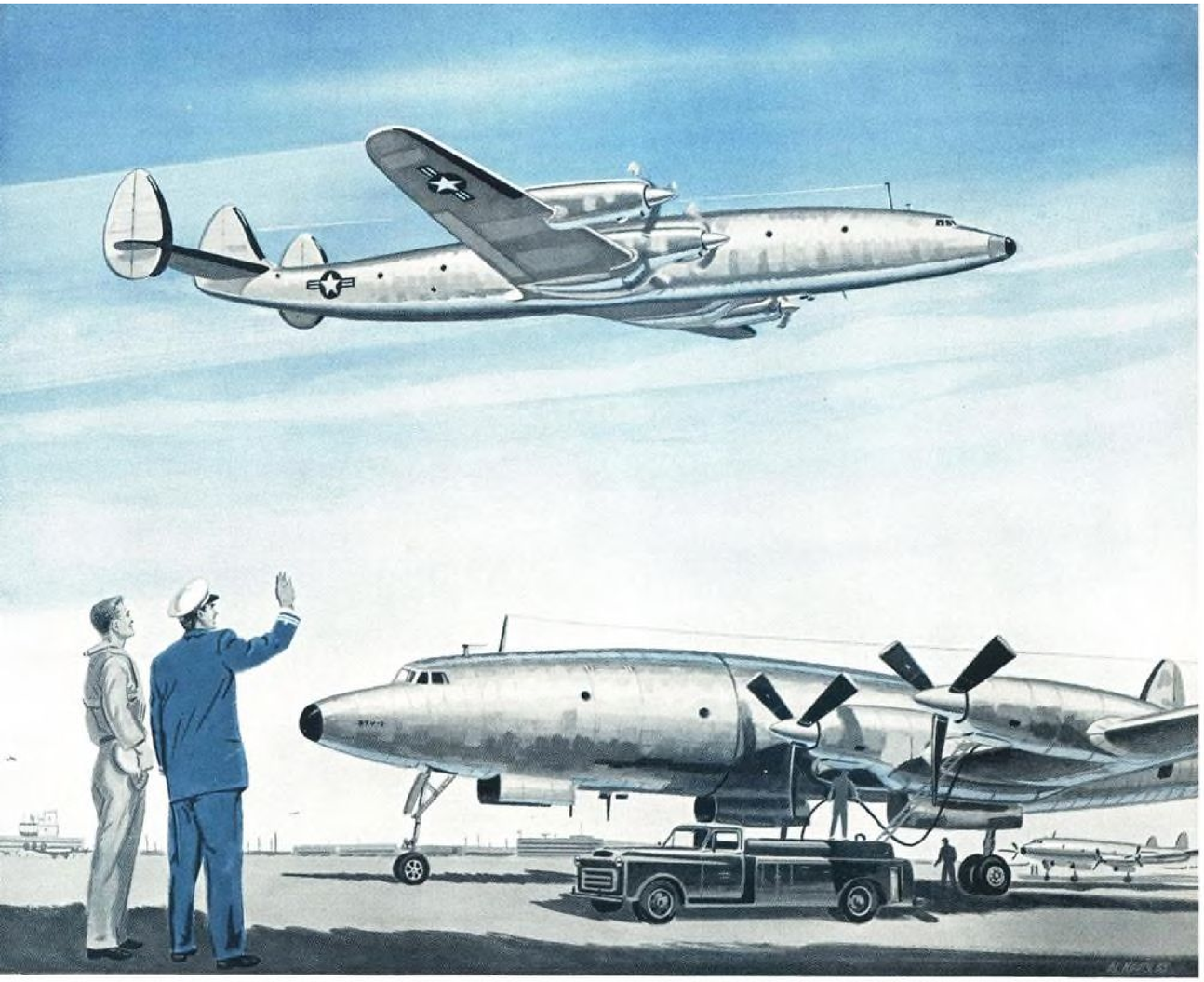
AVIATION WEEK

A McGRAW-HILL PUBLICATION

MAY 9, 1955

50 CENTS



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One-hundred and six passengers or 36,000 pounds of cargo cruise at speeds up to 440-miles-per-hour in the Navy's new Lockheed R7V-2 turboprop Super Constellation. Four Pratt & Whitney Aircraft axial flow T-34 propeller turbine engines develop a total of 22,000 horsepower for take-off. Each of the four is automatically controlled by a new Holley gas turbine power control.

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Aviation Week

MAY 9, 1955 VOL. 62, NO. 19

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Los Angeles 17—1111 Wilshire Blvd., Phone MAdison 6-4323

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AVIATION WEEK • MAY 9, 1955 • Vol. 62, No. 19
Member ABP and ABC

Published weekly by the McGraw-Hill Publishing Company, James H. McGraw (1860-1948), Founder. Executive, Editorial, Advertising and Subscription Offices: **McGraw-Hill Building, 330 West 42nd Street, New York 36, N. Y.** Publication Offices: 99-129 North Broadway, Albany 1, N. Y. Donald C. McGraw, President; Paul Montgomery, Executive Vice President; Joseph A. Gerardi, Vice President and Treasurer; John J. Cooke, Secretary; Nelson Bond, Executive Vice President, Publications Division; Ralph B. Smith, Vice President and Editorial Director; Joseph H. Allen, Vice President and Director of Advertising; J. E. Blackburn, Jr., Vice President and Circulation Director.

Subscription: Address correspondence to AVIATION WEEK—Subscription Service, 99-129 North Broadway, Albany 1, N. Y. or 330 West 42nd St., New York 36, N. Y. Allow 10 days for change of address.

Subscriptions are solicited only from persons who have a commercial or professional interest in aviation. Position and company connection must be indicated on subscription orders.

Single copies 50¢. Subscription rates—United States and possessions, $6 a year; $9 for two years; $12 for three years. Canada $8 a year; $12 for two years; $16 for three years, payable in Canadian currency at par. Other Western Hemisphere and the Philippines $10 a year; $16 for two years; $20 for three years. All other countries $20 a year; $30 for two years; $40 for three years. Entered as second class matter July 16, 1947, at the Post Office at Albany, N. Y., under Act of Mar. 3, 1879. Printed in U. S. A.

NEWS DIGEST

Domestic

First test flights of an improved C-46, modified by L. B. Smith Aircraft Corp. and Air Carrier Engine Service (AW May 2, p. 21), are slated to begin today, May 9, at Miami International Airport.

Northwest Orient Airlines ordered four more new transports from Douglas Aircraft Co., increasing its contract to 14 airliners at a total cost of $29 million. The order calls for eight DC-7Cs to be used on routes to Hawaii, the Philippines and Japan and six DC-6Bs for domestic aircoach service. Deliveries on DC-6Bs will start in January 1957, with DC-7Cs following in March.

North American Airlines started nonstop DC-6B flights between Los Angeles and New York May 1. Flight time set by the nonsked: 7 hr. 55 min. eastbound and 8 hr. 55 min. westbound.

Adm. John H. Towers, "father of U.S. Naval Aviation," died Apr. 30 in New York. One of Navy's first pilots, Towers commanded the trans-Atlantic NC-4 flight in 1919, became chief of the Bureau of Aeronautics in 1939, rose to commander in chief in the Pacific in 1945 and was appointed chairman of the Navy Department's Board in 1947. After he retired, the admiral joined Pan American World Airways as a vice president and later became president of the Flight Safety Foundation.

Merger proposal between Bellanca Aircraft Corp. and Pressed Metal of America, Inc., Port Huron, Mich., was defeated by stockholders of the Michigan company. The vote: 218,204 against, 2,417 for.

Riddle Airlines purchased five C-46 cargo transports from Resort Airlines, bringing its total C-46 fleet to 15.

Financial

General Dynamics Corp., New York, reports consolidated net income of $3,914,000 for the first quarter of 1955, compared with $3,313,000 for the same period last year. Sales totaled $142,248,000, increasing from $129,353,000. Backlog: $1,035 million.

Bell Aircraft Corp., Buffalo, N. Y., had net income of $1,582,000 for this year's first quarter from sales totaling $48,448,906. This compared with a $1,699,000 net and sales of $45,069,826 during the first three months of 1954. Backlog Apr. 3: $298,191,000.

First French Jet Liner Starts Tests

France's first entry in the civil jet transport field rolls onto an apron to start ground tests. The 70-passenger Sncase Caravelle S.E. 210 is scheduled to make its first flight in mid-June. External pods aft of the passenger cabin house two 9,000-lb.-thrust Rolls-Royce Avon R.A. 16s. Cruising speed is estimated at 500 mph.

Fairchild Engine & Airplane Corp.'s net income for the first three months of 1955 dropped to $1,103,000 from $1,164,000 reported for the same period last year. Sales were $37.5 million, compared with $36.9 million. Current backlog totals approximately $200 million. The Hagerstown, Md., company declared a 25-cent dividend, payable June 1 to stockholders of record May 16.

Lockheed Aircraft Corp.'s backlog Mar. 31 totaled $1,085 million, compared with $1,295 million a year ago.

Trans World Airlines reports a net loss of $3,898,000 for the first quarter of 1955, compared with a $3,965,000 deficit for the 1954 period. Revenues totaled $42,313,000, a 7.1% increase.

Delta-C&S Air Lines reports net earnings of $1,063,000 and operating revenues of $43,056,000 for the nine-month fiscal period ended Mar. 31. The airline declared a 30-cent dividend, payable June 6 to stockholders of record May 18.

Temco Aircraft Corp. put 1,676,852 shares of common on the New York Stock Exchange last week. The Dallas company also reported net earnings of $583,561 for the first quarter of this year, a 7.5% drop from the same period of 1954. Sales totaled $16,511,000, a 34.8% increase.

Boeing Airplane Co. declared a regular quarterly dividend of 50 cents a share and a special 25-cent payment, payable June 10 to stockholders of record May 20.

International

British engine builders last week confirmed an AVIATION WEEK report (Oct. 29, 1952, p. 15) that two rocket powerplants, de Havilland Engine Co.'s Spectre and Armstrong Siddeley Motors' Screamer, are being developed for high-performance interceptors capable of operating in rarefied atmosphere.

Louis Breguet, 75, French aviation pioneer who built and flew his first aircraft in 1907, founded the Society of Louis Breguet Aviation Workshops in 1911 and formed the forerunner to Air France in 1932, died May 4 in Paris.

First prototype GA-91, Fiat's winning contender in the NATO lightweight fighter competition (AW Apr. 18, p. 15), made its first test flight last week at Turin. The NATO contract calls for three prototypes and 27 production fighters.

West German Lufthansa's third Super Constellation of four ordered from Lockheed Aircraft Corp. arrived May 3 in Hamburg. Super Connies will operate on the airline's trans-Atlantic route to New York, scheduled to open next month.

Trans-Australia Airlines ordered three additional Viscount 700Ds from Britain's Vickers-Armstrongs, Ltd., increasing TA's total contract for the turboprop-powered airliner to 10.

New $10-million terminal at Montreal's Dorval Airport will be started this summer and completed in mid-1957.

The Aviation Week

May 9, 1955

WHO'S WHERE

In the Front Office

Roy C. Ingersoll, president and chairman of the board, Borg-Warner Corp., Chicago.

A. V. Finn, president and board chairman, Propulsion Research Corp., Santa Monica, Calif.

F. Leroy Hill, chairman of the board, Camdale, Inc., East Detroit, Mich. Hill now is president of Hill Machine Co., formerly headed Air Associates, Inc.

Capt. A. M. A. Majendie, member of the Council of Britain's Air Registration Board, succeeding **Capt. M. J. R. Alderson,** whose term as pilot representative expired.

Stuart E. Weaver, vice president-engineering, Radioplane Co., Van Nuys, Calif., subsidiary of Northrop Aircraft, Inc. Other changes: **John R. Jacobsen,** assistant vice president-engineering for Radioplane; **Ray Gayner,** assistant to the vice president-manufacturing of Northrop; **Ralph H. Hopkins,** member of Northrop's public relations staff.

Edwin A. Speakman, vice president Fairchild Engine & Airplane Corp., and general manager of Guided Missiles Division, Wyandanch, N. Y.

John F. Floberg, former Assistant Secretary of the Navy for Air, and **William J. Keary,** former president of New York's Empire State Building Corp., new directors of Flight Refueling, Inc., Baltimore.

Honors and Elections

Dr. Hugh L. Dryden, director of the National Advisory Committee for Aeronautics, elected home secretary of the National Academy of Sciences for a four-year term.

Frank N. Piasecki, board chairman of Piasecki Helicopter Corp., became an honorary member of Tau Beta Pi, national honorary engineering society.

Jacqueline Cochran Odlum, first woman pilot to exceed the speed of sound, will receive honorary degrees May 29 from Russell Sage College at Troy, N. Y.

Changes

Dr. Louis N. Ridenour, director of program development, Lockheed Aircraft Corp.'s Missile Systems Division, Van Nuys, Calif.

James N. Krebs, manager of the development department's engine section at General Electric Co.'s Aircraft Gas Turbine Division, Cincinnati.

Robert E. Sawyer, chief engineer, Braniff International Airways.

F. A. Good, purchasing agent, Weber Aircraft Corp., Burbank, Calif. Also promoted: **N. W. Plumlee,** chief industrial engineer; **Kenneth Bostwick,** manager of contracts coordination.

Henry Burlage, Jr., director of the Case Institute of Technology's new Propulsion Laboratory at Cleveland.

John Brophy, aviation products sales manager, Federal Telephone & Radio Co., Clifton, N. J.

(Continued on p. 91)

INDUSTRY OBSERVER

► Boeing Airplane Co.'s B-52 has encountered control problems and a high-speed restriction has been placed on the Stratofortress. The trouble is attributed to transonic control problems very similar to the difficulty encountered on the company's 707 jet transport prototype (AW May 2, p. 85).

► **Allison J71 jet engine has successfully completed 150-hr. test at Indianapolis. Engine will be used in McDonnell F3H-2N Demon, Douglas B-66B, and Martin P6M SeaMaster.**

► Air Force is continuing its D-to-P-Day concept in the production of war consumable items such as ammunition, bombs, tiptanks and RATO bottles. The D-to-P-Day concept provides for a sufficient stock of each commodity to cover the expenditures of the force in combat from D-Day, the beginning of the war, to P-Day, the time when deliveries from production are sufficient in quantity and location to meet these requirements.

► **Air Force reports the following number of flying hours between major overhauls for jet and piston engines: J47-GE-17, 225 hr.; J47-GE-25, 625 hr.; J65-W-5, 125 hr.; R2800 engine overhauls range from 600 hr. for the —85 to 1,100 hr. for the —52.**

► Prospects for wide use of the Ryan Q-2 target drone by Army and Air Force appear good, USAF says. There is at least another year of research and development necessary on the XQ-2 which will probably become the Q-2B. This drone will have the latest firing error indicator equipment, passive radar reflectivity will be improved and air-to-air radio control will be developed and installed. Low altitude control below 500 ft. may be required by the Army. Operational service tests of the Q-2A is scheduled to start after July 1 at Holloman AFB, N. M.

► **Landing gear failure of the B-52 which crashed while landing at Edwards AFB, Calif., (AW Mar. 28, p. 11) has been traced to malfunction of a gear down latch. Aircraft was repaired and was flying again within three weeks.**

► USAF now has nine Douglas RB-66s in flight test to expedite engineering solutions to aerodynamic deficiencies. Air Force says the B-66 is "fundamentally sound and that the difficulties encountered will be resolved."

► **Navy plans to use the Republic F-84 as a target drone. Utilization of the converted fighter makes possible a reduction of about $10 million in the Navy's target drone procurement program.**

► Successful firings of Boeing's IM-99 Bomarc missile have been made at USAF's long-range missile center in Florida.

► **New family of large turbojet engines—Pratt & Whitney J75, General Electric J79 and Curtiss-Wright J67—will be ready for production release in the near future, Roger Lewis, USAF Assistant Secretary for Materiel, reported to Congress. In addition, he said the Pratt & Whitney T57 turboprop engine is well along in development.**

► Boeing turboprop B-47 still has not made its first flight. Following taxi tests, the aircraft was grounded with prop trouble. It probably will not fly for another month.

► **Westinghouse Electric Corp.'s lease on the government facility at Kansas City has several years to run after the current production order runs out this year. Company holds a license to build Rolls-Royce Dart turboprop engine used in Vickers Viscounts and intends to keep the plant running, either on engines or subcontract work. Jet powerplant development work is being continued.**

Washington Roundup

Pearson to ATA?

Top candidate for the presidency of the Air Transport Assn. is Harold L. Pearson, 52, an assistant director of the Bureau of the Budget. Pearson is reported to be the hand-picked choice of Earl D. Johnson, outgoing president.

He previously served as deputy to Johnson when the latter was Under Secretary of the Army.

Pearson probably will be elected to succeed Johnson at the next semi-annual board meeting in mid-June and assume his new duties on July 1. Whether Johnson will stay on at ATA until Pearson arrives or leave immediately for General Dynamics Corp. apparently hasn't been determined.

Prior to entering government service in 1950, Pearson had concentrated a business career in the merchandizing and financial fields. He was associated with Montgomery Ward from 1928 until 1945 and was vice president and treasurer from 1940.

Renegotiation Back

Revival of Renegotiation Law, which expired last Dec. 31, is certain. The House unanimously passed legislation which would extend it from the expiration date to Dec. 31, 1956. The Senate is expected to do the same shortly.

No Subsidy Money

Civil Aeronautics Board is not expected to ask for additional money to meet airline subsidy payments—which means that $6.3 million due the industry is not going to be paid. CAB's requirement for subsidy payments for the final months of fiscal 1955 was $15.2 million, but Congress reduced this to $8.9 million.

The final decision as to which carriers should be paid—or not paid—will be made soon by the comptroller general, but this is the out-look:

Payments due local service lines will be met. This is because the position of the comptroller is that the "intent" must be considered in interpreting legislation, and members of the House and Senate flatly stated in a report that local lines should be paid.

The situation regarding helicopter services, intra-Alaskan and intra-Hawaiian services is questionable since the congressional "intent" in this area was vaguely expressed.

International carriers will have the last priority on funds. The board takes the position that carriers have the "right" to sue the government for payments—determined under the provisions of the 1938 CAA Act.

But the dilemma that will face unpaid carriers is this: Even if they should successfully get a Court of Claims decision in their favor they still have to get an appropriation from Congress before it can be paid.

CAB Investigation

General Accounting Office's comprehensive "audit" of Civil Aeronautics Board will be submitted to Congress in approximately a month. It has been underway for almost a year—since last July.

GAO's findings will probably have a considerable influence on Congress' attitude toward future appropriations for airline subsidies. The agency, established as a financial watchdog over government activities, is responsible only to Congress. It is not a part of the executive branch directly responsible to the President.

The prospect is the report will call for a more rigid rate-making formula to reduce "service" mail pay rates and more aggressive action to eliminate airline subsidy payments. GAO is already on record as favoring statutory ceilings on executive salaries of subsidized airlines.

Louisiana vs CAB

The Louisiana congressional delegation continues to voice its antagonism to Civil Aeronautics Board, provoked because of the failure to establish direct New Orleans-Mexico City service.

The latest comment, by Rep. Edward Hebert: "There is indeed something very peculiar and most strange in connection with the activities of this particular board . . . in the failure to establishment New Orleans-Mexico City service there is something present which does not meet the eye, and I frankly do not believe all the cards have been placed face up on the table, and I would not be at all surprised if there were several cards concealed in somebody's sleeve. How to shake them loose is a real problem."

Nebraska Air Industry Bid

The first political pressure for location of new aircraft and guided missile facilities in the Mid-West (see p. 13) comes from Nebraska's congressional delegation.

"We fully appreciate the merit of your proposal," the delegation wrote Secretary of the Air Force Harold Talbott, "and believe that Nebraska affords distinct advantages in such a program." The Nebraskans are now drawing up facts and figures.

Jet Tanker

USAF says Boeing Airplane Co., will not be permitted to use any of the work on the KC-135 jet tanker contract to develop a commercial prototype. Assistant Secretary for Materiel Roger Lewis said "We bought that airplane to meet a military requirement and until we are satisfied that the military requirement is going to be met, we are not going to talk about anything else. . . . There is no authority given them to use any of the work we are doing for purposes other than meeting our requirements for tanker airplanes."

The Lewis statement followed a prediction by Boeing that a commercial transport will be ready for delivery in 1958 (AW May 2, p. 85).

Facility Policy

Tightening of Defense Department policy on use of government-owned industrial facilities is indicated by new directive giving Thomas P. Pike, Assistant Secretary for Supply and Logistics, power to review military programs in this area. Directive (4100.15) says Defense does not want to compete with private enterprise and will not provide facilities if they can be reasonably obtained any other way. Pike is given responsibility for carrying out the program, carrying through to Defense Secretary Charles E. Wilson when he needs help to enforce order.

—Washington staff

AVIATION WEEK VOL. 62, NO. 19 MAY 9, 1955

Air Force Copes With Nuclear Radiation

Special Weapons Center learns how to operate aircraft in atomic warfare. Pilots fly into bomb cloud.

By Robert Hotz

Indian Springs AFB, Nev.—Pilots and airmen of the Air Force Special Weapons Center are learning how to fly and maintain aircraft safely despite the radiation effects of atomic warfare.

Lessons learned by Special Weapons Center crews during radiation exposure in Nevada tests with atomic weapons will have wide applications in the future to both military and civil aviation.

Experience in operating within safe limits during radiation exposure of air crews and in handling contaminated aircraft on the ground comes from the scientific report furnished by the Special Weapons Center to the Atomic Energy Commission, and special research using human "guinea pig" pilots and observers to get data on radiation necessary for combat operations of Strategic Air Command, Tactical Air Command and Air Defense Command.

▶ **Special Team**—This special research produced the earliest penetration of an atomic cloud by piloted aircraft in history during the current Operation Teapot test series. Nearly a dozen early penetrations of atomic blast clouds were made by a special flying scientific team of the Bio-physics Division, Special Weapons Center Research Directorate without exceeding the AEC radiation safety limits of 15.9 roentgens per year.

This team flies a pair of specially instrumented Lockheed T-33 jet trainers. Pilots are equipped with normal radiation protection gear—including respirators, lead vests and seats. But scientific observers in the rear seat wear only normal flying gear plus special instrumentation to measure the radiation level penetrating various layers of clothes and skin.

To measure internal radiation absorbed during the dash through the bomb cloud, observers swallow a wax-coated film badge on a string. Capsule rests in the stomach during flight and is retrieved after flight by pulling up on the string which the observer holds in his teeth.

▶ **Terrific Odor**—First early penetration mission was flown by Capt. Charles B. Oldfield, observer and Lieut. Dalton W. McCullar, pilot. Subsequent missions of this team were augmented by Col. Ernest A. Pinson, observer, and Lieutenants Jean Rowan and Floyd Patterson, pilots. Col. Pinson, head of the Bio-physics Division, is known in atomic energy circles for his work in defining safety criteria for handling tritium, a vital element in the hydrogen bomb.

Capt. Oldfield, who is also a rated pilot and has a masters degree in nuclear engineering, described his first flight through the atomic cloud as distinguished by "a terrific odor—sort of like the smell just after lightning strikes mixed with exploded gunpowder. There is little turbulence inside the cloud. The cloud is mostly boiling red with shades ranging all the way from pale pink to a deep burnt brown. Our flight time from initial penetration of the atomic cloud to wheels down on the Indian Springs runway takes about 10 minutes."

These early penetrations have not yet produced sufficient data to warrant any conclusions other than that they can be made safely without any damage to either aircraft and crew at time intervals more than 45 minutes earlier than any previous operations.

▶ **Scientific Air Support**—The first piloted penetrations during Teapot were preceded by similar experiments in earlier Nevada tests and over Eniwetok using drone aircraft carrying mice and monkeys into the atomic and hydrogen clouds shortly after detonation. Empty drones were also plunged directly into the blast during Teapot to measure heat, blast and radiation damage. These drones were badly damaged but two of the three were recovered.

Air support of the scientific mission during the Nevada and Eniwetok tests is provided by the 4925th Atomic Test Group, commanded by Col. Harry Donicht, with a major role played by the 4926th Test Squadron (Sampling), commanded by Col. James E. Watkins, and some assistance from a Navy group. The addition of new scientific support missions plus refinement of techniques on older standard missions has resulted in a constantly increasing amount of detailed data gathered for Atomic Energy Commission laboratories for new weapons development.

First phase of scientific air support consists of measuring special effects produced by the detonation at medium altitudes and during the first few minutes after firing. Douglas Skyraiders, flown by Navy pilots and gleaming white with special heat-resistant paint and silver heat-reflecting cockpit canopies, measure thermal effects generated by the explosion. Blast effects are recorded by Republic F-84F Thunderstreaks while Lockheed F-94s carry instruments to measure light created by detonation. Sikorsky H-19 helicopters carry radiological instruments to measure fall-out in the area immediately around the blast while a Douglas C-47 flies at approximately 500 ft. altitude to measure the terrain radiation of more distant areas.

▶ **Sampling Program**—A major scientific support effort is the atomic cloud sampling program that begins within an hour after shot time and continues for another hour, using specially equipped aircraft of the 4926th Squadron. A specific sampling program is organized for each atomic blast aimed at matching the scientific requirements of the Los Alamos and Livermore AEC laboratories with the operational capabilities of the sampling aircraft. Scientific director of this program is Dr. Harold Plank of the University of California.

AEC laboratories and the Special Weapons Center have cooperated in a program to develop special airborne instruments and equipment for the sampling operations. Sampler pilots are equipped with lead vests, lead seats and special respirators.

A certain amount of radiation absorption by the pilot is unavoidable in performance of this mission. Every effort is made to properly plan penetration, sampling maneuvers within the atomic cloud and return to the Indian Springs base so as to expose the pilot only to the bare minimum of radiation. Better results are obtained from piloted sampling planes than with drone aircraft.

▶ **Missions Vary**—"The pilot is an effective computer that can plan and execute maneuvers for his aircraft to fly through the constantly changing targets of opportunity offered by the atomic cloud development much better than a remotely controlled drone," said a scientist working on the program.

Since penetrations are made over an hour-long period, the sampling missions vary with the character of the cloud. Early penetrations require fast maneuvers to hold down the pilot's radiation exposure time while later sorties require longer flights inside the clouds to pick up sufficient radioactive particles in the wingtip filter tanks to make an acceptable specimen.

The sampler fleet is directed by Dr. Plank who rides in the Boeing B-50 control plane.

A pair of T-33 "sniffers" fly around the atomic cloud as it develops and report to Dr. Plank in the B-50 who in turn directs the F-84 sampling aircraft to make their specific penetrations. Since the actual cloud work requires both precise flying to a pre-determined pattern plus strict attention to the variety of special cockpit radiation instrumentation, all of the F-84 samplers are equipped with Lear L-5 autopilots. During Teapot, a specially modified Martin B-57 Canberra was added to the sampler fleet for high altitude operations.

▶ **40 Hr. in Action**—Sampling aircraft return to Indian Springs where their filters containing radioactive cloud particles are removed from wing tanks, packed into lead "pigs" for safe shipment and rushed by Special Weapons Center B-25 courier aircraft to various atomic energy laboratories for scientific analysis.

SWC scientific support of the test concludes with tracking operations by B-25 and B-50 aircraft which follow the atomic cloud until its radioactivity diminishes to an insignificant level. The C-47 terrain survey aircraft measure radioactive fallout. Another C-47 is aloft during the entire test period to take documentary photographs of the blast and resulting cloud formation.

SWC also uses a flight of North American F-86 Sabre aircraft to shoot down drones that go out of control.

From the time briefing the test operation begins until the last cloud tracker returns, the 4925th Test Group has been in action for 40 hours.

EXPOSED PILOT gets out of F-84, then . . .

RADIATION SAMPLE is lifted from tank.

QF-80 Drones Measure Atomic Damage

Remotely-controlled Lockheed QF-80 drones played another spectacular role in Operation Teapot atomic tests.

Operated by the 3215th Drone Squadron from Eglin AFB, Fla., pilotless drones controlled from Lockheed DT-33 mother planes plunged directly into the atomic blast for the first time to measure the extreme battle damage to planes caught in a nuclear mushroom cloud.

All three drones sent into the blast were expected to be destroyed before recovery was possible. But two were maneuvered by the mother planes to safe landings despite severe atomic damage. The third pulled out of the blast to a crash landing. The drone-mother plane teams takeoff together in a fighter-type scramble with the drone leading.

A spectacular incident occurred during the Teapot operations when a DT-33 mother plane flamed out during take off at Indian Springs and was forced to abort, leaving its motherless child hurtling down the runway without guidance to a certain crash. The alert pilot of another DT-33, orbiting high above after losing his own child, spotted the impending takeoff disaster.

He executed a wingover into a screaming dive, levelling out just over the controlled drone. He took over with his guidance system and pulled the drone off the runway and flew it through a successful test mission during the shot. This motherless drone happened to be the last QF-80 available for that particular shot. Without this emergency save by the director plane pilot, the drone portion of this expensive test would have been incomplete.

Drone pilots still talk about the skillful and dangerous save made by a squadron director plane during the last Eniwetok hydrogen bomb tests. A QF-80 went out of control at 500 feet altitude and began to plunge toward the sea. The director plane pilot spotted the runaway drone. He reefed around in an extremely tight turn almost at stalling speed just above the water to get the drone under his control and retrieve it within a hair's breadth of disaster.

Talbott Clarifies Dispersal Policy

West Coast concern over Defense Department determination not to build new production facilities in that area is no threat to existing facilities and payrolls, Air Force Secretary Harold E. Talbott has emphasized.

Coming expansion in guided missile output will necessitate construction of new plants, Talbott said last week, and it is USAF policy to put new bricks and mortar away from present defense industry concentrations.

Said Talbott:

"We have no idea of decreasing the amount of activity, the amount of contracts or the amount of employment on the West Coast but we think that further expansion or duplication of product should be moved probably to the Middle West."

He gave two reasons:

• **Military:** Dispersion of defense plant targets for safety in time of war.

• **Economic:** Dispersion to protect local business from substantial dependence on one-industry payroll.

Talbott disclosed that Boeing Airplane Co., now developing the Bomarc missile at its plant in Seattle, is looking for another site in another part of the country for production of the weapon. Middle West locations are under consideration.

▶ **Misinterpretation** — "This question never came up," he said, "until the question came up of building new facilities for guided missile work. If they are going to build them, we believe it is well to disperse them."

Talbott's statements were made in reply to a wave of criticism from small West Coast firms, labor unions and the Los Angeles Chamber of Commerce. All were heard from upon dis-

XV-1 Makes First Transition

McDonnell Aircraft Corp.'s XV-1 convertiplane has made the transition from vertical to horizontal flight (AW Apr. 25, p. 11). Conversion was the first achieved by any aircraft of this type.

Transcendental Aircraft Corp.'s 1-G is expected to follow with its first flight conversion in the immediate future.

McDonnell announced last week the four-place XV-1's successful transition was made at Smart Field near St. Louis by John R. Noll, chief test pilot of the company's Helicopter Division. Later tests of the joint Army-USAF project will explore the prototypes' performance as a liaison-reconnaissance aircraft and the possibility of using a larger convertiplane as a troop and cargo transport.

In converting from vertical to horizontal flight, the XV-1 flew forward on its rotor until it exceeded the stalling speed of its fixed winds. Power was shifted from the convertiplane's rotor to its propeller, and flight controls were changed over from helicopter to conventional aircraft type. Lift was provided by the XV-1's wings, while the rotor windmilled.

The XV-1's single rotor is driven by McDonnell-developed pressure jets, one at the tip of each blade. The propeller, mounted on the after end of the fuselage, is driven by a Continental R975-19 reciprocating engine. This powerplant also drives compressors that supply air to the pressure jets during vertical flight.

McDonnell engineers instrumental in developing the XV-1 include: C. H. Hurkamp, chief engineer of the Helicopter Division and overall supervisor of the project; Fred L. Doblhoff, project director and Kurt H. Hohenemser, chief aerodynamicist of the division.

XV-1 development is being done in conjunction with Convertiplane Weapon Systems Project Office, Wright Air Development Center.

closure that the secretary had told a House committee that he is trying to curtail expansion of the aircraft industry on the West Coast (AW May 2, p. 15).

He did not at any time say he planned a cutback in that area in the interest of dispersion, but his viewpoint was so misinterpreted by some West Coast groups.

▶**No Activity Reduction**—Talbott said USAF figures showed 185,000 aircraft production personnel in the Los Angeles area, an increase of 8,000 since October.

"We have no idea of trying to reduce the activity that is there," he said, "but we do not want it expanded."

It appeared that major USAF contractors fully accepted and recognized the situation. Donald W. Douglas, president of Douglas Aircraft Corp., agreed with the decision on the basis of Talbott's assurance that "current production and existing facilities on the West Coast are not involved."

On the other hand, a large number of telegrams and letters have been received at the Pentagon from small businesses, component manufacturers and local trade associations voicing fear that they would be forced to move or close down. Air Force was definite in denying there is ground for this concern.

▶**Defense Policy**—Talbott also made it clear that the policy is being enforced in other areas outside the West Coast. He said USAF will not approve new facilities on Long Island, for example, or other areas where the defense industry is heavily concentrated.

The dispersion policy was set forth by the Defense Department long before Talbott's House testimony was made public. In the past, however, the discussion has centered around the electronics industry.

In this case, most electronics firms are centered in the East, although there has been a trend—now about two years old—for these companies to look for new plant sites on the West Coast, closer to the prime contractors. USAF has frowned on this trend and sought to discourage it.

Republican's Airport Policies Criticized

Seattle—The Eisenhower Administration is blocking the efforts of Congress to provide for the nation's air transportation needs, Sen. Warren G. Magnuson charged at the Airport Operators Council sessions here.

Speaking at the same meeting, Joseph P. Adams, vice chairman of the Civil Aeronautics Board, called for better routes and more flexible schedules for local service airlines.

This double blast by Democratic aviation spokesmen provoked considerable comment at a session which already had tangled with Air Force and Navy representatives on the question of military use of civil airports (AW May 2, p. 84).

▶**'Niggardliness' Charged**—Magnuson declared: "Niggardly federal assistance in airport development to meet the facility demands of air transportation, and interference with federal commissions in carrying out the expressed will of Congress, are two of the most important handicaps we are faced with."

"Desires of Congress have been subverted by the executive branch of the government," he said, "because, while the Civil Aeronautics Act and the Federal Aid to Airports Act call for establishment of a nationwide system of public airports adequate to meet the present and future needs of aviation, the whole intent of this policy can be changed when the criteria for allocating federal aid to airports is arbitrarily set by some official in the executive department."

Magnuson criticized the President for requiring only $11 million for the U.S. airport system while asking $101 billion for federal highway construction. "If Congress' appropriations for airports have been spotty, the result lies with the Administration which has originated the annual budget requests," he said.

The Democratic senator called for a program of enlarged airports in anticipation of airline jet transport operations.

▶**Local Carrier Support**—CAB Vice Chairman Adams said local service carriers must be permitted access to more lucrative markets in order to fulfill their proper place in the U.S. air transport system.

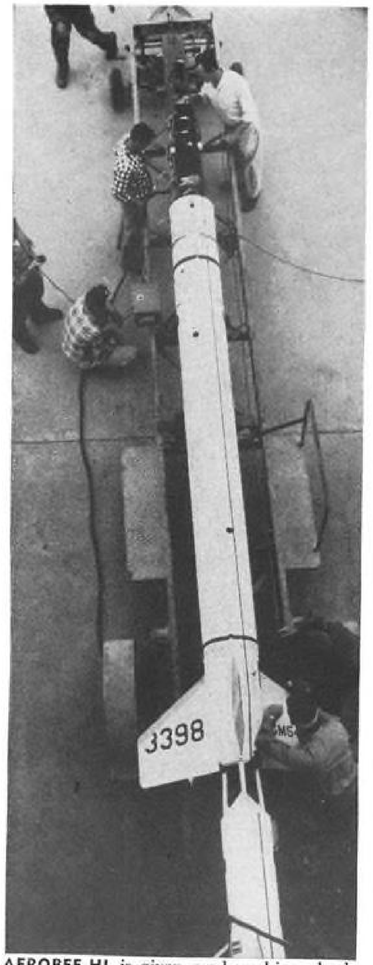
City and state officials must work with local feeder lines to increase revenues and reduce costs, Adams said in a repetition of his "use it or lose it" advice of two years ago. "But unless the Civil Aeronautics Board supplements these efforts by improving the route systems of the local carriers, in terms of both revenue potential and operational flexibility, the subsidy bill will not go down," he commented.

Increasing load factors and decreasing costs, said Adams, will follow increased operational flexibility combined with service to more lucrative markets.

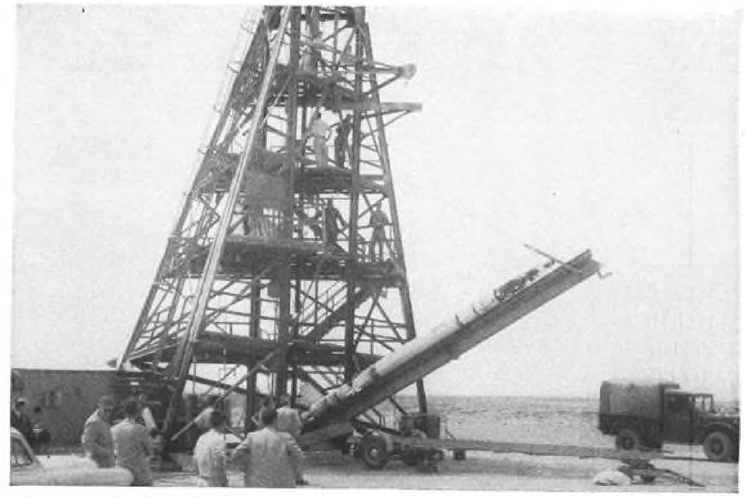
USAF Limits Gasoline Sales to Civil Carriers

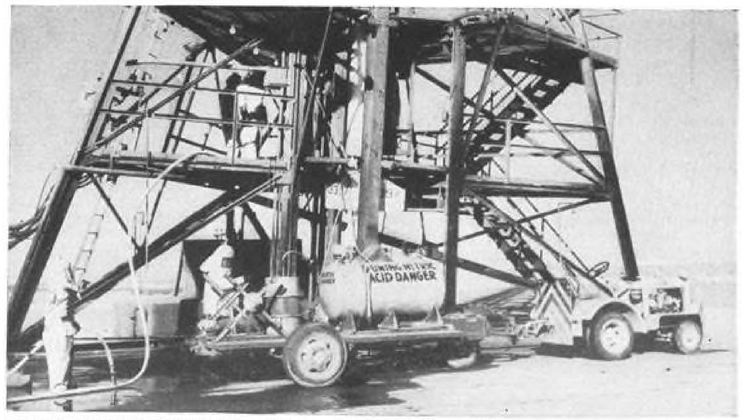
U. S. Air Force will not sell aviation fuel and oil to civil aircraft and charter carriers in competition with regular outlets, at bases where commercial refueling is available.

In a new Air Force Regulation (67-53), issue of USAF gasoline and oil to contract carriers is authorized when necessary to accomplish the aircraft's mission. Civil aircraft and planes not hired by the government can obtain fuel at USAF installations only in case of emergency and then only enough can be provided to reach the nearest commercial airport.



AEROBEE-HI is given pre-launching check.


HIGH-ALTITUDE ROCKET is raised on its cradle to launching tower, prior to first flight.



IN LAUNCHING POSITION, oxidizer gets strong nitric acid content to boost performance.

New Rocket Boosts Space Research

Holloman AFB, N. M.—A new program of research penetration of outer space began here with the first firing of a new series of the Aerobee rocket, which reached a maximum altitude of 124 mi.

The new rocket, known as Aerobee-HI, to distinguish it from earlier Aerobee models, incorporates new features of recent rocket developments. It is another indication of the steadily accelerating progress in this once unstable field.

Aerobee-HI is designed to penetrate altitudes up to 130 mi. with 200-lb. payloads. This compares with the 75-mi. altitude with 150-lb. payloads of earlier Aerobees, of which a total of 58 already have been fired at Holloman and White Sands in the high altitude research program.

▶**Mach 4-6**—The new Aerobee has a new thrust chamber lining, uses a stronger nitric acid content in the oxidizer that gives 10% performance boost and has an outer wall of extremely thin stainless steel. Length of rocket was increased two feet. Better fuel will increase the maximum speed of the Aerobee from Mach 4 to Mach 6.

Aerobee-HI will cost $30,000 initially with a reduction to $22,000 for production quantities—a relatively inexpensive research vehicle compared with other means now available. It is manufactured by the Aerojet-General Corp., Azusa, Calif.

▶**Quantum Jump**—Capt. Joseph Hurst, Aerobee project officer of Holloman, told AVIATION WEEK that use of the Aerobee-HI represents a quantum jump in space research. It will enable thorough exploration of the 70 to 130-mi. altitude layer previously only briefly


FIRST FIRING blasts rocket to 123 mi.

penerated by expensive rockets such as the Bumper experiment and the Viking. Previous Aerobees only explored the lower fringe of this layer.

The first two Aerobee-HI firings were aimed only at checking the rocket's performance. The next three prototypes, of five on order, will be instrumented to begin their upper air research role.

Convair Gets Order For 28 TF-102As

New order for 28 TF-102A supersonic jet fighters has been awarded by the Air Force to Convair Division, General Dynamics Corp., San Diego, Calif.

Total value of the order is $5 million, according to the procurement synopsis published by the Department of Commerce.

Other recent contracts in the aircraft and related industries:

Consolidated Diesel Electric Corp., Stamford, Conn., two engine generator sets, $10,036,748.

Kearfott Co., Inc., Little Falls, N. J., 1,536 master indicators, $7,263,695; 1,902 indicators, $251,393.

Continental Motors Corp., Muskegon, Mich., 1,015 Packette engines spare parts, $4,498,804.

Avco Mfg. Corp., Lycoming Division, Stratford, Conn., R1820-86 installation engine, and special engine tools, $2,274,828.

Westinghouse Electric Co., Dayton, Ohio, compressor drive system, $13,151,289.

Curtiss-Wright Corp., Carlstadt, N. J., contractor maintenance flight simulators, $1,185,515.

Sundstrand Machine Tool Co., Rockford, Ill., 1,092 constant-speed drives, $3,814,265; constant speed drives spare parts and data, $2,650,315.

Hughes Tool Company, Culver City, Calif., power supply, receiver, transmitter, antenna, $2,193,468.

Engineering Products Division, Radio Corp. of America, Camden, N. J., converters, signal data, synchronizers, gyroscopes, $1,449,431.

The Sperry Corp., Great Neck, L. I., New York, transmitters compensators controls, $1,754,382.

Royal Jet, Inc., Alhambra, Calif., 9,730 jettisonable fuel tanks, $2,600,000.

General Motors Corp., AC Spark Plug Div., Flint, Mich., Type A-4 gun-bomb-rocket sights, spare components, spare parts, maintenance tools and test equipment data and contingency fund, $2,339,659; modification on one type A-2 tow tractor, 57 aircraft towing tractors, spare parts, $2,596,612.

Ford Motor Company, Chicago, Ill., machinery and equipment for production of J57 engines, $4,443,940.

Canadian Commercial Corp., Ottawa, Ontario, Canada, R1340-59 aircraft engine modification and overhaul, special tools, $1,120,940.

Burroughs Corp., Detroit, Mich., 215 gun-bomb-rocket sights, $1,096,500.

The Glenn L. Martin Co., Baltimore, Md., B-57E airplanes, spare parts, special tools and data, $10,000,000.

Bendix Aviation Corp., Eclipse Pioneer Division, Teterboro, N. J., indicators, spare parts and data, $1,965,861.

Loewy Construction Co., Inc., New York, N. Y., extrusion tools for horizontal extrusion presses which are a portion of the heavy press program, $1,137,060.

General Motors Corp., Allison Division, Indianapolis, Ind., maintenance and overhaul of J35-A17D, A29, A29A turbojet engines and data, $3,052,870.

Don Berlin Replaces Piasecki As Board Chief of Copter Firm

Frank N. Piasecki, 35-year-old pioneer designer of tandem transport helicopters, has been deposed as board chairman of the Piasecki Helicopter Corp.

Replacing Piasecki and now in complete control of the 12-year-old corporation is President Don R. Berlin, who came to the Morton, Pa., plant in January 1953. Choice of the Laurence Rockefeller interests who own a substantial part of Piasecki Helicopter Corp., Berlin formerly was executive vice president of McDonnell Aircraft Corp.

Although the company's announcement last week made it clear that Piasecki's status had not changed with the exception of the fact that he no longer is board chairman, the young inventor moved out of the plant and did not occupy his office.

▶ **Piasecki's Statements**—In addition to serving as board chairman he had been active as chief of the company's research and development work ever since he stepped aside as president in 1950 to make room for Berlin's predecessor, C. Hart Miller.

In a statement last week, Piasecki said his main interest will continue to be the welfare of the company. He said he will work as a member of the board and executive committee.

Last Saturday, Piasecki received an honorary degree of Doctor of Aeronautical Engineering from his alma mater, New York University.

▶ **Developed Tandem Copter**—The corporation was launched in 1943 as P-V Engineering Forum and under this name flew the PV-2, a single-rotor helicopter, in April of that year. Success of the model led to a government contract, under which Piasecki developed the first successful tandem, the XHRP-X and later models, the Navy's HUP-1 and the H-21 Work Horse, now in production for the Army and Air Force.

In the early stages, interests headed by Rockefeller and A. Felix duPont, Jr., provided necessary capital to start the enterprise on the road to where its gross assets at the end of 1954 were $16 million. Production difficulties five years ago resulted in appointment of Miller as president, followed in 1953 by Berlin.

Berlin's main job in his two and a half years has been to cut costs and it is generally reported in the industry that he has improved the corporation's standing with its customers, who are entirely military.

▶ **Vitally Interested**—Last year's annual report showed 1954 net earnings of $1,360,241, slightly lower than the 1953 figure. Technical difficulties forced a slowdown of production last year, but the Air Force has authorized resumption of full-scale output (AW Apr. 11, p. 16).

In his statement, Piasecki said:

"I am vitally interested in the improvement of our company's performance especially in the control of the quality of the product, the safety of our flight operations, the reduction of production costs, the investment of company funds into the promising new research and development items, toward the advancement of our present products and the construction of new concepts."

▶ **New Board Members**—While the company indicated Piasecki could continue to supervise the firm's research and development, by vacating his office Piasecki indicated that he had withdrawn from active participation.

The change in Piasecki's position was not unexpected. At a meeting of the board of directors in early April two new members were added to the board, raising it from a nine-man group to an 11-man board.

The new additions were Donald N. Meyers and James J. Davis, Jr., both close associates of Piasecki. Meyers, a helicopter design engineer, was associated with Piasecki in the original P-V Engineering Forum. Davis, a Philadelphia lawyer and son of former Republican Senator James J. Davis, is a friend and counsel of Piasecki's.

It is known that appointment of Meyers and Davis to the board followed an effort by Piasecki to gain a stronger voice in control of the company's affairs.

With Meyers and Eliott Daland, retired chief of the company's design group, Piasecki is reported to control about 20% of the corporation's voting stock.

Nav–Aid Compromise

Air Coordinating Committee's Nav Panel, which produced the present DME/Tacan compromise plan, nearly turned out contradictory majority and minority recommendations, as did the earlier Vortac committee, a letter from the National Business Aircraft Assn. to its members reveals.

Compromise was reached only on the last day before the deadline set by top ACC officials, says NBAA.

Comet Catastrophe Cost

(McGraw-Hill World News)

London—Failure of the Comet airliners cost de Havilland a loss of $3.7 million for the year ended Sept. 30, 1954, W. E. Nixon, chairman of the company, reported to stockholders, when informing them that they will not receive ordinary dividends.

Adverse results for the year "are due to the need to take care of the position arising from the Comet catastrophe," directors said. "This has been done by writing off redundant Comet stock of $13.3 million.

De Havilland made a profit of $7.4 million in 1953 and paid a dividend of 7½%.

House Unit Approves New Aircraft Funds

House Appropriations Committee essentially approved funds to implement the Administration's aircraft and related procurement, contemplating ordering 3,933 new planes in Fiscal 1956—2,333 by the Air Force and 1,600 by the Navy. Here are committee actions:

• **Reduced the new money** request for aircraft and related procurement for USAF by $150 million—from the $6.1 billion recommended to $5.95 billion. But the committee said that the carryover of unobligated funds from previous years is going to be greater than anticipated. "In other words, it is expected that even with this $150 million reduction, there will still be a total of over $9 billion available for obligation in Fiscal 1956," the committee said. "The reduction in no way affects the planned procurement of 2,333 aircraft in Fiscal 1956."

• **Increased the new money** allocation for "aircraft and related procurement" by the Navy by $152 million—from the $753 million asked to $905 million. This increase, however, was a technicality—a transfer of funds for aeronautical guided missiles from a new category "Navy military procurement," as proposed by Navy, to the aviation category. Net obligations during Fiscal 1956 are expected to approximate the Fiscal 1955 level of $1.6 billion. Because of large-scale cancellations, Navy will start off Fiscal 1956 in July with an $800-million carryover. Because of this, the committee noted that to support the fleet the new money provided for aircraft procurement will "have to be substantially" increased.

• **Approved funds** for construction of a fifth Forrestal-class carrier. Money was also approved for construction of a conventional-powered submarine and three frigates with guided missile capabilities.

AHS Meeting Studies Commercial Copters, Names Bunker President

The American Helicopter Society last week entered its 12th year with a new president enlisted from the military services at a meeting where industry experts put unprecedented emphasis on commercial application of rotary-wing aircraft.

Far from an apparent contradiction, the situation was entirely logical. The new chief of AHS is Col. William B. Bunker, one of the Army's most enthusiastic helicopter experts. He assumed leadership of the society at a time when military and commercial copter operators are close to agreement on specifications and interchange of equipment.

▶ **Commercial Operations**—Top interest in AHS's annual forum at Washington centered on a full-day meeting devoted to reports on commercial rotary-wing operations.

Activity of foreign and U. S. operators was reviewed, along with discussions of transport helicopter design, heliports, navigation problems and regulation of air carrier operations.

Stanley Gewirtz of the Air Transport Assn. said the most important project for the industry at this time is development of a transport helicopter that can be operated economically by the carriers.

He said some progress has been made toward exchange of military and commercial operating data, "but it is much too slow."

Other top problems defined for the forum by Gerwitz:

• Drafting of flexible Civil Air Regulations to control rotary-wing aircraft. He emphasized that they must not be made rigid, pending perfection of aircraft designs.

• New and different traffic control systems for helicopters. Quick action is needed in this field.

• Conditioning of local communities to accept helicopter operations. He pointed out that foreign cities are ahead of U. S. municipalities in this respect.

"Military operators and commercial users must mutually seek out one another's views," Gewirtz said. "Admittedly there is a difference between the operating techniques involved in flying a fixed-wing transport, on the one hand, and a fighter, interceptor or bomber, on the other. But the basic operating experiences and data on helicopters are substantially the same."

▶ **Heliport Studied**—Broad report on future heliport designs was given by Martin A. Warskow of the Port of New York Authority. He said their studies indicate downtown heliports must be about 200 by 400 ft. in area. Proper glide angles can be allowed with such a spot, permitting fifty-foot obstructions one block away.

NYPA, Warskow said, has concluded that the heliport capacity will be from 40 to 50 movements an hour. Refueling and loading time will range from five to 12 mins., depending on whether the flight is an aerial cab service or intercity carrier.

The New York study frowns on elevated heliports if they are more than two or three stories above the ground because of fuel and passenger movement difficulties at higher points.

Helicopter activities of British European Airways were described by R. A. C. Brie, and Sabena's experience was covered by Anselme V. J. Vernieuwe.

Carl C. Agar of Okanagan Helicopters related his experiences in more than 6,000 hours of flying for the Alcan project in Canada.

Officers elected in addition to Col. Bunker were Joseph Mashman, Bell Aircraft Corp., secretary; Han Weichsel, also of Bell, treasurer, and the following regional vice-presidents: Robert T. Wood, Kaman Aircraft Corp.; Frank MacMahon, Piasecki Helicopter Corp.; Maj. Gen. Frank A. Heileman, USA (Ret.); A. C. Ballauer, Parsons Corp.; Owen Q. Niehaus, Bell Aircraft Corp., and Raymond A. Young, Douglas Aircraft Corp.

'Whirly Girls'

Aviation's newest and most exclusive organization was launched at the recent 11th Annual Forum of the American Helicopter Society.

It is the "Whirly Girls."

So far, there are no officers and only 13 persons are eligible for membership. They are the 13 women who hold helicopter pilot licenses. Of these, there are only eight in the United States, two in France and one each in Germany, New Zealand and Puerto Rico.

Older than the "Whirly Girls" and almost as exclusive are the "Twirly Birds," a group of copter pilots (male) who received their tickets before the end of World War II.

At their annual meeting, also held during the forum, Jim Ray, now a Washington aviation consultant but once the pioneer pilot of the Kellett autogiro, was elected president.

CAA Orders Further Inspections For Boeing Stratocruiser Props

Propeller troubles which have periodically plagued the Boeing 377 for several years have resulted in a series of Civil Aeronautics Administration airworthiness directives (AW Apr. 11, p. 131), the latest of which calls for stricter inspection measures.

The CAA directive requires that all Hamilton-Standard 2J17 propeller blades with fairing type closure be inspected with X-ray on areas which can't be visually or magnetically inspected.

Inspection of these nickel plated blades must be done on each aircraft before it leaves a designated point where X-ray facilities are available. Non-nickel plated blades were to be inspected as soon as possible, but not later than May 5.

▶ **Blade Cracks**—Operators of Hamilton-Standard 2J17 zinc plated blades must inspect them under the garter for cracks and correct any corrosion conditions that may exist. Any cracked blades must be immediately removed from service.

This latest directive is the result of discovery of blade cracks a few weeks ago by Pan American World Airways and British Overseas Airways Corp. Both were in areas concealed from ordinary inspection by the garter and cuff attached to the blade near the propeller hub.

The propeller blade involved is a hollow steel model used on the Boeing Stratocruiser. The blade is made of thin steel filled with a nylon-rubber compound and by its nature is more fragile and requires more care than solid aluminum types. The Boeing is the only certificated transport flying that doesn't have a solid aluminum blade available as an alternate.

▶ **Accident Record**—The propeller has been blamed for most of the major accidents that have occurred with the Boeing Stratocruiser. A number of accidents, the latest of which occurred near Portland, Ore., in March, have had similar causes and most have been traced to propeller trouble.

In most cases, an engine has been lost.

Two were lost at sea and one in the Brazilian jungle, making analysis difficult, but the probable cause in each case has been listed as engine loss through vibration caused by a fractured propeller blade.

The CAA investigation of the Portland incident is still incomplete, but the circumstances seem to fit earlier patterns.

The CAA, Hamilton-Standard and the carriers involved have all been actively trying to find the cause of the trouble.

Thus far, no specific fault has yet been found, and remedial efforts have been concentrated in perfecting inspection measures.

Various inspection techniques are being tried in a continuing effort to develop a standard procedure.

ICC Official Suggests Military Traffic Split

Strict division of domestic military traffic between the various forms of common carrier transportation has been advanced as a solution to the continuing "rate war" between airlines and railroads.

Interstate Commerce Commission Examiner Burton Fuller suggested "allocating a specific percentage of military traffic to each transportation group, at fares, at least as far as the railroads are concerned, more nearly approaching a reasonable maximum level, but at the same time reflecting a substantial discount under commercial fares."

His proposal could be implemented, Fuller said, through an informal conference of the regulatory bodies (ICC and CAB), and the military agencies. Total at stake is an estimated $75 million annual volume in passenger traffic offered by the Defense Department.

Fuller rejected a complaint of the Independent Military Air Transport Assn. alleging that the railroad's use of "free or reduced" rates to obtain military traffic constituted procedures and practices contrary to the national transportation policy.

J35 Production Nears End

Production of the Allison J35-A-35 engine will end this summer.

E. B. Newill, Allison general manager, added: "However, increasing production in two other newer types of engines will provide employment of those released from production of the J35-A-35."

The J33 engine will continue to be produced in reduced quantities. Increasing schedules for the T56 turboprop engine and the J71 turbojet will require a minor increase in employment, Newill said.

The phasing out of J35 production is due to increased service life available from J35 engines and the new overseas airlift which now reduces the pipeline supply.

Airlines to Discuss 'No-Show' Solutions

Discussion of solutions to the no-show problem among trunk and local service carriers has been authorized by the Civil Aeronautics Board.

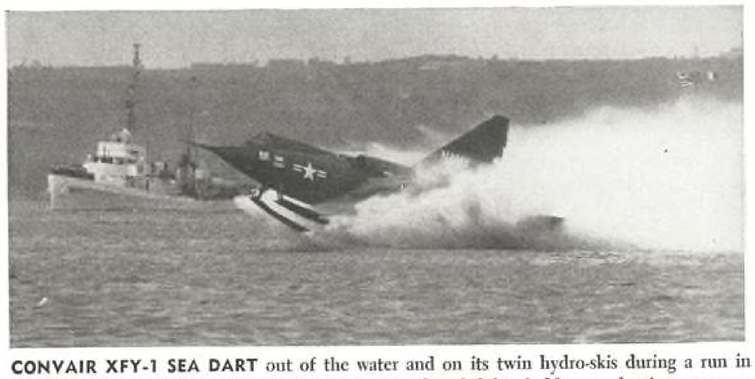
The Board approved a request of National Airlines that the carriers be allowed to discuss the problems of no-shows and multiple reservations for a six-month period.

The problem is especially critical now since the airlines have decided to eliminate reconfirmation practices July 15, and an industry-wide alternate program must be found to replace the controversial reconfirmation rule.

The Board told carriers that any solution must meet the test of the CAB "hold the line" policy on passenger fares.

In dissenting from the majority opinion, CAB Vice Chairman Joseph P. Adams said that discussion should not include possible fare increases as well as decreases.

Adams believes public benefits will not come from the discussion, since a solution will probably result in an increase of charges to air travelers in the face of the current satisfactory profit position of the airlines.



CONVAIR XFY-1 SEA DART out of the water and on its twin hydro-skis during a run in a continuation of the experimental turbojet, water-based fighter's Navy evaluation program.

GUIDING THE "CORPORAL"

ELECTRONIC GUIDANCE IS THE SECRET OF THE CORPORAL'S ACCURACY

The U. S. Army required a ground-to-ground missile capable of delivering an atomic warhead at supersonic speed — accurately–to a target beyond the range of artillery. Army Ordnance awarded four prime contracts for this project:

PRIME CONTRACT–RESEARCH
Jet Propulsion Laboratory, California Institute of Technology
Basic research and development covering all facets of total problem.

PRIME CONTRACT–DEVELOPMENT
Gilfillan Bros., Inc.
Improvement, simplification of ground and airborne electronic equipment.

PRIME CONTRACT–PRODUCTION: MISSILE
Firestone Tire & Rubber Co.
Missile and missile handling equipments.

PRIME CONTRACT–PRODUCTION: GROUND GUIDANCE SYSTEM
Gilfillan Bros., Inc.
Complete ground guidance system.

RESULT: *The Army's "Corporal," ground and airborne equipment. In full production; delivery being made to troops.*

Today's missiles are superior to yesterday's mechanically timed rockets for one reason—electronic *guidance.*

It is electronics research and the electronics industry that put the guidance into the guided missiles . . . that share the major responsibility of keeping America first in guided missiles.

Primary credit for the "Corporal" is due to the basic research achievements of the engineers and scientists of the Jet Propulsion Laboratory at the California Institute of Technology. Gilfillan is proud to have been awarded a prime contract to assist in the development and do the production of the vital electronic guidance system.

In the electronics industry, Gilfillan is a recognized leader. Gilfillan's ability to carry on from basic research comprehensively—to approach a total problem as a whole and achieve a whole solution—has been thoroughly proven in GCA Radar, the "Corporal" guidance system, and is now being further demonstrated in top secret projects in a number of fields.

Today and Tomorrow
Comprehensive Research and Development

GCA RADAR AND ELECTRONICS
Gilfillan
LOS ANGELES
GCA
AROUND THE WORLD

Beech to Test Jet Business Plane

By Erwin J. Bulban

The market for a turbojet-powered 400-mph. business plane will get a critical field-test this summer when Beech Aircraft Corp. sends the French Morane-Saulnier MS-760 on tour in the U. S. and Canada.

▶ **Tour Outlook**—Future of the Wichita aircraft builder and probably that of many business plane equipment makers and fixed-base operators will be influenced by the outcome of these demonstrations. A successful tour will mean:

• **Beech Aircraft** will produce the MS-760 and sell the French plane with its trio of piston-engine executive transports—the twin-engine Model 18, the Twin-Bonanza and the Bonanza.

• **Equipment makers** will have to gear their thinking to a new jet era in light civil aircraft. New equipment demands will range from cabin pressurization and air conditioning gear through navigation and communications systems.

• **Fixed-base operators** will face the problems of adapting service and overhaul facilities to take care of the MS-760's two 880-lb.-thrust Turbomeca Marbore turbojets and other equipment new to them now. Fuel may be another problem; this has become a controversy as a result of the airline swing to turbine transports (AW Apr. 18, p. 21).

▶ **Nonstop Range**—Morane-Saulnier's MS-760 has a pressurized cabin that will give an equivalent of 7,800-ft. altitude when the plane is at 20,000 ft. Useful range will enable it to fly nonstop from New York to Chicago, St. Louis to Washington and Seattle to San Francisco.

The maximum range is said to be nearly 1,000 miles and cruising speed approximately 350 mph.

▶ **MS-760 Specs**—The French plane has the following dimensions: wing span 33.3 ft., wing area 194 sq. ft., length 32.9 ft., maximum height 8.5 ft., maximum inside cabin width 46 in.

Gross weight is 7,840 lb.; empty weight with equipment is 4,325 lb. Service ceiling is claimed to be 34,400 ft. on both engines; one-engine absolute ceiling is given as 9,000 ft. Take-off speed is 105 mph.; distance to clear a 50-ft. obstacle is 3,550 ft. Landing roll, over a 50-ft. obstacle, is 3,050 ft.

The only small U. S. twin-jet now flying is Cessna Aircraft Co.'s side-by-side two-place T37A, in production for USAF as a trainer and ordered by the U. S. Army for high-speed liaison. No civilian versions of the aircraft have been announced.

▶ **Price, Availability?**—Beech refuses to disclose now any opinion on what the cost of the MS-760 will be or when deliveries of the production models.

Jack Gaty, vice president-general manager, says proposed delivery dates will be "reasonable" and price will not be too high for operators able to use this type of "super transportation."

The implication is strong that the MS-760 project will be handled this way: There must be orders or there will be no production.

A reliable source says Beech will try to demonstrate the twin-jet plane to the U. S. armed forces.

▶ **Continental J69s**—If Beech produces the MS-760, it will be powered by Continental Motors Corp.'s version of the Marbore, now in production for the Cessna T-37A under the USAF designation J69. Beech says the engine will be available from Continental in quantity "in the near future." Four mechanics can change the MS-760's jets in 50 min. elapsed time, the company reports.

Beech says both airframe and engines show promise of considerable growth factors for the future.

▶ **Tested Prototype**—Morane-Saulnier first flew the MS-760 last July 29; a two-seat military trainer version was flown Jan. 23, 1953.

Gaty says the plane stands alone as the "first and only twin-jet aircraft in the four-place field available now for demonstration," a point emphasized by President O. A. Beech, who claims that "it cannot be duplicated by anybody else at this time."

The company has been studying jets for some time.

Development costs and time involved in going ahead on a fresh design of its

own have been key factors leading to the MS-760 decision.

Beech began negotiating with Morane-Saulnier last year. Sergei Saulnier, president of M-S, was in Wichita during the negotiations.

► **CAA Tests**–The company will check with Civil Aeronautics Administration early this summer on the test program it will carry out on the specimen MS-760, just before the plane's arrival in the U.S. Beech wants to get the plane to Wichita so it can run trials and gather its own data.

Bull Market Develops For Large Twins

Fewer large twin-engine transport planes will be available to corporations in coming months because local-service airlines have started picking them up to meet sharp-rising traffic curves.

Airlines, including foreign carriers, are scouting the field for available Convair-Liners, Martin 2-0-2s and Douglas DC-3s, according to William C. Wold, New York multi-engine aircraft broker. Some corporate transports, including two CV-240s and some DC-3s, already have donned airline markings.

The eight Martin 2-0-2s formerly owned by Pioneer Air Lines are being negotiated for by several feeder lines, Wold told AVIATION WEEK.

► **Prices Going Up**–Competition for the large twins has had a bullish effect on prices. A year ago an airline or basic Douglas C-47 could be bought for $60,000-$70,000; by the first of this year the price had risen to $70,000-$80,000 and today's asking price is from $90,000 to $105,000. If the market continues in this fashion, prices could climb to $125,000 within the next 60 days, according to Wold.

Lodestars were selling for $85,000-$100,000 a year ago, the company reports, with sellers asking from $100,000 to $125,000. Asking prices are about the same today, but selling prices are said to be somewhat firmer and the planes are moving. At the start of 1955 Wold had 15 Lodestars and 10 basic Lodestars listed; the respective figures are now 11 and 10. Wold reports that there are 254 corporate Lodestars, 17 airline types and three are government owned.

Wold predicts that for the next three or four years the need for additional twin-engine equipment by the airlines and corporations will grow faster than the ability of manufacturers to furnish planes. With few Convairs and Martins available, the DC-3, a longtime favorite of corporations, has moved into the spotlight again. But, as the DC-3 market tightens, business firms will turn more attention to the Lockheed Lodestar-class transport, Wold believes.

How Russian Engineering Looked To a Captured German Scientist

By Gerald W. Schroder
(McGraw-Hill World News)

This article is based on extended conversations with one of Germany's top aerodynamicists. Although he now lives in the relative safety of the West, he has asked that his identity be shielded. To this man, at least, the arm of the MVD is still long and effective. At his request, Aviation Week has omitted all references to his activities or location that might pinpoint him to the communists.

Bonn—The story of Prof. "Hans Schmidt" begins at the end of 1945 when he, with a large group of German scientists, was captured by the Russians in bomb-shattered Berlin and confined in an empty NKVD cellar.

After a few weeks of rather dismal existence here, Prof. Schmidt and his colleagues were moved to a suburb of Berlin and began to get the Russian version of the VIP treatment. In fact, Mrs. Schmidt and the children were allowed to visit Prof. Schmidt and the whole family was granted an eight-room apartment by their Russian captors. "We lived, in those days," says Prof. Schmidt, "in a golden cage."

But this "golden" existence was not to last forever; after a few weeks, the Russians suddenly descended on the Schmidt apartment one early morning and informed the professor and his family that they would leave on a train for Russia that very evening. When Prof. Schmidt protested and told the Russians that they had promised him that he might stay in at least what is now East Germany, they told him:

"You have two choices, Prof. Schmidt; you can either go to Siberia or you can work for us in Russia. The choice is yours."

Under these circumstances, Prof. Schmidt chose the easier course for himself and his family and embarked on the long train voyage to Russia. On Oct. 22-23, 1946, over 2,000 German engineers and scientists were moved by train to Russia in probably one of the largest mass movements of "brains" in the recent history of the civilized world.

All German scientists who have worked in Russia, and who may still be working there, were probably moved during those two days.

Arrival In Russia

After an eight-day trip by train, under the most primitive conditions, Prof. Schmidt and a group of about 50 Germans were deposited in a little village not far from Moscow. In Prof. Schmidt's group there were roughly 15 scientists; the rest constituted wives and children.

And now began the real work in Russia for Prof. Schmidt. He and his fellow scientists were put to work on various projects given them by the Russians.

Prof. Schmidt stresses that he never signed a contract or any other written agreement with the Russians. "Our contract was a submachine gun", he says.

His group of 15 scientists was subdivided into three small groups of four or five Germans each. To each small German nucleus, roughly 30 Russian engineers were attached for study and work. In order to train the highest possible number of Russian engineers, these Russian groups of 30 were changed with great rapidity.

Each project given to these groups was handled in several different stages: first, the draft stage; then, the technical project stage; last, the final presentation stage. Whenever a project was 99% completed, the entire project was canceled by the Russians and all drawings, papers, biographies, and whatever technical work had been performed, were turned in.

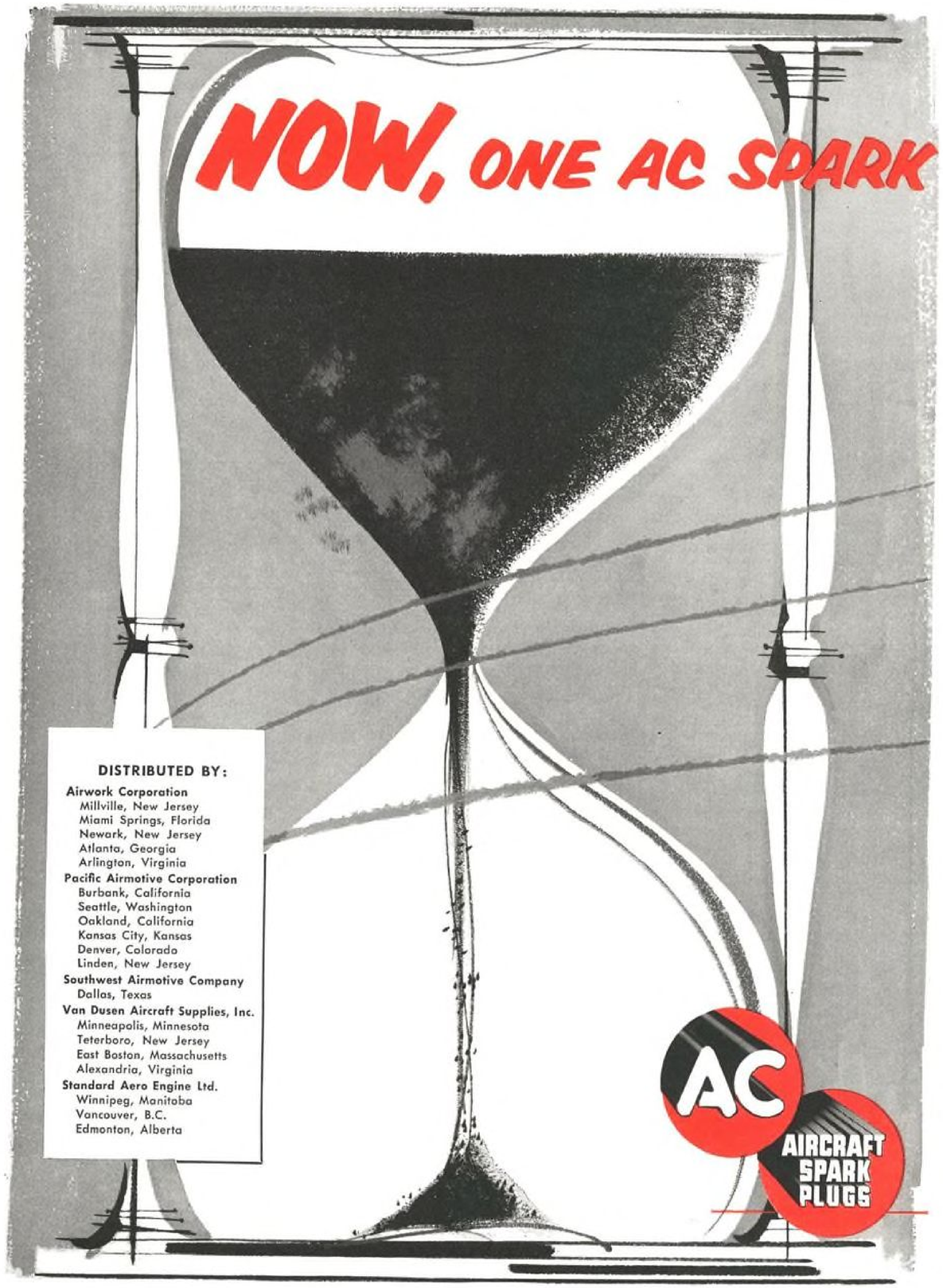
But the German scientists soon found out that it was at this stage that the real work on the project was begun by separate Russian groups who might exist at a great distance from the location of the original German pilot groups.

It is also interesting to note that several German groups, sometimes at far distant locations, would be put to work on the same project by the Russians.

Prof. Schmidt says: "The Russians would play one German group against another. Sometimes they would come to us with improvements on our own work which undoubtedly had been perfected by another German group located at some distance from our village."

Each German project was, of course, closely followed on a parallel course by a Russian group composed of top scientists, supported by practically unlimited funds.

The German scientists were paid roughly 1,500 rubles monthly, but some salaries were as high as 5,000 rubles and a few select Germans actually received 8,000 rubles. Oddly enough,



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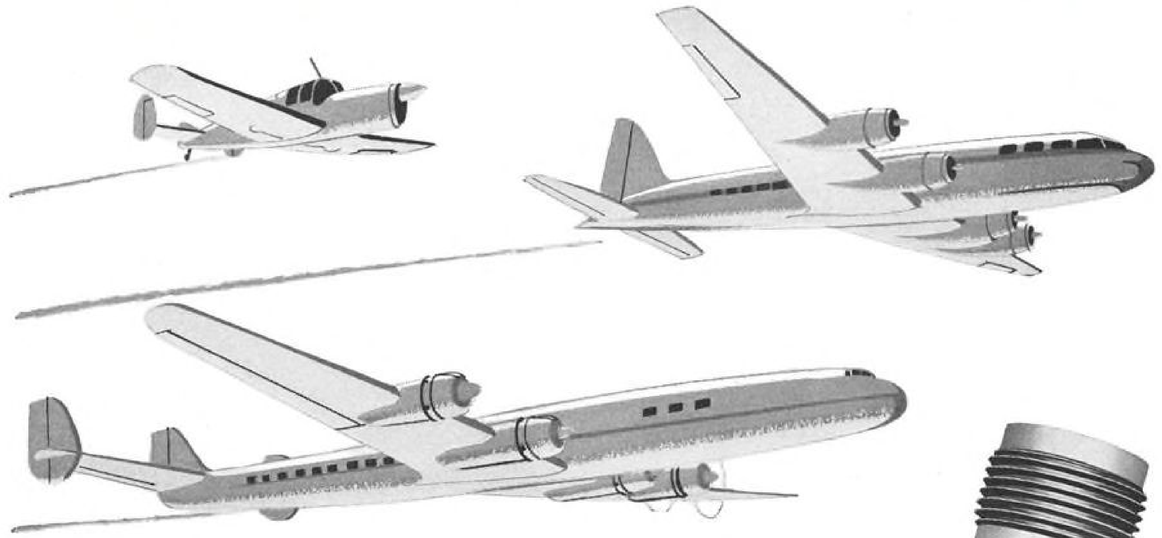

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all salaries to German scientists were reduced sharply in 1947. In most cases, they were cut in half; some were reduced even more.

Russian Work Good

Almost seven years of experience in working with the Russians has left Prof. Schmidt with a deep and apparently lasting respect for Russian workmanship and efficiency. Observers frequently call attention to the fact that Russian goods for civilian consumption, such as iron, tractors, refrigerators and cars, show primitive and sometimes slipshod workmanship.

Prof. Schmidt warns that this state of affairs is certainly not true in the military sector. "The Russian mechanics who worked with us during those years were really top-flight," he says. "I wish we had a few of them in the West.

"Whatever specifications we asked for, we could always be certain that we would get those specifications without fail and on time."

Details of Schmidt's work in Russia are, of course, almost impossible to obtain. But it is known that several German groups of scientists worked on perfecting the Lorin ramjet powerplants in the form of a "flying laboratory." In effect, a model ramjet was adapted to standard Russian artillery guns and could be fired from these guns and thus achieve the speeds necessary.

The groups also claim that they achieved a 40% efficiency from fuel used. This certainly exceeds the efficiencies that are accomplished by most conventional powerplants today. It only cost the Germans about 50 to adapt the ramjet "flying laboratory" to conventional artillery guns.

Thus, they claim, they achieved a cheap and effective method of perfecting the Lorin ramjet powerplant.

The West underestimates Russian efficiency in military technology. Prof. Schmidt emphasizes that the Germans in Russia learned to build certain types of military items cheaply, simply and quickly. These items nonetheless performed the job for which they were designed.

"We in the West build things on far too complicated a scale," he believes.

Schmidt realizes the limitations of Rusisan engineers, at the same time he has come away with a tremendous respect for Russian engineering capabilities in the field of aviation. He claims Russian engineers know 10 times as much material by heart as the average German engineer.

But the Russians are fairly low on what the West would call technical imagination. Apparently they don't play around with ideas the way west-

ern engineers would. Real inventiveness on the model of Edison or Diesel does not exist in Russia. Russian engineers become somewhat scared when they have to enter any real new ground.

Prof. Schmidt warns that the Western world should realize and appreciate the complete, religious devotion to his job on the part of the Russian engineer. The Russian engineer has tremendous ability to soak up knowledge and to learn by rote. This is aided by the fact that textbooks are extremely cheap indeed. He also has a very real sense for practical, simple solutions. On the other side of the coin, there is a certain born disregard for basic values, and machine tools fall apart literally under their hands.

"The Russian engineers tend to dissipate their own riches," Schmidt says.

Engineers for the Future

Tremendous efforts are made in Russia to train large numbers of engineers for the future.

Today there are some 17,000 technical institutes; some of these are very small, others are good-sized plants. Education at most may be somewhat mediocre, but the Russians claim that "in 20 years we will put out 200 Galileos."

Education on the lower level—on the high school and undergraduate level—is bound very tightly by Marxist doctrine. But at the higher seats of learning, such as the Universities of Moscow and Leningrad, this curricular limit does not hold true.

Natural sciences faculties at Moscow and Leningrad Universities are completely and thoroughly trained in the traditions of European research and scientific work. They are not only well trained but cultured on Western standards as well; to German engineers they enjoyed showing off their knowledge of Goethe, Milton and Gauss. One Russian faculty member at Moscow knew the University of Goettingen well.

It is ironic that Prof. Schmidt's work on ramjet powerplants was pretty much ignored by the German government before and during the war. But when the Russians captured Prof. Schmidt, he found out that the Russians had watched his work for many years and were completely and thoroughly acquainted with it.

While the Russians probably educate lots of mediocre scientists, the Western World should never forget that they do turn out some really top-flight people. What probably sets a top-flight Russian scientist apart from his western counterpart is the fact that he is even more highly specialized than his colleague in the West. When the Russians train a really good physicist, they don't allow him to spend much time on subjects such as chemistry and mathematics, for example. A high degree of

overspecialization is the result.

In 1952, the Schmidts were finally told that they would be returned to Germany. The Russians offered Prof. Schmidt a good job with adequate pay, lots of food and prestige, if he would agree to stay on voluntarily in Russia. Schmidt turned down this offer and returned to Germany.

The tight-lipped discipline of even the lowliest Russian worker in Schmidt's village was illustrated by the fact that practically every Russian in the village knew for nine months in advance that the professor would return to Germany; yet, the Schmidts and all the other German scientists and their families were kept completely in the dark until the actual day of departure for Germany.

Prof. Schmidt warns against believing the "beautiful legend" that the communist system in Russia will break down. The majority of Russians are extremely devoted to their country and will go along with the present political regime, he claims. Liberty and a standard of living on the Western style mean very little to the average Russian since these have never been factors in his life, according to Schmidt.

There is only one hope for the West, Schmidt says: "In 1946, the Russian was a sober realist to whom one could talk sensibly. The Russian of today is drunk with his own power. The Russians today are suffering from a real power infection. They are now beginning to bear the mark of destruction on their own foreheads." Schmidt also hopes that, somehow, Russia and Red China will turn antagonistic and thus split the present communist block of power.

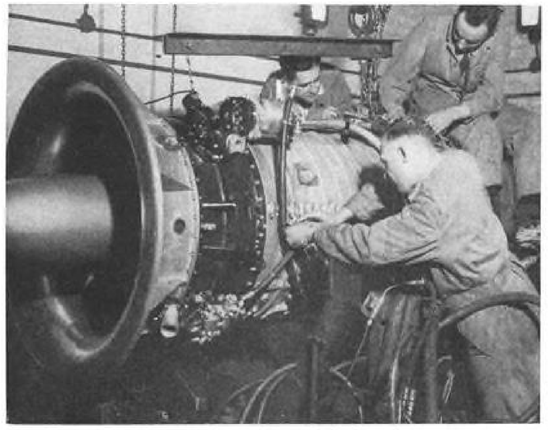
The basic impression which Prof. Schmidt conveys today is that he believes that the Russians are sure of what they are doing in the field of military and aviation technology and that they are doing their jobs in the sciences extremely well.

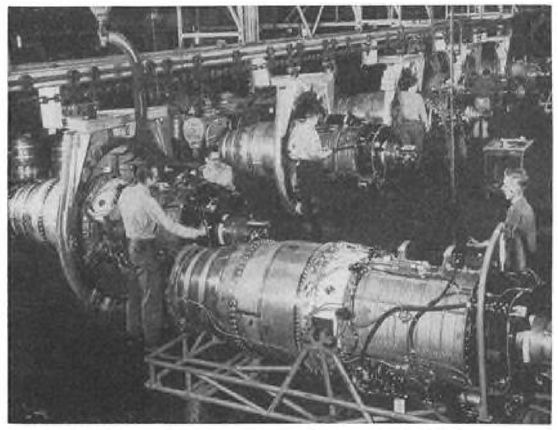
Schmidt stresses that it is a disservice to the cause of the free world to underestimate Russian capabilities and strength.

Colonial Safety Record

Colonial Airlines has marked a "Silver Anniversary of Safety," 25 consecutive years without a fatal accident.

During the quarter century of operation, Colonial has carried 3 million passengers; flown 50 million plane-miles between the U. S., Canada and Bermuda; made a million landings and takeoffs and flown a billion passenger-miles, all without a serious accident.





SAPPHIRE & J65—Ample supply of skilled craftsmen speeds development in Britain; machinery speeds production in the U. S.

How U.S., British Jet Practices Differ

By David A. Anderton

What are the differences between British and American design and test requirements for jet engines?

What factors make the developmental climate healthy in Great Britain and France? What factors account for the production records of the United States manufacturers?

Should we adopt British standards to speed our engine development programs?

Questions like these must be answered, in view of today's general belief that the British excel in development but it takes Americans to produce.

To answer that, five engineers from American turbojet manufacturers—each with specific experience in connection with British or French engine development—formed the nucleus of a panel discussion at the Society of Automotive Engineers' national aeronautic meeting in New York recently. (Discussion was reported briefly in AVIATION WEEK Apr. 25, p. 15).

How We Differ

Specific differences between British and American practice in test requirements were spelled out by H. W. Paige, manager of General Electric's J47 and J73 projects. He noted that British test specs were in some cases tougher and in some more lenient than the American requirements.

To qualify for first flight, the British run a test in a special category, running the engine for a minimum of 25 hr., but not necessarily at the specification rating. By contrast, the U.S. manufacturer has to meet the terms of spec. MIL-E-5156B, and must run his engine for a minimum of 50 hr. at the specification rating.

Said Paige: "There's a lot to be said for the British viewpoint. Altitude tests can be done just as well after 25 hr. as they can after 50."

For endurance tests, the British use a prototype engine, but it must be fitted with the flight inlet and tailpipe, exactly as will be used on the particular aircraft installation. During the test, the governing requirement is that the engine must be capable of continuous satisfactory operation.

American engine developers have to use a production engine for the endurance runs. They are allowed to use a bellmouth, however, and flight inlets and tailpipes are not required. Governing requirement is that the engine must not fail or indicate weaknesses.

Paige commented that it seemed the Powerplant Laboratory at Wright Air Development Center interpreted that phrase to mean that the engine must look brand-new.

▶ **Last of Three**—Acceptance testing differs in Great Britain and the U.S. In Britain, the engines run for 2 hr. 5 min., with a final run of 20 min. Thrust ratings are taken as an average over the first batch of 20 engines, with acceptable figures down to 4% below the type rating.

By contrast, the green run for American engines lasts 1 hr. 30 min., with a final run of 30 min. Thrust is established on a proof test, with no deviation from guaranteed rating permitted.

▶ **The Reasons Why?**—There is emphasis on getting British engines into condition to evaluate their potential, said Arnold Redding, chief, preliminary design, for Westinghouse Aviation Gas Turbine Division. By contrast, in the United States the emphasis is on getting production engines into squadron service.

Actually, there is little difference between the quality of the production engines in either country.

One reason for the improved development capability in England is the skilled craftsman, said Redding, basing his observations on his stay at Rolls-Royce, in Derby, under the terms of the Westinghouse-RR interchange agreement.

Although capital costs are about the same for machines and plant in both countries, the British workman is available for about one-third the salary of his U.S. counterpart, Redding said. This has meant there is always a preponderance of manpower over machinery.

These workmen furnish a pool of skilled craftsmen-machinists and mechanics who are able to design parts, make tools and fixtures and knock out pilot production runs, he added.

British technical personnel have a more general background of experience, having worked on many phases of development and design. In the U.S., engineers tend to become compartmentalized and to be forced into specializing, on compressor design, to use an example.

Another large contributing factor to developmental speed is the supplier situation in Britain. The firms are mostly small business, and they tend to be more cooperative. With the exception of one quite-independent firm with a "strangle-hold" on the combustion business, suppliers' relations with the engine manufacturers are easy.

From the airplane viewpoint, the engine manufacturer has an easier time in

Britain because the airframe pace is slower. The engine people can tailor their engine after development of the airplane has started. Redding said that Rolls' engine timetables can change overnight according to the pace of the airframe development. If airplane A is slowing down, so does work on the engine for airplane A.

Typical British Program

Redding detailed the outline of a typical British engine development program for comparison with U.S. techniques.

The preliminary design phase is carried on at a high level of activity for about one month if the engine is similar to others developed by the firm, or for as long as two years if the engine is new. In contrast, here we either drop the design completely in a few months or start detailing for production.

Prototype engine design goes on at a high rate in Britain, and accounts for between one month and four months.

Detail design starts at a high level, and after about six months from the finalization of the design, a separate group is split off to start adapting the components for tests. About six months after the start of the final engine design, test rigs are running.

Prototype manufacturing takes place in the company experimental shops. All tooling for the engine is made right in the same shop, and Redding cited a case where special broaches were made in there weeks. "That compares to a familiar figure of six to ten months' delivery time," he added.

Ground and flight testing begins seriously after about one year from the first static test. Then come the 25-hr. tests, and after that, engines are assigned to specific experimental airframes. Qualification tests follow.

Production lines start rolling steadily within about one to two years after the qualification tests.

▶ **Additives**—To these comments, Stewart Scott-Hall, of the British Joint Services Mission, added that he believed the engine manufacturer was protected financially all the way down the line, and better than in this country. Further, there are no military requirements for engines in Great Britain; instead, the overall aircraft mission and problem is stated, and the engine is part of that. The engine manufacturer may wind up with a four-line specification.

Another plaudit for the experimental shop was voiced by Rolls-Royce representative Stanley Taylor. The Rolls shop had built an experimental 11-stage axial-flow compressor within seven weeks from the receipt of the drawing. And in the case of the Derwent 5 centrifugal engine, said Rolls representative Kenneth Vincent, it was only six months from the date of the first draw-

ing to the time the first engine came off the line.

Gallic Touch

French turbojet practice, typified by Turbomeca, was outlined by Whitney Collins, chief engineer of Continental's Gas Turbine Division. Continental builds Turbomeca jets under license from the French company.

There is similarity between British and French practice, Collins said. By our standards, theirs is a prototype or pilot-line practice. The quantity of production is the real key to the difference in techniques.

Collins called the French experts in the art of prototype development, and said their rapid developments stimulate engineering thought. He cited four specific areas of advantage to the French developer:

- Incentive contracts, tied to a bonus for exceeding performance figures. Conservative minimum values are given as target figures for weight, thrust and specific fuel consumption, and a formula relates these to the bonus.
- **Flexibility of design specs,** and even their complete absence. During the development, the firm will produce one design report for a single responsible government official, instead of the echelons that must be reported to over here.
- **No need for extensive component** development before the first series of engines. Tests are done either on scale models or similar components.
- **Apparent dominance** of the engine manufacturer over the airframe developer and the military in the early stages. The latter two, according to Collins, seemed to act in almost an advisory capacity.

A firm historical footing for the panel discussion was placed by G. N. Cole, of Pratt & Whitney Aircraft, and Marshall Galliers, of Wright Aeronautical Division. Both men spoke of specific experience in Americanizing engines.

Cole told about the changeover from the Nene to the J48; Galliers enumerated at length the changes that Americanized the Sapphire.

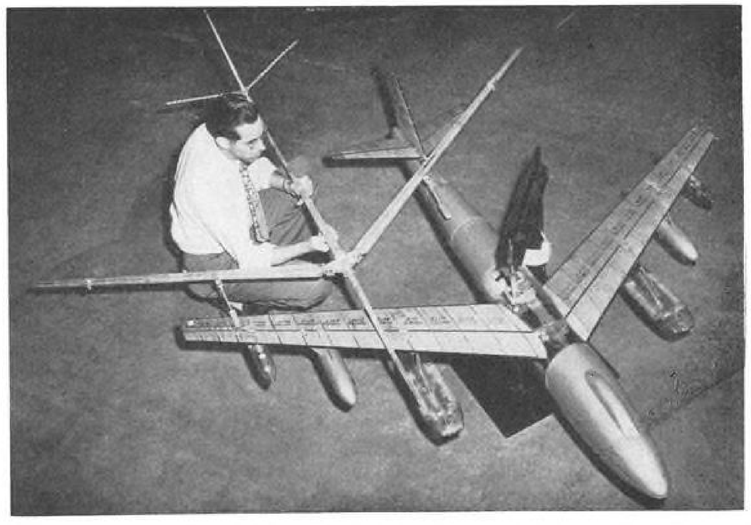
Windtunnel Group Names New Officers

The Supersonic Tunnel Assn., a rapidly growing working-level group formed to interchange ideas, techniques and problem solutions in the field of supersonic windtunnel testing, held its third semi-annual meeting in Washington recently.

Eight technical sessions were featured during the two-day meeting at which Naval Ordnance Laboratory and David Taylor Model Basin were co-hosts.

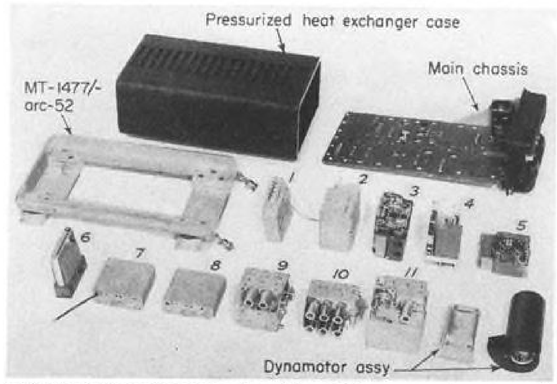
Nineteen organizations were represented, including three airframe firms and one aircraft engine company.

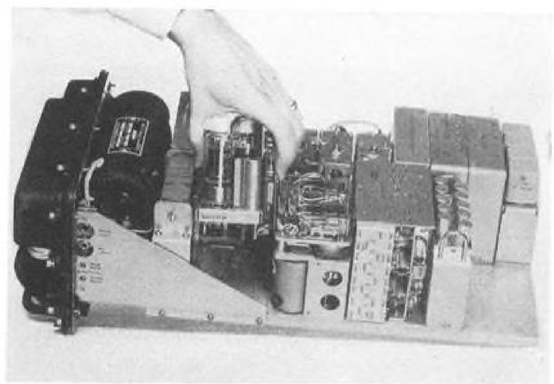
Officers elected: H. M. Schurmeier, Jet Propulsion Laboratory, California Institute of Technology; I. Twomey, United Aircraft Corp.; A. B. Buckley, Wright Air Development Center.



Research Skeleton

The aluminum skeleton, held by Boeing's Jamie Robertson, is the frame on which a flexible flutter model is built. Boeing starts with the aluminum structure, machined to match the scaled stiffness of the big airplane. On these metal bones are hung plastic and balsa sections, free to move independently. The combination structure simulates the aeroelastic characteristics of the big plane during wind tunnel tests.





ARC-52 TRANSCEIVER developed by Collins can conform to available space in aircraft fuselage. Major plug-in units are shown at left: (1) final IF amplifier, (2) 20-30 mc. IF amplifier, (3) mechanical drive, (4) modulator, (5) a.c. power supply, (6) relay unit, (7) guard receiver, (8) audio unit, (9) spectrum amplifier, (10) receiver pre-amp, (11) power amplifier.

Modular Transceiver Cuts Space Waste

By Philip J. Klass

The problem of squeezing growing numbers of avionics equipments into jam-packed jets has bedeviled the aircraft industry for some time.

Now Collins Radio Co. has done something about it by designing Navy BuAer's new 1,750-channel UHF transceiver, the AN/ARC-52, with a modular construction that can be packaged in a variety of shapes, or even two boxes, to conform better to available fuselage space.

Collins is applying the same techniques to several other pieces of equipment, including BuAer's new Tacan receiver, the ARN-21 (XN-10).

The new ARC-52 eases another pressing airframe industry problem: cooling of avionic equipment—It requires 15 lb. of cooling equipment and 10.6 lb. of extra engine fuel per hour to remove 1 kw. of avionic heat in a Mach 1 airplane, Douglas Aircraft Co. says.

The ARC-52 consumes 20% less power in transmitting, and 40% less in receiving mode than its predecessors.

The new transceiver, now in pilot production, is expected to become Navy's successor to the Collins ARC-27, early postwar UHF set used by both Navy and the USAF.

Britain reportedly has adopted the ARC-52 as its NATO standard, and Italy is weighing the set against the ARC-34, made by RCA, which USAF is using to replace its ARC-27s (AW July 26, 1954, p. 44).

How It Compares

Figures provided by Collins indicate that the ARC-52 stacks up very favorably against the ARC-27 and ARC-34. For example:

- **Increased power output:** 20 watts, a better than 3-db. gain over the 8-9 watts output of predecessor equipments. The ARC-52 is pressurized to permit operation at altitudes up to 70,000 ft. without de-rating.
- **Smaller size and weight:** ARC-52 is slightly smaller and lighter than the unpressurized ARC-34, and is 50% smaller and 35% lighter than the ARC-27.
- **Fewer tubes and tube types:** The new Collins set uses only 42 tubes, compared to 73 in the ARC-34 and 55 in the ARC-27. Only 10 different tube types are employed, compared to 18 in the ARC-34.

▶**Modular Challenge**—Modular construction techniques lend themselves more easily to autopilots, digital computers and similar systems where only electrical interconnections are required between modules.

The challenge is more difficult in a communications set, particularly one operating in the UHF band. Here mechanical shaft rotations must be transmitted between some of the modules for channel (frequency) selection. If the full maintenance advantage of modular construction is to be retained, these "mechanical" modules must be designed for speedy replacement without special tools, fixtures, or alignment procedures.

In the ARC-52, Collins has solved this problem by interconnecting the mechanical drive module, and the four modules it powers—main RF, spectrum, IF and power amplifiers—through a gear plate assembly located under the main chassis. The modules, mounted on the other side of the chassis, connect to the gear plate assembly, via Oldham-type couplers which permit speedy replacement (see photos, p. 45).

▶**Packaging Flexibility**—This approach to the problem of mechanical interconnection also simplifies the problem of repackaging the ARC-52 to different form factors. The same five mechanically interconnected modules can be regrouped in a variety of ways merely by employing a different configuration of gear plate assembly and chassis.

There are other design challenges that result from modularization, particularly when RF circuits are involved. Considerable attention must be given to circuit impedance levels of interconnections between modules when the equipment is subdivided.

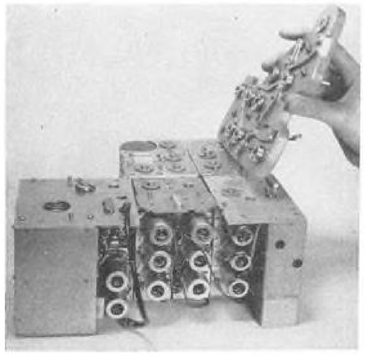
As with conventional construction, discretion must be used in the location of individual modules relative to one another. For instance, a high-gain IF amplifier should not be located next to a power amplifier.

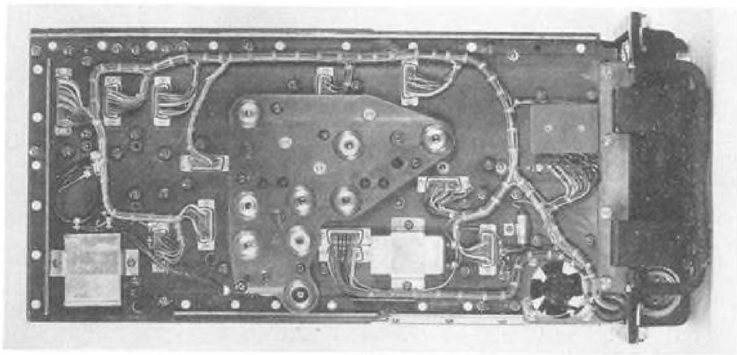
Individual modules can not be expected to meet military specs for conducted and radiated interference without an assist from the main equipment case and filtered conductors into the equipment, Collins points out.

Modular Design Benefits

In addition to the obvious benefits of simplified maintenance and logistics for the military, and flexible form factor for the aircraft manufacturer, there are other significant benefits to be gained from modular construction, Collins believes.

For instance, equipment can be given





GEAR PLATE ASSEMBLY which mechanically interconnects all driven modules in Collins ARC-52 helps give the equipment form flexibility and eases module replacement. Gear plate assembly is shown, at left; right photo shows it in installed position under chassis.

major modification and/or improvements in the field merely by substituting different or improved modules. This might include such things as changing receiver bandwidth and/or frequency stability, or converting an AM set to FM.

Thus modular construction facilitates equipment modernization and delays obsolescence.

Modular design's advantages to the manufacturing of avionic equipment include:

• **Accelerated development:** Equipment can be turned over to mechanical engineers for thermal and shock design earlier in a development program. As soon as circuit engineers have established approximate size and power requirements for each module, the mechanical engineers can go to work while the electronics specialists are still refining their circuits.

• **Standardization:** Some modules can be applied to several equipments, giving engineering and manufacturing economies.

For example, some of the ARC-52 modules are used in a small 20-channel UHF receiver designed for direction finder use. Certain of the modules employed in Collins' new tubeless AP-101 autopilot also find use in its FD-104 flight director and MC-101 gyrocompass.

Collins not only is applying modular techniques to its new military avionics equipment, but to its commercial lines as well. The firm has established company-wide standards for modular dimensions (in multiples of an acceptable unit-length). Exceptions are granted if necessary, but eventually Collins expects to standardize on a few basic module sizes within the company.

Because the ARC-52 is pressurized, cooling takes place indirectly through a heat exchanger built into the equipment's case. Internal heat is transferred to the case via a small internal blower. From here it is transferred to ambient cooling air which is forced into a plenum chamber at the bottom of the case and exhausted from the top. Cooling air is supplied by a built-in (external) blower or from a central source in the plane.

Cooling capacity is sufficient to permit ARC-52 operation to 70,000 ft. without derating, Collins says.

Circuit Highlights

Like most transceivers, many of ARC-52's components and modules serve dual roles, functioning both in the receive and transmit modes. Using only 35 crystals (36 in the transmit mode), the set provides 1,750 discrete channels in the 225 to 400-mc. band.

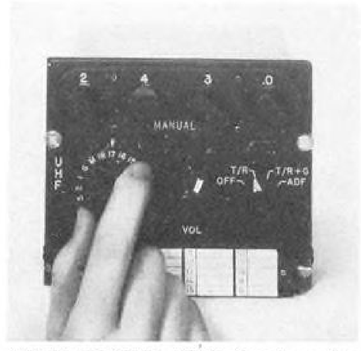
When operated as a receiver, incoming signals are boosted in an RF amplifier, tunable over the 225 to 400-mc. band. The resulting signal is mixed (heterodyned) with one whose frequency is some 10-mc. increment between 200 and 370 mc., depending upon the channel selected (see block diagram, p. 46).

This injection signal is obtained from one of a bank of 15 crystals whose basic frequency has been doubled or tripled, then amplified in the spectrum amplifier.

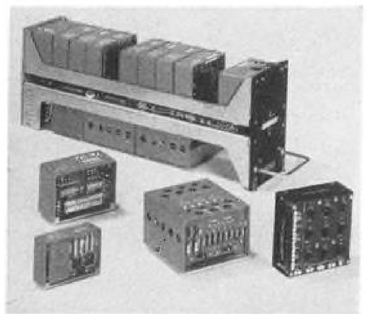
▶ **Second Injection**—The resulting IF signal (20.0 to 29.9 mc.) is amplified and fed to another mixer (B). A second injection signal, obtained by mixing the output from two crystals, one in the 1-mc. decade and the other in the 0.1-mc. decade, is then introduced to produce an intermediate frequency of 1.85 mc. This is filtered using a highly selective fixed-tuned filter package, to reduce spurious responses, amplified and then detected.

The resultant signal is fed to an audio amplifier and associated circuits, such as automatic volume control, noise limiting, and squelch.

A separate guard channel receiver also feeds into the audio amplifier. It is a single-channel, double conversion receiver with its own AVC and squelch



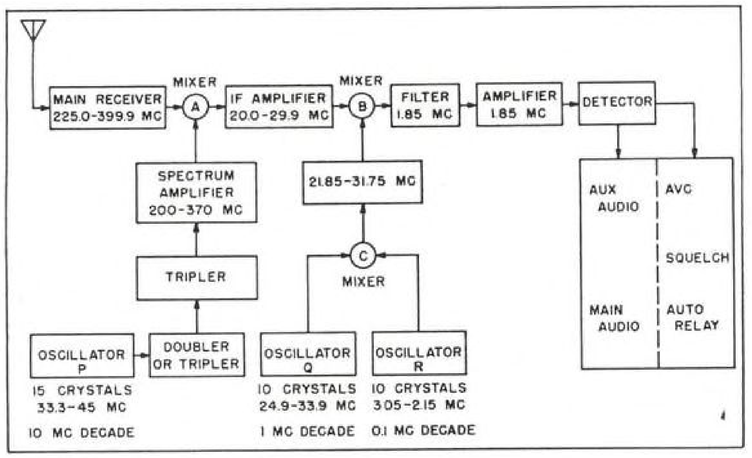
ARC-52 CONTROL HEAD gives transceiver flexibility by permitting selection of any one of 19 pre-set channels, or direct tuning of all 1,50 UHF channels.



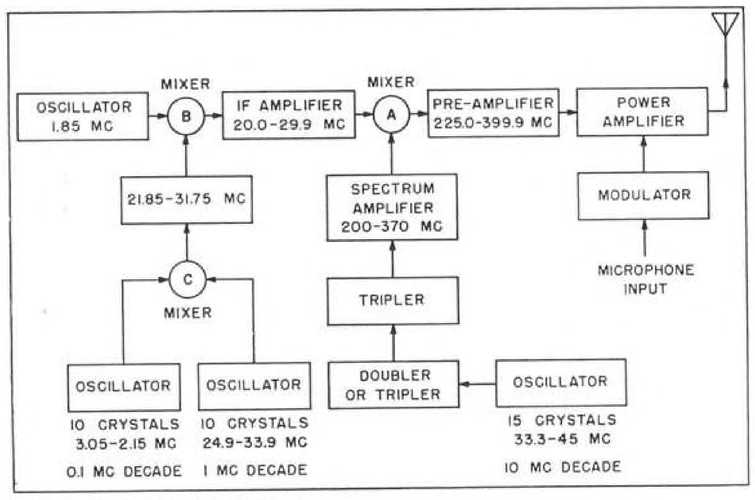
MODULAR CONSTRUCTION, a company-wide policy at Collins Radio Co., is employed in its new tubeless automatic pilot amplifier. The unit includes computing and control modules that incorporate transistor-magnetic amplifier circuitry.

circuits. The ARC-52 has provisions for preflight selection of any 19 channels which can be tuned in later by the pilot by means of a rotary selector switch.

▶ **As a Transmitter**—When the ARC-52 is operated as a transmitter, channel selection works in a fashion similar to the receive mode. The carrier frequency starts out as a 1.85-mc. signal



ARC-52 IN RECEIVING MODE



ARC-52 IN TRANSMIT MODE.

generated by an oscillator. It is boosted to 225-400 mc. and fed to the power amplifier where modulation is applied.

The new ARC-52 consumes approximately 350 watts in the transmit mode, 200 watts in receive, including both blowers. The unit weighs 51.5 lb., including control box, and occupies 1.08 cu. ft.

Receiver sensitivity is quoted at 5 microvolts or better with 10-db. signal-plus-noise to noise ratio.

Researchers Get New Electrodata Systems

Two new electronic computers are going to work in the aviation industry, one at the Langley Lab of the National Advisory Committee for Aeronautics, and the other at Bell Aircraft Corp., Buffalo. Both machines are Type 650 magnetic drum data processing systems made by International Business Machines Corp.

The new computers are expected to speed the vast number of mathematical calculations involved in NACA's aeronautical research programs and in Bell's Rascal missile program.

► **Machine Characteristics**—The Type 650 takes its problem data input from punch cards and stores the information in a magnetic drum which can hold up to 20,000 digits at 2,000 different addresses. Average access time to any address is three milliseconds, IBM says. The problem is then fed into the machine from punch cards.

Additions and subtractions of 10-digit numbers are performed at the rate of approximately 200/second, with multiplication and division at the rates of 60 and 50/second, respectively. Final answers are produced on punched cards. The operator can manually alter or add to stored data and program instructions at any time, IBM says.

New Expansions In Avionics Industry

The avionics industry has reported a number of changes and expansions.

Among them:

• **Deutsch Co.**, Los Angeles, is now manufacturing and distributing the complete line of AN and other types of electrical connectors previously made by General Electric's Monowatt Division. Deutsch purchased complete tooling from GE, as well as designs for several new types of connectors which GE had under development, including improved quick-disconnect, potted, and hermetically sealed connectors.

Company address: 7000 Avalon Blvd., Los Angeles, Calif.

• **Canadian Marconi Co.** will build a 30,000-sq. ft. plant to manufacture magnetrons and various types of transmitting tubes. New facility, slated to be in production early next year, will be adjacent to Marconi's head office and factory at 2442 Trenton Ave., Montreal 16, P. Q., Canada.

• **Electronic Specialty Co.**, Los Angeles, has acquired controlling interest in Electromec, Inc., Burbank (Calif.) manufacturer of avionic test equipment. Company also has announced start of construction on a new 20,000-sq. ft. plant to house all of its divisions. New facility, slated for completion in May, will be located at 5121 San Fernando Road, Los Angeles.

• **Winder Aircraft Corp.**, Winder, Ga., will build new plant at Tifton, Ga., to which it will move its entire operation in the near future. Company's products include navigation equipment of undisclosed nature, and military electronics equipment.

• **Stevens Manufacturing Co., Inc.**, maker of bimetal thermostats and switches, is transferring all its operations to a new 31,000-sq. ft. plant at Lexington, Ohio. New site, at 45 North Plymouth St., is 9 miles south of previous location at Mansfield, Ohio.

Gyroscope Makers Report New Models

An improved integrating rate gyro, which is lighter, has lower drift rates and greater sensitivity than earlier models, yet is completely interchangeable, is one of several recently announced gyroscopes. The redesigned HIG-5, now in pilot production at Gyroscopics, Inc., reportedly has a 5-minute warm-up period. Company's address: Box 226, New Hyde Park, N. Y.

Other new gyroscopes include:

• **Vertical reference**, Series 2153, employs steel parts throughout to provide uniform expansion through a wide temperature range, giving a predictable

and uniform drift rate. Free drift rate is quoted at less than 0.25 deg./min. Added benefit is lower cost.

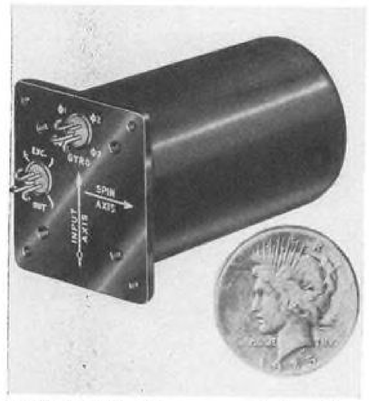
The gyro is designed for 115-v., three-phase, 400-cps. operation. It has 360 deg. of freedom about roll axis and ±82 deg. in pitch. Erection rate is variable between 0.8 and 3 deg./min. Erection system maintains gyro spin axis aligned within 1/10 degree when free of external acceleration, manufacturer says. Gyro wheel momentum is 8.0 x 10^6 gram cm.²/sec.

Manufacturer: Lear, Inc., Dept. 80, 110 Ionia Ave., N.W., Grand Rapids 2, Mich.

• **Directional reference,** Model 45,000, reportedly has a Scorsby test drift rate under 6 deg./hour (exclusive of earth's rotation). Under 10G vibration up to 2,000 cps., drift rate reportedly is under 30 deg./hour. The Model 45,000 is remotely cageable, comes in a hermetically sealed case measuring 5 in. dia. x 5½ in. long, weighs 5½ lb. Gyro motor operates from 115-v., 400-cps. source. Inner axis has ±85 deg. of freedom, and provision is made for torquing about both axes.

Manufacturer: Gyromechanisms, Inc., Halesite, N. Y.

• **Rate gyro,** a low-cost, hermetically sealed unit measuring 1¾ in. dia. x 3⅜ in. (including mounting bracket) and weighing only 0.8 lb., develops an angular momentum of 4.0 x 10^5 g. cm.²/sec. Damping ratios of 0.2 to



DOLLAR-SIZE rate gyro made by Allen.

more than 1.0 can be provided over temperature range of −55C to 80C without a heater. Gyro sensitivity and output can be varied over a wide range. Unit operates from 26 or 115 v., 400 cps., 2 or 3-phase.

Manufacturer: R. C. Allen Business Machines, Inc., Instrument Division, 678 Front Ave. N. W., Grand Rapids, Mich.

• **Vertical reference,** Model CG-100, incorporates caging mechanism for orienting gimbals relative to mounting surface. Unit measures 5¾ in. dia. x 6⅛ in. long, weighs 7½ lb.

For application data, write to manufacturer: Automatic Controls Division, Clary Multiplier Corp., San Gabriel, Calif.

• **Rate gyro,** Model 36128, fluid-damped, has angular momentum of 1.5 x 10^6 g. cm.²/sec., measures 2 in. dia. x 2.7 in., weighs less than 1½ lb. Unit operates from three-phase 400-cps. power, is available with a variety of sensitivities, damping ratios, and pick-offs.

Manufacturer: G. M. Giannini & Co., Inc., 918 E. Green St., Pasadena 1, Calif.

New Transducers Cover Wide Range

A new pressure transducer whose output is an easily changed non-linear function of pressure is one of several recently announced transducers.

The new Type 1100 consists of a bellows driving a tapped potentiometer, with a resistor board to which as many as six precision resistors may be connected to any of the six pot taps. The unit's operating range is 3.42 to 30.36 in. of mercury (−400 to 50,000 ft.). Instrument reportedly meets MIL-E-5272 environmental requirements.

Manufacturer is Trans-Sonics, Inc., Bedford Airport, Bedford, Mass.

Other new transducers include:

• **High-frequency pressure pick-ups,** for measuring gage and absolute pressure in the 1,000, 2,000, 3,000 and 5,000-psi. range, provide potentiometer-type signal sources. Natural frequency is above 20 kc., linearity deviation is less than 1% of full-scale output, according to manufacturer. Output is 20 mv. open-circuit, full-scale with 5-v. d.c. or a.c. excitation. Bulletins 1541 and 1553 give application data.

Manufacturer: Consolidated Engineering Corp., 300 No. Sierra Madre Villa, Pasadena 15, Calif.

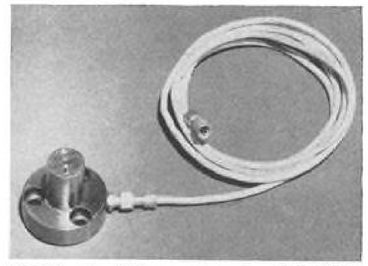
• **Air-flow differential pressure,** dual-element type, for use in airspeed-altitude measurements, covers the range of 0 to 580 knots over altitude range of −1,000 to 20,000 ft. in a typical application. Independent static and pitot pressure signals are brought out. Unit measures approximately 3x4½x6 in., weighs 1.3 lb.

Manufacturer: Technology Instrument Corp., Acton, Mass.

• **Accelerometer,** Model 602A, air-damped to provide stable characteristics over temperature range of −65F to 200F, has damping ratio which is adjustable between 0.1 and 1.0. Instrument covers range up to 20G and has linearity quoted at 0.5 to 1.0%, with resolution of 0.25% to 0.45%. Unit measures 1¼ in. dia. x 4⅛ in. long, weighs 8 oz.

Manufacturer: Bourns Laboratories, 6135 Magnolia Ave., Riverside, Calif.

• **Wide-range accelerometer,** Model A 330, is designed to measure over the range of 5 to 10,000G, and reportedly is capable of withstanding 30,000G without damage. Unit employs a special piezoelectric ceramic crystal which



MODEL A 330 operates in 5-10,000G range, withstands 30,000G without damage.

maker says provides better linearity and temperature stability than pure barium titanate. It measures 1¼ in. dia. x 1¼ in. long, weighs 1¼ oz.

Manufacturer: Gulton Mfg. Corp., Metuchen, N. J.

Makers Report New Microwave Devices

A new low-cost X-band reflex klystron for use in airborne radar and beacons is one of several recently announced microwave devices.

The new VA-203 Klystron, weighing only 8 oz., reportedly has exceptionally good frequency stability and can withstand 50-100G shocks without malfunction or damage. Complete specs may be obtained from the Applications Engineering Dept., Varian Associates, 711 Hansen Way, Palo Alto 2, Calif.

Other new microwave devices include:

• **Ridged waveguide bulkhead assembly,** for use with either X- or C-band radar, contains a circular plate which can be used to bolt waveguide to airplane bulkhead. A rubber gasket provides an airtight seal. VSWR is quoted at 1.05 maximum.

Manufacturer: Airtron, Inc., Dept. A., 1103 West Elizabeth Ave., Linden, N. J.

• **Rotary joint,** available for K_a, X, and S bands, reportedly provides VSWR of less than 1.10 over operating frequency range. Peak power without pressurization is 80 kw. for K_a band, 175 kw. for X band and 1,500 kw. for S band.

Manufacturer: Reeves Instrument Corp., 215 E. 91st St., New York 28, N. Y.

• **Silicon crystal diode,** Type 1N286, is a broad-band coaxial point-contact type designed for use as a crystal mixer over the frequency of 10 to 20 kmc.

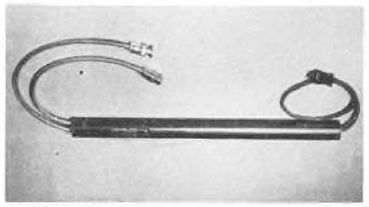
Manufacturer: Sylvania Electric Prod-

ucts Inc., Electronics Division, Woburn, Mass.

• **H-Plane folded hybrid** "T," developed by Hughes Aircraft Co., covering the frequency range of 8.5 to 9.6 kmc., reportedly has a VSWR of 1.12 or less for all arms. Isolation between parallel arms is at least 28 db., 40 db. between perpendicular arms, according to manufacturer. Peak power rating is 250 kw. A special model has slightly greater isolation and lower VSWR.

Manufacturer: Microwave Development Laboratories, 92 Broad St., Babson Park, Mass.

• **C-band traveling wave tube amplifier,** for operation at 4 to 8 kmc., reportedly has a 30-db. small signal gain and a minimum power output of 10 milliwatts. The tube requires a 300-gauss field and a 700-v. regulated power supply.



HUGGINS traveling wave tube amplifier.

Manufacturer: Huggins Laboratories, Inc., 711 Hamilton Ave., Menlo Park, Calif.

Avionics Bulletins

Recently announced bulletins and literature of interest to the avionics field include:

• **Radar antennas, mounts,** and accessories for use with land or ship-based systems are described in GEA-6279 (8 pp.). General Electric, Apparatus Sales division, Schenectady 5, N. Y.

• **Germanium diodes.** Bulletin GD-2, lists ratings and specs on a variety of types. International Rectifier Corp., Semi-Conductor division, 1521 E. Grand Ave., El Segundo, Calif.

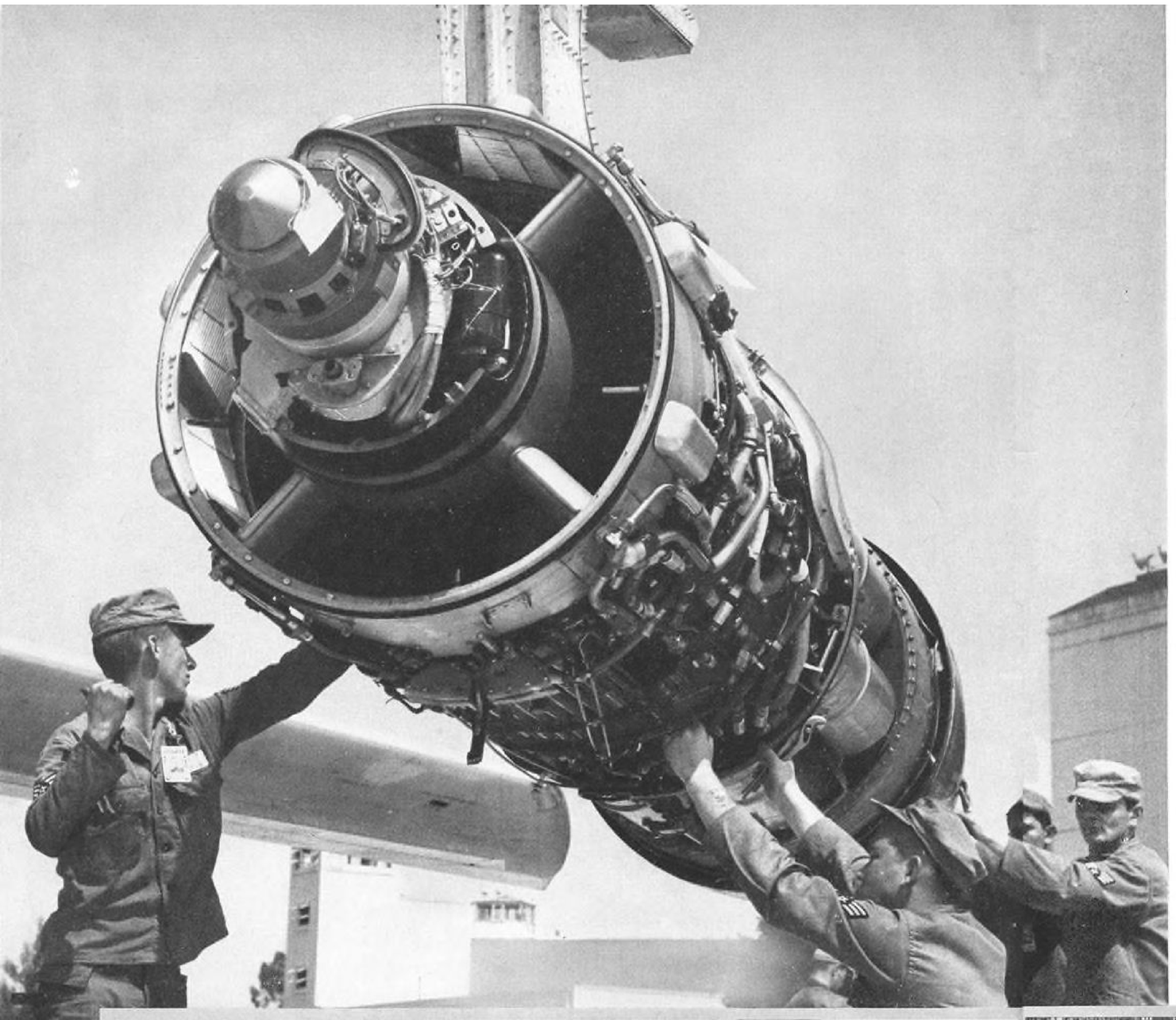
• **Magnetic amplifier catalog** lists specs, includes description of two-stage mag amplifiers with self-contained phase detector. Write to Keystone Products Co., 914 23rd St., Union City 2, N. J.

• **Dual-element pressure transducer** for converting static and dynamic air pressure into proportional voltages (4 pp.). Technology Instrument Corp., 531 Main St., Acton, Mass.

• **Facilities report** on Cook Research Lab, brochure No. R-14, describes organization and facilities for basic, applied, and development research in servomechanisms, radar, countermeasures, guided missiles, airborne fire control, and other fields. Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.

• **Miniature adjustable inductors,** and a series of IF transformers are described in leaflet Form VI-1154. Levinthal Electronic Products, Inc., 2727 Fair Oaks Ave., Redwood City, Calif.

• **Simplified approach** to buying regulated power supplies is the subject of an 8-page bulletin available from New Jersey Electronics Corp., 345 Carnegie Ave., Kenilworth, N. J.



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6-POINT G-E SERVICE PROGRAM HELPS CUT JET OPERATING COSTS

Over 250 G-E jet representatives at 100 locations in the U.S. and overseas help engine users get peak jet performance—anywhere, anytime

G.E.'s six-point jet service program is set up to help G-E engine users reduce their operating costs and get top performance from G-E J47 and J73 engines. Over the past four years, this program has helped reduce maintenance time-cycles. It has added extra operating life to G-E engines in the field. It has helped cut users' manpower needs. The program includes these major benefits:

WORLD-WIDE COVERAGE—In the U.S. and 13 foreign countries, the six technical services shown below are available at military bases, overhaul stations, spare parts depots, special test locations and G-E repair, overhaul and modification shops.

HIGHLY-SKILLED G-E TECH REPS, key members of the team, are on 24-hour call at bases here and abroad, in Stateside G-E service shops and through 65 G-E district offices. As part of G.E.'s complete technical services, Company representatives have a library of technical publications and training aids. They also can supply engine users with training films, visual aids, parts catalogs and handbooks for pilots.

PUBLICATION GEA-6136, "Operation Service," describes the six-point program in detail. For a copy, contact a G-E Aircraft Specialist via your nearest G-E Apparatus Sales Office. Or write *Section 232-4, General Electric Company, Schenectady 5, N. Y.*

Progress Is Our Most Important Product

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1. JET ENGINE TROUBLE-SHOOTING. To help minimize aircraft "ground-time," G-E tech reps are available throughout the Free World to help personnel discover, correct unusual engine difficulties.

2. CLASSES IN THE FIELD. Using standardized manuals and visual aids, G-E reps often conduct classes designed to give students a better understanding of jet operating and maintenance procedures.

3. PARTS REPLACEMENT. Tech reps often help determine amount of parts needed to support flight operations, make available tools and test equipment for field use.

4. G-E REPAIR, OVERHAUL AND MODIFICATION SHOPS provide complete maintenance service to customers. Shops are conveniently located to airframe manufacturers and USAF bases, thus help reduce users' costs.

5. ENGINE SERVICE ANALYSIS. Jet service reports gathered in the field are analyzed in IBM machines to give valuable information for parts replacement estimates, also for improvement of engine design for the Armed Forces.

6. ENGINE TRAINING SCHOOL. Advanced instruction in G-E engine operation and maintenance is given on request to military and civilian personnel at the Company's Cincinnati plant.

FILTER CENTER

► **Transistors for Data Link?**—Bell Telephone Labs has used tetrode transistors to produce and amplify pulses only 1/20 of a microsecond long and to manipulate these pulses at a rate of 10 million pulses per second in an experimental pulse-code transmission system, which is possibly an air defense data link. Peak pulse power output as high as 500 milliwatts has been obtained without excessive heating of the transistor, according to the Bell Laboratories Record.

► **All-Transistor Autopilot**—Watch for Lear to announce a new L-6 airline autopilot which uses transistors throughout, in place of vacuum tubes. New L-6 is expected to weigh around 50 lb., sell for under $10,000.

► **More Stable Neon Diodes**—National Bureau of Standards reports a new inexpensive method for equalizing and stabilizing the voltage characteristics of cold-cathode gas diodes, such as neon tubes. The technique, developed under USAF sponsorship, stabilizes both initial firing voltage and conduction holding voltage. It involves the use of pulsed voltages simultaneously applied to a large number of neon tubes. NBS Summary Technical Report No. 1917 describes the technique.

► **For the Record**—Radio Technical Commission for Aeronautics has officially adopted new nomenclature for the Common System ATC Radar Beacon System. Henceforth the airborne unit (sometimes called "radar safety beacon," "airborne radar responder," "airborne responser") will be known as the "airborne ATC transponder." The ground equipment is to be called "ground ATC interrogator."

► **New High-Dielectric Film**—Fiberfilm, a new very thin sheet of dielectric capable of operating at temperatures of 200-250C, has been announced by American Machine & Foundry Co. AMF says new Fiberfilm has all the desirable electrical qualities of Teflon, plus desirable mechanical properties. It is available in both porous and non-porous forms. The non-porous film can be made in 0.8 to 1.7-mil thickness, and reportedly does not stretch up to its breaking point. The porous film comes in 0.6 to 13-mil thicknesses in a variety of Teflon-to-glass ratios.

► **TCA Viscount Gets New Autopilot**—One of Trans-Canada Air Lines' Viscounts has been equipped with the new British Smiths S.E.P.2 autopilot, which uses magnetic amplifiers throughout and an automatic approach coupler.

All-in-One Panel

New transistorized audio control panel, available from Bendix Radio, consolidates VHF, HF, VOR, interphone, ADF, and marker beacon controls on a single console panel, with transistors used in the isolation amplifier. Panel includes volume control and rotary switch for audio filter selection. KLM Royal Dutch Airlines has ordered 16 of the new Bendix panels which come in two models: one for DC-6, -7 and Convair pedestal mounting; the other conforming to the new RTCA 5¾-in.-wide standard.

USAF Contracts

Following is a list of recent contracts announced by the United States Air Force.

Acme Aluminum Alloys, Inc., 232 N. Findlay St., Dayton 3, runway overrun barriers, less anchor chain and shackles, 30 pr., $555,156.

Blue Anchor Overall Co., Inc., 1826 E. Somerset St., Philadelphia, jacket, flying man's, nylon wool backed rayon lining, knit wool wristlets, waistband and collar, slide fastener, front closure, sage green, 20,944 ea.; large, 28,150 ea.; extra large, 5,807 ea.; $492,662.

Lewis Welding and Engineering Corp., 1 Interstate St., Bedford, Ohio, jack, hand hydraulic, folding tripod, 30-ton capacity, 525 ea., $358,158.

Southern Sportswear Co., Centerville, Tenn., trousers, flying, men's, intermediate nylon, sage green, 2,722 pr., $53,051.

Welsh Mfg. Co., 9 Magnolia St., Providence 9, R. I., glasses, sun, spectacle type G-2 with carrying case, 16,800 pr., $40,992.

Dresser-Ideco Co., 875 Michigan Ave., Columbus, Ohio, tower for use with AN/FPS-8, 5 ea., $194,615.

Eastman Kodak Co., 343 State St., Rochester, N. Y., film, 2,100 rl., 629,000 ft., $28,904, 6,670 rl., $522,928.

Northern Radio Co., 143-5 W. 22nd St., New York, oscillator, Type 102 Model 1, 110 ea., keyer, Type 105 Model 4, 662 ea., tone keyer, Type 153 Model 2, 1,217 ea., $1,861,051.

Sperry Gyroscope Co., Great Neck, N. Y., pulse analyzers, 4 ea., computers, 1 ea., airborne digital recorders, 1 ea., $81,576.

Stromberg-Carlson Co., 100 Carlson Rd., Rochester, N. Y., central tele. equipment, 3 ea., $284,257.

Corvey Engineering Co., 1737 DeSales St., N.W., Washington 6, D. C., procurement of staff analysts, engineering and other necessary personnel to perform specific analytical studies as may be required by the CO and as accepted by the contractor, $31,214.

Educational Research Corp., 10 Craigie St., Cambridge 38, Mass., development of a B-47 simulator maintenance training program outline, $35,740.

Regents of the University of California, Berkeley 4, Calif., research and reports on care of flyer-accident proneness, $32,655.

A. C. Spark Plug Div., General Motors Corp., Milwaukee, Wis., kit, relocation of limit switches, 1,882 ea., $31,268.

Avco Mfg. Corp., Evendale 15, Ohio, kit, addition of capacitor C-920 to antenna control amplifier OA-113, 1,502 ea.; antenna control amplifier, 1,522 ea.; kit, modification of 519E364 panel assy., 183 ea.; kit, modification of 141D601 panel assy., 183 ea.; kit, modification of switch from "AFC manual operation to Mod Disable Normal" operation, 324 ea.; kit, modification change capacitor C104 in delay timer circuit, 324 ea.; kit, modification of balance weight on antenna; kit, modification replacement of limit switch sub unit, 257 ea.; kit, modification by the installation of monowatt connectors in saddle junction box, 222 ea.; kit, modification of spare saddle junction box, 43 ea.; kit, modification by the installation of monowatt connector in saddle junction box, 222 ea.; kit, modification of spare saddle junction, 43 ea.; kit, modification installation of reinforcement clip turret access door, 222 ea., $266,274.

Clayton Mfg. Co., El Monte, Calif., cleaner, vapor pressure spray rinse, electrically operated, portable, type B-3, 241 ea., $170,533; photographs, 3 sets.

General Electric Co., Johnson City, N. Y., kit, modification installation of Monowatt connector in saddle junction box turret, 990 ea., $35,456.

Mall Tool Company, Chicago 19, Ill., sander, disk, portable, 7-in. capacity; motors, 768 ea., $32,102.

McColpin-Christie Corp., Los Angeles, Calif., rectifiers, metallic, d.c. power supply, portable, jet engine starting, 16 ea., $27,830.

Minneapolis-Honeywell Regulator Co.,

Minneapolis, Minn., repair and/or modification of labs computer components for the MA-1 computer system, $160,438.

Parker Appliance Co., Cleveland, Ohio, machine, flaring and beading, 27 ea., $48,080.

Powermatic Machine Co., McMinnville, Tenn., surfacer single cylinder, 24"x8", screw-type bed, complete with knife jointer, knife grinder, knife, setting jig and one extra set of cylinder knives, machine shall be furnished with 5Hp., 63 ea., $138,427.

Racine Hydraulics & Machinery, Inc., Racine, Wis., saw, hack, power, 66 ea., $51,189.

Aeroquip Corp., 300 S. East Ave., Jackson, Mich., fittings, end, 115,800 ea., $35,782; 374,100 ea., $69,582.

AiResearch Mfg. Co., 9851 Sepulveda Blvd., Los Angeles 45, coolers, 416 ea., $184,246; cooler assys., 751 ea., $143,628.

Airframe Mfg. & Supply Co., P.O. Box 74335, Oakwood Station, Los Angeles 4, bowls, fuel strainer, alum., 6 items, $28,245.

Aluminum Division, Atlantic Steel & Iron, Page Blvd. at Shan's Lane, Springfield, Mass., alum. alloy sheet, 52,845 lb., $25,676.

American Seating Co., Ninth & Broadway N.W., Grand Rapids, reel assys., 22 items, $86,302.

E. M. Jorgensen, 7311 E. Pine St., Tulsa, steel bar and rod, 249,338 lb., $43,178; steel, chrome, 238,953 lb., $110,041.

Federated Metals Div., American Smelting & Refining Co., 4041 Park Ave., St. Louis, lead sheet, 143,946 lb., $25,032.

Howard Steel Fabricating Corp., 1221 S. Plate St., Kokomo, Ind., steel, 299,080 lb., $30,847; steel bar, 68,000 lb., $47,670.

Kaiser Aluminum & Chemical Sales, 919 N. Michigan Blvd., Chicago 11, alum. alloy sheet, 323,010 lb., $139,217.

Pacific Welding Alloy Mfg. Co., 310 N. Ave. 21, Los Angeles 21, steel electrodes, 280,220 lb., $35,501.

Purolator Products, Inc., 970 New Brunswick Ave., Rahway, N. J., element assys., filter, restricter valves for hydraulic systems on B-47A, B-47B, B-47E and RB-47E, 23,502 ea., $26,792.

Rohm & Haas Co., Washington Square, Philadelphia, plastic, 4,157 sheets, $36,872.

Shell Chemical Corp., 380 Madison Ave., New York, alcohol, 955,000 gal., $324,700.

Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio, research on and assistance to Office of Assistant Secretary of Defense (R & D)-sponsored titanium program, $998,650.

Duke University, Durham, N. C., continuation of research on microwave and radiofrequency spectroscopy, $79,997.

Johns Hopkins University, 1315 St. Paul St., Baltimore 3, continuation of research on the study of complex liquid entropies with the automatic computing calorimeter, $34,999.

University of Chicago, 5801 Ellis Ave., Chicago 37, research and reports on the histo-pathology and/or abnormal physiology of the fatigued vestibular apparatus which results in vertigo, tinnitus and disorientation, $48,640.

Washington University, Skinker & Lindell Blvd., St. Louis 10, research and reports on the cause and prevention of cataracts, $31,712.

Coast Guard Contracts

The following contracts with the aviation industry were recently announced by U. S. Coast Guard Hq., Procurement Section, Washington, D. C.:

Columbian Bronze Corp., 216 N. Main St., Freeport, N. Y., propeller hubs, studs and nuts, etc., 12 ea., $45,000; removable blade propeller equipment for wind class cutters, $41,980.

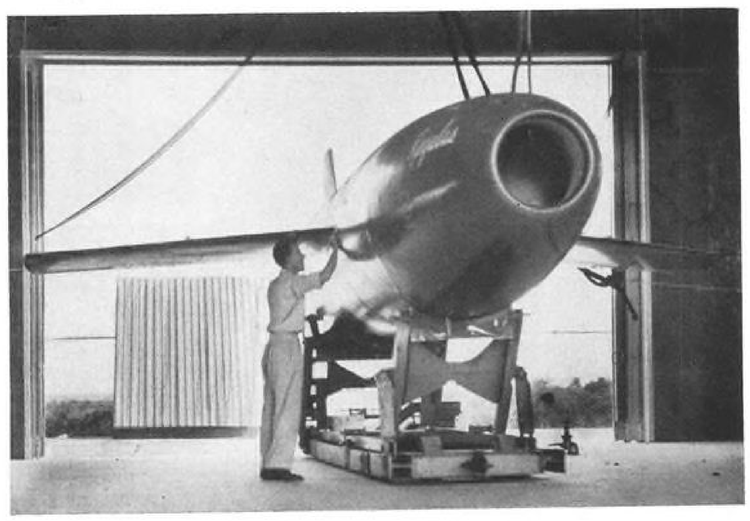
General Electric Co., 777-14th St., N.W., Washington 5, D. C., armature for main propulsion motor, 1 ea., $26,275.

Hallicrafters Co., 5th & Kostner Ave., Chicago 24, radio transmitters for airborne communications, 120 ea., $78,141.

Marine Div., Sperry Gyroscope Co., Garden City, N. Y., radar equipment, complete packaged, antenna unit, transmitter, receiver unit, indicator unit, 6 ea., $103,542.

Navigation Electronics Corp., 11616 Hart St., N. Hollywood, Calif., provide aircraft with homing capabilities in the 2.0-3.5 mc. band, 110 ea., $61,980; modify receivers, kits, instruction books, etc., $23,054.

Washington Aluminum Co., Inc., Pennsylvania RR and Knecht Ave., Baltimore 29, conical radio transmitting antenna assembly, complete with all hardware for assembling and erecting, 30 ea., $37,080.



Regulus Gets Simulated Flight Test

Regulus guided missiles go through simulated flight trials in Chance Vought Aircraft's new four-cell test facility at Dallas. Before delivery to the Navy, the surface-to-surface missile's Allison J33 turbojet is run at full speed, landing gear is lowered and raised, electrical and hydraulic systems are operated and the parachute release is popped. Technicians control the missile's simulated flights, which include weapon's final dive on an enemy target.

the new *Super 18*
Beechcraft

Time for Decision!

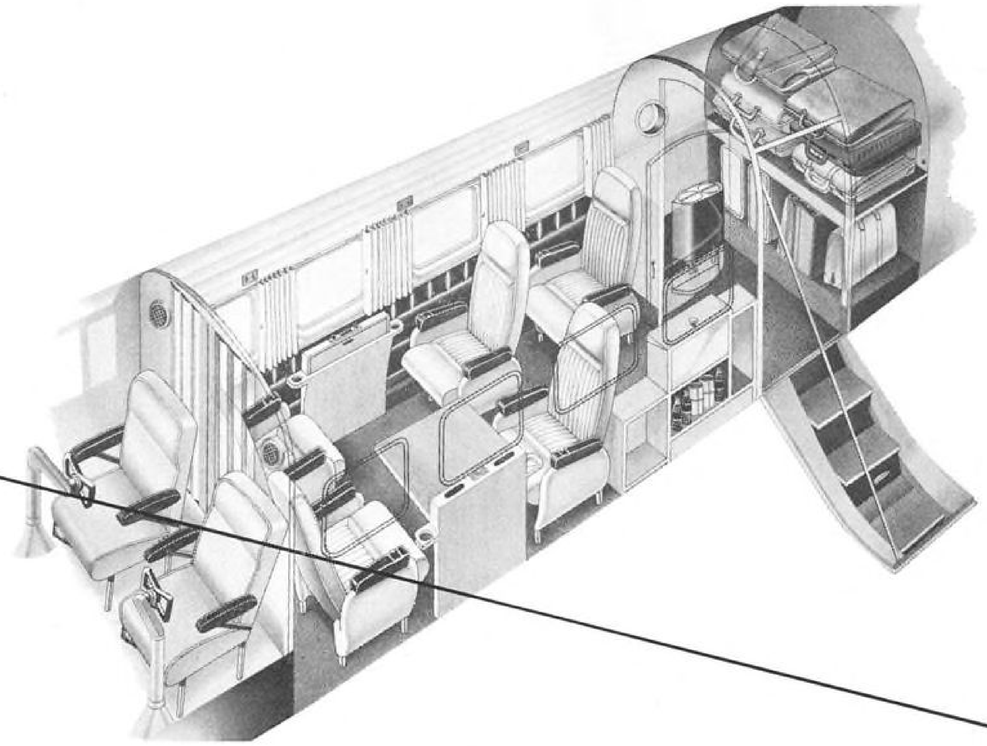
Time... the priceless commodity money can't buy... is the only factor restricting the activity of many a corporate executive. The demands for time... to consult plant managers and technicians... to inspect far-flung facilities... to call on business contacts... exceed the working hours available and the physical capabilities of over-worked executives.

In the competitive business world of today, Beechcraft ownership opens the way for business expansion... increases executive activity... *by saving time.* With a Beechcraft, company executives have more time for business and more time for pleasure, too!

The Super 18 Beechcraft is an airplane that can be purchased with confidence... not only in its ruggedness, reliability, and adaptability, but also with confidence that it will deliver the ultimate in comfortable air travel.

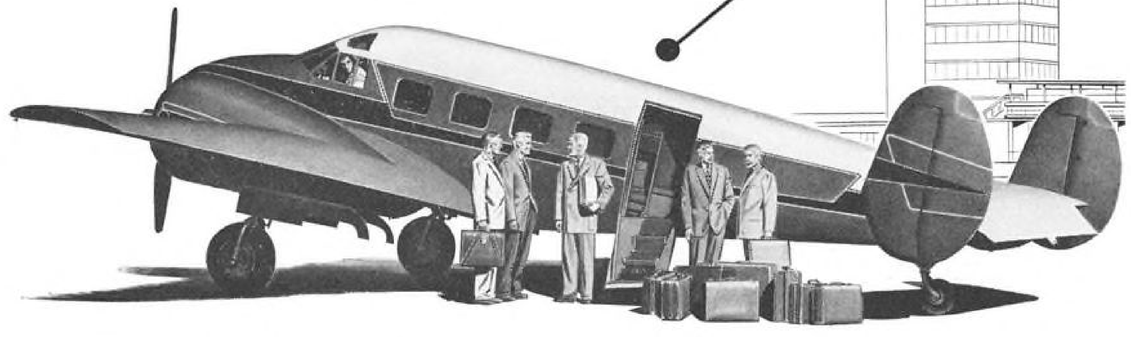
Beechcraft

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS



Executive Suite

Luxurious comfort... relaxing quiet dominate the spacious interior of the new Super 18 Beechcraft cabin. Travel in your own transport at speeds up to 234 miles per hour... with all the facilities for private consultation and deliberation while on the way on important missions. The Super 18 pays dividends to any corporate activity by slashing travel time by as much as 75 per cent... by increasing business efficiency and by easing the demands of time upon the executive team.



★ASK ABOUT BEECHCRAFT'S NEW EXCLUSIVE LEASING PLAN.

Typical costs, operating data on request from Beech Aircraft Corp., Wichita, Kansas, U. S. A. — or from any of the following Beech Distributors:

Albuquerque—Cutter-Carr Flying Service, Inc.
Amarillo—Tradewind Airport Corp.
Atlanta and Birmingham—Southern Airways Company
Butte—Butte Aero Sales & Service, Inc.
Charleston—Hawthorne Flying Service
Chicago—Butler Airplane Sales
Dallas—J. B. Gray Co., Inc.
Davenport—Elliott Flying Service
Denver—Mountain States Aviation, Inc.
Houston—J. D. Reed Co., Inc.
Indianapolis—Roscoe Turner Aeronautical Corporation
Lansing—Francis Aviation
Lantana—Florida Airmotive, Inc.
Memphis—Memphis Aero Corp.
Milwaukee—Anderson Air Activities
Nashville—Capitol Air Sales, Inc.
New Orleans—Magee Aircraft Co., Inc.
New York City—Atlantic Aviation Corporation
Oakland—Pacific Aircraft Sales Company
Oklahoma City—Aircraftsmen, Inc.
Omaha—C. J. Abbott & Co.
Philadelphia—Atlantic Aviation Service, Inc.
Portland—Flightcraft, Inc.
Rochester, Minn.—Gopher Aviation, Inc.
Rochester, N. Y.—Page Airways, Inc.
Salt Lake City—Kemp & Kelsey Airservice, Inc.
San Antonio—Alamo Aviation, Inc.
Shreveport—Currey Sanders Aircraft Company, Inc.
Teterboro and East Boston—Atlantic Aviation Corp.
Topeka—Topeka Aircraft Sales & Service
Tulsa—Tulsair Distributors, Inc.
Vandalia—Ohio Aviation Co.
Van Nuys—Norman Larson Company
Wichita—Aircraftco, Inc.
Wilmington—Atlantic Aviation Service, Inc.
Youngstown—Youngstown Airways, Inc.

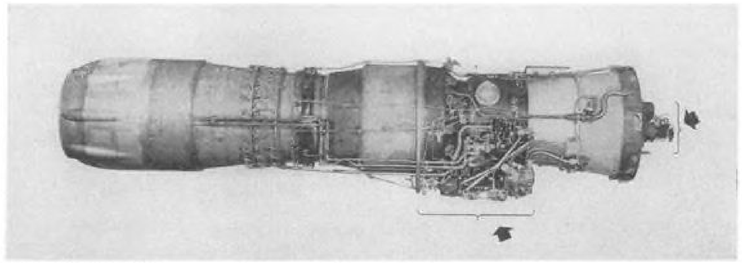
Auxiliary Jet Power Poses Problems

By George L. Christian

Fast-growing demands for auxiliary power in modern aircraft are complicating the equipment designer's life.

Military aircraft speeds are already such that the human pilot is incapable of "weapon delivery" without the aid of electronic eyes and is too weak to control his plane without hydraulic muscle. Auxiliary sources must provide the power for these aids.

The Accessory Power Source panel during the Society of Automotive Engineers' recent New York meeting took up the problem of how this power ought to be supplied.



J57 ACCESSORIES are engine-mounted (arrows); but military favors remote mounting.

Three Kinds of Power

• **Electrical.** An airframe engineer proposed a new and separate source of a.c. power for aircraft because a.c. frequency for new avionic equipment on the latest aircraft has to be held to ever-tighter tolerances. If a plane's main electrical system, with powers ranging from 40 to 240 kva., has to be very tightly regulated, it is a major task, the panelist said.

A separate a.c. source for the close-tolerance avionic units, whose power demands are a relatively modest 2 to 4 kva., will greatly simplify job of close frequency control.

• **Hydraulic.** Trend in the hydraulics field is to split a plane's utility hydraulic system—operation of landing gear, flaps, speed brakes, etc.—from the dual power control systems used to actuate flight control surfaces. So a third hydraulic pump-and-pad is indicated.

• **Pneumatic.** A panelist pointed out that compressor bleed air is rapidly geting too hot to handle. A complicating factor is that modern turbojet powerplants are lubricated by synthetic oils which can leak past engine seals and contaminate the bleed air. Therefore pneumatic engineers may have to resort to an engine-driven pneumatic pump, requiring still another pad.

▶ **How to Drive**—The speakers disagreed strongly over how the auxiliary power sources themselves should be driven and where they should be mounted. Among the points brought out:

• **Engine-driven.** This is the most popular method among the airplane makers. Navy's Bureau of Aeronautics circulated a letter to investigate possibility of achieving consistency in how to drive accessories and to decide which services should be powered electrically, hydraulically and pneumatically. Out of 10 airframe companies, eight came out for direct-driven, engine-mounted units. Such an installation is light and simple, they said.

Opposed were the engine manufacturers and the military services. Powerplant people objected that there is no longer room to mount a host of accessories on jet engines, particularly because higher speeds mean engines must have smaller frontal areas, and the slimmer engines cannot bulge with accessories.

Another objection, agreed on by all powerplant engineers present, was that engine mounting of auxiliary equipment is too inflexible—each airframe manufacturer has his own idea of how many and what type of accessory drive pads he wants—there is even lack of consistency at a single plant making different models of aircraft using the same engine.

The military services objected that engine changes are more difficult when accessories are engine-mounted, because powerplants have to be stripped of the units when removed from the plane, then built up again prior to re-installation of the engine. Also, use of accessory pads on the engine leads to many different models of a single basic powerplant, greatly complicating logistics problems.

• **Remotely driven.** One powerplant engineer came out strongly in favor of remotely locating the accessories and powering them through tailor-made mechanical drives. Such drives provide a great installation flexibility, since the engine maker has to provide only a basic number of power drives on which the plant manufacturer can mount any accessory drive he wants. However, the airframe representatives called such a method undesirable because it is heavy, space-consuming and too complex mechanically.

The more commonly suggested drives for remote installations are electrical, hydraulic or pneumatic. The first two were tossed out by panelists as being too heavy.

The military favored pneumatic, because it is light enough to be practical, they said. They added that remote drive in itself is desirable because engine changes are simplified, so can be performed more rapidly. Logistics are eased; since the airframe, not the engine, carries the accessories, one powerplant type can be installed in various planes. This is of growing importance as the Air Force seeks to supply more and more of its needs by air.

Other features of remote pneumatic drive cited by the Air Force: accessories may be tested on the ground by plugging in an outside source of pneumatic power instead of having to run the engines; loss of a powerplant in flight does not mean loss of auxiliary power for a multi-engine plane, since bleed air for accessories is ducted from all engines.

Engine makers objected that such a plan bleeds their powerplant to death. They said that bleeding compressor air costs four times as much in thrust loss as use of mechanical drives.

This complaint was seconded by the airframe people who brought up the additional objection of piping complexity between engine and accessories.

Consensus appeared to be that trend

Bled or Shafted?

Complaint of the jet engine manufacturer, apropos of methods of supplying power for accessory drives:

"When we lay down a new engine will someone please tell us early in the game whether we are going to be bled to death or shafted to death?"

is still towards engine-mounted accessories for buried powerplants, although supersonic flight may change this.

Time for Standardization

The engine maker has to design an engine with the greatest possible installation flexibility, at the same time allowing design to stabilize quickly so production may proceed. If aircraft requirements change after the engine's development is well along, major changes will result in serious engine production delays.

A Wright Aeronautical spokesman said: "We would rather devote our engineering energy to developing new engine models instead of diluting it through creating many variants of one engine to adapt it to many different installations."

Another panelist summed it up this way: "Arriving at standardization is the temporary agreement of organized solutions for an undetermined period of time—and that time is getting shorter and shorter as we get more inquisitive and the planes we produce go faster and higher."

▶**The Heat's On**—The imminent existence of manned Mach 2 aircraft whose stagnation temperature will be approximately 280F was called to the panel's attention.

Accessories, to operate successfully in such aircraft, must be designed and made of materials which will be capable of appreciably higher continuous operating temperatures than those in use today. This applies to most system components—O-rings and seals; hydraulic fluid; electrical insulation; hydraulic and pneumatic pumps and actuators; generators, alternators and motors.

Some such high temperature components are already on the horizon, the panel was told.

Gilfillan Pump Rights To Houdaille-Hershey

Manufacturing and sales rights to the Gilfillan vari-flow high pressure pump for operating hydraulic equipment on aircraft have been acquired by the Houdaille-Hershey Corp., Detroit, Mich., through a contract with Gilfillan Bros., Inc., Los Angeles, Calif.

The pump delivers pressures up to 3,000 lb., and embodies a built-in inlet supercharger which enables the basic pump to function with the same efficiency at high altitudes as at sea level. A dual pressure control is available which enables the pump to operate at extremely low mechanical loads, conserving horsepower and prolonging service life.

The two companies will work together to further progress on the project.

Pressure Valve Keeps Emergency Line Full

New Vickers flow-sensitive pressure regulator assures that plane's emergency hydraulic system will be supplied with fluid as long as the emergency ram-air turbine is turning.

The ram-air turbine is designed to provide maximum torque output at a given airflow. Normally, when airspeed and airflow decrease, as during approach to landing, torque produced by turbine decreases, and the pump it drives may stall if it has to operate against a pressure relief valve set at a fixed 3,000 psi. But the flow-sensitive regulator senses reduced torque in terms of reduced fluid flow, and lowers relief valve setting accordingly. This eliminates likelihood of pump stalling.

Vickers says the new regulator is going into several of the "Century" series of fighters and the McDonnell F3H Demon.

The valve is used with a constant-displacement hydraulic pump. It directs all or part of the pump's output to the hydraulic system, with unneeded fluid being metered off through the valve's return port.

Primer Heats Fuel for Cold Piston Engines

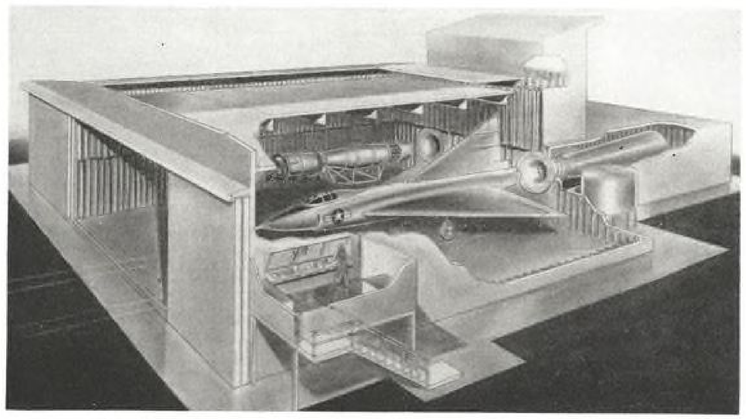
New piston engine priming unit delivers 200F fuel to cold powerplants, enabling them to be started in 3 min. in −65F temperatures, according to Janitrol Aircraft Automotive Division. It has been tested in a Wright R3350.

The primer, mounted between the carburetor and cylinders, in series with the standard primer, uses Janitrol's "whirling flame" principle.

Unit automatically actuates the engine starter when fuel temperature reaches 200F and turns off when fuel reaches 220F.

It holds less than half a pint of fuel at a time and passes a gallon a minute. Dual solenoid fuel valves and thermal switches provide a margin of safety.

The primer is ignited by a spark plug. Its total current draw is less than 7 amp.; it weighs 15.8 lb., is 17.6 in. long and 4.3 in. in diameter.



Prefab Silencer Hushes Jet Test Noise

Prefabricated accoustical tube system for lessening noise of jet engines under test reduces field installation costs and can be varied to meet local requirements. Sketch shows complete unit having concrete and steel demountable panels. Progressive stages contain structures as needed to quiet larger powerplants or provide a higher degree of noise abatement, depending upon proximity of test area to inhabited areas. Units were designed by General Sound Control, Inc., Los Angeles 25, Calif.

OFF THE LINE

De Havilland Propellers, Ltd.'s hydraulic pitch lock has flown about 90,000 hr. on DH propellers. The safety device instantly locks blade angle in case of any failure that might allow blades to swing to fine pitch and cause engine to overspeed.

Growing trend in hydraulic valves is to use precision-lapped moving parts instead of dynamic seals to prevent leakage past the parts, according to Vickers, Inc. Variable friction caused by seals makes correct valve operation difficult to control. Also, deterioration of dynamic seals due to corrosion and heat is a problem.

Ejection seat contract for McDonnell's supersonic F-101 Voodoo has been awarded to Weber Aircraft Co., Burbank, Calif.

Jet development tames flaming saucers...to squeeze more energy from fuel

Making flame do tricks—like taking the shape of a flat, stationary saucer—is part of the jet engine research at Westinghouse. By putting flame through its paces, engineers learn how to maintain fire in a small space to liberate the most energy . . . develop smaller, more efficient combustion chambers and afterburners. Specialists meet frequently to discuss combustion problems and direct effort along the most productive lines.

This flame research—one of a hundred avenues of aviation gas turbine development—is typical of Westinghouse corporate capability. Metallurgists investigate new heat-resisting alloys; casting engineers develop new precision methods and chemists work on new fuels and lubricants.

These projects are just some of the *new* things going on at the Westinghouse Aviation Gas Turbine Division. They are all part of our program of jet engine development for commercial, military and missile use. All-out research and development is a Westinghouse contribution to turbojet design that is aimed at helping you bring tomorrow's aircraft . . . One Step Closer. J-91035

* * *

Basic research in fields allied to jet propulsion is a corporate function—carried on by persons such as this Westinghouse man. Your AGT sales engineer thus is backed by the corporate capability of all of Westinghouse as well as specific AGT Division facilities and experience.

THE WESTINGHOUSE AVIATION FAMILY

Jet Propulsion • Aircraft Electrical Systems and Motors • Airborne Electronics • Airborne Systems Components • Wind Tunnels Airport Lighting • Ground Electronics

YOU CAN BE SURE...IF IT'S

Westinghouse

Flying test beds like this B-45 airplane are used to test new designs *in the air*. Flight testing is the ultimate proof of the value of a new design.

These two development engineers are evaluating a new fuel nozzle. The equipment in the background is designed to test the performance of fuel systems.

This is Allan U. Macartney, your Aviation Gas Turbine sales engineer in the Dayton, Ohio, area. He is THE MAN WITH THE FACTS. Contact Al or his counterpart in your area for FACTS on Westinghouse and Rolls-Royce engines and designs or write to Westinghouse, P. O. Box 288, Kansas City, Mo.

Navy Contracts

Contracts recently announced by the Navy's Aviation Supply Office, 700 Robbins Ave., Philadelphia 11, are:

Arrow Lacquer Corp., 208 Dupont St., Brooklyn 22, lacquer, $169,788.

Carbide & Carbon Chemicals Co., 30 E. 42nd St., New York, hydraulic fluid, 26,000 gal., $68,706.

Douglas Aircraft Co., Inc., 3000 Ocean Park Blvd., Santa Monica, Calif., services, parts, material, 29 ea., $36,525.

Eagle-Picher Co., American Bldg., Cincinnati 1, pigment, 360,000 lb., $51,660.

Enmar Inc., 1424 E. 25th St., Wichita 1, lacquer, 16,696 gal., $34,728.

Fred C. Good & Sons Inc., 521 W. Glenwood Ave., Philadelphia 40, cable assy. hooks, $143,804.

Goodyear Tire & Rubber Co., 1144 E. Market St., Akron 16, wheel assys., 186 ea., $33,084.

Greer Hydraulics, Inc., N. Y. International Airport, Jamaica 30, N. Y., stands, 8 ea., $25,360.

Hub Paint & Varnish Co., Inc., 47-38 Fifth St., Long Island City 1, N. Y., paint, 18,145 gal., $30,910.

Huron Metal Products, 120 Clay St., Brooklyn 22, davit, lock, $32,405.

Jetronic Industries, Inc., Main & Cotton Sts., Philadelphia 27, test sets, 208 ea., $170,724.

Jowil Electronics, Inc., Belfield Ave., Wister St., Philadelphia 44, test bench cable kits, 481 ea., $240,115.

McDonnell Aircraft Corp., P. O. Box 516, St. Louis 3, parts, $256,027.

Minneapolis-Honeywell Regulator Co., 2600 Ridgeway Rd., Minneapolis 13, units, 296 ea., $28,587.

New York Air Brake Co., Starbuck Ave., Watertown, N. Y., seal assys., $26,602; pumps, 121 ea., $84,288.

Pesco Products Div., Borg-Warner Corp., 24700 N. Miles Rd., Bedford, Ohio, pump assys., 146 ea., $45,129.

Rohm & Haas Co., 222 W. Washington Sq., Philadelphia 5, plastic, $45,968.

Scintilla Div., Bendix Aviation Corp., Sherman Ave., Sidney, N. Y., plugs, $40,289.

Superior Paint & Lacquer Works, 6231 Maywood Ave., P. O Box 271, Huntington Park, Calif., paint, 19,500 gal., $37,245.

Switlik Parachute Co., 1325 E. State St., Trenton 7, parachutes, 159 ea., $30,603.

William Armstrong Smith Co., 109 East Point, Ga., paint, 20,032 gal., $39,062.

B. G. Corp., 321 Broad Ave., Ridgefield, N. J., thermocouples and spark igniters, $208,219.

Denison Engineering Co., Columbus 16, Ohio, conversion kits, 25 ea., $28,125.

Douglas Aircraft Co., Inc., 3000 Ocean Park Blvd., Santa Monica, Calif., maintenance parts, $34,163.

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., amplifiers, 31 ea., $131,582.

General Veneer Mfg. Co., 8652 Otis St., South Gate, Calif., plywood, 811 sheets, $25,246.

Raytheon Mfg. Co., 100 Revere St., Waltham 54, services, facilities and materials, $34,898.

Vickers, Inc., 1400 Oakman Blvd., Detroit, hydraulic valves, 21 ea., $43,856.

Acushnet Process Co., P. O. Box 965, New Bedford, Mass., oxygen masks, 4,600 ea., $77,740.

Atlas Paint & Varnish Co., 32-50 Buffington Ave., Irvington 11, N. J., paint, 21,500 gal., $28,310.

Bendix Products Div., Bendix Aviation Corp., South Bend, Ind., maintenance parts, $88,381.

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., indicators, 233 ea., $77,973.

Glidden Co., 11001 Madison Ave., Cleveland 2, paint, 13,000 gal., $25,391.

Henry Spen and Co., Inc., 1995 Pitkin Ave., Brooklyn 7, spare parts, $57,359.

Hub Paint & Varnish Co., Inc., 47-38 Fifth St., Long Island City 1, N. Y., enamel, 14,166 gal., $27,904.

Kollsman Instrument Corp., 80-98 45th Ave., Elmhurst 73, N. Y., indicators, 137 ea., $31,238.

Lear, Inc., 110 Ionia Ave., N.W., Grand Rapids 2, power units and screw-jacks, $27,619.

(Advertisement)

Valve Talk

for WM. R. WHITTAKER CO., Ltd.

by Marvin Miles,
Senior Member, Aviation Writers Assn.

North American Aviation gave the session a formal title — "Symposium on Quality Standards."

But it can better be described as a unique step in assuring understanding, cooperation and efficiency in the relationship between prime contractor and vendors.

Long have the major manufacturers and their vital suppliers been linked by field engineers and purchasing agents, specifications and order forms. And although this bond, in itself, would seem sufficient, North American realized it could be strengthened by an open exchange of problems and viewpoints with officials of its suppliers.

Thus one day recently the builders of the Sabre Jet and the Super Sabre played host to some 23 supplier executives. Whittaker representatives among them, at the third of a series of symposiums devoted to mutual understanding that can weld complex manufacturing into a flawless operation.

On this occasion, the series – conducted under guidance of Rulon Nagely, director of North American's Material Division, and John Young, director of Quality Control–presented the picture of procurement, quality control, engineering and manufacturing as it related to the vendors and simultaneously gave them a chance to let down their hair, so to speak.

It gave both groups a chance to ask and answer the all-important questions: "What can we do for you?" "What can you do for us?"

The North American experts, twenty in all, presented their requirements to the session, frankly and in detail, explaining the reasons for the company's design and quality standards, methods of evaluating proposals in terms of quality, delivery and price, and the necessity for keeping schedules keyed to assembly line stations with but a small margin of safety in delivery time.

They discussed the varying results of failure in a single component of an aircraft system and stressed the necessity for consistent quality to the point that the last airplane of a production run must exhibit the same performance as the first.

And they pointed out also that suppliers are expected to make a fair profit, that a vendor who is not making money is a liability because he will often fail to deliver on schedule and may even go broke and not deliver at all.

The suppliers learned that last year North American paid out $632,971,469, with some $250,000,000 of this in wages and salaries to the company's 54,930 employees and the balance to more than 10,000 subcontractors and suppliers and their supporting network, 54% of whom represent small business, together with payments for rent, heat, light, transportation, etc.

Nor were technical intricacies disregarded in the session. Hydromechanical and hydraulics specialists addressed the group with brief remarks, receiving and shipping problems were outlined, inspection procedures explained and discussions ranged from design considerations in flight control systems to building quality in vendor products and ways and means of meeting North American's quality requirements.

In other words, after Mauri Dubuc, equipment purchasing supervisor, welcomed the supplier executives and defined the purpose of the program, North American, through its engineers, foremen and directors, told its story, explained its needs and pinpointed requirements.

After each presentation the vendors asked questions and clarified many a point to their satisfaction in the give-and-take meeting of minds. And through the symposium's flexibility they learned – as did the company speakers – more of the other fellow's problems than they had known before.

Then, to give the guests the real feeling of North American's vast manufacturing and research panorama, they were taken on a tour of the Sabre Jet and Super Sabre final assembly lines, shown the company's F-100 flight simulator, high speed wind tunnel, high altitude test chamber, sound abatement chamber, hydraulic machinery, assembly and test, etc.

Finally the day wound up with a dinner where the North American representatives and twenty-three of the men who help supply them got to know each other in the informal, relaxed atmosphere of a nearby country club.

There's no need to explain what such a program accomplishes in the way of mutual understanding or to estimate its effect on future relationships between North American and its suppliers. The answer is far too obvious.

We can only urge that other prime contractors follow suit.

WHAT'S NEW

Telling the Market

Airborne electrical power systems components, engineering, development, test and manufacturing, Booklet B-6392, Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh 30, Pa. . . . **Epocast epoxy resins** for tooling and foundry patterns, booklet, Furane Plastics, Inc., 4516 Brazil St., Los Angeles 39, Calif.

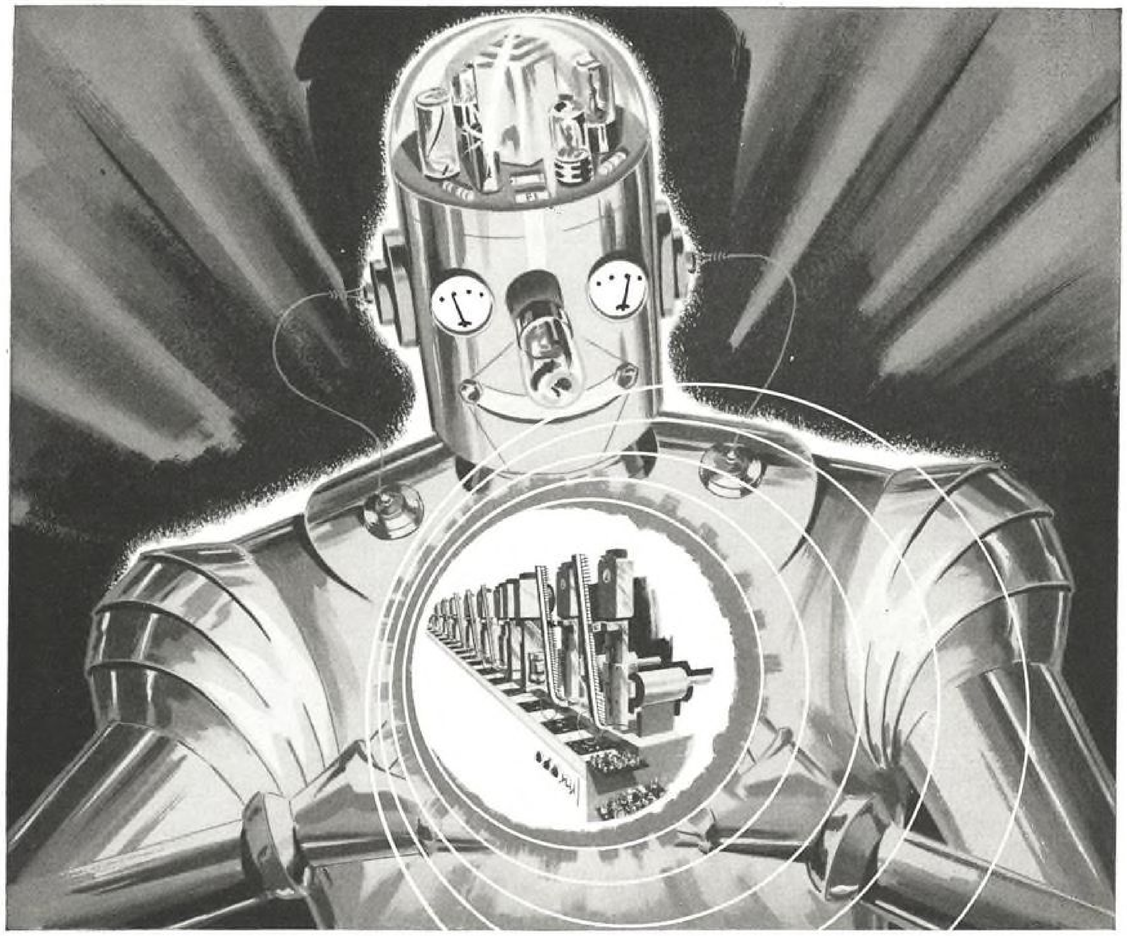
Shock and vibration requirements of military specifications are summarized in Bulletin 804A, Barry Controls, Inc., 1000 Pleasant St., Watertown, Mass. . . . **Leitz optical measuring and inspection equipment**, catalog, George Sherr Optical Tools, Inc., 200 Lafayette St., New York 12, N. Y. . . . **"Automation and Automatic Machinery"** outlines engineering and design services of De Florez Co., Inc., 16 E. 30th St., New York 16, N. Y.

Basic information for installing or operating **gamma-radiography inspection equipment**, Technical Operations, Inc., 6 Schouler Court, Arlington, Mass. . . . "Manual for Reinforced Plastics Tooling," Marblette Corp., 37-21 30th St., Long Island City 1, N. Y. . . . **Specialty heating equipment** for aircraft, missiles and personnel, Bulletin GEA-6285, General Electric's Apparatus Sales Division, Schenectady 5, N. Y.

Kodak Axicon, a new type of optical element applicable to machine tool alignment and similar problems, booklet, Special Products Sales Division, Eastman Kodak Co., 343 State St., Rochester 4, N. Y. . . . **Mechanized metallurgical furnaces**, pamphlet, Surface Combustion Corp., Toledo 1, Ohio. . . . **"Safer Landings in Any Weather,"** describes airport ceilometer and transmissometer equipment, Bulletin 2675, Crouse-Hinds Co., Wolf & Seventh North Sts., Syracuse, N. Y.

Production capabilities of new **12,000-ton and 8,000-ton hydraulic extrusion presses**, Harvey Aluminum, 19200 S. Western Ave., Torrance, Calif. . . . **Facilities for working magnesium and titanium**, Brooks & Perkins, Inc., 1950 W. Fort St., Detroit, 16, Mich. . . . **Aircraft cleaning and maintenance chemicals**, Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.

Aviation products, including pumps, electronic tube cooling units, refrigeration-type coolers, pressurization devices and dehydrators, Bulletin 330, Eastern Industries, Inc., 100 Skiff St., Hamden 14, Conn. . . . **Precision undercut measuring gage**, folder, Mueller Laboratory,



239 W. Maple Ave., Monrovia Calif. . . . **Testing machines guide** covers broad range of equipment, instruments and accessories, Bulletin RG-14-55, Riehle Testing Machines Division, American Machine & Metals, Inc., E. Moline, Ill. . . . **Blanks, tools and inserts** are described in V-R Carbide Catalog, Vascoloy-Ramet Corp., Waukegan, Ill.

Shurclose caps and plugs for protecting, sealing or masking tubing, fittings, valves, hydraulic components and machined parts, Catalog 55-1, Ray A. Scharer & Co., 3000 E. Grand Blvd., Detroit 2, Mich. . . . **"The Helicopter Goes to Town,"** a film of an airline's passenger operations, Sabena Belgian World Airlines, 720 Fifth Ave., New York 19, N. Y.

Aircraft extrusions, sheet and plate and wire, rod and bar catalog and price list, Catalog Dept., Pioneer Aluminum Supply Co., 5251 W. Imperial Highway, Los Angeles 45, Calif. . . . **Preventative Maintenance Manual for V-Belt Drives,** Dayton Rubber Co., Dayton, Ohio.

Work holding equipment and jig and fixture components, Catalog 101, Jergens Tool Specialty Co., 712 E. 163d St., Cleveland, Ohio. . . . Precision rectangular and Hoke-type **gage blocks,** steel and tungsten carbide, Catalog, Dept. A-9, Fonda Gage Corp., Stamford, Conn. . . . **Facilities** for sheet and plate fabrication, welding, angle rolling, bending, punching, machining, shearing and flame cutting, booklet, National Welding & Manufacturing Co., Newington, Conn.

Hoisting Honest John

Army's ballistic rocket Honest John is shown preparatory to a test firing from a launching ramp. For field use with artillery batteries, Honest John is fired from a truck-mounted single-rail launcher. The Douglas Aircraft Co. missile is powered by a Hercules Powder Co. solid-propellant rocket. It is 21 ft. long, having a 30-in. body diameter.

AVIATION SAFETY

CAB Report on Executive Plane Crash

Engine Failure Downs Private B-34

LOCKHEED VENTURA, N 44M,
GENERAL MITCHELL FIELD,
MILWAUKEE, WIS., DEC. 17, 1954

THE ACCIDENT

A Lockheed Model B-34 Ventura, N 44M, owned and operated by the Miller Brewing Co., Milwaukee, crashed approximately 3,200 ft. north of General Mitchell Field, Milwaukee, Dec. 17, 1954, at approximately 1708.[1] The four occupants were killed and the aircraft was demolished by ground impact and subsequent fire.

HISTORY OF THE FLIGHT

Lockheed Ventura N 44M took off from Runway 1 (005 deg. magnetic) of General Mitchell Field, Milwaukee, at approximately 1708 for an IFR (instrument flight rules) flight to Winnipeg, Canada.

Aboard were Pilot Joseph Laird, Co-pilot Paul Laird, and two passengers—Fred Miller, Sr., president of the Miller Brewing Co., and his son, Fred Miller, Jr.

As N 44M was passing over the northern boundary of the airport, after an apparently normal takeoff, the Mitchell Field Tower Controller received the message, "an engine on fire" and "making an emergency landing."

The controller acknowledged this message and the pilot reported something about an engine sputtering.

The aircraft, which had started a turn to the left at this time, was cleared to return to the airport and use any runway. The pilot then reported an engine feathered. As the controller turned up all runway lights to the highest intensity, personnel in the tower observed a mushrooming mass of flame just north of the field. The aircraft had crashed in a nose-down right-wing-low attitude in an open field approximately 3,200 ft. north of the airport and west of a projected line of Runway 1.

Fire of large magnitude occurred after ground impact and continued for several hours before it was completely extinguished.

INVESTIGATION

Impact occurred in an open field, 3,200 ft. north of the northern boundary of the airport and 26 deg. to the left of a projection of Runway 1, where the ground level is slightly less than 50 ft. higher than the airport. The highest altitude attained by the flight, which was not more than a minute in duration, is estimated at 150-200 ft. by ground eyewitnesses.

The 1710 weather observation of the U. S. Weather Bureau station at Mitchell Field was: measured ceiling 4,000 ft., overcast, 500 ft. broken; visibility 1¼ mi.; light rain, very light snow, moderate fog; temperature 33; dewpoint 33; wind west 7 mi.; ceiling ragged. Night takeoff minimums for Mitchell Field are 300 ft. and one mile.

The purpose of the flight was to transport Fred Miller, Sr., and his son to Canada for a combination hunting and business trip. Because of marginal weather conditions Pilot Laird had canceled a short trip to South Bend, Ind., the morning of Dec. 17 and the aircraft remained at Mitchell Field until the start of the subject flight. The six wing tanks had been "topped" on the preceding day and the two bomb-bay tanks were filled to capacity on Dec. 17 after the South Bend flight was canceled. The gross weight of N 44M at the time of takeoff has been computed at 27,390 lb., well under the maximum gross weight of 31,000 lb.

The Miller Brewing Co. maintained a well-appointed private hangar at General Mitchell Field and owned two aircraft—the Lockheed involved in this accident and a Grumman Widgeon. Pilot Joseph Laird had been employed as a pilot and in charge of the aviation department since 1947. His brother, Co-pilot Paul Laird, has been employed by the Miller Brewing Co. nearly five years. Lockheed N 44M had been flown to all parts of the United States for upwards of 250 hr. during 1954. Both

[1]All times referred to are Central Standard and are based on the 24-hour clock.

pilots were engaged in courses to maintain proficiency and there was no expense spared, so far as could be ascertained, in the maintenance and upkeep of the aircraft or home base.

It is known definitely that the aircraft was on a northwesterly course just prior to ground impact. However, the ground impact mark of the right wing leading edge indicates that had the plane been level fore and aft, rather than practically vertical, the heading would have been about 30 degrees or approximately 90 degrees to the right of the northwesterly course.

Examination of the remaining portion of the airframe did not reveal any evidence of structural failure or control malfunctioning prior to impact. Testimony of eyewitnesses nearest the accident scene indicates no fire prior to ground impact.

Examination of both propellers revealed the dome position at impact, in respect to blade angle, to be approximately 26 deg. with the rotating cam lug against the low pitch stop. From examination of the blade shim plates, the blades of both propellers indicated a blade angle of approximately 26 deg. There was no evidence of other than normal propeller operation prior to ground impact and no indication of propeller feathering.

Extensive examination of the entire left engine assembly revealed a fatigue failure in the crankshaft at the rear intermediate counterweight cheek in the area of the crankshaft bolt. The nucleus of the fatigue fracture originated in the last full thread edge of the rear crankshaft bolt hole and the progression lines extended approximately 85% through the crankcheek before instantaneous failure took place. This failure resulted in complete destruction of the articulating and piston assemblies of the rear power section.

Extensive examination of the right engine assembly indicated all piston movement to be normal, and there was no indication of excessive operating temperatures, lack of lubrication, or other difficulties. All cylinder interiors were free of scoring, the pistons were in normal condition, the pins and plugs were normal. Rotation of the propeller shaft revealed that all gear trains and reciprocating parts from the nose section to the rear cam compartment were operating normally.

Examination of the dual magneto of the right engine (Scintilla model DF18RN, serial no. 6379) revealed that the No. 1 breaker assembly cover had a hole, approximately one-half inch in diameter, and two worn grooves made by rubbing of the propeller governor control cable which is normally next to the magneto. Bench testing of this magneto revealed flashover on both coils due to a considerable amount of moisture being present in the interior; however, the magneto breaker assemblies were normal, with no evidence of point arcing or burning.

At ground impact both engines had separated from the nacelles at the firewall and were subjected to the intense ground fire that consumed approximately 85% of the airframe as well as all of both engine rear sections up to and including the rear cam compartments. All front cylinders on both engines received severe damage from ground impact.

A majority of the eyewitnesses testified

they did not see any signs of fire in the air. One of the three controllers in the tower, and another witness driving east and south several blocks of where the accident occurred, stated that there were signs of light, or a streak of flame, coming back from the engine area. The first of three radio transmissions from the flight, after becoming airborne, also stated "an engine on fire." However, a former Air Force pilot and one of the three witnesses nearest the point of impact gave positive testimony that there was no visible fire or flame on the aircraft in flight.

The flame-smudged parts of the aircraft, when examined, gave indication of ground fire only, with the flames rising vertically. There were no fore and aft flame streaks or marks that indicated a fire in flight.

The completely burned-out cockpit area prevented the determination of instrument indication at the time of ground impact. Examination of the airframe revealed that at the time of the accident the landing gear and wing flaps were fully retracted. The rudder trim tab was at a 10-deg. right setting. The elevator trim tab was 5 deg., indicating a nose-down setting.

ANALYSIS

From testimony of eyewitnesses and examination of the engines, it is apparent that a sudden cessation of power from the left engine occurred soon after the aircraft became airborne in a normal takeoff. The nature of the structural failure in the left engine would permit windmilling of the left propeller. Several ground witnesses stated they heard sputtering noises as the aircraft passed overhead north of the airport boundary. These sputtering noises could be attributed to the initial failure of the crankshaft.

There were also witness statements to the effect that the righ propeller was turning slowly. It is possible that there was sufficient moisture in the right engine magneto to cause engine roughness, although this moisture may have been introduced after the accident. Any reduction of power would have resulted in the output of less than rated power from the right engine and affected single-engine performance adversely.

The Military Technical Order (01-55EC-1) Manual covering the operation of this model Lockheed states that, "if an engine fails (after takeoff) after attaining an indicated airspeed of 127 mph. and gross weight does not exceed 27,000 lb.—flight may be continued. . . . Every effort must be made to prevent the airplane from yawning excessively. Do not use the ailerons. Maintain all power possible while holding a straight course. If flight is continued retract the landing gear, adjust the rudder trim tab and then feather the inoperative propeller."

The gross weight of N 44M at the start of this flight has been computed as 27,390 lb. (390 lb. over the 27,000 lb. named in the single-engine procedure) and because of the short time element, reduction of the gross weight was impossible.

The record of Capt. Joseph Laird indicates a well-trained and conservative pilot with ample experience in flying N 44M. It is reasonable to assume that an indicated airspeed of 127 mph. had been attained

at the time of passing over the boundary of the airport. It was in this immediate area that the failure of the left engine occurred. The ground level rises north of the airport and there is also a high tension power line running east and west less than a mile north of the airport. A necessary left turn to return to the airport, with the left propeller windmilling, would seriously affect any single-engine performance. This, coupled with the possible engine power reduction on the right engine, would compound the pilot's difficulties.

These difficulties continued to a point where flight was no longer possible. Impact marks from a nose-down, right-wing-low ground contact from the estimated flights altitude of 50-75 ft. indicate a loss of flying speed and falling off on the right wing at the final stage of the flight. This movement is substantiated by the heading of the ground marks being approximately 90 deg. to the right of the observed northwest course.

There may have been a considerable pyrotechnical display streaming back during the left engine failure. This would be due to probable rupture of manifolds, irregular firing, etc., and would account for the two witnesses who observed unusual light or fire effects on the aircraft while it was still in flight. However, the great majority of eyewitnesses, and this includes three nearest the point of impact, are certain that there was no aircraft fire in flight. It is also possible that the pilot had a panel fire-warning indication that prompted him to report a fire to the tower.

FINDINGS

On the basis of all available evidence the Board finds that:

1. The aircraft and the crew were properly certificated.
2. The aircraft was properly loaded with respect to maximum gross weight and center of gravity limits.
3. A structural failure and total power loss in the left engine occurred shortly after the aircraft became airborne.
4. A power lessening of the right engine prevented normal single-engine performance.
5. The terrain and obstructions did not permit a straight-ahead emergency landing.

The left turn and loss of power produced loss of airspeed and control that resulted in an uncontrolled crash.

PROBABLE CAUSE

The Board determines that the probable cause of this accident was the failure of the left engine, together with a reduction of power in the right engine following takeoff, which prevented normal single-engine performance.

This condition together with the fact that the aircraft was overloaded for single-engine performance resulted in loss of control.

By the Civil Aeronautics Board:

/s/ Ross Rizley
/s/ Chan Gerney
/s/ Harmar D. Denny
/s/ Josh Lee
/s/ Joseph P. Adams

FINANCIAL

Aircraft Industry's Profit Margins on Sales

	1952		1953		1954	
	Pre-Tax Profit Margins	Net Profit Margins	Pre-Tax Profit Margins	Net Profit Margins	Pre-Tax Profit Margins	Net Profit Margins
Beech	5.4%	1.9%	Def.	Def.	10.0%	4.3%
Bell	5.5	2.4	7.2%	2.4%	7.1	3.5
Boeing	6.7	1.9	6.4	2.2	7.4	3.6
Cessna	9.7	2.8	8.3	2.6	11.3	4.8
Chance Vought[a]	....	....	....	....	9.4	4.4
Convair-Gen. Dynamics[b]	4.3[c]	2.1[c]	4.2	2.8	6.8	3.2
Curtiss-Wright	6.4	2.8	8.1	2.6	8.3	3.7
Douglas	6.4	2.1	7.0	2.1	8.7	4.0
Fairchild	7.4	2.2	8.2	2.4	6.2	2.9
Grumman	8.3	2.4	10.0	2.9	10.1	4.8
Lockheed	4.0	2.1	5.9	1.9	6.3	3.1
Martin	4.0	4.0[d]	7.3	7.3[d]	7.8	7.4[d]
McDonnell	7.5	3.8	6.6	3.2	6.6	2.9
North American	6.5	2.5	6.3	2.0	8.1	3.4
Northrop	4.0	1.3	3.8	1.3	5.2	2.2
Republic	6.6	2.0	6.7	2.0	6.1	2.8
Ryan	8.5	2.5	11.5	2.9	9.5	4.3
United Aircraft	7.7	2.7	8.5	2.6	8.2	4.0

NOTES

Def. Deficit.

[a] Chance Vought was spun off from United Aircraft in 1954.

[b] Convair merged into General Dynamics in 1954.

[c] Excludes non-recurring and special items.

[d] No federal tax liability reported.

SOURCE: Company annual reports.

Will Probers Hit Aircraft Profits?

Aircraft industry profits are likely to get a close inspection by at least two government sources soon. Before the year is over, the Renegotiation Board may have rewritten some industry profit and loss statements, and at least one congressional committee investigation seems certain.

Although renegotiation has been completed for most aviation companies through 1951, the excellent earnings of the succeeding years have yet to run the renegotiation gauntlet. The Renegotiation Board has already recaptured $710,000 net from Grumman Aircraft Engineering Corp. on 1951 profits and McDonnell Aircraft Corp. is faced with making an undisclosed refund on its 1951 fiscal profits (AW Apr. 25, p. 95).

Earnings for the aircraft industry as a group were either moderate or submarginal for the years up to and including 1951. It was not until 1952 that earnings started to pick up, gathering momentum in 1953, and rising

sharply in 1954 with the lapse of the excess profits tax.

Measuring the Profit

The aircraft industry prefers to measure its profitability in terms of return on sales rather than return on investment.

On this basis (3.8% average for 1954) the group's earnings have been quite low—in fact even submarginal—in past years compared with other industries.

This compares with an average of 2.4% for 1953 and 1952 and 2.2% in 1951. The average for 1950 was higher, 4.5%. In 1948 the average experience was only 1.4%.

The compilation on page 82 shows profit margins before and after taxes for 18 aircraft companies during the past three years. It can be seen that wide variations exist.

Most Air Force production contracts in recent years specify that profit margin on sales before taxes should not exceed 7%. Higher profit margins shown by some of the companies for 1954 may be attributed to their commercial business. This is the probable reason Cessna made the best individual showing in 1954.

There can be no doubt, that the lapse of excess profits taxation Dec. 31, 1953, was a major element in permitting profit margins after taxes to increase smartly during 1954.

Some observers believe this absence of EPT, while serving to increase profit margins, may make the industry vulnerable to renegotiation, although excess profits taxes are not formally a factor in renegotiation.

Some industry officials are most outspoken that removal of the excess profits tax should in no way justify renegotiation of the rate of profits. When taxes were increased, contract profits were not raised; hence, it is maintained, it would be inequitable if a contrary policy were now followed after the death of EPT.

Profit margins on sales are only one of the measures likely to be applied in evaluating aircraft earnings. Government agencies are inclined to place considerable emphasis on the return realized on invested capital. This return has shown a substantial gain for the past three years.

Factors in Renegotiation

There are, of course, many other factors that enter into the renegotiation processes. The Renegotiation Act of 1951 makes it clear that, in determining excessive profits, each contractor shall be treated as an individual case and that he must be given credit for good business practices and performances in carrying out defense contracts.

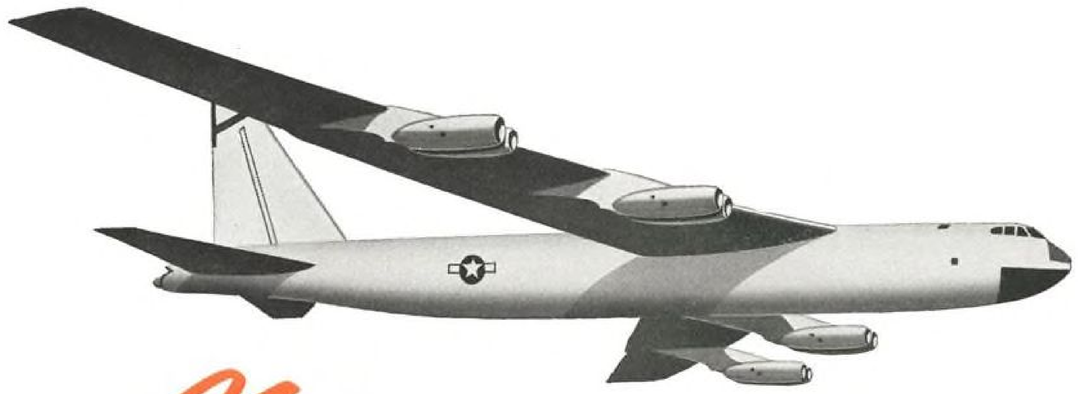
The act states that favorable recognition must be given to the efficiency of the contractor or subcontractor, with particular regard to attainment of quantity and quality production, reduction of costs, and economy in the use of materials and facilities, as well as manpower.

Other factors include reasonableness of costs and profits; amount and source of public and private capital employed; extent of risk assumed, including that incident to reasonable pricing policies, nature and extent of contribution to the defense effort, such as inventive and developmental contribution; and character of business.

The present chairman of the Renegotiation Board has stated: "It is entirely a judgment operation. There is no fixed formula or yardstick for the determination of excess profits, nor is there any fixed maximum to the amount of profits which may be realized or retained by any contractor."

While this arrangement affords considerable free-wheeling in the renegotiation processes, it is also frustrating to the aircraft industry which would welcome some "ground rules" so there would be a firmer basis for its operations.

—Selig Altschul



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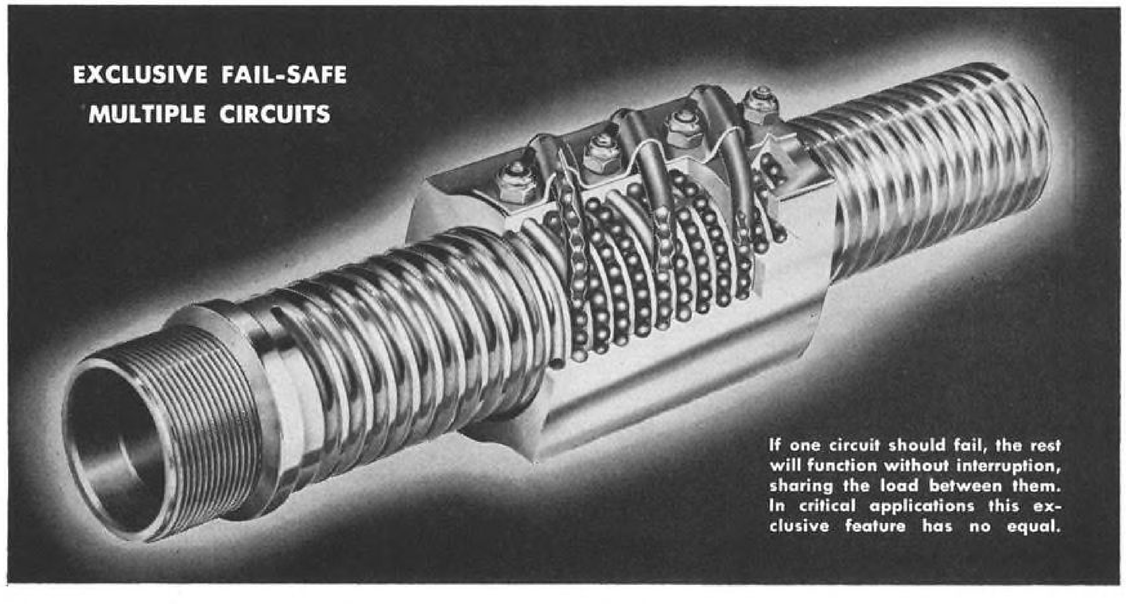

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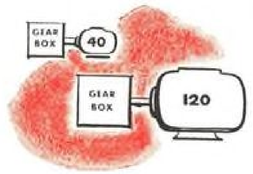

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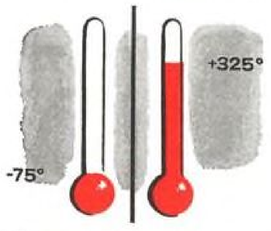

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(Continued from page 9)

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Rear Adm. Malcolm F. Schoeffel (USN Ret.), director of weapons planning for General Precision Equipment Corp., Washington, D. C.

Harvard C. Waken, controller, and **Howard C. Powell,** senior buyer, Pastushin Aviation Corp., Los Angeles.

Alexander MacGillivray, director of finance, Hughes Aircraft Co.

Bailey Wright, director of Cleveland Aero Products' new landing gear service department.

William K. Lawton, advertising manager and public relations director, L. B. Smith Aircraft Corp., Miami, Fla.

R. James Pfeiffer, executive director of customer relations, Fairchild Engine & Airplane Corp.

Lewis G. Sinning, procurement director, Piasecki Helicopter Corp.

Nathan C. Price, scientific consultant and inventor, Lockheed Aircraft Corp.

C. B. Wilder, director of technical operations, Delta-C&S Air Lines.

Ross Willmot, public relations director and assistant to the vice president, Hunting Associates, Ltd., Toronto, Ont.

Wendell E. Eldred, engineering manager for landing gear products, Bendix Aviation Corp.'s Products Division, South Bend, Ind.

Elton J. Smith, chief experimental pilot, Bell Aircraft Corp.'s Helicopter Division, Fort Worth.

T. J. Dalton, sales and service manager, Nasco, Inc., Miami.

H. Grady Gatlin, Jr., assistant manager of Air Transport Assn.'s regulatory section of operations.

Edward J. Rhoades, plant manager for Mattel Engineering Co., Los Angeles.

Wilfred Greenway, cargo sales officer in the U. S. for British Overseas Airways Corp., replacing **Robert Ritchie,** who retired Apr. 1. Other changes: **Brian Griffin,** advertising executive, North America; **H. Laird Loftis,** district sales manager, New York.

John Young, Jr., agency and interline sales manager, Sabena Belgian World Airlines.

James L. Straight, public relations staff, Lear, Inc., Santa Monica, Calif.

Leo P. Wansink, assistant sales manager for the West Coast, Pierce Governor Co.'s Aircraft Accessories Division.

Bruce A. Willsey, assistant plant manager, Solar Aircraft Co., Des Moines, Iowa.

Ronald F. St. Martin, industrial engineer, W. C. Twigg Industries, Inc., Brazil, Ind.

W. E. Hampton, aviation export representative, D. Napier & Son, Ltd., London.

Robert Lovell, manager of aircraft sales, Townsend Co., New Bighton, Pa.

Boyd Madison, San Francisco district sales manager, Quantas Empire Airways.

Guy L. Antrim, Jr., manager of American Bosch Arma Corp.'s field office at Dayton, Ohio.

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March 21 missile story was month's most important aviation news. Chief Editor Robert Hotz personally reported latest technical advances in missile field.


AVIATION WEEK

Operational Missiles Now Arming USAF


British Missile Details Revealed

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JANUARY
Headline News Article, "Guided Missile Program Reaches Pay-Off," by Military Editor Claude Witze

FEBRUARY
Engineering Article, "Scientific Detection helps RAE Engineers Solve Comet Mystery," by Senior Engineering Editor David A. Anderton

MARCH
Headline News Article, "Operational Missiles Now Arming USAF," by Chief Editor Robert Hotz

This outstanding article is typical of AVIATION WEEK's coverage of the swiftly-expanding missiles field—a branch of aviation which will surpass a billion dollar volume in airframes, powerplants, avionic equipment and components in 1955. Quick to recognize the growth potential of this dynamic new industry segment, AVIATION WEEK was the first to furnish complete editorial coverage on guided missiles, and is today recognized as the one authoritative source on this subject among aeronautical magazines. The article, "Operational Missiles Now Arming USAF," was written by our Chief Editor, Robert Hotz, whose biography appears in this advertisement and whose editorial career and distinguished service to aviation are matched by few.

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Robert B. Hotz has covered aviation for the past 15 years on four continents. An expert on military aviation, he served four and a half years in the Army Air Forces during World War II, was a war correspondent with the U.S. Air Force and Navy in the Korean war, has reported on the Pentagon for seven years and is currently covering the Atomic Energy Commission nuclear weapons test on the Nevada proving grounds.

Mr. Hotz is a graduate of Northwestern University and learned to fly in 1939 when he began reporting aviation for the Milwaukee Journal.

He was one of the organizers of Air Force magazine, and contributed several articles later re-published in "Air Force Diary" an anthology of the best AAF wartime stories. He served for a year as liaison officer between the Air Transport Command and Trans-World Airlines during the period when it was pioneering global operations of four-engine transports. Later he served two years with the 14th Air Force in China both as a staff officer with its commander, Maj. Gen. Claire Lee Chennault and in combat operations for which he was awarded the Air Medal with Oak Leaf Cluster.

He was one of the original staff members of Aviation Week, directing its Washington coverage until 1950 when he became Public Relations Manager for Pratt & Whitney Aircraft division of United Aircraft Corp. Mr. Hotz returned to Aviation Week in 1952 as Executive Editor and was promoted to Editor last January.

He is the author of "With General Chennault—the story of the Flying Tigers" and co-author of "The Pratt & Whitney Aircraft Story." He also edited General Chennault's memoirs "Way of a Fighter" and was assistant producer of the Air Force documentary film "China Crisis." He is a member of the Caterpillar club (a result of bailing out of a B-25 bomber during combat in China); White House Correspondents Association; National Press Club; Aviation Writers Association, and the 14th Air Force Association.

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AVIATION WEEK

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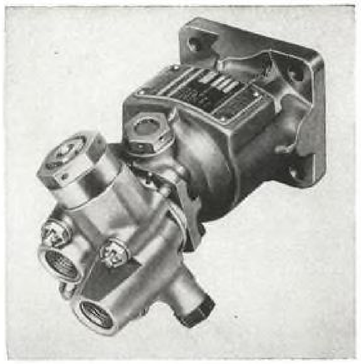
NEW AVIATION PRODUCTS

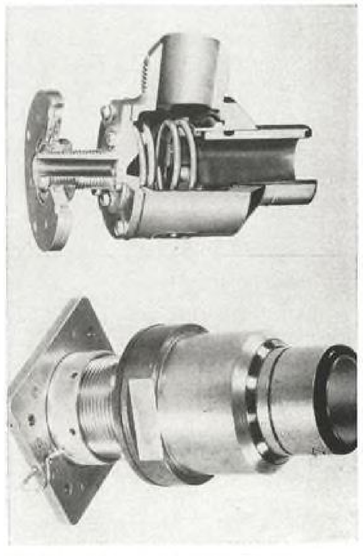


Motors Have Integral Controls

A line of oil-hydraulic motors having integral constant-speed control to meet the needs of aircraft alternators, generators, fans, air compressors maintain speed within ± 3 percent, the maker reports.

Integration of motor and control provides compactness and low weight. Series MRO motors are available in sizes rated, at nominal horsepower, from 2.3 to 18 hp. The smaller motors weigh 2.5 lb. and measure 3½ in. x 2 in. x 2 in. They operate at continuous speeds to 6,000 rpm. and at intermittent speeds to 9,100 rpm. Assemblies are designed for 3,000 psi. continuous duty. Rotation can be left or right hand or reversible.

Vickers, Inc., 1400 Oakman Blvd., Detroit 32, Mich.



Fuel Valves for Drop Tanks

Quick-disconnect aircraft drop tank valves of aluminum weigh from 0.343 lb. for ⅜-in. model up to 2.56 lb. for two-inch unit. The line includes right-angle and through-flow types.

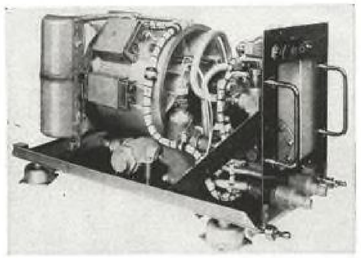
Valves conform to specification MIL-C-7413. All units have a 60-psi. working pressure, 120-psi. proof pressure and are designed to operate from −65 to 165F, the manufacturer states. Positive spring sealing provides clean jettisoning.

Allen Aircraft Products, Inc., Ravenna, Ohio.

Cooler for Electron Tube Coolant

An airborne unit for lowering the temperature of fluid used to cool electron tubes in aircraft has been developed by Lear Romec division of Lear, Inc.

The coolant cooler removes a minimum of 2,000 watts, provides an outlet coolant flow of 2 gpm. at temperature of 185F. Fluid is Monsanto OS-45.



Air blower and oil-circulating pump are driven by a common motor developing 0.3 hp. at 5,400 rpm. It uses 115-v., 400-c., single-phase current, and draws up to 700 w.

Maximum coolant pressure of 110 psia. is controlled by a bypass valve. Other components include: heat exchanger, thermal switches, flow switches, supply tank. Dimensions are 11¼x23¼x12¼ in.; weight of the unit is 38 lb.

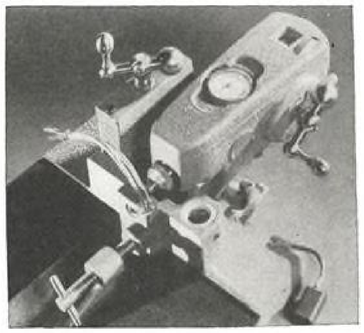
Lear-Romec Div., Lear Inc., Abbe Rd., Elyria, Ohio.

Governor Controls Three Speeds

New three-element speed-sensitive switch opens or closes three circuits at three different speeds between 1,200 and 10,000 rpm.

The model GA-3 governor can be arranged for mounting on a standard aircraft AND20005 engine tachometer drive pad, and is available in older-style drives, including flexible shaft, SAE distributor takeoff, and belt or chain drive. Special water-/or fungus-proof units can be furnished.

Synchro-Start Products, Inc., Skokie, Ill.



Tester for Material Hardness

Dynamic hardness tester uses a octahedral diamond with a 360-deg. oscillating motion to check materials ranging from soft plastics through tough steels. Two models are available: Model 164-M for testing metals; Model 164-C for ceramics. The manufacturer offers to test two or three samples of products submitted by interested parties.

Taber Instrument Corp., 111 Goundry St., N. Tonawanda, N. Y.

ALSO ON THE MARKET

Porous silver bearing liners carry loads up to 50% to 75% of those of solid silver. Material is available in flat sheets.—Micro Metallic Corp., 30 Sea Cliff Ave., Glen Cove, N. Y.

Dromus Oil E, cutting agent for machine tools, dissolves completely in water, the manufacturer reports. It is colorless and sludge resistant.—Shell Oil Co., 50 W. 50th St., New York 20, N. Y.

Vane-type air motor developing one horsepower is less than 13 in. long x 3¼ in. dia. (center spindle type) and less than 15 in. x 4½ in. (offset style)—Keller Tool Division of Gardner-Denver, Grand Haven, Mich.

Helipot T-10-A is set to desired value with positive lock in one-fifth of time of a five-dial decade box. Total resistance range 100-100,000 ohms.—Helipot Corp., 916 Meridian Ave., S. Pasadena, Calif.

High-vacuum pump for evacuating electron power tubes combines a titanium evaporation process and ion pumping to produce pressures of less than 10^{-8} mm. Hg without using refrigerated traps or baffles.—Consolidated Vacuum Corp., subsidiary of

Consolidated Engineering Corp., Rochester 3, N. Y.

Celerimeter measures machinery straight-line speeds from five inches to 30,000 in./min., using a synchronous-motor indicator timing at 1/100th sec. intervals.—Lake Erie Engineering Corp., Box 68, Kenmore Stat., Buffalo 17, N. Y.

Chromium diffusion process provides low-carbon steels with corrosion resistance and elevated temperature resistance of Series 400 stainless steels. Process is stated not to be a plating.—Alloy Surfaces Co., 1115 N. 38 St., Philadelphia 4, Pa.

Seelscrews are designed for hermetically sealed cabinets or where severe vibration is encountered. Silicone rubber, neoprene or plastic O-rib provides seal when tightened.—Automatic & Precision Manufacturing Co., 252 Hawthorne Ave., Yonkers 5, N. Y.

Low-temperature test chamber of 1.5 cu. ft. interior capacity has three ranges: −40F, −100F and −120F and operates on any regular 110-v. 60-cycle line, the maker states.—Tenney Engineering, Inc., 1090 Springfield Rd., Union, N. J.

Air-line couplers and connectors provide high-volume air passage and remain airtight under high pressure, the manufacturer reports. Units are quick-disconnect type.—Aro Equipment Corp., Bryan, Ohio.

Time-Saving Truck

Fueling truck used with underground gasoline supply system has cut aircraft servicing time in half, United Air Lines says. The truck supplies the plane's total liquid needs —it pumps fuel from the underground hydrant system and carries large tanks of oil, ADI fluid and water. As a safety feature, truck's gears cannot be engaged unless fuel hose has been disconnected from hydrant. Six units are currently in operation at San Francisco, and others will be ordered for use at Chicago and other UAL stations. Trucks were built to United's specifications by Industrial Steel Tank Body Works, Emeryville, Calif., on a 1½-ton Chevrolet chassis.

AVIATION CALENDAR

May 16—National Fire Protection Assn., annual aviation seminar, Netherland Plaza Hotel, Cincinnati.

May 16-20—National Materials Handling Exposition, produced by Clapp & Poliak, International Amphitheater, Chicago.

May 18-19—Air Navigation Development Board, technical symposium on the common system radar beacon, Washington, D. C.

May 18-20—National Telemetering Conference, Morrison Hotel, Chicago.

May 19—Royal Aeronautical Society, 43rd Wilbur Wright Memorial Lecture, Royal Institution, London. Lecturer: Dr. C. S. Draper, head of the Department of Aeronautical Engineering at Massachusetts Institute of Technology.

May 19-21—Armed Forces Communications Assn., global communications conference, Commodore Hotel, New York.

May 23—Daniel Guggenheim Medal Board of Award, annual meeting, University Club, New York.

May 23-24—American Society for Quality Control, ninth annual convention, Hotels Statler and New Yorker, New York.

May 28-30—Eastern States Soaring Assn., championship contest, Wurtsboro, N. Y.

May 30—Federation Aeronautique Internationale and KNVvL Royal Netherlands Aeroclub, fifth International Air Display, Ypenburg Aerodrome, The Hague.

May 30-June 4—Aviation Writers Assn., 1955 annual convention, King Edward Hotel, Toronto.

May 31-June 3—Design Engineering Show, produced by Clapp & Poliak, Inc., Convention Hall, Philadelphia.

June 4—Reading Aviation Service, sixth annual Maintenance and Operations Meeting, Reading, Pa.

June 4-5—Canada's National Air Show, Toronto.

June 8-10—American Welding Society, third annual Welding Show, Municipal Auditorium, Kansas City, Mo.

June 9-14—Sixth All-Women's International Air Race, Washington, D. C., to Havana, Cuba.

June 10-19—Twenty-first International Aviation Display, LeBourget Field, Paris, France.

June 12-17—Society of Automotive Engineers, Golden Anniversary meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 12-19—Pennsylvania Pilots Council, Pilot's Proficiency Contest, Graham Field, Butler, Pa.

June 13-14—Women's Aeronautical Assn., annual Skylader Derby, Little Rock, Ark., to Raton, N. M.

June 18-25—Philadelphia Junior Chamber of Commerce, third annual Transcontinental Air Cruise, Palm Springs, Calif., to Philadelphia.

June 20-23—Institute of the Aeronautical Sciences and the Royal Aeronautical Society of Great Britain, fifth International Aeronautical Conference, IAS Building, Los Angeles.

June 20-25—Symposium on Electromagnetic Wave Theory, University of Michigan, Ann Arbor, Mich.

June 20-July 1—Special short course on Parachute Technology, Massachusetts Institute of Technology, Cambridge.

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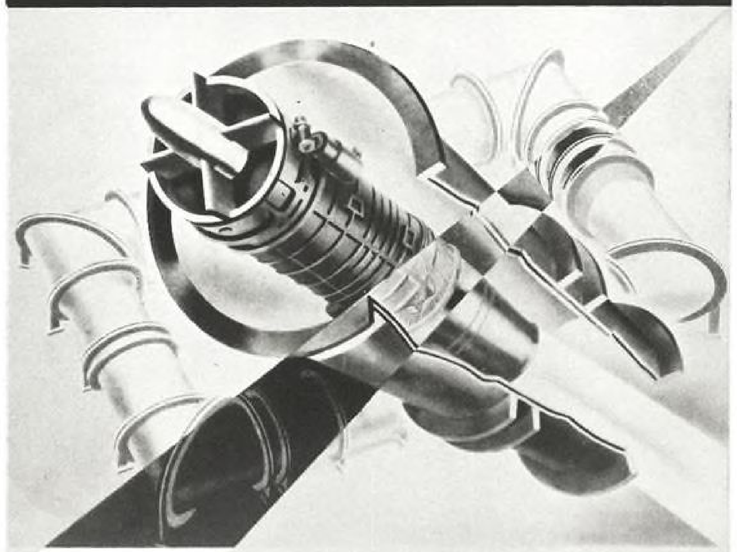

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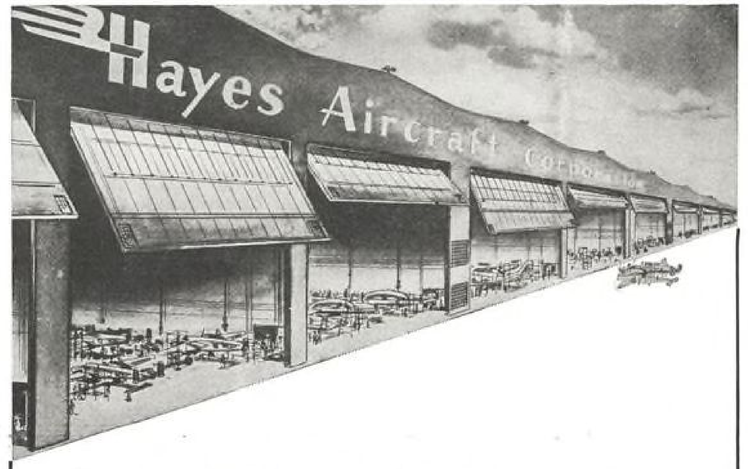

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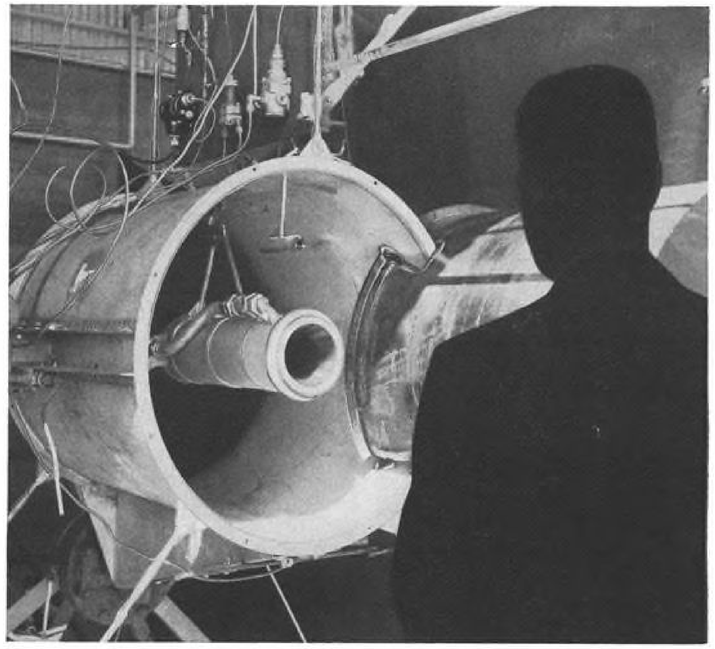

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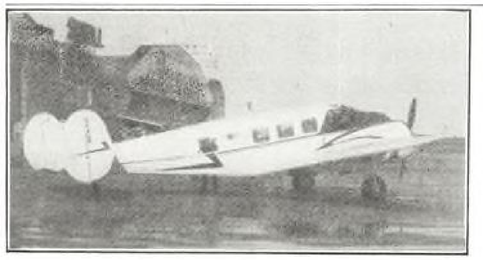

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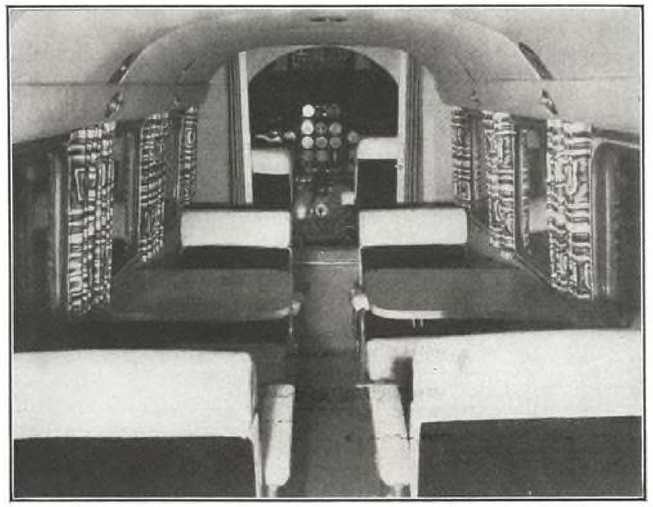

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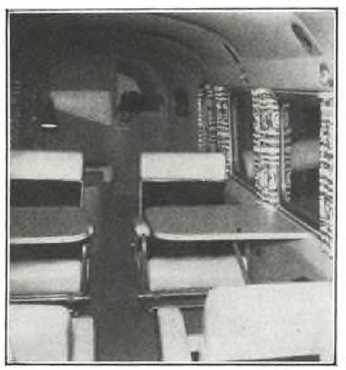

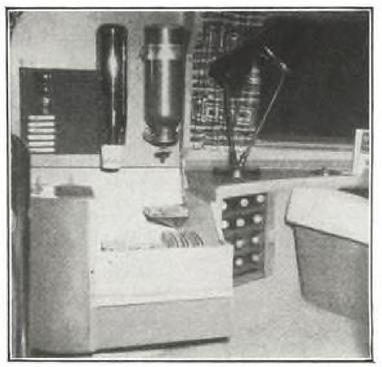

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Senators Back Airport, Cargo Programs

Support grows in Commerce Committee for increased airfield funds, larger commercial airfreight fleet.

By Katherine Johnsen

Senate Commerce Committee members are convinced that no more time should be lost in moving forward with a major airport development program and an aggressive plan to increase commercial air cargo lift.

Developments indicating that there will be action to spur these two programs at this session of Congress came as the committee continued hearings on the omnibus civil aviation bills sponsored by Sen. Warren Magnuson and Sen. John Bricker.

Airport Legislation

Six Democratic members of the committee introduced legislation authorizing federal outlays of $63 million annually—$60 million for continental airports and $3 million for territorial airports—for the next four years, a total of $252 million.

Congress has no power to force the Administration to spend funds for airports. But Sen. Mike Monroney, chairman of the Commerce Aviation Subcommittee believes a showing of congressional support might induce the Administration to raise its sights on airport development.

► **Fund Appropriations**—During the first year of the Eisenhower Administration, Fiscal 1954, no money was requested for airports, pending a study. The request for Fiscal 1955 was only $22 million, and the amount proposed for Fiscal 1956 is only half of that—$11 million.

Out of the total $520 million federal aid authorized in the 1946 Airport Development Act and originally planned for use within seven years, only $236 million, less than half, has been appropriated to implement the program so far. The 1946 act authorized annual allocations of "not to exceed" $100 million. The new proposal flatly establishes an annual allocation of $63 million.

"When we consider the rapid tempo at which America is developing in both military and civilian aviation," Monroney told the Senate, "it is disturbing, indeed, to realize that our airport program throughout the 48 states has been left without adequate funds to bring airport facilities serving the hundreds of thousands of people who use the airlines and other air services up to a point where they will be modern, or capable of accommodating the new jet transport planes and other fast flying aircraft which will be in the air in a matter of only a few years."

► **Cargo Hearings**—Full hearing on buildup of civil fleet as a military mobilization reserve was endorsed by both Monroney and Sen. Andrew Schoeppel, ranking Republican on the subcommittee, after Delos Rentzel, chairman of the board of Slick Airways, estimated that the rate for air cargo could be reduced to three cents a ton-mile in five years if advanced types of aircraft that have been developed by the military services are made available for commercial operations during peacetime. The rate now averages 18 cents.

Commenting that there are only nine "modern" (DC-6) aircraft now engaged in air freight operation, Rentzel said military cargo types "hold great promise for the commercial, as well as the military, point of view."

► **Support, Not Subsidy**—Calling air cargo "the greatest area for development in the air transport industry," he said this could be accomplished with government "support"—but without government subsidy. He mentioned the Navy's tentative plan to lease cargo aircraft to commercial users (AW Feb. 26, p. 13) and bulk shipment of mail on all-freight planes (see p. 112) as two ways in which the government could "support" expansion of airlift.

The Army wants the airlift capacity increased, Rentzel observed. But in the other services, he added, airlift gets the funds that are "left over after strategic, defense and tactical requirements are provided for."

Monroney commented that "U.S. foreign policy has been at a disadvantage because we have not had the airlift to move quickly and put force where force is needed."

Contract Carriers

Testimony by government spokesmen before the subcommittee disclosed agreement on some important changes in civil aviation law, but with differences as to the extent.

Support for economic regulation of contract carriers, as proposed in the Magnuson and Bricker bills, came from both Commerce Department and Civil

CAB Favors Limiting President's Powers

Civil Aeronautics Board is taking a lone stand—among government agencies—in its willingness to have the President's authority over international cases reduced.

The proposal of Sen. Warren Magnuson which would explicitly limit the President's power to veto CAB decisions in international route cases to national defense or foreign policy aspects—and eliminate presidential authority over economic aspects—was proposed as a "clarification of the original intent" of the 1938 Civil Aeronautics Act.

CAB's Chairman Ross Rizley acquiesced: "While relieving the President of the burden of examining and passing upon complex economic matters, for which the board is already staffed and to which it devotes a major part of its activity, the proposed transfer of responsibility would not add significantly—if at all—to the Board's present workload" (AW May 2, p. 86).

Commerce Department's Under Secretary for Transportation Louis Rothschild had another view. His comment: "A principal reason which has been mentioned for this proposal is that it would relieve the President of the burden of reviewing all the Board's decisions . . . we believe that this would not reduce the extent of review required by the President. Since every international air route decision may have some effect upon national defense or foreign policy, the President would still have to review all cases. . . ."

State Department's Assistant Secretary for Economic Affairs Samuel Waugh observed: "The President . . . should have an opportunity to review any case dealing with operations beyond the continental United States and should not be requested to report his reasons for approving and disapproving proposed decisions of the Board except" at "his own discretion."

Sen. Mike Monroney, chairman of the Commerce Aviation Subcommittee, observed at the hearing that the President's "review" of in the Pacific case apparently had been inadequate, since he subsequently reversed his original decision (AW Feb. 14, p. 12).

Aeronautics Board. This type of carrier would have to obtain licenses from the Board in proceedings similar to that for certificates under the measures.

State Department wanted to go further than this. Assistant Secretary for Economic Affairs Samuel Waugh urged that Presidential approval be required for all air contractor licenses for operations in the international field.

Defense Department, however, had a word of caution. Daggett Howard, office of the general counsel, Air Force, said the department wanted it made clear that CAB regulations would permit contractors to perform services on "a more flexible basis."

Subsidy Separation

Divorcement of service mail pay from subsidies, by establishing mail rates in one proceeding and subsidy "amounts" in another, had unanimous support—from CAB, Commerce, Post Office and General Accounting Office.

For "complete separation" of the subsidy program from the mail transportation service, Post Office proposed that all air carriers be made eligible for subsidy—not just those that carry mail, as at present.

► **Claim Authorized**—Post Office Solicitor Abe Goff commented: "Otherwise, when CAB has before it the question of whether a carrier should be authorized to engage in the transportation of mail, its decision may be influenced by the fact that the granting of a mail certificate will authorize the carrier to claim subsidy. . . .

"To eliminate this possibility, the Post Office Department urges that the right to claim subsidy be completely divorced from the transportation of mail, so that a mail certificate is not the initial requirement for claiming subsidy. . . . We are not proposing that government subsidy be expanded to cover any and all air carriers. . . . The carrier must prove that the particular service it is authorized to perform warrants subsidy before it is entitled to receive it."

General Accounting Office endorsed a Magnuson proposal to establish a "subsidy administrator," who would make initial decisions on subsidy allocations for the CAB as a way to separate further the rate-making and subsidy functions. But this proposal had no other government support.

► **Elimination of Subsidies**—Removal of most of the domestic airlines from eligibility for subsidy at some reasonably early date was advocated by Commerce spokesmen, Under Secretary for Transportation Louis Rothschild. "With the favorable trend toward increased self-sufficiency," he suggested, "similar action may be suitable for various other segments of the industry in the not too distant future."

Monroney pointed to the difficulty of writing legislation removing airlines from subsidy "eligibility" which would not penalize those which had advanced toward self-sufficiency. Rothschild volunteered to draft a proposition.

General Accounting Office's spokesman, Robert Keller, assistant to the comptroller, endorsed the more drastic proposal, originally advanced by former Under Secretary of Commerce for Transportation Robert Murray, of setting forth timetables for the gradual elimination of subsidy payments to airlines, particularly local service lines. Keller's solution: If a non-subsidized line should have need of financing it could have recourse to government loans or government-guaranteed loans.

Mail Pay

Changes in the formulae for determining mail pay by requiring CAB, in international cases, to take into account the Universal Postal Union Rate, and in domestic cases to pay for minimum loads were unanimously opposed by CAB, Commerce, and Post Office.

Post Office's Goff emphasized that the UPU agreement, setting high rates to be paid by the carriers of one nation by the government of a foreign nation were highly advantageous to the U.S. in Fiscal 1954. For example, he pointed out, payments of UPU rates to U.S. airlines totaled more than $8.9 million, but payments by the U.S. to foreign flag lines totaled less than $2.2 million.

But, if the U.S. Post Office had to pay the maximum UPU rate of $1.91 a ton-mile to shipments of U.S. mail by U.S. carriers, Goff reported the "service" mail pay to the U.S. carriers would be $127 annually—or $97 million more a year than the total "service" mail pay, plus subsidies, now being paid of $50 million.

Establishment of minimum mail loads in domestic airmail, Goff observed, would force the Post Office to change its present practice of dividing mail between competing carriers or successive schedules of the same carrier. Otherwise, he added, the department would have to pay for "fictitious" loads.

CAB Approves Cargo Airline Participation in Mail Test

Entry of the all cargo air carriers into the surface-mail-by-air program has been granted by the Civil Aeronautics Board, but the decision has been challenged by the trunkline carriers.

The CAB has decided to reverse its earlier position and let three cargo carriers—Slick Airways, Flying Tiger Line and Riddle Airlines—participate in the Post Office Department experiment through issuance of exemptions. Thus they would be authorized to join the trunkline and local service carriers who have been participating in the program since it was started over 18 months ago.

The air mail-carrying airlines, led by American Airlines and National Airlines, have gone to court to block the move. They have asked the U.S. Court of Appeals for the District of Columbia to review the decision and keep the CAB order from going into effect pending the review.

The Board has voluntarily stayed effectiveness of its order until May 13 to allow the court time to hear the issues.

► **Board Findings**—In reversing previous denials of the cargo carriers' applications, the Board finds that:

- It would be an undue burden on the cargo carriers to keep them out of the experiment, considering its temporary nature, while a long formal proceeding is prosecuted.
- The Post Office Department supports the all-cargo applications and needs to find out as much as it can in order to furnish information on which to base a sound policy on air transportation of surface mail.
- Granting the exemptions isn't going to harm any of the present participants. The Board says it can see no prospect of "anyone's getting rich or poor by reason of an exemption" to the cargo lines.

The three carriers involved are currently before the CAB in cases relating to renewal of their certificates. These renewal cases include consideration of breaking the no-mail barrier included in the original certification of the all-cargo carriers. The exemptions issued last week by the CAB terminate sixty days after decision in the certificate cases.

► **Dissenting View**—The airlines are arguing that the CAB has no authority to issue such an exemption to carry mail to carriers which are not certificated to carry mail. And, assuming the Board did have the authority, the carriers maintain the applicants have not made a sufficient showing of need or public interest to warrant issuance of such exemptions.

Board Member Chan Gurney, who dissented when the CAB decided in December 1953 it had the disputed authority, has disagreed with the majority. He takes the view that the Board does not have the power under the Civil Aeronautics Act to issue exemptions for mail transportation to carriers which don't hold mail certificates. He also finds that the applications don't meet exemption requirements of the act. And if there were no legal impediments, Gurney feels that granting of the exemptions isn't in the interest of the public.

The majority decision makes clear the fact that the cargo carriers will be paid a regular service rate common to other carriers participating in the experiment, and that no subsidy is contemplated.

CAB Over-Rides CAA On Pacific Route Pay

Civil Aeronautics Board has reaffirmed its decision to equalize Pacific mail route mileages (AW Apr. 11, p. 130), despite objections of Pan American World Airways that the move is "discriminatory."

At the end of March, the Board decided to set a standard mileage in the Pacific for purposes of mail pay. Mail carried between either San Francisco or Seattle and Tokyo would be paid for by the Post Office Department on the basis of 5,078 mi., the Seattle-Tokyo mileage on Northwest Airlines' route.

Pan American objects that it will get paid the same amount of money for hauling the same amount of mail 1,610 mi. farther than Northwest, in effect reducing its rate to 33 cents a ton-mile while NWA will get the temporary rate of 50 cents a ton-mile.

Currently, the Post Office plans to split trans-Pacific mail about evenly between the two carriers in the coming fiscal year. Total volume is estimated at 26,226,000 ton-miles. The CAB decision is an attempt to insure an even distribution. Without it the bulk of the mail would probably go over Northwest's shorter route, since it would be cheaper.

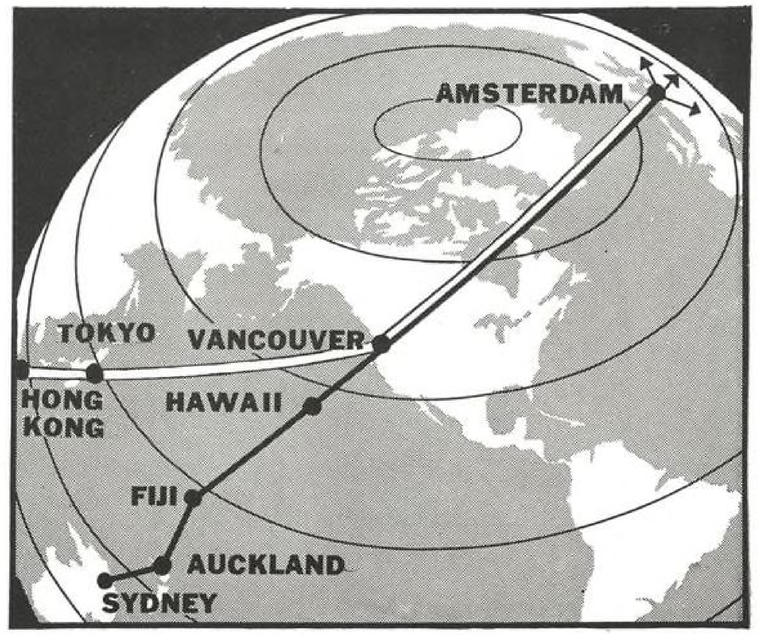
The Board finds that the net effect would be an increase in Pan American subsidy and greater cost to the government. It also feels that problems involved would be much worse if the mileage weren't standardized.

The action applies only to the temporary rate. The situation will be reviewed in the final rate proceeding.

Nonstop N. Y.-S. F. Flights

Nonstop transcontinental flights between New York and San Francisco will be inaugurated May 6 by United Air Lines.

Two Douglas DC-7s roundtrips are scheduled daily over the 3,000 mile route. Flight times of 8 hr. 45 min. westbound and 7 hr. 45 min. eastbound cut an hour from one-stop service between New York and San Francisco.



Canadian Pacific May Buy Comets For 'Fast' Transpolar Schedules

Canadian Pacific Airlines is planning to buy de Havilland Aircraft Co.'s Comet 4 for its transpolar Vancouver-Amsterdam route. CPA probably will order 12 of the turbojet-powered transports at $2.8 million each.

A firm contract would increase de Havilland's backlog for the Comet 4 to 32, including British Overseas Airways Corp.'s order for 20 of the long-range jet airliners (AW Mar. 28, p. 85).

► **'Complete Faith'**—The proposed transpolar operation would be Canadian Pacific's second try with the Comet. The airline's first jet transport, a Mark 1A, crashed during takeoff from Karachi, India, in March 1953.

CPA President Grant W. McConachie reports he has "complete faith" in the new Comet 4.

"We are convinced the Comet will . . . be the best aircraft in the field," he says. De Havilland's delivery date of 1958 puts the Comet ahead of any other (turbojet-powered) airliner in the world."

► **10-Hour Flight**—McConachie expects to begin operating Comet 4s on the 4,825-mile transpolar route by 1960, replacing Douglas DC-6Bs scheduled to inaugurate over-the-pole service between Vancouver and Amsterdam June 3.

The jet transport would cut flight time on the route to 10 hours, compared with 18-hour service of the DC-6B. With the eight-hour time differential, a westbound Comet leaving Amsterdam at noon would arrive in Vancouver at 2 P.M. local time.

Canadian Pacific Arctic service will connect with the airline's flights from Vancouver to Tokyo and Hong Kong on the Great Circle route and to Sydney via Honolulu.

With this route network, CPA predicts it will reclaim a large part of the European traffic now traveling from the West Coast on U.S. air carriers.

"The practical problems in getting set to operate the polar service are surprisingly few and simple," according to a CPA report. "It is already evident that Vancouver-Amsterdam will be one of the best flying routes in the world today, much less complex operationally than the North Pacific span via the Aleutians to Tokyo and Hong Kong."

► **Navaid Devices**—Canadian Pacific is equipping its DC-6Bs with polar-grid charts, non-deviating gyro compasses (Sperry C-5 and Bendix Polar Path), and the Kollsman Skycompass.

On the route, ADF will be available to CPA transports between Vancouver and Sondrestrom. Loran in the western segment and between Churchill and Amsterdam on the eastern extremity, and Consul from Sondrestrom to Amsterdam.

Despite the number of navigation aids, Canadian Pacific's navigation plans call for constant astro fixes during the entire transpolar flight.

Heliport Setback

Heliport construction, blocked in many cities by prohibitive land costs and lack of municipal planning, received a new setback in Cleveland.

Common Pleas Judge Joseph A. Artl set aside as invalid a zoning regulation under which Cleveland Air Taxi, Inc., was granted permission to build a small field adjacent to the Shaker Heights residential area.

A Shaker Heights resident charged the proposed heliport would create a nuisance.

Artl then ruled that the plaintiff failed to prove his case. But the judge said the regulation permitting Cleveland Air Taxi to start construction was an attempt by the area zoning board to effect an unlawful delegation of legislative authority.

Pan Am to Get New Co-Terminal to Mexico

Pan American World Airways has been recommended by Civil Aeronautics Board for permanent certification between Los Angeles and Guatemala City plus a five-year trial with San Francisco as a co-terminal.

Examiner Francis W. Brown specified in his report that the extension denies PAA the right to carry local traffic between the two California gateway cities.

Brown said, that due to uncertainties, the authorization for San Francisco service should be limited. Brown termed it a problem "of whether the benefits are justified in the light of a possible increase in subsidy requirements of PAA and diversion of revenues from other carriers now operating between the cities of Los Angeles and San Francisco."

It was indicated that inauguration of San Francisco/Los Angeles service direct to Guatemala will result in "minor" diversion of approximately $60,000 to Western Air Lines and $50,000 to United Air Lines.

Capital Sells More DC-4s

Capital Airlines has sold seven more DC-4s, with delivery to the purchasers contingent upon acceptance of the recently-ordered Vickers Viscounts on a plane-for-plane basis.

In addition to five aircraft sold to West Coast operators (AW May 2, p. 85), Capital sold three to Mackey Airlines, three to Jorge Carnicero, and one to an undisclosed purchaser. Capital has 13 DC-4s out of its original fleet of 25 on the market for tentative deliveries in mid-1956.

More Airlines Report Salaries

Salaries, bonuses and other fees paid in 1954 by the certificated scheduled airlines to their officials have been reported to the Civil Aeronautics Board. Other payments were previously reported in AVIATION WEEK (Apr. 18, p. 127; Apr. 25, p. 117; May 2, p. 87.)

Mohawk Airlines, Inc. Robert E. Peach, president and director, $16,250 salary; John R. Carver, vice president and secretary, $11,749.92 salary; Carl A. Benscoter, vice president—operations, $14,333.21 salary; W. D. Bosworth, treasurer, $7,458.31 salary; H. Stuart Goldsmith, assistant treasurer, $6,240 salary; Lois P. Hornbrook, assistant secretary, $3,870 salary; L. W. Simmons, general counsel and director, $3,600 salary.

North Central Airlines, Inc. H. N. Carr, president and director, $13,885 salary and $75 bonus and indirect compensation; F. N. Buttomer, vice president—traffic and sales, $9,904 salary; A. E. Schwandt, vice president—industrial relations, $9,904 salary; B. Sweet, treasurer, $6,197 salary; Arthur E. A. Mueller, chairman of the board of directors, no salary and $975 bonus; Werner Christensen, director, no salary and $750 bonus; G. F. DeGoursin, director, $750 bonus; K. B. Willett, director, $450 bonus; Robert Grover, director, $300 bonus; A. L. Wheeler, director, $525 bonus; H. Morey, president (resigned Mar. 9, 1954), $13,581 salary; G. Webster, vice president (resigned Dec. 10, 1954), $7,224 salary; R. B. Stewart, director, (resigned Nov. 19, 1954), no salary and $675 bonus; and Harold Emch, director (resigned Mar. 24, 1954), no salary and $75 bonus.

Pioneer Air Lines, Inc. Robert J. Smith, president and director, $15,000 salary; Harold B. Seifert, vice president and director, $14,400 salary; Harding L. Larence, vice president and director, $14,400 salary; Arthur F. White, secretary-treasurer (elected June 8, 1954), $5,950 salary; and E. W. Baily, director, $6,000 salary.

Chapman, Bryson, Walsh and O'Connell, legal services, $18,000.

Pan American World Airways, Inc. J. T. Trippe, president and director, $20,000 salary and $2,350 directors fee; S. F. Pryor, vice president and assistant to the president, and director, $29,000 salary, $15,000 bonus and indirect compensation and $1,850 directors fee; J. C. Leslie, vice president and director, $29,000 salary, $15,000 bonus and $1,100 directors fee; H. J. Friendly, vice president-general counsel, director, $29,000 salary, $15,000 bonus and $800 directors fee; Erwin Balluder, vice president, $27,000 salary and $11,000 bonus; Franklin Gledhill, vice president and director, $28,000 salary, $14,000 bonus and $1,200 directors fee; H. M. Bixby, vice president and director, $14,000 salary, $5,000 bonus and $2,250 directors fee; A. P. Adams, vice president, $26,000 salary and $11,000 bonus.

R. B. Adams, vice president, $21,000 salary and $6,000 bonus; W. G. Lipscomb, vice president—traffic and sales, $28,000 salary and $14,000 bonus; A. A. Priester, vice president (elected June 8, 1954), $11,278 salary and $5,000 bonus; H. E. Gray, executive vice president—Atlantic Division, $28,000 salary and $14,000 bonus; W. L. Morrison, executive vice president—Latin American Division, $28,000 salary and $14,000 bonus; C. M. Young, executive vice president—Pacific-Alaska Division, $25,000 salary and $9,000 bonus; H. W. Toomey, vice president, $20,000 salary and $2,500 bonus; H. W. Berke, vice president (elected June 8, 1954) $11,278 salary and $8,000 bonus, assistant vice president, $8,722 salary; J. S. Woodbridge, comptroller, $22,000 salary and $9,000 bonus; R. G. Fergerson, treasurer, $22,000 salary and $9,000 bonus; H. P. Morris, secretary and general attorney, $14,000 salary and $3,000 bonus.

J. C. Cone, assistant vice president, $16,000 salary and $5,000 bonus; W. J. McEvoy, assistant vice president, $13,000 salary and $3,000 bonus; W. W. Lynch, assistant vice president, $18,360 salary and $4,000 bonus; S. B. Kauffman, assistant vice president, $17,000 salary and $4,000 bonus; E. M. Goulard, assistant vice president, (elected June 8, 1954) $8,458 salary and $2,500 bonus; J. E. McGuire, assistant comptroller (elected July 13, 1954), $5,600 salary and $1,000 bonus; Amos Hiatt, assistant comptroller, (resigned effective June 8, 1954) $4,828 salary; R. P. Monson, assistant treasurer, $15,000 salary and $6,000 bonus; E. G. Rothrock, assistant secretary, $11,280 salary and $1,000 bonus; J. J. Cantwell, assistant secretary, $8,460 salary and $750 bonus; and Josiah Macy, Jr., assistant secretary, $12,400 salary.

S. M. Fairchild, director, $1,100 directors fee; R. V. Fleming, director, $1,600 directors fee; Merrill Griswold, director, $1,800 directors fee; R. L. Hamill, director, $1,400 directors fee; R. W. Howard, director, $1,000 directors fee; D. S. Ingalls, director, $1,100 directors fee; Robert Lehman, director, $900 directors fee; E. O. McDonnell, director, $5,000 directors fee; M. T. McKee, director, $5,000 directors fee; J. S. Rockefeller, director, $1,200 directors fee; W. H. Standley, director, $1,200 directors fee; V. F. Taylor, director, no salary and no directors fee.

Root, Ballantine, Harlan, Bushby, and Palmer, legal services, $65,000; Cleary, Gottlieb, Firendly and Hamilton, legal services, $107,840; Steptoe and Johnson, legal services, $28,000; Campbell, Brumbaugh, Free and Graves, legal services, $12,335; Skaedden, Arps and Slate, legal services, $19,674; Dickie-Raymond, Inc., advertising services, $18,000; J. Walter Thompson, advertising services, $43,358; Julius Klien, public relations services, $12,000; Loomis, Suffern and Fernald, accounting services, $99,076; Milo L. Berenson, building contractor, services, $10,048; Kahn and Jacobs, architectural services, $14,908; Paul Aiken, airmail traffic consulting services, $14,400; Sanderson and Porter, engineering services, $15,586 and Lowell A. Mayberry, labor relations consulting services, $44,250.

Southwest Airways Co. J. H. Connelly, president and director, $19,375 salary; T. R. Mitchell, executive vice president, $12,963 salary; A. W. Johnson, vice president and treasurer and director, $12,317 salary; Raymond Costello, vice president and assistant secretary, $8,720 salary; Max King, vice president, $9,300 salary; and Walter Roche, secretary and director, no salary.

Chapman, Bryson, Walsh and O'Connell, legal services, $17,000; and Abbott Kimball Co., advertising services, $11,000.

Southern Airways Inc. Frank W. Hulse, president and director, $14,400 salary; Norman K. Arnold, vice president-research, $8,400 salary; George E. Estey, secretary and treasurer, $10,350 salary; C. H. D. Tarrer, assistant treasurer, $7,147.50 salary; and C. M. Britt, vice president-sales (elected May, 1954), $10,045.10 salary.

Slick Airways, Inc. Thomas L. Grace, president and director (resigned 1955), $20,095.75 salary; Joseph F. Grant, vice-president-secretary-treasurer, general manager and director (resigned 1955), $16,915 salary; Henry P. Huff, vice president $16,341.60 salary; John W. Walbert, assistant secretary, $10,575 salary; Edwin B. Warwick, assistant treasurer, $7,930 salary.

Steptoe and Johnson, legal services, $55,985.68; and Price-Waterhouse and Co., auditing services, $11,350.

West Coast Airlines, Inc. Nick Bez, president and director, $10,000 salary; H. A. Munter, vice president and director, $13,916 salary; R. A. Duwe, secretary-treasurer, $9,600 salary; James William Johnston, assistant secretary, no salary; Ernst B. Code, vice president, $10,400 salary; and W. Calvert, vice president and director, no salary.

United Air Lines, Inc. W. A. Patterson, president and director, $100,000 salary and $11,218.20 bonus and indirect compensation; R. E. Johnson, vice president-assistant to the president, and director, $40,000 salary and $4,524.08 bonus; J. A. Herlihy, vice president-engineering and maintenance, director, $44,000 salary and $4,116.59 bonus; D. F. Magarrell, vice president-transportation service, $41,000 salary and $3,903.37 bonus; O. E. Kline, vice president-coordinator of operations and director, $45,000 salary and $3,244.29 bonus; D. R. Petty, vice president-flight operations, $37,000 salary and $3,171.59 bonus; Curtis Barkes, vice president-finance and property, $28,667 salary and $2,461.61 bonus; R. F. Ahrens, vice president-personnel, $27,000 salary and $2,640.90 bonus; H. E. Nourse, vice president-economic controls, $26,000 salary and $2,773.45 bonus; R. W. Ireland, vice president—traffic administration, $26,000 salary and $4,052.35 bonus; S. P. Martin, secretary and assistant to the president, $15,500 salary and $1,341.23 bonus; R. E. Brent, comptroller, $16,000 salary and $837.73 bonus; and A. M. Devoursney, treasurer and assistant secretary, $16,000 salary and $994.33 bonus.

M. C. Ansorge, director, $2,100 salary; Paul A. Bissinger, director, $1,348 salary; H. T. Brown, director, $2,100 salary; Gardner Cowles, director, $1,900 salary; Justin Dart, director, $1,550 salary; Paul G. Hoffman, director, $1,350 salary; Eric A. Johnston, director, $1,550 salary; and John J. Mitchell, director, $1,850 salary.

Mayer, Freidlich, Spies, Tierney, Brown and Platt, legal services, $268,770; Skidmore, Owings and Merrill, Architect and engineering services, $124,490.26; John R. Steelman, consultant services, $12,000; Arthur Andersen and Co., audit services, $42,953; James F. Reilly, legal counsel, $30,200; Meryle Stanley Rukeyser, legal services, $12,000; Barrett and Help, contractors fees, $104,272.27; Booz-Allen and Hamilton, management consultant services, $40,869.52; Harriman Ripley and Co., underwriters, $30,000; H. J. Brunnier, engineering services, $39,140.46; and Treadwell and Laughlin, legal services, $21,999.98.

Los Angeles Airways, Inc. C. M. Belinn, president and director, $18,000 salary and $4,500 bonus and indirect compensation; John T. Kane, treasurer, $7,720 salary and $1,000 bonus; Martin J. Burke, secretary and director, no salary and no bonus; Donald L. Litton, assistant secretary, $4,137.50 salary.

Reeve Aleutian Airways, Inc. Robert C. Reeve, president, $15,000 salary; Robert L. Hanson, vice president, $10,800 salary; Margaret Rutledge, secretary-comptroller, $8,700 salary; and Janice M. Reeve, treasurer, $9,000 salary.

Wien Alaska Airlines, Inc. Sigurd Wien, chairman of the board of directors, president and general manager, $15,000 salary and $1,286.12 accrued vacation paid in lieu of vacation; James P. Whaley, vice president-general traffic manager, $11,600 salary; Fritz Wien, vice president-operations and director, $11,600 salary and $535.32 accrued vacation paid in lieu of vacation; George B. Rayburn, executive vice president, treasurer, and director, $12,000 salary and $1,829.88 accrued vacation paid in lieu of vacation.

Theodore A. Seaman, legal services, $13,214.75.

CAB ORDERS

(Apr. 21-27)

GRANTED:

North Central Airlines permission to serve Ann Arbor, Mich., through Willow Run Airport.

Riddle Airlines an exemption to acquire five C-46s from Resort Airline.

Allegheny Airlines an exemption to permit the carrier to serve for one year Oil City-Franklin, Clearfield-Dubois-Philipsburg and Bellefonte-State College, Pa., on one daily roundtrip between Cleveland and Philadelphia/Camden, and to serve Oil City-Franklin on one daily roundtrip between Cleveland and New York.

City Airport Commission (Bristol, Johnson City and Kingsport, Tenn.) leave to intervene in the case involving extension of Piedmont Aviation's route to Washington.

Pittsburgh Chamber of Commerce leave to intervene in the airfreight renewal case.

Riddle Airlines an exemption to operate flights from Stuart, Palatka, West Palm Beach, Tampa/St. Petersburg and Orlando, Fla., to New York carrying freight originating at the Florida points destined for New York, with certain provisions.

Mohawk Airlines an exemption to continue serving Keene, N. H., on one daily roundtrip flight between Boston and Albany for one year, with certain provisions.

San Francisco City and County, City of Houston, and the Houston Chamber of Commerce leave to intervene in the airfreight renewal case.

APPROVED:

New York Airways' flight pattern, including service between Teterboro, LaGuardia, New York International and Newark heliports.

Interlocking relationships between Frank J. McHugh and Pacific Air Freight.

Agreements between United Air Lines and Western Air Lines; Trans World Airlines and Braniff Airways and various other carriers relating to intercompany arrangements.

AUTHORIZED:

Lake Central Airlines to serve Springfield, Ohio, through the Dayton Municipal Airport.

Allegheny Airlines to inaugurate its summer service to Cape May, N. J., on May 1.

Mohawk Airlines to omit service at Pittsfield, Mass., on flights in excess of one daily roundtrip until June 30, 1955; on flights in excess of one and one half daily roundtrips from July 1 to Oct. 30, 1955, and on flights in excess of one daily roundtrip from Nov. 1, 1955, to Apr. 28, 1956.

AMENDED:

Orders authorizing Pioneer Air Lines to omit certain services, to extend them until 60 days after final decision in the PAL (now Continental Air Lines) certificate renewal case.

Transportes Aereos Nacionales, S.A., foreign air carrier certificate, adding Belize, British Honduras, as an intermediate point between Honduras and Miami.

Consolidation order involving amendment of certain Eastern Air Lines routes, to exclude an irrelevant portion of the application of the Commonwealth of Kentucky and to consolidate the severed portion with an American Airlines application.

ORDERED:

Alaska Island Airlines' certificate be canceled, since the carrier's properties have been acquired by Alaska Coastal Airlines as previously authorized.

Letters of registration of National Air Parcel Service and of K & R Airfreight suspended, providing the companies fail to file certain overdue reports before May 11, 1955.

DISMISSED:

Flying Tiger Line's application to perform a charter flight pursuant to a contract with the Lions Club of Altoona, Pa., at the request of the carrier.

SHORTLINES

► **Australian airlines** are reported asking for a 5% fare increase to cover rising operating costs.

► **Aerovias Panama** will inaugurate a Miami-Panama service May 6, using DC-6 equipment through an agreement with Trans Caribbean Airways.

► **British European Airways** will inaugurate the first direct service between Manchester and Milan in June with Vickers Viscounts.

► **British Overseas Airways Corp.** resumes Chicago-London service May 5 with a weekly tourist-class Stratocruiser flight via Montreal and Glasgow. . . . Stratocruisers will replace Constellations in BOAC's North Atlantic tourist service as they become available.

► **Braniff Airways** has started aircoach service between San Antonio, Tex., and Denver via Austin, Dallas, Fort Worth and Oklahoma City. The service will be operated daily with 44-passenger Convair Liners.

► **COPA**, the Panamanian flag airline, has received a permit to operate between Panama and San Jose, Costa Rica.

► **Lake Central Airlines** reports March passenger sales increased 36% over the same month in 1954. Passenger-miles flown gained 31% in March and 30% in the first quarter over the same periods of last year.

► **Pan American World Airways** will increase services to Saigon and Singapore to three flights a week starting May 14. . . . PAA reports a 22% increase in passengers traveling through the Miami gateway in the first quarter of 1955 over 1954.

► **Quantas Empire Airways** is adding a second weekly roundtrip service between Australia and Japan. Flights will operate between Sydney and Iwakuni via Darwin and Manila.

► **Riddle Airlines** reports freight traffic gained 20% in the first three months of 1955 over the first quarter of 1954. The carrier lifted 5,533,029 lb. of freight between New York, Florida and Puerto Rico between January and March.

► **Trans-Texas Airways** reports record passenger traffic in March. The carrier flew 12,587 passengers with a load factor of 36.58%, 29% above the March 1954 load factor.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—MAY 9, 1955

SEARCHLIGHT SECTION

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

EDITORIAL

Notes From the Missile Country

(The following notes are jottings from the editor's notebook during a two-week trip to USAF, Army and Navy missile test centers in the Southwest and the Atomic Energy Commission Nevada proving ground.)

Special Weapons Center Albuquerque, N. M.

Brig. Gen. William A. Canterbury, commander of ARDC's Special Weapons Center, says major progress has been made during past two years in designing atomic weapons capability into new military aircraft from their inception. Special Weapons Center is responsible for getting this capability into all new USAF planes that require it and works through the Weapons System Project Office at Wright Air Development Center, Dayton, Ohio, to transmit its data to aircraft and missile contractors concerned. Special Weapons Center also provides Strategic Air Command and Tactical Air Command with information on atomic blast, flash and radiation effects required for training aircrews in delivery techniques.

New 12,000 ft. runway at Kirtland AFB is completed and will soon be used by the first Boeing B-52 Stratofortress to be assigned to the center. The 4925th Atomic Test Group has made all atomic weapon and test device drops on the Nevada proving grounds and is proud of its record of only one aborted mission.

Holloman Air Development Center Alamogordo, N. M.

Brig. Gen. Leighton I. Davis, Holloman commander, says the development workload of this missile test center has more than doubled during past two years. Current belief is that USAF missile program is now over the basic research and development hump. Main job now is working out development fixes on specific missiles to provide them with operational reliability required for combat use. USAF is planning to use Holloman in the future to train combat organizations in field handling and use of missiles.

Holloman has a group of 20 former German scientists headed by **Dr. Ernest Steinhoff,** Peenemunde guidance expert, but still has opening for more civilian scientists. Dr. Steinhoff believes considerable basic research needs to be done and fundamental theories organized in the field of hypersonics—speeds from Mach 6 to Mach 20—before intercontinental ballistic missiles and space vehicles can be successfully developed. **Maj. David Simon,** head of the space biology laboratory, reports that high altitude experiments with various types of animals indicate pilots can operate at 90,000 to 120,000 ft. altitude for 60 hours with no ill effects from cosmic radiation.

High altitude balloon unit at Holloman has done interesting work in miniaturization of balloon control devices and high altitude research instrumentation carried as payload packages in the upper air research program. These balloons will also be used in experiments with anthropomorphic dummies to test pilot bail-out problems at altitudes above 90,000 ft. Data from dummy tests will lead to later experiments with human pilots bailing out from these balloons.

Signs in the Holloman lunch rooms warn military and civilian personnel that radioactive tracer is being used in new research rockets to help recovery teams locate their instrumented nose cones after firing on the vast desert expanse of the Holloman range.

White Sands Proving Grounds, N. M.

Maj. Gen. E. L. Cummings, Chief of Army Ordnance, says more than 80% of its missile research and development funds now go to industry. Redstone Arsenal at Huntsville, Ala., is now the Army's chief clearing house for missile information. All unsatisfactory reports from Army field forces equipped with missiles funnel through Redstone which monitors all contractor and Ordnance-developed fixes. Marines will use the Army's Honest John rocket. Contrary to popular opinion, Navy's Terrier and Army's Nike, both anti-aircraft missiles, do not represent duplicated effort. Terrier is a shipboard system designed to fundamentally different combat requirements than the area-defense goal of the Nike. Army Ordnance is contracting with missile manufacturers to put technical representatives in the field with combat units using missiles to insure better maintenance and field service during early field operations. Navy missile experts are extremely pleased with the effectiveness of the controls on late versions of the Glenn L. Martin Co.'s Viking, high altitude research rocket. Viking has performed some strange tricks in flight through use of these controls.

Atomic Energy Commission Nevada Proving Grounds

James E. Reeves, AEC test manager, says the Nevada proving ground has "perhaps doubled the rate of acquisition of knowledge in the fields of weapon design and weapon effects. Our continental site's greatest value is in the time it saves in development of weapons." Example of this close and swift relationship between AEC's weapons development laboratory at Los Alamos, N. M., and the Nevada test operation were the two additional shots tacked onto the current Operation Teapot series that are designed to answer technical questions raised by the results of earlier blasts in this same series. Total of 45 atomic shots will have been fired on the Nevada site when Teapot's 14 blasts have been completed. **Dr. Alvin C. Graves,** scientific advisor to the test manager, outlined experiments to be conducted during and immediately after the 40 kiloton Cue shot. These include nine for the military, 16 for Los Alamos laboratory, one for Livermore Laboratory and 48 for civil defense. Dr. Graves said AEC has not yet tested a guided missile in the Nevada operation. Air drops on the Nevada site have ranged from bursts only a few hundred feet above ground to above 30,000 ft. Air bursts produce little radioactive fall-out. Problem of fall-out from firing nuclear test devices from steel towers (tower for Cue shot is about as high as the Washington Monument) is getting so serious due to vaporization of the structural steel used in tower and its supports that AEC is considering use of anchored balloons to mount both atomic test devices and instrumentation.

—Robert Hotz

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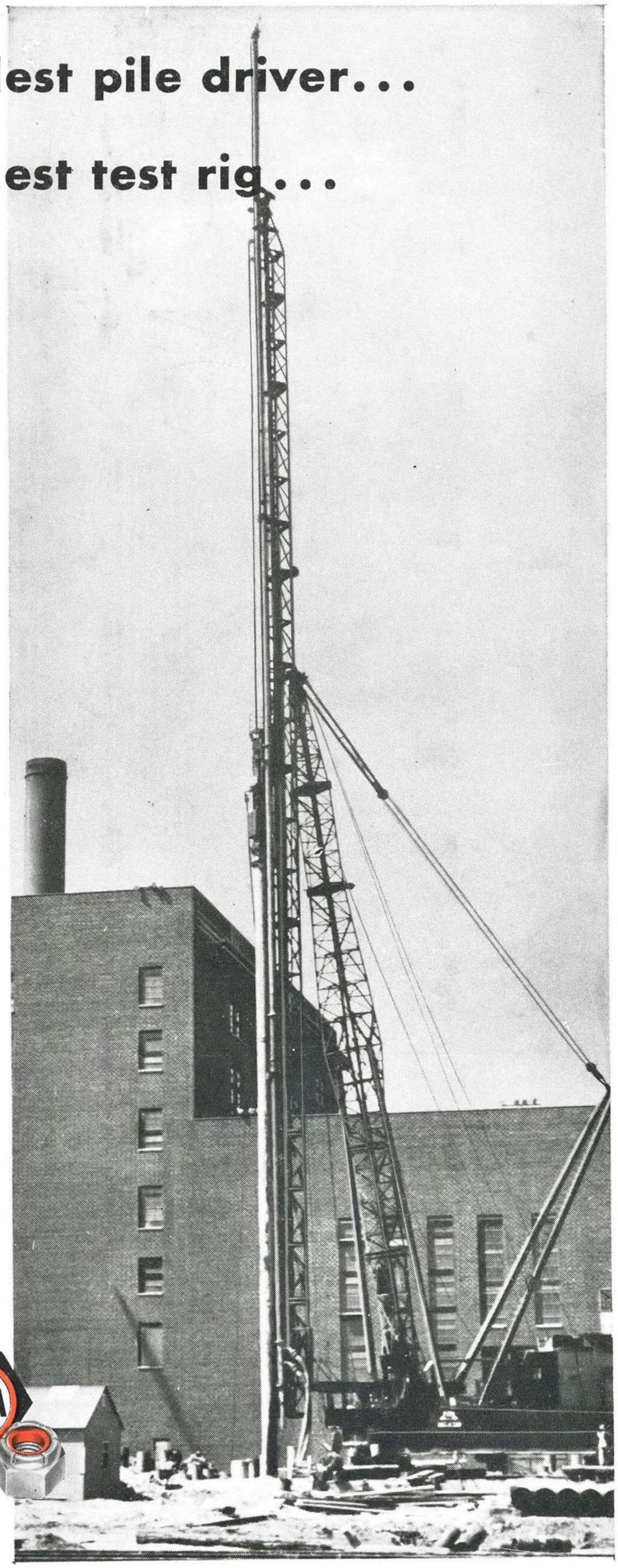

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