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AUG. 24, 1953

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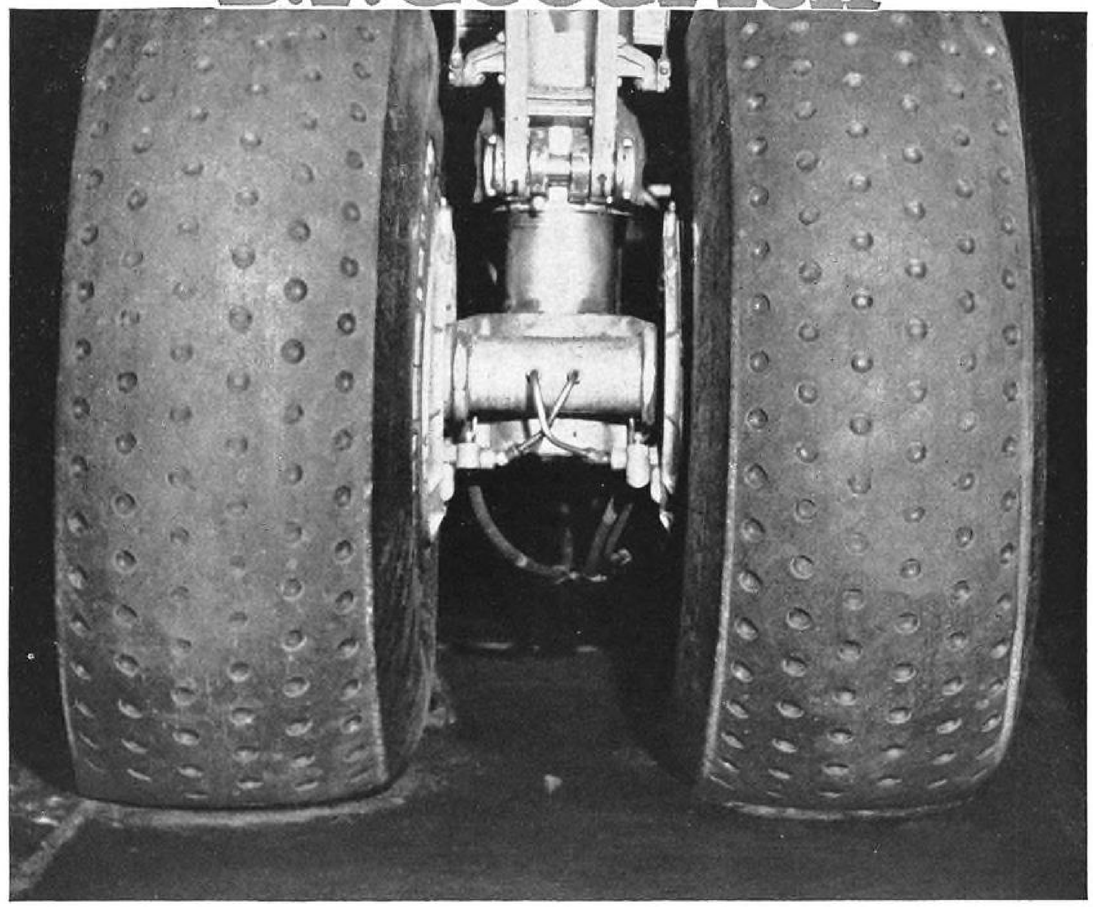

New B.F.Goodrich tire gives up to 27% more landings

RESULTS are now coming in from still another airline testing the B. F. Goodrich dimpled tire versus standard airplane tires of other makes. They indicate the new BFG tire gives up to 27% more landings per tire.

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Aviation Week

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Table of Contents on Page 8

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NEWS DIGEST

Domestic

Boeing's jet transport, the sweptwing Model 707 (AVIATION WEEK June 29, p. 12), may be in operation by 1955, Civil Aeronautics Administrator Fred B. Lee said last week.

Aviation industry should act now to set up a single grade of fuel for commercial jet liners to help keep operating costs at a minimum, warns A. R. Ogston of Esso Export Corp. He says, "Multiplicity of fuel grades has been a problem which has beset piston-engined aircraft and has undoubtedly resulted in increased cost of distribution."

USAF pilot last week poured part of a salad oil cargo into a C-46's faulty hydraulic system to build up sufficient pressure to force the transport's stuck wheel from its well. Action avoided a night crash landing at Seoul, Korea.

Robert E. Gross, president of Lockheed Aircraft Corp., last week was appointed to a 12-man committee formed by Defense Secretary Charles E. Wilson to review and modernize financial procedure of the "biggest business in the world"—the Defense Department.

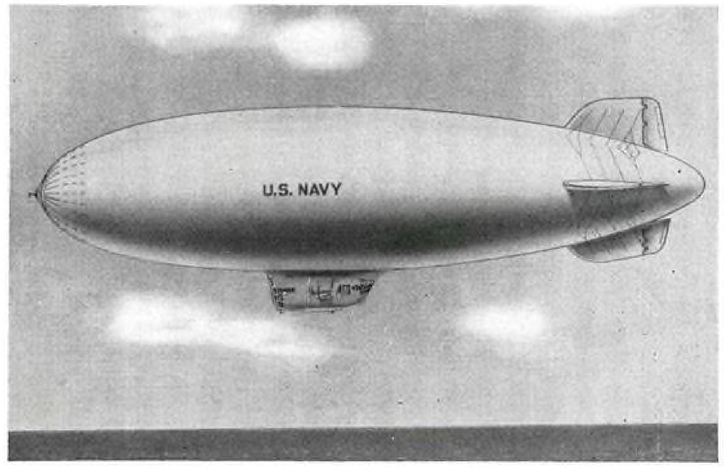
Mooney Model 20, new four-place personal aircraft, successfully completed first flight tests Aug. 10 at Kerrville, Tex. The Scotsman is powered by a 145-hp. Continental engine, and designed to cruise at better than 160 mph., climb more than 1,000 ft. per min., and land at 45 mph. under fully loaded conditions.

CAB investigators have turned up no conclusive evidence to determine the cause of a Transocean Air Lines crash that killed 58 persons July 12 off Wake Island. They will take technical clues to Washington, D. C., for further study.

Northrop Aircraft is developing the XB-62 Snark pilotless bomber (AVIATION WEEK Mar. 23, p. 10) at Hawthorne, Calif., USAF officially revealed last week. The Snark is powered by an Allison turbojet engine and is being flight tested at AF's long-range missile test range, Cocoa, Fla.

Seven C-124s flew a record 1,680 passengers Aug. 18 on USAF's Korean airlift Tokyo-Seoul.

Capt. Eddie Rickenbacker, chairman and chief executive officer of Eastern Air Lines, will deliver the principal address at a safety forum Sept. 8 at Dayton, Ohio, in connection with the National Air Show.



Navy Getting New Blimp

Artist's conception of new Goodyear ZP4K nonrigid airship now under construction for the Navy at Akron, Ohio. An undisclosed number of the craft, designed for anti-sub warfare, are being built. Powered by two P&WA R1340 engines, the ZP4Ks will be able to cruise at approximately 65 knots. They will have neoprene-coated cotton envelopes having a capacity of 527,000 cu. ft. of helium gas. Crew will consist of eight officers and enlisted men. A noteworthy feature of the craft will be their three-blade hollow-steel Curtiss "Beta" props of 11 ft. 6 in. diameter. They will incorporate a control system permitting use of one lever for forward, hovering and reverse thrust.

Maj. Gen. Walter G. Bain, Director of Procurement and Production for Air Materiel Command, is returning to inactive duty Aug. 28, four months after he was promoted to the AMC post. He will be succeeded by Maj. Gen. David H. Baker, AMC Controller.

U. S. lightplane exports in July totaled 69 aircraft valued at $509,589, bringing the total so far this year to 313 units at $2,301,591, Aircraft Industries Assn. reports.

VHF omnirange facility will be operated by CAA at New York's Idlewild International Airport under a one-year license granted by the Port of New York Authority. Installation will be located 850 ft. southwest of Runway 1-19.

Financial

United Aircraft Corp., East Hartford, Conn., reports net income for the first half of this year totaled $12,330,314, an increase of $4,729,995 over the same period of 1952. Total shipments were $408,574,280, compared with $323,691,593 last year. Backlog and letters of intent: $1.6 billion.

Kellett Aircraft Corp., Camden, N. J., reports net profit of $119,413 during the first six months of 1953, compared with $80,946 the first half of last year. Sales increased approximately $200,000 over 1952.

Ryan Aeronautical Co., San Diego, has declared a regular quarterly dividend of 10 cents per share of common capital stock, payable Sept. 11 to stockholders of Aug. 21.

International

British aircraft exports totaled a record $19.6 million last June, $4.2 million more than the previous high of $15.4 million in May.

Israeli Airlines has received permission from occupation powers in Austria to operate a Tel Aviv-Vienna service, is expected to begin flying the new route this week.

Philippine Air Force has set up a research and development board to study production of gliders and aircraft spare parts from materials available on the islands. The board also will investigate the use of alcohols as aircraft fuel.

The Aviation Week

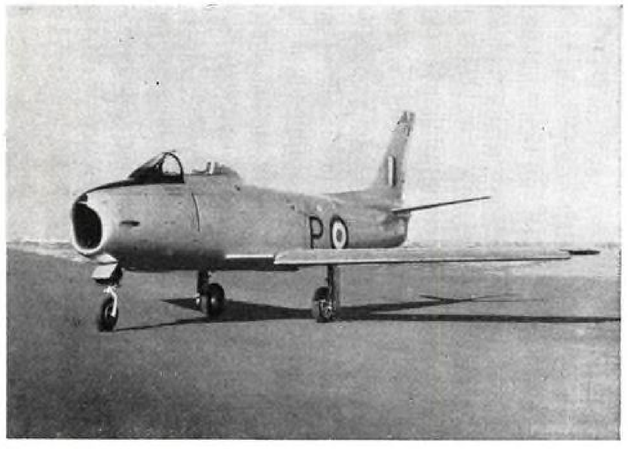
August 24, 1953

Picture Credits

7—Goodyear; 9—(top) U. S. Navy. (lower left) North American, (lower right) Saab; 15—CAA; 16—U. S. Navy: 17, 18—Lockheed.

New Military Jet Aircraft Undergo Flight Tests

JET ESCORT FOR REGULUS—Chance Vought Regulus Navy missile opens its braking chute shortly after being guided to a landing by Lockheed TV-2 mother plane (center). At right is a McDonnell F2H-2P Banshee which photographs the missile's flight from takeoff to landing. Use of retractable landing gear makes possible important economies in testing missile's characteristics.



AVON-POWERED SABRE—Australian-assembled F-86E with Rolls-Royce Avon in place of GE J47 is being tested near Melbourne. Note modified air intake for new engine.

NEW PHOTO PLANE—Swedish Saab S.29C is photo version of J.29A fighter. It carries cameras in lower portion of nose. Pylon-mounted tanks increase range.

WHO'S WHERE

In the Front Office

A. V. Leslie, former vice president-treasurer of Trans World Airlines, will return to the carrier Sept. 15 as vice president-finance and treasurer. **Erle Constable** has resigned as TWA treasurer, effective the same date, to join Glenn L. Martin Co., Baltimore.

Gordon S. Light is new staff engineer to the president of Engineering & Research Corp., Riverdale, Md.

Changes

Rollin M. Russell has become manager of Continental Aviation & Engineering Corp.'s Turbine Div., Detroit.

Joseph M. Mergen has been appointed chief propeller engineer in charge of Curtiss-Wright Corp.'s new propeller engineering section of the Propeller Div., Caldwell, N. J. Other changes: **Lee H. Wurster,** chief propeller design engineer; **Donald R. Woolf,** chief development engineer; **John L. Hall,** project engineer in charge of the turbo-jet control section; **Foster B. Stullen,** chief technical engineer; **Henry V. Borst,** staff engineer-aerodynamics; **William F. Meyer,** staff engineer-structures; **Jack H. Kasley,** chief preliminary design engineer; **William E. Bates,** chief blade designer engineer, and **John B. Reese,** project engineer-special assignments.

Gordon Israel is new chief aircraft engineer for Lear, Inc., Los Angeles.

Nicholas M. Stefano has joined American Helicopter Co., Manhattan Beach, Calif., as chief engineer.

William M. Steffen has been appointed general supervisor of materials and process engineering for Northrop Aircraft, Hawthorne, Calif.

J. W. S. Brancker is new traffic director of the International Air Transport Assn.

Clyde McKinley has become director of research for Air Products, Allentown, Pa.

T. W. Cummins has been appointed operations manager of Northwest Orient Airlines. Also promoted: **Russell G. Collins,** sales manager; **M. A. Kennedy,** personnel manager; **George E. Masters,** public relations manager; **R. W. Chambers,** properties manager, and **K. G. Schultz,** budget manager.

C. William Laubin has joined Nagler Helicopter Co., New York, as project engineer.

Luke L. Hilliard has been named communications director for Allegheny Airlines.

Harlan S. Hosler has been named sales manager of Parsons Corp.'s Aircraft Div., Traverse City, Mich.

Honors and Elections

O. L. Morrow, president of Meteor Air Transport, has been elected 2nd vice president and director of Aircoach Transport Assn., succeeding **Philip Mann** of American Air Transport, who resigned recently. **Hamlin B. Johnston** is ACTA's new executive director, and **A. J. Rome** has been promoted to general manager.

INDUSTRY OBSERVER

►**First flights of a Russian flying-boat fighter have been reported by observers behind the Iron Curtain. The plane is reminiscent of the British Saunders-Roe designs of a few years back. Moderate sweep back and a high T-tail are recognition features. Hull is double-stepped; jet intakes are behind and below high forward cockpit position. First flight was in June at Magadan, center of Red naval aviation.**

►Red night-fighter group equipped with MiG-17s has been moved from Merseburg (AVIATION WEEK May 4, p. 11). The late-model MiGs had two axial-flow turbojets similar to those in the IL-28. The fuselage was about 4 ft. longer than the MiG-15; a double nosewheel was used, and the landing gear was very short. Four cannon, probably about 23mm., were the armament.

►**Although both Westinghouse and the Navy are playing their cards close to the belt, there are indications that the Rolls-Royce R.A.14 Avon which recently passed its type test at 9,500 lb. thrust will be built in the U.S. as part of the recently announced Rolls-Westinghouse technical agreement. Navy badly needs a high-powered jet engine for its next generation of fighters and attack planes.**

►Arnold Engineering Development Center at Tullahoma, Tenn., is scheduled to begin calibration runs on the test cells in its engine test facility next month.

►**One CAA theory being investigated on the power loss which led to the crash of the experimental AG-1 agricultural plane is that iron or rust particles in the fuel tank may have clogged fuel flow or affected the sparkplugs. A magnetic test disclosed the presence of such particles in the dust near the airplane.**

►Problems of helicopter blade deicing are complicated by the fact that mechanical deicers such as flexing "boots" cannot be used. They alter the blade section too critically. Trend is toward blade flexibility, and probably hot air deicing through the blades with air temperatures of about 300 deg., the ATA helicopter committee learned in its recent survey of Sikorsky and Piasecki plants.

►**New Air Force proposals regarding the four-engine Boeing B-47C involve substitution of the Pratt & Whitney J57 for the Allison J71 originally scheduled for the bomber. Air Force and Boeing are both reported pleased with the performance of the J57 in the bigger Boeing B-52, and see advantages to using the same powerplants in both planes.**

►Temco's proposed Mamba turboprop executive transport (AVIATION WEEK June 1, p. 16), still a paper design, would cruise at about 300 mph. with a range of approximately 1,400 mi., according to preliminary design figures. Objective of the range is to make it a one-stop coast-to-coast airplane. Design includes pressurized cabin for operation at 30,000 ft. with 6,500 lb. useful load, including 4,000 lb. for fuel.

►**Proposal for a test heliport being examined by Air Transport Assn. helicopter committee provides for five helicopter loading gates and a technique under which the copters will "taxi in the air," land in one minute. Under such a technique, it is expected the copters can complete the cycle of landing, unloading, loading, engine check and takeoff in 12 minutes. Thus the five gates could handle 25 arrivals and departures an hour.**

►Atomic Energy Commission reports that military requirements for an atomic aircraft propulsion reactor have been modified and the program has been revised. However, construction contracts totaling $5.5 million have been let for test facilities in Idaho and at Oak Ridge laboratory for the aircraft reactor development program, and development work continues at General Electric's Evendale, Ohio, plant and at Oak Ridge. Meanwhile, another contract was signed in June for aircraft propulsion development at Pratt & Whitney Division of United Aircraft Corp.

Washington Roundup

Big Decisions Soon

New major decisions that will set the future course of the defense program will be out soon. This is the outlook now:

• **The Joint Chiefs of Staff** will complete their review of strategy and force levels approximately the third week of September. They are not starting from scratch, but accepting most of the basic decisions of the 1948 Key West blueprint—for example, the assignment of strategic air as the primary mission of the Air Force—and up-dating them.

Decisions in the guided missile field, however, might have a major effect on the roles and missions of the services—and are sure to be hotly argued. Service conflicts will be decided by Defense Secretary Charles Wilson. Major controversies, as in the guided missile field, probably will go to National Security Council for final decision.

• **The National Security Council** will take up the new strategic plan and set a tentative ceiling for the fiscal 1955 defense budget some time before the end of September.

• **By the beginning of October,** Defense Department's comptroller, Assistant Secretary W. J. McNeil, expects to start moving on the coming-year budget. The services already have done preliminary work.

• **If the schedule is kept,** the fiscal 1955 budget, geared to the new JCS plan, should reach Congress on time next January.

Army vs. Air Force

The conflict between USAF and Army over guided missile jurisdiction may break into open warfare—the bitterest since 1948's USAF-Navy fight over strategic air. But the top defense command is expecting USAF's Chief of Staff, Gen. Nathan Twining, and Army's Chief of Staff, Gen. Matthew Ridgway to play with the "team," and see to it that their services do.

Army's guided missile program is not only cutting into USAF's air defense role, but its "family" of six surface-to-surface missiles would cut into Air Force tactical and interdiction missions. Navy, so far, is on the rim of the fighting.

Procurement Money Prospects

Defense Comptroller McNeil makes these two reports:

• If the JCS endorse a 143-wing USAF, it is a "question" whether aircraft procurement funds in fiscal 1955 will rise much above the fiscal 1954 level of $4.9 billion, but there would be a substantial increase in fiscal 1956.

• It will be another year or two before there is any great increase in funds for guided missiles. Since the Korean outbreak in mid-1950, $4.5 billion has been made available for guided missile programs—research, facilities, and some production. Of this amount, $3.7 billion is committed and $800 million now remains on hand for obligating.

• Army, meanwhile, says it will go ahead with a $146-million aircraft procurement program this year. Army's procurement money was cut $170 million by Congress, but it isn't planned to apply any of the cut to the aircraft program.

New Key Men

• **Frank D. Newbury,** Assistant Secretary of Defense for Applications Engineering, is expected to emerge as the new key man in the guided missile picture. K. T. Keller, director of guided missiles, is expected to be phased out. Newbury will make recommendations on what missiles are to go into production—and when. And as an engineer, he was vice president and board member of Westinghouse Electric Corp. before retirement in 1946.

• **Charles Sparks Thomas,** Assistant Secretary for Logistics and Supply, will scrutinize the USAF and Naval Aviation procurement budgets for the coming fiscal year, before they go to the comptroller's office for review. In the past, clearance by the Munitions Board, with all three services represented, has been no more than routine motion.

• **Donald Quarles,** Assistant Secretary for Research and Development, similarly will pass on the aviation research and development budgets instead of the now defunct Research and Development Board.

Obsolescent: When?

Under heavy congressional pressure, Defense Secretary Wilson is expected to come up with a new yardstick for determining aircraft obsolescence—or try to. Former Secretary Robert Lovett made the attempt but was unsuccessful.

Air Force now sets standard periods—three years for fighters, five for bombers, seven for transports. Navy, however, gears obsolescence to the status of enemy progress. Phasing out of planes under the Navy system requires more time. However, it is much more popular politically because it results in greater savings of procurement money.

R & D Outlook

Here are future trends in Air Force's research and development program:

• Air Force special assistant Trevor Gardner has made little headway in selling top defense officials on sharply stepping up research and development as procurement drops off.

• Deputy Secretary Roger Kyes is showing more receptiveness toward research. When Congress trimmed $35 million off the $475 million requested for R and D, Kyes applied the trim to 25% of the total request his office withheld pending a review of the program. Now the withhold order has been rescinded and USAF has been given the green light to program the full $440 million appropriated by Congress.

• Selectivity will be the by-word in the program. There will be more emphasis placed on fewer projects, rather than spreading the emphasis over broad number of alternative projects.

• Tactical aviation and SAC projects will take the large brunt of the cuts. Air defense has top priority in the program.

• There is little likelihood the atomic aircraft project will be revived. Air Force's top civilian and military command recommended the cancelation to the Secretary of Defense, and there were few dissents in USAF down the line.

—Katherine Johnsen

AVIATION WEEK VOL. 59, NO. 8 AUGUST 24, 1953

ATA Committee Forecasts:

Big Copters May Replace DC-3s by '59

- **New airline trend is toward acceptance of rotary-wing aircraft as the shorthaul, inter-city transport.**
- **And the commercial air bus development is keyed to the S-56 and XH-16 as possible prototypes.**

By Alexander McSurely

Only six years away is the prospect of fleets of 30- to 50-passenger helicopter buses competing directly with surface carriers for shorthaul inter-city public transportation.

That is the outlook projected last week by the Air Transport Assn.'s helicopter committee in a significant report, which fits together today's known copter factors with tomorrow's probabilities.

▶**Two Prototypes**—Key to the forecast is the fact that two large twin-engine copters, possible prototypes for such commercial air buses, are nearing completion at Piasecki Helicopter Corp. and Sikorsky Div. of United Aircraft Corp.

The ATA committee expects commercial helicopter transports, developed from these or similar military prototypes, to build up operational experience and establish a sound foundation for future improved designs.

The copters will fly local scheduled operation, feeding to trunkline stations for transfer to long-range aircraft. This stage is predicted within 15 years.

Much significance of the ATA report lies in the fact that it represents the thinking of most of the principal U. S. air carriers with local service potentials, airlines that have been strictly fixed-wing aircraft operators in the past except for a Eastern Air Lines' brief experimental autogiro airmail route.

▶**New Philosophy**—Airline acceptance of the rotary-wing direct lift aircraft in place of the fixed-wing transport for local service operation still is preliminary.

But the new trend is toward writing a death warrant for fixed-wing feeder transports. This probably is at least a partial explanation for the lack of enthusiasm that most fixed-wing aircraft manufacturers have shown toward post-war development of a feeder transport to replace the aging Douglas DC-3.

"The helicopter has two major advantages: To operate from smaller terminal areas than fixed-wing aircraft and to fly at very low speeds," the report says. "These will permit air transportation to expand into fields where the airplane cannot now compete."

▶**Costs No Greater**—The committee says the helicopter bus can be integrated into local schedules within the next decade at an overall cost no greater than present day twin-engine aircraft and at fares adjusted to include ground transportation costs, so that the average passenger-mile fare will be no higher than first-class air tariffs of today.

▶**Sikorsky Design**—A commercial transport helicopter to be developed from the S-56, now nearing completion as a Marine and Army assault transport, is projected by Sikorsky, the ATA report discloses.

"This is a single five-blade rotor helicopter powered with two turbine engines. Powerplants are mounted in nacelles at the outboard end of stub wings located above the fuselage. Landing gear is retractable. Rotor system and blades are fully de-iced. A single tail rotor and horizontal stabilizer provide directional control and longitudinal stability. Payload capacity is 10,000 lb. for 200-mi. range and, with a cabin seating 50 passengers, gross weight is expected to be about 34,000 lb.," the report says.

"Performance is estimated as follows: Cruising speed, approximately 160 mph.; vertical all-engine rate of climb, sea level, approximately 2,000 ft. per min.; minimum flight speed with one engine inoperative, 25 mph."

In the absence of a sales tag on this design, the committee calculates from the $140,000 price of the present S-55 that production cost of the new transport will be $550,000 to $600,000.

The report says Sikorsky is committed to the single-rotor philosophy using a larger number of blades—even greater than five if necessary. It is the company's view that the single-rotor system is 15% lighter than the dual or tandem-rotor and far less complicated.

▶**Power Required**—Power requirements for maximum safety are set at approximately 100 hp. of takeoff power per passenger, about the same as for fixed-wing aircraft.

By partially unloading rotor blades with stub wings, helicopter speed will be increased. Cruising speed of 200

ATA Committee Compares Copter vs. Fixed-Wing Transport

	Airplane	Helicopter	
	Now	Now	Foreseable Future
Minimum speed	75 mph.	0 mph.	0 mph.
Maximum speed	600 mph. plus	120 mph.	200 mph.
Takeoff and landing area, length	7,000 ft.	150 ft.	300-400 ft.
Max. climb gradient, all engines	Approx. 5 deg.	90 deg.	90 deg.
Max. climb gradient, one engine inoperative	1.45 deg.	—11.0 deg.	2.2 deg.
Stability	Good	Not yet satisfactory	Expected to be satisfactory
Maneuverability	Limited	Exceptionally good	Exceptionally good
Instrument flight characteristics	Good 10 mph. above stall speed	Unsatisfactory	Satisfactory above 40 mph.
Approach speeds	Stall speed plus 10 mph.	60 mph.	40 mph.

mph. should be attained eventually.

► **Turbine Advantages**—Three reasons for advantages of the turbine powerplant for helicopters are cited as:

- **Lighter weight.**
- **Less vibration.**
- **Constant rpm.** for maximum rotor efficiency.

► **New Piasecki Development**—Piasecki's commercial transport development will be an offspring of the second Piasecki XH-16.

The commercial copter will be designed to be powered by two turbine engines, Allison T-38s or T-56s or similar powerplants. The report says the first XH-16, powered by two Pratt & Whitney R2180 engines, "appears to be underpowered for its size."

It is expected that the first XH-16 will carry 30 to 40 passengers, but the turbine-powered commercial version is expected to carry 50 in a high-density version.

The committee reports the following basic specifications for the commercial Piasecki: Gross weight, 45,000 lb.; payload, 10,500 lb. with 200-nautical mi. range and 40-min. reserve; cruising speed, 130 knots.

► **1959 Delivery**—The second XH-16 prototype with turbines will be flying within 18 months. With two years "for testing, tooling and getting production rolling," the committee expects available airline fleet delivery date will be sometime in 1959—granting priority to initial military orders.

The report points out that all Piasecki helicopters to date are used only in military operation and that total flight time of Piasecki helicopters so far is approximately 38,000 hr., with a maximum of about 1,400 hr. on any individual Piasecki machine.

Availability of powerplants is expected to be the main governing factor in payload. Advent of the turbines depends on the rate of progress of development of these powerplants in reliability.

In the interim, the report suggests Pratt & Whitney's standard airline engine, the R2800, as "about right for a 30- to 40-passenger helicopter." Indications are that 50-passenger helicopter carriers will await the turbine powerplants.

► **Copter Standards**—Here are proposed requirements for transport helicopters as seen by the committee:

- **Size.** If any helicopter used by the scheduled airlines is to replace currently used twin-engine equipment for local schedule operation and extension of services to other smaller cities, any size less than 30 to 40 passengers—and perhaps not more than 40 to 50—should not be contemplated.

Thus, the design payload will not be less than 6,000 nor more than 10,000 lb., size of the average interurban bus.

- **Range.** It must have minimum range of 250 to 300 mi. with maximum payload and one-half hour fuel reserve. Fuel reserve yardstick for fixed-wing aircraft does not apply because of the low landing speeds of the helicopter.
- **Speed.** Cruising speed should be as high as possible, because direct flight costs are directly proportional to cruising speed. A minimum is considered to be 160 mph. at conservative cruising powers. This is feasible today and can be exceeded readily.
- **Flight safety.** In view of the greater frequency of takeoffs and landings when compared to fixed-wing aircraft, the helicopter must be able to operate safely with one engine inoperative at maximum gross weight.

Hovering with one engine should be possible immediately after takeoff during the critical ascent distance. Copter also should be able to descend with one engine inoperative without damaging the rotorcraft.

It must be an all-weather helicopter, able to furnish a type of service equal to or better than that now supplied by twin-engine, fixed-wing aircraft.

- **Cockpits.** Visibility, control arrangement, instrument design and location should be the subject of a specific study by a competent group that includes experienced helicopter pilots.
- **Cabin arrangement.** Helicopter interiors should be designed for light weight, minimum maintenance and high-seating capacity.
- **Noise level.** The noise level, external and internal, should not exceed a maximum of 75 decibels at takeoff power and maximum gross weight.
- **Operating costs.** Direct flight cost per mile should not exceed that of present twin-engine aircraft for a distance of 200 mi. between stops. This means that as distance between stops decreases, helicopter costs per seat-mile should be proportionately lower than those of fixed-wing aircraft.
- **Miscellaneous.** Transport helicopters should be absolutely independent from any external power source.

The report states that the committee is continuing study of:

- **Multi-engine** helicopter performance related to heliport size, configuration.
- **Instrument flight** techniques.
- **Evaluation** of specific direct flight costs and indirect operating costs.
- **Development** of communication, navigation and landing aids for helicopters.
- **Ground** handling.
- **Passenger** and baggage handling.

Air Force Cuts AMC Facilities

Economy move kills all air procurement districts and three regional offices, consolidates Olmsted AFB.

Air Force, in a new economy move, last week began cutting back its logistical arm, the Air Materiel Command.

All six air procurement districts are being eliminated, along with three AMC regional offices. The Air Materiel Area depot and Olmsted AFB Headquarters at Middletown, Pa., are being consolidated.

Air Force Undersecretary James H. Douglas gave this reason for the slash: "To reduce administrative overhead, bring procurement and production administration closer to supply and maintenance functions and provide more efficient operations under current programming."

► **Buying Methods Unchanged**—Douglas emphasized that the new measures will not affect USAF's buying methods or locations for buying. It merely rearranges the procurement system by absorbing the former procurement districts into the eight Air Materiel Areas of AMC.

Air Force decentralized its buying methods last year (AVIATION WEEK Apr. 21, 1952, p. 12).

► **Administration Shift**—Eliminated in the new program are: Eastern APD, New York; Northeastern APD, Boston; Central APD, Detroit; Mid-Central APD, Chicago; Southern APD, Fort Worth, Tex., and Western APD, Los Angeles.

Functions of these districts, which administer more than 14,000 Air Force contracts totaling $16.86 billion, will be transferred to the eight AMA headquarters. Air regional offices will report to AMAs rather than to district offices.

The eight Air Materiel Area headquarters are: Middletown AMA, Olmsted AFB, Pa.; Mobile AMA, Brookley AFB, Ala.; Warner Robins AMA, Robins AFB, Ga.; Oklahoma City AMA, Tinker AFB, Okla.; San Antonio AMA, Kelly AFB, Tex.; Ogden AMA, Hill AFB, Utah; Sacramento AMA, McCellan AFB, Calif.; and San Bernardino AMA, Norton AFB, Calif.

Another AMC cut will be elimination of three of the present 24 air regional offices. Cut are those at Glendale, Calif.; South Bend, Ind.; and Minneapolis, Minn., expected by Oct 1. The remaining 21 regional offices are to be redesignated procurement districts.

► **New Makeup**—Here are the regional offices and the materiel areas to which they are assigned:

Cleveland, Detroit, Dayton, Ottawa and Indianapolis are assigned to the Mobile AMA. Seattle and San Francisco are assigned to Sacramento AMA; Atlanta to Warner Robins; Boston, Newark, New York, Philadelphia and Rochester, N. Y., to Middletown; Chicago, Milwaukee, St. Louis and Wichita to Oklahoma City; Tucson, Ariz., Los Angeles and San Diego to San Bennardino; and Dallas to San Antonio.

► **Substantial Savings**—Lt. Gen E. W. Rawlings, AMC commander, stated: "We are proud of the fact that we have done this on our own. We have not been prodded into it by the Department of the Air Force: But I am glad to state that the office of the Secretary, Mr. (Harold E.) Talbott, and the Chief of Staff, Gen. Nathan F. Twining, have given it their enthusiastic approval.

"We have been making thorough studies of our operations and organization to comply with new Air Force programs. Consequently, we have come up with this plan which not only will result in substantial savings of taxpayers' dollars but actually will increase our efficiency."

Rawlings says it is not possible at present to place an accurate dollar saving estimate on the reorganization.

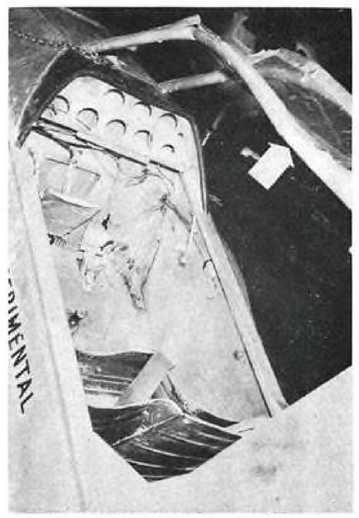
► **Contract Administration**—The 36 Air Force plant representatives, who assist in administration of more than $13 billion worth of Air Force contracts with large manufacturers, beginning in October will be responsible to the AMA already holding responsibility for maintenance, supply and spare parts computation for the contractor's specific types of aircraft.

With the new plan, all of those contracts will be administered by the Oklahoma City AMA and USAF representatives at all those plants will report to the Oklahoma City AMA commander.

AMC's reorganization is expected to be accomplished by Dec. 31.

AG-1 CRASHED in this inverted position, but because of plane's crash-safety features, pilot walked away uninjured. Arrow points to AG-1's left wing.

SHOULDER HARNESS kept pilot from being thrown about during crash.



OVERTURN RAILS (arrow) held up under the aircraft's impact.

Beech Names Three To Engineering Posts

Beech Aircraft Corp. has appointed three long-time employes to head up the company's reorganized engineering divisions, following the resignation of chief engineer Ted A. Wells:

- **Military projects,** A. S. Obevseff.
- **Commercial projects,** Herb Rawdon.
- **Administrative and statistical,** Dean Burleigh.

Beech's engineering section is reported to have been cut from 750 to 200 employes after cancelation of the T-36 project.

C. C. Pearson, vice president-manufacturing, has been elected to the Beech board of directors. Two new vice presidents also were named recently: James N. Lew, in charge of contract administration; Lynn D. Richardson, in charge of military sales.

Aviation Safety

AG-1 Crashes, Pilot Walks Away

A cart-wheeling, inverted airplane crash recently reduced Civil Aeronautics Administration's experimental AG-1 agricultural plane to a mass of wreckage.

But the accident near Lubbock, Tex., has provided the aviation industry with its most convincing demonstration of the effectiveness of engineering crash protection into the design of airplanes.

► **Walking Proof**—Living proof of the protective design theory is walking around Washington, D. C., on temporary assignment at CAA headquarters.

He is John Paul Jones, 44, safety agent from CAA's Ft. Worth Region who, unaided, climbed out of the intact "safety zone" of the airplane after it crashed inverted. His only injury was a sore thumb, bruised from pressing hard on the control stick.

"I am completely convinced," Jones said in his report, "that the specially designed cockpit and other safety features of this plane were responsible for the fact that I lived through the crash. It appears highly improbable that any other plane used for agricultural work could have been crashed as this one was without killing the pilot. And it appears beyond reason that such planes could have sustained this crash and left the pilot unhurt."

► **Design Credit**—Two men share the credit for the way crash-resistant features of the AG-1 passed this rigorous test.

They are Fred E. Weick, aeronau-

tics engineering professor at Texas A&M College who designed and supervised the building of the AG-1, and Hugh DeHaven, director of Cornell University's Crash Injury Research unit who consulted with Weick on protective features of the plane.

▶**Spur to Design**—Spurring their work was a long record of fatalities in crop control plane crashes. Aerial spraying, dusting and seeding are low flying operations.

In 1952, there were 49 fatal crashes in 376 crop control plane accidents. In 1951, CAA reported 53 fatal crashes out of 348 accidents during an estimated 700,000 hr. of crop control flying.

▶**Research Precept**—Keynote of Crash Injury Research program is this precept: If you can't prevent crashes, build the airplanes strong enough so occupants can walk away from accidents.

Here is how Weick and DeHaven applied this precept to the AG-1:

• **Cockpit structure** is designed to provide a 40G "island of safety" for the pilot and to remain intact in impacts up to 75 mph., normal cruising speed for the AG-1.

• **Turnover structure** behind the cockpit is higher than the pilot's head and includes strong tubular guard rails from this structure to the front of the open cockpit.

• **Cockpit** is located as far aft as possible (13 ft. from nose), high in the craft and over the rear portion of the wing, so that energy-absorbing structure is ahead of and below the pilot.

• **Forward structure** design calls for failure at progressive G-loads to absorb crash energy: engine mount at 15Gs and hopper-fuselage area at 25Gs, plus the cockpit protection.

• **Pilot seat** is designed for 40G stress and is fitted with military safety belt and integral two-strap shoulder harness with spring-loaded inertia reel.

The reel permits a pilot to move freely in the cockpit under normal conditions but locks automatically under loads of 3G or greater.

▶**Powerline Crash**—The crash took place about 5:25 pm. June 26, shortly after Jones had taken the plane off from a 1,600-ft. improvised landing strip at Texas Technological College near Lubbock. He was demonstrating plane to National Cotton Congress.

At the time, Jones had flown 200 hr. in the AG-1 out of a total of 684 hr. on the airplane in its two-and-a-half-year life span. He has a commercial license and 4,000 hr. flying time with wide experience as an instructor and in checkouts of many different types of aircraft.

Jones said he noticed a loss of power as he began making a climbing turn at about 60 ft. altitude. He nosed the plane down, pumped throttle and picked up additional power, thinking he would be able to clear the pole of a powerline nearby. Then the engine lost power again and, feeling that a crash was inevitable, Jones closed the throttle after swerving to the right so the fuselage would clear the pole.

▶**Cartwheel**—The left wing and spring steel gear were torn off by the pole. The plane traveled approximately 15 ft., and the right wing hit a heavy fence post made of a railroad tie. This threw the nose to the ground and the plane cartwheeled, landing inverted and sliding several feet upside down before coming to a stop.

▶**Power Loss**—Jones and CAA still are somewhat mystified by the power loss of the Continental E-225 engine. Jones said he did not hear the engine spit or backfire but said it seemed to quit producing power at the top of the climbing turn."

On July 27 at Ft. Worth, CAA mounted the battered fuselage on the back of a truck and replaced the McCaulley 1B-200 two-blade, fixed-pitch aluminum propeller, which was bent into a pretzel shape by the crash. Then they made a test run of the engine.

Test mechanics said they straightened a bent throttle control and cleaned carburetor air intake screens but made no other changes in existing conditions, except to spin the propeller to start it because the battery was out of the plane. The engine ran for 30 min. and appeared normal at all speeds.

▶**Detailed Plans**—CAA will sell the wreckage of the battered AG-1 to the highest bidder. It is doubtful if another plane exactly like it will be built.

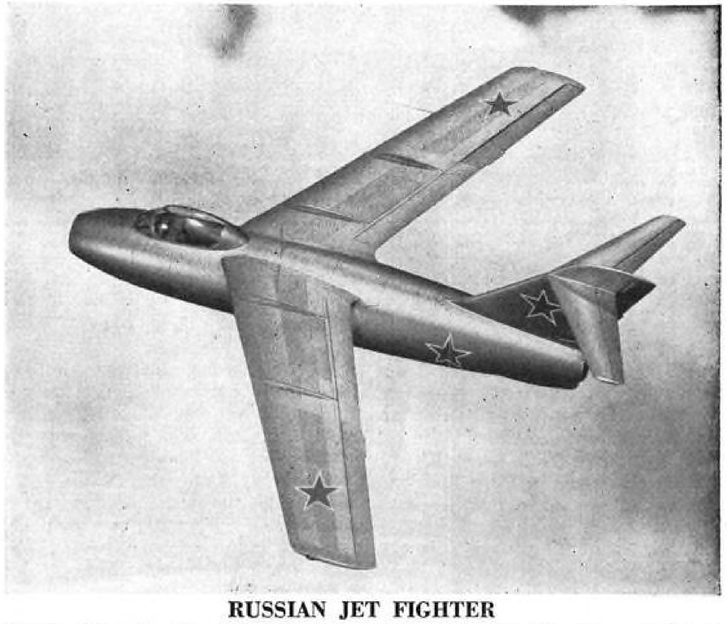
But CAA has made detailed sets of plans available to 14 individuals and firms in this country, and its safety features probably will turn up in other planes of the future.

Speed Flight Cost

Jacqueline Cochran's recent record speed flights at Edwards AFB., Calif., will cost Canadair, Ltd., $5,769.70.

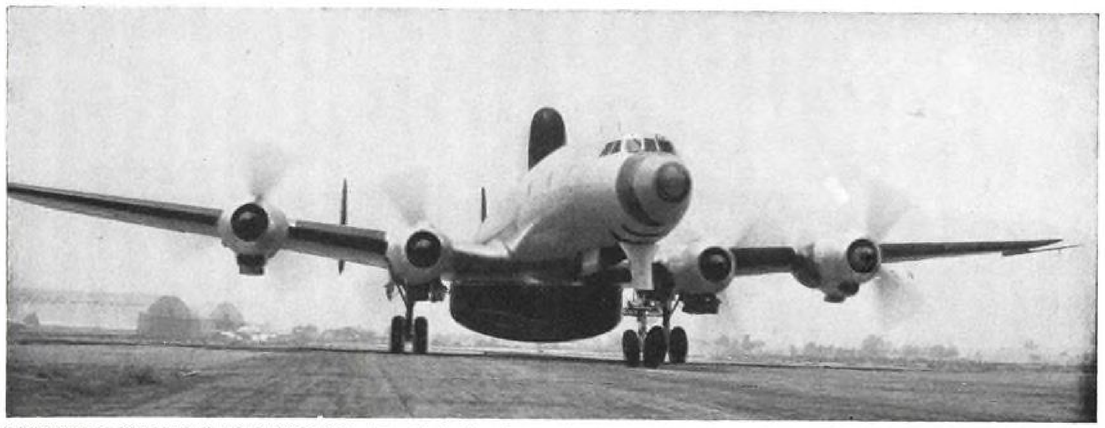
Air Force has billed the Canadian firm, of which Miss Cochran is an advisor, $2,521.45 for setting up the range, engineering expenses, data reduction, instrumentation and barograph studies. She set the records in a Canadair-built Orenda-powered F-86E Sabre jet.

During her training period in a T-33 and subsequent flights in the F-86E, 18,282 gal. of fuel were consumed, which will be billed to Canadair at $3,248.25.



RUSSIAN JET FIGHTER

This detailed model of what is believed to be the Russian Lavochkin LA-17 was built by the Navy's Special Devices Center, L. I., N. Y., after careful study of combat photos of the plane taken over Korea during the recent war. Because of its close similarity to the Rusisan-built MiG-15, the LA-17 was often mistaken for the other, more famous enemy fighter. Most important recognition feature distinguishing the two planes: the LA-17's wing is placed shoulder high; the MiG-15 is a low midwing craft. Note the dual wing fences on this model and the high aspect ratio swept wings.



LOCKHEED RC-121C RADAR PICKET, with wide belly radome plus one atop fuselage, presents odd aspect from this angle.

AF Orders Super Connie Radar Pickets

By William Coughlin

Burbank, Calif.—First official disclosure that USAF plans to supplement its continental defenses with "flying radar stations" comes this week with Lockheed Aircraft Corp.'s announcement of an Air Force production contract for high-altitude RC-121C picket planes, a military version of the Super Constellation transport.

Other manufacturers are known to be at work on similar types, indicating importance Air Force is attaching to airborne radar in its defense planning. Lockheed is first to announce a production contract, however.

▶**Shark's Fin Antenna**—Most details of the RC-121C remain under security wraps, but it is similar to the Navy's WV-2 version announced some time ago. WV-2 is successor to the WV-1, which Navy has been using to develop aerial radar searching for the past three years.

RC-121C will carry height-finding and search radar in bulging radomes that give it an unusual configuration:

• **A thin superstructure** rising 8-ft. from the top of the fuselage like a shark's fin houses the height-finding radar antenna.

• **A giant bowl-shaped radome,** hanging from the bottom of the aircraft like a huge bathtub, contains the airborne search radar antenna. Air Force has classified its exact size but Lockheed describes it as "probably the largest plastic part ever built." Zenith Plastics Co., Los Angeles, manufactures the radomes.

Stubby radio antennas down the spine of the fuselage add a saw-like touch to the top of the picket plane.

▶**Greater Range**—The RC-121C is jam-packed with more than six tons of complex avionics gear and accessories. Radar consoles on both sides of the center aisle are faced by swivel chairs in front of large radar scopes. Remaining area of what is the main cabin of the transport version is almost solid with electronic equipment.

The RC-121C will have greater range and endurance than the commercial Super Constellation, with tiptanks giving it added capacity for more than 20-hrs. of orbiting on station.

Engines are the same: four Wright 3,250-h.p. Turbo Compounds.

▶**Filling Fence Gaps**—USAF decision to purchase the picket planes was prompted by serious gaps left in U. S. radar fences by inability of ground-based stations to overcome line-of-sight radar limitations that allowed enemy aircraft to sneak in at low altitude.

Use of the RC-121C, designed to carry powerful search radar to high altitude, not only will increase chances of discovering low-flying enemy aircraft but can extend the range of U. S. detection facilities beyond the present capabilities of ground-based radar.

With sufficient quantities of picket planes continually replacing each other on station, a constant patrol of U. S.-based radar planes would be possible well beyond U. S. borders.

▶**Interceptor Guide**—The RC-121C also may be used as an airborne control center to guide interceptors to approaching enemy aircraft long before the "bogeys" are within range of ground stations.

The giant radar planes, with their vast array of electronics equipment, can direct jet interceptors to precise altitudes and locations in relation to approaching enemy aircraft, thus permitting a simplification of radar within the interceptor itself.

With three or more radar controllers scanning for enemy aircraft, each can concentrate on a different portion of the scope picture. Another controller may be assigned to simultaneous weather reconnaissance for guidance of the interceptors.

Large TV relay units can be used to transmit radarscope pictures from the picket plane to ground control stations. These TV transmitters also can relay a picture from a more distant plane to the ground station.

▶**Flexible Link**—The radar plane thus becomes an integral part of an air weapons system, which includes interceptors, a network of ground stations and the early-warning aircraft. This system can be linked to guided missile bases for further protection.

The picket plane will be equipped for electronic countermeasures and also will be able to track weather disturbances by radar.

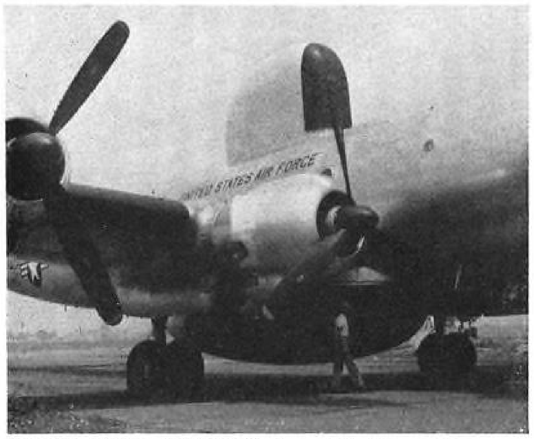
If enemy action puts a vital U. S. ground radar station out of commission, an RC-121C could be assigned to orbit in the area, thus quickly patching a hole in this country's breached radar defenses.

Under certain conditions, an RC-121C could serve to direct U. S. missiles or aircraft to enemy land targets, even through weather or darkness. The flying radar stations can spot surface as well as aerial targets. Navy uses its WV-2s far at sea primarily to protect U. S. surface fleets from surprise enemy attack, either aerial or surface.

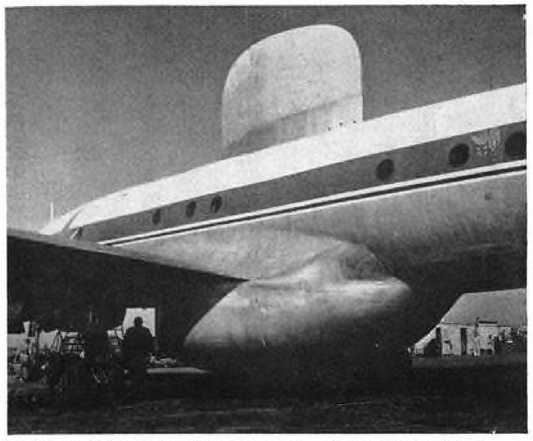
Such aerial radar stations would be valuable in any mass over-water movement over long distances of smaller fighter aircraft.

▶**Vital Tool**—Limited production order places many of the above uses in the speculation category, but Air Force urgency to test the new weapon in its

EXPERIMENTAL SUPER CONNIE, used by Lockheed to test radar picket installations, has wingtip fuel tanks.



FRONT VIEW of RC-121C's top and bottom radomes.



REAR VIEW of Lockheed test ship shows radomes' size.

air defense system is underlined by the decision to convert some of the Super Constellation transports USAF had on order to the radar version.

"Airborne radar search planes and combat information ships are a vital new defense tool," says Hall L. Hibbard, Lockheed's engineering vice president. "Their radar value is increased by their mobility, their ability to be where needed in a surprisingly short time."

►**30-Man Crew**—The RC-121C can carry a crew of more than 30, including pilots, navigators, flight engineers, radar controllers, radar, radio and TV operators, electronic countermeasures officers, and maintenance specialists to make in-flight repairs of the intricate electronics gear.

The aircraft contains a complete electronics maintenance shop, as well as a galley and bunks for its large crew.

Some indication of the height at which the picket planes may patrol comes from the fact that cabins will be pressurized to maintain 10,600-ft. comfort at 25,000-ft.

Despite outside temperatures as low as 60 below zero, the interior can be held at an even 75-deg., a valuable asset in arctic operation across U. S. northern defense lines.

Range of the aircraft's radar units is classified.

German Calls U. S. Aircraft 'Overbred'

Development costs on North American F-86 Sabre jet were "about five times more than necessary," in the opinion of Prof. Kurt Tank, former technical director of the German Focke-Wulfe firm who has worked for the Argentine government since World War II.

Tank did not indicate the source of his information on Sabre development, although details and costs were widely publicized when J. H. Kindleberger, NAA president, testified before a congressional committee two years ago (AVIATION WEEK Aug. 27, 1951, p. 23).

While visiting Bremen, Germany, industrialists recently, the professor called the American aircraft industry "overbred." He asserted the financial means, time and labor required to develop a new airplane are exorbitant, a report of the Transportation, Communications and Utilities Div. of Commerce Department reveals.

"Even minor construction problems are assigned to a large staff of technicians and, for any trial, a large organization is put into operation," Tank said. "This results in a complicated and expensive project."

He based his assumption on experience in developing Argentina's Pulqui II, Latin America's first sweptwing jet fighter that flew in June 1950. The plane is slightly smaller than the Sabre. The Pulqui II crashed during tests.

The professor said civil aircraft production should begin in Germany within three to five years. This new industry will have a great advantage, he predicted, in avoiding the errors of the American, English and French manufacturers.

USAF Bases Get $268 Million

Congress has authorized $489 million for new military construction, giving the largest slice of $268 million to the Air Force. Army got $134 million; Navy received $87 million, of which the largest allocation is $47.8 million for aviation facilities.

In authorizing the $489 million, Congress rescinded $757 million in projects already authorized, including a substantial allocation for USAF and Naval Aviation construction. Actually the action adds up to a $268-million cutback in programmed military works. The new aviation facilities are to be financed out of money on hand and uncommitted. USAF has $1.7 billion and Navy has $466 million unobligated.

Here are the new projects:

Air Force

Strategic Air Command, $116 million

Abilene, Tex., Municipal Airport. For navigational aids, operational, maintenance and training facilities, $12.2 million.

Barksdale, La., AFB. For navigational aids and other facilities, $4.3 million.

Bergstrom, Tex., AFB. For training and other facilities, $1.4 million.

Blytheville, Ark., Municipal Airport. Fuel storage, navigational aids, training and other facilities, $8.8 million.

Bunker Hill, Ind., NAS. For fuel storage, communications, navigational aids and other facilities, $11 million.

Carswell, Tex., AFB. Fuel storage, maintenance, operational and other facilities, $480,000.

Castle, Calif., AFB. For maintenance and other facilities, $1.4 million.

Davis-Monthan, Ariz., AFB. Navigational aids, maintenance and storage facilities, $1.4 million.

Dow, Me., AFB. Communications, operational, and training facilities, $2.1 million.

Eglin, Fla., Air Field. Navigational aids, lighting and maintenance facilities, $4.8 million.

Ellsworth, S. D., AFB. Maintenance and storage facilities, $10.3 million.

Forbes, Kan., AFB. Airfield facilities, $4.2 million.

Great Falls, Mont., AFB. Maintenance, storage, and other facilities, $425,000.

Homestead, Fla., AFB. Fuel storage, navigational aids, maintenance, operational and other facilities, $13.3 million.

Lake Charles, La., AFB. Training facilities, $265,000.

Limestone, Me., AFB. Maintenance and other facilities, $851,000.

Lincoln, Neb., AFB. Communications, operational, training an other facilities, $8.8 million.

Little Rock, Ark., AFB. Navigational aids, maintenance, operational and other facilities, $11.3 million.

March, Calif., AFB. Airfield lighting and training facilities, $965,000.

Mountain Home, Ida., AFB. Maintenance, training and other facilities, $3.3 million.

Offutt, Neb., AFB. Navigational aids, lighting, and improvements, $6.7 million.

Plattsburg, N. Y., barracks. Fuel storage, operational, training and other facilities, $9.5 million.

Sedalia, Mo., AFB. Navigational aids, airfield lighting, operational training and other facilities, $4.7 million.

Smoky, Hill, Kan., AFB. Operational, training and other facilities, $5.6 million.

Travis, Calif., AFB. Storage facilities, $37,000.

Turner, Ga., AFB. Training facilities, $221,000.

Walker, N. M., AFB. Storage facilities, $33,000.

Westover, Mass., AFB. Storage facilities, $37,000.

Aid Defense Command, $13.2 million

Burlington, Vt., Municipal Airport. Storage facilities, $37,000.

Duluth, Minn., Municipal Airport. Storage and other facilities, $219,000.

Geiger, Wash., Field. Storage and other facilities, $284,000.

Grandview, Mo., AFB. Storage and other facilities, $314,000.

Greater Pittsburgh, Pa., Airport. $130,000.

Hamilton, Calif., AFB., $162,000.

Kinross, Mich., AFB. Storage and other facilities, $132,000.

McChord, Wash., AFB. Storage facilities. $37,000.

McGee-Tyson, Tenn., Airport. Airfield improvements, $146,000.

Minneapolis-St. Paul, Minn., Airport. Storage facilities, $162,000.

New Castle County, Del., Airport, $205,000.

Niagara Falls, N. Y., Airport, $95,000.

O'Hare International Airport, Ill. Storage facilities, $37,000.

Otis, Mass., AFB. Storage, navigational aids, operational, maintenance and other facilities, $5 million.

Oxnard, Calif., AFB. Storage and other facilities, $265 000.

Paine Field, Wash. Storage facilities, $189,000.

Portland, Ore., International Airport. Storage and other facilities, $166,000.

Presque Isle, Me., AFB. Communications, storage, and other facilities, $434,000.

Selfridge, Mich., AFB. Storage and other facilities, $43,000.

Sioux City, Ia., Airport. Communications, navigational aids and other facilities, $97,000.

Stewart, N. Y., AFB. Navigational aids, airfield lighting and other facilities, $971,000.

Suffolk County, N. Y., AFB. Storage facilities, $37,000.

Traux Field, Wisc. Operational and storage facilities, $831,000.

Youngstown, Ohio, Municipal Airport. Training and storage facilities, $184,000.

Yuma County, Ariz., Airport. Storage, communications. airfield lighting and other facilities, $2.8 million.

Tactical Air Command, $7.8 million

Alexandria, La., AFB. Navigational aids, operational, maintenance and other facilities, $1.2 million.

Clovis, N. M., AFB. Airfield pavements, $2.5 million.

Foster, Tex., AFB. Storage and other facilities, $67,000.

George, Calif., AFB. Airfield lighting, storage, training and other facilities, $1.4 million.

Langley, Va., AFB. Navigational aids, storage and other facilities, $240,000.

Larson, Wash., AFB. Navigational aids and storage facilities, $61,000.

Moore Airfield, Tex. Fuel storage, communications, navigational aids and other facilities, $1.3 million.

Pope, N. C., AFB. $28,000.

Air Training Command, $23.7 million

Bryan, Tex., AFB, $44,000.

Craig, Ala., AFB, $1.6 million.

Ellington, Tex., AFB, $2.2 million.

Goodfellow, Tex., AFB, $142,000.

Greenville, Miss., AFB, $1.8 million.

Harlingen, Tex., AFB, $163,000.

James Connally, Tex., AFB, $117,000.

Laredo, Tex., AFB, $9,000.

Laughlin, Tex., AFB, $578,000.

Luke, Ariz., AFB, $1 million. For emergency flood control, $2.9 million.

Mather, Calif., AFB, $1.8 million.

Moody, Ga., AFB, $599,000.

Nellis, Nev., AFB, $819,000.

Perrin, Tex., AFB, $1.3 million.

Pinecastle, Fla., AFB, $2.4 million.

Randolph, Tex., AFB, $2 million.

Reese, Tex., AFB, $50,000.

Scott, Ill., AFB, $373,000.

Tyndall, Fla., AFB, $844,000.

Vance, Okla., AFB, $1.7 million.

Webb, Tex., AFB, $578,000.

Wichita, Kan., Airport, $3.2 million.

Air Materiel Command, $25.5 million

Bookley, Ala., AFB. Maintenance and other facilities, $3.8 million.

Hammonton, N. J., AFB, $747,000.

Kelly, Tex., AFB. Aircraft maintenance facilities, $216,000.

McClellan, Calif., AFB. Fuel storage, maintenance and airfield improvements, $5.6 million.

Norton, Calif., AFB. Airfield lighting and aircraft maintenance facilities, $940,000.

Olmstead, Pa., AFB. Fuel storage, aircraft maintenance, research, development and test facilities, $5.6 million.

Robins, Ga., AFB. Aircraft maintenance facilities, $162,000.

Tinker, Okla., AFB. Airfield improvements, $4.4 million.

Wright-Patterson, Ohio, AFB. Communications, navigational aids, operational, research, development and test facilities, $4 million.

Military Air Transport, $25.6 million

Andrews, Md., AFB. Storage and other facilities, $299,000.

Dover, Del., AFB. Fuel storage, lighting, operational and maintenance facilities, $19.6 million.

McGuire, N. J., AFB. Operational and maintenance facilities, $5.3 million.

Orlando, Fla., AFB, $330,000.

Palm Beach, Fla., International Airport, $20,000.

Research and Development Command, $21.6 million

Arnold Engineering Development Center, Tenn. Research, development and test facilities, $10 million.

Navy

Continental, $40.1 million

Alameda, Calif., NAS. Jet engine test cells, $1.7 million.

Alice, Tex. Airfield pavements, $2.1 million.

Barin Field, Ala. Naval auxiliary air station, $226,000.

Brunswick, Me., NAS. Aircraft maintenance and other facilities, $5.9 million.

Cabaniss Field, Tex., NAAS. Operational and training facilities, $560,000.

David Taylor Model Basin, Md. Wind tunnel, $665,000.

Cecil Field, Fla., NAS. Airfield facilities, $3.4 million.

Chase Field, Tex., NAAS. Fuel and aircraft maintenance facilities, $1.6 million.

Corpus Christi, Tex., NAS. Fuel facilities, $510,000.

Fallon, Nev., Field. Operational and maintenance facilities, $5.2 million.

Kingsville, Tex., NAAS. Airfield improvements and training facilities, $1.5 million.

Miramar, Calif., NAS. Airfield improvements, $1.2 million.

Norfolk, Va., NAS. Jet engine test cells, $1.8 million.

Oceana, Va., NAS. Maintenance facilities and airfield improvements, $3.9 million.

Pensacola, Fla., NAS. Operational facilities, $849,000.

Quonset Point, R. I. Jet engine test cells, $2.3 million.

San Diego, Calif., NAS. Jet engine test cells, $1.7 million.

Trenton, N. J., Naval Air Turbine Test Station. Test and development facilities, $3.4 million.

Whidbey Island, Wash., NAS. Maintenance facilities, $1.2 million.

Whiting Field, Fla., NAAS, $197,000.

Overseas, $7.7 million

Cubi Point, P. I., NAS. Operational facilities, $5.6 million.

Kwajalein, Marshall Islands, NAS. For fuel storage and other facilities, $2.1 million.

Edwards, Calif., AFB. Fuel storage and maintenance facilities, $1.4 million.

Griffis, N. Y., AFB. Operational and fuel storage facilities, $452,000.

Hollman, N. M., AFB. Airfield pavements, $4.7 million.

Kirtland, N. M., AFB. Storage facilities, $33,000.

Laurence G. Hanscom Field, Mass. Storage facilities, $37,000.

Patrick, Fla., AFB. Communications, navigational aids, research, development and test facilities, $4.9 million.

Air Proving Ground, $3.7 million

Eglin, Fla., AFB. Research, development and test facilities, $3.7 million.

Alaskan Air Command, $2 million

Aniak area. Operational facilities, $1 million.

Williams Field. Operational Facilities, $1 million.

Aircraft Control and Warning System, $25.9 million

Three-Seat Bells?

Larry D. Bell's trip to Korea may lead to three seats instead of two inside the "two place" Bell helicopters of the future.

En route home, Bell, president of Bell Aircraft Corp., disclosed in Honolulu that his flights near the front lines had taught him that generals' aides need a place in a helicopter, too.

With room for only the pilot and a general, aides have to trail along by jeep.

Air Associates Stock Sales Total 15,500

Aviation stock transactions and holdings reported to Securities & Exchange Commission during June were headed by Air Associates, Inc., which reported the purchase of 15,500 common shares.

Following were reported:

Air Associates, Inc.: C. Kenneth Baxter, director, bought 400 common shares, making a total holding of 500; Donner Trusts, beneficial owner, purchased 13,400 common shares, making a 58,246-share total; F. A. Twomey, officer, bought 1,000 common shares, his total holding; Victor I. Zelov, director, sold his entire holding of 1,500 common shares; and Hillsboro Plantation, beneficial owner, bought 700 shares of 6% cumulative convertible preferred stock, making a total holding of 14,081.

American Airlines, Inc.: A. R. Bone, Jr., officer, acquired 500 shares through exercise of rights, making a total of 1,600; through exchange or conversion, he disposed of 500 options for common stock.

Aro Equipment Corp.: Ralph A. Bard, director, sold 500 common shares, leaving a 1,500-share total.

Cessna Aircraft Corp.: Sheldon Coleman, director, bought 100 common shares, making a total holding of 500 shares.

Colonial Airlines, Inc.: L. Orville Cameron, officer, bought 200 common shares, making a total of 500.

Consolidated Vultee Aircraft Corp.: Frank Pace, Jr., director, bought 200 common shares, his total holding; Lawrence B. Richardson, director, bought 100 common shares, making a total of 200.

Curtiss-Wright Corp.: George R. Hill, officer and director, bought 100 common shares, bringing his total to 1,200; William T. Lake, officer, bought 100 common shares, making a total holding of 200 shares.

Douglas Aircraft Co., Inc.: Arthur E. Raymond, officer and director, bought 600 common shares, his total holdings.

Eastern Air Lines, Inc.: Stuyvesant Peabody, Jr., director, bought 100 common shares, making a total of 1,100 shares.

Flying Tiger Line, Inc.: James E. Davidson, director, bought 500 common shares, his total holdings.

Glenn L. Martin Co.: John L. Sullivan, director, bought 1,000 common shares, his total holdings.

McDonnell Aircraft: Sidney W. Souers, director, bought 400 common shares, bringing his total holdings to 500 shares.

Pacific Northern Airlines, Inc.: A. G. Woodley, officer and director, sold 2,000 common shares, leaving a total of 276,051 shares.

Piper Aircraft Corp.: Walter C. Jamouneau, officer and director, bought 200 common shares, making a total holding of 300 shares.

Seaboard & Western Airlines, Inc.: Arthur V. Norden, officer and director, bought 500 common shares, making a total holding of 34,421; W. H. Renninger, officer, sold 600 common shares, leaving total holding of 14,625 shares.

Western Air Lines, Inc.: Marvin W. Landes, officer and director, bought 135 capital shares, making a total holding of 500 shares.

New Air Bills

Two bills introduced the eve of congressional adjournment would: transfer operation of Washington National Airport from the Administrator of Civil Aeronautics to the Administrator of General Services; exempt operation in the transportation of livestock, fish and agricultural commodities from regulation by Civil Aeronautics Board.

DOUGLAS AD-5 Skyraider differs externally from previous models mainly in new cockpit layout and slightly larger tail. Note four 20-mm. cannon protruding from wings and racks for rockets, bombs or napalm tanks.

AD-5 Converts from Bomber to Transport

Navy takes delivery this month on multiplex Skyraider produced on assembly lines patterned after Detroit.

By William J. Coughlin

El Segundo, Calif.—U. S. Navy is taking delivery this month on an aircraft which can haul everything from admirals to atomic bombs. It is the AD-5, a new version of the familiar "Able Dog" of the Korean air war, the Douglas Skyraider.

In Korea, the AD was known as an all-purpose aircraft, capable of ferrying personnel on the "Codfish Line" on one mission and, on the next bombing powerplants along the Yalu River under the noses of Russian-built MiG-15s. The AD-5 adds greater range and a few more uses to what already was a very useful airplane, and it adds them in a unique manner.

▶ **Multi-Purpose Plane**—When Navy takes delivery of its basic AD-5s, it also will begin taking delivery of a number of conversion kits built by Douglas. With these neatly-packaged kits, the AD-5 aboard carriers can be converted in a few hours from a day attack aircraft to a plush VIP transport, a cargo aircraft, an ambulance plane or one of several other versions.

This so-called "multiplex" aircraft embodies what Ed Heinemann, chief engineer of the Douglas-El Segundo Division, likes to call the "Detroit philosophy." Like an automobile, the AD-5 starts down the assembly line as a common chassis. It rolls out the far end in three versions:

- **AD-5.** This is the basic day attack aircraft.
- **AD-5N.** Night attack version.
- **AD-5W.** Airborne early-warning and anti-sub search aircraft.

The kits then can be used to convert these ADs for almost any combat assignment. This can be done at squadron level in 2 to 12 hr. The common chassis also makes it possible for the Navy to convert its AD-5s to AD-5Ns or AD-5Ws, if needed.

The AD-5 Skyraider does not necessarily disprove the ancient aeronautical axiom that an airplane which can do all jobs does none of them well.

"We do not advocate doing this to all aircraft," says Heinemann. But in this one airplane, at least, a combination has been found which indicates a niche in military aviation for an all-purpose aircraft. It is a tribute to Heinemann and his assistants at Douglas that the Navy still is ordering the propeller-driven ADs along with its more advanced jet aircraft.

▶ **Saved by Korea**—The Skyraider was saved from oblivion by the Korean War. Designed during the closing days of World War II, it never saw action in that conflict. With the Navy converting to jet aircraft, last of the ADs was to have been delivered in 1949. But when fighting broke out in the Far East, the AD received a new lease on life.

The Skyraider demonstrated in Korea that under certain conditions there still are jobs for propeller-driven aircraft in warfare. No jet could orbit on station during close support missions for the length of time an AD could. No jet could haul the AD's large and varied bomb load.

ADs were flying in Korea with loads of more than 9,000 pounds.

Douglas now has a production contract which will keep the ADs rolling off the assembly line for another two years. The AD-6 is an improved version of earlier AD models. The AD-5 is a different airplane.

▶ **Conversion**—Behind the powerful Wright R3350-26W engine, the cockpit has been widened to make the AD-5 a two-place aircraft, with side-by-side seating. Range with a full external bomb load has been doubled, although exact figures cannot be revealed. It also is a safe guess that the AD-5 has the atomic capabilities of the re-designed AD-4B.

But perhaps the most unusual thing about the AD-5 is the provision for switching its capabilities by use of the kits.

Kits presently are designed only for the day attack version, but structure of the other types also has provision for them. The kits are used to modify the large compartment behind the cockpit for various assignments. These are available:

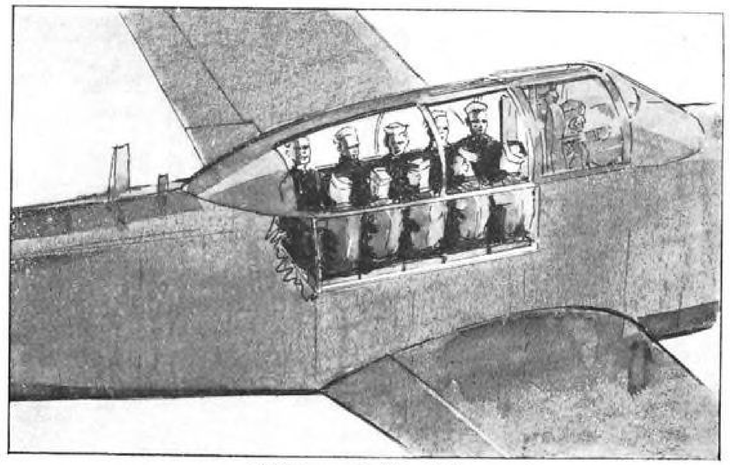
- **VIP kit.** Four backward-facing plush seats, fastening to studs in the floor of the compartment for quick disconnect.
- **High-density passenger kit.** Two bench-type seats fasten on each side of the compartment, seating 10 men in addition to the two in the cockpit, thus converting the aircraft to a 12-place transport for aircoach travel, Navy-style.
- **Cargo kit.** With plywood flooring, up to a ton of cargo can be carried. A hoist is included.
- **Ambulance kit.** This includes four litters and a hoist.
- **Long-range kit.** Two 150-gal. fuel tanks can be installed. This doubles the AD-5's internal tankage. In addition, up to 300-gal. can be carried on any of the three primary wing stations.
- **Tow target kit.** This includes a belly pod for the target.
- **Photographic kit.** Five large cameras can be installed for all types of automatic mapping and photo reconnaissance.

Defense Dept. cutbacks resulted in cancellation of Navy orders for the last two types, but the others will be delivered by Douglas.

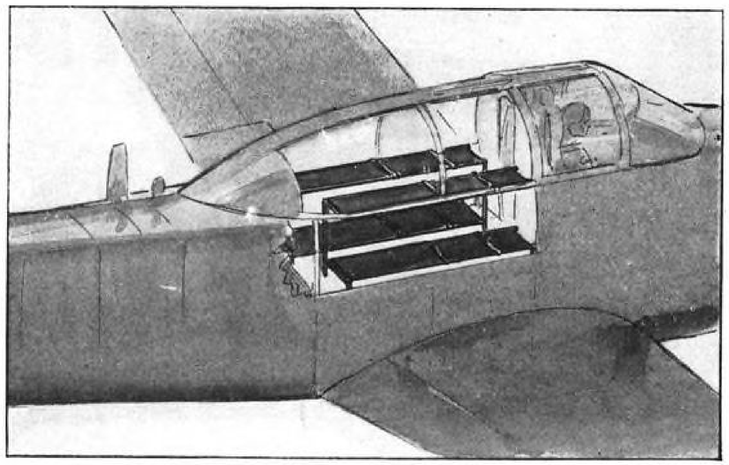
▶ **Advantages**—"It's like buying an extra airplane in an inexpensive, 500-lb. package," Heinemann says. A carrier squadron equipped with basic AD-5s and a set of kits can be nearly self sufficient for all missions. It can, for example, change stations without calling in a transport squadron to help with the move, switching back to its day attack duties simply by removing the cargo and passenger kits.

To obtain these advantages, a number of changes were made which make the AD-5 a much different aircraft than earlier AD models. Lack of wheel doors, extra weight and wider canopy area resulted in a speed decrease of from 7 to 9 knots. Despite resultant drag increase, landing gear doors were eliminated to save weight.

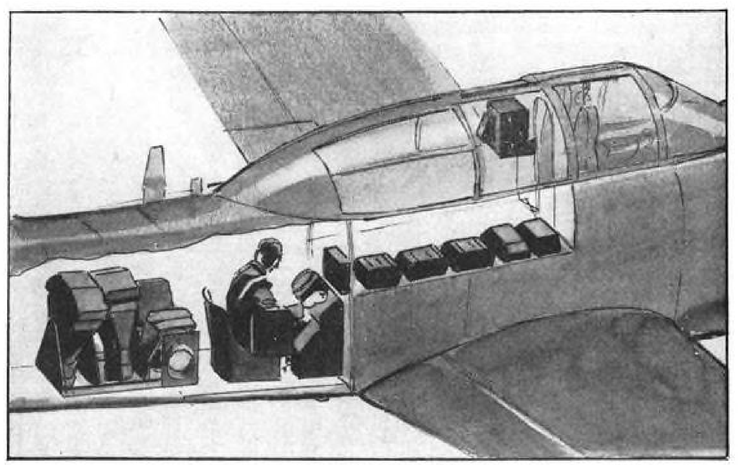
▶ **Avionic Gear**—Although the side-by-side cockpit somewhat compromises visibility to the right for formation flying, overall visibility for all-weather operation is improved. By putting the radar



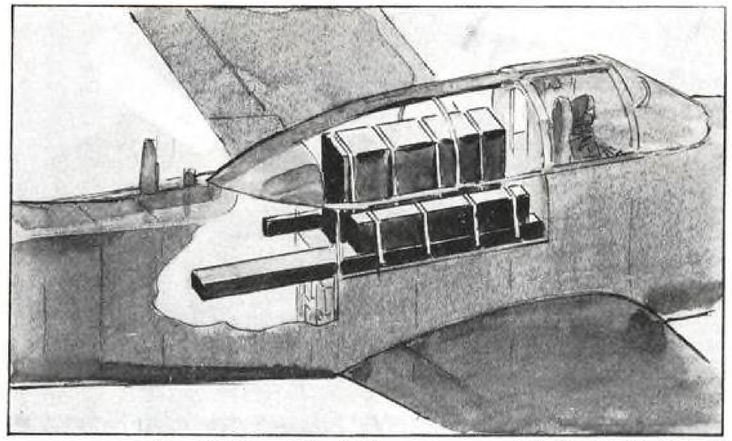
HIGH DENSITY AD-5 is seen in this artist's conception seating 10 passengers on bench-type seats. Crew of two sits side-by-side up front.



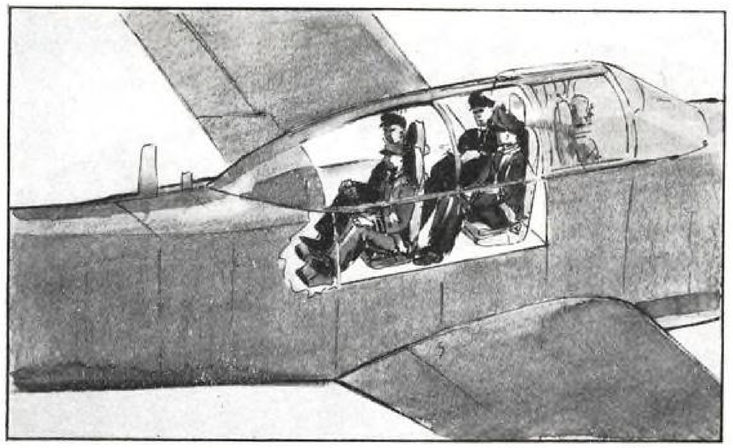
AMBULANCE version of Skyraider carries four litters, in this cutaway sketch. Plane is fitted with hoisting gear when used to carry wounded.



PHOTOGRAPHIC model can be fitted with five cameras for aerial mapping or reconnaissance. This type has been canceled by Navy.



CARGO carrying AD-5 is capable of flying up to a ton of freight. It also is fitted with a hoist. Plywood flooring is installed for these misisons.



VIP TRANSPORT type is shown carrying four officers in rearward facing seats. Chairs can be fastened quickly to studs in the plane's floor.

operator and the pilot together in the night and anti-sub versions, it increases their ability to operate as a team.

Electronic gear in the rear compartment also is more easily available for inflight servicing. The radar versions of the AD-5 carry more avionic gear than many large patrol boats and, in fact, much of the electronic equipment in the AD was designed for patrol boats.

The day attack version is much like the AD-4 and can be operated single-place. Mounting four 20-mm. cannon, it also has provision for radar.

The radar-equipped AD-5N night attack aircraft can be used for night interdiction, all-weather operation and anti-sub warfare. It has a searchlight and sonar equipment for sub detection.

► **Sub Chaser**—The AD-5W airborne early-warning and anti-sub search aircraft will have improved radar gear. Details are classified. An AD-5S version will have more anti-sub capabilities.

With addition of special gear to the night attack version, the Navy will have a single ship capable of both searching for and attacking enemy subs, eliminating the present need for search and attack teams. Only one of this type is being turned out at the Douglas-El Segundo plant, but Navy can convert others at squadron level.

In addition to the wider canopy and lack of wheel doors, other external features have changed. Vertical fin and rudder area has been increased by 50% in order to compensate for the familiar large radar belly tub on the AD-5W. On the AD-4W, a triple-tail installation looking somewhat like a small Constellation empennage was necessary to obtain stability.

New bomb racks are swept forward to a noticeable extent. These, incidentally, can carry heavier stores.

► **Internal Changes**—The two sliding canopy sections, operating independently, are not jettisonable. Two large panels in the rear compartment can be jettisoned for emergency escape and there also is an escape hatch in the bottom of the rear compartment.

A number of internal changes resulted from an unusual Douglas approach to the maintenance problem for its new model. Neil O'Connell, a Douglas service technician with several years experience with the Skyraider series under operating conditions, was called in from the field to consult with El Segundo engineers on maintenance problems.

"As a result," says Leonard Quick, project engineer for the AD-5, "we feel we have anticipated service troubles. It's already paying off in the experimental flying." Numerous maintenance improvements have been designed into the AD-5 as a result of O'Connell's advice, changes that ordinarily would not be made in a current line model.

► **Wiring**—Electrical system wiring was rerouted for this reason. Lines in the power plant section were relocated to improve access to the oil tank and accessories. Electrical and hydraulic components in the forward equipment compartment were separated. Components were assembled into package units for easy bench maintenance.

Much of the AD-5 structure is interchangeable with other AD models. The outer wing panels are interchangeable with those of the AD-6 or, with slight modification, the AD-4. Horizontal stabilizers, landing flaps, ailerons, elevators, landing gear and other parts are common to all of the Skyraider series.

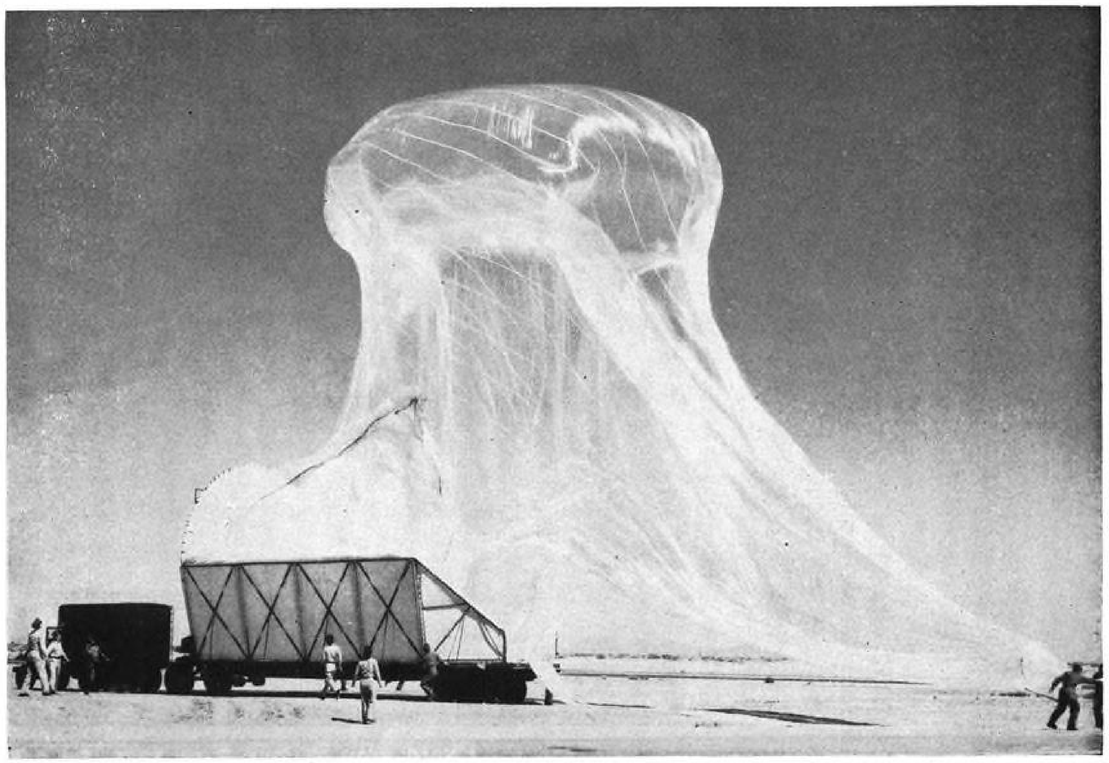
► **Other Details**—The AD-5 electrical power system is a combined AC-DC system where AD-4s had a dual DC generator with AC inverters. The newer model thus has a complete emergency DC power system which can operate from the generator if the battery fails.

Primary flight control system is identical with that of the AD-4, although electric trim tabs replace manual tabs for space-saving reasons.

The cockpit, with a larger bullet-proof windshield, has a single set of controls, despite the shift to two-place seating. Instruments are arranged so that it is possible to fly the aircraft with either a one- or two-man crew in the day attack version. Crew for night and anti-sub models is three.

New navigation instruments have been added, including a radio compass and marker beacon receiver. Arresting gear is improved and a single dive brake replaces the AD-4's multiple-brakes.

► **Specifications**—Basic specifications are almost the same as those of the AD-4: wingspan 50 ft.; length 38 ft. 9½ in.; height 15 ft. 7½ in.; design gross weight 17,800; rate-of-climb, s.l., 2,850 fpm.; maximum speed 350 mph at 15,000 ft.; takeoff power, 2,700 h.p. at 2,900 rpm. at 3,500 ft. The Wright R3350 turns an Aeroproducts 4-blade 13 ft. 6 in. propeller.



MOBY DICK deploys from specially built "covered wagon"; plastic envelope will be filled by expansion of gas bubble.

Atmospheric Research Expands as . . .

Moby Dick Balloons Explore Upper Air

If you see a "flying saucer" scooting along through the evening sky aglow with fiery trails, or a gleaming white planet that can't be found on any astronomical chart, the chances are you are watching one of the huge plastic balloons drifting cross-country at 100,000-ft. altitude on a routine flight for the Air Research and Development Command's "Moby Dick" program.

▶ **Cooperative Venture**—Moby Dick is aimed at a thorough exploration of the upper atmosphere between 50,000 and 100,000-ft. altitude as a preliminary to piloted flight in this area and beyond. It is a good example of how various ARDC centers work together to implement a complete research program.

Primary responsibility for Moby Dick rests with the Geophysics Directorate of the Cambridge Air Research Center at Boston. Original balloon work was done at Holloman AFB, Almogordo, N. M., with additional launching work at Air Force Flight Test Center, Edwards, Calif. and other U. S. bases.

The Moby Dick balloons range in diameters from 50 to 116 ft., with a cubic capacity ranging to 750,000 cu. ft. when fully inflated. The largest balloons are about as tall as a 20-story building when fully inflated. Even larger balloons, with 150-ft. diameter and 3 million-cu. ft. capacity, are under construction for high-altitude exploration. Some idea of the size of these monsters can be gathered from the fact that their cubic content is about half that of Navy's dirigible Akron.

The balloons are made from polyethylene plastic and inflated with helium carried on standard storage rail cars developed by the Navy for its lighter-than-air program. They can carry useful loads up to 500 lb. and can stay aloft for three days at altitudes ranging up to 107,000 ft. They fly at a constant altitude that can be controlled within a 2,000-ft. margin.

▶ **Source of Saucers**—Moby Dick balloons launched at Holloman have landed as far away as Norway and North Africa. Many go as far as Bermuda and recoveries of instruments carried by the balloons have been made in Mexico and Canada. About 15% of the launchings have been lost in the Atlantic and Pacific oceans.

More than 160 balloons have been launched since the program began experimentally in 1950 and more than 90% of the flying saucer reports coincide with the time and place of Moby Dick balloons in flight.

Because of their huge size and the extreme altitude at which the balloons drift, it is difficult for observers not familiar with the program to identify them properly even though they are easily visible from the ground with naked eye.

The shiny, ribbed surface of the polyethylene balloon sphere is an excellent reflector of light. Long after the sun has set, shrouding the earth in darkness, the balloons reflect sunlight brilliantly at 90,000 to 100,000 ft. Depending on the extraneous material in the atmosphere, this reflected light appears white, red, purple or green. Because of the difficulty of judging speed at altitude of 50,000 ft. or more, it is easy for the balloons to appear to be moving along at tremendous speeds with fiery jets of reflected light playing around them, whereas they are actually moving at between 50 and 60 mph.

▶ **False Alarms**—One evening at twilight most of the Strategic Air Command units in Texas were busy trying to catch and shoot down a flying saucer that was actually a Moby Dick drifting along at 90,000 ft. in a glare of dust-tinted reflected sunlight. B-36 crews were baffled when they were left behind at 45,000 ft. and jet fighters stalled out trying to pursue it beyond their altitude limitations.

A balloon hung over San Francisco during the parade welcoming General van Fleet back from Korea and shone as a brilliant white sphere as jet fighters vainly tried to intercept it. Another balloon "hung" over Dayton at 80,000 ft. one day for five hours keeping the town in a turmoil of saucer reports.

▶ **Lost, By Jupiter**—It is also easy to mistake a Moby Dick for a planet under certain conditions.

A B-17 is used to follow some specially instrumented balloons. Pilots of the chase plane who were watching a Moby Dick rise into the evening sky at Holloman as a bright white sphere against the darkening sky interrupted their vigil to get a cup of coffee. When they returned the balloon had drifted off but Jupiter had risen in about the same spot. They placidly watched Jupiter for an hour until they became disturbed by its lack of movement.

Checking the balloon through a theodolite they noted the little moons that surround Jupiter. The balloon was long gone.

▶ **Economical Tool**—The balloons are proving to be an ideal research vehicle for high altitude explorations. Because of their ability to operate at constant altitudes for as long as 96 hours they provide considerably more data than can be obtained from the relatively short flights of high-altitude sounding rockets such as Aerobee, and they also are much less expensive. A complete flight costs about $1,500 and the balloons themselves are purchased for about $800.

They are manufactured by General Mills of Minneapolis and Winzen Research, Inc., in St. Paul. Tufts College and Wentworth Institute of Boston have helped in developing equipment and techniques for the project.

▶ **Jet Stream Discovery**—One of the major discoveries contributed by the Moby Dick research has been the determination that air currents travel in opposite directions at varying altitude layers. While the prevailing wind around 50,000 ft. moves from west to east across the United States, above 60,000 ft., the flow is sometimes reversed and reaches velocities of 50-60 mph. in a westerly direction.

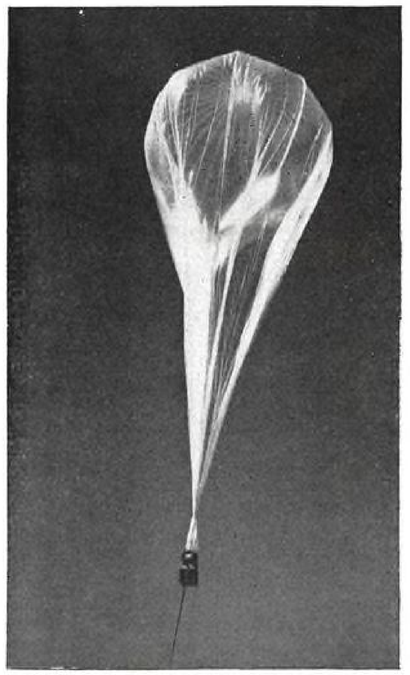
The balloons have also been used to fly various animals in explorations of the effects of secondary cosmic ray radiation. Fruit flies, hamsters, mice and monkeys have stayed at 80,000 ft. for as long as 24 hours and have been recovered alive.

Among the other data being gathered are measurements of the composition of the atmosphere, variations in ozone with altitude, electrical conductivity of the atmosphere in the 50,000-60,000-ft. area on top of thunderstorms, concentration of carbon dioxide, and the effects of ultraviolet and infrared light.

In addition to Moby Dick project work, the balloons have been used to drop rocket nose cones by parachute from high altitude to study stability problems and to drop small-scale models of aircraft designs for highspeed data recording.

The project was started in June 1951. An experimental phase conducted by the Geophysics Research Directorate and Holloman Air Development Center included the development of instrumentation, procedures and methods of evaluation. By the middle of 1952, instrumentation had been developed to warrant quantity production. Operational work began in January 1953.

▶ **Launching Sites**—Moby Dick is being



ON THE WAY, Moby Dick rounds out.

INSTRUMENTS are parachuted to ground, terminating flight to altitude.

conducted over the entire U. S. by launching constant-level, large plastic, free-floating balloons, one a day from each of three West Coast launching sites—Tillamook, Ore., Vernalis, Calif., and Edwards AFB, Calif.

Two more sites are being opened to take care of late summer winds. These new locations will be at Moody AFB, Ga., and Sedalia AFB, Mo.

Wind data are obtained by tracking to determine half-hourly positions. The tracking is made possible by means of a VHF transmitter which sends out coded information identifying the balloon and telling its pressure-altitude. On some of the flights the amount of ballast consumed also is reported. The ballast, a very fine steel dust, is used to maintain constant altitude. It is expended slowly as the balloon begins to descend, to bring the balloon back to desired altitude. Ballast is completely discharged by the time it reaches the ground.

► **Receiving the Data**—The data telemetered from the balloon are received at the AF's Airways and Air Communication Service (AACS) and Navy (VHF/DF) ground stations, more than 100 of which are located in the U. S.

The ground receiving station can take a directional bearing on the balloon as it receives the telemetered information. The directional bearing, together with the data received, is transmitted by an AACS network to a plotting center at Lowry AFB, Denver. Lowry records the information and advises the Civil Aeronautics Administration hourly of the location of the balloons. Three hours prior to the time the balloon releases its load by parachute, CAA is informed of the approximate time and place of release. The Air Defense Command is also notified of balloon location to prevent possible misidentification.

► **Instrument Recovery**—When the balloon starts its descent, it is destroyed automatically at 30,000 ft.—a large hole is ripped in its side and the instrument package parachutes to the ground on a 24- or 28-ft. chute.

Instruments are recovered by citizens who report to AFCRC. Each Moby Dick package dropped carries complete instructions for finders, and offers a $20 reward for its return. Recoveries run about 70%.

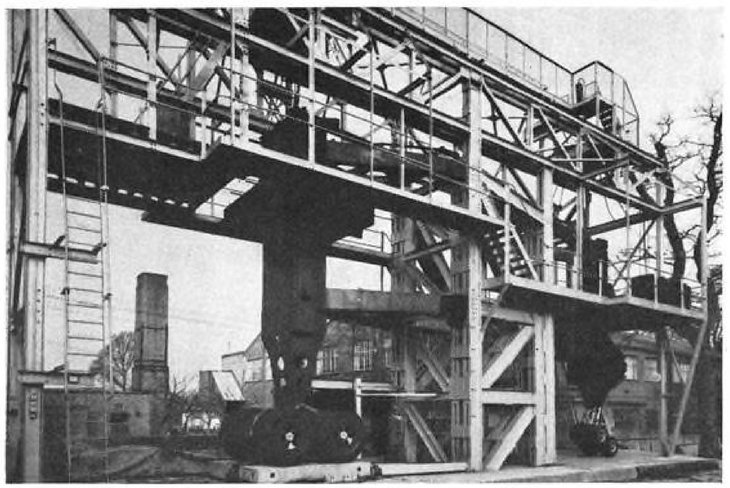
The parachuted instrument package is initially suspended directly below the balloon. The package measures about 22x22x19 in., and weighs about 150 lb. It contains a transmitter, power supply, coder which transforms altitude and ballast information into Morse, and control box, including altitude control and safety devices.

► **Safety Features**—Safety control is contained in two parallel systems—electrical and mechanical.

The electrical system is "on" above 3,000 ft. and below 30,000 ft., to cut the load and destroy the balloon if it begins to descend during ascent. It also destroys the balloon if 33,000 ft. is not reached within two hours after launching. The electrical safety system terminates the flight any time the balloon descends to 33,000 ft. after going above that level.

The mechanical safety system duplicates the last two functions of the electrical system. The balloons are fitted with lights for night operation.

The project is expected to end early in 1954, when the large mass of information will be analyzed by Cambridge for an over-all picture.



TESTING THE VULCAN'S LANDING GEAR

This landing gear test rig, called the world's largest by its maker and user, Dowty Equipment Ltd., England, is seen fitted with multi-wheel bogie for the Avro Vulcan four-jet delta-wing bomber. Two main hydraulic jacks raise the landing gear and then allow it to descend onto a reinforced concrete platform, simulating any desired load conditions. The wheels can be spun at the same rate as they would attain during an actual landing. Gauges and a camera record the test results.

THRUST & DRAG

"You fixed me fine with that piece about the atomic cannon," said the engineer. "The whole field artillery has zeroed in on me. Look at these letters."

He held out a batch of long, single-spaced correspondence that fairly glowed in the dimly lit room.

"You said all that, didn't you? And didn't you say that was the way a lot of your cohorts were thinking?" I retorted.

"Yeah, but it's so final in print. . . . Look, let's pick out a few choice rejoinders from these and give the artillerymen a break. Put them in the column, will you?"

"Okay," I said. And here they are:

"'. . . An elite crew . . .' for the first test firing, 'yes,' by all means. For service firing, a loud, resounding 'nuts'. . . . The Hiroshima, Nagasaki and Bikini Able crews were elite. And what's more, the latter, in broad daylight, with no flak, and with the latest weather reports, didn't come within a country mile of the old Nevada."

"'. . . An artillery piece with its associated column' is a lot less vulnerable than those 10,000-ft. runways a modern aircraft demands. The 'five-mile caravan' for the 280-mm. gun sounds like an exaggeration. I have never seen the 280 but it can't be a whole lot larger than the 240-mm. howitzers which are on the line in Korea right now without five-mile caravans."

"It takes awfully nasty weather to prevent a forward observer from seeing enemy action within 1,000 yd. of his position. Each company of infantry has an artillery forward observer attached and what one FO doesn't see another one or two will pick up. If the weather or darkness is so dense as to prevent observation, then artillery fire on surveyed coordinates, with maps like those in Korea, are deadly accurate . . . within 100 to 200 yd. after corrections are made for meteorological changes. These corrections are maintained and applied every three or four hours."

"Of course aircraft are used for spotting. So are ground observers, sound and flash battalions, radar and any other means available; but if none of these can do the job, the artillery will shoot unobserved and mass its fires in an area smaller than that taken by the dispersion of a single stick of bombs dropped from 35,000 ft. under the most ideal conditions. Any artillery battalion will be glad to demonstrate. . . .

". . . I have yet to see the Air Force drop bombs or strafe within 100 yd. of friendly troops (except by accident) and be able to render any such support in less than three minutes time, and in any kind of weather, and on a 24-hr. schedule. Anyone who has ever been on the front can tell you that the artillery can and does support those requirements just as everyday chores.

"If targets for A-missiles exist within a few thousand yards of our front lines, then the artillery had better be called upon to do the delivery. You want it to go to the right address and not be left in the general vicinity. Even with airmail, it's the letter carrier that handles it last. His motto is 'Neither rain, nor snow . . . nor gloom of night. . . .'"

—DAA

PRODUCTION BRIEFING

► **Bendix Aviation Corp.** is adding a 103,250-sq. ft. structure, to be known as Plant 2, to its Eclipse-Pioneer Div. at the Bergen County Industrial Terminal, Teterboro, N. J.

► **Rhodes Lewis Co.**, Los Angeles, has received an order from Navy's Bureau of Aeronautics for more than $10 million worth of pneumatic ejectors and compressors.

► **North American Aviation, Inc.**, Los Angeles, has awarded a $1,134,681 contract for construction of an engineering flight test hangar on the north side of Palmdale Airport. NAA plans to transfer its Edwards AFB flight test activities to the new facility.

► **Consolidated Vultee Corp.**, Ft. Worth, Tex., Div., has several hundred employes working on tools and parts for four different aircraft in production at the company's San Diego, Calif., Div. The planes include the F-102, T-29, C-131 and the R3Y. Ft. Worth is making parts for the F-102 on a new 7,000-ton hydraulic press. San Diego plans to install a similar press later this year.

► **Kellett Aircraft Corp.**, Camden, N. J., has leased an 8,000-sq. ft. facility to house its engineering department. Building is located opposite the firm's Central Airport manufacturing quarters.

► **Greer Hydraulics, Inc.**, Brooklyn, N. Y., is appraised in a study of the testing equipment manufacturer's history and position in the industry prepared by aviation financial writer, Selig Altschul.

► **Prewitt Aircraft Co.**, Clifton Heights, Pa., successfully has adapted its bonded steel rotor blades for use on the American Helicopter's XH-26 pulsejet copter. Prewitt also has delivered similarly constructed blades to Piasecki Helicopter Corp., Morton, Pa., for test and evaluation on the H-25.

► **Willys Motors, Inc.**, Detroit, subsidiary of Kaiser Motors Corp., has delivered 1,000 Wright R1300 engines to USAF during nine months of production.

► **Kaman Aircraft Corp.**, has moved its helicopter manufacturing facilities from Bradley Field to Bloomfield and Hartford, Conn. Engineering testing, modification and certain warehouses and offices will be retained at the latter facility.

► **S & S Machinery Co.**, Brooklyn, N. Y., has been named U S. representative of Canamerican Helicopter Manufacturing Co., Ltd., Montreal, Canada.

► **Allied Research Associates, Inc.**, has moved its offices to 43 Leon St., Boston 15, Mass.

HIGHLIGHTS IN *Jet Engineering*

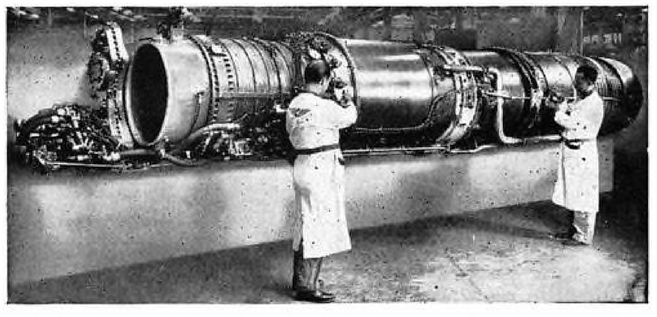
New jet engine designs further reduce frontal area

With their introduction of the first axial-flow jet engine over ten years ago, Westinghouse engineers expanded their efforts to reduce aerodynamic drag to an absolute minimum. Continued designing and testing met with outstanding success on the J34 engine, first in its class with the smallest frontal area per pound of thrust . . . permitting the first twin-jet aircraft design. The unequaled performance of twin-jet planes in Korea has put real meaning in that record.

While the J34 was writing jet history in combat, Westinghouse had new pencil-slim engines in their test cells . . . new designs for a more powerful jet engine that promised even greater latitude in plane design. Today, those designs have made possible the J40 with the smallest thrust frontal area ratio of any announced engine.

Realizing that even projecting rivet heads can have effect on the speed of jet aircraft, Westinghouse engineers know that they must respect every aerodynamic factor. That is why they have maintained leadership in the development of axial flow engines . . . why they have designed jet engines smaller in diameter for given power output than any other manufacturer. That is why they have acquired a wealth of jet engineering and designing knowledge that will prove invaluable to commercial airlines tomorrow. Westinghouse Electric Corporation, Aviation Gas Turbine Division, Philadelphia 13, Pennsylvania.

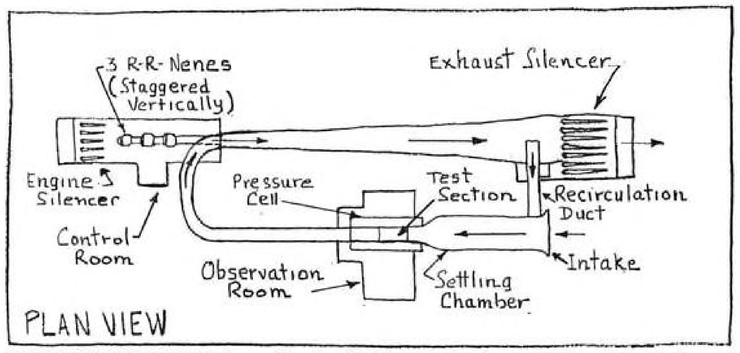
J-54014-A



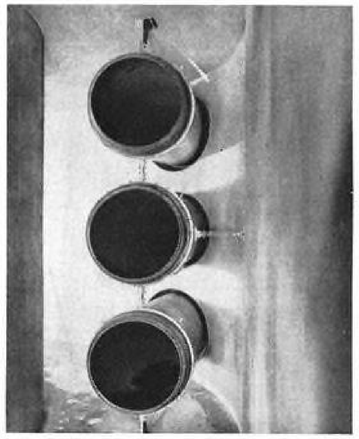
Final Assembly. Shown above in the last stages of assembly is the Westinghouse J40 . . . world's most powerful jet engine, fully qualified for production.

YOU CAN BE SURE...IF IT'S

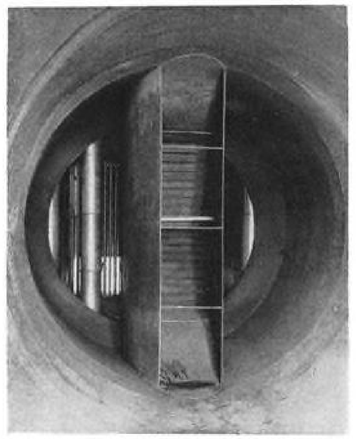
Westinghouse



BASIC COMPONENTS of new Handley Page high subsonic speed 4-ft. x 3-ft. windtunnel are located in this sketch. Three 5,000-lb. thrust Rolls-Royce Nenes are used.



JET EXHAUSTS jut into the tunnel in a vertical bank.



HOT GAS recirculation entry and part of exhaust silencer.

Handley Page Expands Facilities

New test and research facilities at Handley Page Ltd.'s Radlett, England, airfield have put the company in a position where it can be almost independent of outside help in these activities. HP now has an integrated arrangement incorporating a turbojet-driven windtunnel, a test house, water tank for pressure tests, laboratories, drafting office, and shops.

▶**Tunnel**—The new windtunnel is a high-subsonic facility for model study. It was designed by HP technicians in collaboration with Rolls-Royce people, who were responsible for the injector layout. Incorporated in the plan are features suggested by the Ministry of Supply, Royal Aircraft Establishment and the National Physical Laboratory.

Three 5,000-lb.-thrust Rolls-Royce Nenes are used for the tunnel drive. Their jets form the primary flow of an injector scheme, inducing air flow through the tunnel's working section. Under this arrangement, the turbojets are located outside the tunnel proper—only jet pipes extend into tunnel duct. This allows combustion air for the engines to be drawn in from the outside and so be independent of flow in the tunnel duct. The scheme also protects the engines in the event a test-model is torn loose.

The Nenes are staggered vertically, one directly above the other, so that the exhaust pipes jut into the tunnel in a vertical bank.

▶**Sections**—Tunnel intake air enters between a set of 15 hollow airfoils fed with hot exhaust air to reduce relative humidity so as to avoid condensation in the working section. Airfoil internal vanes distribute the hot air evenly into tunnel through open trailing edges.

This installation is followed by a 30-ft.-long settling chamber to the nozzle, which has a 12:1 contraction ratio.

The octagonal working section measures 4 × 3 ft. across, is 8 ft. long. From the entry to the working section and the end of the first diffuser, the tunnel duct is parallel in width and the depth varies. The nozzle, working section and transition to the diffuser are housed in, and vented to, a pressure cell to reduce loading on their sides.

At the end of the diffuser, the duct goes through two 90-deg. bends to mixing chamber at the head of which triple jet pipes from the Nenes enter.

Here, duct changes from rectangular to circular cross-section with constant area for about 40 ft. It remains circular as area increases towards the exit.

▶**Heat Source**—Ahead of the exhaust silencer is the hot gas recirculation entry for the incoming air. The entry is an airfoil with an open leading edge running from duct floor to roof. The trunking leading the hot gases to the entry has cascades of airfoils at each 90-deg. bend.

A control room is located along the turbojet engine house, with telephone connection to the observation house adjacent to the working section.

▶**Test House**—In the structural-test house, the main test frame for trials on complete fuselages and wings is 50% higher and wider than the Royal Aircraft Establishment's Cathedral rig. It will apply a maximum load of 400 tons. Main load-reacting structure is buried in the floor, to afford unobstructed space for easy access to test structure under the frame.

Each floor reaction point will take a 30,000-lb. load. Loads are applied by an electrically controlled hydraulic system. Load measurement is by an independent hydraulic system. Strain-gage measurements on test specimens can be recorded on 800 channels.

Tail units and smaller structural components are tested on a smaller frame, similar to main frame design. Another test-house section is fitted with a specially strengthened floor, supplemented with stanchions and overhead tackle for proving seats, castings, doors and other small components. A parallel installation for work of this type may also be done on a large L-frame, with loads up to 20 tons.

▶**Machines**—Testing machines include two Avery universals (15- and 50-ton capacities), and a Handley Page-designed machine for compression tests (up to 200 tons).

For fatigue testing, there is a Losenhausen unit with a load range up to 300 tons for static trials or 150 tons fluctuating; a Handley Page-designed Krouse type machine with a load range of 1,000-5,000 lb.; and an Ansler vibrophore for loads up to 4,000 lb.

▶**Tank**—Pressure tests on fuselages can be run in the facility's water tank—42 ft. long and 14 ft. wide and deep.

HP says that primary failures are easily determined and that it is usually possible to repair specimens and test them to a higher pressure.

▶**Rigs and Labs**—A drafting room, plus machine shop and fitting shop, make it possible to design and build on the site all rigs needed for functional testing of aircraft systems.

Research facilities include electronic, chemistry, photographic and instrument laboratories. The electronics lab designs a substantial amount of the measuring equipment used in testing. The chemistry section is stressing metallurgical research and studies on improved methods of spotwelding and synthetic-resin bonding.

Boeing Divisions Plan Expansions

Boeing Airplane Co. is setting up a number of new facilities to take care of expanded activities in test, engineering and manufacturing research phases on advanced projects.

▶**Fuel Tank Lab**—A new fuel tank test laboratory, scheduled for operation next February as an addition to the company's powerplant test center at Boeing Field, Seattle, will include accommodations for a huge slosh and vibration table, equipment for determining fuel tank weathering properties, and facilities for refrigerating and checking tanks at temperatures as low as −85F. A large, paved apron will be used for outdoor tests and provisions will be made for underground fuel tanks and distribution.

The slosh and vibration test table will take full fuel tanks weighing up to 50,000 lb. The table will provide for a 15-deg. tilt and vibrate at various frequencies and amplitudes adjustable during operation.

Cost of the new facility, reported as $283,018, will be paid for by the Air Force, with Boeing acting as the prime contractor.

▶**Engineering, Research Additions**—At Boeing's Wichita division, a new building will be constructed to accommodate expanded engineering activities for the B-47. It also will relieve office area congestion and increase cafeteria capacity. Cost of the new addition will be about $850,000.

Boeing, Seattle, has formed a new manufacturing research unit, which has taken over the entire staff of the former mechanical development unit.

Work of the older activity largely was restricted to development of fixtures, dies and tools that were requested by the shops.

The new unit will perform independent research and work out entire processes and build sample tools and fixtures. It will work closely with committees representing planning, tool and parts fabrication, special tools and equipment, and inspection departments. The organization will be headed by E. E. Carpenter, former mechanical development supervisor of the Seattle plant.

USAF Contracts

Following is a list of recent USAF contracts announced by Air Materiel Command.

Aircraft Radio Corp., Boonton, N. J., ARC Type 12 equipment, $210,000.

AiResearch Mfg. Co., Div. of the Garrett Corp., 9851 Sepulveda Blvd., Los Angeles, Calif., actuators, thermostats & shaft assemblies, 1 lot, $941,545. thermostat, actuator, 53 ea., 141 ea., $29,652.

Airpath Instrument Co., Lambert Field, St. Louis, Mo., compass, pilot's standby, spare parts, 1562 ea., 1665 ea., $93,234.

American Machine & Foundry Co., Electroncis Div., Boston, Mass., ground radar beacon & jamming simulators, spare parts, 27 ea., $160,907.

Arrow Sales, Inc., 7460 Varna Ave., North Hollywood, Calif., housing, 1219 ea., $26,147.

Baldwin Co., 1801 Gilbert Ave., Cincinnati, Ohio, pulse analyzer, 684 ea., $521,395.

Bendix Radio Div., Bendix Aviation Corp., Baltimore, Md., ARN-6 components, 1400 ea., $1,778,083.

Berndt-Bach, Inc., 7377 Beverly Blvd., Los Angeles, Calif., camera, 8 ea., $48,921.

Burton Mfg. Co., 11201 West Pico Blvd., Los Angeles, Calif., indicators, 78 ea., $26,910.

Chicago Pneumatic Tool Co., 570 East Larned St., Detroit, Mich., spare parts, $557,442. spare part, $26,211.

Collins Radio Co., Cedar Rapids, Ia., transmitting receiving unit, $193,808.

Dayton Aviation Radio & Equipment Corp., Dayton Municipal Airport, Hangar 2, Vandalia, Ohio, tuning assembly, tuning unit, 2094 ea., 2002 ea., $87,403.

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., pump unit, 120 ea., $28,078. servo, electric Type E-2, 30 ea., $1,417,379.

Electronic Div., Curtiss-Wright Corp., Carlstadt, N. J., trainer, ground instr. flying, maintenance data, spare parts, 86 ea., —lot, $3,998,876. trainers, radio procedure, maintenance data, spares, 84 ea., $1,927,079.

Fairchild Camera & Inst. Corp., Robbins Lane, Syosset, L. I., N. Y., CAX 12 camera systems, $2,303,075.

Fogarty Electric Co., 946 Blair Ave., Cincinnati, Ohio, furnish & install power center, $55,783.

General Electric Co., 1 River Rd., Schenectady, N. Y., field assy., 338 ea. $60,383. indicator, 6915 ea., $691,559. generators, $552,259.

Gilfillan Bros. Inc., 1815 Venice Blvd., Los Angeles, Calif., actuator gear boxes, 278 ea., $76,880.

B. F. Goodrich Co., 500 South Main St., Akron, Ohio, deicers, 628 ea., 371 ea., 622 ea., $249,722. deicers, 197 ea., 85 ea., 115 ea., $111,552.

Goodyear Tire & Rubber Co., Inc., 1144 E. Market St., Akron 16, Ohio, wheel & brake assy., 400 ea., 1500 ea., 14097 ea., $80,530. brake assy., wheel assy., brake assy., 413 ea., 208 ea., 150 ea., $185,431.

Gould-National Batteries, Inc., Depaw, N. Y., battery, aircraft, 374 ea., 1009 ea., 140 ea., $63,823. aircraft batteries, 50 ea., 146 ea., 16 ea., $63,066.

Gremco, Inc., 3535 N. Sylvania, Ft. Worth, Texas, diesel generator units, motor generator units, rectifier, 30 ea., 120 ea., 120 ea., $4,052,352.

Hughes Simonson Eng. Co., 20 North McGee St., Dayton, Ohio, painting of exhaust piping sys., all, $50,695.

Jack & Heintz, Inc., 17598 Broadway, Cleveland, Ohio, Q-6 generators, 670 ea., $286,413, generators, 1,738 ea., $1,275,247.

Kollsman Instrument Corp., 80-08 45th Ave., Elmhurst, N. Y., indicator, tachometer electric, 5,377 ea., $669,544, airspeed indicators, 345 ea., $31,829, spare parts, 4716 each, 16,770 ea., 19513 ea. $34,271, indicator, true airspeed, 2623 ea., $785,262.

Lackner Co., 1115 York St., Cincinnati, Ohio, airspeed indicator, 744 ea., $36,251.

Lavoie Laboratories, Inc., Mataway-Freehold Road, Morganville, N. J., cavity, 339 ea., $54,562.

Lear, Inc., 110 Ionia Ave., N.W., Grand Rapids, Mich., indicator, Type K-4 control, spare parts, 189 ea., 189 ea. varies, $1,154,539.

Leland Electric Co., 1501 Webster St., Dayton, Ohio, inverters, 518 ea., 142 ea., 770 ea., $525,842.

G. H. Leland, Inc., 123 Webster St., Dayton, Ohio, solenoids, 23,000 ea., $73,600.

Lycoming-Spencer Div., Avco Mfg. Corp., Williamsport, Pa., containers, 144 ea., $38,571. spare parts, $202,835.

Nash Eng. Co., 242 Wilson Rd., South Norwalk, Conn., pump assy., 120 ea., $54,360.

National Die Casting Co., 3633 W. Touhy Ave., Chicago, Ill., accelerometers, 7247 ea., $632,424.

W. H. Nichols Co., 48 Woerd Ave., Waltham, Mass., pump assy., plate and bearing, head and bearing-subassy., 88 ea., 935 ea., 2411 ea., $99,194.

Ohio Hoist & Mfg. Co., Broadway & Chaincraft Rd., Cleveland, Ohio, tiedown cargo, 7304 ea., $134,320.

Olympic Radio & TV, Inc., 34-01 Thirty-Eighth Ave., L. I., N. Y., components of radar set, $393,981.

Pacific Div., Bendix Aviation Corp., 11600 Sherman Way, North Hollywood, Calif., valve assy., pump assy., valve assy., 25 ea., 280 ea., 345 ea., $50,428.

Pacific Piston Ring Co., 1810 W. Pico Blvd., Los Angeles, Calif., valve assy., solenoid, plunger, 1211 ea., 25 ea., 25 ea., $29,560.

Platt Electronics Corp., 498 Broome St., New York, N. Y., radio set, oscillator assy., motor, 1500 ea., 1000 ea., 500 ea., $71,675.

Joseph Pollack Corp., 75-99 Freeport St., Dorchester Dist., Boston, Mass., switch, remote control, selector, 8 ea., 509 ea., 18 ea., $124,737.

Red Bank Div., Bendix Aviation Corp., Eatontown, N. J., inverter, rotary, 478 ea., 191 ea., $235,729.

Red Jacket Mfg. Co., 1051 S. Rolff St., Davenport, Iowa, pump assy., 100 ea., $38,850.

Ruland Mfg. Co., 380 Pleasant St., Watertown 72, Mass., valve assy., 11485 ea., 4752 ea., $33,935.

FLAW SPOTTER

New million-volt X-ray machine in Eaton Mfg. Co.'s Battle Creek, Mich., plant is used for searching inspection on sodium-cooled piston-engine valves. The General Electric X-ray unit can radiograph several hundred valves in one exposure because its beam emanates through 360 deg. around X-ray tube's target. It can also be used in radiography of castings. Installation includes fully automatic film-developing and drying equipment.

FIELD EXPEDIENT—It required only a few minutes for this big Army H-19 Sikorsky helicopter to lift and place a prefabricated control tower into position atop an airfield-operations building in Korea. The Sikorsky was called when a conventional crane tried and failed to do the job. Regular work of Army H-19s is transportation and supply.

AROUND THE WORLD WITH SIKORSKY HELICOPTERS

HIGH HAUL—In rugged British Columbia, a 50-mile power line is being built to serve an Aluminum Company of Canada plant at Kitimat. Work on this project has been enormously speeded by S-55s, flown by Okanagan Helicopters, Ltd., which can airlift almost everything needed to virtually inaccessible construction sites.

PROBLEM SOLVER—Operation of eight factories in eight Ohio and Pennsylvania cities presented unusual transportation problems for executives and staff members of Rockwell Manufacturing Company, Pittsburgh. Now a new Sikorsky S-55 helicopter is in operation, providing fast, practical transportation to and from the outlying plants.

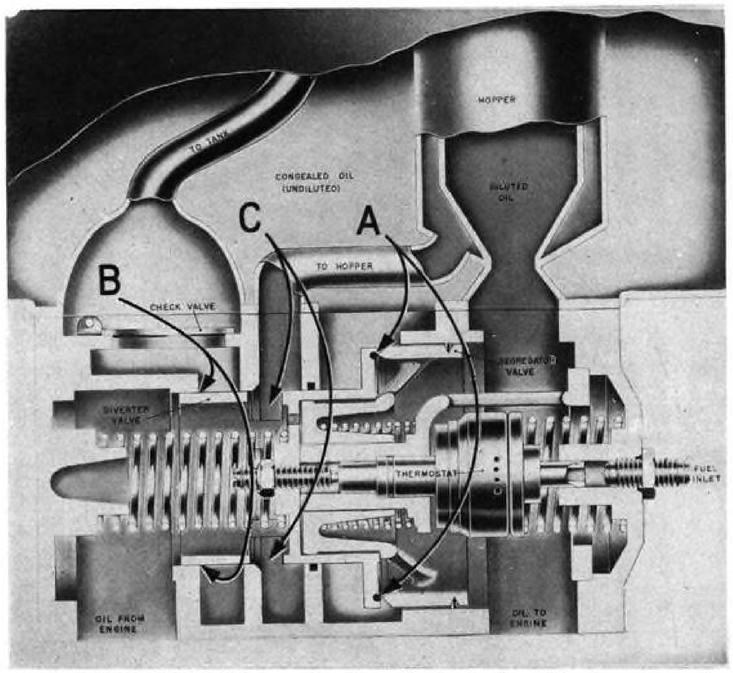
RESEARCH TEAM-MATE—A new Sikorsky S-55 helicopter is the latest addition to Sperry Gyroscope Company's large flight research department at MacArthur Field, Long Island. This versatile aircraft will be used as a flying laboratory, helping Sperry engineers test and develop improved instruments and other equipment for navigation and flight control.

SIKORSKY AIRCRAFT

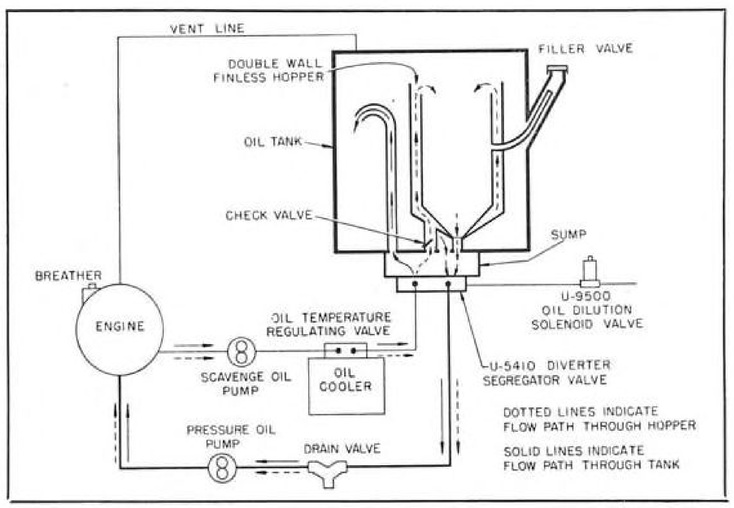
BRIDGEPORT, CONNECTICUT

One of the Four Divisions of United Aircraft Corporation

New Oil De-Aerator Speeds Arctic Starts



HOW DCWOS OPERATES: Assuming that engine is shut down, diverter and segregator valves are positioned as shown. Postive seal at "A" prevents undiluted makeup oil from pressure in "In" and "Out" chambers separates valves slightly at "A" allowing makeup oil to flow to the engine as soon as it becomes fluid enough, until oil reaches 130F. Over 130F, diverter valve moves to the left, opening port "B," allowing part of the return oil to flow through check valve to decongealing makeup oil in main body of tank if oil in tank is warm enough to allow flow. At 160F, diverter valve opens port "B" fully, allowing most of return oil to go to tank. Port "C" always remains slightly open, permitting small lubricant flow into hopper to prevent entrance of air into "oil in" circuit.



- **UAP system eliminates lubricant foaming.**
- **It also cuts preheat time, controls dilution.**

By George L. Christian

A particular, USAF-approved method of de-aerating aircraft engine oil offers the additional advantages of positive control of oil dilution and elimination of the need for engine preheat in arctic climates.

The system—known as De-Aerating Cold Weather Oil System (DCWOS)—was developed for reciprocating engines by United Aircraft Products, Dayton, after 10 years work.

It is in production for the Piasecki H-21 and the Grumman SA-16, according to United, and has been tested on the B-36, B-50, and the C-123. Production was scheduled for the T-36 and C-123 before they were cut back. A B-50 installation was made in a Fairchild C-119 and was successfully service-tested in Alaska last winter at temperatures down to minus 50F. A DCWOS system is also being tested in two Army tanks.

▶ **Advantages**—Here is what the military gets from United's new engine de-aerating unit.

• **Better engine lubrication.** The oil that circulates is more liquid, has less air and foam. Sludging and oxidation are reduced.

• **Faster cold weather starting,** eliminating as much as six hours of engine preheat.

• **Faster oil dilution.** Time is reduced as much as 300%.

F. E. Carroll, Jr., UAP's chief engineer, achieved this triple-utility system by using three basic ingredients:

• **New type of oil hopper** in the oil tank.

• **New diverter-segregator valve** mounted outside the tank to direct engine oil flow.

• **New theory of oil circulation** in an aircraft engine's oil tank.

▶ **Foam Problem**—To avoid foaming of oil and its consequent spewing out of engine breather lines, scavenge pumps of larger capacity than the pressure pumps are installed in engines. But as a result of this extra capacity—as much as two or three times the pressure pump's—air is entrained at the sump, and the oil returned to the tank has about 15-25% air (by volume), according to Carroll.

This caused no particular problem before hoppers for oil dilution were introduced in the system. The oil tank was large enough to serve as a settling chamber and enough entrained air escaped to avoid lubrication problems in the engine.

But cold-weather operation requires oil dilution, and hoppers had to be provided to segregate diluted oil from surrounding makeup oil. Capacity of the hoppers proved too small to allow air to "settle out" of the return oil.

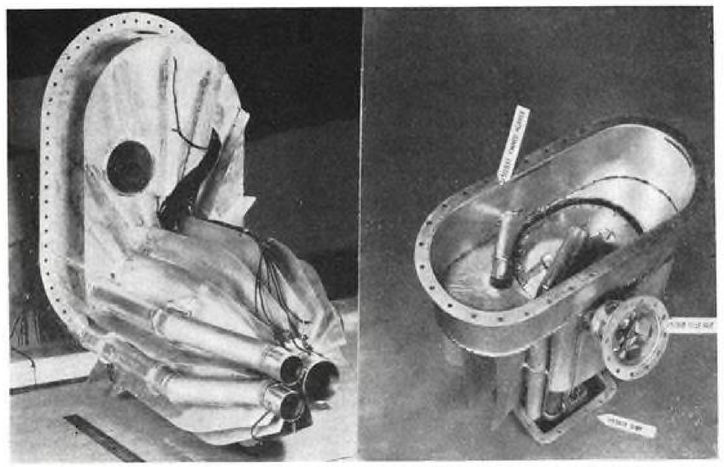
Result was that "champagned" oil was pumped to critical engine bearings, and failure rates rose.

To combat this condition, mechanical de-aerators and anti-foaming additives were tried. The de-aerators required working pressure and so were installed between the oil cooler and tank. They eliminated significant quantities of air, but the oil picked up air again in the hopper so net gain was small, Carroll says. The additives, such as 0.0015% silicone fluid, have been used with great success in some cases, but are not approved by the military.

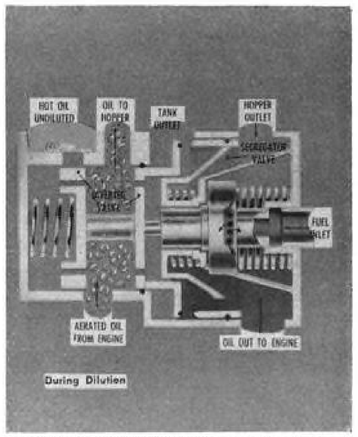
▶ **Diverter-Segregator**—In the DCWOS setup, most of the return oil is directed through the diverter-segregator valve tangentially against the main body of oil tank instead of the hopper (after oil temperature has reached 160F). The return oil thus has a large enough settling chamber for effective de-aeration.

Below 130F, the valve sends all the return oil to the hopper to hasten its warmup. Between 130-160F, return oil is directed partly into and partly outside the hopper.

Carroll reports that a special adaption of this valve is now used on the Lockheed P2V-6 Navy plane.



FINNED HOPPERS with expansion tanks. Unit at left is installed with R4360 engines powering B-50s; the hopper at right is for R1820 powerplants of H-21 helicopters.



DURING DILUTION, fuel enters "oil out to engine" through holes in segregator valve. Diverter prevents oil from returning to tank.

▶ **Benefits**—Removing the air from the oil gives these benefits:

• **Reduced sludging.** Elimination of air in the oil results in reduced sludge formation caused by oil oxidation. And sludge is one of the worst enemies of reciprocating engines. Another means of reducing sludge in large engines, currently under evaluation by USAF, is the installation of Fram oil filters (AVIATION WEEK June 22, p. 74).

• **Less acid.** Aerated oil's oxidation results in formation of acids which attack the lead-indium engine bearings, causing excessive wear.

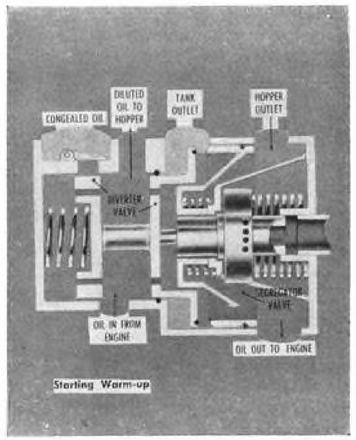
• **More oil.** Elimination of air in oil means that "champagning" effect is done away with and bearings receive liquid oil. Liquid oil has superior heat transfer qualities and better lubricity than foamed oil. Also higher oil pressures may be kept at high altitudes.

Carroll reports that flight tests conducted on a military bomber "using the diverter system showed an increase of 15 psi. main engine oil pressure over conventional hopper system at 40,000 ft. altitude."

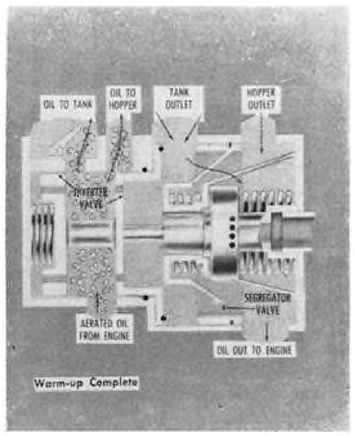
▶ **No Preheat**—Starting aircraft engines at minus 50-60F poses particular problems, which are compounded by the necessity of getting military aircraft into the air as quickly as possible.

Carroll quotes USAF estimates that from two to six hours of preheat are required to get engines on a plane the size of the Douglas C-124 Globemaster warm enough to start. Of this, 80-90% is required to warm up the oil system; the remainder is for the fuel system.

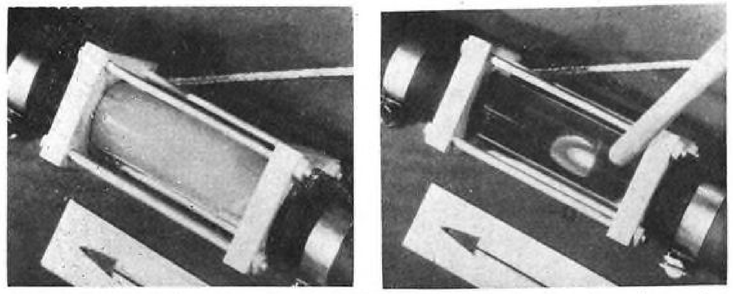
USAF has developed a Hot Prime Fuel System that precludes the need for heating the fuel system. United will manufacture the HPFS. In conjunction with the company's de-aerating system, this will completely eliminate present preheat requirements for piston-



HASTENING engine warmup, diverter valve cycles oil from hopper to powerplant and back again until lubricant heats to 130F.



STANDARD operating position of diverter allows most oil from engine to flow to tank. Small return to hopper removes circuit air.



FOAMING OIL (left) is changed to clear lubricant (right) in aircraft engines after passing through United Aircraft Products' new De-Aerating Cold Weather Oil System.

engine airplanes, according to Carroll.

The reason so much heat has been needed for thawing out engine oil is that there had been no satisfactory method of separating diluted oil in the hopper and tank-oil-out line from undiluted makeup oil in the tank, Carroll says.

▶ **Oil Slugs**—Among the various methods tried were using flappers or lightly spring-loaded check valves over ports connecting bottom of the hopper to the main tank. But undiluted oil seeped into the bottom of the hopper, oil-out line, or both. The result was that a solid slug of frozen oil would block oil entry to the powerplant when the engine was started, and a quick shutdown was necessary to avoid ruining the engine.

Carroll says: "Since all attempts to obtain positive segregation [of diluted and undiluted oil] were fruitless, the obvious solution was to melt the frozen oil slugs by . . . brute force, i.e. the application of . . . large amounts of heat for hours . . . to the oil system before attempting an engine start. . . . Several units of this external ground heating equipment of 400,000-Btu. capacity per unit are required for the oil system. . . ."

▶ **Less Equipment**—No "brute force" is required with DCWOS, Carroll points out.

No heavy, costly ground heating equipment is needed to start aircraft in cold weather. Considerable logistics savings would result in not having to transport such units to arctic bases. Other economies would be realized in elimination of maintenance of the equipment, men to operate it and the sizeable amount of fuel consumed by high-Btu.-ouput machines during oil system warmups.

▶ **Fast Starts**—With the DCWOS installed, starting times are reduced from hours to minutes, says Carroll. Full takeoff power may be applied to an engine that has been frozen in minus 65F temperatures in less than 30 min., Carroll points out.

UAP's chief engineer quotes tests run in conjunction with Wright Air Development Center engineers in which "full oil flow was diverted at 24½ to 28 min., depending on the particular system used . . . when the entire hopper, makeup oil, diverter-segregator valve, and approximately two feet of the engine supply line were maintained in a cold dry ice fuel bath between minus 65 and minus 75F until the undiluted makeup oil temperature had reached minus 60F. . . . In all cases positive segregation was provided. Preheat was never used."

Moreover, the diverter-segregator valve design includes fail-safe provisions that preclude engine oil starvation, Carroll says.

CONVENTIONAL HOPPER SYSTEM VS. DIVERTER SYSTEM DEAERATION COMPARISON
—GRADE 1120 OIL—

OIL TANK TESTED	CAPACITY U.S.GAL.	ENGINE OIL FLOW LB./MIN.	OIL TEMP. °F	OIL LEVEL IN TANK	%AIR TANK INLET	%AIR TANK OUTLET	%AIR REMOVED	REMARKS
RCAF LANCASTER	44	113	180	¾ FULL	16	12	25	CONV. HOPPER SYS.
					21	1	95.3	DIVERTER SYS.
RCAF LANCASTER	47	113	180	¾ FULL	22	12	45.4	CONV. HOPPER SYS.
					22	0	100	DIVERTER SYS.
GRUMMAN F8F-1	17	140	167	¾ FULL	16	7	56.2	CONV. HOPPER SYS.
					18	3	83.3	DIVERTER SYS.
RCAF MOSQUITO	19	100	175	¾ FULL	23	10	56.5	CONV. HOPPER SYS.
					24	2	91.7	DIVERTER SYS.

▶ **Speedy Dilution**—The DCWOS provides for positively controlled oil dilution which reduces time to reach a given percentage of dilution by as much as 300%, UAP's chief engineer claims. Engine running time at undesirable idle rpm. is reduced to a minimum.

Here is why the time is so sharply reduced: In a standard hopper setup, as oil diluting takes place, the diluted mixture overflows the hopper and diluted oil pouring into the main tank forces undiluted makeup oil into the circulating system.

This action may continue to the point where the desired 40% dilution can never be attained, because dilution times are extended to such a point that engine heat boils off the fuel as fast as it is introduced into the oil. In any event, the prolonged dilution times can be harmful to the engine.

▶ **Early Design**—The first DCWOS hoppers incorporated a USAF-designed, mushroom-shaped addition at the top of the hopper to contain the surplus, diluted oil.

Later investigation showed that when diluting fuel is introduced into the diverter-segregator valve, a minute amount of "backflow" through the makeup port occurs which effectively prevents any undiluted makeup oil from entering the system during fuel dilution period.

So the need for the mushroom addition was eliminated—makeup oil cannot enter the circulatory system with the DCWOS, even when the hopper overflows.

▶ **How It Works**—The hopper, oil-tank-out line and engine all contain diluted oil only when engine is started. Differential hydraulic pressure between the "in" and "out" chambers of the diverter-segregator valve immediately opens the segregator valve slightly, allowing tank oil to flow from the tank as the engine requires it during initial warmup period. Diverter valve is positioned to direct cold oil coming from engine to the hopper only. Tank port is closed off.

When oil from the engine reaches 130F, an integral Vernatherm thermostet moves the diverter valve to open the tank port so that warm oil from engine may now flow directly into the tank, but only if the "to-tank" line is de-congealed. If oil in this line is still solid, valve will relieve at 12 psi. and oil will continue to flow into the hopper until the "to-tank" line clears.

All this time, oil flowing from the engine has carried its heat to the hopper through whose walls the heat is used to de-congeal undiluted tank oil. At 160F, the diverter valve is moved to open the tank port wide, almost, but not completely closing the hopper port. A small flow of oil is constantly circulated through the hopper to pre-

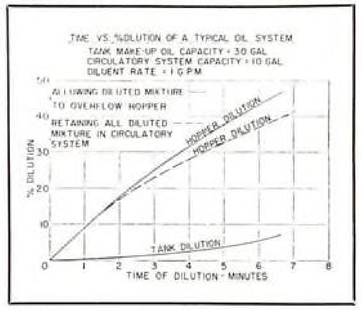


CHART shows time needed by hopper to obtain percentage of oil dilution.

vent any air from entering the oil at the hopper outlet.

Locating the thermostat in the "out" chamber prevents engine oil inlet temperature fluctuations from affecting the unit. This results in steady thermostat operation. Entire operation is automatic.

► **Dilution**—This is how Carroll describes dilution as performed with the DCWCS:

Before engine shutdown, fuel is directed into the diverter-segregator valve in the "oil-out" chamber under pressure.

The cold fuel (even at 70F) flowing through and around the thermostat makes it retract in two to five seconds. The return spring forces the diverter valve to close the tank port and direct the oil flow through the hopper. This dilutes oil in the hopper circuit. The small opening of the segregator valve allows a little oil at the bottom of the tank to be slightly diluted. When the segregator valve closes after engine shutdown, this diluted oil slowly rises to the top of the tank.

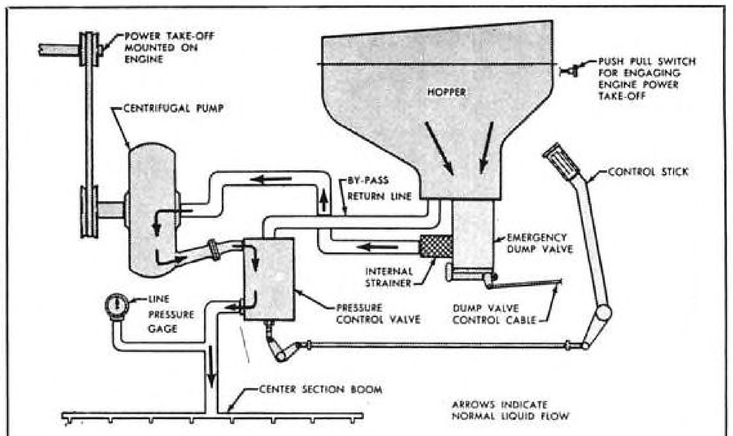
As the thermostat absorbs heat from the surrounding warm oil, after flow ceases, the diverter valve will tend to move away from the segregator valve. But opening of the segregator does not occur, as it is forced to follow the diverter by the force of the segregator spring. Complete segregation—closed check and segregator valves—prevents the collection of undiluted oil in any portion of the hopper circuit, Carroll says.

Since there is no communication between hopper and tank, filling both hopper and tank from a single point is accomplished by inserting a hopper filler line inside the tank filler.

Lear Offers New Service

Lear, Inc., is offering engineering, configuration and interior work, and other phases of aircraft modification, including autopilot and radio installations, at Clover Field, Santa Monica, Calif. The new service will supplement Lear's Grand Rapids, Mich., facility. Lockheed Lodestar modification will be available only at Lear-Santa Monica.

NEW AVIATION PRODUCTS



ENGINE-DRIVEN LIQUID SPRAY SYSTEM

Dust-Spray Kit Stresses Simplicity

Standardized equipment for agricultural planes, engineered to provide more precise control and greater flexibility in spraying and dusting operations, is being produced by Transland Co., subsidiary of Hi-Shear Rivet Tool Co.

The design stresses easy installation, interchangeability and minimum interference with normal flight operations the company says. This approach is exemplified in a dust-spray kit for the Stearman PT-17, many components of which can be used in other agricultural aircraft.

The aluminum hopper, mounted in front of the pilot and neatly faired to give maximum vision, can be used both for dusting and spraying. Attach fittings mate with standard Stearman structure. Capacity is 26 cu. ft.

For liquid spray, the pilot can control flow through a range of from .5 to 17 gal. per acre. This avoids the need for changing nozzle orifice tips, with each change in application. Fluid is drawn from the hopper by a centrifugal pump driven by a V-belt connected to a power takeoff on the aircraft's engine and sprays out through 25 nozzles spotted at intervals along a tube or boom suspended below the wing.

Transland estimates more than 2,000 operators using some 7,000 aircraft are engaged in dusting, spraying, defoliating and seeding activities. Most of this business has developed since World War II, the company says.

List price of the dust-spray kit for the Stearman airplane is $1,490 F.O.B. El Segundo.

Transland Co., 223 California St., El Segundo, Calif.

Tiny Tape Recorder Tells How Many and When.

Recorder that can fit in the palm of the hand will record a wide variety of on-off phenomena together with the time they occurred, according to Alden Electronics and Impulse Recording Equipment Co. It can operate unattended.

The unit operates in sub-zero temperatures and uses Alfax ¼-in. electrosensitive tape carrying two separate data traces plus a timing trace. The tape moves under tiny styluses actuated by normally open or normally closed switches which make or break the marking current as the monitored actions go on or off.

Either one or both data-collecting channels can be used. Timing mark signals on the third channel are provided by tiny internal switches. Actions separated by as little as ¼ sec. are positively recorded, the company says.

The recorder can take down such information as machine down-time and operation, valve opening and closing, voltage or other variations beyond set limits, and door opening and closing. On one job, where it was left unattended on a mountaintop in sub-zero weather, it gathered 8 days of weather information, the company says. The unit contains a motor to drive the takeup reel in the magazine and can be plugged into any 110-v a.c. outlet for operation.

Alden Electronic and Impulse Recording Equipment Co., Westboro, Mass.

STOWED, new seat folds against wall.

IN USE, it swings out against door.

Swing-Out Unit Provides Seat for DC-6 Stewardess

A new swing-out folding seat for National Airlines' DC-6s and -6Bs provides a chair for stewardess during takeoff and landing.

The seat assembly is mounted alongside a lavatory door in the forward section.

The new seat opens by swinging 180 degrees on its vertical hinges until the back is flat against the door; then it is folded down, locking in place. It meets loads as required by Civil Aeronautics Administration's TSO-C25.

For stowing, the seat is released by pulling a spring-loading knurled knob on the side plate of the folded-down seat. The folded unit snaps into a clip mounted on the wall, permitting access to both forward lavatories.

The swing-out arrangement still leaves room for the standard Douglas stewardess seat unit, so that there is sit-down space for two.

Acrosmith, Inc., Miami 48, Fla.

U.K. Revives Interest in Turboprop Liners

- **British observers predict trend away from pure jets, that Comets will be last 'for a long time.'**
- **BOAC chairman says turbine-propeller combination is 100 mph. slower, but more economical than jets.**

(McGraw-Hill World News)

London—An epidemic of turbopropitis has hit the British aviation industry. Three major engine manufacturers have new turboprop projects in the mill and informed industry observers are predicting that the de Havilland Comet series will be the last turbojet transports to be built in any volume here for a long time.

The revival of British interest in turboprops for civil jet transports follows a similar trend in the United States, where the turboprop is currently being boomed for both military and civil transports (Aviation Week Aug. 10 p. 13; Aug. 3 p. 7).

Largely responsible for the revived British interest in turboprop airliners is Sir Miles Thomas, British Overseas Airways Corp. board chairman, who has never made any secret of his preference for the turbine-driven propeller as an economical jet transport for airline operations.

▶ **Up to Sir Miles**—It is Sir Miles' decision on a Comet 3 replacement that will make or break British transport manufacturers. He has let many visitors know recently that he is most reluctant to pioneer any further turbojet transports. He tipped his hand publicly in a recent article in the London Times, where he said:

"The big propeller turbine aircraft will not be so fast as the pure-jet type by almost 100 mph. It will not be so smooth. It will not fly so high. But it will be a great deal quieter (from the outside) and a great deal more economical to operate—at least 50% better than a pure jet on mileage-per-gallon-per-ton-carried. . . . Present evidence is that the propeller is likely to be a good friend to airmen for many years to come, if only because it gives faster acceleration and can be used as a brake."

Sir Miles' future interest in large turboprop airliners is keyed specifically to a new project under development by Bristol Aeroplane Co., Ltd., which also makes the 100-passenger turboprop-powered Britannia transport.

▶ **Super-Britannia**—The new Bristol project is a closely guarded company secret. Known tentatively as the Super-Britannia, it will be built around four new twin-spool turboprops that will offer a considerable power increase over the 4,000 equivalent shaft horsepower of the Proteus models now powering the Britannia.

British turboprops have consistently fallen short of their contemporary airframe power requirements. At one time, Bristol was exploring the purchase of American Pratt & Whitney T34 turboprops for the Super-Britannia. The commercial version of the T34 is rated at 5,600 eshp. and now is available for export.

The Super-Britannia probably will have a thin, straight wing and a fuselage stretched beyond the 114 ft. of the Britannias now in production. Gross weight will be close to 170,000 lb. more than that of a Boeing Stratocruiser. The new Bristol airliner would be able to clock a block time of eight hours on 3,500-mi. nonstop London-New York run (seven hours cruising, one for landing and takeoff).

Using BOAC's current reserve requirements of 88-mph. headwinds all the way, diversion to the next alternate field and a two-hour stacking allowance, the Super-Britannia would have to have a still-air range of about 6,000 mi.

▶ **Better Engines**—The engines under development for the Super-Britannia probably are an outgrowth of the Bristol split-compressor Olympus turbojet design. What power Bristol is shooting for in the new turboprops is still under wraps, but it would have to be at least more than 5,000 eshp. to make the project feasible. The split-compressor design would mean considerably lower fuel consumption than now found in current U. S. or British turboprops.

Hamilton Standard, Aeroproducts and Curtiss-Wright are developing high-speed propellers for turboprop operations at well over 500-mph. cruising speeds, and Bristol has a working agreement with Curtiss.

In addition to the new Bristol engine development, Rolls-Royce is continuing its turboprop work with a new project aimed at higher powers than the 1,400 eshp. Darts now powering the Vickers Viscounts. Rolls experimented earlier with two-stage compressors for turboprops and can be expected to continue this trend on its new engine.

There are indications that de Havilland also has a large turboprop in the works and British industry observers hear rumors that DH is sounding out prospective customers on the desirability of powering the proposed Comet 4 with turboprops.

▶ **Viscount Status**—The British were the first to build, fly and operate turboprop-powered airliners, and despite the more spectacular operating performance of the turbojet Comet, American transport manufacturers are feeling their stiffest competition in the foreign airline market from the turboprop-powered Vickers Viscount.

Biggest challenger to the turboprops is expected to be the Rolls-Royce Conway by-pass engine. Championing the Conway is Vickers Armstrongs director-designer George Edwards, who plans four Conways for the forthcoming V.G.7 transport. Edwards considers the Conway a proven engine, claims it will give fuel economy of a turboprop plus the extra speed of turbojet.

He reasons that a by-pass engine will allow cleaner airframe, eliminate slipstream drag and permit higher cruising altitude. He says the Conway is quieter than a turbojet.

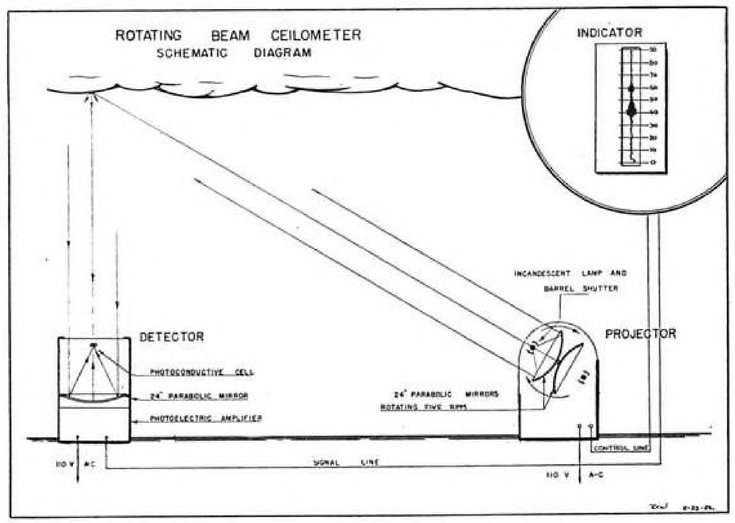
▶ **Turbojet Doubts**—In the past, Edwards' gambles have paid off. He picked the Rolls Dart for Viscount at a time when the Armstrong Siddeley Mamba looked better on paper. Maybe now he will cure turbopropitis.

But currently this citadel of the Comet is alive with the virtues of the turboprop.

Viscount Profit

Vickers turboprop Viscount revenues totaled $1,344,000 during the first 2,000 hr. of scheduled commercial service with British European Airways, the carrier reports. Net profit was nearly $196,000.

BEA says it plans to enter the prototype Viscount V.700 turboprop in the London-New Zealand International Air Race in October.



Airports Get New Weather Gear

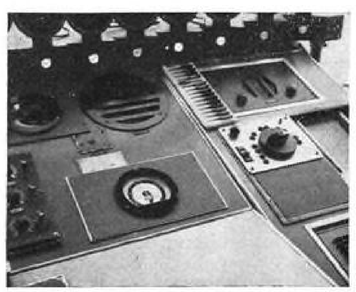
Ceilometer gives airport traffic controller continuous reading on cloud ceiling and visibility over runway.

New York's three main airports this winter will get new weather bureau equipment that may cut airlines' expensive missed approaches in half or better, judging by tests at Washington National Airport.

Instruments will give the traffic controller continuous reading on two key factors governing success or failure of landing approaches that are made during bad weather:

- **Cloud ceiling** on the approach lane.
- **Visibility** at the landing point on the runway.

Ceilometer located at the middle marker in the approach path automatically will report to the tower weather office on cloud ceiling at that critical approach point. Transmissometer which is located by the runway will report information concerning visibility at that point to the tower controller and weather office.



VISIBILITY METER used experimentally at Washington National Airport.

►**Misses**—When this remote equipment was installed at Washington National Airport, missed approaches in visibility of less than one mile dropped from 8 to 3% in the six-month test period.

Previous ceilometer and transmissometer equipment could not report readings automatically to a distant point and therefore had to be located at the weather office. Readings on the conventional equipment were taken a mile and more from the critical point where the weather sometimes differed considerably from the conditions that were encountered by the plane in its actual approach path.

►**ANDB Project**—More improvements are under development and will be completed this winter, according to Benarthur C. Haynes, who is acting chief of Weather Bureau's Station Facilities and the Meteorological Observations Division.

The remote-reporting equipment is the first major improvement to come out of the research project started last winter under sponsorship of Air Navigation Development Board. Sperry Gyroscope has the flight-test contract in the program.

Sperry so far has completed approximately 150 test runs at MacArthur Field on Long Island, N. Y.

Weather Bureau expects to make further substantial improvements in pilot's slant-visibility prediction after correlating results of these flight tests—still in progress.

CAB Trims Denver Route Petitions to 7

Civil Aeronautics Board has taken action to speed up the competitive Denver route case by cutting major airline applications in the hearing from 17 to seven.

This is the second of three long-delayed transcontinental and inter-city route cases that CAB this spring slated for hearing. The two others are the New York-Chicago and the Southwest service case, which the Board is trying to narrow down to workable size.

►**Planting the Seed**—In the Denver case as finally defined by CAB this month, all but one of the route requests are competitive with United Air Lines. UAL has a chance to add Kansas City service to its own system, competitive with Trans World Airlines.

TWA planted the seed of this case several years ago by filing an application to add Denver to its transcontinental routes through Chicago and Kansas City to California.

When CAB set the application down for hearing this spring, other airlines requested hearing of similar petitions. Under the so-called Ashbacker Doctrine determined by the federal courts, all similar petitions must be considered by the Board at once.

Examiner Ferdinand Moran was able to "sever" 10 of the 17 applications for separate handling, however, and the Board adopted his recommendation completely.

►**Up for Hearing**—New route requests now up for Board hearing and decision in the Denver case:

- **TWA, American,** Continental and nonsked North American Airlines will get CAB hearing on their requests to give transcontinental service through Denver. The issue in the case is confined to routes from Chicago and Kansas City specifically to Denver and on to San Francisco and Los Angeles.

TWA already flies from Chicago to Kansas City and from both cities to Los Angeles and San Francisco direct. American flies Chicago-Los Angeles. Continental flies Kansas City-Denver. North American has no route certificate but operates transcontinental air-coach services.

- **Braniff Airways** will be heard on its request for a Kansas City-Denver route. It flies Chicago-Kansas City. CAB rejected the carrier's plea for hearing on Denver-California routes in this case, because the company filed too late.
- **Western Air Lines** asks re-certification on the Denver-San Francisco route it originally sold to United.
- **United,** whose routes the other airlines seek to duplicate, countered by asking for American and TWA routes to the east.

CAB Ponders Subsidies Budget

Civil Aeronautics Board sits down Sept. 3 to decide its newest and perhaps most complex budget problem—airline subsidy appropriation for fiscal 1955. The CAB money request is due at the White House Sept. 15.

Only two Board members were in Washington last week—Joseph Adams and Harmar Denny. Chairman Oswald Ryan and Chan Gurney return Aug. 31, and Josh Lee (convalescing from an operation) Sept. 2.

Complexity of the problem stems from the fact subsidy pay is largely beyond the Board's control in the short term, and that payments previously came from Post Office Department. Airline subsidies (formerly included in mail pay) are in effect contracts between each airline and the Board. While the Board could curb some airline services if necessary to cut costs, that takes time because CAB is a quasi-judicial agency.

Normally, if an airline's costs go up, the Board must pay the extra bills unless it can show mismanagement by the airline. A cost-reduction policy requires a long period of adjustment of services and rates to show substantial results.

►**A New Problem**—This is an old situation with the Board, but firm budgeting is a new problem. Heretofore, CAB gave the Post Office its cost estimates; if they proved low, P. O. asked Congress for a deficiency appropriation.

CAB could ask a deficiency appropriation next year, too, if things went wrong, but the Board is not planning on doing this unless business drops off badly.

With virtually every other government agency cutting expenditures, the Board's Republican majority would be embarrassed to request more money next year.

Yet the nature of airline subsidy rates makes accurate budgeting difficult. The plan of the Administration is to make a close estimate of total subsidy needed, add a modest reserve for contingencies, then make the subsidy in fiscal 1955 fit the appropriation. In case of a business recession, the Board will ask more subsidy for needy airlines. With no recession, most airlines are expected to do well on present or projected rates in fiscal 1955.

►**Outlook**—The Board's past budget estimates have proved surprisingly accurate, the staff says. New Board member Harmar Denny, who has been reviewing the problem, therefore proposes to show Congress the Board's record on budgeting subsidies, present the new budget as this year's best estimate, and allow the appropriation request to speak for itself.

He proposes no padding in the budget. Outlook is there will be no substantial degree of intentional padding.

Most airlines are on final mail rates now. Subsidized international airlines are operating on straight per-mile subsidy rates.

Base mileage figures in rates set an absolute limit on the total subsidy outlay.

Most of the local service carriers—also subsidized—have the more flexible sliding-scale type of rates, but CAB staff unofficially estimates that it would take a substantial recession to increase their subsidy need by 10%. Almost all domestic trunklines, which do most of the airline business today, are off subsidy entirely.

Airline Chiefs Protest Nonsked Program

Following the lead of Air Transport Assn., presidents of trunk airlines are protesting the Senate Small Business Committee's recommendations aimed at invigorating nonskeds.

The committee urged that nonscheduled airlines be permitted to fly 14 round trips a month between any two points and that four or five nonskeds be permitted to fly restricted route-type service (AVIATION WEEK Aug. 10, p. 56).

- **C. R. Smith,** American Airlines president, declared in a letter that was addressed to all of the 96 members of the Senate:

"For at least three years in a row the members of the Senate have been bombarded with proposals from certain of the 'nonscheduled' air carriers.

"Without the veneer their story appears to be this: They want to engage in air transportation, but they do not want to be bound by the provisions of the federal regulatory law, the Civil Aeronautics Act. And they do not want to be prosecuted if they violate the act.

". . . Until the Civil Aeronautics Act is repealed or modified by the Congress, the law should be enforced, as written."

- **W. A. Patterson,** United Air Lines president, said in a letter to Sen. Edward Thye, Small Business Committee's chairman:

"The committee appears to condone those among the 'irregulars' who are in business only because of their deliberate, willful and continuing violating of the law. The committee protests not only that the law should not be enforced against them but that they should be assisted to stay in business."

- **Warren Lee Person** board chairman of Trans World Airlines, said the scheduled airlines, like other public services, are required to take the bitter with the sweet and service large and small traffic markets."

"But the non-scheduled airlines want the sweet only," he declared.

BOAC Buys CPA Comets, Shuffles Jets

London—British Overseas Airways Corp. has purchased Canadian Pacific Airlines' remaining Comet jet liner.

CPA lost its first Comet (1A) last May 2 in a crash at Karachi, India, during the delivery flight from de Havilland Aircraft Co. to the airline's operations base at Sydney, Australia. With only one Comet left, CPA was faced with the problem of buying another, perhaps from RCAF, or sell out.

BOAC, which has lost two of its original nine Comet 1s, provided the answer.

►**BOAC Reshuffle**—The new purchase comes on the eve of a big reshuffling of BOAC Comet services. In October, the British airline will lend two of its jet transports to South African Airways for operations on the London-Johannesburg route. Two BOAC Comets will continue to operate this route, in addition to the SAA service.

By the end of August, the British airline will have increased its service to Singapore from once to twice weekly. Two aircraft will be assigned to this service-plus crew training duties.

The increased service to Singapore comes at the expense of one of the twice weekly flights to Tokyo, by way of Bangkok and Manila. Only one Comet, instead of two, will be working this route from now on. (Tokyo informants report the Tokyo service was cut in half because of lack of passengers. An extra Argonaut service to Tokyo via Hong Kong is being added, however.)

The eighth Comet operates a weekly service to Colombo, Ceylon, where BOAC finally has secured full traffic rights.

►**Philippine Pact**—The decision last week of the U.K. Ministry of Civil Aviation to renegotiate its bi-lateral air pact with the Philippines figures in the reshuffle. Until the Comet came along, BOAC didn't operate a regular passenger service to Manila. The airline does not have passenger rights there, and the Philippine authorities have not granted them for the Comet.

The Filipinos base their refusal on grounds the British don't let Philippine Air Lines discharge and take on London passengers at Rome, Frankfurt and Hamburg stops on PAL's twice-weekly service from Manila to London.

Without operation rights at least at Manila, there would seem to be no practical route for the Comet between the closest usable mainland airport, Bangkok, and Tokyo.

CAB Proposes New Evacuation Rules

Revised requirements for airline crash evacuation on land or sea are proposed by Civil Aeronautics Board. Deadline set by the Board for answering industry comment is Sept. 9.

Highlights of the proposed revision:

- **Escape.** Main-door exits must have a chute or equivalent device capable of handling evacuees as fast as they can come out. Other exits must have some kind of ladder, rope or other escape device readily available.
- **Exit marking.** Exits must be "marked conspicuously," with identity "recognizable from a distance equal to the width of the cabin." Exit-opening handle instructions must be readable from a distance of 30 in.
- **Exit lighting.** Lighting system with independent power source must shine on every exit. It must have an impact switch to light automatically in a crash.

Wiggins Airways
THE COMMUNITY AIRLINE

LOGAN INTERNATIONAL AIRPORT BOSTON, MASSACHUSETTS

Address reply to:
NORWOOD, MASS.
July 31, 1953

Dear Friend:

This probably is the only Last Flight Cover you ever have received. We are sorry to send it to you.

Scheduled service on the route of Wiggins Airways, designated as AM-79, was inaugurated September 19, 1949. On July 3, 1953, the Civil Aeronautics Board voted, 3-to-2, to discontinue the Wiggins service, effective Aug. 1. Time usually is the best judge of the wisdom of such decisions.

Wiggins Airways is in healthy financial condition, and the company will concentrate its efforts on other aviation activities.

We and our passengers are deeply grateful to the many people--in thirty-five cities and towns--who have labored unselfishly to secure continuation and extension of the service. It is with deepest regret that we announce the untimely demise of the Wiggins Airline Division, and send you this Last Flight Cover as a unique souvenir.

Regretfully yours,
WIGGINS AIRWAYS
Jos. Garside
Joseph Garside
President

WIGGINS' LAST FLIGHT

Marking the end of scheduled service by Wiggins Airways on New York-New England system, the carrier sent out black-bordered "Last Flight Covers" such as the one pictured above, with a letter from Wiggins' president Joe Garside. He explains in the letter that Civil Aeronautics Board voted to discontinue the service, effective Aug. 1. (Aviation Week July 13, p. 88).

► **Overseas**—Extended over-water flights shall have:

- **Life vests.** One for each person.
- **Life rafts.** One more than necessary to hold all aboard.
- **Pyrotechnics.** "Suitable pyrotechnic signaling devices."
- **Gibson Girl.** Emergency radio signaling device that is water resistant and floats.
- **Speedy access.** All the emergency equipment, including rafts, must be "readily available and easily accessible in the event of a ditching without appreciable time for preparatory procedures."
- **Passenger briefing.** Passengers must be "orally briefed" on place and use of evacuation devices. This must include a demonstration of life-vest "donning and inflating."

CAA Installs Traffic Radar at 25 Fields

First of Civil Aeronautics Administration's improved surveillance radars, the ASR-2 built by General Electric, has been commissioned at Norfolk (Va.) Municipal Airport. The new ASR-2 enables ground radar operators to view all aircraft within a 30-60-mi. radius of the airport.

The new ASR-2s, now being installed or slated for installation at 24 other major airports, include duplicate standby equipment to take over instantly in the event of failure. This feature permits preventive maintenance without shutting down the radar.

The GE radar also incorporates moving target indication (MTI) that, at the option of the operator, eliminates radar echoes from stationary targets such as buildings and mountains, showing only moving aircraft on the radar scope.

General Electric says ASR-2 radars have been installed and accepted by CAA in the following cities and are now awaiting commissioning: Newark, Philadelphia, Detroit, Houston, Jacksonville, Indianapolis, San Francisco, Birmingham, New Orleans, Pittsburgh, Oakland, Memphis, Portland, Kansas City and Dallas.

They are slated for installation at Cincinnati, Columbus, Seattle, Minneapolis, Salt Lake City, St. Louis, Milwaukee, Anchorage, Alaska and Honolulu, Hawaii.

Modified Lodestar Cruises at 301 Mph.

A specially modified Lockheed Lodestar cruised at 301 mph. true airspeed during speed trials on the West Coast, William P. Lear, research and development director of Lear, Inc., reports.

The performance was achieved at 57.5% rated Meto (maximum except takeoff) power. Normal cruising speed for the standard Lodestar is estimated at 220 mph.

The transport had been remodeled according to specifications developed by Lear (AVIATION WEEK Mar. 16, p. 51), who says he is contemplating further modifications to increase the plane's speed even more. These include main landing gear wheel-well doors, wingtip fuel tanks, new wing leading edge and additional streamlining of windshield, engine cowlings and other airframe components. A cabin pressurization development program is also underway, he states.

CAB to Hear ATC Resolutions

Airlines proposed revision of travel-agent contracts for domestic sales will have to go through formal hearings at Civil Aeronautics Board before a change can be made.

The Board decided to hold an investigation of the Air Traffic Conference resolutions:

- **Allowing discounts** on air-fare-portion of package tours offered by travel agents and tour operators.
- **Cutting maximum commissions** on straight point-to-point air tickets sold by agents. Present commission on ticket sales is 5%. New proposal would place a $1.50 maximum on one-way tickets.

Other proposals by the airlines include eliminating agency reports on their business volume and permitting some designation of general agents without prior approval of the agency committee.

PAA Relinquishes Venezuelan Holdings

(McGraw-Hill World News)

Caracas, Venezuela—Pan American World Airways and the Venezuelan government have signed an agreement authorizing nationalization of all PAA installations in this country except those needed by the airline for radio communications and weather service. Pan American is being reimbursed for its holdings but the figure has not been disclosed.

The agreement will take effect on the day the projected Venezuela-U.S. bilateral air agreement is activated. Under an agreement of Aug. 26, 1942, Pan American's property was to be turned over to the government in 1960.

The bilateral air measure would permit Linea Aeropostal Venezolana, the government-owned carrier, to serve New York, New Orleans and Miami.

CAB ORDERS

(Aug. 3-16)

GRANTED:

North Central Airlines subsidy mail rate increase of $60,000 for the three months Apr. 1-June 30, 1953, and estimated increase of $223,586 for the 12 months starting July 1. Total revised temporary mail pay: $615,802 for the three months and $2,252,549 for the 12 months.

Nogales, Ariz., Chamber of Commerce right to intervene in Nogales air service case.

Apple Valley Building & Development Co. consolidation in Bonanza Air Lines renewal case.

Post Office Department, city of Raton, N. M., Raton chamber of commerce, and Truth or Consequences, N. M., city and chamber of commerce right to intervene in Continental Air Lines Route 29 renewal case.

Allegheny Airlines permission to fly over Altoona and Johnstown, Pa., on certain flights.

Braniff Airways nonstop service Tulsa-Dallas.

Central Airlines Dallas-Oklahoma City and Wichita Falls-Dallas service. Dissents by chairman Oswald Ryan and vice chairman Harmar Denny contended that Continental Air Lines service would be more economical, argued that Central would need too much subsidy. Majority denied Continental's request for extension Wichita Falls-Dallas.

Lake Central Airlines mail pay increase of $82,644 a year effective Apr. 1. New temporary rate proposed in CAB show-cause order is 73.19 cents a mile. Former rate was 68.90 cents. New rate would yield an estimated $1,414,094 a year. Working capital situation was critical CAB says.

Midet Aviation Corp. waiver of technical requirements of Part 41 of Civil Air Regulations to permit flying DC-3s to West End, Bahamas, for construction project there.

Confidential treatment of routine financial forms submitted by Braniff, Pan American, Panagra, Northwest and TWA. CAB granted three-year secrecy on their schedule C-2, Form 41, columns 5-6 reporting distribution of statistics by flights.

Intervention by Socorro, N. M., county, city and chamber of commerce in Continental Air Lines Route 29 renewal case.

Frontier Airlines route request consolidation in Continental renewal case.

New York-Chicago route case intervention by municipalities and chamber of commerce in the area affected. Board denied various Oklahoma and Texas petitions to intervene.

APPROVED:

Routine inter-airline contracts of 18 groups of parties.

Liability rules voluntarily changed by three local carriers, Piedmont, Trans-Texas and West Coast Airlines.

Applications of Northwest, Frontier, and Fargo, N. D., chamber of commerce in Williston Basin area case.

Routine inter-airline contracts between 14 groups of contracting parties.

Trans-Texas Airways mail rate proposed in the Board's previous show-cause order.

ORDERED:

Newly amended economic regulation that forbids scheduled lightplane service on routes between identical airports or to airports within three miles of those served on the same routes by certificated helicopter services. Non-subsidized copter operators may not serve a certificated copter route at all. Aim is to minimize subsidy to certificated operators.

REVOKED:

Robin Airlines operating authority for violating CAB order requiring that the carrier operate only so long as Norman Kessler maintained 50% control.

DISMISSED:

Delta Air Lines objection to Braniff complaints in the reopened southern service to the West Coast case. Braniff added proper data for the record, making objection moot.

CAB investigation of nonsked Air Transport Associates rates Seattle-Alaska. Board revoked ATA's registration letter.

CAB investigation of Regina Cargo Airlines fare New Orleans-San Antonio. Regina cancelled the fare.

CAB investigation of World Wide Airlines fares San Diego-New York. World cancelled the fares.

Delta-C&S Air Lines route extension applications in New York-Chicago route case under Docket 5740 at request of the carrier.

Delta-C&S says previous petitions of its predecessor companies, Delta and C&S, are sufficient.

DENIED:

Aero Finance Corp.'s motion to dismiss CAB enforcement office complaint against the carrier.

Eastern Air Lines motion to dismiss the Board's investigation of service to Owensboro, Ky.; Board proposes to substitute Ozark Air Lines for EAL there.

Empresa Guatemalteca de Aviacion request to intervene in Skytrain Airways' Latin American airfreight case.

Riddle Airlines' application for consolidation in the Latin American airfreight case.

Freight forwarder requests to delay a CAB investigation this year aimed at renewing or amending forwarder regulations (Part 296 of economic regulations). The board also made Railway Express Agency a party in the investigation.

Southwest Airways request to serve Medford-Klamath Falls, Ore. CAB certificated West Coast Airlines; Southwest asked reconsideration.

Consolidation in Lake Central Airlines acquisition case requested by Transport Air Group, Ozark Air Lines and North Central Airlines.

Eastern's motion to investigate all coach fares on route segments shorter than 500 mi. Board said its investigation of Eastern and American Airlines' Boston-New York-Washington fares on coach service (mileage pu to 399) would "furnish an adequate guide to subsequent exercise of managerial discretion in adjusting short-haul coach fares. . . ."

Riddle's request to give scheduled air-freight service to 10 military bases. Eastern protested, and the Board denied Riddle's application because Defense Department said that "while the proposed service would be beneficial . . . there exists no emergency. . . ."

SUSPENDED:

Operating rights of nonsked World Wide Airlines for not filing proper reports for calendar 1952 and first quarter of 1953. Board suspended letter of registration effective Aug. 18 until or unless reports are updated.

CEASE AND DESIST:

Caribbean American Lines agreed to stop accepting passengers ticketed by non-contracted agencies and flying or advertising scheduled flight service.

SHORTLINES

▶**Air Transport Assn.** opposes a bill to increase passport application fee from $1 to $3, raising total passport cost from $10 to $12. Fees should be cut, not raised, ATA says.

▶**Allegheny Airlines** carried 24,062 passengers last month, a 24% gain over July 1952.

▶**British Overseas Airways Corp.'s** July passenger traffic gained 13% from year ago to 23,150. . . . Company leased 56-seat Argonauts for heavy bookings of tourists returning to the U.S. this month.

▶**Capital Airlines** will get the last five Constellations of a group ordered from KLM Royal Dutch Airlines by year's end.

▶**Compania Cubana de Aviacion** has the first of four Constellations ordered in Havana-Madrid service, also plans Havana-Mexico City, Havana-New York and Miami-Varadero (Cuban beach resort) flights.

▶**International Air Transport Assn.** has switched routine administration of rates and fares to a new traffic advisory committee, replacing the traffic committee. . . . IATA reports June interline clearings at $20,798,000 compared with $18,225,000 year ago.

▶**Iraq Airways** has ordered three turboprop Vickers Viscounts.

▶**Japan Air Lines** plans to start two overseas services in November—three DC-6B flights a week to San Francisco and two DC-4 flights weekly to Okinawa.

▶**KLM Royal Dutch Airlines** started trans-Atlantic DC-6A all-cargo flights Aug. 1, with twice-a-week service.

▶**Oakland Airport** movements during the first half this year indicate 10% increase for 1953 from last year's 187,119 flights.

▶**Pan American World Airways** new DC-6B aircoach service from New York to Buenos Aires stops at San Juan, Port of Spain, Belem, Rio de Janeiro, Sao Paulo, Porto Alegre and Montevideo.

▶**Philippine Air Lines** plans to buy "substantial stock interest" in Aviacion y Commercio, Spanish Airline. . . . This is PAL's "first" acquisition of part of another line, the company reports. . . . PAL has switched from DC-6 to Convair 340 on Manila-Hong Kong run.

▶**Pioneer Air Lines** is increasing flight mileage 20%.

▶**Scandinavian Airlines System** reports hauling 14% (4,481 passengers) of total North Atlantic air traffic in June. SAS was third, following Pan American and TWA.

▶**South Pacific Airlines** plans to use DC-4s or DC-6s instead of Solent Flying Boat as previously planned, for Honolulu-Bora Bora segment of route to Tahiti because of CAA limit on Solent payload for that run.

▶**Seaboard & Western Airlines** reports operations last month climbed 23% above year ago to 742,689 revenue miles.

▶**Trans World Airlines** now offers air-travel information to all who write the New York general sales office, sends copy to TWA sales office nearest sender. . . . TWA coach service topped a billion passenger-miles during the 12 months ended July 31. Total international service was 51% coach, domestic 38%. . . . The carrier started nonstop (2 hr.) Las Vegas-San Francisco service Aug. 14, cut the fare to $23.50 one way.

▶**United Air Lines** traffic gained 11% last month from year ago to 261,610,000 passenger-miles. . . . Company doubles its Hawaii coach service Sept. 8 to eight a week at rates 25% less than standard. Sales of package tours to Hawaii gained 40% the first half of this year.

▶**Washington National Airport** plane movements in fiscal 1953 gained 1% to 188,815; number of passengers handled increased 6% from fiscal 1952 to 2,637,296.

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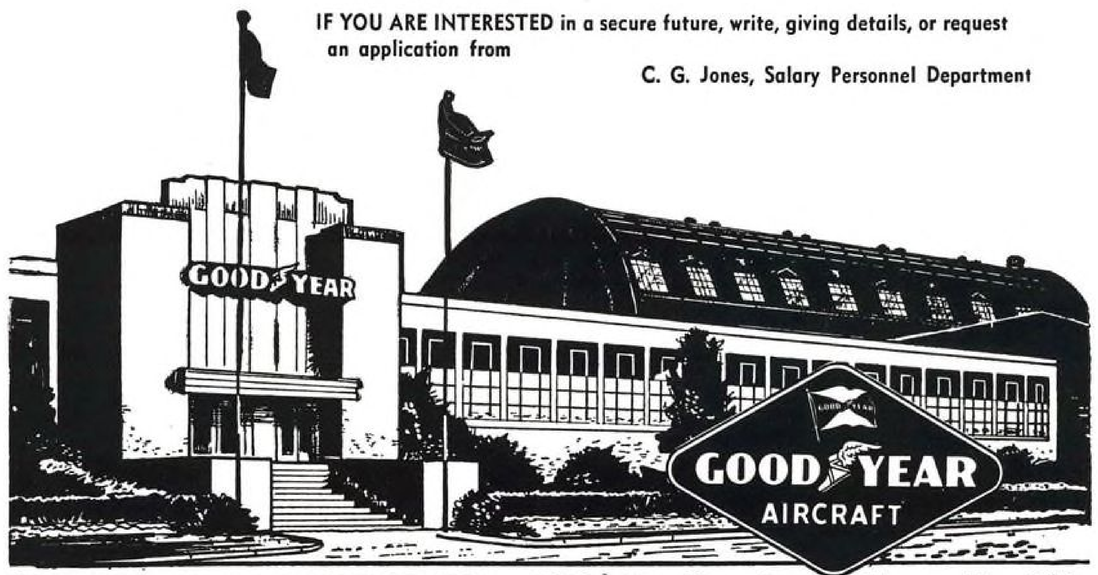

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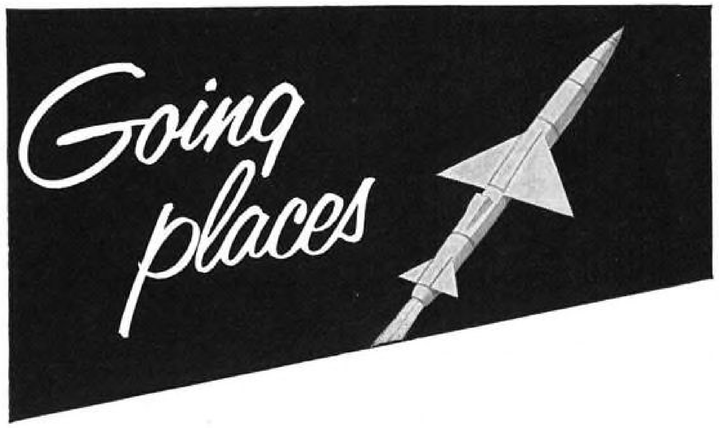

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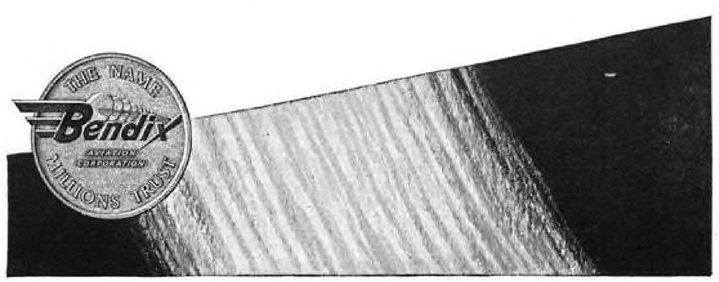

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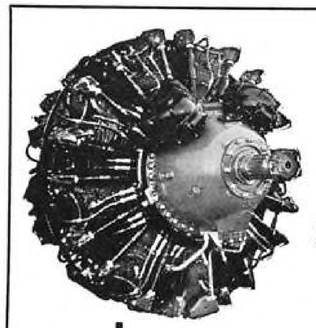

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62	CQ-9	Eclipse	Clutch Switch (PB10)
11	12086-1C	Eclipse	Amplifier
19	15100-1B-A1	Eclipse	Pitch Trim Gauge
8	20000-43A-13A1	Eclipse	Magnesyn Transmitter
67	23000-2A	Eclipse	Magnesyn Indicator
15	22101-11-A4	Eclipse	Pressure Trans.
6	2226-11C-3A	Eclipse	Dual Tach.
9	20100-42B-14A2	Eclipse	Torque Ind.
9	20000-8A-14	Eclipse	Magnesyn Pos. Ind.
23	20100-11C-4-A1	Eclipse	Wing Flap Indicator
11	DW-33	Eclipse	Transformer
23	CQ-2	Eclipse	Switch Box
75	1195-4-A	Eclipse	Vibrator
80	DW-28	Eclipse	Transformer
11	2227-11-D3A	Eclipse	Tachometer
75	1416-12E	Eclipse	Starter
100	716-3A	Eclipse	Generator (NEA-3A)
384	564-2A	Eclipse	Oil Separator
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40	119862	Weston	Carb. Air Temp. Indicator
400	AN5780-2	Weston	Wheel & Flap Position Indicator
1000	AN5780-2	GE	Wheel & Flap Position Indicator
40	828TY12Z2	Weston	Dual Carb. Temp. Gauge
11	727TY70Z2	Weston	Air Temp. Ind.
85	727TY72Z2	Weston	Air Temp. Gauge
88	727TY73Z2	Weston	Air Temp. Gauge
83	727TY74Z2	Weston	Air Temp. Gauge
10	728-40Z2	Weston	Air Temp. Gauge
21	8DJ29AAY	G.E.	Cowl Flap Ind.
22	77C5	Lewis	Carb. Air Temp.
16	76B19	Lewis	Cyl. Head Temp.
23	77C3	Lewis	Oil Temp. Gauge
13	77C4	Lewis	Oil Temp. Ind.
30	47B21	Lewis	Free Air Temp.
33	47B22	Lewis	Air Temp. Gauge
28	47B23	Lewis	Air Temp. Gauge
54	47B24	Lewis	Air Temp. Gauge
22	906-6-011	Kallsman	Diff. Press. Gauge
48	254BK-6-052	Kallsman	Diff. Press. Gauge
33	DW-47	Eclipse	Transformer
46	117-47	Edison	Fire Detecter
19	117-10	Edison	Control Box
200	981280	Kidde	CO_2 Cylinders
43	966090	Kidde	Interconnector
104	966679	Kidde	Pressure Control
225	981591	Kidde	Tee
151	A-4614	Kidde	Switch
47	M870036B	Kidde	CO_2 Cyl.
74	923748	Kidde	Oxygen Cyl.
326	982585	Kidde	Valve
325	AN60009-1B	Oh. Chem.	Valve
247	AN6009-2A	Oh. Chem.	Valve
47	2-1046-76	Parker	Valve (3000 PSI)
115	P4CA2A	Parker	Primer
68	SP4-2746-77	Parker	Restrictor Valve
105	SP4-2746-78	Parker	Restrictor Valve
68	6-746-10	Parker	Valve
40	SP4-2746-79	Parker	Restrictor Valve
48	SP-2746-80	Parker	Restrictor Valve
60	SP4-2746-81	Parker	Restrictor Valve
127	PL2-2546-75	Parker	Cone Check Valve
123	PI2-2546-76	Parker	Cone Check Valve
620	PL2-2546-77	Parker	Cone Check Valve
540	PL2-2546-78	Parker	Cone Check Valve
142	SP4-2746-76	Parker	Restrictor Valve
112	PLY-843-54	Parker	Check Valve
23	PL2-1846-77	Parker	Check Valve
120	MF9-713-15A	Vickers	Hydraulic Pump
124	PF12-713-25BCE	Vickers	Hydraulic Pump
10	PF9-2713-20Z2	Vickers	Hydraulic Pump
327	PF4-713-20BCE	Vickers	Hydraulic Pump
57	MF45-3911-20Z	Vickers	Hydraulic Pump (3000 PSI)
28	AA31400	Vickers	Valve
125	D7818	Adel	Anti-Icer Pump
250	AN4014	Erie Meter	Wobble (D-3) Pump
45	AN4103-2	Clifford	Brass (Valve #U4785) Oil Cooler
70	AN3213-1	Scintilla	Ignition Switch
250	A-9 (94-3226)	Nesco	Ignition Switch
66	M862A	Jos. Pollack	Master Switch
148	PG208AS1	Honeywell	Switch Air Ram.
40	PG208AS7	Honeywell	Air Ram Switch
18	4582-AA-6C	Dynamic Air Eng.	Blower
24	U-702-15	Joy Mfg. Co.	Blower
20	V301B7	Aerotec	Pressure Relief Valve
419	450	Skinner	Filter
287	1033-4E1	White-Rodgers	Heater Control Switch
126	17322-2	Fenwall	Thermo Switch
34	9804B	Vapor Car Heating Co.	Control Box
25	46B311	Vapor Car Heating Co.	Compensator
202	A812	Interstate Aircraft & Eng. Co.	Solenoid
46	146102	Bendix	Valve (0-500 PSI)
240	1265-900	Airex	Relief Valve
29	HC2109	Air Associates	Hyd. Cylinder
8	HC2110	Air Associates	Hyd. Cylinder
53	AN6203-3	Bendix	Accumulator 10"-1500 P.S.I.
90	JH950-R	Jack & Heinz	Starter Motor
140	K14949E	Marquette	Windshield Wiper Kit
188	EYLC-2334	Barber-Coleman	Control
230	921-B	Stewart-Warner	Heater (200000 BTU)
22	0655-D	Aro	Oxygen Regulator
65	ASDC2	CO_2 Mfg. Co.	Fire Detector
97	6041-H-146A	Cutler Hammer	Relay (B-12)
237	6141-H69A	Cutler Hammer	Circuit Breaker
47	7264-404	Leach	Relay
22	M-2031	Air Associates	Actuator
11	FYLD2516	Barber-Coleman	Thermostat
51	AYLZ2284	Barber-Coleman	Micropositioner
20	72400	Ham. Stand.	Prop. Reversing Control
10	5X18	Woodward	Governor
46	A14-A-9708P	Westinghouse	Contractor
26	70G3	G.E.	Transformer
718	B2A	Square D	Relay
6	83A9	Surface Combustion Co.	Heater
115	C6363-1-5A	Spencer	Circuit Breaker
115	C6363-1-2A	Spencer	Circuit Breaker
33	18784	Adel	Restrictor Valve
1700	AM1614-80	Heinemann	Circuit Breaker
31	BOBX-2	Allied	Relay
85	12924-2	Adel	Lock Valve
805	58G926	G.E.	Ballast Core & Coil
140	58G946	G.E.	Ballast
40	7210-24	Leach	Relay
66	25432	Airesearch	Flex. Cable
518	MT48C	Bendix Radio	Insulator
20	M-101-B	Aerotec	Pressure Switch
12	MT68EG	Bendix Radio	Mount
52	715E	Fulton Syphon	Temp. Control
478	D9530	Adel	Selector Valve
668	D9530-2	Adel	Selector Valve
428	D9560-2	Adel	Selector Valve
179	D9632	Adel	Selector Valve
237	D9696	Adel	Selector Valve
744	D10044	Adel	Selector Valve
244	D10051	Adel	Selector Valve
814	74247 (TY. PH3)	Aero Supply	Valve
335	AN5830-1	Whittaker	Valve
74	AN5830-6	Whittaker	Valve
60	AN5831-1	Parker	Valve
130	612-4A	Eclipse	Valve
2200	37D6210 (AN4078-1)	United	Solenoid Valve
1888	K1593-6D	Kohler	Valve
500	NF3-5	Mallory	Noise Filter
20	TA-12B	Bendix Radio	Transmitter
35	RA10-DB	Bendix Radio	Receiver
2585	AN3096-4	Grimes	Dome Light
775	AN3096-5	Grimes	Dome Light
1365	AN3096-6	Grimes	Dome Light
6	610-2C	Eclipse	Vacuum Pump
550	PD12K10	Stromberg	Carbureator
236	PR48-A1	Stromberg	Carbureator
90	1685-HAR	Holley	Carbureator
19	1375F	Holley	Carbureator
407	SF9-LN-2	Scintilla	Magneto
185000	LS4-AD1	Aero	Spark Plug
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16	R1820-54	Wright	Engine
4	R1820-60	Wright	Engine
1	R1830-43	P & W	Engine
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500	3506	P & W	Flange
130	9288	P & W	Follower Ass'y.
814	35814	P & W	Blower Ass'y.
53	48362	P & W	Shaft
75	48363	P & W	Shaft
56	48399	P & W	Sump
390	48461	P & W	Gear
78	76236	P & W	Gear
1178	84289	P & W	Bearing
113	84487	P & W	Housing
77	84591C	P & W	Nose Housing
200	48350-D	P & W	Crankcase Ass'y.
200	84083	P & W	Cylinder
100	84084	P & W	Cylinder
200	84085	P & W	Cylinder
281	CR2791-G100-K4	G.E.	Relay
626	CR2792F101-A3	G.E.	Relay
41	G34464	Guardian	Relay
350	G31502-A	Guardian	Relay
22	146102	Vickers	Brake Valve
9	557-5	Eclipse	Check Valve
107	D12296	Adel	Pump
67	19100-2-101B	Kenyon	Check Valve
88	3135-11C	Eclipse	Pressure Switch
32	3V-217-HC	Pesco	Separator
100	27314	Purolator	Oil Filter
128	3801-3B	Eclipse	Fuel Quan. Gauge
33	420313	Wright Aero	Pump Ass'y.
46	416421	Wright Aero	Drive Ass'y.
76	U635A (AN4000-2B)	U.A.P.	Fuel Strainer
12	U8416-MM	U.A.P.	Oil Cooler Ass'y.
25	26675	Airesearch	Motor
35	AA14002A	Vickers	Accumulator
21	FD65-5	Diehl	Motor
81	3616	Bendix Radio	Control
23	3620	Bendix Radio	Station Box
335	G1 (94-32376)	G.E.	Oxygen Pressure Signal Ass'y
180	AW-CV-1-1	U.S. Gauge	Check Valve
740	1C-200	G.E.	Radio Noise Filter
15	1EAR-280BH	Pesco	Pump
7	SP-1-445-8	Parker	Selector Valve
8	1E621	Pesco	Pump
29	NEP-2	Eclipse	Auxiliary Power Unit
16	LER-30D	Lawrence	Auxiliary Power Unit
4	2CM46A2	G.E.	Generator
6	2P248EB	Pesco	Fuel Pump
21	2E258SA	Pesco	Pump
146	AW2-3/4-25K	U. S. Gauge	Manifold Press Gauge(Metric)
27363	CREB3N	Casco	Rod End
18	SA/3A	Kidd	Impact Switch
13	3GBD1A18A	G.E.	Regulator
18273	AN200-K3L2	Fafnir	Bearing
245	LMR-4	Micro	Switch
2094	PM-5	Spencer	Circuit Breaker
44	5BA25D-J4B	G.E.	Motor
31	5AM31JJ9A	G.E.	Amplidyne
111	5AM31NJ10	G.E.	Amplidyne
425	5BA40NJ1A	G.E.	Motor
189	5PD65-MB1	G.E.	Motor
25790	NR6L12	Torrington	Bearing
26	MS49A	Bendix Radio	Antenna Switch
45	D2060	C. P. Clare	Relay
298	727-TY37P	Weston	Air Temp. Ind.
2000	8909-K99	C. H.	Switch
2747	NAF310310-4B	Cannon	Plug
402	NAF310310-5B	Cannon	Plug
132	AN6209-B	Hydro Aire	Valve
50	AN6213-2	Bendix	Hyd. Valve
280	AN6220-4	Aeroquip	Couplings
27	AN6247-2	Adel	Hyd. Valve
14	UA8013-MM	United Aircraft Prod.	Oil Cooler
1175	RS-2	Mallory	Selector Box
172	A7012	Delco	Motor
6	8DJ13ABK	G.E.	Tachometer Indicator
200	2222-1F-2A	Eclipse	Tachometer Indicator
28	AN5770-2	Manning Maxwell Moore	Manifold Pressure Gauge
71	1003-4	Eclipse	Generator
427	NAF1016-1	Adams & Westlake	Light Ass'y.
616	NAF1016-2	Adams & Westlake	Light Ass'y.
1008	1222BF	Leach	Relay
751	B1392T	Teleflex	Gear Box
130	B1394T	Teleflex	Gear Box

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Ground Thinking vs. Reality

The old adage about textbook theory being a long way from practical everyday living is well suited to aviation. This is especially noticeable in the difference between the thinking of non-flying experts and that of pilots.

Recently (AVIATION WEEK July 27 p. 82) a letter was published chiding pilots for not making better use of GCA to prevent collisions, because "GCA has no blind spots." This is a perfect example of what we mean and leads a pilot to ask, "How gullible can you be?"

▶**Of Little Use**—First off, the term "GCA" is normally associated with Precision Approach Radar (PAR). This usage is not strictly correct, but if PAR was being referred to here, forget it. Any device that scans a speck of space 6 deg. high and 20 wide in one direction only, and used at a mere handful of airports, is worth nothing in preventing collisions.

Furthermore, the idea that GCA relieves an airline pilot from some of his usual chores while making an instrument approach shows a pitiful lack of understanding of flying. **Does anyone really believe that the Captain of an aircraft can delegate his legal (and moral) safety responsibilities to another person?**

Since a pilot is required to monitor at least four radio frequencies during an approach the addition of a fifth—GCA—ADDS to the burden.

But wait. Maybe we're supposed to be talking about ASR (Airport Surveillance Radar)—the other part of GCA. Anti-collision device? No blind spots? Now hear this quote from an official CAA letter describing the "blind spot" of the LaGuardia ASR.

▶**Big Blind Spot**—This "blind spot" extends, "from Holmes northeast almost to the range, thence northwest almost to Yonkers, thence down the near shore of the Hudson along the west edge of Manhattan to approximately the Empire State Building, and thereafter eastward to Holmes."

This territory is roughly 4x6x8x4 miles. Some "spot" eh!

True this is an area larger than some and is caused mainly by antenna location. But then this is just one of life's little realities; there simply isn't enough money (in CAA, anyway) to go laying high priced cables all over the country. Thank goodness most ASR's are content with having a moderate-sized "cone of silence."

▶**ASR Limits**—So far, we haven't even mentioned that ASR provides no altitude information—a severe, although quite natural, limitation of a two-dimensional device trying to solve three-dimensional problems. Actually, even in the various radar traffic control systems around the country, separation still is primarily a function of altitude assignment.

Other factors, such as lack of positive identification (due in turn to lack of airborne beacons and the profusion of flying pips on the scopes in terminal areas); the "grounding" of radar in icing and thunderstorm conditions (the very time when its help would be welcomed); the confinement of radar to terminal areas (where antennae and necessary communications exist), and many other items have been discussed in the past. Now the object of all this is not to lampoon radar—for it is a good tool if one understands its use. Nor is this an attempt to criticize an individual, or to be egotistical in favor of pilots. This is merely an illustration of our "old adage."

▶**Pilot Consultation**—Manufacturers, especially those planning "drives" for new product acceptance, should recognize this difference in thinking. We suggest that if you don't have a pilot handy for consultation you are missing a good thing.

AVIATION CALENDAR

Aug. 25—Ninth legal committee session, International Civil Aviation Organization, Rio de Janeiro. Meeting will study and revise a draft intended to replace or amend Warsaw Convention international air law.

Sept. 1-4—Pacific general meeting, American Institute of Electrical Engineers, Hotel Vancouver, Vancouver, B. C.

Sept. 5-7—National Aircraft Show and 50th anniversary of powered flight, Dayton (Ohio) Municipal Airport.

Sept. 7-13—1953 SBAC Coronation Year Flying Display, Farnborough, England.

Sept. 7-17—Fourth International Aeronautical Conference, joint meeting of RAeS and IAS, London.

Sept. 8-9—Second half of Airmail Pioneers National Convention, Cheyenne, Wyo.

Sept. 9-11—1953 conference on nuclear engineering, University of California, Berkley.

Sept. 9-15—Joint meeting of the Royal Meteorological Society and the American Meteorological Society, University of Toronto, Toronto.

Sept. 10-11—Second conference and seminar of the American Society of Traffic and Transportation, University of Pittsburgh, Pittsburgh.

Sept. 12-13—Third Wisconsin air pageant, Curtiss-Wright Airport, Milwaukee.

Sept. 19—Canadian National Air Show, sponsored by Toronto Flying Club, Toronto.

Sept. 20—Naval Air Reserve Day commemorating 50th anniversary of powered flight, Niagara Falls (N. Y.) Municipal Airport.

Sept. 21-25—Eighth National Instrument Exhibit, Instrument Society of America, Sherman Hotel, Chicago.

Sept. 22-25—1953 meeting of Aircraft Spark Plug and Ignition Conference, Champion Spark Plug Co., Toledo.

Sept. 28-30—Ninth annual meeting, National Electronics Conference, Hotel Sherman, Chicago.

Sept. 29-Oct. 1—American Institute of Electrical Engineers, middle eastern district meeting, Daniel Boone Hotel, Charleston, W. Va.

Sept. 29-Oct. 3—National Aeronautics Meeting, Aircraft Engineering Display and Aircraft Production Forum of the Society of Automotive Engineers, Hotel Statler, Los Angeles.

Sept. 30-Oct. 2—Aircraft electric equipment conference, American Institute of Electrical Engineers, Benjamin Franklin Hotel, Seattle.

Sept. 30-Oct. 2—Series of seminars on transonic testing in windtunnel, Purdue University, Lafayette, Ind.

Oct. 1-3—Air Reserve Assn.'s annual convention, Augebilt Hotel, Orlando, Fla.

Oct. 5-9—General meeting of the International Air Transport Assn., Montreal.

Oct. 10—England-Christchurch (New Zealand) air race, with speed and transport handicap sections.

Oct. 13-15—Air Transport Assn.'s annual Engineering and Maintenance Conference, Saxony Hotel, Miami Beach. Fla.

Oct. 14-15—Annual airport development and operation conference, sponsored by New York Dept. of Commerce, Onondaga Hotel, Syracuse, N. Y.

ADVERTISERS INDEX

AVIATION WEEK

AUGUST 24, 1953

SEARCHLIGHT SECTION

(Classified Advertising)
H. E. Hilty, Mgr.

EDITORIAL

Mr. Hensley Closes an Era; More of the Same?

Ernest Hensley is finally leaving his post as director of the notorious Office of Aviation Safety in the Civil Aeronautics Administration in Washington.

His cohort, William Davis, deputy director, was transferred months ago.

Some 60 days ago this writer learned that Mr. Hensley was to be granted his request for a transfer to a minor CAA position in the happier clime of Hawaii and that he was to be replaced by Al Koch, another Old Guardsman CAA official—now only about two years from retirement—who most recently has headed the International Division.

An AVIATION WEEK editor immediately requested verification of this report from Administrator Fred Lee. Mr. Lee, taken by surprise, said nothing like this had been decided and apparently postponed the shift so that he could make his own announcement.

As one CAA official was telling his fellow workers in Washington, "We'll show the editor of AVIATION WEEK that he isn't running CAA." The logic of this escapes us at the moment, especially considering how accurate our earlier report has turned out.

So this magazine officially closes an editorial campaign that was launched a little over a year ago, demanding the removal of both men, and their replacement by capable leaders who would clean up OAS and administer safety regulations efficiently.

The former co-conspirators are gone but another Old Guardsman is in their place, and we can hardly be blamed for wondering whether we are all not in for more of the same.

It is doubtful if any business magazine ever carried on such an intensive editorial campaign on any subject as the year-long series on OAS.

Unfortunately, some of the most important and telling information about the inefficient OAS could not be printed. Credibility of other material which we did print was attacked by the two directors and their henchmen because we refused to name those directly involved in many of the acts of omission and remission.

A number of conscientious employes and officials told us in detail about the machinations of the politicking OAS big shots and their supernumeraries, and we were able to double-check these reports with other employes, in numerous cities from coast to coast.

But when publication of any incident would point directly to one or two hapless individuals, we always held up the story and refused to publish it. The willingness of many OAS employes to write us, call us, wire us, and visit us in Washington and New York was a stirring testimonial to the majority of decent, honorable civil servants in OAS who had once been proud of working for CAA and had hopes of restoring their important branch of this agency to respectability. Some of them worked in the offices of the director and deputy director themselves!

The notorious "reorganization" of OAS, engineered by Messrs. Hensley and Davis, must go down as one of the blackest maneuvers in civil service history. In order to put their cronies into top jobs—most of them unworthy and unqualified—Hensley and Davis hopped on capable men, with records of public service in aviation safety, banished them to insignificant posts, or cut their salaries, or eliminated them entirely by one means or another.

All of the tricks in the civil service books, and others not even sanctioned by civil service regulations, were used. The famous story of the trumped up "examinations" and their phoney grades, and the completed examination papers which never were permitted to see the light of day again will be remembered with disgust by decent people in CAA for a long time. The details were all published here.

We have been asked why AVIATION WEEK never turned the glare of publicity on other CAA divisions, especially Airports, under Phillips Moore. Originally this Division, and Al Koch's International Division, were on our list. But the surprising quantity of material we uncovered in OAS dictated a concentration of effort on the Office that wielded the greatest influence on air safety—or lack of it—in all classes of aircraft, from the puddle-jumping grasshopper to executive and commercial transports.

Despite the smokescreen raised by Hensley and Davis—that we were publicizing only complaints from disgruntled employes—we have since learned that an exceedingly high percentage of the material was accurate. None knew this better than those within CAA.

Mr. Koch's past record gives us little evidence for expecting any outstanding reforms in OAS, although we shall be happy to be proven wrong.

We do believe the present Civil Aeronautics Administrator, Fred B. Lee, is well equipped with the experience necessary to start the big cleanup job that CAA needs. It's a bigger job than most observers realize.

Whether Mr. Lee has the intestinal fortitude, the resistance to pressures, the super-human energy to raise his agency's efficiency and see that it meets the public's demand for honest and effective service will be told us only by time.

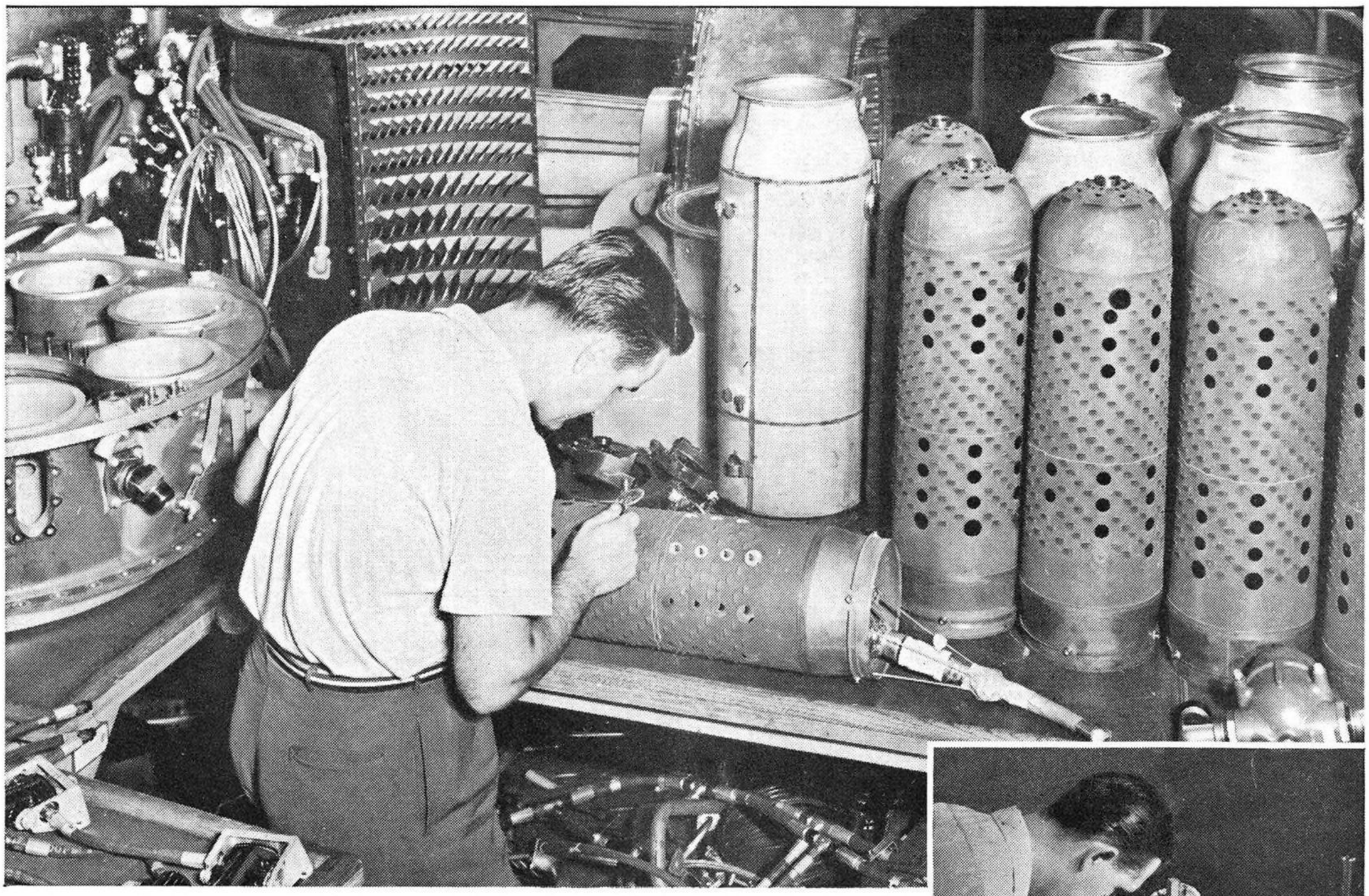
Certainly, he seems to have one aid not enjoyed by any other Administrator in recent years—the support of a vigorous and intelligent Undersecretary of Commerce, Robert B. Murray, Jr., who has a refreshing and realistic viewpoint on the subject of public service.

We shall be watching CAA with keen interest, and you have already begun to see the results of our inquiries into this new administration, as published in our news columns.

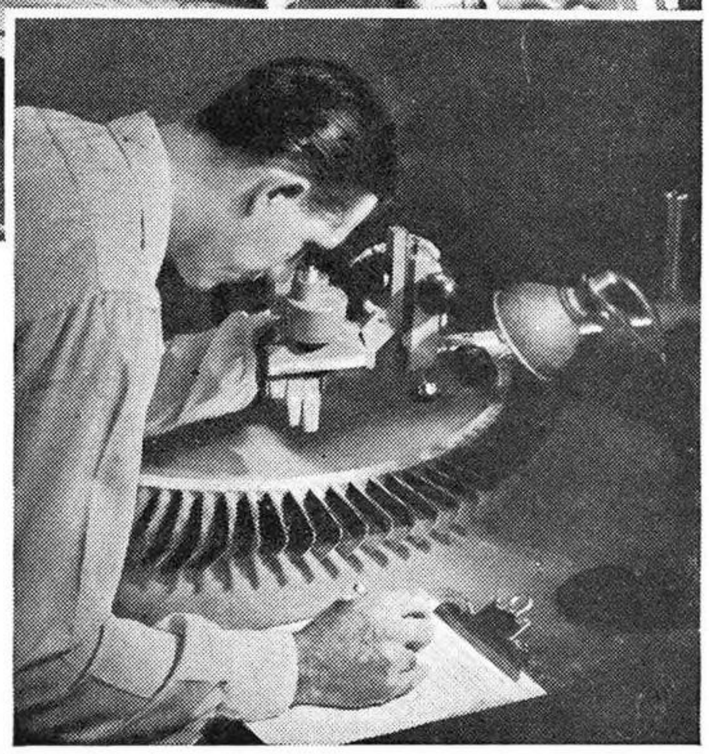
Meanwhile, let us huzzah. The Hensley-Davis era, at least, is closed!

—Robert H. Wood

ANOTHER REASON ALLISON LEADS IN THE AIR



Inspector uses sealed beam spotlight and magnifying glass for visual check of inner combustion chamber.



Turbine blade serrations are inspected under 45-power binoculars.

The sky's the limit on our tests

In the never-ending search for higher standards of jet performance, for improved materials and increased endurance, Allison engineers keep putting jets through their paces under every conceivable flight condition—even to altitudes above 45,000 feet.*

Then, as the picture above shows, they completely dissassemble the engine for a detailed inspection of every part. The parts you see here are from an experimental model of a J35 engine that recently completed an altitude test well above the 45,000-foot mark. Some 3,500 parts are spread out on tables for examination. Tests go far beyond mere visual scrutiny and usually include fluorescent-penetrant, magnetic-particle and dye-penetrant inspections, as well as X-rays in some instances. No part is too small to be checked. And constant improvements are being made in our inspection procedures to be sure that no flaws or breakdowns in any piece escape detection.

Yes, the sky's the limit on our tests. And this thoroughness of inspection—in both experimental development and production engines—pays off in the greater dependability for which Allison engines are famous.

**Security restrictions do not permit identification of the actual altitude reached.*

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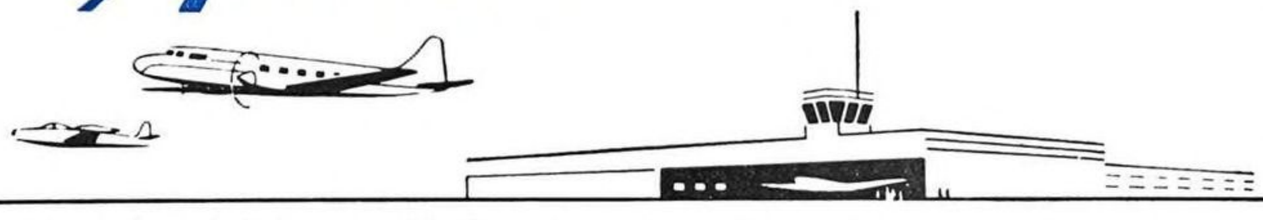

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