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AIRPORT FIRE DRILL

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COVER

Crash-rescue crew at Greater Rockford (Ill.) Airport sharpens its skills in practice session (see page 7).

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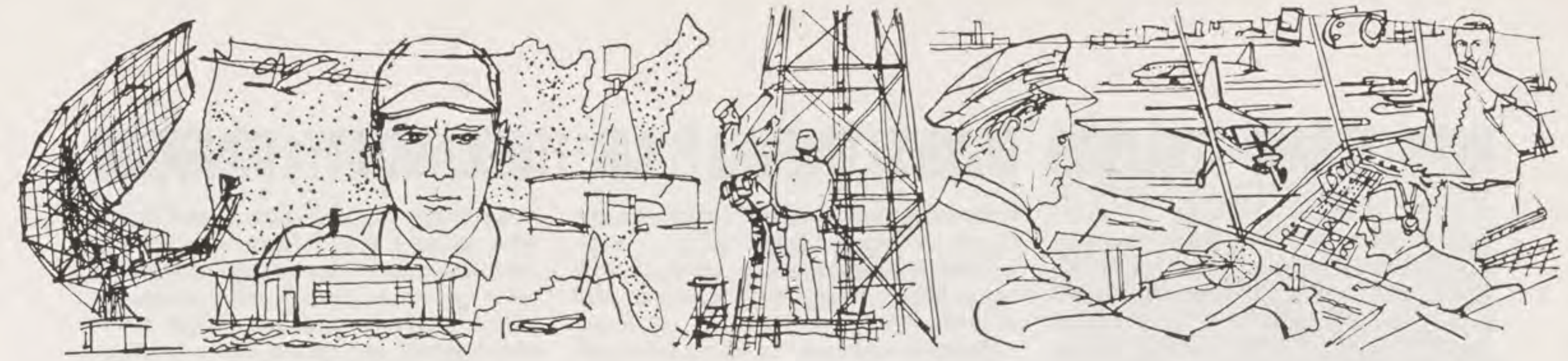


FAA STUDY SEEKS TO OVERCOME HAZARDS OF AIRCRAFT CRASHES, FIRES

Two large transport aircraft will be deliberately crashed and five others burned in major FAA research and development tests to be conducted later this year and early in 1964.

The tests are part of an over-all program to help overcome the hazards presented by aircraft crashes and crash fires. Five contracts totaling $740,000 have been awarded in this program. Preliminary work is in progress under each of them.

The contracts are as follows:

- All-American Engineering Company, Wilmington, Del., $334,000 for design and test of a high-strength bladder cell fuel system for modern transport aircraft that is resistant to crash impact and crash fire.
- Flight Safety Foundation, New York, $168,000 for tests in which two remote-controlled transport aircraft will be crashed in order to study fuel containment, crash loads and survivability in the aircraft cabin.
- General Dynamics/Convair, San Diego, $104,000 for a study of fuel containment under crash conditions on aircraft employing integral wing fuel tanks and examination of alternate design concepts in this connection.
- General Dynamics/Convair, San Diego, $103,000 for a crashworthiness study of the basic structural concepts incorporated in contemporary aircraft designs. The results of the study will be incorporated into a *Crashworthy Structural Design Handbook*.
- University of Dayton Research Institute, Dayton, Ohio, $32,000 for instrumentation support in a program in which five surplus Air Force transport aircraft will be burned to measure heat and toxic fumes. A helicopter will be used to determine the effect of helicopter downwash on ground fire fighting and rescue operations for transport crash fires.

In the crash-resistant fuel system work being undertaken by All-American Engineering, the 70-foot center section of a transport wing, with developmental bladder-cell fuel system installed, will be exposed to a series of simulated crash impacts. The crash impacts will be simulated by high-speed acceleration runs along a 5000-foot track terminating in controlled decelerations. The 40,000-pound wing section will be accelerated along the track by a jet-driven cart. Deceleration will be effected by a water-squeezer arresting system.

The test runs will vary in speed, with top speed about 70 mph. The arresting system will apply deceleration forces that range, in the successive runs, from three G's, or three times the force of gravity, to an expected high of 25 G's. The developmental fuel system will thus be subjected to increasingly high or simulated crash impacts.

After each run, wing section structures, the developmental crash-resistant fuel cells, and the interconnecting fittings between the cells will be examined for the effects of crash impact. System modifications will be made, if indicated, for succeeding runs.

This crash-resistant bladder-cell fuel system program, in its preliminary stages, will run for a year. Initial test runs of the wing along the track will take place early in 1964. They will be conducted at the All-American Engineering facility at the Sussex County Airport, Georgetown, Del.

In the Flight Safety Foundation remote-controlled impact project, the two transports will be placed in ground runs and accelerated through what amounts to a crash "obstacle course." The aircraft's right wing will hit two telephone poles; the left wing will hit an embankment. The fuselage will initially strike a sloping ramp that will provide an impact similar to the impact experienced in a crash landing. It will then strike a steeper ramp, providing more severe crash landing. The transport to be used in the first run will be either a surplus Douglas DC-7 or a Lockheed Constellation. The transport in the second run will be Boeing Stratocruiser. These tests will be conducted at Deer Valley Airport north of Phoenix. Tentative date for the two runs has been set for February and May, 1964.

Major aspects of the tests will be studies of fuel containment in the wing tanks under crash impacts, crash-load forces experienced on aircraft structural components and in the passenger cabin, and crash effects on typical equipment and dummy passengers in different parts of the cabin. The equipment will include different types of seats, galleys and cargo. Extensive instrumentation on and in the transports will provide impact data, as will cameras located in the cabin and at various locations of the test site.

In the fuel containment study by General Dynamics/Convair, now under way and scheduled to run for ten months, representative transport wing sections containing fuel compartments are being subjected to varying simulated crash impacts with the aim of defining methods to improve conventional integral wing tanks.

In the crashworthiness study by General Dynamics/Convair, structural design concepts of contemporary transport aircraft and service experience of these planes will be assembled and subjected to engineering analysis. Factors to be studied, in terms of structural integrity under crash conditions, will be basic airframe construction, internal components, galleys and passenger seats.

In the fire tests for which the University of Dayton Research Institute will provide instrumentation support, five surplus Air Force Stratocruisers will be set afire. Instrumentation will measure heat and toxic fumes in the aircraft cabin. The helicopter will be used to learn whether rotor downwash can disperse flames and cool the fuselage enough to increase the time passengers have to escape from a crashed and burning plane. Ground fire-fighting methods, including the use of foam, will be comparatively analyzed.

More than 20 fires are scheduled for these tests at FAA's National Aviation Facilities Experimental Center (NAFEC), Atlantic City, N.J. Initially scheduled to begin next month, the fire tests have been postponed until early 1964.

NEAR MIDAIR COLLISION REPORT GIVEN AT AIR FORCE SAFETY CONGRESS

It is Thursday—daylight, unlimited ceilings, visibility better than five miles. A twin-engine aircraft is flying VFR between 3,000 and 14,000 feet at a speed greater than 150 knots but less than 300 knots. Suddenly—while passing an en route VOR—it crosses the path of another aircraft flying IFR. The pilot of the "twin" takes smooth evasive action. He estimates the "near-miss" distance at about 500 feet and reports the incident to FAA. There are no injuries.

This profile of the "statistically typical" near midair collision incident was presented recently to the Air Force Safety Congress by David D. Thomas, FAA's Associate Administrator for Programs and former Director of its Air Traffic Service. However, there are other incidents where the pilot reports, "I had the jet in sight about two seconds, the closest distance was 50 feet, and I had no time for evasive action." Or, "I took violent evasive action. I had an ambulance meet the flight to take the injured to the hospital."

To reduce the number of such incidents, Thomas said, FAA is constructing a modern air traffic control and air navigation system which will provide for the maximum protection from midair collisions.

"Obviously," he added, "we have not reached our goal. However, we have learned something about the midair collision potential and some actions we can take to reduce the potential."

First, we know there are about 20 midair collisions each year involving civil aircraft.

Second, we know that about 60 to 100 incidents are reported each year which were so critical that collision avoidance was due to chance rather than any action by the pilots involved.

Third, nearly half of all reported incidents involve military aircraft.

Fourth, most incidents occur in daylight and in clear weather with both aircraft en route on converging courses.

Fifth, an IFR flight plan does not offer full protection. Last year, 156 aircraft flying IFR had near collisions with aircraft flying VFR. There also were 108 incidents, resulting from pilot or controller error, involving IFR aircraft exclusively.

Sixth, the positive control environment is the safest place. In 1962, only four near midair collisions occurred in positive control areas compared with 78 in other high-altitude areas.

Steps being taken to reduce the potential midair collision hazard, Thomas said, include extension of positive control to cover all aircraft flying above 24,000 feet in the continental United States. The program is scheduled for completion in early 1964.

In addition, continued emphasis is being placed on VFR arrival and departure radar traffic information service, radar handoffs, modernization of terminal radar systems to provide more range and altitude coverage, and new Center buildings designed to improve traffic handling capabilities. Work also is being done in the development of collision avoidance systems, pilot warning instruments, and conspicuity enhancement.

Cockpit layout design is another area in need of improvement, Thomas said. "The complexity of our high-speed jet cockpits requires a concentration of pilot controls and monitoring instruments in a relatively small space. If the pilot cannot readily control and monitor radio and navigational equipment without undue distraction from his other priority cockpit activities, then he quickly reaches a saturation point and he can no longer continue to effectively receive air traffic control instructions and carry out the necessary procedures."

Thomas also said that FAA is working closely with the Air Force to minimize the air traffic control problems created by the mix of military and civil aircraft. Of particular concern is the "unacceptable increase in the number of near midair collisions as a result of operations under the Authorization for Fighter/Intercept Operations (AFIO)." FAA and the Air Force have tentatively agreed upon a program to reduce this hazard.

STARLIFTER UNVEILED

The Nation's newest cargo airplane, Lockheed's C-141 StarLifter, is rolled out of the factory preparatory to ground and flight testing. This 550-mph fan jet transport is the first airplane to be developed from inception for both commercial and military use. FAA certification is expected in 1965.

SIX COMPANIES ENTER DESIGN COMPETITION FOR SST

Six leading aviation companies notified FAA last month that they intend to participate in the competition to develop a supersonic transport airplane.

The three airframe companies were:

The Boeing Company, Seattle, Wash.; Lockheed Aircraft Corporation, Burbank, Calif.; North American Aviation, Palmdale, Calif.

The three engine manufacturers were:

Pratt and Whitney Aircraft Division, United Aircraft Corporation, East Hartford, Conn.; Flight Propulsion Division, General Electric Company, Cincinnati, Ohio; Curtiss-Wright Corporation, Wood-Ridge, N.J.

Deadline for submission of proposals by these six companies will be January 15, 1964.

The government, with the recommendations of the airlines, will evaluate proposals and select engine and airframe manufacturers to take part in a second phase of the development program. Under the projected timetable for development, the supersonic transport that is developed is expected to enter flight testing in 1968 and enter passenger service sometime in the '70s.

In announcing that the six concerns had indicated intent to submit SST design proposals, FAA Administrator N. E. Halaby declared:

"These concerns represent immense reservoirs of talent and experience in airframe and engine development and production, both for military and civil application. They have already turned their very considerable capabilities to intensive study of supersonic transport development in its many facets. From the design and competition phases of this program directly ahead of us, and from the later stages of development, I am confident will come a superior American supersonic airliner to carry the air traveler of the 1970's safely, speedily, and economically."

PILOT GETS FIVE YEARS FOR FALSIFYING MEDICAL

For the first time a Federal District Court has imposed a prison sentence on a pilot for giving false information on an FAA medical application.

The pilot, who was sentenced to five years, tried to conceal an established history of a chronic, severe psychoneurosis for which he was receiving a 50 per cent disability pension from the Veterans Administration. He had previously been denied a medical certificate by the FAA Civil Air Surgeon based on his medical record. He petitioned, as was his right, the CAB to review the denial, but did not pursue the petition.

In a new application for a medical certificate, he transposed his first and middle names, stated that he had never been denied a medical certificate, falsely represented his address and indicated that he had no history of nervous trouble or had ever been confined to a hospital.

Part 67 of the *Federal Aviation Regulations* states: "To be eligible for a first-class medical certificate, an applicant must have . . . no established medical history or clinical diagnosis of any of the following: a character or behavior disorder that is severe enough to have repeatedly manifested itself by overt acts, a psychotic disorder, chronic alcoholism, drug addition, epilepsy. . . ."

The case came to light in a routine check of medical applications by FAA's Aviation Medical Service. The FAA issued an Order of Emergency Revocation on August 8, 1962. A Civil Aeronautics Board hearing examiner sustained the FAA order on August 31, 1962, and the pilot surrendered his pilot certificate and invalid medical certificate. The case was referred to the Department of Justice for review of any criminal actions as a result of his false representations.

From this referral, the pilot was tried and found guilty by a jury.

Fledglings Receive VIP Treatment from Controllers

FAA is encouraging student pilots to identify themselves as such when communicating with air traffic control facilities. Students making this identification will be shown special consideration when operating in areas of concentrated air traffic.

George S. Moore, Director of FAA's Flight Standards Service, pointed out that there are approximately 115,000 student pilots in the United States. They account for a substantial part of all VFR flying.

Moore said students generally are most eager to practice good piloting techniques but are handicapped by lack of experience. It is difficult for them to maintain the same standards as experienced pilots in such activities as compliance with air traffic control instructions.

To receive additional assistance in heavy traffic areas, a student need only identify himself as such on his initial call to an FAA facility. For example, "Dayton Tower, this is Fleetwing 1234, Student Pilot, over." This special identification will alert FAA controllers and enable them to provide the student with such extra assistance as he may require.

NEW TRAFFIC CENTERS DEDICATED

Left, FAA Administrator N. E. Halaby dedicates new Chicago Air Route Traffic Control Center. Right, at New York ARTCC also dedicated last month, controllers at Idlewild inbound position follow aircraft by voice contact and radar.

Septuagenarian Earns His Private License, Seeks Instrument Rating

One of America's newest private pilots is also one of its oldest. He is Arvid Ericsson of Fort Lauderdale, Fla., born 10 years before the Wright brothers produced the world's first successful power flight in a heavier-than-air machine. At 70, he is among the oldest private pilots ever certificated by FAA.

Ericsson started flying lessons early in 1959 after an experiment in aerial photography had stimulated his interest. He soloed that Fall and soon afterwards purchased a J-3 Cub.

He presently flies an Ercoupe and averages one to two hours a week in the air. His next project is to acquire an instrument rating—not for flying in instrument conditions, but to learn what to do and what not to do in case he should ever find himself in weather.

DISCUSS HANDS-OFF LANDINGS

More than 400 technical experts from a score of nations gathered at Atlantic City, N.J., last month to discuss progress in the development of automatic, all-weather landing systems for aircraft.

FAA is conducting a major research and development program aimed at providing aircraft wtih safe "hands-off" landing capability in conditions of low airport visibility. An FAA DC-7 airplane equipped with a test version of a radio altimeter flare-out landing system has made more than 1100 successful automatic landings. This system includes airborne radio altimeter and computer linked to an improved ILS.

Parallel work to produce an operational all-weather landing system is proceeding in Great Britain and France.

Government and industry leaders here and overseas delivered 19 papers examining various facets of their programs at FAA's Second International Aviation Research and Development Symposium.

FAA HOBBYISTS BUILD AIRPLANES IN SPARE TIME


Marshall Turner, FAA maintenance technician, works on Smith Miniplane. At *right*, finished version.

When an FAA man gets through with his official daily duties it doesn't mean an end to his interest in aviation. Many Agency representatives not only spend their spare time flying as a hobby, they also build their own aircraft.

During working hours Marshall E. Turner is an electronics technician for FAA's System Maintenance Sector at Cedar Rapids, Ia., responsible for keeping the sector's complex air navigation facilities operating. After hours is he busy at home constructing an experimental airplane.

Turner is president of the Cedar Rapids chapter of the Experimental Aircraft Association. He soloed when he was 16 years old, has held a private pilot's certificate since he was 18, and has been flying ever since.

One of scores of FAA employees interested in building planes as a hobby, Turner is constructing a Smith Miniplane in the basement of his home. It has a 17½-foot wingspan and a 15-foot fuselage. It is small enough so that with the wings folded, the FAA maintenance technician can get it up the basement steps and out the back door when it is finished.

Experimental home-built aircraft make up a sizable and rapidly growing segment of general aviation and an area in which FAA takes an active interest. The Experimental Aircraft Association, founded only 10 years ago, now has 134 chapters with some in Canada, Australia, England, and other European countries. In Cedar Rapids the chapter has 35 members, eight of whom are building their own airplanes at the present.

As part of its mission to promote the development of civil aviation, FAA encourages home-built construction. However, keenly aware of its responsibilities for safety, the Agency closely monitors the activities of those who design and build experimental models.

Before a man is turned loose to fly in his own creation, the aircraft must meet certain standards. An FAA Flight Standards inspector almost lives with the aircraft from its conception in the mind of the builder to its birth and maturity. The inspector is called in while the plans are still on paper to help solve problems and protect the builder against pitfalls that might be expensive—or fatal.

As construction progresses the inspector, quite likely a home-built enthusiast himself, will make periodic checks to see that the job conforms to acceptable standards. Before aircraft surfaces are closed in or covered over, he will check to assure that the structure is satisfactory.

When the aircraft is ready for flight testing, it is thoroughly inspected once more. If approved, the inspector issues an experimental airworthiness certificate. This permits restricted test flying in a specified geographic area set aside by FAA to provide maximum protection to persons and property on the ground, and minimum interference with other air traffic.

If the airplane has a non-type certificated engine, a minimum of 75 hours in the air is required. Aircraft with type certificated engines require a minimum of 50 hours. At the end of this period, the operational limits may be modified to permit the operator to fly outside the test area. However, the airplane still carries an experimental classification which restricts the pilot to non-commercial operations.

Turner is only one of a number of FAA employees whose hobby is building airplanes. Air traffic specialists, maintenance technicians, and desk-bound administrative agency personnel all join the experimental aircraft fraternity composed of butcher, doctor, school teacher and others who get a tremendous amount of satisfaction out of creating their own flying machines and flying them.

Rule Change Will Clarify Ban on Private Pilots Flying for Pay

FAA proposes to amend Part 61 of the *Federal Aviation Regulations* to clarify the existing prohibition against a private pilot acting "as pilot in command of an aircraft for compensation or hire."

In its present form, the regulation does not specify whether it is the pilot or the aircraft operator (who may be someone other than the pilot) or both who are prohibited from receiving compensation in such circumstances.

The proposed amendment would make it clear that neither the pilot nor the operator may be compensated when a private pilot is acting as pilot in command. It also would prohibit them from receiving compensation for the carriage of passengers or property.

However, the proposal would permit a private pilot to act as pilot in command in connection with any business or employment if the flight is only incidental to the job and does not involve the carriage of persons or property for compensation or hire. It also would allow a private pilot to share the operating expenses of a flight with his passengers and to participate in a passenger-carrying airlift sponsored by a charity.

RULE CONFERENCES SCHEDULED

Ten two-day informal conferences have been scheduled by FAA to obtain views from the aviation public on five regulatory subjects concerning: equipment malfunction reports; requirements to list alternate airports on IFR flight plans; adoption of the nautical mile as a national standard of measurement; control zone weather; and operations at uncontrolled airports.

People planning to attend should notify FAA, AT-300, Washington, D. C. 20553, prior to October 11, stating meeting and dates they will attend. Others are invited to submit comments that may be included in conference discussions.

Locations and dates of meetings, all starting at 9:30 A. M. local time, are:

Philadelphia—Oct. 18, 19, Sheraton Motor Inn; Birmingham, Oct. 18, 19, Municipal Airport; Des Moines—Oct. 22, 23, Municipal Airport; Houston—Oct. 22, 23, International Airport; Denver—Oct. 25, 26, Jefferson County Airport; Phoenix—Oct. 25, 26, Sky Harbor Airport; Seattle—Oct. 29, 30, Seattle Hilton Inn; Oakland—Oct. 29, 30, Oakland International Airport; Anchorage—Nov. 1, 2, FAA Headquarters Building; Honolulu—Nov. 1, 2, Moana Hotel.

Airport manager Robert P. Selfridge.

Rx for a Good General Aviation Airport

Good general aviation airports are not born, they're made—by people who believe in the future of aviation and its value to a community.

Good general aviation airports don't grow, they're developed—by people who combine missionary zeal with aeronautical competence.

This rich mixture is exemplified by Greater Rockford Airport, tucked away at the top of Illinois near the Wisconsin border and only 60-odd miles northwest of Chicago's O'Hare. There, white-thatched, 50-year old airport manager Robert P. Selfridge purveys a heady brand of aviation sense, vision and swivel-necked watchfulness over the smallest detail of his airport operation.

Selfridge, who learned to fly in 1928, has more than 8,000 hours in his log book. He has taught instrument and multi-engine flying and helped set up a flight curriculum for girls at Stevens College, Columbia, Mo. During the war he was a flight instructor. Before coming to Greater Rockford, Selfridge was superintendent of operations at Kansas City Municipal and Grandview, Mo. airports.

Since coming to Greater Rockford in 1955 ("I mowed the grass for the first time. . ."), he has combined the talents of flier, accountant, economist, real estate operator, safety engineer. Above all, he is an articulate spokesmen on how to operate a successful airport: "Surround and protect the airport from housing; use all revenue to make a better airport; keep rates and charges as low as possible; don't try to make excessive profits."

By following a tight zoning policy, Selfridge, with the full cooperation of the Board of Commissioners of the Greater Rockford Airport Authority, has been able to bar residential housing around the airport. On the other hand, Selfridge has

Above, FAA DC-3 lands at Greater Rockford after checking accuracy of ILS. Above right, written pilot exams are given 'round-the-clock at Flight Service Station *(right)* with no appointment.

Fixed base operation *(left)*, rated for A&P, radio and accessories, also runs enterprising flying school *(above)*. For $99, a student can get a full course through solo flight.

attracted considerable industry around the airport, many of whom keep airplanes there. More than 100 aircraft are based at the airport; about 95 per cent of this fleet, representing 35 companies, is business-owned.

One company bought a DC-3—its first airplane—and used it to generate enough sales one winter to keep 400 workers on the payroll during what might have been a layoff period. Another company finds it is cheaper to shuttle expensive dies between Rockford and its Canadian plant via corporate airplane than to make duplicate dies.

The zoning policies are an outgrowth of extraordinary power granted by the Illinois Legislature to the Greater Rockford Airport Authority which represents four cities. The Authority has the power not only over zoning and height restrictions which might hamstring an airport, but also has the right to levy taxes for airport use. Taxing power has been used sparingly however, with the revenue used solely for airport police and fire protection and for capital improvements.

As a result of these zoning policies, Greater Rockford lies in a 1700-acre protective cocoon of aeronautical activity. Nearly half the acreage is clear zone. To the northwest, a river provides a natural buffer. Circling clockwise are a railroad, industrial areas and a farm. Much of the industrial land and the farm the canny airport manager leases, providing both income and protection.

Selfridge keeps a hawk-like vigil over the most minute aspects of the airport. Walking around with visitors, he points to the neat weed-free areas under the fence that surrounds the airport and around the freshly-painted runway lights. He is hardly ever out of earshot of the 24-hour control tower, keeping a radio tuned to approach control in his office, in his living room (he lives across the street) and near his bed.

In line with his policy of keeping prices low for general aviation, Selfridge says, "I'm opposed to landing fees; it drives business aircraft away. And one thing my boys won't stand for is pay toilets or pay parking." At Rockford, it's free.

Moreover, Selfridge doesn't even follow the customary practice of taking a percentage of aircraft sales. That would drive business away also. His feeling is that everyone "should grow together."

Greater Rockford is growing. Operations at the field have climbed from 80,000 in 1959, when FAA installed a control tower, to an estimated 120,000 operations this year. The greatest gain has been in itinerant flying—a major yardstick in airport growth. Ozark Airlines has 14 flights daily.

In a constant program of airport improvement, an ILS and Approach Light System were installed by FAA on the 6,000-ft. runway in 1961. Land was provided by the airport authority. Last year, FAA and the airport shared the cost of removing a water tower that interfered with the back course of the ILS. This year, under the Federal Aid to Airport Program, 6,000 feet of runways and connecting taxiways were resurfaced at a shared cost of $290,000. Federal aid totals $1.4 million.

Aeronautical services and attitude have both combined to make Greater Rockford a homing beacon for general aviation. The Experimental Aircraft Association meets there each summer because they find not only a warm welcome but also a host of non-aviation fringe benefits. Selfridge has built for EAA members a comfortable picnic-camping area with electricity, swings for the children and trucks that shuttle back and forth bearing hot water for shower tanks. During this year's EAA meeting, a mobile tower set up on the field by FAA tower chief Richard P. Smolla handled a landing every 38 seconds for 3½ hours.

Selfridge is proud of everything and everybody connected with Greater Rockford Airport, but his special joy is the crash-and-rescue operation which is garaged adjacent to the 3,000-ft. mark of the instrument runway. He estimates that the equipment is worth about $50,000 although it cost him considerably less, thanks to some handy employees who fabricated all but one of the trucks to Selfridge's specifications, using manufacturers' chassis.

All the rolling equipment is equipped with two-way radio. A turret-topped crash-rescue truck can handle both foam and water, can spew a torrent of water at the rate of 750 gallons per minute. It carries power saw, cutters, grab hooks. Its design incorporates underbody sweeps for foaming runways.

Other equipment includes two mobile tankers that can rev up to 60 mph in 50 seconds and a chemical truck and search jeep. The crash-and-rescue crew, headed by a veteran of four years crash experience with the Strategic Air Command, is kept on its toes by frequent practice alerts.

"I like nothing better," says Selfridge with a twinkle, "than to get out on the runway some February night after telling the tower to punch the crash button.

"Then I time 'em coming out. They can set up and be ready," he says with pride, "in two minutes."

Greater Rockford Airport's crash-rescue personnel keep alert through frequent practice alarms. Top to bottom: controller in tower summons crew; equipment is directed to scene of "fire"; men garbed in "hot suits" move in; foam-drenched flames are quickly doused; then back to the garage for clean-up and inspection by airport manager.

"All of a Sudden I Was Surrounded...."

There are probably thousands of pilots like James Henry Faber of Modesto, Calif. He has been flying for about a year and a half, holds a single-engine rating on his private pilot's certificate, and has logged less than 200 hours. He does not have an instrument rating although he did have five hours under the hood while qualifying for his certificate.

Mr. Faber flies for pleasure. He enjoys renting an airplane and taking his family on trips to visit nearby relatives. He took one recently that nearly ended in tragedy when he was suddenly enveloped in rapidly-forming turbulent cumulus clouds. But he learned a lesson, one he agreed to share with other pilots. . . .

Q. What was the purpose of your renting the aircraft?

A. We took a week-end trip to Boise, Idaho, to visit relatives.

Q. And your family accompanied you?

A. Yes.

Q. In this particular plane you had 30 hours total time?

A. Yes.

Q. Before you made this trip, did you spend any time with the operator in reviewing the use of the aircraft and the trip you were making?

A. Yes, we went over the trip quite extensively, especially since this was my first time over the Sierras. I was quite concerned about the Sierras. I went over with him quite a number of times the possibility of encountering weather, how to approach it, how to cross the mountains and come back again.

Q. What was the trip like?

A. We filed a flight plan at Stockton, Calif. for a trip to Boise, Idaho. I also requested flight following and they gave us the Lovelock and Boise flight service stations to report into and a flight following plan. The trip was quite uneventful. At Boise we landed at a private field, called Bradley. We spent Saturday there and then we were to depart Sunday afternoon. However Boise was completely weathered in so we delayed our departure until Monday morning. I checked with the weather at about seven o'clock Monday morning, they told me that Boise would open up at about ten. So at ten o'clock, approximately 9:30, I called Boise weather and they said that the weather had opened and we could depart, and the en route weather would be satisfactory for a flight.

I called the flight service station and filed a flight plan from Boise, Idaho, to our home airport, and also requested flight following. They gave us Rome VOR to check with and also Lovelock and Stockton, Calif. as my reporting points en route. We departed Boise at ten o'clock and our initial altitude was 8,500. And we crawled through the—it was a scattered cumulus clouds we went through—went through the clouds and leveled off at 8,500 feet. We proceeded to Rome VOR.

At the Rome VOR we made a left turn and headed south towards Lovelock. Between Rome and Lovelock, between Rome and Sidehouse which was the next VOR station down, the cumulus clouds started building up a little bit so I called Lovelock VOR, told them we were changing the altitude from 8,500 to 10,500 because the cumulus was topping at about 9,500. In between Sidehouse and Lovelock the cumulus started building again and I called Lovelock and told them that the cumulus were rising and we were rising and we were changing our altitude again to 12,500. And, oh, I would say the cumulus then were at about 9,000 feet, and Lovelock acknowledged.

And so we proceeded to Lovelock and, well, when I got over to the VOR course I made my station report to Lovelock. They gave me the weather advisory that they had, which was scattered cumulus, and the only report I think they had as far as the tops were concerned was the information I had given them in their area. The Sacramento weather at that time was scattered cumulus at about 5,000 and visibility 30 miles and no turbulence.

I might say, too, then I think this was probably one of the reasons that the whole thing developed was that there was no turbulence at all in the flight from Boise to Lake Tahoe, absolutely none. It was like flying in a perfect vacuum. We were over these cumulus clouds all the way, and it was, well, it was just a perfect flight, that is all. I mean, everything went right, the VOR's were checking out, I was coming over them just like I planned I would. Well, it was just a real, real fine trip up to this point.

At Lovelock we changed our course to Lake Tahoe, and Lovelock at that time had suggested also that I check with Reno to check the weather before going over the top of the summit. At Carson City the clouds opened up, we made a visual identification of Carson City and Virginia City. Over Carson City I called Reno radio. They gave me the weather in the San Joaquin Valley as scattered cumulus 5,000, visibility 30 miles. They had one private plane report: A Cessna 210 that had crossed from Blue Canyon to Ruckee reported the tops at 10,500.

Well, we were at 12,500 still proceeding on our same course when we got to Lake Tahoe. The whole lake was completely open, as a matter of fact, my children looked down and pointed out the ski runs at Heavenly Valley where we ski during the wintertime. We crossed the lake heading towards Echo Summit. I could see Echo Summit was built up way above 12,500. I called Reno radio and told them I was changing my course to the north because Echo Summit was completely obscured, I had no idea of the ceiling, but it was way above 12,500.

So we turned north, and, oh, I imagine 20 miles north of my intended course to my left I saw a valley of cumulus and I could see through to the other side, so we turned and went back on our original course which was 210 and I was to take a cut on the Tahoe VOR. The last cut I took was bearing 030 from my position. And looking below, the clouds opened up and we made what I think is a positive identification of three lakes below me which would be, oh, 20 miles east of Lake Tahoe, and maybe 20 miles north of the Echo Summit road. Then, at that time, the air wasn't turbulent and what we were flying over were cumulus clouds I am sure.

What happened for a second after this, I don't know whether the weather came up and met me, whether the plane dropped into this thing, I just don't know. All of a sudden I know I was surrounded in a cloud.

Q. Was this something you had no warning of?

A. No warning at all, there I was. And I suppose at that particular point I was scared as hell, I must have been, because this is the one thing that is, what should I say, the one thing that I have been—

Q. Feared?

A. Well, feared or have been more concerned of in my flying than anything else, was this cloud sort of thing. And so the first thing I realized that I wanted to do was to get the plane . . . make sure that it was on a straight and level situation. The next thing I thought I could make a 180 and get out of this. Well before I made the 180 the plane started to gyrate. I don't know what the first thing was that happened, whether the plane went up and down, whether it went sideways, in which direction it went I don't know; I can't recall.

Q. There was a sudden movement of the plane though, violent sudden movement?

A. Yes, it did something. I mean, it just—

Q. Right at this point, as you got into this sudden circumstance, do you know what your air speed was as you went into it?

UP AND DOWN VIOLENTLY . . .

A. Well, we were maintaining 147 knots indicated. So we were still at 147 knots when we went into this thing. And after that I don't know, I didn't look at the air speed indicator at all. I was more concerned with the needle ball and also my climb and dive indicator on the instrument panel, and my artificial horizon. Those are the only three instruments I watched. And at what point I reduced speed, pulled by throttle back, I don't know either. But I know it was pulled back, and well, I just—it just—I just don't know. I mean I was concerned with getting this airplane in a straight and level position. I know we went up and down, we must have gone up and down violently. I know at one time my head was thrown back, then another time I know it went way forward under my chest, and the climb and dive indicator did fluctuate just . . .

Q. Up and down?

A. Up and down rapidly.

Q. To the extremes? How far over did it go?

A. I don't know, way, way up and way back. I am sure it must have but I did try to keep the plane in a—not that I suppose that it did any good at this point—was to keep it straight and level attitude. I know we didn't go into a dive and . . . a spiral, we must have gone into a dive because we dropped from 12,500 and came out somewhere above, between Pollock Pines and Placerville at 6,500 feet. And when we came out of the clouds the ground was coming up at me so we were diving into it. When I leveled the plane out, the horn came on which was the landing gear horn. So I pushed the throttle back in and I brought my manifold pressure back to at least 20 inches, then the horn went off. And then I put the plane back down in a straight flight attitude and went on.

Q. Do you have any idea how long you were in the clouds?

A. No, I have no idea. It could have been 30 seconds, it could have been three minutes, it was an eternity. I have no idea. It couldn't have been too long because we arrived home about the same time that we anticipated in our original flight plan. Our forward distance on this whole time on the chart was about 20 miles.

Q. Was there any change in the management or operation of the plane after you came out? Could you feel any change in its response?

A. No, the only thing was that the air was very turbulent from Placerville all the way home.

Q. Was there any panic in the plane?

A. No, there was no panic at all. As a matter of fact, the only concern in the whole aircraft with all of passengers was for a small poodle dog that travels with us that was bounced around pretty badly, and she went from lap to lap to lap, I think, through the air.

Q. No injuries?

A. No.

Q. Going back to some of your first comments, you explained that you had discussed with the operator at length this proposed first trip across the Sierras. Do you recall that as a result of your early visits with him that you were better prepared to accommodate this situation?

A. Yes, I think I have discussed weather many, many times with him and I think if it hadn't been for his training, I don't know. And these discussions I have had with him, I don't know, just what the end result would have been, because I feel that the plane survived because of some of the training I got from him.

Q. As I understand it, when you did return the operator wasn't here and you left him a note. Did you have any reason to believe that damage had been caused to the plane?

A. No, at the time I didn't, but I didn't want anybody to fly the aircraft until it had been checked with somebody because I didn't know just what structural damage could be done. I knew we had been through this violent weather and turbulent weather, and rather than risk the aircraft, if there had been structural damage done, I wanted somebody to look at it before anybody else took the plane off.

A BUCKLE ON THE WING . . .

Q. Did you know that someone had struck the top of the plane and there was marks on the head liner? Had you observed that when you left the plane?

A. Yes, the children pointed that out after we sat it down. We started to look around the aircraft and the kids said, "Daddy, we hit our heads on the roof." But other than that, that was the only apparent damage that I could observe.

When I finished helping the man from the repair hangar put the plane in the hangar, I asked him, "How could you observe structural damage to an aircraft?"

He said, "Well, the first thing that you look for is a buckle in the wing." We briefly looked at the airplane and at the time he said this had been damaged structurally. He said, "I would suggest that you leave a note for the owner to call." So I put a note on his desk telling him. "Don't fly the plane until you call me."

So he did that night about six o'clock, or eight o'clock, and I told him what had happened. And he said, well, he'd go out and look at the aircraft. So the next morning I came on over and we looked the whole plane over, and, of course, there were wrinkles. . . .

VISIBILITY

This is the seventh article in a series on aviation weather prepared by meteorologists of the Weather Bureau.

The measurement of visibility is one of the least satisfactory elements in aviation weather observation. Modern instruments can measure cloud heights, wind and temperature precisely enough. But visibility is always dependent upon the individual's eyesight.

To maintain level flight, the VFR pilot must be able to see the ground or some other reference points. He must be able to avoid collisions and to make a 180 degree turn without entering clouds. Visibility is especially crucial to takeoff and landing operations. Even the instrument pilot must rely on his eyes as he approaches the runway.

As reported in the aviation weather observation, visibility is intended to be a measure of the transparency of the atmosphere, evaluated in terms of what the normal human eye can see.

The transparency of the atmosphere decreases in relation to the number of particles of foreign matter suspended in it. Dust, smoke, snowflakes or water droplets in the form of fog, clouds or rain scatter light rays and reduce visibility.

The angle of the sun's rays passing through the atmosphere also affects visibility. When the sun is low, in early morning or evening, visibility is generally poorer than it is during the middle of the day.

Industrial centers create their own special visibility problems. Smoke and fog are common in these areas and are frequently reported in combination. Smoke itself contributes to the formation of fog by providing particles on which water vapor can condense. Morning visibility is often reduced drastically by a photochemical process that produces sulphur trioxide from combustion products suspended in the air. The effect is most noticeable about an hour after sunrise and lasts for two or three hours. Visibilities toward the sun are often reduced to fractions of a mile when the sun is near the horizon and haze, dust, smoke or fog are present, although visibilities in other directions may be several miles.

VISIBILITY REPORTS

In order to make effective use of visibility reports, the pilot should understand how the observations are made and what their limitations are. With instruments and methods now available, *visibility can be measured only along the pilot's line of vision when he is on the ground.*

Prevailing visibility. To measure prevailing visibility, the weather observer looks for prominent landmarks around his station. He know the distance to various permanent objects—radio towers, buildings, hills—within visual range of the airport. In daylight hours, he uses these reference points to determine the visibility. At night, he looks for permanent lights of known intensity and distance.

The observer reports essentially the median distance—in miles and fractions—that prominent objects can be seen and recognized throughout the horizon around his station. He might, for instance, be able to see three miles to the north and south, five miles to the east, and one mile to the west. Prevailing visibility would then be three miles.

This procedure attempts to insure that a pilot will have an average visibility of about the reported value when he is circling the airport.

If visibility is three miles or less and the observer feels that it will help the pilot, he may add remarks to his report. In the situation described above, he would report the prevailing visibility as three miles and might add that visibility was five miles to the east and one mile to the west. These remarks are very important and should never be slighted in reading aviation weather reports.

Runway visibility. The pilot's main interest is visibility on the runway, and this is not necessarily the same as prevailing visibility. At a number of airports, visibility is measured along the instrument runway actually in use. This measurement is reported as "runway visibility."

It is made by an instrument called a transmissometer, which measures the transmission of light through the atmosphere over a fixed path. This information is then translated into terms of what the human eye can see. During daylight hours, the reading represents the distance from which dark objects can be seen against the horizon. At night, its measurements indicates how far a moderately intense, unfocused light of 25 candlepower can be seen by the human eye.

Much of the value of the runway visibility report depends on the pilot's knowledge of the landing field and the relative distances of reference points.

Runway visual range. A new measure of visibility is appearing in the "remarks" portion of aviation weather reports and should be familiar to all pilots. The measurement known as Runway Visual Range or RVR is *based on the visibility of high-intensity runway lights which a pilot can see more readily than anything else nearby.* The RVR report tells the pilot about how far down the runway he will be able to see from the point of touchdown.

There is an important difference, then, between runway visibility and runway visual range. At night, runway visibility is defined in terms of the distance that a light of moderate intensity can be seen. Because the runaway lights used in calculating runway visual range have peak intensities measured in thousands of candlepower, they obviously can be seen by pilots from much greater distances.

VISIBILITY IN FLIGHT

The visibility from an aircraft may be very different from that on the surface. Often a pilot in the air can see the ground through a low-lying fog when the surface visibility is very low. At other times, the surface visibility may be eight or ten miles, but haze or smoke aloft make visual navigation difficult.

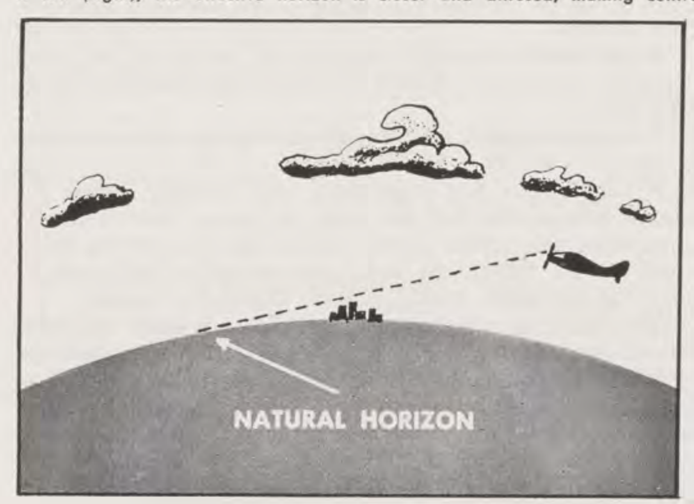
In flight, visibility is often related to the speed of the aircraft. Reports of surface visibility are, of course, made at a stationary point. If visibility is restricted by precipitation, the effect is much more severe in a moving aircraft, just as it is in a speeding car. *Pilots changing to higher speed aircraft should bear in mind that any increase in speed affects visibility during rain or snowstorms.*

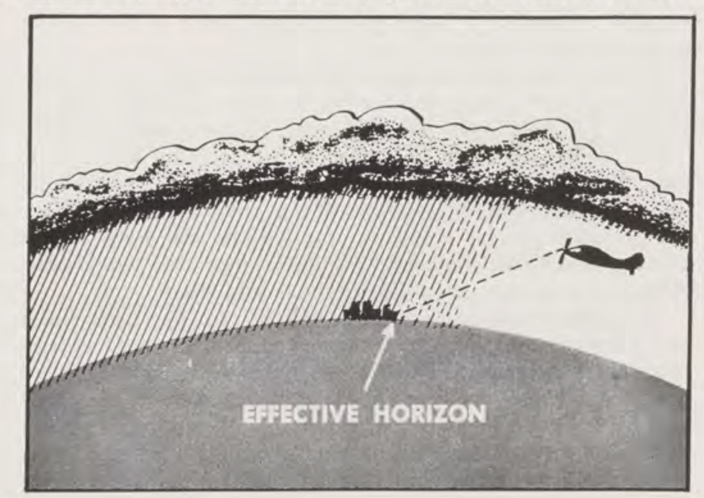
No existing instrument can measure visibility from the aircraft to the runway, called the "slant" visibility. Such a measurement would tell the pilot at what height and from what distance from the end of the runway he could expect to recognize objects on the ground. He would then know in advance how many seconds he would have in which to correct his final approach before touchdown.

Today, slant or in-flight visibility measurements can only come from pilots. These reports are valuable to forecasters, briefers and other pilots. Air-to-air, air-to-ground, and slant visibilities become more and more important as aircraft fly faster.

Today's instruments for measuring visibility have removed some of the human element from the aviation observation. Scientists are now seeking a way to measure slant visibility, and when it is found the IFR pilot will know exactly how much time he has to correct his final approach. The VFR pilot will still have to depend on visibilities determined by eyes just like his own.

Left, when the weather is clear the horizon is plainly visible, thus helping the pilot to control his aircraft by visual reference. But when visibility is low *(right)*, the effective horizon is closer and diffused, making control of aircraft's heading, attitude and bank by visual reference more difficult.





SAFETY FIRST

CARBON MONOXIDE POISONING

Cabin heaters in aircraft are intended to keep pilots and passengers warm, but a defective unit can produce a permanent chill.

This is especially true in aircraft which utilize engine exhaust gases in heating cabin air. Cracks or holes in the heating unit can cause deadly carbon monoxide to leak into the cabin.

Even the smallest amount of carbon monoxide can affect a pilot's judgment or flying ability. Over a period of several hours it can cause unconsciousness.

When inhaled, carbon monoxide is absorbed by that part of the blood—hemoglobin—whose normal function is to carry oxygen. Hemoglobin has an affinity for carbon monoxide about 300 times that of oxygen's. Consequently, the absorption of the poisonous gas is quite rapid.

As the hemoglobin becomes saturated with carbon monoxide, the oxygen in the blood stream is reduced proportionately. If the air contains sufficient carbon monoxide, oxygen starvation and death result.

Long before this point is reached, however, pronounced physical disturbances occur which should serve to alert pilots to the potential danger.

The first symptom of carbon monoxide poisoning is a feeling of tightness across the forehead usually accompanied by a slight headache. As the poisoning becomes more severe, the headache increases and there is a throbbing in the temples. Next, there may be severe headache, general weakness, dizziness and dimming of vision. Then, there is a decided loss of muscular power, vomiting, convulsions and coma. The pulse gradually weakens and the respiratory rate slows until there is a complete respiratory failure and death.

A carbon monoxide concentration of .02 per cent (only two parts in ten thousand) may produce the characteristic primary symptoms in a few hours time. A concentration of .06 per cent may produce headache in less than an hour and unconsciousness in two hours, while .1 per cent carbon monoxide may produce unconsciousness in a little more than an hour and prove fatal in four hours.

The amount of carbon monoxide present in exhaust gases varies according to the fuel-air ratio available to the engine. With full throttle openings and rich mixtures, less air is available for combustion and the carbon monoxide content is high. The normal cruise mixture is best, but there is always some incomplete combustion, causing carbon monoxide to be present.

The danger of carbon monoxide poisoning increases with altitude. The reasons are obvious. As altitude increases, air pressure decreases and the body experiences difficulty in obtaining an adequate supply of oxygen. Add carbon monoxide, which further deprives the body of oxygen, and the situation can become critical.

There is no acquired or natural immunity to carbon monoxide. Repeated exposure produces identically the same effect each time.

The best protection, therefore, against carbon monoxide poisoning is alertness to its symptoms. If the pilot begins to feel headachey, drowsy or sluggish, he should immediately assume carbon monoxide is present and take the following precautions:

- Immediately shut off the cabin air heater and any other opening that might connect the engine compartment air to the cabin.
- Open a window and any other fresh air source immediately.
- Land at the first opportunity and carefully inspect the entire exhaust manifold for holes or cracks. Since a careful inspection will require disassembly of both the exhaust manifold and the heater, the inspection should be performed by qualified personnel. Defective units should be replaced.

Physical inspection of the manifold and heater assembly should be included in the periodic airworthiness inspection. Portable carbon monoxide indicators may also be used to test for cabin air contamination. These tests usually are performed while the aircraft is airborne since the airflow and pressure distribution in the cabin is quite different in the air than on the ramp.

Letters

FAA

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

• Full Stop

Please explain the reason for requiring a pilot to make five full stop landings every 90 days to remain current in type aircraft. It would appear that, except for night flight operations, touch and go takeoffs and landings would suffice and also save the pilot some expense.

Anthony E. Severino
Philadelphia

The Federal Aviation Regulations *(and the superseded Civil Air Regulations) have for years required that the landings prescribed in the recent pilot experience requirements be completed to a full stop.*

Full stops are required on the prescribed five landings before passengers may be carried because of the old adage that "a landing is not complete until the airplane stops rolling." The fact is that loss of control on the ground after landing is one of the major causes of aircraft accidents. More than 500 such accidents have been reported in each of the past two years.

We consider that touch-and-go landings do not provide evidence of the ability to bring an airplane safely to a stop, especially in cross-wind conditions or with tailwheel type airplanes. Landing practice which does not include a full stop after each touchdown fails to provide the benefits which are to be expected from full stop landings.

• Low Numbers

Please tell me the correct procedure to obtain a short "N" number for homebuilt aircraft. I have noticed quite a few large aircraft sporting these short numbers.

Homebuilders who build planes all of eighteen feet long should not have to clutter up the small space we have available while the large corporate and commercial planes can obtain one, two and three digit numbers.

When I applied for a short number for my plane, I was told that an FAA representative would have to certify that my plane was too small to utilize a four digit and one or two letter "N" number.

Irving Winer
St. Louis Park, Minn.

The subject of aircraft registration numbers is covered in Part 501 of the Regulations of the Administrator. *It states that "all unassigned registration numbers consisting of 1 to 3 digits, and of 1 or 2 digits followed by a letter, are reserved for use on Government-owned aircraft and on aircraft which will not accommodate a large number. Any application for a 1 to 3 digit number, or a 1 or 2 digit number followed by a letter for other than a Government-owned aircraft must be accompanied by a statement from a Federal Aviation Agency inspector verifying the fact that the aircraft will not accommodate a number of more than three symbols."*

Part 501 permits persons assigned low numbers prior to September 19, 1960 (the effective date of this part) to keep them or to transfer them to another aircraft. This explains why you still see large aircraft with low registration numbers.

• Phonetic Alphabet

I would like to see you print the phonetic alphabet in *FAA Aviation News.*

I have in turn learned the Able Baker Charlie alphabet, then the later, international phonetic alphabet. Now our state aviation administrator's office has printed a combination of the two and this one seems to be the one in considerable use right now, and I'm confused.

Lawrence E. Thornton
Cleveland, N. D.

FAA has adopted the ICAO (International Civil Aviation Organization) International Phonetic Alphabet printed below:

Alfa (*Al*-fah) **Bravo** (*Brah*-voh) **Charlie** (*Char*-lee) **Delta** (*Dell*-tah) **Echo** (*Eck*-oh) **Foxtrot** (*Foks*-trot) **Golf** (Golf) **Hotel** (Hoh-*tell*) **India** (*In*-dee-aH) **Juliett** (*Jew*-lee-*ett*) **Kilo** (*Key*-loh) **Lima** (*Lee*-mah) **Mike** (Mike) **November** (No-*vem*-ber) **Oscar** (*Oss*-cah) **Papa** (Pah-*pah*) **Quebec** (Keh-*beck*) **Romeo** (*Row*-me-oh) **Sierra** (See-*airrah*) **Tango** (*Tang*-go) **Uniform** (*You*-nee-form) **Victor** (*Vik*-tah) **Whiskey** (*Wiss*-key) **Xray** (*Ecks*-ray) **Yankee** (*Yang*-key) **Zulu** (*Zoo*-loo)

• Flying Lessons

I intend to start taking flying lessons this year. After visiting three flying services in this area, I am thoroughly confused as to the regulations.

The plan is that as soon as I solo, my extra time will be logged, in part, by calling on dealers in distant parts of Ohio. I will be carrying no freight or passengers. There also is a possibility that by that time our company will have a small airplane.

One flying service told me that any business contacts while logging time toward a private license is strictly illegal. They also said that I would not be able to fly a company plane with or without the presence of a licensed pilot. Several persons have told me that this information is not correct.

This same man told me that if I purchased a plane, it must have an OMNI if I intend to land at any airport. He said that without OMNI all I would be able to use would be landing strips and "cow pastures."

He also told me that I must take his ground course if I intend to pass the test. Other pilots tell me that they passed the test by studying the book *Private Pilot.*

George A. Chapman
Piqua, Ohio

Section 61.73 (Part 61 of the Federal Aviation Regulations) *prohibits a student pilot from piloting an aircraft "in furtherance of a business." The effect of this limitation on the operations of a company airplane would depend on the purpose of the flight.*

There is no objection to a student pilot operating the controls of an airplane in flight when accompanied by a certificated pilot who is seated at dual controls. However, such flight time cannot be logged as solo flight time and cannot be counted toward the 40 hours required for a private pilot certificate unless the certificated pilot involved also holds a valid instructor certificate.

There is no requirement that an airplane must be equipped with OMNI radio for the conduct of flights under visual flight rules. However, an applicant for a private pilot certificate is required to demonstrate his ability to use radio (OMNI or low frequency range) as an aid to VFR navigation.

Completion of a formal ground school course is not required for the issuance of a private pilot certificate. Various manuals are available for home study which have been used successfully by many students in preparing for the private pilot written examination. Good ground school training, of course, is an effective aid in qualifying for a private pilot certificate, and is recommended.

• Short Cut Sought

Can I meet the aeronautical knowledge requirements for a commercial pilot certificate and an instrument rating by passing an airline transport pilot written examination? Rather than taking separate written examinations for these ratings, I prefer taking the ATR written test to meet both requirements simultaneously. I now have a private pilot certificate.

Ivan B. Steiner
Norwalk, Conn.

There is no provision in the Federal Aviation Regulations *to permit substitution of written tests. Knowledge requirements are based on the progressive development of pilots from one grade to another. For example, the ATR written test does not cover general operating rules required in the commercial pilot written test. The rules also specify that an applicant for the ATR written test hold a commercial pilot certificate or the equivalent.*

EDUCATIONAL REPRINTS

Reprints of the article "Teamwork Brings Lost Pilot and Passengers to Safety" that appeared in the March, 1963 issue of *FAA Aviation News* are available on request. Reprints of the article appearing on page 10 of this issue, "Suddenly I Was Surrounded . . ." are also available.

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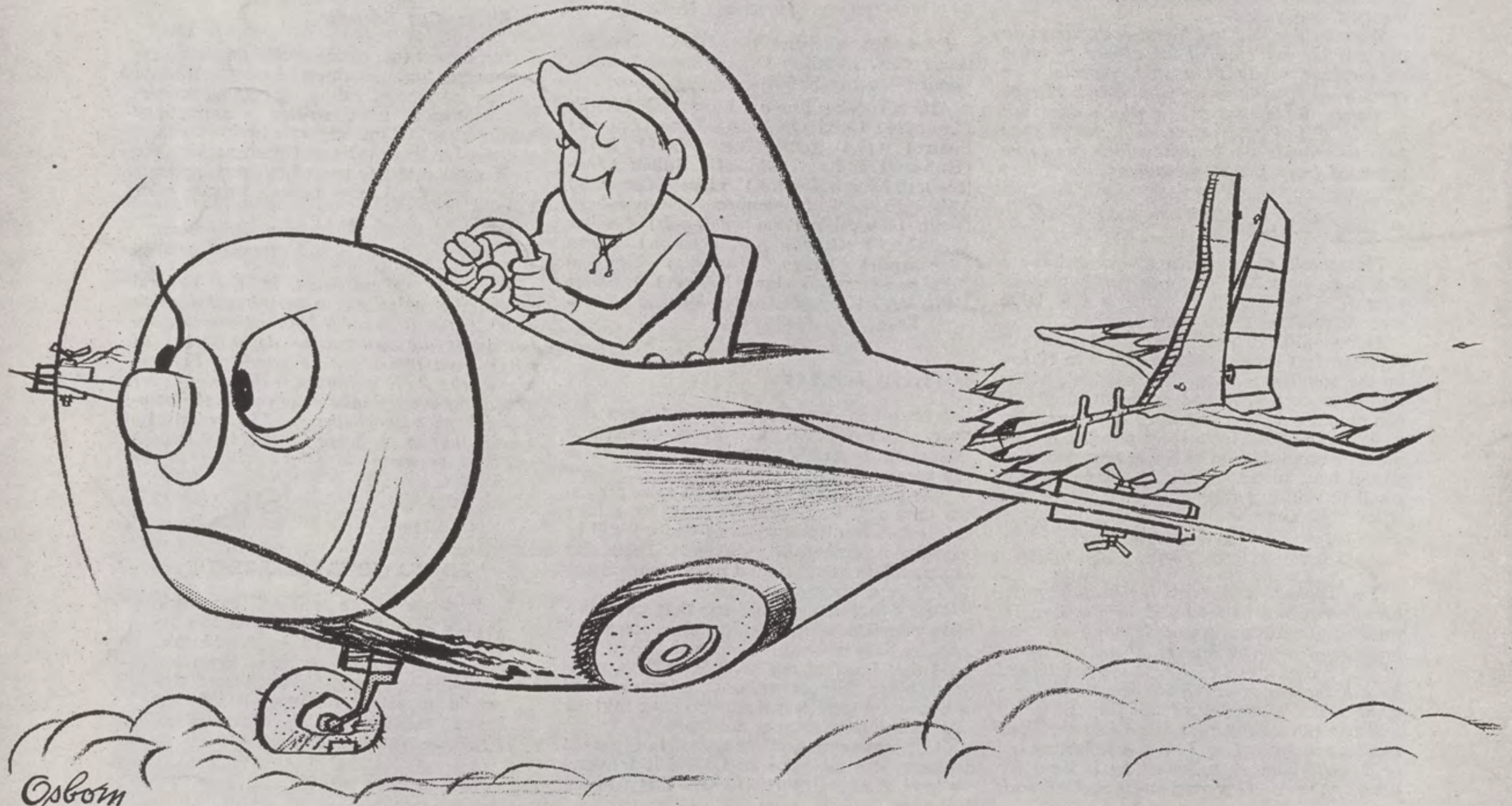
The End's in Sight . . .



He Skipped the Preflight