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Saving the See and Avoid Principle

photo by Robert E. Olds

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BRIEFS

CAP PUT ON CHOPPER NOISE. A new rule, effective February 5, 1988, requires helicopters for which application for issuance of an original type certificate in the normal, transport, or restricted category is made on or after March 6, 1986, must meet Stage 2 noise levels. FAA's helicopter noise certification is similar to ICAO's Annex 16, Chapter 8 helicopter noise standards. The continued production of helicopters for which type certificate application was made earlier than March 6, 1986, is not affected. For further information contact Steven Albersheim, Noise Policy and Regulatory Branch AEE-110, Office of Environment and Energy, FAA, Washington, D.C. 20590.

WIND SHEAR EQUIPMENT. A new rule proposed by the FAA would require FAR Part 121 operators to equip their jet aircraft with wind shear warning units to conduct low altitude wind shear training for their flight crews in an approved simulator. Pilot training on how to recognize and escape low altitude wind shear would be required of both Part 121 and Part 135 operators, if this rule is adopted. Compliance would be required starting two years after the effective date of the rule.

GRASS FIRES. The grass may be green on the prairies, but it is already tinder dry in the southern deserts. Pilots of helicopters with reciprocating engines are reminded to be careful about landing or idling their aircraft on dry grass or bushy terrain. Dry vegetation may be set on fire from the chopper's exhaust. If the helicopter goes up in smoke, it can be a long walk out.

PONTOON INSPECTION. Floatplane accident records are similar to land planes except that floatplanes have a higher proportion of landing accidents. This may be due to inadequate or improper float maintenance, especially on amphibious aircraft which may undergo annual inspections when floats are not installed. Before installation, previously stored floats should be examined for signs of corrosion or failure of skin integrity. Additionally, installed floats should be examined carefully in the preflight inspection for signs of leakage. In some cases the attitude of the floats during high speed taxiing will aggravate a very small leak to the extent that the float fills and sinks before takeoff can be accomplished.

Postflight Inspection

Many safety devices and procedures that are developed for air carriers and commercial aviation are resisted by other general aviation pilots because of the expected increase in operating costs. However, there is one procedure practiced by large operators that private pilots might consider adopting, since it costs nothing more than a little time—and in the long run could save both lives and money.

That practice is the *postflight inspection*. Preflight inspections are a time-honored and widely accepted procedure, directly tied to the Federal Aviation Regulations that make the pilot responsible for not taking off in an aircraft unless it is airworthy. But many people in aviation feel that mechanical deficiencies which arise during a flight can best be identified and attended to at the completion of the flight, rather than before takeoff.

To some extent this reasoning is psychological. The pilot who is eager to be airborne is looking ahead in thought, which may reduce the acuity of one's near vision. Unconsciously you may overlook items which on closer inspection might call for immediate maintenance work. You may have invested considerable time in weather briefing and flight planning; and you hate to disappoint passengers or friends you expect to meet at your destination. You are, in a phrase, "departure-oriented."

This is in sharp contrast to the frame of mind of the pilot conducting a postflight checkup at the destination airport, when all of the pressures of being a pilot-in-command are over for the moment. You tend to relax, when you finally shut down the engine and fasten the tie-downs, basking in a glow of satisfaction at having completed another flight safely and effectively. You may feel a sense of gratitude toward the faithful "old bird" that has carried you swiftly and obediently through hostile elements of the environment.

This is an ideal moment to take a slow walk around to see how your faithful old bird has fared en route. You are not looking for anything as obvious as arrow shafts or bullet holes (not usually) but more subtle signs of strain or wear, such as the following:

- **Wrinkled skin.** Could indicate internal structural damage, following exposure to severe turbulence or airspeeds in excess of limitations for a given maneuver. Requires immediate examination by an appropriately qualified technician.
- **Metal damage** from stones or other debris. Propellers are especially vulnerable; also the underside of the fuselage and the airfoils.
- **Mud, ice, etc.,** clogging up small opening, such as pitot tubes or vent holes, may give you distorted readings on vacuum pressure instruments.
- **Scuffed or torn tire surfaces.** Can occur even on paved runways, as a result of potholes or metal parts dislodged from aircraft.
- **Uneven landing gear extension.** Could be caused by loss of tire pressure, improper pressure in struts, leaks, etc.
- **Fuel stains,** or other signs of leakage of fuel, oil, or hydraulic fluid. The source of a leak should be found and corrected by a qualified mechanic prior to further operation of the aircraft.

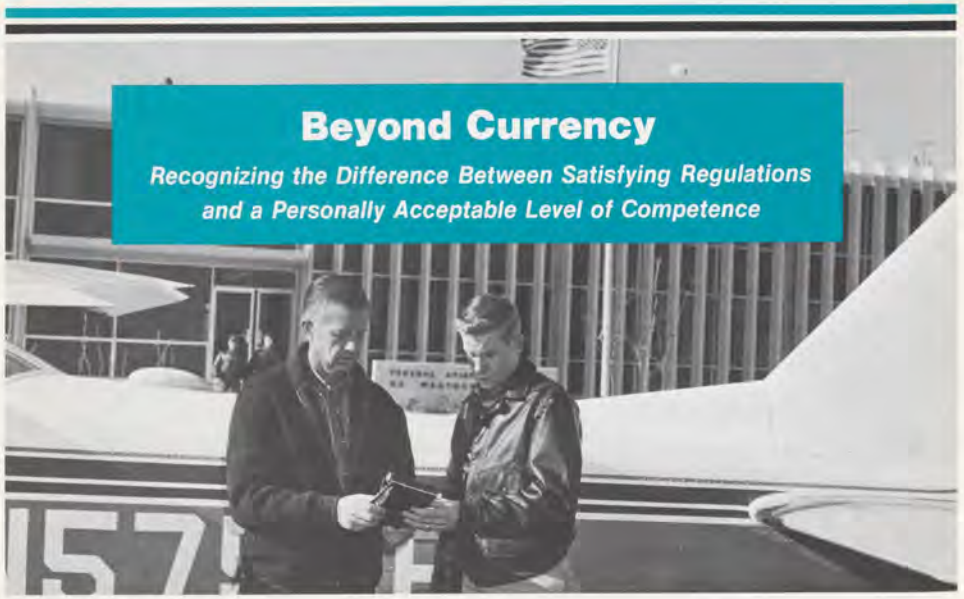
Your experience during the flight may direct your attention to other potential trouble areas. *Excessive fuel consumption en route?* Check the fuel caps seating, the fuel drains, underneath tanks and line fittings. *High oil consumption?* Look for drips around engine seals. *Uneven braking or steering on the ground.* Take a good look at the undercarriage. And so on.

After any long cross country flight the chances are good that you will find at least some minor problems if you conduct a postflight examination while the flight experience is still fresh in your mind. The chances are equally good that if you just "let it go for later" you will forget about whatever concerned you during the flight. You may have urgent business in town, but that is hardly ever so pressing as to justify not putting together a squawk list before you leave the aircraft. The time you take to do so could save you hours or days of delay the next time you get ready to fly the aircraft. It might also save your life.

This is not to suggest that a postflight inspection should take the place of a preflight inspection—both are important. There are special problems which occur typically during periods of disuse. Corrosion or rot may develop. Insects or rodents or birds may nest in engine tubing. Water may condense in the fuel. Tire pressure may go down. Inspections may become overdue. And so forth.

Problems surfacing during preflight could be said to be more of a passive nature than those which may be found immediately after a flight. Both are important. ■

Editor's Note: This article is based in part on suggestions appearing in the Australian Government's Aviation Safety Digest.



Beyond Currency

Recognizing the Difference Between Satisfying Regulations and a Personally Acceptable Level of Competence

by Robert Wright,
FAA Flight Standards, Certification Branch

The first flight test is an occasion most of us remember vividly. It is an exciting event that leaves one feeling proud and happy. I can remember the exact date of my test, although it was over 20 years ago. The date was October 13, 1967. It was also *Friday* the 13th, but it turned out to be a lucky day for me — the beginning of what was to become a lifetime career in aviation.

I was still in college then, pursuing an accounting major at the University of Massachusetts, which was followed by a (non-flying) stint in military service. But because I knew the direction in which I was headed I had no trouble maintaining and increasing my flying proficiency while completing my academic degree and my military obligation. I picked-up my commercial and airline transport pilot certificates in due time, and did a lot of instructing in various aircraft before eventually becoming a safety inspector for FAA.

Others I knew who started flying at about the same time but followed different careers and had problems with currency. Some had the impression that flying skill was pretty much like automobile driving skill: once you got your license you improved steadily with each additional flight. This is an unfortunate myth—completely false, for at least three reasons:

1. Most of us drive a great deal more often than we fly. Driving a car is a normal part of our daily routine.

2. The driving environment is much more closely supervised and corrected — thanks to traffic police. Poor technique or rule infringement soon results in fines, insurance rate hikes, loss of permit, etc. The environment of flight is much too large to maintain a comparable enforcement program. FAA enforcement is as effective as possible, but the agency must depend on voluntary compliance by general aviation with currency requirements and on individual pilot responsibility to remain proficient and safe.

3. In modern aircraft — and in the contemporary aviation environment — flying proficiency will inevitably erode unless the pilot flies regularly in the various aircraft and conditions for which he is qualified, and receives periodic re-training and flight reviews. This is true regardless of whether you fly a single engine simple airplane or a wide-body jet.

In my experiences as an instructor and an inspector I have observed that pilot skills typically peak at the time of certificate acquisition and then fall off sharply, unless the pilot is receiving some form of recurrent training or is obtaining an additional certification or rating. Even air carrier captains, who probably spend more time in the cockpit than most drivers do behind the wheel, are subject to semi-annual recurrent or retraining stints.

USING OR LOSING IT

The FAA currency requirements for all levels of pilots are based on the assumption that many flight skills, no matter how expertly acquired initially, will decline unless they are exercised with appropriate frequency. You might imagine that if you have logged, say 100 or more takeoffs and landings, then you are never going to have any trouble with these two procedures again. But FAA says (FAR 61.57) if you let three months go by without performing a landing or takeoff there is a significant chance you may make a mistake. Because of that chance of error the rules say that you should not carry passengers until you have again demonstrated in actual flight that you can take off and land safely.

OK, no problem. As long as your BFR is still good you can go out to some quiet little field, shoot three quick landings and takeoffs, log them in, and now you are current again—right? *Maybe.* Think about this. If FAA would not allow you to carry passengers until you shot those landings and takeoffs, because of a safety question, what does that tell you about your own safety during this exercise?

How secure did you really feel during those landings—especially the first one? Did you fly a proper pattern or did you wander around a bit? Did you have any problem with drift? With your turns? With keeping lined up with the centerline on final? Did you touch down about where you had intended? How many times did you bounce? Were you comfortable enough to be looking out for other aircraft? Did you announce your positions and intentions on the radio? Could you have handled an engine failure?

WHO NEEDS IT? MAYBE YOU

Maybe so, maybe not. It is hard to be objective with self analysis. Maybe it was "all coming back to you," or maybe you had developed some bad habits you were not aware of. Maybe the safer course would have been to have a flight instructor come along and critique your style. If you feel you can not afford a half-hour of instruction, why not have a pilot friend (fully qualified as P.I.C. for the aircraft) ride with you and comment? If you have developed any bad habits are they not becoming further ingrained with every flight? The longer you wait to get corrective instruction the more difficult—and expensive—it could be for you to regain your skills, and the more likely you are to end up bending metal.

The same considerations apply to other currency requirements—such as night flying, biennial flight review, and instrument currency. These requirements provide a foundation upon which the concerned pilot may build a personal recurrent training plan.

Each pilot's "aeronautical fitness program" will vary according to individual needs, desires, and flying background. For example, an experienced pilot who had just purchased a nearly new Cessna 182RG equipped with a sophisticated instrument package, once asked me to check him out in the airplane. "A couple of hours should do it," he told me.

But when I looked at his flight log, I discovered he had flown only a handful of hours since becoming certificated—*almost 25 years earlier.* After a half-dozen hours of dual he admitted that a quick sign-off would be foolish, on my part and his, and we worked out a complete refresher course.

Sometimes much of the necessary training can be done on the

CURRENCY REGULATIONS OF PART 61

1. **Biennial Flight Review (BFR)** - Section 61-57 (a) provides that "No person may act as pilot-in-command of an aircraft unless, within the proceeding 24 calendar months, that person has accomplished a flight review given to him, in an aircraft for which he is rated, by an appropriately certificated instructor or other person designated by the Administrator and had his logbook endorsed by that person upon satisfactory completion of the review."

The meaning of "flight review" is covered in Section 61.57(b). Recommended procedures covering the scope and content of the BFR are contained in Advisory Circular (AC) 61-98, "Scope and Content of The Biennial Flight Review." (This subject, and the specific provisions of the AC, were covered in the March–April 1988 issue of *FAA Aviation News.*)

2. **General Experience** - Section 61.57(c) states that "No person may act as pilot-in command of an aircraft carrying passengers, nor of an aircraft certificated for more than one crewmember, unless within the preceding 90 days, he has made three takeoffs and three landings as the sole manipulator of the flight controls in an aircraft of the same category and class; and if a type rating is required, of the same type." If the aircraft is a tailwheel airplane, the landings must have been made to a full stop in a tailwheel airplane.

3. **Flight Experience** - Section 61.57(d) requires three takeoffs and three full-stop landings at night (as defined in this section) if passengers are to be carried at night. This requirement must be fulfilled in the category and class of aircraft to be used.

In addition to the above requirements for all pilots, instrument-rated pilots are subject to the following provisions before exercising instrument privileges.

4. **Recent IFR Experience** - Section 61.57(e)(i) specifies a minimum number of instrument approaches and/or hours of instrument flight time which must be conducted and logged within the past six months in order to act as pilot-in-command under Instrument Flight Rules (IFR), or in weather conditions less than that prescribed for Visual Flight Rules (VFR).

5. **Instrument Competency Check** - Section 61.57(e)(2) requires an instrument competency check for pilots who have not met the requirements of Section 61.57(e)(i) during the prescribed time or six calendar months thereafter, in order to exercise instrument privileges.

It should be pointed out that the above currency requirements apply to aircraft requiring a crew of only one pilot. The pilot-in-command of an aircraft requiring more than one pilot is also subject to the currency requirements of Section 61.58.

ground. Once I was asked to carry out a biennial flight review, or BFR, for an instrument-rated pilot who flew a Beech *Debonair*. Overall I found this pilot to be very proficient, except that since he mostly filed IFR, he had become a little rusty on VFR navigation. All he needed was an hour at a desk and a review of sectional chart reading—plus a dual hour of pilotage navigation—to return to aeronautical fitness.

In interpreting the word "current" we sometimes have to rely on judgment as well as a literal adherence to rules. For example, I own a Mooney 201, which is obviously a high performance single. Sometime ago, I decided to take in a partner, a pilot who had previously been checked out in a Piper *Arrow*, and thus had satisfied the requirements of FAR 61.31(e) for familiarity with a high performance aircraft.

Because I knew the Mooney flies very differently from the *Arrow*, we agreed to start the partnership by my giving my friend a complete checkout in accordance with the recommendations made in FAA Advisory Circulars on this subject (AC 61-9B and 61-98). With this preparation, added to my partner's previous experience, we both felt much more comfortable.

INSTRUCTING THE INSTRUCTOR

Instructors themselves sometimes have a problem staying current in the various aircraft they fly and instruct in. From a strictly regulatory point of view, an instructor who is current in a given class of aircraft can instruct in any make or model within that class, regardless of familiarity with the make and model (Exception: To give instruction required for the issuance of a certificate or a category, or class rating in a multiengine aircraft or a helicopter, the instructor must have at least five hours of P.I.C. experience in the given make and model of aircraft.) However, most instructors I know would not instruct in an *any* aircraft they have not been checked out in by someone competent to do so.

A fellow instructor and close friend of mine belongs to a flying club in Massachusetts that owns five different kinds of airplanes, including three tail-draggers—an Aeronca *Champ*, a Taylorcraft BC-12, and a Piper PA-16 *Clipper*. The other two are Cessnas, a 150 and a 172. My friend likes to instruct in all five, although the tail-draggers are not used much in the winter.

My friend made it a point to renew his currency in these tail draggers each Spring by flying several hours in them with other pilots who flew them year around. Only then would he be willing to instruct in them.

That might sound like an unnecessary precaution, but flight instructors are just as susceptible as any one else to lack of currency. And the last thing any conscientious instructor wants to do is pass bad techniques or habits onto a student.

The reason we all need a personal aeronautical fitness program is that today there is so much variation to flying. Most pilots develop a fairly specific profile of flight, which means that we regularly carry out a fraction of the various possible kinds of flight activity and seldom experience anything else. Some of us do our flying VFR between small uncontrolled airports; some mainly fly IFR between controlled airports; some fly complex aircraft with all kinds of sophisticated avionics; some prefer a single engine tail-dragger with no radios, etc. Unless we make a deliberate effort to broaden this profile we are bound to lack proficiency in the areas of flight not used.

This is not a problem unless we fail to recognize that we may need practice and perhaps instruction if we decide to expand our usual profile. The currency requirement of Part 61 will not insure flight proficiency unless we anticipate our future needs and intentions when taking a review and discuss them frankly with the reviewing instructor.

In between reviews we can improve our aeronautical fitness in any or all of the following ways:

1. **Gradual expansion.** If you have not flown into a controlled airport in years, you do not want to start with a super busy terminal like O'Hare or LAX. By starting with a small tower-controlled airport at non-busy hours you can build on experience without undue pressure. The same principle applies to moving up to a high performance aircraft. Do your initial flying in sparsely occupied airspace and you will have ample time to adjust yourself to the increased cockpit load.

2. **Refresher Courses.** These are offered frequently by flight schools and fixed base operators, often on convenient weekends. A two-or three-day combination of ground and flight training may do more to up-grade your skills than dozens of flight hours on a non-structured basis. Likewise attending pilot safety seminars can sharpen your safety consciousness.

3. **New Ratings.** Acquiring new ratings is a great way to stimulate your learning interests as well as to expand your aeronautical horizons. There is almost no end to the list of possible ratings and qualifications available.

4. **Aviation Literature.** There are many good aviation periodicals on the market. Find one that suits your interest and read it regularly. In addition many excellent advisory circulars are published by FAA on all phases of flight operation. These are listed in the "Advisory Circular Checklist" AC 00-2.1, available from DOT, M-443.2, Washington, D.C. 20590.

The checklist and many of the circulars are free. A nominal charge is made for other publications.

5. **Consult an Accident Prevention Specialist or Counselor.** The specialists are FAA safety inspectors, working out of Flight Standards field offices. They will help you organize pilot meetings on any subject of interest to airmen, and often provide video tapes, slide shows, speakers, literature, etc. They are also available, time permitting, to discuss any aeronautical problems or questions you have with you personally.

The counselors are safety-minded non-government pilots who are willing to share their experience and knowledge with other pilots without charge. Ask for them at FBO's or airport manager offices.

Who could ask for anything more? ■

How to Save the See and Avoid Principle

A Message to all Pilots from FAA Administrator T. Allan McArtor

For more than three quarters of a century aircraft have used the "See and Avoid" principle to avoid colliding with each other in flight.

The human eye is a marvelous organ that has been wonderfully successful in guiding the human race and helping us avoid danger for thousands of years. But today we are hearing increasing comments that in the busy modern aviation environment we can no longer rely on human vision to keep aircraft apart. Some critics are saying that VFR traffic must be kept out of controlled airspace.

I do not agree. I say that we have a proven instrument available which will not only upgrade the effectiveness of "See and Avoid," but will also—when in general use—bring about a tremendous improvement in the smooth, efficient management of air traffic flow. I am talking about the altitude encoding transponder.

A transponder, as most of us know, is essentially an automated radar transceiver mounted on an aircraft. When activated by a radar sweep, it sends back a radar signal which may be displayed on a controller's scope as a bright slash of light, accompanied by a data identification tag. A grid on the scope locates the aircraft's horizontal position, but its altitude is unknown unless the transponder has an altitude encoding device, known as Mode C. The encoder transmits the ambient air pressure into the radar signal, deriving its information either from the aircraft altimeter's pressure sensing instrument, or from a separate sensor. Pressure altitude is corrected automatically to true altitude and displayed on the scope, together with the aircraft's data tag. This information is updated with every sweep of the interrogating radar's antenna, providing an indication of vertical speed and direction as well as altitude.

Unless you have observed a controller's scope in a busy terminal radar environment, it is difficult to appreciate the difference that an altitude reporting transponder can make in carrying out work of such a highly responsible nature. Each scope may display dozens of light blips, the majority of which may represent aircraft which are not being worked by ATC. If their altitude is unknown, the controller must consider each such aircraft as a possible conflict for other aircraft in its immediate or projected vicinity—even though the unknown may be miles above or below the possible conflict situation.

This is a tremendous waste of controller time, aircraft movement, and airspace. Aircraft with Mode C, even when not in con-

tact with ATC, can be automatically abstracted from the scope when their altitude does not concern the sector being handled by a given controller. Furthermore, with Mode C the controller can be alerted to possible conflict situations, or to aircraft descending below minimum safe altitudes, by the automated radar tracking systems in use at radar terminals.

The widespread use of Mode C will bring pilots a welcome relief from trying to observe possibly conflicting traffic at an unknown altitude. The difference between being told by ATC that you have "traffic at ten o'clock descending through five thousand," and "traffic at ten o'clock altitude unknown," is enormous. The latter aircraft could be below your wing, in the sun, behind a cloud—anywhere, including beyond human vision. There is a limit to how much time you can spend searching for such a target, but if you finally decide to disregard the advisory you are taking what I consider an unacceptable risk. A recent experience recounted by one of our Washington, DC, headquarters pilots is a perfect example of what I mean.

Our pilot was on a personal flight from Manassas, in northern Virginia to Lancaster, PA in his own Cessna 172 *Skyhawk*. As he cleared through the Dulles radar service area and headed north, he was offered—and accepted—flight following service from Washington radar. Presently he was informed that another aircraft, altitude unknown, was flying on approximately the same track, one mile behind. He looked behind carefully and could see nothing, although it was a clear day with visibility 20 miles. The Washington controller came on the radio again, advising him that the aircraft behind was overtaking him, still on approximately the same track. Our pilot searched the sky behind him extensively, but still saw nothing. He knew that the overtaking aircraft could be at virtually any altitude and was probably above him, since it was moving faster. But he could not be certain. There was a chance it was on the same VFR altitude, 5,500'. He asked the controller's help in realigning his course to the west. He had scarcely taken up his new heading when he saw a silver *Bonanza* flash by at his altitude, about 500 feet to his right.

It is disconcerting to imagine what might have happened if he had not been receiving radar advisories, or had elected to stay on course.

I do not think we should have to rely on luck to avoid mid-air collisions. I have known some tense moments in flight, particularly as a combat pilot in a wartime environment, but nothing makes me so edgy as not being able to see unknown, uncontrolled traffic. We can go a long way toward eliminating this disturbing hazard if we agree to equip all aircraft that fly in a busy controlled airspace with altitude encoding transponders. I personally would not leave the ground without one. □

How Mode C Help

SITUATION I — *Inadvertent Penetrati*

Boundaries of specially designated airspace, such as TCA's or ARSA's, are invisible to the eye, and such airspace may be inadvertently transgressed by VFR aircraft not in contact with ATC. Mode C on the aircraft will quickly inform the terminal controller as to whether the unknown traffic is within his or her sector, and whether tracked aircraft need to be advised of or vectored away.

SITUATION II — *Terrain Clearance*

Small aircraft do not have the expensive ground proximity warning devices that alert air carriers when they have descended dangerously close to the ground. However, any aircraft in contact with ATC and employing Mode C may be tracked by automated radar tracking systems, which alert controllers to situations involving hazardously low altitudes. The pilot can then be advised immediately how to avoid the hazard.

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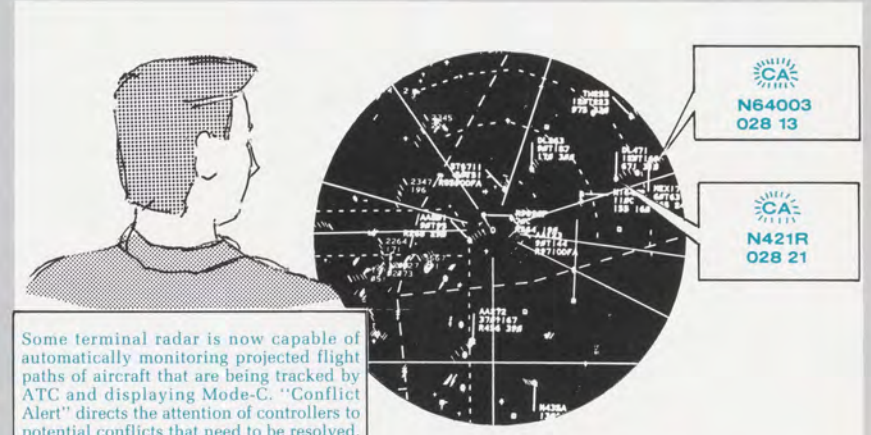
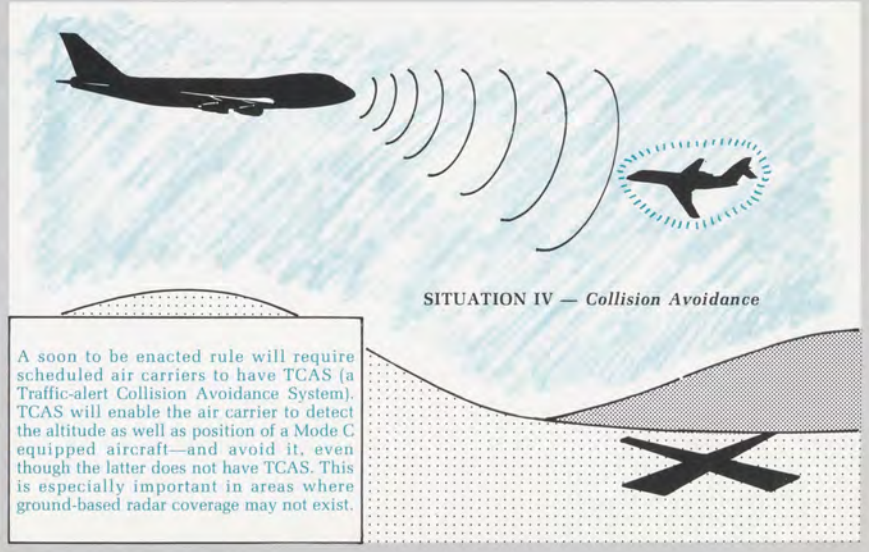


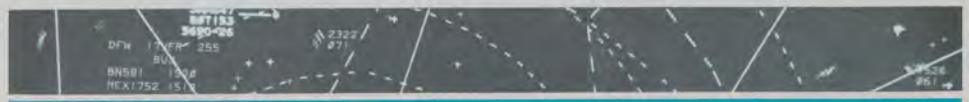
Some terminal radar is now capable of automatically monitoring projected flight paths of aircraft that are being tracked by ATC and displaying Mode-C. "Conflict Alert" directs the attention of controllers to potential conflicts that need to be resolved. Conflict Alert surveillance also serves en route traffic and will eventually cover situations where only one of the Mode C equipped aircraft is being worked by ATC.

SITUATION III — *Conflict Alert*



SITUATION IV — *Collision Avoidance*

A soon to be enacted rule will require scheduled air carriers to have TCAS (a Traffic-alert Collision Avoidance System). TCAS will enable the air carrier to detect the altitude as well as position of a Mode C equipped aircraft—and avoid it, even though the latter does not have TCAS. This is especially important in areas where ground-based radar coverage may not exist.



Believing and Seeing

In scanning for other aircraft, our ability to spot targets is affected significantly by what is going on in our mind. If we believe that we are or may be on a collision course with other aircraft, we are much better able to identify a small speck on the horizon as an intruder aircraft than if we have no such conviction.

This conclusion that "believing enhances seeing" is supported by test studies carried out recently by the Massachusetts Institute of Technology in Boston.

One of the tests evaluated two groups of pilots who flew a series of cross country flights in light aircraft outside of the Boston Terminal Control Area. All flights originated at Hanscombe Field, Bedford, MA. The pilots flew a triangular course and returned to Hanscombe. Each leg of the course was flown at a different altitude. Each pilot was required to perform his own navigation, using adjacent VORs, and to answer various questions put to him by an on-board evaluator.

It was arranged that intruder aircraft would be in the area, with angles of conflict varying from head-on, 90 degrees and 135 degrees. The intercepts were predominately from the left (pilot's side of evaluated aircraft).

The first group of pilots tested were not told that scanning behavior was the purpose of the study, or that intruder aircraft would be visible. Consequently only 36 of the 64 programmed intruders were sighted (56 percent). The median acquisition range for these 36 encounters was 0.99 nmi. The greatest range of acquisition was 2.9 nmi. Note that at 90 knots, two aircraft one mile apart, on a course leading to a head-on conflict, would close in 20 seconds.

The second group evaluated were pilots who had been alerted to the presence of intruder aircraft and were given radar traffic advisories. These pilots sighted 57 out of 66 conflicting aircraft (86 percent of the total). In five of the nine sighting failures the problem was considered at least partially due to inadequate response to the radar advisory.

In this group, the median distance at which target aircraft was sighted was 1.4 nmi. The weather and other flight conditions were constant for both groups.

The M.I.T. studies suggest that the size of a target and its degree of contrast with the background are not the only important factors in successful scanning. Being told to expect to see an aircraft in a given quadrant appears to greatly improve the chances of early recognition.

The M.I.T. studies may shed some light on the reasons why frequently many mid-air collisions have taken place despite good scanning conditions. A case in point was the tragic collision of a DC-9 air carrier and a Piper 28 *Cherokee* over Cerritos, CA in 1986, resulting in the deaths of 60 persons in the aircraft and 15 fatalities on the ground.

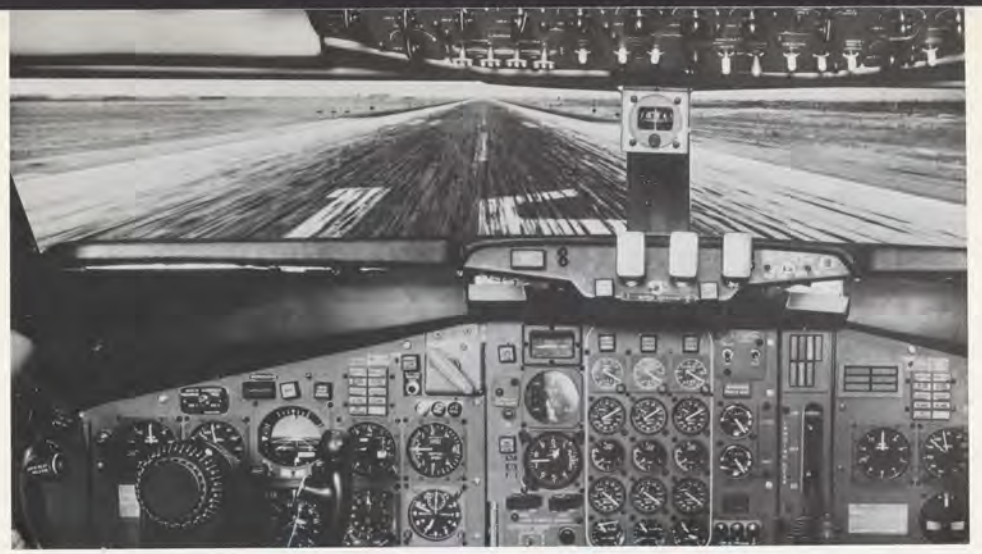
According to the National Transportation Safety Board report this accident occurred close to mid-day in cloudless conditions, with a reported visibility of 14 miles. The DC-9 was in the Los Angeles Terminal Control Area descending from 7,000' to 6000' while reducing airspeed from 210 Kts to 190 Kts, on a heading of 320 degrees. The *Cherokee* was climbing on an easterly heading and apparently entered the TCA without intention or clearance. At the point of collision, the *Cherokee* struck the left side of the DC-9's horizontal and vertical stabilizer.

Vision studies during the NTSB investigation showed that for about 65 seconds the DC-9 could have been seen by the *Cherokee* pilot on the far right side of the passenger's windshield. For approximately the same time period the *Cherokee* was visible to both the Captain and the First Officer of the DC-9, at about 15 degrees to the left of center of each pilot's windshield. Both aircraft had anticollision lights, with the switches found in the "ON" position by investigators.

However, the *Cherokee* was not equipped with an altitude encoding transponder and the aircraft was not observed on radar by the approach controller. Consequently, neither aircraft received radar advisories of the other's presence.

Failure of the pilots to see and avoid one another in these tragic circumstances underscores the need for continuous vigilant scanning, even in airspace where it is expected that all traffic will be separated by air traffic control. It also emphasizes the importance of being able to enhance traffic advisories with Mode C transponder-derived information

What you do not know about other traffic *can* hurt you. ■



Myths and Facts

The case for recurrent and specialized training in simulators and ground trainers

Presented by Bruce Landsberg

Professionals in most occupations agree that periodic review is essential to maintaining peak proficiency. Piloting an airplane is no different. Air carrier pilots participate in training, primarily recurrency in simulators, every six months. General aviation safety would also be improved by simulator training, which has much to offer in terms of convenience and effectiveness.

However, there are some pilots who pay verbal homage to the special advantages of simulator training as regards emergency and other little used procedures; yet when it comes to spending the time and money, they find a variety of excuses as to why now is not a good time. While many of the statistics that follow are based on the use of multiengine aircraft, the concepts apply to singles as well. The data comes from National Transportation Safety Board records and reports for the years 1981 through 1984.

MYTH

I'm not a professional pilot. I don't have to tackle difficult weather and can adjust my schedule accordingly. So I don't need more training for conditions I don't encounter.

FACT

We all operate in the same airspace, and in many cases operate the same type of aircraft. So the basic skills for all pilots are essentially the same. It's true that you usually have some choice over weather situations, but this can significantly limit the utility of the aircraft.

Also, as most pilots who have dealt with forecast weather versus reality will tell you, there are numerous occasions where what you were told about the weather isn't necessarily what you got. Furthermore, some pilots expose themselves to risks inadvertently, and the accident rate reflects their inability to cope with rapidly deteriorating weather.

But weather isn't the only problem area. There are all sorts of possible mechanical emergencies which are difficult to foresee, let alone practice in an aircraft. Most of these accidents could be avoided, given the wide scope of emergency training that is available for specific aircraft at simulator training centers.

MYTH

Two engines means greater safety. Hence there is less need for additional training after you move up from a single.

FACT

Twins are involved in fewer engine failure accidents because there are fewer aircraft. However, the percentage of fatal accidents *after power loss* in twins is four times greater than in single engine aircraft. This can be due to several reasons.

1. The bigger the airplanes are the harder they fall—more speed and energy to dissipate in any impact.

2. In single engine aircraft the emergency options are fewer, since the pilot without a functioning engine cannot make a wrong decision about continuing a takeoff or attempting a single engine go-around. In twins these conservative courses of action frequently enable us to save lives. But without "experiencing" such procedures via the simulator, it is easy to make a serious mistake.

3. Twins that lose power in one engine can be more difficult to control than a single that has become a glider. Two engines can mean greater safety if the pilot is properly trained initially in dealing with assymetrical thrust and maintains that proficiency by training at least annually.

MYTH

It's important for jet pilots to train, but I only fly a relatively simple piston engine aircraft. I have no need of frequent reviews.

FACT

During the period 1971 to 1981 there were, in the average year,

18 times the total accidents in piston twins compared to turbine aircraft and ten times the fatalities. True, there are more pistons than jets, but when corrected for exposure the accident rate for pistons is three times as high per 100,000 flight hours as for jets.

The piston disadvantage appears to come from three general areas.

1. **Less reliable engines** (and hence more inflight engine failures). The time between overhaul (TBO) for a typical piston engine is 1,500-2,000 hours, compared to 3,500 to 8,000 hours between major overhauls for turbine aircraft. Fewer moving parts is one key reason why the time between anticipated failures is longer for turbines.

2. **Less Performance.** Nearly all turbine powered aircraft are able to climb after an engine failure on takeoff and many are made easier to handle by auto feather systems or centerline thrust configurations. Piston twins, by contrast, require a high level of proficiency to deal with assymmetrical thrust and marginal or nonexistent rates of climb after power loss.

3. **Less mandatory training**—Pilots flying jets must participate in an annual flight check in each type of jet they fly. Most also take recurrency training. For those of us flying piston aircraft, the Biennial Flight Review is the only requirement and theoretically it could be taken in a Cessna *Skyhawk* on a sunny Sunday afternoon, after which we could legally depart in IFR conditions the next day in a pressurized *Baron*. The disparity speaks for itself.

Less reliable aircraft may require more capable pilots. Ditto for less climbout capability.

MYTH

Experienced pilots don't need recurrent training.

FACT

If this were true the airlines, the military, and the majority of corporate jet operators would not invest in periodic recurrent training. Although professional pilots fly constantly, routine flight experience repeated over thousands of hours does not prepare them for non-routine or emergency situations—only training can develop the skill in a pilot to handle the unexpected.

For example, the typical pilot involved in a fatal piston twin accident between 1981 and 1984 had an average total flight time of 4,800 hours with about 500 hours in type. 85% held commercial or airline transport pilot certificates. Where a cause could be determined, the pilot was the primary cause or a contributing factor in 84% of the cases.

MYTH

The airplane is a better place to train for emergencies than a simulator.

FACT

On a typical piston twin the emergency procedures that can be safely or effectively trained in the aircraft are limited. Virtually all emergency procedures could be realistically trained in the simulator.

Many accidents are caused by minor unusual malfunctions that so distract the pilot that basic airmanship is sacrificed. Examples include: landing gear or flap problems, pitot heat failure, or avionics trouble.

Certain weather conditions, such as low ceiling instrument weather, are difficult to duplicate in actual training. This results in pilots having little or no proficiency in the some critical areas. A quality flight simulator excels in preparing pilots for worst case scenarios. Every airline and most corporate operators use simulators to ensure complete readiness. ■

Editor's Note: The above article by Bruce Landsberg was reprinted with permission from The Flying Physician *magazine. Mr. Landsberg is an official of FlightSafety International, a simulator learning center. He is also a well-known supporter of the FAA's Accident Prevention Program. However, these comments represent his own views, and are not necessarily those of FAA. This article may not be used elsewhere without the permission of the author.*

Famous **FLYERS**

Amelia

First Woman to Fly the Atlantic

Few question whom you are referring to when you say a name like Napoleon or Michelangelo—the surname of Bonaparte or Buonarroti is unnecessary. The same is true in aviation. Say the name Amelia and the family name Earhart is as easily understood, as her married name (Putnam) is forgotten. Most people can even name at least one of her many achievements. To name a few:

1) 1922—Set new women's altitude record of 14,000' shortly after she had soloed.
2) 1928—First woman to cross the Atlantic by air.
3) 1928—First woman president of a National Aeronautics Association chapter.
4) 1929—Placed third in the first Women's Transcontinental Air Derby (dubbed by Will Rogers as the Powder Puff Derby).
5) 1929—Elected first President of the newly formed women pilots organization, the 99's.
6) 1932—First woman to fly solo over the Atlantic.
7) 1932 and 1933—Established women's non-stop transcontinental speed record of 2,448 miles in 19 hours and 5 minutes from Los Angeles, CA, to Newark, NJ. Then reduced time to 17 hours, 7 minutes, and 30 seconds.
8) 1935—First person to fly solo from Hawaii to California.

In February 1937 Amelia, by this time the world renown "First Lady of Flight," announced to reporters that she had "just one more long flight" in her system—a global circuit east-to-west around the equator. Its purpose would be chiefly to gather information to "encourage world-wide civilian plane travel." In June Amelia started the 27,000 miles flight with her navigator, Fred Noonan. It was on the second to last leg, after completing over 80% of the trip, that Amelia radioed they were low on fuel and Howland Island was not in sight. An extensive Naval search failed to locate her.

FIRST LADY OF FLIGHT

It has now been 51 years since her disappearance, and stories are still being written retelling her adventures and glamorizing her "lifelong ambition to fly," which started in early childhood according to most reports. The truth is she had never known a lifelong ambition, and her emergence as the "First Lady of Flight" actually started as a publicity stunt which became a personal embarrassment.

Amelia was born in 1897 at her grandparents' Atchison (KS) home, but her family home was in Kansas City, where she spent her early years with her younger sister, Muriel. In 1905 Amelia's father, a lawyer, went to work for the railroads. Over the next ten years the Earharts moved seven times to keep up with each of his job relocations.

Encouraged by their father, the Earhart girls grew up to be adventurous tomboys in an age where most little girls did not do such things. Their mother, in her youth, had traveled throughout the West with her father and was one of the first women to climb to the top of Pikes Peak. So Amelia's wanderlust and thirst for adventure is not surprising.

Early in life, Amelia began to question the roles women were traditionally assigned in life. Volunteering one's time to good causes was considered socially correct until the time a woman married and started a family. If a woman had to work, such careers as teaching, nursing, or social work were considered acceptable fields. Amelia felt there had to be more to life than that. Nevertheless, she began her career by following a well-worn path that led directly to nursing, social work, and teaching.

In 1917 twenty year old Amelia was in her last year of Ogontz School (PA) when she went to visit her sister Muriel at St. Margaret's College in Toronto. During this Christmas break visit Amelia became aware of the realities of war. The U.S. had been involved in World War I for less than a year (since April 1917), whereas Canada had been fighting for four long years. At the nearby Toronto veteran's hospital, everyday Amelia saw evidence of the injuries war can inflict, and decided that her time would be better spent there helping these badly wounded men than finishing her last semester at college. By the time the new year (1918) arrived, Amelia had taken Red Cross training so she could be a member of the Voluntary Air Detachment.

WATCHING AND WAITING

When the Armistice was declared in November 1918, Amelia, who had been working with influenza and pneumonia patients, became a patient herself, with a respiratory inflamation. After a series of treatments in Toronto and Boston, she returned to Massachusetts to recuperate. To pass the time and also because she was mechanically inclined, she took an auto mechanics course and also considered flight training. However, her interest in aviation was temporarily shelved when she decided to enter pre-med studies at Columbia University in New York. After a year, however, she realized she was not suited to be a doctor and went to Los Angeles to be with her parents.

Southern California, at this time, was particularly active in aviation and Amelia, persuaded her father to attend an airmeet with her. His enthusiasm did not match Amelia's, but he was willing to allow her to arrange a trial flight. He thought one ride would "cure" the flying bug—he was wrong.

Two things delayed Amelia from signing up right away for lessons; her father would have to finance them (he was not willing), and she had heard of a flight instructor at another field who was actually a women! (Amelia felt she would feel less self-conscious taking lessons from a woman.) To get around both problems, Amelia took a job with the telephone company to earn money for her lessons, and found that the female instructor, Neta Snook, was willing to give lessons on credit.

By the time Amelia had about 2½ hours of instruction in Neta's Curtiss *Canuck*, she had decided she wanted her own airplane. A small but expensive sport plane prototype was being produced at Kinner Airfield where Amelia flew. She arranged a deal with Kinner Aircraft and Motor Corp, that she would buy the *Airster* biplane for $2,000 and the company could still use it for demonstration purposes. Amelia became the proud owner of the new *Airster*, in which she continued her training.

Neta left aviation to get married shortly before Amelia soloed in 1922. After solo at this time, a pilot was on his (or in this case, her) own. If someone wanted their accomplishment to be officially recorded, they could pass the requirements for a Federation Aeronautique Internationale license, but it was not necessary. Amelia was one of the few women flyers who became licensed.

In this period Amelia considered aviation as something fun to do when her finances allowed, but never as a career. In 1924 she sold her airplane and moved back to Boston where she became a social worker at Denison House, a settlement house for immigrants. With what little spare time she had, she did join a local flying club and occasionally flew, but social work was what she considered her calling.

The Spring of 1928 found Amelia still at Denison House, and engaged to a very traditionally minded engineer. At this time, just a year after Charles Lindbergh's sensational conquest of the Atlantic, a group of businessmen in New York were asked to promote a similar venture: the first flight by a woman over the Atlantic ocean. Through mutual acquaintances Amelia's name came up as a candidate.

Amelia had accomplished very little in aviation thus far. She was known as a pilot who flew well and was not adverse to getting her hands dirty. Her interview proved she was articulate and well-educated. Also, she looked very much like a female version of Lindbergh, with her tall, lanky figure and her shy but intense manner.

At an interview with the project's promoters—attorney David Lapman, publisher G.P. Putman, and John Phipps—Amelia learned that the aircraft would be a Fokker

(continued on back cover)

AEROBATIC QUEEN. Patti Wagstaff, top ranking female aerobatic pilot in the United States, in her EXTRA 230 monoplane, will lead the U.S. women's team in the World Championship aerobatic competition in Alberta, Canada this August. Patti is a flight instructor from Alaska who teaches flying in the fall and winter and competes during the remainder of the year. The men's team will be led by Clint McHenry, at 60 one of the senior members on the circuit. He is a retired Eastern Airlines captain.

PILOTS CAUTIONED ON NATIONAL PARK OVERFLIGHTS

Pilots planning a flying vacation near National Parks should be aware of special flight rules affecting the various areas. The nearest Flight Service Station should be contacted for the pertinent restrictions and any NOTAM information, prior to engaging in flights near Park areas.

Examples of some of the flight restrictions are:

Haleakala National Park—Flight below 9,000 feet MSL by VFR helicopters or fixed-wing aircraft is prohibited by public law over Haleakala Crater, Crater Cabins, the Scientific Research Reserve, Halemauu Trail, Kaupo Gap Trail, or any designated tourist viewpoints within the Park.

Yosemite National Park—Flight of VFR helicopters or fixed-wing aircraft below 2,000 above the surface of the Park. ("Surface" refers to the highest terrain laterally of the route of flight or the uppermost rim if within the Yosemite Valley.)

Grand Canyon National Park—Special Federal Aviation Regulation, SFAR–50–1, is in effect establishing a temporary Special Flight Rules Area for all aircraft operations at 9,000 feet MSL and below. It also establishes the boundaries of certain noise-sensitive areas to be avoided by aircraft overflight; and sets forth certain terrain avoidance and communications requirements for flights over the Park.

Consult current sectional charts as well as NOTAMs. Additional information on noise sensitive flight areas may be found in Advisory Circular 91–36C, available free from DOT, M–443.2, Washington, DC 20590.

Grand Canyon, South Rim

NEW TECHNICAL REPORTS

The newest list of Federal Aviation Administration scientific and technical aviation reports is available to the public. The subjects include advanced automation, aircraft safety, airport technology, aviation medicine, and weather, just to name a few. To obtain a copy of the list, with titles and prices, write to FAA, Office of Public Affairs, APA-300, 800 Independence Ave., SW, Washington, DC 20591.

LIABILITY LIMITING AIRPORTS

Although the overall number of civilian airports in the United States increased from 16,582 in 1986 to 17,015 in 1937, the availability of public use airports is continuing to decline. "Public use" means an airport which is open to any aircraft; all other airports are restricted to pilots who have attained prior approval to use them.

Public use airports have been becoming less available each year for the past 15 years. They presently number 5,723. Rising costs of liability and liability insurance have been cited as the reasons for this decline.

About two thirds of the public use airports are paved, and about four out of five are lighted. Those receiving scheduled commercial service total 403, while 312 have unscheduled service.

Texas is by far the leading state as regards total number of airports, with 1,687. Illinois is second with 913, followed by California with 909.

NEW AIRSHIP CERTIFICATION

FAA has recently published an Advisory Circular (AC 21.17–1) and a related document on "Airship Design Criteria" (P–8110–2). Those documents are available without charge from DOT, M–443.2, Washington, DC 20590. They established the first-ever civilian guidance for manufacturers seeking a certificate for an airship. The criteria were developed because of a recent revival of interest in such airships as "blimps" (non-rigit airships), chiefly for advertising purposes.

Airships appeared to be fading out of the aviation future in the 1930's, after a series of disasters with considerable loss of life, including the globe circling German dirigible, the *Hindenburg*, which crashed in flames at Lakehurst, N.J. in 1937.

DRUG TEST IN AVIATION

FAA has proposed a rule that would require persons in certain safety and security related positions in commercial aviation to be tested for drug use. The tests would be administered on specified occasions to pilots, flight engineers, and flight attendants.

All applicants for these positions would be tested as applicants; also, periodically during routine required flight medical examinations, following accident involvement, and on a random basis. It has been estimated that 7.5 percent of those tested would be confirmed positive.

Copies of the proposal are available without cost from the FAA, Office of Public Affairs, APA-300, Washington, D.C. 20591. Comments from the public will be considered if received by June 10 at the FAA Rules Docket, AGC–204, same mailing address.

• Riding with a Student

Please advise if I, an FAA licensed private pilot, can ride the right seat with a student pilot (just to keep him company and bolster his confidence).

P.S. Your publication is terrific. Our cadets not only enjoy reading it but also learn a great deal. Keep up the good work.

D.J. Ronald, Cpt., USAF
Buffalo, NY

The holder of a student pilot certificate may not carry passengers. A student may be accompanied by a certificated pilot (private pilot or better) who is fully qualified for and current in the aircraft, but the latter must be the pilot-in-command. The student may not credit the flight time toward certification requirements.

We are happy to be of service. Thank you for the kind words.

• Commercial Venture

I have always respected your publication over all other literature on the market. Recently, reading a popular flying magazine, I came across an advertisement which promised that I could start a business in aerial photography without holding a commercial pilot certificate.

Is there any validity to this promotion? I have a private pilot certificate with about 150 hours total time. As a side business, I would plan to rent an aircraft to shoot aerial pictures with a photographer. We would then sell the finished photo and frame for a profit. As pilot in command, using the plane for a side business, can I fly without the commercial certificate?

Even after reading the FARs, other pilots I have discussed this with seem to be divided on the issue. Your word will dictate whether I start buying film or start working on the commercial certificate.

Jeff Schubert
Mequon, WI

The operation you describe would appear to be a commercial enterprise, and therefore you would be required to have a commercial pilot certificate.

Good luck with your enterprise.

• Chapped Lips and Oxygen

My question concerns the possible fire or other hazards involved with using supplemental oxygen in aircraft when the pilot/user has a case of chapped lips, and has applied a petroleum based anti-chapping product. The oxygen sets that I have seen all are labeled 'use no oil" on the controls. I am familiar with FAR 91.32, 135.89, 135.91 and 135.157, but they don't contain the information that I need. I look forward to your response.

Robert L. Grinch
Ridgewood, NJ

Using supplemental oxygen when your lips are coated with an anti-chapping medication, petroleum based or otherwise, should not be a cause of concern. FAA research on this subject found that even in the presence of 100% oxygen it was not possible to ignite such materials with a static spark. The burning point of these medications is in the order of 250° C. The agency has no confirmed reports of an inflight fire due to using an anti-chapping medication with an oxygen mask. The warning about "use no oil" may reflect a concern about oil seepage impeding normal oxygen flow.

• Approach Vector

Recently I was cleared for the approach to Runway 8 at Lancaster, PA by the approach controller. Since he said nothing about giving me radar vectors to the final approach course I initially assumed I would track inbound to the Lancaster VOR, and then track outbound to execute the published procedure turn. Then I wondered whether I was being vectored directly to the final approach course. When I questioned the controller about this he very curtly told me, "Sir, I cleared you for the approach."

This has happened on other occasions as well. Could you provide the proper phraseology a controller should use under these circumstances.

Name Withheld
Glen Arm, MD

As indicated in the Airman's Information Manual Par. 362b(1)(b), when aircraft are vectored to the final approach course pilots must not deviate from the headings issued by approach controllers. FAR 91.116(j) requires ATC approval to execute a procedure turn after radar vectors to the final approach course or fix.

When receiving radar vectors from approach control you may expect to be vectored to the final approach in the most effective manner possible under current conditions. However, controllers are instructed in the Controller Manual (5-19) that... "when initiating a vector, advise the pilot of the purpose." Phraseology examples would be: "FOR VECTOR TO BLANK FIX," "FOR VECTOR TO FINAL APPROACH COURSE FOR RUNWAY 8," etc.

Whenever a pilot is uncertain about a controller's intentions he/she should request specific information.

• Class of Medical

Reference the "CFI Without a Medical" letter and your answer on page 15 of the May/June 1987 issue of FAA Aviation News. What is not addressed is the class of medical certificate required by a flight instructor in order to a) give creditable flight instruction or b) give creditable flight instruction for compensation.

Can you clarify?

Owen Baker
Fairfax, VA

Whether flight instruction is given for compensation or not has no bearing on the class of airmen medical certificate required.

• Save the Dipstick

The article on the dipstick (Jan/Feb 88) reminded of two and a half hours I spent with a flexible grapple in an attempt—finally successful—to retrieve my dipstick from the wing tank of a Cessna 152; into which it had slipped from my cold fingers on a winter morning. I have not used the dipstick since then but, in case I need to, it now has a nylon string threaded through it with a loop to go around my neck.

An A&P once warned me about the danger of cleaning the plastic dipstick by wiping it with a cloth, which might generate static electricity.

And finally, it may not be as quick, but it is probably safer to calibrate the dipstick by noting the readings before each topping, instead of undertaking the laborious and somewhat hazardous procedure of draining out the tanks.

Cyril Toker
Potomac, MD

FAA AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA AVIATION NEWS, AFS-810, Washington, D.C. 20591.

• Estimated Time En Route

I am concerned about the estimated time en route figure that goes into block 10 of the instrument flight plan. The Airman's Information Manual provides no help. The only rule I can find that speaks of this issue is FAR 91.83, which says you must give "... the point of first intended landing and the estimated lapsed times until over that point."

Some pilots interpret this "point" to be the initials or the final approach fix. Some estimate from takeoff to landing. Which is correct?

Duane Jenson
Claremont, CA

The actual approach fixes you will use may not be known in advance. You should interpret the rule literally and estimate your ETA based on the actual distance to the airport. Air Traffic Control will protect your airspace for 30 minutes after that point in time, in the event of radio failure.

• Student and the TCA

Can you settle the question of whether a student pilot, whose aircraft is properly equipped with radios, Mode-C transponders, etc., is allowed to enter a Group I TCA?

Wm. Hewit
Saratoga, NY

A student pilot, with a properly equipped aircraft, may be given a clearance to transit a TCA. However, a civil aircraft may not land or take off from an airport within a Group 1 TCA unless the pilot-in-command holds at least a private pilot certificate.

• Outer Area or Circle

I noticed in your November/December FAA Aviation News that you made the statement, "although not mandatory, pilot participation is encouraged within 20 miles of the primary ARSA airport." I thought pilot participation was mandatory in an ARSA. Please let me know.

Joan Mace
Athens, OH

Pilot participation is mandatory within the inner and outer circles of an ARSA (the latter has a radius of 10 nautical miles). Pilot participation is optional within the outer area, an uncharted circle of airspace, which has a radius of 20 miles from the primary airport. The outer area extends from the lower limits of radio/radar coverage to the upper limits of approach control airspace (excluding the ARSA and other regulatory airspace as appropriate).

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Famous Flyers

(continued from p. 13)

trimotor equipped with pontoons, an airplane she knew nothing about. However, it was also disclosed that although nominally she would be the "captain" of the airplane (dubbed the "Friendship") the actual flying would be done by a professional pilot, Bill Stulz, and his mechanic, Louis Gordon. The two men would be on salary but Amelia would receive no pay, and any income from royalties or advertising concerning the flight would revert to the backers.

Nevertheless the sense of adventure was so appealing to her that she put everything else behind her and agreed to go on the spot.

Departure from Boston harbor was at dawn on June 4, 1928. By nightfall they had reached Halifax, where they intended to stay the night. As it turned out they were fogbound for 14 days and nights at the Newfoundland capital before the sun shone again and they began the actual ocean crossing. Some 20 hours and 40 minutes later they touched down at Burry Port, Wales, with less than one hour's fuel remaining. Otherwise the flight had been relatively uneventful.

However, during the long delay at Halifax, public interest in this flight had been worked up to a feverish pitch and Amelia, whose photographed image had caught the public fancy, was already a household word. In London, where she spent an exciting ten days, she was feted by royalty and cheered by millions. Her insistance that Bill Stulz had actually done the flying and she had contributed little more than sitting there "like a sack of potatoes," was taken as a charming display of modesty and entirely disregarded.

Back in the United States Amelia was taken on a triumphant tour of the nation and appeared at countless receptions and festivities. The "Friendship" promotion had succeeded beyond its backers' wildest dreams. Amelia enjoyed the limelight initially, but she was troubled by a guilty feeling about being given credit for someone else's accomplishment. This feeling was only assuaged after she embarked on a brilliant career of solo record-setting flights, including her second Atlantic crossing. She disappeared finally over the Pacific at the height of her fame, having written her own epitaph years earlier:

"Hooray for the last grand adventure! I wish I had won, but it was worth while anyway." ■

No Skylarks at National Parks