flight path.

MOVEMENT AREA- The runways, taxiways, and other areas of an airport/heliport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports/heliports with a tower, specific approval for entry onto the movement area must be obtained from ATC.

PROGRESSIVE TAXI- Precise taxi instructions given to a pilot unfamiliar with the airport or issued in stages as the aircraft proceeds along the taxi route.

RUNWAY- A defined rectangular area on a land airport prepared for the landing and takeoff run of aircraft along its length. Runways are normally numbered in relation to their magnetic direction rounded off to the nearest 10 degrees; e.g., Runway 1, Runway 25.

TAXI INTO POSITION AND HOLD- Used by ATC to inform a pilot to taxi onto the departure runway in takeoff position and hold. It is not authorization for takeoff. It is used when takeoff clearance cannot immediately be issued because of traffic or other reasons.

our meetings."

So what is the answer? Initial airmen training and recurrent training is one answer. Another is using the FAA's Aviation Safety Program to reach those who are already involved in aviation and attend safety meetings. Another approach is through the various membership groups and safety organizations such as the Aircraft Owners and Pilots Association (AOPA) and the various maintenance organizations such as the Professional Aviation Maintenance Association (PAMA) and others. These groups can reach their members through their publications and other internal information channels such as internet sites, meetings, conventions, and training sessions.

But all of the techniques designed to reach those at risk for committing a runway incursion and the various aviation membership groups discussed can't do it all. They and FAA need your help and the help of everyone in aviation. Because one of the most effective ways to reduce runway incursions is through one on one discussions about the problem with pilots and others who operate on or about a runway safety area. Pilots, maintenance technicians, vehicle operators, airport managers, and anyone who is involved in airport operations should talk about the problem and discuss ways to reduce or better yet avoid the problem by discussing this issue with their friends, coworkers, employees, friends, students, and anyone else who has access to a runway safety area.

Some safety points to live by include only taxiing or driving along approved access areas; taking off and landing only on the correct runway when authorized by ATC; if operating on a towered airport with an air traffic controller on duty, to only operate in accordance with ATC instructions; and if, at anytime, an instruction or clearance is not clearly understood to ask for verification or clarification. If someone is operating into an unfamiliar airport, that person should have studied the airport layout before approaching the field for landing. One of the best

Continued on Page 25

THE FOLLOWING INFORMATION IS TAKEN DIRECTLY OUT OF THE *AERONAUTICAL INFORMATION MANUAL*'S RECOMMENDED OPERATION PROCEDURES WITH SECTIONS AND PARAGRAPHS AS NOTED:

4-3-18. TAXIING

a. General: Approval must be obtained prior to moving an aircraft or vehicle onto the movement area during the hours an Airport Traffic Control Tower is in operation.

1. Always state your position on the airport when calling the tower for taxi instructions.

2. The movement area is normally described in local bulletins issued by the airport manager or control tower. These bulletins may be found in FSS's, fixed base operators offices, air carrier offices, and operations offices.

3. The control tower also issues bulletins describing areas where they cannot provide ATC service due to nonvisibility or other reasons.

4. A clearance must be obtained prior to taxiing on a runway, taking off, or landing during the hours an Airport Traffic Control Tower is in operation.

5. When ATC clears an aircraft to "taxi to" an assigned takeoff runway, the absence of holding instructions authorizes the aircraft to "cross" all runways which the taxi route intersects except the assigned takeoff runway. It does not include authorization to "taxi onto" or "cross" the assigned takeoff runway at any point. In order to preclude misunderstandings in radio communications, ATC will not use the word "cleared" in conjunction with authorization for aircraft to taxi.

6. In the absence of holding instructions, a clearance to "taxi to" any point other than an assigned takeoff runway is a clearance to cross all runways that intersect the taxi route to that point.

7. Air traffic control will first specify the runway, issue taxi instructions, and then state any required hold short instructions, when authorizing an aircraft to taxi for departure. This does not authorize the aircraft to "enter" or "cross" the assigned departure runway at any point.

NOTE-

Air traffic controllers are required to obtain from the pilot a readback of all runway hold short instructions.

8. Pilots should always read back the runway assignment when taxi instructions are received from the controller. Controllers are required to confirm the runway hold-short assignment when they issue taxi instructions.

b. ATC clearances or instructions pertaining to taxiing are predicated on known traffic and known physical airport conditions. Therefore, it is important that pilots clearly understand the clearance or instruction. Although an ATC clearance is issued for taxiing purposes, when operating in accordance with the FAR's, it is the responsibility of the pilot to avoid collision with other aircraft. Since "the pilot-in-command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft" the pilot should obtain clarification of any clearance or instruction which is not understood.

REFERENCE-

AIM, GENERAL,

1. Good operating practice dictates that pilots acknowledge all runway crossing, hold short, or takeoff clearances unless there is some misunderstanding, at which time the pilot should query the controller until the clearance is understood.

NOTE-

Air traffic controllers are required to obtain from the pilot a readback of all runway hold short instructions.

2. Pilots operating a single pilot aircraft should monitor only assigned ATC communications after being cleared onto the active runway for departure. Single pilot aircraft should not monitor other than ATC communications until flight from Class B, Class C, or Class D surface area is completed. This same procedure should be practiced from after receipt of the clearance for landing until the landing and taxi activities are complete. Proper effective scanning for other aircraft, surface vehicles, or other objects should be continuously exercised in all cases.

3. If the pilot is unfamiliar with the airport or for any reason confusion exists as to the correct taxi routing, a request may be made for progressive taxi instructions which include step-by-step routing directions. Progressive instructions may also be issued if the controller deems it necessary due to traffic or field conditions; i.e., construction or closed taxiways.

c. At those airports where the U.S. Government operates the control tower and ATC has authorized noncompliance with the requirement for two-way radio communications while operating within the Class B, Class C, or Class D surface area, or at those airports where the U.S. Government does not operate the control tower and radio communications cannot be established, pilots shall obtain a clearance by visual light signal prior to taxiing on a runway and prior to takeoff and landing.

d. The following phraseologies and procedures are used in radiotelephone communications with aeronautical ground stations.

1. Request for taxi instructions prior to departure: State your aircraft identification, location, type of operation planned (VFR or IFR), and the point of first intended landing.

EXAMPLE-

Aircraft: "Washington ground, Beechcraft One Three One Five Niner at hangar eight, ready to taxi, I-F-R to Chicago."

Tower: "Beechcraft One Three One Five Niner, Washington ground, taxi to runway three six, wind zero three zero at two five, altimeter three zero zero four."

or

Tower: "Beechcraft one three one five niner, Washington ground, runway two seven, taxi via taxiways charlie and delta, hold short of runway three three left."

Aircraft: "Beechcraft One Three One Five Niner, hold short of runway three three left."

2. Receipt of ATC clearance: ARTCC clearances are relayed to pilots by airport traffic controllers in the following manner.

EXAMPLE-

Tower: "Beechcraft One Three One Five Niner, cleared to the Chicago Midway Airport via Victor Eight, maintain eight thousand."

Aircraft: "Beechcraft One Three One Five Niner, cleared to the Chicago Midway Airport via Victor Eight, maintain eight thousand."

NOTE-
Normally, an ATC IFR clearance is relayed to a pilot by the ground controller. At busy locations, however, pilots may be instructed by the ground controller to "contact clearance delivery" on a frequency designated for this purpose. No surveillance or control over the movement of traffic is exercised by this position of operation.

3. Request for taxi instructions after landing: State your aircraft identification, location, and that you request taxi instructions.

EXAMPLE-
Aircraft: "Dulles ground, Beechcraft One Four Two Six One clearing runway one right on taxiway echo three, request clearance to Page."
Tower: "Beechcraft One Four Two Six One, Dulles ground, taxi to Page via taxiways echo three, echo one, and echo niner."

or

Aircraft: "Orlando ground, Beechcraft One Four Two Six One clearing runway one eight left at taxiway bravo three, request clearance to Page."
Tower: "Beechcraft One Four Two Six One, Orlando ground, hold short of runway one eight right."
Aircraft: "Beechcraft One Four Two Six One, hold short of runway one eight right."

4-3-19. TAXI DURING LOW VISIBILITY

a. Pilots and aircraft operators should be constantly aware that during certain low visibility conditions the movement of aircraft and vehicles on airports may not be visible to the tower controller. This may prevent visual confirmation of an aircraft's adherence to taxi instructions. Pilots should, therefore, exercise extreme vigilance and proceed cautiously under such conditions.

b. Of vital importance is the need for pilots to notify the controller when difficulties are encountered or at the first indication of becoming disoriented. Pilots should proceed with extreme caution when taxiing toward the sun. When vision difficulties are encountered pilots should immediately inform the controller.

c. Advisory Circular 120-57, Surface Movement Guidance and Control System, commonly known as SMGCS (pronounced "SMIGS") requires a low visibility taxi plan for any airport which has takeoff or landing operations in less than 1,200 feet runway visual range (RVR) visibility conditions. These plans, which affect aircrew and vehicle operators, may incorporate additional lighting, markings, and procedures to control airport surface traffic. They will be addressed at two levels; operations less than 1,200 feet RVR to 600 feet RVR and operations less than 600 feet RVR.

NOTE-
Specific lighting systems and surface markings may be found in Taxiway Lights and Taxiway Markings.

4-3-20. EXITING THE RUNWAY AFTER LANDING

The following procedures should be followed after landing and reaching taxi speed.

a. Exit the runway without delay at the first available taxiway or on a taxiway as instructed by ATC. Pilots shall not exit the landing runway onto another runway unless authorized by ATC. At airports with an operating control tower, pilots should not stop or reverse course on the runway without first obtaining ATC approval.

b. Taxi clear of the runway unless otherwise directed by ATC. In the absence of ATC instructions the pilot is expected to taxi clear of the landing runway even if that requires the aircraft to protrude into or cross another taxiway, runway, or ramp area. This does not authorize an aircraft to cross a subsequent taxiway/runway/ramp after clearing the landing runway.

NOTE-
The tower will issue the pilot with instructions which will normally permit the aircraft to enter another taxiway, runway, or ramp area when required to taxi clear of the runway.

c. Stop the aircraft after clearing the runway if instructions have not been received from ATC.

d. Immediately change to ground control frequency when advised by the tower and obtain a taxi clearance.

NOTE-
[1] The tower will issue instructions required to resolve any potential conflictions with other ground traffic prior to advising the pilot to contact ground control.

[2] A clearance from ATC to taxi to the ramp authorizes the aircraft to cross all runways and taxiway intersections. Pilots not familiar with the taxi route should request specific taxi instructions from ATC.

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PERSONAL COMPUTER-BASED AVIATION TRAINING DEVICES: DOES YOURS MEET FAA TRAINING REQUIREMENTS?

By H. Dean Chamberlain

Recently, the status of FAA-approved personal computer-based aviation training devices (PCATD's) was discussed with the FAA's Flight Standards' Certification Branch here at Headquarters. At issue was the apparent misunderstanding some people may have about the use and role of PCATD's in pilot training. According to the project manager for the introduction of PCATD's in pilot training, some pilots and flight instructors may not understand the provisions of the AC that explain how an FAA-qualified PCATD is to be used in an integrated ground and flight training program.

When the Advisory Circular (AC) 61-126, "Qualification and Approval of Personal Computer-Based Aviation Training Devices," permitting the use of PCATD's in pilot training was released, it specifically outlined both what was permitted to be used as a FAA-qualified PCATD and how such an FAA-qualified PCATD could be used in pilot training.

The how it could be used is simple. As the AC notes, an FAA-qualified PCATD can be used for up to a maximum of 10 hours of creditable instrument procedural flight instruction towards an instrument rating for airplanes in those tasks specifically outlined in Appendix 1 of the AC. Those hours, up to the 10 hours maximum authorized, have to be part of an integrated ground and flight instrument rating curriculum either under an FAA-approved FAR Part 141 training course, or if used under a FAR Part 61 training course, that FAR Part 61 training course must be an integrated ground and flight instrument rating curriculum meeting the scope and content of a course approved under FAR Part 141. However, FAA approval is not required for the FAR Part 61 course.

So the use is limited to a maximum of 10 hours in an integrated ground and flight instrument curriculum under either FAR Parts 61 or 141. It is also important to remind everyone that instruction in an FAA-qualified PCATD must be given by an authorized instructor. There must also be a training plan for its use.

What has apparently complicated this issue is what kind of PCATD can be used for that training. Although the AC outlines how a manufacturer of such training devices can get FAA approval for its respective device, there seems to be some confusion among pilots about how to tell if the device they may be using in training is in fact qualified by FAA.

A good way to start is by reviewing what is an approved training device, what is an FAA-approved simulator, and what is a PCATD. At the bottom end of the spectrum is the old ground training devices many of which are now designated as Level One Flight Training Devices (FTD). There are seven levels of FTD's. At the other end of the spectrum are the very complex, state of the art, FAA-approved flight simulators. There are four levels of flight simulators. From the simplest Level A to the most complex Level D flight simulator with its full motion and visual capabilities, these devices constitute their own special category of FAA-approved equipment. Now let's talk about FAA-qualified PCATD's. By definition, a PCATD is not an FAA-approved flight training device or flight simulator. A PCATD is defined as a training device approved for a specific purpose by the FAA under FAR §61.4(c).

Now let's speed this detailed explanation up so we end this article before the new millennium occurs (we just had to get that word in before we finished this explanation.). When FAA approved the use of PCATD's, it only approved specific hardware and software combinations from the four manufacturers that currently have [as of the date this article was being written] received FAA qualification for their respective systems. No other hardware or software computer-based combinations are approved by FAA to be used in an integrated ground and flight instrument rating curriculum.

Although some readers have taken me to task before in other articles I have written about PCATD's, please let me say one more time that unless the specific PCATD by make, model number, designated software version, with all of the specified hardware as listed in the unit's FAA qualification documentation is available and functioning, then and only then can that unit be used in an integrated ground and flight instrument training curriculum up to the maximum of 10 hours of training as described in the AC. Having said that, that training in a fully functioning FAA-qualified PCATD must be given by an authorized instructor and an appropriate pilot training entry made by that authorized instructor in the student's log book.

Of concern to FAA is the possibility that some pilots may have received training in non-approved systems. If so, the training time logged using such systems cannot be credited towards meeting the training requirement for an instrument rating as outlined in the FAR.

Although thousands of pilots have and are using the various commercial PC-based flight programs available for sale, the time spent practicing "flying" on those non-FAA qualified systems cannot be used to meet any FAA required flight training requirement even if the training is being given by an FAA certificated instructor. The FAA is concerned that some instrument applicants may try to use such time and when their records are audited in preparation for the practical test, they

will not meet the requirements for the instrument rating. To prevent such an occurrence from happening, each student using a PC-based training device should ask to see and then to check the unit's documentation to determine whether the unit being used is FAA-qualified and -approved for use under the terms of the AC. The time you save may be your own. More importantly, the money you save may also be your own.

Each FAA-qualified PCATD will have as part of its documentation a complete list of all of its components, a copy of the qualification guide used to ensure its compliance with the AC, and a letter from the FAA's Flight Standards Service's General Aviation and Commercial Division, AFS-800, stating that the PCATD was qualified under the conditions of the AC for use in an integrated ground and flight instrument training program. The PCATD must be maintained and operated under the terms of the above documentation to retain that FAA qualification.

Again, it is important that instrument applicants meet all training requirements for the instrument rating as outlined in the Federal regulations. An applicant who uses a PC-based flight simulation device in his or her training program, but who then fails to ensure that it is an FAA-qualified PCATD may fail their initial instrument check if the applicant does not meet all of the minimum training requirements without using the non-qualified PCATD training time. The best way to avoid that situation is by ensuring that the equipment used in all training is FAA-qualified or —approved for its intended use. Have a good lesson.

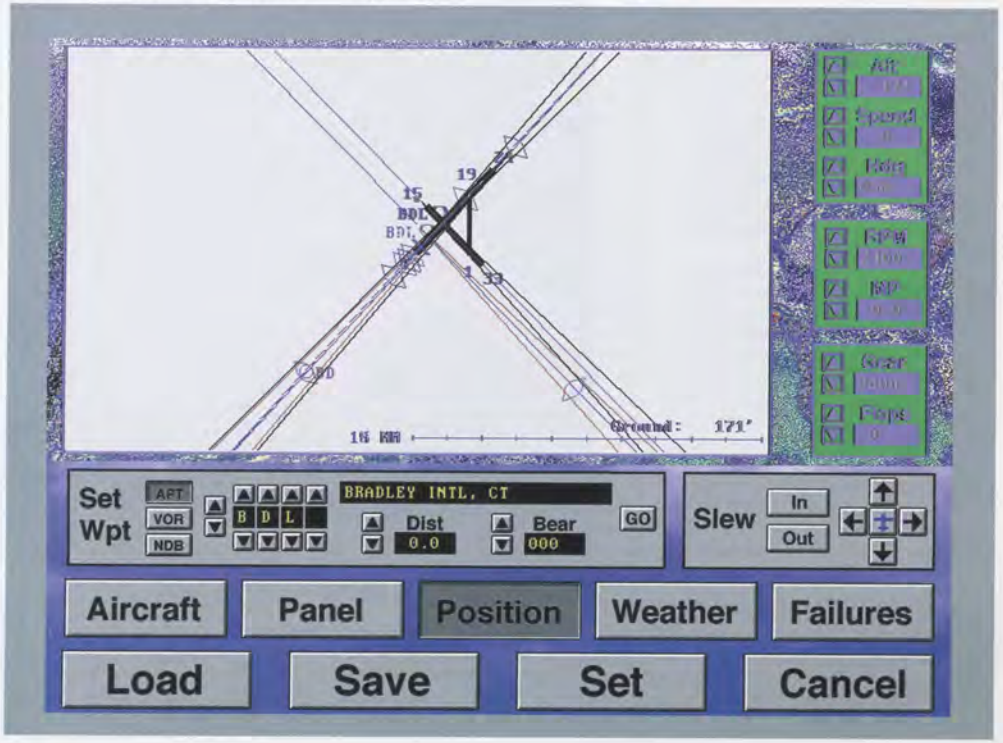
PCATD MANUFACTURERS AND FAA QUALIFIED MODELS

Jeppesen Sanderson, Inc.: ASE Beech A36; C23; Cessna 172R

Aviation Teachware Technologies: BE A36; Piper Arrow IV; Cessna 172P; Mooney M20J; Piper Seneca III; BE-58

Precision Flight Controls, Inc.: BE-36; Piper Seneca III

Aviation Supplies and Academics: BE-36; BE-58



PARACHUTE INDUSTRY ASSOCIATION

"Some people just fall naturally into their jobs.
Others are pushed. Some just stand and watch.
But some people dive headfirst into their jobs.
They are called skydivers among other things."

by H.Dean Chamberlain,
One Who Stands and Watches.

A skydiver floats in for a landing at the Town and Country Resort and Convention Center in San Diego as part of the Parachute Industry Association's conference and symposium. (Photo by H.Dean Chamberlain)

Such were many of the types of people at the Parachute Industry Association's (PIA) biannual meeting and convention in San Diego (also the location for 2001) in January. Because I had written an earlier article describing my experience in trying to purchase an emergency parachute for use in flying gliders (October 1998 *FAA Aviation News*), I was invited by the FAA's Parachute Technical Program Manager, Morgan Brookfield—who is also a skydiver, Instructor Examiner, and a master parachute rigger—to attend the PIA convention. He was leading a contingent of FAA aircraft certification safety engineers and inspectors to the symposium for a training session to meet the developers and manufacturers of current parachute and skydiving equipment as well as to meet the men and women who have made the industry what it is today. Equally important was the opportunity for the FAA specialists to attend the many training sessions held during the convention. This hands on industry training is important because these engineering types are involved in parachute certification issues among other certification responsibilities within their respective offices and geographical areas.

For those FAA specialists new to the FAA and the parachute industry, this type of meeting gives everyone the opportunity to see, question, and meet with subject matter experts from both industry and the FAA's other field and headquarters offices.

This industry meeting is important for other reasons as well. For example, although most of us commonly think of skydiving parachutes as the only "parachutes" in use today, the military buys parachutes for dropping anything from people to supplies to tanks. I think it is safe to say, if something can fit in an aircraft or on top of a rocket, there is a parachute somewhere in the world that can float it to earth. For those of us born before the space shuttle era, I think we can all still remember the huge parachutes used to float the early U.S. space capsules to a safe touchdown (or was it a splashdown) in the ocean. In fact for some manufacturers, the military is their largest customer.

In addition to sport and military parachutes certain aircraft flight operations require FAA-approved emergency

Allen Silver (left), chairman of the Parachute Industry Association's Rigging Committee, demonstrates with the help of a volunteer from the audience the proper way to fit and wear an emergency parachute during a seminar on the use of emergency parachutes for the non-skydiver. (Photo by H.Dean Chamberlain)

parachutes to be worn. Whether emergency or sport, all parachutes must be periodically inspected and repacked by appropriately rated parachute riggers.

So as you can see, there are many different types of parachutes and uses for parachutes within the parachute industry.

Whether it is a part of reinventing government or part of the ongoing partnership development between government and industry, PIA is becoming one of the recognized industry organizations responsible for maintaining and developing the standards for the parachute industry including some of the standards used by the U.S. military.

For some people, this industry involvement may seem like heresy. But getting government out of the specification business is nothing new. For example many of the standards used everyday in the U.S. are based upon various Society of Automotive Engineers (SAE) standards. Many of these same SAE standards are used within aviation.

In fact one of SAE's standing committees, SAE S-17 Committee, deals with the Certification Standards of Personnel Parachutes Assemblies. The S-17 Committee is responsible for maintaining the Aerospace Standard (AS) 8015, Minimum Performance Standards For Parachute Assemblies And Components, Personnel, which the FAA incorporates directly into the Technical Standard Order (TSO) C23 Series.

Other aviation standards include the Radio Technical Commission for Aeronautics, Inc., (RTCA) electronic standards for such things as the Global Positioning System (GPS) civil receivers and related equipment. And like the SAE and RTCA standards, the evolving industry parachute standards will reflect various government organization views and needs concerning parachute equipment and performance and safety standards. One of the reasons is many government organizations have PIA and/or other industry memberships and many of the government employees involved in these activities have their own personal memberships in these organizations.

And since parachutes and related equipment also falls, no pun intended, under FAA regulatory oversight, the Federal government is also represented by those FAA employees whose job it is to certify such equipment by ensuring that each item meets or exceeds the FAA's minimum performance standards. In addition to the FAA's Aircraft Certification Service's involvement in the certification of parachutes and related equipment, the FAA's Flight Standards Service's aviation safety inspectors (ASI's) also play a critical role in ensuring the industry's safety. For example, ASI's monitor sport parachuting in the field as well as certify parachute riggers to pack, maintain, repair, and alter parachutes. ASI's are involved with the operational use of FAA-approved parachute equipment in aircraft and for sport use.

This important FAA involvement in the parachute industry was one of many reasons the FAA employees attended the symposium. At times, their need to meet with their industry experts can best be done at such a convention. In many cases, this may be the only time they all may be able to see the latest equipment and meet with the manufacturers of that equipment at one time and in one location. Another benefit is that the FAA employees can meet and share their views with each other on the training they have received and the equipment they have seen.

For those of you who are not familiar with PIA, it is an organization made up of a broad range of companies and businesses involved directly or indirectly in the parachute industry. From the manufacturer of yarn (DuPont

Parachute Industry Association President Cliff Schmucker (left) and FAA representative Morgan Brookfield discuss a parachute assembly. (Photo by H.Dean Chamberlain)

for example) used by a cloth manufacturer (Milliken) in the weaving of material that is sold to a supply company that sells the material to a parachute canopy manufacturer who then makes parachute canopies and attaches it to equipment made by the manufacturers of "hardware" (buckles, rings, and other metal parts of a parachute) and "software" (our magazine term for fabric, lines, and webbing), to the design of harnesses and related items, the parachute industry crosses many industries and technologies. From chemistry to metallurgy to aerodynamics, the parachute industry has it all.

And in today's hi-tech world for example, you can even buy a computerized safety device known as an automatic activation device or AAD that will automatically activate your reserve parachute in case something happens to you that prevents you from manually deploying your parachute. The computerized device (AAD) measures the jumper's velocity and altitude through a barometric sensing device. Below a preset altitude, if the unit senses excessive airspeed the device activates the parachute. Several hundred "saves" have been made by the device activating the parachutes of jumpers involved in such incidents as a midair collision with another jumper to someone with an incapacitating medical problem such as a heart attack to an inexperienced jumper who has an equipment malfunction to experienced jumpers who have lost situational awareness while at a dangerously low altitude.

Computers are also used in the industry to design and manufacture parachutes. Parachute manufacturers have developed computerized drawing and cutting systems that utilize lasers or hot knife technology. These systems can cut entire bolts of fabric in only a few hours.

In today's rapidly evolving parachute industry, change is inevitable. Now both FAA and industry members must work hard at keeping up with those fast paced changes and how they impact established industry and FAA safety standards.

One of the interesting challenges facing PIA and the parachute industry is how it and parachuting can keep up with all of the changes occurring within the industry worldwide. With the rapid integration of computers and other hi-tech developments within both the manufacturing and operational use of parachutes and their related support equipment, the challenge for everyone involved in the use and certification of that equipment is to stay on the leading or cutting edge of those changes. The challenge for the men and women of the FAA is to ensure that those changes maintain the same high safety standards that both the industry and FAA have worked so hard for since the first American jumped from an aircraft with a parachute. Now, I wonder if that person knew or even cared about the current FAA parachute regulations contained in FAR Part 105? What do you think?

Although this brief article is about the role that PIA and FAA certification specialists play within the parachute industry, no discussion of the industry and the FAA's oversight and partnership with that industry would be complete without mentioning the important role that the United States Parachute Association (USPA) plays within sport parachuting. Although not a manufacturing group, USPA effectively sets the standards for sport parachuting through its membership rules and its oversight of those rules, standards, and operating principles for sport parachute jumping within the U.S. based upon the Federal regulations. Those standards include operating requirements for operators of local training sites and drop zones across the country and for those who jump. Although USPA is a volunteer membership organization like PIA, FAA recognizes the important leadership role USPA, like PIA, plays within the parachute community. Together, PIA, the SAE S-17 Committee, and USPA all work with the FAA to promote safety within the parachute industry.

Editor's Note: FAA Aviation News *would like to thank the Parachute Industry Association, its President, and its members for their cooperation and support; Mr. Morgan Brookfield, FAA; Mr. Fred W. Christlieb, the Safety Program Manager (Airworthiness) of the FAA's San Diego Flight Standards District Office for his support; and everyone who took the time to work and discuss parachuting with Mr. Chamberlain in the preparation of this article.*

Generators and Alternators: What's the Difference

by H. Dean Chamberlain

Recently two people I work with had an electrical problem in a light twin. Fortunately the electrical failure happened in day VFR conditions and the aircraft had two pilots onboard. The benefits of being day VFR and having two pilots on board cannot be over emphasized. Although a single pilot could have safely handled the problem, being able to share the workload with someone else makes any problem easier to handle.

With two pilots working the problem and being in visual meteorological conditions, it was easy for one pilot to fly the aircraft while the other pilot ran the appropriate pilot operating handbook electrical checklist. They were able to return to their home airport without incident. They were landing at an airport with a relatively short runway where they wanted to use flaps. Once they had the runway made, they were able to lower the electrically operated flaps using battery power without any problem. They had left the gear down when they discovered the problem after takeoff from a nearby airport to minimize the electrical drain on the battery. If the electrical system had to fail, it chose the best possible time to fail. Some pilots aren't so lucky.

NTSB and FAA DATA REVIEW

A cursory Internet review of the National Transportation Safety Board's (NTSB) and Federal Aviation Administration's (FAA) accident and incident data bank produced some interesting reading. First, we want to acknowledge that accidents have occurred as a result of electrical problems in flight. We want to emphasize that a serious electrical problem under the worst circumstance can be a potential killer. One such bad situation could be a total electrical failure in a complex, high performance aircraft on a dark and stormy night in instrument meteorological weather conditions over hostile terrain on an instrument flight plan with only one pilot aboard. A pilot who has worked all day, and who is now fatigued trying to get home. Now if you really wanted to make this a difficult situation, add in some snow or freezing rain and the risk factor would go sky high. In such a situation, what would you do? Fortunately, most electrical failures aren't this serious.

Although we are discussing general aviation aircraft, history has shown that modern air carrier aircraft can crash under such conditions the same as your typical general aviation aircraft can. We want to emphasize that these kinds of problems can be very serious especially for the unprepared regardless of the type of equipment being flown.

However, our non-scientific look at a handful of general aviation electrical related problems that made the NTSB or FAA incident or accident reports were more typical. In many cases the damage to the aircraft was minor or none. The same was true of injury to pilot or passengers.

TYPICAL TYPES OF PROBLEMS

A review of some of the general aviation reports seems to indicate that pilot error in responding to the situation caused more of a problem than the electrical problem. Because many of the reports had little or no damage reported, the narrative of the reports were very brief without a lot of details. For example, one report about a Cessna 182 stated, "Electrical problem. Overran runway returning. Alternator field wire loose. Struck rwy light." The airport conditions were day VFR. Although no damage was reported, could the private pilot have handled the situation better? We don't know. But the report begs the question of why did the pilot hit the runway light in day, VFR conditions?

The following incident is even more common. The narrative said the air taxi "departed alternators off. Drained batteries. Used manual gear. Not locked down. Folded landing."

Another report said, "Alternator failed en route. Diverted. In confusion landed gear up." Again, minor damage was done to the aircraft. The question is why did the pilot, a commercial pilot and flight instructor, land gear up?

Another pilot while descending from altitude did a "long cruise descent with the engines at a very low power output. He said he was unaware that the aircraft had generators instead of alternators, and that the engine speed he was using for the descent was below the speed required to keep the battery charged." After landing and discharging his passenger, the commercial pilot and flight instructor discovered the aircraft's battery was too low to start the aircraft. The pilot set the brakes and handpropped the twin's right engine. He then tried to use the operating engine to produce enough electrical power to start the twin's left engine. When that idea failed, the pilot got out of the aircraft and tried to handprop the left engine. When the left engine started and went to a high power setting before the pilot could get back into the aircraft, the twin went out of control and started turning in circles eventually striking a fence and a tree with substantial damage to the aircraft. The report listed a probable cause of the incident as, "The pilot's failure to ensure the aircraft was secured prior to attempting an engine start by handpropping."

TO HANDPROP OR NOT TO HANDPROP

A good recommendation for anyone attempting to start an engine by handpropping it is that a qualified, trained pilot, knowledgeable in handpropping techniques, be in the pilot's seat to safely operate and control the aircraft. Although people have handpropped aircraft engines for decades, it is not without risk. Only trained people should attempt to hand prop an aircraft because handpropping can be dangerous. A rotating prop has the potential to inflict serious or deadly injuries to those who make a mistake while handpropping an aircraft. Of course, the safest option is to have the aircraft's battery replaced or charged and avoid the handpropping completely for those aircraft with an electrical system.

LACK OF AIRCRAFT SYSTEM KNOWLEDGE AND STRESS

In another case there were reasons to suspect a low voltage situation before the flight departed. There had also been a previous electrical discrepancy reported. Then while preparing to land at night, the electrical system failed and the aircraft hit trees during the landing. Later it was discovered that a wire had broken.

A common thread in several incidents was the failure of retractable landing gear aircraft to land with all of their wheels down and locked. In some cases because of distraction or stress, the pilot failed to extend the gear. In others, the manual gear extension procedure was not done properly. Adding to the problem is the fact that in a complete electrical failure, for those aircraft with landing gear indicator lights, the lights probably will not be working. Without the lights, the pilot may not realize the gear is not down or not down and locked properly. Adding to the problem is the fact that most retractable gear aircraft have generally high performance and therefore require more pilot attention to fly them.

TYPICAL GENERAL AVIATION AIRCRAFT ELECTRICAL SYSTEMS

Since aircraft electrical problems can occur at any time, we want to review the major differences between aircraft electrical systems in your typical general aviation aircraft.

For our readers with little knowledge of aircraft electrical systems, we want to provide a very brief discussion on your typical general aviation (GA) aircraft's electrical system. First, modern piston-powered GA aircraft have two totally separate electrical systems. One engine-driven, self-contained system provides the electrical power for the ignition system needed to keep the engine running once it starts. This system is based upon a self-contained magneto electrical generating system that can keep the engine running whether or not the aircraft has any other type of electrical system onboard. For those not familiar with a typical general aviation piston-powered aircraft, you can compare such an engine's electrical ignition system to that of a typical gasoline powered lawn mower. Although it has a much simpler kind of magneto system, the lawn mower, once you start it by pulling on its starting rope, will continue to run until it is out of gas or it is shut off. The same concept is true of most small GA aircraft engines.

This is why older aircraft such as the classic Piper *Cub* can fly without any other onboard electrical system. To start a *Cub*, just like a gas lawn mower, the *J-3*'s engine must be rotated fast enough to start running. Someone normally does this by rapidly turning the propeller until the engine starts. Hence the term, "handpropping."

The fact that a piston-powered aircraft can be started by rapidly turning its propeller when the magneto switch is turned on and the fuel is on is why anyone working or standing around a propeller is always warned to stay out of the propeller's arc when handling or turning the propeller. The engine could inadvertently start and the rotating propeller could injure or kill anyone within its rotational plane. Although the magneto switch in the off-position is designed to prevent the engine from starting by grounding the output of the magneto, a defective switch or a loose magneto grounding wire could allow the engine to inadvertently start if the propeller is turned rapidly enough and there is enough fuel for the engine to start.

MAGNETO SYSTEMS

Although the magneto system can pose a potential safety problem for those turning the propeller, its biggest advantage is that it provides an independent electrical system to keep the aircraft running until the magneto system itself fails or the fuel is exhausted or the engine stops running. To reduce the probability of a magneto failure, modern piston engines have dual or two separate magneto systems firing two separate spark plugs in each cylinder. Although both systems are normally used together, in the case of a magneto failure, one system is adequate to fly the aircraft to an airport where repairs can be made to the broken system.

The important thing to remember is that a piston-powered aircraft engine does not need an alternator- or generator-based electrical system or battery to fly. This is an important safety point. As part of your preflight briefing to your passengers, you may want to remind your non-aviator passengers that if they hear you say, "We have lost our electrical system," the aircraft will continue to safely fly and not fall out of the sky. This briefing is not required in those aircraft without an electrical system onboard. Better yet, use your preflight check as a way to educate your passengers about how your aircraft operates and important safety issues such as propeller safety.

We may have a problem communicating and navigating. But there are

safe operating FAA rules for that eventuality too. If you are in VFR conditions, you stay in them. If you are in IFR conditions, you follow the rules outlined in FAR §91.185. So read on.

Then why have an alternator or generator and battery in an aircraft. There are many reasons. The most important is pilots are like the drivers of the early automobiles. Most pilots don't want to hand start (commonly called handpropping) their engine. It is potentially dangerous, and it is nasty to do in the rain or snow. It is also nice, but not required, to have two qualified people to do it. One trained person doing the handpropping and one in the aircraft operating the controls (preferably another pilot). So like automobiles, GA aircraft started being manufactured with electrical starters in them.

THE GENERATOR

This required not only a starter, but some means of powering it. All of which lead to the need for some type of battery to provide the necessary stored electrical power, a means of keeping the battery fully charged, and a means of regulating the charging process. Voila, the first aircraft electrical system based upon a battery, a generator, and the all important electrical starter.

Once you had an electrical system, it was easy to add all of the radios, navigational, and electrical equipment we now have in modern aircraft.

But generators have a slight problem. They like a minimum rotational speed to produce a specified amount of electrical power. Too slow a speed and the output drops. If you want to make sure the battery is being charged, you have to operate the engine faster. This is normally not a problem in flight, but if you are number 25 waiting for takeoff, it can become a problem on the ground. Or like the pilot listed in one of the accident/incident reports who noted how his long, low-powered glide caused him problems with his generator equipped aircraft. Generators are also somewhat heavier than what has replaced most of them: The Alternator.

THE ALTERNATOR

Enter the alternator; a different way to make power. Again, like in cars, as electronics and technology advanced, so did the way to produce power. Today, instead of a generator, cars and new aircraft normally have alternators in them. The main benefit of the alternator is that it can produce a specified amount of power at a much lower rotational speed than a generator.

An alternator also operates differently. It produces alternating current that is then rectified or converted into direct current for use in most piston-powered GA aircraft. An alternator is normally lighter in weight than a comparable generator. All of which provides important advantages to the aircraft manufacturer and pilot. Better output at lower revolutions per minute at a lessor weight not only improves efficiency, but it also improves the useful load of the aircraft by a small amount.

MAINTENANCE AND IN-FLIGHT DECISION MAKING

So how do you know which one is in your aircraft? The best way is to read the pilot's operating handbook. Reading the handbook does several important things. First it allows you to hanger fly with the best of pilots. You can also join any argument about the type of electrical system in your aircraft. Plus when you have a problem you can talk intelligently with your maintenance technician.

But the most important reason for reading your operating manual or aircraft flight manual (AFM) is to learn how to identify and possibly handle any electrical problem in flight.

Electrical problems need to be handled correctly and promptly because they could cause an onboard electrical fire, damage other electrical gear, or cause problems with other systems.

Another reason is once you understand the electrical system in your aircraft or the aircraft you fly, you can make important decisions about what you are going to do in case you have a generator or alternator failure.

For example, by knowing and understanding your electrical system, you may decide to continue your flight by turning off non-critical electrical items such as your second radio and other redundant electrical gear or start looking for the nearest airport to land.

Equally important is knowing critical flight data such as what to do if you have electrically operated flaps or gear. More than one pilot has put him- or herself in a "box" with no way out by making the wrong decision during a "minor" incident or problem. Putting electrically operated flaps down early and not having the electrical power to raise them may mean having to fly with increased drag or minimal lift during a go around or while having to divert to another airport. The same may be said of electrically operated landing gear. Although in some aircraft the increased drag produced by the lowered landing gear may be worth the drag penalty considering the potential problems later of having to either manually lower them or forgetting to lower them. Or if the pilot is in the clouds, the pilot may decide that being able to talk and navigate is the most important use of any remaining battery power.

Because each flight is unique and the needs of each pilot is unique, it is hard to say which electrical devices should remain on and which devices should be turned off. This is why it is important that each pilot review his or her aircraft's electrical system and know and understand it to the point where the pilot can make the best decision about the aircraft's electrical system before the loss of the generator (or is it an alternator?) becomes critical to flight safety. Knowledge is power (pun intended). And if your aircraft has electrically operated retractable landing gear? Please remember that you still have to lower the gear before your next landing, so you just may want to review your aircraft's emergency gear operating procedure before your next takeoff. Have a great season of flying. ✈

We All Know About ASRS, But What's An ASRP?

by Mark E. Blazy

On December 1, 1974, a TWA B-727 was inbound from the northwest to land at Dulles International Airport in instrument meteorological conditions (IMC). The flight descended prematurely below the minimum safe instrument altitude striking the slope of Mount Weather, VA. All 92 passengers and crew on board were killed.

Investigating the circumstances, the National Transportation Safety Board (NTSB) discovered that the flight crew misinterpreted information on the approach chart as well as ATC instructions. The NTSB then discovered that another airline made a similar premature descent some six weeks earlier—somehow avoiding the same fatal error. The earlier incident was reported within the company, but it was not disseminated to any other airlines for fear of enforcement action.

This incident served as a catalyst to create an incident reporting system. Since one of the primary missions of FAA is to promote aviation safety, the NSTB made an immediate recommendation for the FAA to create a reporting program designed to identify unsafe operating conditions. In 1975 the FAA instituted the Aviation Safety Reporting Program (ASRP), which was designed to encourage the identification and reporting of deficiencies and discrepancies in the National Airspace System (NAS). To encourage reporting, the ASRP provided limited immunity from certain types of enforcement action.

Pilots were uneasy and often times reluctant to report errors to a regulatory agency that could assess fines and revoke licenses. Understanding the reluctance to report deficiencies or hazards, the FAA determined that the effectiveness of the ASRP would be further enhanced if an objective, non-regulatory agency served as the repository for reported safety information. The National Aeronautics and Space Administration (NASA) was selected as the independent agency.

In 1976, FAA and NASA entered into a Memorandum of Agreement where NASA would handle the collection, analysis, and de-identification of safety reports. Although NASA designed and now administers the Aviation Safety Reporting System (ASRS), the FAA provides the major funding for the ASRS to promote the continued use and operation of the system. NASA's ASRS is a voluntary, confidential incident reporting system that is designed primarily to provide information to the FAA and the aviation community to assist in reaching the goal of reducing and ultimately eliminating unsafe conditions in the NAS. NASA's system also ensures the anonymity of the reporter.

Hazards or potential hazards are reported directly to NASA on their ASRS reporting Form 277. In an effort to encourage the aviation community to report incidents, the FAA agrees that the entire form is not to be used as evidence to substantiate an alleged violation in an enforcement action.

The immunity provision is outlined in Federal Aviation Regulation (FAR) § 91.25. However, the immunity will not apply if the incident was deliberate, criminal, or resulted in an accident. In addition, the reporter cannot have been involved in any enforcement action within the previous five years and the incident must be reported to ASRS within 10 days of the event.

Because of the FAA's immunity provision and commitment to funding NASA's system, the ASRS now receives over 34,000 reports per year. These reports are de-identified and held in strict confidence by NASA. For more than 20 years this arrangement has not been compromised.

Safety issues identified in the ASRS reports are discussed by FAA and NASA on a teleconference held twice a month. The issues can run the gamut of safety and security problems. In consultation with the ASRP program manager, NASA will forward to the FAA, aircraft manufacturers, airport representatives, and other aviation groups a special alert message that highlight the real or potential hazard.

Remember the title of this article? Now you know the difference. So the next time you hear someone say FAA's ASRS program, show your knowledge and say, "NASA has the ASRS. FAA has the ASRP."

✈

Mark Blazy is the Program Manager for FAA's Aviation Safety Reporting Program, Office of System Safety.

Who can file reports?

Pilots, mechanics, air traffic controllers, flight attendants, or any user of the National Airspace System (NAS).

Where can I obtain the forms?

Copies of NASA's ASRS Form 277 may be obtained free of charge from FAA Flight Standards District Offices or Flight Service Stations or directly from NASA at ASRS, P.O. Box 189, Moffett Field, CA 94035. Forms are also available on NASA's ASRS web site at *callas.arc.nasa.gov*. When a form is completed, it is to be mailed directly to NASA, not the FAA.

Questions or Comments?

Should you desire any further information or have any questions on the ASRP, please forward them to Mark Blazy, Program Manager, Aviation Safety Reporting Program, Office of System Safety, ASY-300, 800 Independence Avenue, SW, Washington, DC 20591. Telephone: (202) 493-4619 Email: mark.blazy@faa.gov

Questions relating specifically to the ASRS may be addressed to Ms. Linda Connell, Director, NASA ASRS Ames Research Center, Mail Stop 262-7, Moffett Field, CA 94035.

CANADA/U.S. AGREE ON CROSS-BORDER OPS

by H. Dean Chamberlain

Pictured above, Sherritt (left), and Lacey. (Photo by H. Dean Chamberlain)

Transport Canada and FAA signed a new agreement making it easier for amateur-built aircraft from both countries to cross the Canadian-United States border and operate within each others' airspace. In a July 31 ceremony at the Experimental Aircraft Association's (EAA) AirVenture 1999 in Oshkosh, WI, Donald B. Sherritt, Director, Aircraft Maintenance and Manufacturing, Transport Canada Civil Aviation and FAA's L. Nicholas Lacey, Director, Flight Standards Service, announced the new program that simplifies both countries procedures for permitting cross-border operations of amateur-built aircraft.

Both acknowledged the key role EAA played in the event. As Lacey said, "From the FAA's perspective, we want to thank EAA for hosting this [announcement] and for its role in pointing out the significance of this process to the amateur-built operators and pilots to us. Working with my friend Don Sherritt of Transport Canada, we were able to complete this agreement in time for Oshkosh."

Echoing Lacey's remarks, Sherritt said, "I think what this really shows is when the right people get together and have the will and cooperation with the strong goodwill that we have between FAA and Transport Canada, we can make things happen. Using modern technology and a little creative thinking, I think we have come up with a process that removes a lot of administrative burden from both agencies while at the same time we realize we are dealing with a responsible sector of the industry capable of dealing with this sort of process in a responsible manner."

The benefits of the new process were immediate. In the past, for example, a Canadian certificated amateur-built aircraft owner would have to process a detailed application through the FAA that the FAA would then have to approve and keep detailed records of the application and approval process. The Canadian process was similar. As noted in the FAA letter to Transport Canada, "We have determined that a simplified method of issuing SFA's [Special Flight Authorization] would be in the best interest of both the FAA and Canadian-registered amateur-built aircraft owners. From the FAA's standpoint, manpower and budgetary resources required for the process of completing the appropriate forms, issuing authorizations, and keeping and maintaining the records exceed the safety benefits, if any, realized through such an administrative process." The Canadians agreed.

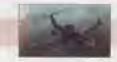
Not only is the process simplified for both Canadian and U.S. pilots, but they can access the information and required forms on their respective country's Internet website. In addition, as long as the amateur-built aircraft owner/operator complies with the specific conditions outlined in the respective documentation, the new operating authorization is valid for an indefinite period unless it is superseded or canceled in writing by either the FAA Administrator for the U.S. authorization or the Minister of Transport for the Canadian authorization.

Within the U.S., FAR §91.715, Special flight authorizations for foreign civil aircraft, and FAR Part 375, Navigation of Foreign Civil Aircraft within the United States apply for the Canadian aircraft as well as the general operating and flight rules of FAR Part 91, and in particular section FAR §91.711. Within Canada, U.S. pilots are expected to comply with the general operating and flight rules in the Canadian Aviation Regulation as well as the conditions of the Standardised Validation of the Special Airworthiness Certificate-Experimental, for the purpose of operating a United States-Registered Amateur-Built Aircraft in Canadian Airspace issued by Transport Canada.

Canadian pilots may contact the appropriate FAA Flight Standards Service Division Manager or the Aircraft Directorate in the region where the aviation event is to take place in writing for this new authorization or obtain it electronically through the FAA's internet website at http://www.faa.gov/avr/afs/afs800/formtext.htm. If anyone has additional questions, call the FAA at 202-267-8212 during normal working hours.

U.S. pilots can apply for the free Canadian authorization by contacting any of the Transport Canada Centres or electronically through Transport Canada's Civil Aviation Internet website at http://www.tc.gc.ca/aviation/mainten/regs&docs/download.htm.

As noted in both countries' documentation, although the new procedures reduce the paperwork required for each country's pilots of amateur-built aircraft to operate in the either Canada or the U.S., the same high standards of safety still apply. These special authorizations only apply while the respective pilots are in compliance with the operating rules and conditions of the issuing country. For ease in applying for the new authorizations, both countries' websites contain links to each other's website for quick access.



RUNWAY INCURSION IS NO ACCIDENT

Continued from Page 12

ways to do this for large, complex airports is by reviewing that airport's instrument approach chart. And since it is hard at times to see some taxiway routes and markings at large airports from the cockpit of a small general aviation type aircraft, pilots unfamiliar with the local operating environment should ask ATC for detailed progressive taxi instructions before starting to taxi in from landing or before taxiing out for takeoff.

Other important ideas include contacting ATC any time you become lost or disorientated on an airport; to maintain a sterile cockpit by avoiding unnecessary conversations within the cockpit; if in a small aircraft while taxiing, taking off, and landing, to keep a good look outside the aircraft for other aircraft operating within the vicinity. Use your aircraft lighting to the extent possible to make your aircraft visible to others operating in the air or on the ground.

If you can't observe the approach area of a runway you have been cleared onto and told to hold, you should maintain a careful listening watch on the frequency for that landing runway. There has been more than one case of an aircraft landing over an aircraft holding on the runway for takeoff.

Because general aviation pilots are involved in many of the runway incursions, they as a group need to be particularly alert while operating on an airport at night after a long day of working. Fatigue and lack of sleep can increase your risk of loss of situational awareness, especially on a large, complex field at night. One way to combat this is to know and understand the relatively new airport signage that has been installed at most airports in the last few years. Pilots also need to review the current runway and taxiway markings used on today's airports. The *Aeronautical Information Manual* (AIM) shows all of the current runway markings and signage.

Equally important for all pilots to know and understand are the meanings of the different types of hold short lines on an airport. For example, what does the double dashed lines mean at a hold short line when approaching them from the runway side?

The lines show that you are expected to cross the dashed lines when exiting the runway.

As noted in the FAA's Runway Safety Program's internet website and included in the letter to all flight instructors and designated pilot examiners, "Historical data clearly demonstrate that runway incursions most likely to cause accidents generally occur at complex, high volume airports. These airports are characterized by parallel/intersecting runways; multiple taxiway/runway intersections; complex taxi patterns; and the need for traffic to cross active runways. The analysis of historical data also shows that a disproportionately large number of runway incursions involving general aviation pilots result from misunderstood controller instructions, confusion, disorientation, and/or inattention."

Based upon this data, general aviation pilots need to be particularly careful when operating into unfamiliar, complex airports. Since many general aviation pilots normally fly single-pilot, they don't have a copilot to back them up with the communications or to look up the airport diagram while taxiing, so single-pilot aircraft need to be operated very carefully in the above type situations. The old adage still applies, "When in doubt: Ask."

The same is true of anyone driving a vehicle on an airport movement area who is not familiar with the airport and its safety procedures. In the case of vehicles, they should always display an appropriate safety signal. Since many of the incursion incidents occur in low light and low visibility situations, that signal should normally be a rotating or flashing safety light. Vehicles operating within the runway safety area must be equipped with two-way radio that allows communication with the designated ATC section having jurisdiction over the runway safety area before the vehicle is driven on or across that area, taxiway or runway. At some airports, there are designated vehicle operating areas and lanes that are marked so pilots should be alert for vehicles in those areas. Vehicles in such designated areas may or may not have radio communications with ATC.

For those who operate on airport movement areas, taxi ways, or runways, when was the last time you reviewed the light signals for loss communications or no communications while driving on an airport? If you have never seen or heard of the surface light signals they exist and you should review them in the AIM. In fact, one of the FAA's runway incursion project decals has the light signal colors printed with their respective meanings. The self-sticking decal is designed to be mounted in any type of surface vehicle.

Now if there were some way to keep deer and the occasional stray cow from wandering across airport operating areas. Deer don't know how to read, nor do they understand the danger of crossing a runway in front of a landing aircraft. Plus it is kind of hard to have a one on one conversation with a deer, but people wandering across an airport operating area or runway is another matter. People should know better. If you know someone who does wander around an airport like a lost deer, whether on foot or in an aircraft or vehicle, please discuss this important runway incursion safety issue with them. The life you might save just might be yours.

To paraphrase a famous American bear, "Only you can prevent runway incursions."

For more information on this important topic, you can review both the *Aeronautical Information Manual* for recommended safe operating procedures and the national Runway Safety Program's website at http://www.faa.gov/ats/ato/ato102.

Flight FORUM

• GPS Revisited

I would like to comment on the article "GPS Status and Vision" in the May/June issue of your publication.

I wonder if Mr. McSweeny or any members of the team from Johns Hopkins University Applied Physics Laboratory have ever flown into La Paz, Bolivia; Guatemala City; or maybe Cali, Columbia. If they have had that opportunity in day VMC conditions to see the mountains and how close they are, would they then feel comfortable flying into these airports at 2 A.M. IMC with one "sole means" of navigation, regardless of what it is? Wasn't it Ronald Reagan who said, "Trust, but verify." Verify, isn't that one of the basics of safety that we were taught when we were learning to fly?

Probably for FAR Part 121 operations two or more GPS receivers on different electrical systems will be required, but what about Part 91? What if you are in the descent or approach phase to an airport, such as mentioned previously, and some element of the system blinks for some reason or the crew has a moment or two of computer confusion as an American Airlines crew did going into Cali. Manageable risk might be one thing to someone doing stochastic risk anaylsis and something else to the crew in the cockpit.

I am an AOPA member, and I know that the folks at AOPA get giddy when they talk about GPS, but this is one member who is not sold on GPS as sole means and sole service. There is still a lot to be said for verifying the altitude at the outer marker.

Donald Smith
Miami, FL

We think you answered your own question. Two of the important elements in flying are risk assessment and subsequently risk management. Flying with only one GPS can be compared to flying with only one automatic direction finder (ADF) or VOR. People have done it and will continue to do it. It is all a matter of determining the amount of risk one is willing to accept. But whether the GPS unit blinks or you lose your only ADF or VOR, you have the same basic problem. You have had a total navigation failure. However, there are established FAA procedures for loss of navigation capability or communications failure. But as you said, it is always safer to verify, and yes, there is a lot to be said for verifying the altitude at the outer marker. It also helps to have redundant systems on board. Another saying is there is safety in numbers.

• Practical Test Standards

A local Designated Pilot Examiner (DPE) is challenging some of our commercial pilot applicants with questions from FAR Part 119 (Certification: Air Carriers and Commercial Operators). The instructors claim Part 119 is out of bounds because it is not listed in the Commercial Pilot Practical Test Standards. Is the DPE correct?

Fred C. Smyth
Via the Internet

No, the DPE is wrong. The instructors are correct. A commercial pilot applicant should only be tested on those tasks or elements of those tasks contained within the Commercial Pilot Practical Test Standards.

• Retracted Gear

The May/June 1999 issue's back cover shows a *Baron* several feet off the runway with the gear retracted. Is this good operating procedure?

Craig Hollander
Elizabethton, TN

The best answer to your question is it all depends upon the situation, type of aircraft, and runway length. When asked, the photographer and FAA pilot said, "Most light twins retract the gear right after take off. In the Baron, *minimum control airspeed (VMC) is 84 knots and rotation is generally five knots higher. Best rate single engine airspeed (VYSE) or blue line is 101 knots so when adequate runway is not available to stop from 89 knots, prudence dictates that a timely gear retraction will reduce the time for acceleration to blue line and give a better chance of maintaining a positive rate of climb should power be lost on one of the engines.*

"Now for the photographic technique, I used a very slow shutter speed of 1/30 second, and I panned with the camera. This technique blurs the back round, yet gives you a sharp image of the airplane. This also gives

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 FORUM 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

AVNEWS

1999 G.A. AWARDS PROGRAM WINNERS ANNOUNCED

The 1999 General Aviation Industry Awards Program has chosen David Faile, Jr. of Fairfield, CT, as the Certificated Flight Instructor of the Year; Harry Shannon of Winter Haven, FL, as the Aviation Maintenance Technician of the Year and Daniel Derby of Greensboro, NC as the Avionics Technician of the Year. A formal presentation to the winners will be given during ceremonies at the Aircraft Owners and Pilots Association (AOPA) Expo, October 21-23, 1999 in Atlantic City, NJ.

David Faile has been a flight instructor for 34 years and is currently flight instructing at Sikorsky Airport in Fairfield, CT. The National Association of Flight Instructors (NAFI) designated him in 1994 as a Master Flight Instructor. Along with his dedication to flight instruction, Faile has had an important role in the education and promotion of general aviation. In 1991, Faile became the coordinator of all FAA Safety Programs in the Sikorsky Airport area. This has included organizing programs and ensuring that safety issues are priority. Faile is also an active member of the FAA multi-year Environmental Impact Study (EIS) for improvements to Sikorsky Airport. He was also instrumental in leading the effort to make the State of Connecticut more attractive to aircraft owners. Testifying before the State Legislature, he led the successful effort to persuade the state to remove the personal property tax on aircraft and institute an aircraft registration fee.

Harry Shannon is self-employed at Amphibians Plus in Bartow, FL. Shannon has been working with general aviation for over 30 years and has owned his business since 1993. He holds an Airframe & Powerplant Certificate (A&P), Inspection Authorization (IA) and commercial pilot certificate, single engine, land and sea. Before owning his own business, Shannon maintained Bell and Allouette helicopters supporting offshore oil field operations in Grand Isle, LA. From there he went to Kissimmee, FL., where in 1993 he became the proprietor of Amphibians Plus with continued maintenance and support to the fleet of Lake Amphibian aircraft all over the world. Shannon has secured a U.S. patent for a "Landing Gear Alert System" for amphibious aircraft. He has shown his dedication towards aviation by teaching the general public and being a statesman for general aviation, especially in his promotion of seaplanes.

For the first time, the Industry Awards Committee is presenting the Avionics Technician Award. Daniel Derby is the Vice President of service marketing for Atlantic Aero, Inc., located in Greensboro, NC. Derby joined Atlantic Aero, Inc., in 1976 as an Apprentice Avionics Technician after serving in the U.S. Marines for four years as an aircraft and engine mechanic. He is now responsible for maintaining and expanding the company's share of the technical services market, with special emphasis on avionics products and services. Derby continues to serve as a technical resource to the avionics department and assists in designing systems tailored to specific aircraft. He has also been active in the efforts of Atlantic Aero and its sister company, Aero Modifications & Consulting, LLC, to develop supplemental type certificate (STC) modifications for general aviation aircraft. Derby is a member of the Aircraft Electronics Association (AEA). He has served as a regional vice president on the board of directors for the past ten years and has made many contributions to the growth of the AEA, which represents the avionics industry.

The national awards program is a cooperative effort between the Federal Aviation Administration (FAA) and the aviation industry. The awards are presented annually to reward outstanding contributions to the aviation industry by the Certificated Flight Instructor, the Aviation Maintenance Technician, and the Avionics Technician in promoting safety and education. The winners are selected from FAA regional winners and are chosen by a national selection committee of aviation professionals. Nomination forms are available from your local FAA Aviation Safety Program Manager and need to be submitted by December 31, 1999, to be eligible for the 2000 awards, which will be presented in August 2000 at EAA Air Venture in Oshkosh, WI.

ATTENTION SUBSCRIBERS

As you may have noticed your October issue of the *FAA Aviation News* is only now arriving and it is the middle of October. Ordinarily, you would receive your issue around the first of the month. Unfortunately, while everyone was worrying about Y2K problems, they forgot to remind us about FY99 problems. In other words the FAA ran out of printing funds in August and the magazine had to wait until the new fiscal year, October 1, before it could be printed. Barring any other unforeseen circumstances, your November/December issue should be back on schedule. We apologize for any inconvenience this delay may have caused you.

FAA PROPOSES ICING ORDERS FOR 17 AIRCRAFT

In its continuing effort to address aircraft icing, the Federal Aviation Administration (FAA) is proposing a series of rule changes designed to improve the safety of flight in icing conditions for 17 different aircraft types equipped

with pneumatic deicing boots.

The notice of proposed rulemaking (NPRM) would require the immediate use of deicing boots at the first sign of ice formation anywhere on the aircraft or upon alert of the ice detector system, whichever occurs first. It would also require continued use as long as icing conditions are present.

Previously, pilots delayed deploying the boots in order to avoid ice bridging. Ice bridging, ice formations above the furthest extension of the boots, occurred in older generation boots which were not powerful enough to completely shed ice. The commonly held belief was that premature use of even modern-day deicing boots would cause ice formation beyond the system's capability to shed.

Research since the mid-1990's found that modern deicing boots do an effective job in both shedding ice and preventing ice bridging completely. Consequently, the proposed rule requires the revision of the Airplane Flight Manual to include requirements for activation of the pneumatic deicing boots at the first sign of ice. Compliance time is 10 days after the effective date of the rules.

The rules would affect 3,018 U.S. registered aircraft. Compliance requires one work hour for a total industry cost of $181,080. Most U.S. regional airlines would be affected by the rule change given their heavy reliance on modern turboprop aircraft.

The FAA has been extremely active in working on the mitigation of the effect of icing on aircraft. Last February, the FAA convened a three-day conference, which attracted close to 400 icing, certification, and weather experts from around the world. These NPRMs resulted from recommendations made during that conference.

The FAA has issued airworthiness directives that change aircraft operations for dozens of aircraft, allowing them to better cope with flight in icing conditions. In 1995, the agency published a document entitled "Roll Upset in Icing!" which instructed pilots on the hazards of extremely severe icing conditions. More importantly, it established, for the first time, visual cues to detect severe icing and critical methods for recovery from dangerous roll upsets caused by ice accumulation. This publication was mailed to some 17,000 commercial turboprop pilots throughout the country.

The FAA has approved several ice detection systems for installation aboard aircraft to warn pilots of ice accumulation on critical surfaces. The agency is also studying the feasibility of developing equipment that can distinguish between the various types of icing conditions.

Other efforts are underway in the agency's continuing in-flight icing program. For example, the FAA is working to define the icing environment that aircraft actually encounter. Another effort would improve weather information and the forecasting of specific forms of icing.

Aircraft Affected by the Proposed AD:

Aerospatiale Model ATR-42 and ATR-72
Bombardier Model DHC-7 and DHC-8
British Aerospace Model HS 748
CASA C-212 and CN-235
Cessna Models 500, 501, 550, 551, and 560
Dornier Model Dornier 328-100
Fairchild Model F27 and FH227
Fokker Model F27 Mark 100, 200, 300, 400, 500, 600 and 700 series aircraft and Fokker Model F27 Mark 050
Gulfstream Aerospace Model G-159
Gulfstream American (Frakes Aviation) Model G-73 (Mallard) and G-73T
Jetstream Model BAe ATP and Model 4101
Lockheed Model L-14 and L-18 and Model 1329-23 and 1329-25
McDonnell Douglas Model DC-3 and DC-4
Mitsubishi Model YS-11 and YS-11A
Saab SF-340A, 340B and Saab 2000
Sabreliner Model NA-265-40, NA-265-60, and NA-265-80
Short Brothers SD3-30, SD3-60, SD3-Sherpa and SD3-60 Sherpa

DESIGN WINNERS

NASA and FAA announced during AirVenture '99 in Oshkosh, WI, the winners of the 1998-1999 National General Aviation Design Competition. The award recognizes engineering undergraduate and graduate students of participating universities who compete to design the most innovative fixed wing, single-engine, single-pilot two to six place general aviation aircraft.

The first place award went to 33 students from Embry-Riddle Aeronautical University for their design of a four-place general aviation jet aircraft. The first place award earned the team $3,000 and Embry-Riddles' Aerospace Engineering Department $5,000.

Second place went to a 13-member team from Pennsylvania State University, University Park, for its version of a four-place composite jet aircraft. The award earned the team $2,000.

Third place went to 21 students from the University of Virginia, Old Dominion University, Hampton, VA, and the Pratt Institute, Brooklyn, NY, for their unusual two-tail boom design with vertical tail, symmetrical wings and canards and asymmetrical tails and fuselage. The combined team received $1,000.

The team from Ohio State University received the "Best Use of Technology Developed by the Air Force Research Laboratory" award and received $3,000 for their efforts.

The Aircraft Owners and Pilots Association's "Best Retrofit Potential" award went to a University of Oklahoma three-member team. The team received $500 from AOPA.

Information for the sixth annual competition is now available from the Virginia Space Grant Consortium who manages the competition for NASA and FAA. Guidelines for the 1999-2000 competition is available on the internet at www.vsgc.odu.edu or by calling 757-865-0726 or by email at msandy@odu.edu.

Editor's Runway

from the pen of Phyllis-Anne Duncan

"Only YOU Can Prevent Runway Incursions"

So says Associate Editor H. Dean Chamberlain in his article on preventing runway incursions on page 9 of this issue. So says just about every aviation safety professional in the FAA and in the industry. Runway incursions—actually the prevention of them—is just about number one on the Administrator's Safer Skies safety agenda. Runway incursions, despite the best efforts of the FAA, airport management, and the airlines, have been on the rise, and FAA has been working with industry to devise some strategies on how to reduce runway incursions by 15% from the 1997 level by 2000. The potential for loss of life from a runway incursion that becomes an accident is tremendous, and the responsibility for reducing incursions is one everyone in aviation shares.

Aviation Safety Program education seminars are in the works, and if you're a designated pilot examiner or a certificated flight instructor, you'll soon be receiving a letter to airmen describing what you can do in teaching and examining pilots to reduce the number of runway incursions. Recently, the Director of the Flight Standards Service, L. Nicholas Lacey, sent a memorandum to the Managers of FAA's Flight Standards Regional Divisions asking them to increase the awareness of pilots in their jurisdictions of "the critical nature of ground operations.... Through all means available to you, please encourage the use of the following nine points of safe ground operations, discipline, and the importance of this discipline to safe operations."

Nine Points of Safe Ground Operations

1. Review airport layouts as part of preflight planning, during cruise before descent, and while taxiing. [Remember to look for traffic as well, particularly while taxiing. Don't want to be a runway incursion statistic while trying to prevent a runway incursion.—Editor]
2. Know and understand airport signage.
3. Read back all runway crossing and/or hold short instructions.
4. Review Notices to Airmen (NOTAM) for runway/taxiway closures and construction areas.
5. Request progressive taxi instructions when unsure of the taxi route.
6. Check for traffic before entering any runway or taxiway. [Looking both ways doesn't just apply to crossing the highway.—Editor]
7. Turn on aircraft lights while taxiing. [Of course, don't overload your electrical system in the process. Consult your manufacturer's recommendations and use your best judgement.—Editor]
8. Clear the active runway on rollout as quickly as possible, then wait for taxi instructions before further movement.
9. Study and use proper phraseology found in the *Aeronautical Information Manual* when responding to ground control instructions.

I might add a tenth: When in doubt, ask. Believe me, air traffic controllers would prefer that you do that rather than assume you know what they want.

These nine steps to safer ground operations are just the beginning salvo in reducing and hopefully eliminating runway incursions as a safety problem. As Mr. Lacey's memo says, vigilance and discipline, especially for the single-pilot operation, are essential to assuring safe operations on airport movement areas. The alternative is beyond unacceptable. It's dangerous.

We'll let Mr. Lacey's words close out this issue's editorial:

"Aviation safety is the business of all who participate. Please spread the word of runway incursion prevention."

'Til next time...

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