FAA AVIATION NEWS

JANUARY 1970

COVER

Unseen but vital to the millions who fly, remote NAVAIDs guard the safety of the airways. For the story of men who man the NAVAIDs see page 4.

FAA AVIATION NEWS

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Schussing Down the Runway

Versatility of ski/wheel equipped aircraft is taking business away from the dogs in northern Canada and Alaska. **Below**—wheel replacement skis are used extensively by bush pilots for sport and business flying.

FLYING (an airplane) on skis may not be as thrilling as schussing down an expert slope on a pair of fiberglas racers, but it has its share of uncertainties as well as its ups and downs. Skis add an extra margin of flexibility and safety in landing an airplane in northern climes or on mountainous areas in wintertime, when runways are crusted with ice or packed with snow, or where frozen lakes abound. Flying with skis as landing gear is probably a lot less difficult to learn and less dangerous than the mountain sport itself, but it does call for some training and understanding on the part of the pilot.

Skis as landing gear are available for virtually all types of aircraft up to about the size of a DC-3—indeed, ski-equipped *Hercules* C-130s (normal weight: 155,000 lbs.) land on the polar ice caps. Skis are used on both "nose-wheel" and "tail-wheel" aircraft, differing somewhat in design. (Retractable gear, of course, must remain locked down when equipped with skis.) Three basic designs are in use:

(1) Wheel replacement skis. Either the wheel is removed or the ski is fitted to ride underneath it.

(2) Wheel/ski combinations, fixed, not adjustable or retractable. Both ski and a portion of the wheel contact the surface.

(3) Wheel/ski combinations that are adjustable by hydraulic control, allowing the pilot to select either wheel or ski or both.

Wheel replacement skis are the least expensive (retailing from about $500 to $800 per set, delivered, but not installed), and are most commonly seen on the lighter aircraft in recreational use, primarily by sportsmen flying in the northernmost states and in Alaska and Canada. Wheel/ski combinations are used by numerous air taxis, that fly off northern strips with varying snow conditions. Having the wheel contact the surface permits a certain amount of braking and additional directional control. Wheel/ski combinations cost from $1,500 to $6,000.

As in the sport of downhill skiing, wooden skis for airplanes have largely disappeared, being replaced by either metal or fiberglas construction. Both materials have their advantages and drawbacks. Fiberglas is less likely to be knocked out of shape by rough landings, possessing a tendency to return to its original form. Metal skis, usually riveted aluminum, may last longer and are more easily repaired when damaged.

Original installation of skis must be done by a certificated mechanic or repair station. Subsequent reinstalling may be done by the pilot in accordance with the approved installing data, recorded in the maintenance record (on FAA Form 337 or a work order), to be kept as part of the aircraft records—provided there is no change in weight or balance. It is a good idea to have the cables checked by an experienced mechanic at the beginning of each season.

Many of the difficulties pilots encounter with ski-equipped aircraft are associated with taxiing, rather than flying. This is especially true of the common wheel replacement or "straight ski" installation, which gives the pilot no braking capacity at all and very little direction control in any kind of a wind.

The ski-pilot's difficulties may begin even before the aircraft begins to move—he may be frozen tight to the surface. Even though most skids are given a protective coating to prevent freeze-ups, hard use will wear off enough of the coating periodically so that the skis may freeze hard to the surface after being parked overnight.

In fact, when the temperature is really zero-ish, the skis could freeze in solidly if the pilot pauses long enough at the end of the runway before taking off.

Experienced ski pilots usually carry wood blocks in the aircraft to place under the skis when parking overnight, thus eliminating the morning after break out. Pushing on a wingtip or tail assembly to break out a frozen ski can easily damage the landing gear severely because of the great leverage afforded by the wing length or fuselage. Incidentally, pre-flight inspection of the aircraft should include a close examination of the ski rigging system for wear or slackness. If a cable should break on takeoff, you will not only have difficulty landing, but you may also have trouble holding altitude with a ski tipped down.

The aircraft parked on broad expanses of icy surfaces should be carefully tied down even if left for a few minutes. It takes only a slight puff of wind to send an unsecured plane skittering over the ice. Setting the parking brake is of no help, with the common straight ski arrangement.

Because of the lack of braking capacity, it may be advisable to perform the engine start-up while the aircraft is still tied down. If the aircraft has to be hand-propped alone to start, this is a must. Stories of runaway aircraft abandoning pilots in frozen wilderness and taking off unattended are legion, as are tragic accounts of pilot injuries suffered under these circumstances.

To avoid possible freeze-up at the runway, many skiplane pilots will perform the engine runup while still tied down, or while taxiing. The latter procedure is not recommended and requires great care, since an aircraft that is taxied rapidly on skis can get into all kinds of trouble.

When aircraft are operated consistently on glare ice, the skis are often fitted with skegs which give better directional control and also help bring the aircraft to a stop.

Without skegs or some other form of aid to directional control, an aircraft with skis will have great difficulty taxiing downwind under slick conditions; there will be a strong tendency to weathervane into the wind, and to slide backwards. Precise use of rudder, elevator, aileron and power is required to avoid weathervaning. (See "Which Way the Wind," FAA AVIATION NEWS, March 1969.) ■

On Top of Old SNOWBIRD

Midnight mountain sorties are routine to Airway Facilities Technicians

At 3:45 a.m. the alarm buzzed on the Knoxville FSS console, signaling an outage of the Snowbird VOR, 4,242 feet high in the Smoky Mountains. The Flight Service Station specialist on duty dialed a re-set signal to the VOR, and when the alarm continued its steady buzzing, he reluctantly picked up the telephone.

An hour later an FAA four-wheel-drive truck was speeding through the snowy night, en route to Snowbird VOR, 80 miles distant. Two-thirds of his way up the mountain, the driver left the truck and climbed into a SnowCat for the final two miles of steeply twisting unpaved road, now thickly covered with snow and ice. It was nearly dawn when he reached the mountaintop, parked the Cat and shoveled his way to the door of the VOR. A half hour later the alarm signal at the FSS went out, signifying the NAVAID was once again in working order.

Midnight alarms of this kind are almost routine to the men who maintain FAA's nationwide air traffic control. Their job description—electronic technician—is not a glamorous one and the nature of their work is rather solitary, especially when they are responsible for remotely located equipment. They spend hundreds of hours a year on rough back-country roads, in all kinds of weather. Pilots and others who ride in airplanes are scarcely aware of their existence. Yet no job in the entire air traffic system is more vital to safe air passage than theirs.

Based at 513 airway facilities sectors, some 8,224 technicians maintain 13,451 separate FAA facilities—control towers, radars, communications relays, direction finders and NAVAIDs of every description, from terminal instrument landing systems to remotely located radio ranges. Not only must the technician know his equipment inside and out, he must also be capable of getting to it quickly, whether it be located underground or atop a swaying hundred-foot tower high in the mountains, or in a swamp, a desert, a tropical island, or a volcanic crater. He must be capable of handling a truck or a tractor on ill-used wilderness roads, day or night, in fair weather or foul.

Modern Daniel Boone

The electronic technician must be capable of working on his own much of the time, carrying out inspection procedures methodically and accurately. He must be resourceful enough to deal with unforeseen emergencies, unfriendly wildlife (bears, for example, that may decide to hibernate in an FAA building, or wasps, or snakes, or skunks, or bobcats), and suspicious local citizens.

He must have the kind of genial disposition that does not mind being on 24-hour recall most of the year—which means that his sector chief can reach him by telephone within an hour, and have him back on duty within another hour. And he must have the kind of intelligent, inquiring mind that enables him to master the intricacies of modern electronic signalling equipment and keep up with increasingly complex designs and installations.

Above—NAVAIDs such as VOR on top of Smokies (alt. 4,242) must be kept functioning regardless of weather. **Below**—airway sector chief uses grounding stick when working on 24,000-volt TACAN.

The numerical strength and area of responsibility of an airway facilities sector varies according to locality. A typical sector, like the one at Knoxville, Tenn., for example, has 17 persons, including 12 technicians and a sector chief. The sector is housed with the Knoxville Flight Service Station, since the two facilities work closely together, and is located on McGhee-Tyson Airport, 14 miles south of Knoxville.

Here the 12 technicians are split into two specialized units: radar and NAVAIDs. Their area of responsibility covers some 200 square miles and includes much of the Smoky Mountains, the highest peaks east of the Rockies. They maintain 24 complex facilities that provide communication, navigation, radar and direction finding services to pilots in middle east Tennessee. Associated with these facilities are engine generators for emergency power. There are roads, fences, grounds and supporting towers. All of these are the responsibility of the technician assigned to a facility. Thus, while he is called an electronic technician he must also have considerable knowledge of civil, electrical and mechanical engineering skills.

The typical apprentice technician at Knoxville starts as a GS-6 or 7 (salary from $6,882 to $7,639). To qualify he must have at least three years of experience or specialized schooling related to electronic signalling equipment. As he moves ahead in his career in facilities maintenance, his skill and knowledge are continually broadened by exposure to advanced correspondence and resident training courses of the FAA Academy in Oklahoma City.

The recruit will start with months of orientation and on-the-job training at the Knoxville sector. Then he will take a correspondence course in advanced mathematics (algebra, trigonometry, etc.). Two hours of his workday will be allotted to study; he is expected to spend another 2-4 hours at night on the course. Next he will be sent to the FAA Communications School at the Academy. Then he will choose a specialty and take an advanced course on VOR, ILS, radar or TACAN, equivalent to about 25 college hour credits.

Above left—FAA airway facilities technician sets out in 4-wheel-drive vehicle to inspect NAVAID site. **Left**—English Mountain radar communication air/ground (RCAG) site enables pilot to receive distant Atlanta ARTCC. **Above**—ice sheathed air route surveillance radar dramatizes maintenance problems.

All told, the trainee will have about a year of Academy schooling and a year of on-the-job training before he becomes a full-fledged journeyman, at which point his salary will be in the GS-11 range ($11,233 to $14,599). Additional training will be required of him at regular intervals.

Airway facilities maintenance work does not appeal to men who like to do their job seated behind a desk or a panel display, in a crowded room. In contrast to the air traffic controller, who is located in a tower cab or in a radar room, and usually shares his responsibilities with others on his shift, the FAA technician is a man frequently on the go and he usually works alone. Some of the technicians at the Knoxville sector log about 2,000 miles a month on the road.

Where remote facilities are difficult to reach, as for example the Snowbird Mountain VOR in the Knoxville sector, the job can be unusually rugged. Although some of the equipment at Snowbird can be remotely tested by dialing signals from a central console in the FSS, the VOR must be visited at least once a week by a technician. When the facility is converted to a VORTAC, some time this year, more frequent visits will be in order.

Furthermore, unscheduled visits are made whenever a failure occurs or reports are filed, either by FAA flight check aircraft or by individual pilots, indicating error in the VOR signal. In a mountainous area such as the Smokies, with dozens of peaks over 6,000 feet, even slight signal errors could contribute to a tragic crash.

When a report that Snowbird VOR is not functioning properly reaches Knoxville FSS, either by automatic alarm signal from the facility or by radio or telephone, the facility is automatically shut down and the specialist on duty immediately takes steps to inform all pilots who may be flying over the area of the outage. A Notice to Airmen (NOTAM) is filed by teletype to all adjacent flight service stations, who broadcast the information on their hourly reports to pilots. The Air Route Traffic Control Center at Atlanta is notified, and an immediate report is sent to FAA headquarters in Washington, D.C.

Speedy Repairs Needed

Despite the extensive warning system in use, FAA does not assume that all pilots will discontinue using Snowbird VOR until it is repaired or carefully checked. There is always the chance that some pilot may not be paying attention to NOTAMs and fly through the area without contacting the Air Traffic Service. Someone must get to the VOR immediately and diagnose the trouble.

Depending on the time of year and the weather, the technician will set out in a Government sedan or four-wheel drive vehicle, usually alone. His route from the sector office will take him 70 miles northeast of Knoxville to the Pidgeon River Valley, at the northern tip of Great Smoky Mountain National Park. Here he will turn off the main road and follow a narrow climbing country road through a gap in the hills.

On either side of the road a patchwork of small tobacco and corn farms, some extending to only a few acres, make up a typical Appalachian mountain community—much removed from the mainstream of society, as evidenced by the sparse signs of economic prosperity or modern conveniences. The progress of a Government car through their valley is noted with interest but without concern by the mountain folk, whose economy is reputedly supported by a backwoods cottage industry beyond the pale of the law. FAA people have learned that if they keep their eyes and their thoughts on the road ahead they have no difficulty.

Where the community road ends, some two miles of narrow, twisting dirt road with

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ON TOP OF OLD SNOWBIRD

Continued from page 5

a 32 percent grade, built by and for FAA to the top of Snowbird Mountain, remains to be traversed. If weather conditions are bad, the technician will switch to the Snow-Cat garaged here and continue up the mountain at a slow, guarded pace. The one-way road borders on severe precipices and after storms is often blocked by landslides or fallen trees. The technician is no stranger to the axe, chain saw, and shovel provided him for clearing the road.

Arriving at the mountaintop VOR, the technician immediately sets to work tracking down the trouble. Working with equipment powered with as high as 24,000 volts, he has to be careful as well as thorough. He is all alone on the mountain.

Experienced technicians are usually able to diagnose and repair outages on the spot, with the equipment on hand. Sometimes the trouble is external: massive snow piled around the VOR may result in a misaligned signal. Certain problems are occasionally caused inadvertently by passing aircraft (propeller driven engines operating at precisely 1800 or 2400 rpm can cause apparent *course swinging*, for example.) Pages 1-12 of AIM explain VOR operation.

Once the problem is solved and the VOR back in operation the technician will notify Knoxville FSS, which will relay appropriate messages through the Air Traffic System. Snowbird VOR is not the focus of particularly heavy traffic, but it is needed to "fill in" an airspace where communications may easily be broken off because of high terrain. Pilots flying over the area are able to listen on the VOR channel and transmit to Knoxville FSS on 122.1, thus strengthening their receiving capability.

The thousands of pilots who fly over the Great Smoky Mountains every year, either on local flights or en route between the Midwest and the south Atlantic Coast, may catch only a passing glimpse of Snowbird VOR and never see the FAA technician toiling up the mountain road in response to his maintenance duties. For the uninitiated, air traffic control means the man at the radar scope or the microphone or DF, or it means a fantastically complex electronic communications system. For the flying public, the man behind the controller who sees to it that his equipment works, is an unsung, unseen hero. There are more than 8,000 "invisible men" in airway facilities maintenance, and all they ever hear are complaints.

Lewis Gelfan

FAA is on schedule with its new system for gathering related FAR Parts into volumes. Volumes I, II, V, VI, X, XI are now ready.

STATUS of The FEDERAL AVIATION REGULATIONS

As of December 1, 1969

The Federal Aviation Administration's program to consolidate the issuance of Federal Aviation Regulations by incorporating associated Parts into volumes is now in its sixth month and should be completed by mid-1970.

To date, 38 FARs have been collected into six volumes—Volumes I, II, V, VI, X, and XI. There will be 11 volumes in the completed FAR "library."

Consolidation of the 59 FAR Parts into volumes had been under consideration for a number of years. The motivating reasons were cost reduction, efficiency in distribution, and convenience to the subscriber. The new system meets these requirements.

Under the long established system now being phased out, FAA was required to maintain separate mailing lists for each of the 59 FARs, a situation which led to slow service, confusion, duplication in mailing, and high cost to the agency. With the pilot population soaring over the 600,000 mark, the need arose for a system that would assure prompt delivery of FARs and *all* changes to all airmen in need of this information.

For example, formerly an FAR user purchasing a Part for a very nominal sum had the option of automatically receiving all changes (in virtual perpetuity) to the Part by simply mailing in a coupon. Since changes in some FARs are numerous, the cost of maintaining ever-growing mailing lists, handling and postage far exceeded the original purchase price.

Furthermore, surveys disclosed that although a considerable number of FAR subscribers no longer had an interest or requirement for the changes, few ever bothered to cancel the service. (There was no way for FAA to halt the service once it was started except on the subscriber's request.)

Under the new system all transactions will be between the subscriber and the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. All charges will reflect the actual costs of the service. Under these conditions, subscription prices for FAR parts and charges would be prohibitively high, if a volume system were not adopted.

As each group of FARs is collected into a volume, the FARs making up a volume and all subsequent changes will no longer be sold individually.

Each volume (except for Volume I) will contain a number of associated Parts, and subscribers will have to purchase an entire volume in order to receive a given Part.

FAR users will be compensated for their increased costs by a more rapid service and by the greater reference convenience of volumized publication.

All FARs in each volume will be up-to-date at the time the volume is offered for sale, and changes will be mailed to subscribers automatically.

These changes, called "transmittals," will be issued in numerical sequence. A transmittal packet can amend one or more of the FARs in the appropriate volume. FARs amended by a transmittal packet are identified by a dagger † following the Part title in the accompanying status sheet.

Failure to renew a subscription after receipt of a near-expiration notice will trim the mailing lists and prevent them from growing to an unwieldy size. As each volume is issued, an availability notice will be mailed to all persons now receiving the FARs and will also be reported in FAA AVIATION NEWS.

While every Part in a given volume might not be of interest to every subscriber, all have a bearing on a common subject (such as certification, operating rules, airports, etc.). Naturally, no ideal please-everyone, every-time combination is possible, but the Parts assembled in each volume are selected on the basis of greatest usefulness to the greatest number of airmen.

Volume VI, for example, contains Part 91 (General Operating and Flight Rules), the basic volume for all pilots, and also Part 93 (Air Traffic Rules), Part 99 (Security Control of Air Traffic), etc.—all having a bearing on safe operation of aircraft. Such a buyer need not purchase Volume V which concerns itself with aircraft maintenance, or Volume X which deals with Federal aid to airports and other airport business matters, unless he has an interest in these subjects.

FAR PART OR VOLUME NO.	TITLE	PRICE
Vol. I, Part 1	Definitions and Abbreviations	$1.50 + 50¢ foreign mailing
Vol. II contains: (Transmittal 1)		$8.00 + $2.00 foreign mailing
Part 11	General Rule-making Procedures	
Part 13	Enforcement Procedures	
Part 15	Nondiscrimination in Federally Assisted Programs of the FAA	
Part 21	Certification Procedures for Products and Parts†	
Part 37	Technical Standard Order Authorizations†	
Part 39	Airworthiness Directives	
Part 45	Identification and Registration Marking	
Part 47	Aircraft Registration†	
Part 49	Recording of Aircraft Titles and Security Documents	
Part 183	Representatives of the Administrator†	
Part 185	Testimony by Employees and Production of Records in Legal Proceedings	
Part 187	Fees	
Part 189	Use of Federal Aviation Administration Communications System	
Vol. V contains: (Transmittal 1)		$3.00 + 75¢ foreign mailing
Part 43	Maintenance, Preventive Maintenance, Rebuilding and Alteration†	
Part 145	Repair Stations	
Part 149	Parachute Lofts	
Vol. VI contains: (Transmittal 1)		$5.50 + $1.25 foreign mailing
Part 91	General Operating and Flight Rules†	
Part 93	Special Air Traffic Rules and Airport Traffic Patterns†	
Part 99	Security Control of Air Traffic	
Part 101	Moored Balloons, Kites, Unmanned Rockets and Unmanned Free Balloons	
Part 103	Transportation of Dangerous Articles and Magnetized Materials	
Part 105	Parachute Jumping	
Vol. X contains:		$4.50 + $1.25 foreign mailing
Part 151	Federal Aid to Airports	
Part 153	Acquisition of U. S. Land for Public Airports	
Part 155	Release of Airport Property from Surplus Property Restrictions	
Part 159	National Capital Airports	
Part 167	Annette Island, Alaska, Airport	
Vol. XI contains:		$2.75 + 75¢ foreign mailing
*Part 71	Designation of Federal Airways, Controlled Airspace and Reporting Points	
*Part 73	Special Use Airspace	
*Part 75	Establishment of Jet Routes	
Part 77	Objects Affecting Navigable Airspace	
**Part 95	IFR Altitudes	
**Part 97	Standard Instrument Approach Procedures	
Part 157	Notice of Construction, Alteration, Activation and Deactivation of Airports	
Part 169	Expenditure of Federal Funds for Nonmilitary Airports or Air Navigation Facilities Thereon (New FAR)	
Part 171	Non-Federal Navigation Facilities	

FAR PART	TITLE	PRICE	CHANGES
The FAR Parts listed below have not yet been assembled into volumes:			
Part 23	Airworthiness Standards: Normal, Utility and Acrobatic Category Airplanes	1.25	6
Part 25	Airworthiness Standards: Transport Category Airplanes	2.25	19
Part 27	Airworthiness Standards: Normal Category Rotorcraft	.70	3
Part 29	Airworthiness Standards: Transport Category Rotorcraft	2.00	4
Part 31	Airworthiness Standards: Manned Free Balloons	.20	2
Part 33	Airworthiness Standards: Aircraft Engines	.40	3
Part 35	Airworthiness Standards: Propellers	.30	2
Part 61	Certification: Pilots and Flight Instructors	1.25	29
Part 63	Certification: Flight Crewmembers Other Than Pilots	.35	10
Part 65	Certification: Airmen Other Than Flight Crewmembers	.35	12
Part 67	Medical Standards and Certification	.25	7
Part 121	Certification and Operations: Air Carriers and Commercial Operators of Large Aircraft	2.00	32
Part 123	Certification and Operations: Air Travel Clubs Using Large Airplanes	.25	1
Part 127	Certification and Operations of Scheduled Air Carriers with Helicopters	.35	10
Part 129	Operations of Foreign Air Carriers	.20	4
Part 133	Rotorcraft External-Load Operations	.20	3
Part 135	Air Taxi Operators and Commercial Operators of Small Aircraft	.35	5
Part 137	Agricultural Aircraft Operations	.25	3
Part 141	Pilot Schools	.35	7
Part 143	Ground Instructors	.25	3
Part 147	Mechanic Schools	.20	1

* Changes to individual airspace designations and airways descriptions, individual restricted areas and individual jet route descriptions are not included in the basic Parts 71, 73 and 75, respectively, because of their length and complexity. Such changes are published in the Federal Register and are included on appropriate aeronautical charts.

** Due to the complexity, length, and frequency of issuance, airworthiness directives, enroute IFR altitudes and instrument approach procedures are published in the Federal Register and are not included in basic Parts 39, 95 and 97. In addition, enroute IFR altitudes and instrument approach procedures are published in the "Airman's Information Manual," and are depicted on aeronautical charts.

STRANGER IN THE COCKPIT

Unscheduled inspections can spot trouble before it happens

You're in a tremendous hurry because you promised your wife that you'd pick up your mother-in-law at Newark Airport at 4 O'clock and you're just going to make it if the control tower cooperates. You even called your fixed base operator from the office and arranged to have your plane rolled out of the hangar, gassed up and waiting at three and you're right on schedule. But, as you stride across the apron, you see a dark-suited stranger snooping around your aircraft and then hanging a note from your cabin door.

In no mood for idle chatter, you fix the stranger with your darkest 'beat-it-buster' scowl and ask what he wants. He introduces himself as an FAA General Aviation Maintenance Inspector and wonders politely if he can check out the interior of your aircraft.

Mustering all of your patience, you explain that you would like to accommodate him, but you're really in a hurry, could he come back at another time? You assume that he's making one of those endless Government surveys that you can live happily without. When he mentions, by the way, that your wiper arms are cracked and are about to break, you force a smile, thank him profusely, and point out that the sky is clear as glass, but you certainly will keep it in mind.

When you unlock the door and turn and find the gentleman is still waiting expectantly with a patient smile on his face, you decide, What the heck, let him snoop around while you run through your practiced, professional preflight.

And then you discover that you've done yourself a favor. Before you've got halfway around the aircraft, the inspector is calling your attention to the fact that, although your altimeter is set at the field elevation, the barometric reading does not agree with the latest weather bureau report. Still trying to save seconds, you humor him with a quick radio check, to show him that he doesn't know what he is talking about, only to discover that you are the one who is wrong. Fortunately, not dead wrong. Before you've had time to puzzle that one out, remembering some pretty hard landings you've made lately in heavy fog, the stranger in your cockpit is mentioning casually the especially bad tread on your starboard tire and the oil leak up front. By this time you have given up the thought of collecting mother-in-law at four on the dot, and you have decided to get acquainted with this mysterious stranger who seems to be able to put his finger on defects in your airplane that have been sitting there under your nose unnoticed.

You learn that there are only about 200 FAA General Aviation Maintenance Inspectors scattered across the country at some 81 General Aviation District Offices—to inspect about 130,000 aircraft. How can they inspect so many?

Top—FAA General Aviation Maintenance Inspector attaches Aircraft Condition Notice to cabin door of aircraft he has given an exterior "spot check."

Below—maintenance chief reviews results of Inspector's 1½ hour comprehensive spot check and discusses necessary repairs.

Right—interior spot check includes instrument calibration review. Inspector receives recurring training on all new models.

The answer is, of course, they can't. No more than 600 aircraft a month are spot checked by the FAA maintenance inspectors, who do it on a random, time-available basis. The primary duties of maintenance inspectors are to oversee and certify critical maintenance work, such as hundred-hour inspections, and to investigate accidents. The time spent on spot checking aircraft may represent some of the inspector's own (unpaid) time.

The aircraft chosen for inspection usually attract the inspector's attention because of some external symptom of neglect—worn tires or oil or fuel leaks. The inspector's eye may not be any sharper than the pilot's, but his background and his attitude are different.

To begin with, he is in no hurry to get airborne. The psychological pressure of getting somewhere precisely on time is enough to dim the vision of many a pilot who has no difficulty passing his physical. But to the inspector who has recently investigated an accident where a smooth tire blew out on landing or where an oil-starved, overheated engine led to a fiery crash—to his eye, worn tread or suspicious discolorations on the cowl may spell DANGER.

Then, too, the inspector is armed with a special input of information which puts him on the alert for specific malfunctions in specific models of aircraft. This is the report called "Flight Standards Maintenance Trends," a computerized readout of significant mechanical problems affecting aircraft over the entire country. Reports of such problems are fed into the FAA Aeronautical Center at Oklahoma City from manufacturers, maintenance stations, inspectors and others. The "Trend" report reaches FAA General Aviation District Offices regularly and alerts inspectors to the type of aircraft or problem to look out for.

Secondly, the inspector has an extensive background in aircraft maintenance. To qualify, he must have had at least seven years of experience as a mechanic and at a foreman-supervisory level. He must have had five weeks of specialized training at the Aeronautical Center and additional on-the-job training at a General Aviation District Office. He must spend much of his time visiting aircraft and component manufacturing plants to familiarize himself with new equipment. He sounds like—and he is—a man on the go, but if he takes time out to examine your airplane, you can be certain that he will go over it with a fine-toothed comb.

If neither pilot nor owner is on hand when he makes his spot check, the inspector will limit himself to an external look-over. If he spots anything wrong he will leave an Aircraft Condition Notice on the door calling it to the airman's attention. If the pilot can be located easily, the inspector will suggest a thorough going over of the cockpit and engine.

Most pilots are quick to acknowledge the value of such a spot check. A typical example is Olier H. Angers, an attorney from Hartford, Conn. Angers and his wife are both pilots and their children are their most frequent passengers. One day as Angers approached his aircraft, he found an Aircraft Condition Notice from FAA Inspector Walter Brigida, of the Westfield, Mass., office, informing him that his fuel cap seals were badly worn. (The defect could have resulted in air from the slipstream siphoning fuel out of his tanks, thereby possibly causing a forced landing.)

In a letter to the FAA Administrator, Angers stated: "I was extremely pleased that an agent of your Department had taken the time to spot check my aircraft and advise me of the correction to be made, because I would not have picked this thing up on my own in 100 years."

So if you should approach your parked aircraft some fine day and observe a neatly folded white paper ticket attached to the door handle with a bit of green cord, and it does not turn out to be a note from your wife, or co-pilot, or an overdue bill from your fixed base operator, be not alarmed. Even if you discover an official FAA Government seal affixed near the signature, utter no epithet. You have not been taxed, cited or (worse yet) grounded.

Unlike the parking ticket found on the illegally-parked automobile, this particular piece of paper, the Aircraft Condition Notice, is the bearer of tidings that will probably save you money and perhaps prevent a serious accident. It will tell you that your aircraft has been spot checked for you, without cost, by an exceptionally able airman, and it will suggest what you can do for the aircraft in the interest of safe flying. It is a suggestion, rather than an order, and it may save your life. Read it, and act.

J. O'Hare

Above—review of aircraft landing gear assembly, including well cover and hydraulic lines may disclose trouble in the making.

Below—inspector points out frayed cable in engine nacelle to surprised aircraft operator.

Above—tread on tires is carefully checked by Inspector. Many landing or takeoff accidents result from worn tires blowing out or skidding.

weather eyes

Second of a two-part article on Airborne Radar

AIRBORNE radar gives the pilot the advantage of a long range pair of "weather eyes," but unless he uses them knowledgeably this specialized equipment can lead to a false sense of security. There are several aspects of weather which radar does not "paint," and their presence must be suspected or presumed from the visible weather picture.

Within its ability the radar system will acquire and display *precipitation* data. For an adequate return, the radar signal must encounter a solid object, such as a rain drop or ice particles. At jet altitudes rain seldom occurs—but associated turbulence often does. Attempting to use airborne radar to pass directly over the top of a storm can lead to trouble, since the turbulence over a rapidly developing storm can extend up to 60,000 feet.

Clouds without actual precipitation, mist or fog are not likely to be detected by radar. The pilot can never assume that the absence of a target on his radar scope means clear sailing ahead. Insufficient scanning and lack of vigilance on his part can lead him into the drift path or turbulence of a storm he has never seen.

Controls on modern airborne weather radars are clearly marked and conveniently arranged. Operating techniques and interpretation of the radar return, however, requires training and practice.

WHEN operating the weather radar on the ground, normally only the test mode is used. With any other mode, the nose of the aircraft should be turned away from large structures such as hangars, terminals, towers, etc., and other aircraft. Radar signals reflected from a large structure can "bounce" back, with destructive effect on the aircraft's radar crystal. The beam in normal, contour, or map mode, directed at another aircraft, could destroy that aircraft's radar crystals.

Weather radar also should not be turned on during refueling operations, or in the vicinity of other aircraft being refueled because of radar-generated sparks. The radar rays, however, *are not* dangerous to human beings.

Pilots experienced with airborne radar will usually re-evaluate the weather shortly after takeoff, using the TILT control to scan vertically. This is particularly important during the climbout, when the nose high attitude of the aircraft would tend to keep low lying storms out of the picture.

To benefit from the advance warning provided by weather radar, the pilot must take evasive action as promptly as possible, rather than hope the storm will pass beyond the flight path by the time the aircraft arrives on the scene. This might not happen—the storm might be drifting on a collision course with the aircraft. The direction and rate of drift can be accurately calculated by direct viewing on the scope screen.

When adjacent storm cells appear on the screen no attempt should be made to pass *between* them unless at least 20 miles—10 miles on each side of the flight path—separates them. The possibility of severe turbulence (as well as lightning strikes) between clouds closer together is very real.

Characteristic radar returns showing severe storm activity. From top: scalloped edge image depicts hail; a U-shaped pattern is related to tornadoes; a prominent hook is associated with high turbulence and a finger return is linked to violent storm activity.

Sometimes the cockpit screen will display apparent storm activity directly ahead which cannot be explained by weather advisories. The likeliest cause of this is "dirt," caused by the antenna being tilted too far downward, where part of its energy reflects from isolated terrain targets such as mountains, and built up areas. Tilting the antenna upward eliminates the "dirt."

The "dirt," however, has a useful function. When the antenna is tilted downward to maximum, the radar screen in the cockpit will reflect terrain characteristics such as rivers, coastlines, mountains, and metropolitan areas.

LARGE bodies of smooth water will not show up because the radar beams ricochet forward and do not return sufficient energy to present an image. Choppy water will show up on the screen, however, and surface wind speed and direction can be estimated by direct reference to the radar scope. (The cup—or concaveside—of the wave will return a strong signal, compared with the back or convex side.)

While the weather radar can be used in the above applications as an aid to navigation, it *cannot* be used as an aircraft proximity warning device. Weather radar is entirely unsuited to this purpose.

Certain phenomena appear on the airborne scope as apparent distortions, although the radar is functioning normally. A long straight river, for example, running either parallel to or athwart the flight path, may appear to taper unrealistically as it recedes into the distance. Targets separated by a space less than the beam diameter of the signal may merge into a single target on the scope. Under conditions of radome icing, targets may be partially hidden in a haze or disappear completely.

Also, where precipitation is extremely light or fine, the storm area may extend somewhat further than actually shown on the radar scope. This could be due to the small size of the target, rather than to malfunctioning.

Actual malfunctioning of the radar in flight is usually indicated by peculiarly shaped returns. Large "spoking," or scalloping on the outer periphery, or heavy "snow" without specific targets are common symptoms of system disorders, which will require the services of a qualified mechanic. If there is any reason to suspect that airborne radar is not working perfectly, all weather en route should be given a wide berth.

In the last analysis, this is pretty good advice no matter how many electronic eyes you have in the cockpit. ■

Third in a series of articles designed to familiarize pilots with environmental conditions that affect vision from the cockpit.

COMING or GOING?

COMING OR GOING? At night or in conditions of poor visibility navigation lights tell you a traffic advisory story in color. All pilots should refresh their memories periodically so that they can immediately determine the flight path of another aircraft by the color and relative position of the navigation lights it displays. The airborne pilot, alone in the cockpit at night, is in no position to start thumbing through a pilot's handbook to find out whether the red and green lights he sees are going away or coming directly at him. He may have only a few seconds to see, decide and react. How much time would you need? Do you have any blind spots in your memory?

Famous

FLIGHTS

THE IRON BIRD

An aircraft made entirely of stainless steel, weighing less than an identical plane made of wood? Built by a car manufacturer?

At first glance the trim biplane amphibian, seen skimming low over the placid waters of Long Island Sound off Port Washington on an October morning in 1931, would have been identified as an import from Italy, a *Savoia Marchetti SM-56*. An observer well-steeped in aviation lore could have told you that the Italian SM-56 was made entirely of wood, had fabric-covered wings and tail surfaces, could carry two persons at 95 mph, and was a cream puff to fly.

A second glance, at close range, would have caused some consternation. What was being unveiled on this date was an American stainless steel version of the SM-56—the Budd *Pioneer*.

Six months in the building, the plane had been cunningly redesigned (without altering its external configuration or aerodynamic qualities) by an engineering team totally inexperienced in aviation.

The American SM-56 was the brainchild of Edward G. Budd, a self-educated industrial genius who had founded the Budd Company in Philadelphia in 1912. Fascinated by the possibilities of stainless steel, a new but capricious metal to work, Budd prodded his engineers into seeking new uses for the metal.

Budd was aware that stainless steel was three times as heavy as the aluminum alloys currently being tested for airframes, but he also knew that it was three times as strong, and would not corrode. He designated Col. Earl J. Ragsdale, chief of stainless steel research, as head of the airplane project, and John C. Whitesell as his ramrod. Whitesell, who is the sole survivor of the design team and who is now living in retirement in Florida, was skilled in turning abstract concepts into hardware.

Above—stainless steel Pioneer skims across Long Island Sound on its maiden flight, Oct. 4, 1931. **Bottom left**—John C. Whitesell, project engineer for first successful steel plane, is center man in trio aboard two-place aircraft. **Bottom right**—at 1,500 pounds, the stainless steel airplane was lighter than the all-wood Savoia Marchetti SM-56 model. Budd engineers used revolutionary shot weld process to join thousands of components into light, strong airframe. Examined during renovation 37 years later, integrity of welds was intact although carbon steel bolts used to join wings and engine mounts were rusted away.

Despite the Depression, now grinding through its second gloomy year, the aviation industry was lively, stimulated in large part by dozens of independent manufacturers who often combined chief engineer, designer, shop foreman, sales manager and test pilot in one person. Many were seeking radical breakthroughs in structural and sheathing materials. Various combinations of wood and fabric and aluminum were being tried.

The major gap in aircraft manufacturing technology was the absence of a light, strong, resilient, easily worked, inexpensive metal with high corrosion resistance. In hindsight, these requirements are met by aluminum alloys, the chief aircraft metal in use today. But in 1930 aluminum alloys were not only very expensive, they were also very unreliable and highly subject to corrosion. (So vulnerable was aluminum at the time that the giant German flying boat, the *Dornier Do. X*, a 12-engine monster capable of carrying 100 passengers, was forced into dry-dock for replacement of the corroded lower hull after a single transoceanic flight. The American dirigible *Los Angeles* was withdrawn from service and dismantled because its aluminum frame had lost its flexibility after only a few years of service.)

On the other hand, stainless steel was strong, highly resistant to corrosion, and not too expensive—but also it was much heavier than any similar airframe metal and required entirely new techniques for drilling and rolling.

Rather than design an entirely new aircraft, Budd's engineer chose to duplicate in stainless steel an airplane with a proven design, the Italian SM-56. The SM-56 was enjoying such popularity in Europe that the firm had opened a branch at Port Washington, L. I., N. Y., hoping to tap the American market with their speedy amphibian.

The most crucial problem in constructing a steel SM-56 revolved around the welds. Whitesell was instructed to fabricate the fuselage skin, the inner framework, wing and tail ribs and spars, struts and the wing-tip pontoons from "Type 304" stainless steel, an alloy containing nickel, chrome and carbon. All joints were to be welded—stainless steel rivets were unknown and aluminum rivets were unsatisfactory for a number of reasons.

The welding problem was related to the carbon. When sufficient heat was brought to bear to effect a weld, the carbon demonstrated an affinity to absorb chrome that resulted in "carbide precipitation," a destructive weakening of the joint.

Eventually, Whitesell's team learned how to avoid carbide precipitation by carefully controlling the amount of current, electrode pressure, and the duration that the current was applied. Rivets were not to Budd's liking, as they required drilling, added weight and in his opinion lacked the strength of a weld.

To minimize weight, Budd engineers deliberately underdesigned the craft—that is, they would take a component and design it of stainless steel so light that it would obviously not be capable of taking the known stress loads specified in the Savoia Marchetti blueprints and engineering data.

Then the engineers would add stresses and loads, carefully watching for the point of failure. When this occurred, they reinforced or redesigned the member to meet the load. The result was a light, strong airplane.

All the design, fabrication, and assembly of the airframe was done in Budd's Philadelphia works. When the engineers were sure that everything would fit together, the *Pioneer* was trucked disassembled to Port Washington where the American branch of Savoia Marchetti Co. covered the wings and tail surfaces with fabric.

After numerous taxi tests, the *Pioneer* took to the air on Sunday, Oct. 4, 1931. The first steel airplane rose smartly from the calm waters of Oyster Bay and flew smoothly into the annals of aviation history. On the third flight, engineer Whitesell was one of two passengers carried, plus the pilot—a substantial accomplishment for a plane designed to carry two persons.

The *Pioneer* logged 1,700 hours in the United States and Europe without mishap. Eventually, it was retired, stripped of its fabric and mounted outside Philadelphia's Franklin Institute.

Soon afterwards, a stainless steel airplane was built by Fleetwing Aircraft Co., Phila., but this plane has vanished without a trace. Their *Sea Bird* was the first stainless steel aircraft to be certificated.

But neither the *Sea Bird* nor the *Pioneer* ever caught on as successful aircraft. Rapid advances in aluminum metallurgy soon pushed stainless steel into the background as an airframe material.

Budd Engineering went back to manufacturing cars and later locomotives and railroad rolling stock, including the famed stainless steel Zephyr trains.

Edward Budd was satisfied to know that he had demolished the myth that "metal airplanes could never fly," and then let the aviation industry go its own way.

Frank J. Clifford

Pilot

BRIEFS

■ PERSONAL IMMUNITY FOR PILOTS and others reporting near midair collisions (NMAC) will continue for another two years, from Jan. 1, 1970 to Dec. 31, 1971. The program, which started Jan. 1, 1968, seeks to encourage pilots, controllers, and others involved in NMAC incidents to submit complete reports on these incidents to FAA. Analysis of the 2,230 "near misses" reported last year was completed in July 1969 and the "NMAC Report of 1968" has recently been distributed. Continuation of the reporting program for two more years will enable the FAA to assess the effectiveness of corrective actions taken.

■ TAMING OF SONIC BOOMS is the task being undertaken by scientists at the University of Tennessee under a $200,000 contract from the Federal Aviation Administration. During the two-year period of the contract, investigators will conduct both theoretical studies and tests in wind tunnels, ballistic ranges, shock tubes, etc. The University will study numerous sonic boom theories and explore unconventional supersonic designs to determine whether these designs would result in improved sonic boom suppression.

■ DEVELOPMENT OF A LOW-COST INSTRUMENT SYSTEM which will warn pilots of the presence of other aircraft is the goal of a $279,032 contract awarded to the Melville Space and Defense System, Melville, N.Y. by FAA. Results of the 22-month study are expected to lead to specifications for a practical and acceptable airborne pilot warning instrument (PWI) system that would reduce the possibility of midair collisions.

■ A LOOK INTO THE FUTURE IN AIRPORT DESIGN is provided in a new FAA advisory circular which describes design and requirements for two types of general aviation airports for jets and larger aircraft. "Basic Transport Airports" accommodate jets weighing up to 60,000 lbs. and "General Transport Airports" handle aircraft up to 175,000 lbs. Included are such topics as design criteria, runway and taxiway widths, safety areas, clearances, design components, crosswind runways, pavement considerations, airport protection and property control, lighting, instrumentation and marking. "Airport Design Standards–General Aviation Airports–Basic and General Transport," AC 150/5300-6, may be obtained free of charge from the Department of Transportation, TAD 484.3, Washington, D.C. 20590.

■ FAA IS CONSIDERING LOWERING THE FLOOR of positive control to 14,500 feet across the U.S., except the Golden Triangle area in the Northeastern U.S. and the Los Angeles/San Francisco corridor, where the floor would be 10,000 feet by 1975. FAA Administrator John H. Shaffer, who announced the plan during a hearing on mid-air collisions, also said that selected airway corridors are planned to connect major traffic hubs which will be under positive control down to 10,000 feet. In the "Triangle" and Los Angeles/San Francisco areas the bases of these special routes would be about 6,000 feet.

Tech Reports Emphasize NAVAIDs, Runway Lighting

Scientific reports covering a broad variety of aeronautical research sponsored or performed by FAA are now available to the public for $3.00 each.

Included in the nine new volumes: "SEAL System Integration" (AD 691 720) reports on the feasibility of inspecting navigation aid signals from the air using an FAA developed system known as Signal Evaluation Airborne Laboratory (SEAL).

"Evaluation of the ASDE Bright Display" (AD 691 187), describes tests made at Chicago's O'Hare International Airport where the equipment proved to be a beneficial air traffic control tool.

"Benefit/Cost Analysis of Approach Lighting Systems," (AD 686 381) recommends adoption of Medium Intensity Approach Light Systems as the basic non-precision approach visual aid. The report also has recommendations for Medium Intensity Approach Light System, Runway Alignment Indicator Landing System, and the Runway Alignment Indicator Lighting System.

"Analysis of VORTAC System Error Accuracy of Standards used by Radio (Avionics) Repair Stations" (AD 693 084) recommends possible action to improve the present calibration methods used for avionics test equipment in the radio repair stations.

"Retro-Reflective Markers as Taxiway Visual Aids" (AD 689 794) concludes that aviation blue retro-reflective sheeting and retro-reflective discs are useful as taxiway visual aids.

"An Evaluation of the VOR/DME Omnitrac 1A Area Navigation System" (AD 689 360) discusses the accuracy of the Omnitrac for various operational modes, and assesses the utility of the system based on data obtained from both pilots and controllers.

"Simulation Tests of the Arcata, Calif., Diamond Runway Centerline" (AD 691 721), compares the diamond-shaped runway centerline marking system with the standard U.S. markings which have 120-foot long painted stripes broken by 80-foot gaps. Twenty experienced pilots tested at NAFEC preferred the standard U. S. system.

"Improved Radiating Element for Use in a Glide Path Image-type Array" (AD 691 189), describes a new low-cost ILS glide path antenna and concludes that the antenna, which consists of a single radiating element over a reflector, has a number of desirable features, including high reliability and insensitivity to weather conditions.

Copies of the studies are available from the Clearinghouse for Federal Scientific and Technical Information, 5285 Port Royal Road, Springfield, Va. 22151. List title, "AD" number and enclose $3.00 check or money order for hard copy volume or 65 cents for microfiche copy, made payable to the Clearinghouse.

FAA technician Eric Hess monitors vacuum test equipment during studies of digital altimeters carried out at the National Aviation Facilities Experimental Center. (NAFEC).

Hourly Flight Quota Extension At Major Airports

The Federal Aviation Administration will extend until Oct. 25, 1970 the hourly flight quotas which have been in effect at five high density airports since June 1, 1969.

The five airports affected by the flight quota rule are Chicago O'Hare, Washington National, Kennedy, LaGuardia, and Newark.

Secretary of Transportation John A. Volpe believes the quota system has not only relieved congestion and reduced delays at these airports but has also benefitted other airports, since the five high density airports no longer act as bottlenecks in the air transportation system.

The effectiveness of the quota system is demonstrated by an analysis of air traffic during June, July, August and September which shows total delays at the five airports declined about 25 per cent over the previous year, while operations were off only five per cent. In September alone, total operations were down only two per cent but the number of aircraft delayed was down by more than 40 per cent.

The rule now in effect (and which will be continued) sets the following limits on hourly IFR operations at the five high density airports:

Washington National—60 (40 air carrier, 10 air taxi, 10 other)

Chicago O'Hare—135 (115 air carrier, 10 air taxi, 10 other)

Newark—60 (40 air carrier, 10 air taxi, 10 other)

LaGuardia—60 (48 air carrier, 6 air taxi, 6 other)

Kennedy—5 to 8 pm peak—90 (80 air carrier, 5 air taxi, 5 other) Other hours—80 (70 air carrier, 5 air taxi, 5 other).

Holding Patterns Now Printed On High, Low Level IFR Charts

New IFR navigation charts now being issued contain aircraft holding patterns. The innovation, which went into effect on charts dated Nov. 13, 1969, is designed to reduce pilot/controller radio communication just as publication of standard instrument departures (SID) for some airports has reduced communications.

The holding patterns will appear on both U. S. Government and commercial charts and will be printed on both high and low level IFR charts and appropriate area charts.

To avoid clutter on the charts, only those holding patterns which are used consistently by air traffic control will be shown. Both standard and non-standard patterns will be shown.

FAA recommends the following procedures for pilots using the new charts:

1. When holding at fixes with charted patterns, fly the pattern as shown, unless otherwise advised by Air Traffic Control.

2. If no clearance beyond the fix is received before arrival, and the holding pattern is charted, maintain the last assigned altitude and begin holding in the pattern shown. (When an aircraft approaches a fix which does not have a charted pattern, ATC will normally continue the current practice of issuing instructions at least five minutes before estimated arrival at the clearance limit.)

3. If no clearance beyond the fix is received for a non-charted pattern before arrival, pilots should hold in a standard pattern on the course on which the fix is approached.

In case of any doubt about procedures, pilots should request instructions from ATC. Note that none of the specified procedures supersede those already published for two-way radio failure.

Racetrack ovals on new U.S. Government and commercial high and low level IFR charts show pilots exact holding pattern.

FORUM

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.

• Transponder Costs

I agree 100 per cent with the article on transponders "The Equalizer" in the October 1969 FAA AVIATION NEWS and I feel that every aircraft should have one on board. A major deterrent, however, is the price.

Why doesn't the Federal Government (which I am sure is concerned with air safety) allow 100 per cent tax benefits to any aircraft owner on the purchase of a reasonably priced transponder?

Philip F. Margo
Brooklyn, N. Y.

FAA has no authority to grant such benefits.

• Prop Tips

I am constantly asking line personnel at airports not to push or pull my Cessna 182 by the blades of the propeller. I quote McCauley's "Ten Commandments of Propeller Care," particularly the fourth one which states "Don't use propeller blades as handles," but this doesn't seem to have much effect.

I wish that through *Flight Forum* you could advise all pilots and ground personnel that handling the propeller in such a manner is destructive to the gaskets. Does FAA concur?

Emmette T. Gatewood, Jr.
Saratoga, Calif.

Exerting force, such as pushing and pulling, on a propeller blade is indeed detrimental to the whole propeller assembly. In the case of your Cessna 182 this could put pressure on the "O" ring, deforming it and allowing grease to escape, with possible lack of lubrication resulting.

Pushing or pulling on the propeller blade also could preload the bearings in the hub housing, causing stress, and possibly pocking of the bearing race. Used in this way, the blade is a long lever, capable of exerting great force and severe damage. It is also a potential cleaver.

• Higher Education

I have been advised that an organization of women pilots called the "Whirley Girls" offers a scholarship leading to a helicopter rating. Can you tell me if there are any other organizations, public or private, offering some type of scholarship leading to advanced ratings on a pilot's license, such as an instrument or a multi-engine rating?

Sophie Jonke
Selden, N. Y.

The Ninety-Nines, Inc., Will Rogers International Airport, Oklahoma City, Okla. 73159, sponsors the Amelia Earhart Memorial Scholar Fund. This covers advanced ratings but eligibility is restricted to its own membership on a competitive basis.

The Office of Education, Department of Health, Education, and Welfare, administers the Vocational Loan Program. Under this program interested persons can borrow up to $7,500 in installments of $1,500 per academic year (nine months). Flight training is approved for this program, although the brochure describing the program does not specifically state this.

• Vintage Volume

Where can I obtain a copy of former Department of Commerce Handbook #7, which I believe was issued in the early '30s as a guide to compliance with rules and regulations pertaining to aviation maintenance? It was similar to the CAM #18 and FAR Part 43.13.1.

O. L. Malpass
Rt. #4, Box 231
Wilmington, N. C. 28401

A single copy of Civil Aeronautics Bulletin #7 "Airworthiness Requirements for Aircraft" is on file in the Library Services Division HQ-600, Federal Aviation Administration, 800 Independence Ave., Washington, D. C. 20590. Zerox copies are available at 50 cents per page. This could be an expensive proposition since Bulletin #7 has eight subsections, from "a" through "h" and the basic part has more than 100 pages. Perhaps a reader of FAA AVIATION NEWS, might have an extra copy.

• Locating Beacon Locators

I am interested in getting a crash locator beacon for our clinic airplane. Do you have information or reprints available on the general features that are desirable such as frequencies, range, type of mounting, power source, etc.? If so, would you please send this information on to me?

T. W. Jensen, M.D.
Safford, Ariz.

FAA specifications for crash locator beacons are contained in Advisory Circular AC 91-19, "Emergency Locator Beacons—Crash, Survival, Personnel." A copy has been sent to you.

Performance characteristics and other specific information may be obtained from the manufacturers whose addresses are found in commercial aviation publications.

• Instruction Abroad

While I was a student in Finland I took some dual instruction in a Cessna 150 and a Piper Cherokee 140 from a flight instructor certificated by the Finnish Government. I've been told this dual time will not be credited toward my private ticket because I did not perform it under an FAA-certificated instructor.

FAA will accept foreign solo time, and will supply persons who have a foreign license with a U. S. pilot's certificate. Doesn't it sound a little unreasonable of FAA to allow foreign-certificated pilots to fly our airways without being tested but not to give a U.S. student credit for his dual time under a foreign instructor?

Thomas P. Moore
Boston, Mass.

Your dual time is creditable. Paragraph 61.22(b) of the FARs provides for crediting of flight instruction received from a flight instructor who is authorized to give that flight instruction by the licensing authority of a foreign state contracting to the Convention on International Civil Aviation, if that flight instruction is given outside the United States.

Because Finland is a member of ICAO, instruction received in Finland from an authorized Finnish flight instructor may be credited toward the experience requirements of FAR 61.85(a) for a private pilot certificate.

• Licensing 2nd Hand Birds

I believe a little bit of clarification is in order relative to your article "Secondhand Birds" in the October 1969 AVIATION NEWS. I have reference to the next to last paragraph.

When completing an Application for Registration (FAA Form 8050-1), the new owner should forward the *original* and the *green* copy of this form and the original bill of sale to the Aircraft Registration Branch, Oklahoma City, Okla. 73125, along with a $5.00 registration fee. The new owner must retain the *pink* copy of the application for registration in the aircraft. The pink copy authorizes 90 days of flying time, pending receipt of the permanent Certificate of Registration (FAA Form 8050-3) which is issued by FAA.

George J. Harlow
FAA Aeronautical Center
Oklahoma City, Okla.

• Smith on Smith

The article on Leslie Irvin in the August 1969 FAA AVIATION NEWS "Sky High Irvin's Winning Dive" was incorrect in one important detail. The parachute used by Irvin was developed and patented by Floyd Smith, not Irvin.

Irvin was working for Smith at the time of the Army demonstration. Irvin admitted this himself, in a court hearing, when he testified that he had used Floyd Smith's 'chute and that, to the best of his knowledge, there were no workable, manually operated parachutes in existence prior to the one developed by Floyd Smith.

Leland Floyd Smith
Portland, Ore.

Leslie Irvin

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D. C. 20590

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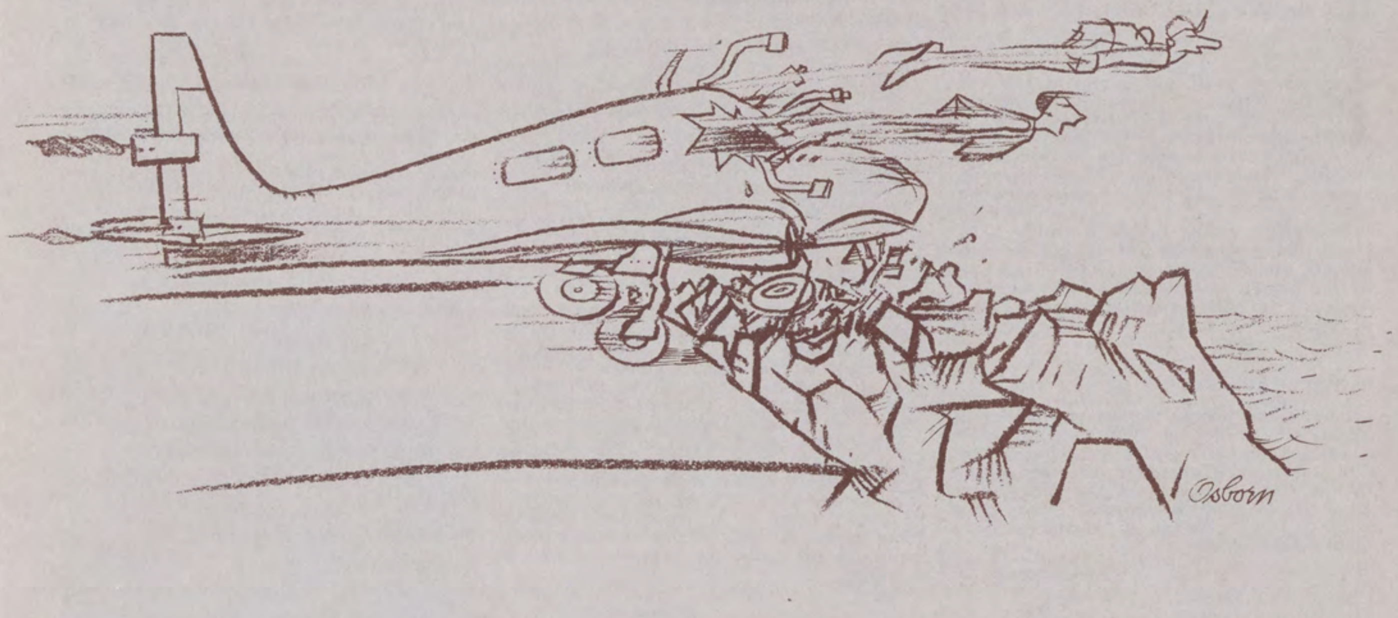
Preflight the plane? That's a laugh



Now it's on their epitaph

Suggested by Louis J. Rauch
IFSS Anchorage, Alaska