FAA AVIATION NEWS

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COVER:
How to take the risk
out of low-level flying.
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FAA AVIATION NEWS

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You and Your FSS III

Assisting the Assister

What you can do to help yourself, if you ever need a flight assist

From the pilot's point of view, any situation is an emergency when he perceives that he is in immediate danger of a crash. From the point of view of the Air Traffic Service, an emergency situation develops whenever a distressed aircraft must be given priority handling over other flights, or when deviations from the regulations are necessary in order to get the plane on the ground safely. In many cases, the emergency nature of the situation is brought about unnecessarily because of the pilot's reluctance to call for assistance soon enough, or to describe his problems effectively. Understanding the procedures involved may help you to "assist the assister," should you ever run into trouble aloft.

Over the first eight months of this year, FAA's flight service stations logged a total of 922 official "flight assists."

An FSS logs an assist whenever the facility aids a pilot who is having trouble in flight. It is not required that the pilot declare an emergency; he may simply radio for assistance in identifying landmarks or in locating an airport. Or he may be in serious danger, with weather closing in, or a dying engine over bad country. In any event, the manner in which he reports his problems and responds to the specialist at the FSS may determine whether or not he becomes a statistic in the accident files.

A case in point occurred on a Sunday morning recently when a flight service station received a call from a pilot, on standard frequency, stating simply that he had "lost contact with the ground and needed a little help getting oriented." Hardly a desperate situation from the sound of it, but as the FSS specialist began eliciting more information he soon realized that he had a first class emergency on his hands. The pilot, with all of 100 hours experience, had not only lost contact with the ground but also with just about everything else: he was in solid IFR with clouds topping out at 15,000 feet, icing predicted, in an aircraft equipped only with minimal instruments (no directional gyro or artificial horizon), unable to hold a heading and too panicky to remember how to use his compass or turn and bank indicator. He also happened to have a thoroughly frightened wife and child with him in the small airplane.

In a tense, 40-minute ordeal that required much coaxing and encouraging, the pilot was finally guided down by radio to a safe landing—with about 15 minutes of fuel to spare. It was much too close for comfort, and it inconvenienced many other pilots, as airspace was blocked off for the distressed aircraft and a number of flights were rerouted but—it need never have happened this way if the troubled pilot had called in earlier and given a complete picture of his situation at once.

Every pilot, of course, has his own criterion for determining when he needs help aloft, but there are some conditions when assistance should be sought immediately:

- Engine or other mechanical failure, icing, fire on board, toxic fumes, etc.
- Pilot or crew incapacitation.
- Penetration of IFR conditions by a VFR pilot.
- Insufficient fuel reserve.
- Becoming lost.

The latter two situations are the only ones that require discussion, and they are often associated. What constitutes a *sufficient* fuel reserve depends on many factors, including weather, terrain, flying experience, type of aircraft, etc., but each pilot should establish firm criteria for himself. Many pilots, for example, do not feel comfortable with less than one hour's fuel reserve, unless they are over familiar terrain with easy access to landing areas—in which case they might reduce their minimum safety factor to

45 minutes. Over difficult terrain, or in marginal weather, many pilots would set an hour and a half as a minimum fuel reserve. Decide in advance for yourself, and stick to your rules.

Becoming lost is something too many pilots refuse to accept as a fact, in some cases out of vanity, or in fear of possible penalties. In point of fact there is no such thing as being "a little lost." You either know where you are, without any doubt, or you are guessing—and one bad guess often leads to another. Hesitating to ask for assistance can be a much more serious exercise of poor judgment than the acts or decisions that resulted in becoming lost in the first place. Pilots who seek flight assistance are seldom penalized by FAA, unless some flagrant and willful type of behavior is evident.

If you become lost or run low on fuel, you can simply call the FSS on a standard frequency, but if any of the first three named situations prevail, you are probably better off to tune in 121.5. Not only the FSS but all other FAA facilities within radio range will hear you and be ready to help if needed. Call out "Mayday!" several times and give your N number *and* the frequency you are using—this is important. Remember to un-key the microphone—if your finger is frozen on the button you will not be able to receive any response, at least not on that frequency. Be prepared to give the FSS the whole picture in a few words, *with the emphasis on relevance.*

In other words, if you are going down in flames, it serves no purpose to mention fuel depletion, or instrument qualifications. Give the big picture first, add details if there is time or need. On the other hand, you do not want to reveal only a small part of a serious problem, like the pilot in the incident described earlier in this article; it is important to make it known that you cannot see the sky or the horizon, as well as the ground. And of course, in this case, whether or not you are instrument-rated.

By far the most common of FSS flight assists involves a pilot who is lost or "disoriented," and calls for directional guidance. If the ground is visible, the pilot can help by intelligently reporting what he sees below. If he is over mountains, for example, he can distinguish between *jagged peaks,* or *ridges,* or *high plateaus.* If he spots a river he can describe its course as *straight* or *twisting, surrounded by woods* or *bare earth.* If he is over a highway, *is it a dual-lane road? Does it have a divider?* Details of this kind speed up the process of locating the aircraft's position. Admittedly it is difficult to concentrate on such facts when there is trouble aloft, and all you really want to see is an enormous runway, but it is important.

Once you have filled the ground station in on your problem, cooperate as well as you can with the advice or instructions given you. Normally the FSS specialist will explain just how he intends to help you, but

Direction finding equipment is used in most flight service station assists. Here a veteran specialist at the Martinsburg, W. Va., FSS watches the scope after punching in the frequency used by a lost pilot. Giving your frequency when you call may save valuable time, as the specialist may be handling several calls from aircraft in trouble at the same time.

sometimes there may not be enough time for that. If you have been hunting for a hole in the clouds and are low on fuel, you may resist the idea of climbing to a higher altitude, but the FSS may know about mountains in the area that also have a very high resistance factor. (You must, however, at all times retain your responsibility, as the pilot of the aircraft, to look out for your own safety, and to make your own decisions.) Being given specified turns to make, while you are in clouds, may seem a waste of time to you in a critical situation, but that may be due to your unfamiliarity with the equipment in use at the FSS.

You want to remember that the FSS specialist is not able to see your airplane as a target on a radar scope. Radar is available only at centers and some towers. The flight service station may ask one of these facilities to assist in locating you on radar, but in most cases the primary FSS tool is the direction finder (DF).

DF equipment consists of a UHF/VHF radio receiver with a cathode ray scope, about ten inches in diameter, with a 360° display. DF will not read out distance from the station, altitude, airspeed or any other information except azimuth. This data has to be given, or determined by additional procedures. One advantage, however: small aircraft may be picked out on radar only with difficulty under certain atmospheric conditions—even at altitude—but the DF receiver, since it is receiving a direct signal rather than a radar "echo," has no trouble receiving under these conditions. The strength of the signal, rather than the size of the target, is the determining factor.

The direction finder console has two rows of channel selector buttons, 10 for VHF and 10 for UHF, covering the range of common use frequencies. When a button corresponding to a pilot's transmitting frequency is punched on the console, a thin strobe light darts out from the center of the cathode ray tube and paints a line directly to the source of the transmission. Encircling the face of the direction finder scope is an azimuth scale marked off in 10° segments. The bearing of the aircraft in relation to the ground station is thus instantly known. If he wishes, the pilot can use the reciprocal of the bearing as a heading to fly directly to the station airport.

Although the direction finder gives only the *direction* of the transmitting airplane, a skilled DF operator can use this information to quickly determine other important facts such as distance from the station.

In one procedure, after the aircraft's DF bearing is determined, the pilot is asked to turn 90 degrees from the bearing. In exactly one minute his bearing is taken again. The number of degrees the bearing has changed is calculated and this number is divided into 60, giving the number of minutes it would take the aircraft to fly to the DF site. For example, if the bearing changed by 12 degrees in one minute this figure is divided *into* 60; thus it should take the plane five minutes to fly direct to the station. Given the speed of the airplane it is easy to determine how many miles the aircraft is distant from the station. (For a 120 mph airplane the distance would be ten miles.)

When it is necessary to bring a non-IFR qualified aircraft down for a landing at an airport where less than VFR weather minimums prevail, direction finder equipment can be used to monitor an emergency DF approach. The aircraft is brought in over the DF antenna site and then directed outbound on either a triangular or teardrop-shaped pattern leading to the most favorable runway. DF approach procedures are reserved for emergencies, and are not published.

Even when a pilot's main problem is not simply being lost (low on fuel, mechanical trouble, caught in clouds, etc.), positive and quick location is usually the first step in helping him—and other airmen whose safety he may be endangering. In some cases the speediest way of pinpointing the distressed aircraft's location is to use the DF from several ground stations. Or, the pilot may be asked to give his position relative to a VOR, or a non-directional beacon, which can then be used with the direction finder reading to locate the aircraft exactly. In still other cases, especially if the plane is low, a fix on location may be determined by having the pilot describe what he can see on the ground. (Flight service station specialists are required to be familiar with the prominent landmarks of the area.)

The FSS has several other means of helping pilots in trouble, in addition to the highly valuable DF. The specialist may have considerable experience with the aircraft in question, or if not he may be able to bring to the microphone in short order a professional pilot with a broad range of experience in general aviation. If the problem is gear that will not go down, or an engine that will not re-start, or loss of power, he may be able to radio instructions that will restore normal control. Here again, time is critical; the sooner you call for help, the better chance you have of staving off serious trouble.

On other occasions, when assistance cannot be given successfully by radio, the flight service station may be able to vector another aircraft or dispatch a local aircraft to a rendezvous with the distressed craft and lead it down to a runway. In a case of this kind, the pilot being assisted must make every effort to comply with radio instructions and maintain his position as requested; "formation flying" for the uninitiated can be dangerous.

The DF bearing may be used in conjunction with VOR or other NAVAIDs to fix location of any aircraft in trouble. Ground observation, when possible, is also important.

It is not unusual for a pilot receiving a flight assist to recognize a landmark, announce he's okay and knows where he is, only to call a few minutes later and admit that he is, once again, lost. Stay with the assist until you are positive you are out of trouble—or on the ground.

The Martinsburg FSS specialists recall a lost pilot who was guided to safety via a DF steer in marginal weather conditions that extended over their entire area. With the Martinsburg airport in sight, however, the pilot declined to land, insisting he was fine now, and wanted to go to Charlottesville, some 100 miles farther south. Not many minutes later he was heard reporting to another facility that he was again "disoriented" and needed further assistance. Using the FSS system as a "crutch" for poor flying is not encouraged. The station may have to respond to several emergencies simultaneously, which limits the amount of assistance that can be given to each problem. It is a nice gesture to notify the station when you are on the ground safely, so that they can close the book on your episode. No—they will not scold you or sit you in a corner of the hangar.

No one plans on getting into trouble and calling an FSS for an assist, but it could happen — even to you. You can improve your chances of being helped to safety by being aware of what the FSS has available to help you, and how you can best "assist the assister." You can also prepare yourself for the unexpected by getting a practice DF steer from the FSS whenever it is convenient for both of you. FSS specialists must perform these procedures monthly to stay current, so when the weather is good you can usually find someone happy to work with you. If you have a qualified safety pilot along, you can use a hood and get some idea of how you would respond to vectors in heavy weather. Just be sure no one is confused about your intentions. One FSS received a request for a practice DF steer from a timid pilot who, when told that the station was too busy for that, sheepishly changed his tune. "How about the real thing?" he asked.

It helps, too, to keep your piloting skills sharp and to practice quickly spotting prominent landmarks that can be identified on a sectional chart. With duplicate charts you can even make up a game to play with your air-minded youngster on a cold winter's evening, seeing how long it takes each to pinpoint the other's location as indicated by the terrain features you identify. The difference between an accident and a flight assist can be a matter of seconds.

(Third in a series of articles on how to get better service from your FSS, based on material supplied by FSS Specialist Terry Lankford, Bakersfield, Calif.)

"Rise Up with Wings as Eagles"

A morality tale about an airplane named Isaiah

We were picking over the carcass of a chicken when the idea of flying came up. You know how friends are always asking, *when are you going to take me up in your airplane?* I had been so busy for the past three weeks getting our new real estate business off the ground, so to speak, that I had not even thought about flying, and I could feel the rust settling in. Meanwhile all of three AD's, including a propeller hub assembly magnaflux, had been performed on *Isaiah 40:31* (my Piper *Arrow—"They that trust in the Lord . . . shall rise up with wings as Eagles . . .*" in case you've forgotten your Scriptures).

Why not? I thought. It was a nice evening, still plenty of light and only the least bit soupy. I could easily get in a few quick touch and goes, work my piloting hand back in shape, and oblige the young lady at the same time. Suddenly I didn't feel all that tired. So out to Palomar Airport we drove.

By the time the dust had been wiped from *Isaiah's* windscreen and the preflight check completed, it was starting to get dark, and even soupier—patches of fog rolling in from the good old Pacific four miles west of us. About three miles visibility and maybe 800 feet ceiling was my guess. Not the best.

But I watched a Cessna 172 come in to land, and it turned out he was my new tie-down neighbor, so we had a little chat. A nice guy, Navy jet pilot out of Miramar having a busman's holiday with his own little toy. Weather was okay for pattern work, he assured me. Soupy upstairs, but the airport was still posting VFR conditions. So my friend and I climbed aboard, and the Navy man waved us off.

I knew I was rusty, so I'd be pretty careful about checking things over. I'd even checked the log to make sure the AD's had been signed off and the aircraft certified to be airworthy. Everything in order. The engine started willingly.

"Palomar Ground Control, Arrow 4518 Juliet, Palomar Air Service, ready to taxi for takeoff."

"Arrow 4518 Juliet, taxi to Runway two four, wind two five Oh at five. Palomar altimeter 29.96."

We acknowledged, and while taxiing I went through the usual scan, checking instruments, controls, trim, doors, etc. I was a little surprised to find the trim wheel, which is located between the front seats, in the extreme aft position. I depressed the electric trim button, and it seemed forever before the indicator was in the neutral range.

For one instant, while I was depressing the trim button, I glanced down and did not see the wheel move, and *that* I thought was strange. But of course by this time it was pretty dark in the cockpit, and there were lots of other things to be looked after, so I just quit worrying.

Run-up went smooth as a whistle.

"Palomar Tower, Arrow one eight Juliet ready to go, Runway two four. We'd like to remain in the pattern for touch and goes."

"Arrow one eight Juliet, cleared for take off. Report downwind, right hand traffic. Runway two four for touch and goes."

Off and flying. I wasn't so rusty but what I noticed *Isaiah* felt very nose-light when we rotated. I applied forward pressure and trim, then it got nose-heavy. Back pressure, ever so gently, but zap! The nose was light again. Right, we were porpoising all over the place.

We were well downwind before I had succeeded in trimming *Isaiah* out level, and by that time I was in a considerable sweat.

Palomar Airport, Carlsbad, Calif.

My companion didn't look too comfortable either. I made a little joke about somebody leaving a toolbox in the tail section, and I told her we'd just go back down and check.

I requested a full stop landing and was cleared on in. Going through the "GUMP" landing checklist, I banked into base leg and automatically brought in back pressure as I reduced power. The sky was really dark now, and as we turned over the scrubby mesa I lost ground contact momentarily. Suddenly I realized that the nose was extremely light again. I glanced at the altitude gyro, which showed, believe it or not, a steep climbing turn. Airspeed dropping out of sight. Stall warning light blinking like crazy.

It all happened so fast I don't even remember what I thought. Maybe I didn't think, I just reacted in a flash, and I did the right things, thank to good training by good instructors. *Apply power—drop the nose—level the wings.* Luck was with us, the stall was averted, and somehow we landed decently, if somewhat hard, on Runway 24. I was aware of holding very heavy forward pressure on the yoke, and unable to trim it out before landing. It was weird all right, landing in the dark leaning on the yoke for all I was worth. Felt like some demon was riding on *Isaiah's* tail.

"One Eight Juliet, turn left when able, remain on this frequency for ground."

I finally peeled myself off the yoke, asked for a taxi clearance in a funny squeaking voice and steered us back to the tiedown. Not much conversation. The Navy man was still there, bedding down his little bird.

"Back so soon? I thought you were going to do touch and goes." He looked at my companion. "You get spooked?"

She repeated my story about the tool box in the fuselage.

"You don't say. Let's look."

We pried open the inspection panel in the baggage compartment and used the flashlight. No toolbox. Not even a glove.

I got back into the cockpit and operated the trim control while the Navy man watched the trim surfaces. He stuck up both thumbs. All Okay. I tried it again and again. He kept those big fat thumbs up in the air. I got out of the airplane.

My imagination? Rust? Demons in the night?

In disgust I leaned into the cockpit, pulled the yoke back angrily and said bitter things to *Isaiah*. To my utter disbelief the trim wheel suddenly started cranking in back trim—though I hadn't gone near the activator. On impulse, I moved the yoke forward, and the trim wheel froze in place. Back on the yoke—and the trim wheel rolled in more back trim. My Navy friend was a little bug-eyed the first time he watched it, but he quickly came up with an explanation (later confirmed in the shop). There was a short in the electrical system that signaled in back trim whenever back pressure was applied. A little unusual, but then I remembered the odd behavior of that wheel as I taxied out, and my "Oh, well" response. It could have cost us.

I tagged the airplane, "Do Not Fly!" and marked the log. As we got in the car to go home, both of us a bit more relaxed and smiling now, I decided that if I wanted to "Rise up with wings as Eagles" I had to trust my checklist as explicitly as the Good Book.

(Edited from a true experience related by William Nemeth, Vista, Calif. Readers are invited to submit similar experiences illustrating a point concerning flight safety. Outstanding examples will be published.

Al Johnson, man with a record.

The Sky Farmer

How to lower the risks in low altitude flying

Al Johnson logs about 400 hours each summer in a sporty looking biplane—and most of that flying is done at an altitude of less than ten feet above the ground.

A stunt pilot, you might ask?

No, Al Johnson is one of the approximately 5,500 agricultural aerial applicators in the United States, who log a total of almost two million hours each year, seeding and fertilizing crops, and applying pesticides. The farmland they treat covers over 150 million acres.

Their "fleet" consists of about 7,000 agricultural aircraft; ten percent are helicopters. Aerial application is a major factor in keeping the cost of agricultural products from skyrocketing out of sight.

Al Johnson, who has a total time of 15,000 hours, owns and operates *Air Enterprises*, at Magnolia, Del. His is the almost classic American success story. Born in 1933, the son of a potato farmer at Commack on New York's Long Island, his hands have never been far from the soil. After his senior year in high school he did borrow $150 from his father to take flying lessons, and found he had a natural aptitude for aircraft handling, but when his father moved the family to the new potato farm he had purchased in Delaware, Al went along with the family. There was one Florida pilot working the season in a Stearman, and Johnson apprenticed himself to the veteran until he was able to obtain the commercial license necessary for aerial application flights. Finally, he took a bank loan to buy an old Stearman PT-17 rigged for aerial application, and he was in business."

Today, 17 years later, he owns a fleet of three Grumman *Ag-Cats*, the modern biplane especially designed for aerial application. His trio of airplanes fly a total of about 1,200 hours each season, and they service over 100,000 acres of cropland. He has his own private landing strip, his own hangar, and his own loading and maintenance facilities.

Al Johnson's flying season begins in March and lasts until October. Each day during the season he and his crews take off at daylight, which means that in mid-summer his initial takeoff will be around five o'clock in the morning, but as the days grow shorter the takeoff will be later.

The areas he services in Delaware is devoted to truck farming, and the crops he works as an aerial farmer are potatoes, corn, peaches, beans and tomatoes. The season begins in April with planting and fertilization. As the summer wears on Al Johnson steps up his "war" with the insects which threaten to destroy the crops. For some crops, such as tomatoes, he has designed a season-long preventive program for the farmer in which he sprays the crop every seven to ten days with fungicides like M-45. For other crops, like beans, he makes regular ground inspections in the late afternoon, searching for a new attack of insects, and determining when a counter-attack from the air is needed. He has come to know "the enemy" well, and he feels personally responsible for defeating them and for protecting the purse of the farmer and the housewife.

But there is an even more impressive aspect to Al Johnson's story than his success as an ag operator: his perfect safety record. In 18 years of flying neither Johnson nor any of his airplanes has ever been involved in an incident or accident. That is an enviable record for a type of flying which has traditionally been considered the highest risk in general aviation.

In the decade of the 1950's, when crop dusting expanded rapidly throughout the nation, with many ex-military pilots and surplus WW II aircraft available, ag flying had an accident rate of over 50 accidents per 100,000 hours flown, compared to an over-all general aviation accident rate of 39.1 per 100,000 hours. Nearly half of these ag accidents were fatal.

But over the past quarter century the safety record of ag flying has improved tremendously, thanks to the production of safe aircraft, a changed attitude on the part of many pilots toward their work, tighter regulations (both Federal and local) and better enforcement. In 1973 the National Transportation Safety Board's figures on ag flying accidents showed a ratio of 19.55 per 100,000 hours (compared with 14.2 per 100,000 hours for all of general aviation). What is more, the rate of fatal accidents had actually dropped below the overall general aviation figure: 2.13 per 100,000 hours, compared to 2.40.

Today's ag pilot's do not all fly in open-cockpit surplus military trainers. There are a variety of modern aircraft especially built for aerial application, with efficiency and safety in mind.

Enclosed reinforced cockpits (with roll bars) give 360 degree visibility with maximum protection from toxic materials, and also afford optimum crash survivability. Wire cutter bars on landing gear, struts and windshield allow the aircraft to pass through wire lines in an emergency. Improved headgear and inhalator masks further reduce the likelihood of chemical poisoning in flight. Quick-discharge devices allow the pilot to jettison his load swiftly in an emergency. Automatic devices for marking swath runs give him a more effective means of doing his job than the time-honored flagman on the ground. Each year sees new safety products on the market for ag flyers.

On the regulatory side, the Federal Aviation Regulations (Part 137) now require a special certificate and examination for persons who engage in agricultural aerial application, and many states have additional local requirements.

Nevertheless, ag flying remains the most accident-prone type of flying in general aviation, largely because of the human element. As the growing season is limited, and the needs of farmers often urgent and even critical for the preservation of a crop, there is always the temptation for the pilot to extend himself beyond the point where fatigue sets in; to ignore warning signals of slowed reactions or poor judgment; to disregard the limitations of the aircraft; or to ignore indications of mechanical wear.

This is where the attitude of the ag operator becomes important. He can push his pilots and aircraft for all they are worth, keep the props turning for every moment of daylight in the season, and hope for the best. Or, like Al Johnson, he can take the attitude that ag flying can be just as safe as any other type of flying, if the operator is determined it will be that way.

Al has never identified with the flamboyant style of the old-time duster pilots, some of whom got a thrill out of taking risks. He considers himself essentially "a farmer who flies an airplane," because it helps him get a particular job done. He wants to eliminate as many of the risk elements in his business as possible. For that reason he insists on a high standard of aircraft maintenance all year around, and a limit to flying hours any pilot can log on a given day. Apparently his policy pays off well in the long run, since his operation is in a much healthier state than many others where pilots are encouraged or allowed to fly from sun-up to sun-down in the busy seasons, with minimal aircraft maintenance practices.

Pulling up over a stand of trees. Be wary of wind shear—and whatever may lie on the other side of the woods or hillside.

Laying it down on the ground where it ought to be. Dusting alfalfa near Magnolia, Del., in a 450 hp *Ag Cat*. The still morning air cuts down on drift, and possible crop contamination.

Ag planes take a beating. They take off continually with heavy loads, use high power settings in much of their flight, operate in and out of dusty landing areas and are exposed to corrosive chemicals. Their high degree of reliability, despite these adverse conditions, is a tribute to their high standards of design and maintenance practices. They are often flown seven days a week, using up virtually every hour of daylight.

Successful operators like Al Johnson have a rigorous maintenance schedule for their airplanes. Johnson's operation has a progressive inspection program, which means that the airplanes are being inspected continuously throughout the season, and any indication of malfunction is investigated. The progressive inspection program is one that any owner may choose. Johnson has a full-time mechanic in his employment, who carries an Inspection Authorization, and who looks over the airplanes daily, frequently between flights. A large blackboard on the hangar wall contains a schedule for maintenance—oil changes, spark plug replacement, and compression checks.

This maintenance is performed *on schedule*, even if the airplane is in the middle of an important ag operation. Observing sched-

Skimming low in an *Ag Pickup*. High tension wires at right are flown under.

uled down time, in Johnson's view, is the best way to avoid *unscheduled* maintenance. The temptation to keep the aircraft with its profitable pay load in the sky without scheduled maintenance must be resisted, he says. There is always tomorrow.

The accident files are filled with evidence of poor maintenance practices. Typical is the recent case of an ag pilot who was flying a Grumman G-164 near Welsh, La., applying dry fertilizer to rice fields. He had just taken off, and was completing a right turn toward the field he was to work, when the engine began to cough and backfire, losing power. The pilot jettisoned his load of dry fertilizer, trying to work the faltering aircraft down, but when he was about 10 feet above the ground it stalled and flipped over into a rice field. Fortunately, the pilot was only slightly hurt, although the airplane suffered substantial damage.

During the subsequent investigation it was discovered that it had been only 414 hours since the engine was last overhauled; however, the pistons and the rings had sand ingestion, and the float level of the carburetor was out of adjustment. National Transportation Safety Board cited improper maintenance as the probable cause of the accident. A prudent inspection program would have prevented the mishap, at a cost far less than the ruined airplane.

The human element is another aspect of ag flying that Al Johnson watches carefully. Before beginning a spray or dusting job, all of his pilots are required to spend as much time as necessary, in an unloaded aircraft and at a safe altitude, inspecting the area to be served. Every field is *presumed to have* trees, poles and wires, etc., unless no evidence of such obstructions are found after several passes. Trees are fairly easy to spot, of course, but thin power lines stretching along the edges of fields or sometime across them present a greater problem. On many a busy day, Johnson has lost valuable flying time searching for the path of wires running from a power pole, only to determine finally that the wires had been removed and the pole abandoned. Lost time, but again an investment in safety. *No lives or airplanes were lost.*

The critical necessity of a thorough search for all possibly existing power lines is illustrated in a serious accident which occurred near Plainview, Texas, on a July morning in 1973. The pilot was spraying pesticides on a grain field in a Piper PA-18A, making a swath run of about a half mile long at an altitude of eight feet above the ground. There were power lines about 30 feet high at the end of the field. He planned to spray right to the edge of the field, go under those power lines, and then pull up. He had plenty of clearance to get under the obstruction, but as he neared the lines he saw that there was a second set of wires on the far side of the road. He would have to shoot under both sets of lines. The first set was no problem, but there was a tall wire fence under the wires on the other side of the road, which left him a clearance of only 12 feet. The pilot tried to bring the Piper up just enough to clear the fence under the second set and "thread the needle." His vertical stabilizer pulled the wires from four high line poles before the airplane went out of control and crashed in a corn field about 1,400 feet away. The plane was totalled, the pilot hospitalized with serious injuries. Installation of cutter bars might have averted the crash.

In addition to surveying the area methodically for ground obstructions, the ag pilot also has to get an accurate fix on wind direction, which may vary from one adjoining field to another. To avoid toxic inhalation, the applicator's dust or spray must flow away from him after he releases it; his swaths must move progressively up wind. Some pilots simply look down to see which way the trees or bushes are bending. But Al Johnson's crews test the wind direction by releasing a trail of smoke from the *Ag-Cat*, and also by dropping several automatic flagmen — weighted strips of tissue paper streamers released from a chute on the wings.

At the end of each swath run Johnson has his pilots drop another automatic flagman. Then when he pulls up and comes around he can use the streamer to accurately line up his aircraft for his return swath run, and so avoid excessive overlapping or missed coverage. When flying at higher altitudes (as when applying fertilizer at 30 feet AGL) the automatic flagman is not as accurate because it will drift as it floats toward the ground, and therefore he has to use a human flagman, who stands in the field, flag in hand, to signal the spot where the pilot completed his last run.

To minimize the danger of the flagman being hit by the low flying airplane, Johnson outfits his flagmen with short wave radios so that they can guide the pilot by voice during the operation. As an added precaution against radio failure, Johnson's crews are trained in a procedure whereby the flagman, when he cannot communicate by radio, moves the distance of two wing lengths from the last swath run, instead of the usual one length. This keeps him well out of the way of the airplane.

The tanks of Johnson's *Ag-Cats* have a

Johnson goes over maintenance check list with chief mechanic. Aircraft are washed down after each mission, to reduce corrosion.

Cessna *Agwagon* testing "quick dump."

300-gallon capacity, capable of spraying 70 to 100 acres per load. The load can be applied in normal conditions in about 45 minutes. This means that the pilot could make a dozen or more trips each working day, during the summer. But Johnson usually limits each pilot to about half a dozen trips a day—he has no fixed limitation, but makes his judgment on working conditions. What he seeks to avoid is the accumulation of fatigue which can build up when pilots push themselves regularly beyond normal endurance. A tired pilot, in his view, is a dangerous one.

He does not run a bed check on his crews, but he encourages his pilots to get plenty of rest during the flying season, and even to take a midday nap during the hot season. They are advised to stop flying for the day anytime they feel fatigued— "Don't push it. There's always tomorrow."

There was almost no tomorrow for a fatigued ag pilot who was spraying crops near Ganado, Texas, on a warm day in late June of 1973. The 25-year-old pilot had flown most of the morning, and at one o'clock in the afternoon he took off again in his Piper PA-18A for another session of aerial application. But as he descended to make his first swath run that afternoon he ran into a set of wires the owner of the field had neglected to mention at the edge of the field. The line snagged onto the airplane, forcing the pilot to pancake the Piper into an open field; although the airplane was substantially damaged, the pilot did manage to escape with minor injuries. The subsequent investigation centered on why he had not been able to avoid the obvious.

The pilot had flown eight hours on the preceding day, it was learned, and then he had stayed up until after midnight working on his airplane, readying it for 5:00 a.m. dawn takeoff. Eight hours of flying, followed by only four hours of sleep, and then six more hours of flying the morning of the accident—it all added up to *fatigue*. The pilot himself later admitted to extreme weariness, a condition which apparently led to a serious loss of alertness in the cockpit. Again, wire cutters might have spared the plane and pilot.

Al Johnson is not only concerned about the safe flying aspect of his operation on crews and aircraft, but also about the possible environmental impact of any pesticides he might spray. He wants to make sure that the pesticides he applies remain in the field where he drops them and do not drift to other areas. The first step he takes, when the wind rises, is to angle back the nozzles on the wings of his *Ag-Cats* so that when he sprays the shear effect is practically eliminated and the spray is kept closer on target.

He also relies on what he calls "a 100 percent safety factor." If, for example, he estimates that wind drift will carry an aerial application 50 yards beyond the edge of the field, he plans to spray no closer than 100 yards from the edge of the field. That means, of course, that on a day of high wind drift there will be a good section of the edge of the field which will not be sprayed, and Johnson will have to return another day to do it. But that is the kind of contribution to good community relations that careful ag pilots make of their own free will.

The flying season finally ends with the fall harvest, and the winter "rest" begins. This too is a busy time for Al Johnson. Winter is the season for going over his aircraft with a fine tooth comb, carrying out major overhauls, protecting against corrosion.

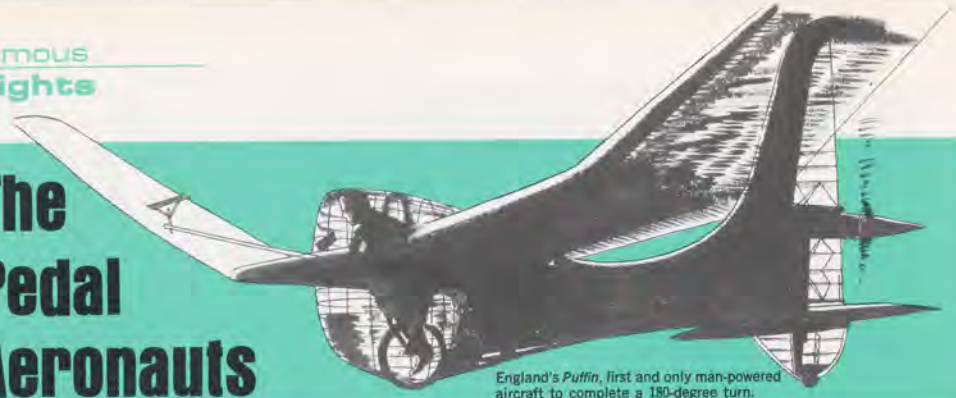
Winter is also the season for sharing experiences and interests with other professional applicators. Johnson has served as President, Vice-President, and Treasurer of the National Agricultural Aviation Association, and he is now on the board of directors. His major accomplishment during his term of office as launching production of a training manual for ag flyers which can be used throughout the country, a project which is now nearing completion.

Johnson feels that agricultural aviation will become even bigger business in the future, with more agricultural aircraft and more hours flown, because the ag flyer is an important soldier in the fight against food cost inflation. Take the American rice crop, for example. More than 90% is seeded by air, as well as treated by air with fertilizers and insecticides. Because of aerial application one acre of rice in the United States today requires only eight manhours of labor from planting to harvest. By comparison, one acre of rice in the Orient requires about 1,000 hours of manpower from planting to harvest. And the yield of the American crop is three times as great.

Keeping the cost low, in terms of accident casualties, is even more important than keeping the market price within reason. Al Johnson has proved that it can be done. ■

Famous Flights

The Pedal Aeronauts



England's *Puffin*, first and only man-powered aircraft to complete a 180-degree turn.

If the historic flight of the *SUMPAC* (Southampton University's Man-powered Aircraft) on November 9, 1959, ushered in a new era of motorless flying, the aviation scene has yet to show signs of its impact. For five years *SUMPAC*, essentially a bicycle-powered propeller mounted on a glider wing, struggled up into the air, returned to the earth, underwent modifications, struggled up again, and down again and so on, eventually achieving a distance mark of 2,000 feet straight ahead, and accomplishing a turn of approximately 80 degrees. But when its career came to a close with a crippling crash in 1964, *SUMPAC* was still far from winning the Kremer prize (50,000 pounds sterling, or about $130,000 for a controlled flight of one mile and return over a figure-eight course); and still farther from offering the man in the street a quick, economical means of aerial transportation.

In the meantime, in another part of England, a group of employees at DeHavilland's Hatfield plant produced *Puffin*, a similar monoplane design with an even larger wingspan (93 feet), and a single pusher prop aft of the fuselage. The fuselage was covered with a 12 micron transparent skin (12 millionth of a meter thin). Flown by designer-pilot-bicyclist, John Wimpenny, *Puffin* achieved flights of over 3,000 feet distance, and managed several 180 degree turns (the only man-powered aircraft ever to achieve this) before stalling and crashing in 1963.

Next the Japanese entered the race with *Linnet*, a 110 lb. (empty weight) bicycle/monoplane with a pusher prop mounted aft of the tail. Designed by the developer of the World War II *Zero* fighter, five successive models were built, but 300 feet appears to have been the maximum length of a flight.

The spotlight shifted back to England in 1971, when a group of "Pedal Aeronauts" in Hertfordshire constructed *Toucan*, a veritable giant of a pedal-powered flying machine which accommodated a crew of two and was supported by gossomer-like wings 145 feet in length with an overall wing area of 600 square feet. The wing loading on *Toucan* was a mere 0.72 lbs. per square foot, but the power load was a discouraging 223 lbs. per hp. The assumption that two can fly better than one has yet to be proved. The "skycycle-built-for-two" was not able to exceed 700 yards in sustained flight.

In 1971 RAF airmen began the construction of *Jupiter*, essentially along the lines of the "first generation" man-powered aircraft —a single seater with spruce and balsa frame and a pusher prop, pylon-mounted on an 80-foot wing. A plastic, removable "bubble" that encased the pilot reduced wind resistance in flight. Over 4,000 man-hours went into the fabrication of this aircraft before its first trial flight on February 2, 1972. The pilot/cyclist was RAF Squadron Leader John Potter.

Over the next three months Potter made short familiarization hops whenever the weather was favorable. There was a heightened interest throughout England, and a growing conviction that if any man could crack this seemingly impenetrable barrier to man-powered flight it would be Johnny Potter in his glistening *Jupiter*.

On June 29, 1972, *Jupiter* and Potter (each weighing 146 lbs., incidentally) were ready for a maximum effort. With officials of the Royal Aeronautical Society observing closely, on a clear windless day, Squadron Leader Potter pedalled his craft straight down a mile-long runway, lifted off smoothly to a height of 15 to 20 feet on a straight ahead course and appeared to be in perfect control. There were cheers of applause, followed by a murmur of disappointment when *Jupiter* glided gracefully to a landing at the end of runway.

Potter said that he terminated the flight not because of physical incapacity but because he was unsure of *Jupiter's* response to controls; he did not believe he could turn without likelihood of a stall and crash. He felt that if 40 or 50 pounds (about a third of *Jupiter's* empty weight) could be trimmed off, airspeed could be increased to the point where the figure-eight course could be negotiated. The flight did establish a new distance record for man-powered aircraft — 3,513 yards — and lasted 107.4 seconds, for an average speed of about 22.3 mph. It was an encouraging effort, but apparently it was also the best that *Jupiter* could do, and it was still far short of a performance what could capture the Kremer Prize, let alone replace the family flivver.

Attention next turned to the United States, where for three and a half years a group of M.I.T. students had been working on a project known as BURD (Biplane Ultralight Research Device). BURD had its genesis on the day that Steven Garboski, a professional pilot and amateur bicycle racer from New Jersey, dropped by at the Massachusetts Institute of Technology to see if anyone was interested in having a go at the Kremer Prize. Steve got the project rolling with a contribution of $5,000; other donors built up a war chest of about $11,000, and M.I.T's Aeronautics lab provided research facilities and hangar space.

The aircraft that finally emerged, after months of intensive thinking and testing, was unlike anything else on the MPA scene: a biplane with a forward mounted stabilizer and rear mounted propeller, powered by a bicycle built for two. Constructed of Boron-laminated balsa and aluminum tubing, covered overall with ½ mil (0.0005 inches) polypropylene film, BURD weighed only about 130 lbs. empty. The 640 square feet of biplane wing area gave it a fantastically light wing-loading of *0.2 lbs. per square foot.*

Ill-fated *BURD*, an ultra-light skycycle built for two, taxiing out near Cambridge, Mass.

BURD was designed to lift off at 18 mph, and accomplish shallow "skiddy" turns by means of spoilers in the wings, which replaced both rudder and ailerons. The relatively short wings (62 feet overall) would provide optimum airborne stability, according to windtunnel tests and computer calculations. Successful taxi trials in the summer and fall of 1973 indicated that American ingenuity was about to turn an ancient dream into reality.

But during a final taxi run in April of 1974 a slight puff of wind caught the craft and turned it over, whereupon hundreds of hours of effort and thousands of dollars worth of equipment, collapsed incredibly into a heap of balsa and plastic. Mr. Kremer's prize money (now shrunk through deflation to about $100,000) was still safe.

Elsewhere around the world new designs are still showing up on the drawing boards of MPA enthusiasts. In Nova Scotia a Gargantuan model is planned with a 185 foot wingspan and a seven-man crew no less—six men pedalling and one commanding the operation. In California students are building "Pteryx Butterly," an ornithopter (wingflapping aircraft) using feathers of rayon filament. Veteran MPA designer Maurice Hurel in France is working on a parasol-type monoplane with a 132-foot wing. Bizarre or unusual designs are reported all over Europe.

For all this, 15 years of accelerated effort has not apparently moved us any closer to an era of muscle-powered flight. The advantage of ultra light construction has been offset by extreme fragility and instability; the aircraft can only be flown in a dead or near calm; a strong man's sneeze is said to be enough to flip one over. The power-versus weight stumbling block is still with us: maximum sustained output, about 0.5 hp, is just not enough to provide controllable lift for the 150 lb.-plus human body—at least not by any mechanical means which have yet been discovered.

Scoffers have derided the modern MPA as "an oversized wing strapped to a stripped-down bike wrapped in plastic that would not hold garbage," which is a little cruel, and also a little true. No doubt the Wright brothers endured similar comments. Perhaps the "pedal aeronauts" will have the last laugh. But for the moment, motorless flight is still for the birds.

(The first half of this article appeared in the September issue.)

SOFT LANDINGS. How to take off and land safely in three types of potentially dangerous situations is the subject of a new FAA color film specially designed for pilot instruction. The film consists of three four-minute segments illustrating proper procedures to use for short field, soft field and crosswind operations. It is most effectively shown along with a slide presentation, and question and answer period. To arrange for a showing, contact the accident prevention specialist at the nearest FAA GADO.

■ MEDICAL OXYGEN FOR AIR TAXIS. A new FAA advisory circular has been issued to help air taxi operators comply with the Federal Aviation Regulation (135.114) governing maintenance programs for the carriage of oxygen equipment for medical use on board the aircraft. The rule was amended in December 1974 to require affected air taxi operators to include such a maintenance program in their Qualifications Specifications.

Each operator should develop his program in coordination with his district office, to assure conformity with the FAR. AC No. 135-5, "Maintenance Program Approval for Carry-on Oxygen Equipment for Medical Purposes," which gives further details and includes a sample application form for submitting a maintenance program for approval, may be obtained without charge from the DOT/FAA Distribution Unit.

■ DESIGNATED ENGINEERING REPRESENTATIVES who are available for consulting work in the examination, inspection and testing necessary for the issuance of aircraft certificates or supplemental type certificates are listed in an updated FAA directory. These designees, as representatives of FAA, are authorized to approve types of data as complying with the FARs within particular categories such as structural, powerplant, flight analyst, flight test pilot, engine, systems and equipment. Write for "Designated Engineering Representatives," AC 183.29-1H.

A FLASH IN THE PANEL can result when two substances commonly used in aviation come in contact. One is ethylene glycol, which is mixed with water and used as an anti-icing fluid. The other is silver, or silver-coated, electrical circuitry. If the glycol/water solution comes in contact with and shorts across silver or silver-coated electrical circuits, such as wiring, switches, circuit breakers, etc., that are carrying positive direct current, rapid oxidation can occur. The result could be a flash fire.

OBSTRUCTION MARKING AND LIGHTING is the subject of a revised FAA Advisory Circular, which includes recommendations for high intensity lighting systems as well as the more traditional red lights, paint standards and patterns, and spherical markers for wires. Included also are marking and lighting standards for moored balloons and kites. Ask for AC 70/7460-1D "Obstruction Marking and Lighting."

Unless otherwise noted, FAA Advisory Circulars mentioned in this column are available free from DOT/FAA Distribution Unit, TAD 443.1, Washington, D.C. 20590.

TANKS A LOT. The *Heli-stat*, proposed new vertical lift vehicle combining best features of helicopters and airships, is intended to lift and move payloads beyond the capability of current highway, rail and air transport systems. Three million cubic feet of helium add to the lift of the four Sikorsky helicopters. Scale model shows how 62-ton battle tank might be lifted.

More Weapons Disclosed by Passenger Screening

Careful screening of airline passengers resulted in detection of twice as many guns and other dangerous items in the first six months of 1975 as in the preceding six months. While the number of passengers remained about the same, more than 60,000 firearms and other weapons were discovered in the most recent period compared to about 30,000 in the period before. Most of the increase was in articles such as knives, clubs and Mace spray. Of 2,343 firearms detected, 958 were handguns whose detection resulted in 637 arrests. The increased rate of detection is attributed to improved methods of screening, including more use of X-ray machines for screening carry-on luggage (not passengers).

There were five hijacks attempted during the first half of 1975—all unsuccessful. Some 20 potential hijackings were thwarted before they could be attempted. The last successful hijacking of a U.S. airliner was on November 10, 1972.

Thanks to efficient screening (and public awareness of the program), arrests for other, non-aviation offenses, such as possession of narcotics also dropped from 2,197 in the first half of 1974 to 570 for the same period of 1975. False bomb and hijacking threats are also diminishing.

Pilot-Controlled Airport Light System Approved by FAA

Pilots can turn on airport lights from their airplane cockpit (in the air or on the ground) by keying the microphone on a discrete frequency, under a program recently approved by FAA. Although the system has been used at some individual airports for the past several years, this is the first time that FAA has established standards for such installations. Plans call for the pilot-controlled lights to be used at 342 airports, first of which is scheduled to go into operation in mid-November, 1975. Considerable saving of electricity will be realized by not burning lights during periods of non-use.

Light systems will vary at different airports. When approach light systems are involved, control of only the approach light system on the runway will be used. There will also be three types of controls: a three-step system with low, medium or high-intensity; a two-step system with medium or high; and an off-on system with no control of intensity.

The mike is keyed a different number of times for different intensities (where there is a choice) but in all cases keying the mike five times within five seconds turns lights on; further adjustment may be made afterward except for on/off systems. Control will be possible when the aircraft is within 15 miles of the airport and 2,000 feet above the airport elevation. Each activation will cause the lights to burn for 15-minutes. If more time is needed the microphone is keyed again for another 15 minutes.

Instructions, including frequencies, for using the light systems will be shown on approach charts for the airports involved and also the Airman's Information Manual.

Public Invited to Review Proposed Changes to FAA Operational Rules

Agenda for FAA's First Biennial Operations Review Conference has been finalized with some 664 proposals scheduled for discussion. Subjects have been broken down into eleven main categories, each to be considered under the supervision of a separate committee. Comments recorded at the conference will be considered in drafting proposed changes of the FARs.

Of special interest to general aviation pilots and aircraft owners are proposed changes to airmen certification and training, aircraft operation, maintenance and equipment requirements and air traffic rules. Notices of proposed rulemaking are scheduled to be published by May 1976. Public comments and finalized rule changes will follow.

All sessions of the five-day conference will be open to the public, without charge, as long as space is available. No advance registration is necessary.

Dates: December 1-5, 1975
Place: Sheraton-National Hotel
Columbia Pike and Washington Blvd.
Arlington, Va. 22204

Meetings will begin at 9:30 a.m. on the first day and at 8:30 a.m. on other days. Persons needing overnight accommodations should make room reservations directly with the hotel. (Be sure to mention conference title and dates; all hotel rooms are being held for conference attendees.)

Catalytic Converters at Airports

FAA has cautioned field personnel to exercise caution in operating 1975 cars, or other ground vehicles equipped with catalytic converter exhaust systems, on airport ramps, around fuel storage areas and in the vicinity of parked aircraft. Most American manufactured 1975 vehicles are equipped with catalytic converter exhausts, which operate at a temperature range from 900 degrees to 1,400 degrees F.

The high operating temperatures (approximately twice that of conventional exhaust systems) present a distinct fire danger if used near combustible material. The Air Force and the Society of Automotive Engineering are presently exploring solutions to this problem.

Airport Standards Book Updated

Design standards for "Utility Airports" (those built for use by propeller-driven aircraft with gross weight of 12,500 lbs or less) are established in a revised FAA Advisory circular. Copies of AC 150/5300-4B "Utility Airports—Air Access to National Transportation" are available free from DOT/FAA Distribution Unit, TAD 443.1, Washington, D.C. 20590.

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

• IFR Formation Flight?

As an instrument rated pilot I have always been impressed with the necessity for adequate separation of aircraft during IFR flights. Imagine my surprise last week when I saw (as I crossed the Oakland-San Francisco Bay Bridge) two military jets take off and penetrate the low overcast in tight formation. I seriously question the safety of this procedure and invite your comment.

Marvin S. Weinreb, M.D.
Castro Valley, Calif.

Formation flying in instrument weather has been a standard practice for military fighter aircraft since World War II. They pose no unusual danger to other aircraft or to themselves. Certain safeguards are built in to ensure maximum safety. When weather is anticipated, there will normally only be two aircraft in the formation. Emergency breakaway procedures are employed if the need arises but are rarely exercised. A formation flight is considered as one aircraft for separation purposes.

As for their proximity to each other, it must be remembered that even in clouds there is some visibility. In a formation a wing man may be closer to the leader's wing tip than the lead pilot is to it himself. Military pilots are required to maintain a high level of skill in this type of flying and they have an excellent safety record.

• Strip Charts

It is quite a chore to plan a VFR flight up the Atlantic coast, where you cut through the corners of multiple sectional charts. Why don't you make strip charts of frequently traveled routes as you did back around 1950, or at least overlap the existing maps about 30%?

H. Lewis Merton, Lt. USNR Ret.
Fort Rucker, Ala.

Strip charts were discontinued for economic and technical reasons which are still present. We would still need all individual charts for local flying and for areas not covered by strips. The strip charts would therefore duplicate coverage, which would cost more for all. There is also the question of which "standard parallels" to use on a strip chart. On sectional charts a different set of parallels is used for each four degree latitude band.

Another problem is currency. Chart production is staggered to balance the work load, so that different sectionals carry different dates—and dates are an important safety item. If a strip chart covered portions of several sectional charts with different dates, which date would the strip chart carry?

Overlapping charts by 30% as you suggest would require many more charts, which would mean extra expense for pilots and involve many of the same problems—standard parallels, currency, etc.

Incidentally, many pilots solve their flight planning problems by using the "Flight Case Planning Chart" which was introduced recently and is available wherever charts are sold. It not only covers the 48 adjacent states, but also contains a wealth of other material that is helpful for planning purposes.

• Prepping for the Written Exam

I plan to take the FAA private pilot written exam soon. I have many old books I've been using to prepare for the exam, but many of the FAA regulations have been changed since the books were printed. Could you please tell me the best way to keep up to date on the FAA regs? Thank you.

Michael A. McKay
Washington, D.C.

An approved ground school or home study course will prepare you for taking the written test. In fact, under FAR Part 61 Revised (which is now in effect) an applicant for a written test must show that he has satisfactorily completed ground instruction or a home study course for the certification sought. Study courses can be purchased from most airport fixed base operators with flight training programs, or from aviation supply houses. For further guidance contact your FAA Flight Standards District Office. Your instructor should be able to give you the location.

• Flyer vs. Flier

One of your readers (Walter Harmon) suggests that you do not use the term "flyer" but rather "flier." Another suggests you use the ter "pilot" instead. I suggest that he be called an "aviator" for that is the only word that has one unambiguous meaning and refers to the guy in the left seat.

Our language is rich in words with nuances of meanings, and the variety lends spice and interest to our speech and writing. (*Cowl*—a monk's hood. *Strut*—a pompous walk. *Elevator*—a lifting device. Etc.) I don't really think our reader's friends will mistake him for an advertising circular.

I like your style. Keep up the good work, you turn out a consistently interesting magazine.

Nathan Shalit
Morristown, N.J.

• A Vote For "Flyer"

Sorry, Walt, "flyer" gets our vote too.

Paul Backes
"170" Flyers, Inc.
Madison, Wis.

• Wind on the Water

Your September article "The Shifting Wind" on wind shear turbulence was very interesting —and very true. However, you did not mention takeoffs or landings on water. Most of my flying is done off water in a Cessna 185 Amphibian. Wind shear can be very severe especially when landing or taking off from small ponds and lakes. In such situations you are very close to the tops of trees or hills and the air and water temperature may be different. Sometimes the wind you are landing or taking off into suddenly leaves you, or gets behind you!

Frederic A. Vinal
Dracut, Mass.

• Open Windows Are Problems Too

Your May article on open door incidents hit very close to home. The men of the Ross flight mentioned were fellow employees and friends. I feel that one further type of open door situation should be brought to the attention of pilots who fly with children.

We were flying a Cessna 172 from Los Alamos to Phoenix a few years ago, with three small children in the back seat. At 12,000 feet there was a sudden rush of air, noise and cold. Our little two-year-old had opened the window! Since there were two adults aboard, we had little trouble in closing the window and collecting scattered papers, maps, etc. When we asked Jonathan why he had opened the window his answer was simply, "I was hot." Now before family flights we always issue a reminder of the "do's and don'ts in flight."

Ellen and Bob Harold
Los Alamos, N.M.

For other hints on flying with children, see "The Family That Flies Together . . ." in the August 1975 issue of FAA AVIATION NEWS.

INSTRUMENT CORNER

• Instrument Written Tests

There is now an instrument rating for airplanes and another instrument rating for helicopters. FAR 61.65 (f) requires a written test in each case. When a person already holds an instrument rating for either airplane or helicopter, and applies for the other, does he need to take another written test?

Name withheld

A second written test must be taken. (It will probably take less time to prepare for the second one since a certain portion of the material will have been also covered in the earlier test.)

• Minimum Sector Altitudes

In reply to a letter in the September "Instrument Corner" you stated that the minimum sector altitudes (MSA) that appear on some approach charts are for emergency reference only, and are shown only on charts for airports where there is a navigational facility (VOR, VORTAC or NDB) that would enable the pilot to establish his position in the sector. While this is a true statement, it needs some clarifying.

The MSA as it appears on the chart means that if the pilot maintains that altitude in the sector he will clear all terrain or obstacles (with 25 miles) by 1,000 feet. It does not necessarily mean, however, that at that altitude he can receive a usable navigation signal for 25 miles.

Thomas J. Hoffmann
Flight Procedures Standards Branch
FAA, Washington, D. C.

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Idea suggested by Carol Clark, GADO, Fresno, Calif.