AVIATION WEEK

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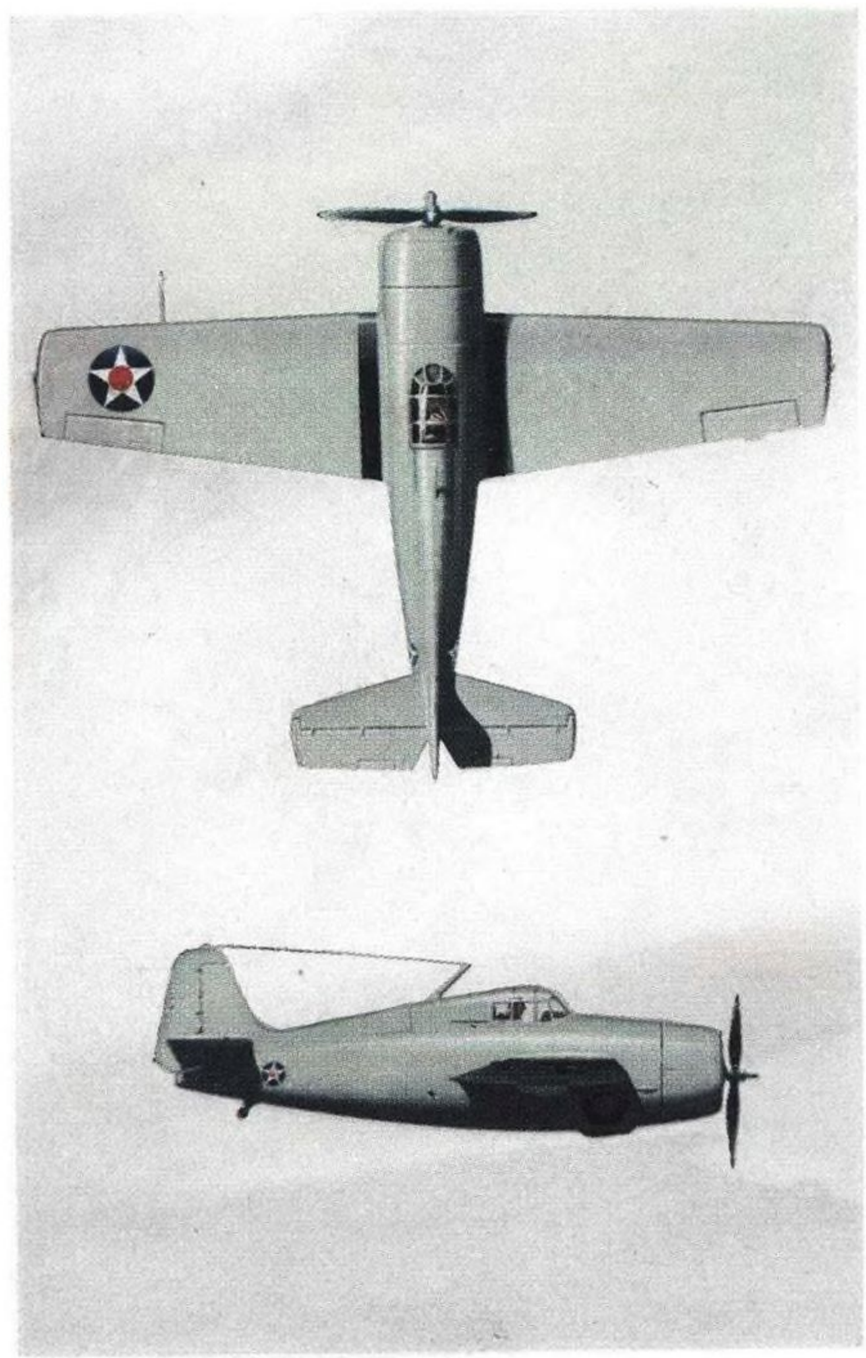

GRUMMAN WILDCAT

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THEN AND NOW

THEN . . . The Wildcat was small and tough and fast—and above all, ready when needed. After Pearl Harbor, Wildcats, the Navy standard fighter, struck back first.

NOW . . . Like the Wildcat, the Cougar is small and tough and fast. Like the Wildcat, the Cougar is ready when needed. They are the first swept-wing jet fighters in squadron operations with the Navy.

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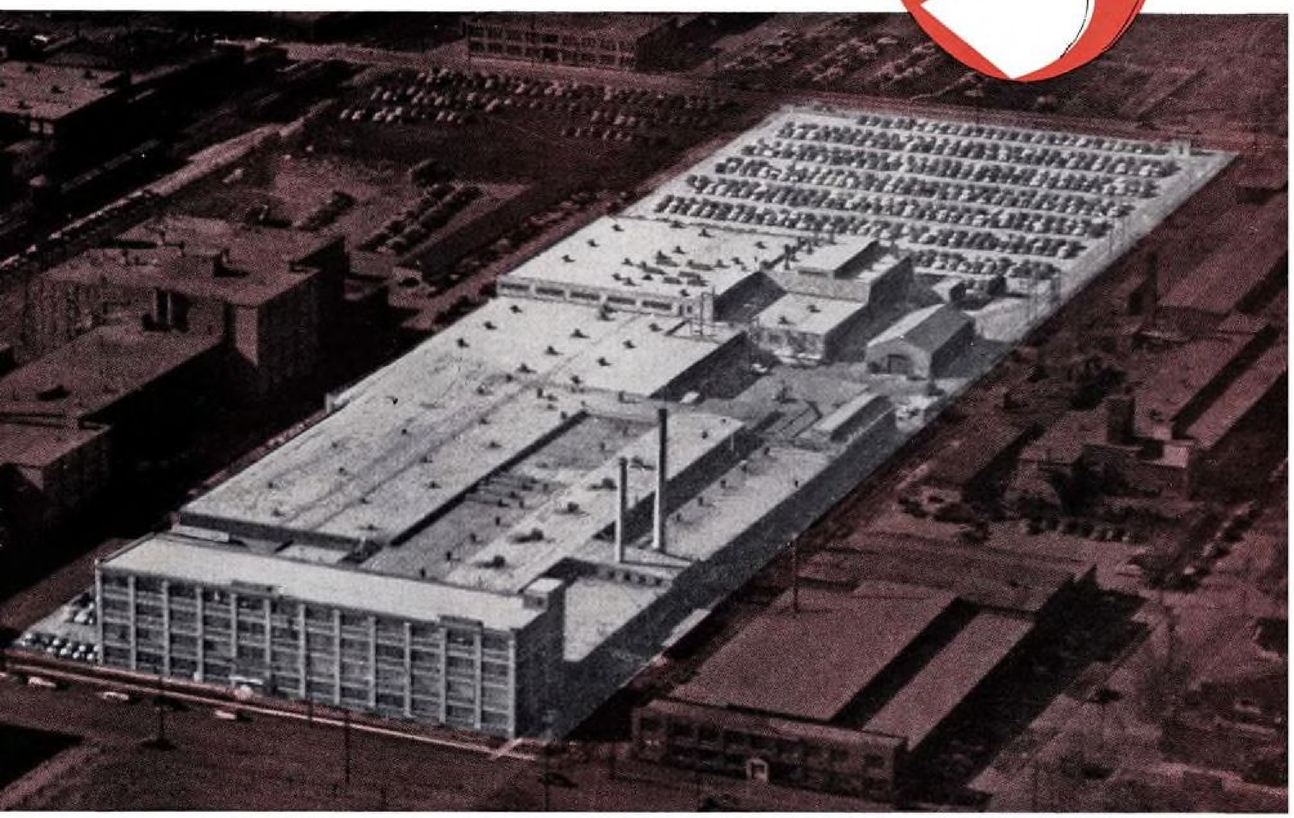
DESIGNERS AND BUILDERS ALSO OF THE S2F-1 SUB-KILLER, THE ALBATROSS AMPHIBIAN, METAL BOATS, AND AEROBILT TRUCK BODIES

Sundstrand announces new Aviation Division



SUNDSTRAND AVIATION has been set up as a separate division of Sundstrand Machine Tool Company. This move represents another progressive step by Sundstrand toward its goal of establishing adequate production capacity for Constant Speed Drives and other specialized accessories for the Air Force, the Bureau of Aeronautics, and engine and airframe manufacturers.

The former Hydraulic Division of the parent company has been divided into two completely segregated entities, the Aviation Division and the Industrial Division. The Aviation Division will occupy the entire 250,000 square-foot plant shown above, which has heretofore been shared with the Industrial Division. All products of the Industrial Division will be manufactured in a new plant now under construction.

SUNDSTRAND AVIATION is now in a better position to serve the aviation industry. In addition to its doubled production capacity for Constant Speed Drives, it has its own management, sales, engineering, and service facilities. Please feel free to call upon us whenever you need help in solving an a-c power generation problem.

(Left) "Package-Type" Drive—can be strut or bracket mounted in line with power take-off pad.

(Right) "Sandwich-Type" Drive—extremely compact for mounting in nose cone, or other available pad.

(Left) "Cartridge-Type" Drive—mounts within engine gear box.

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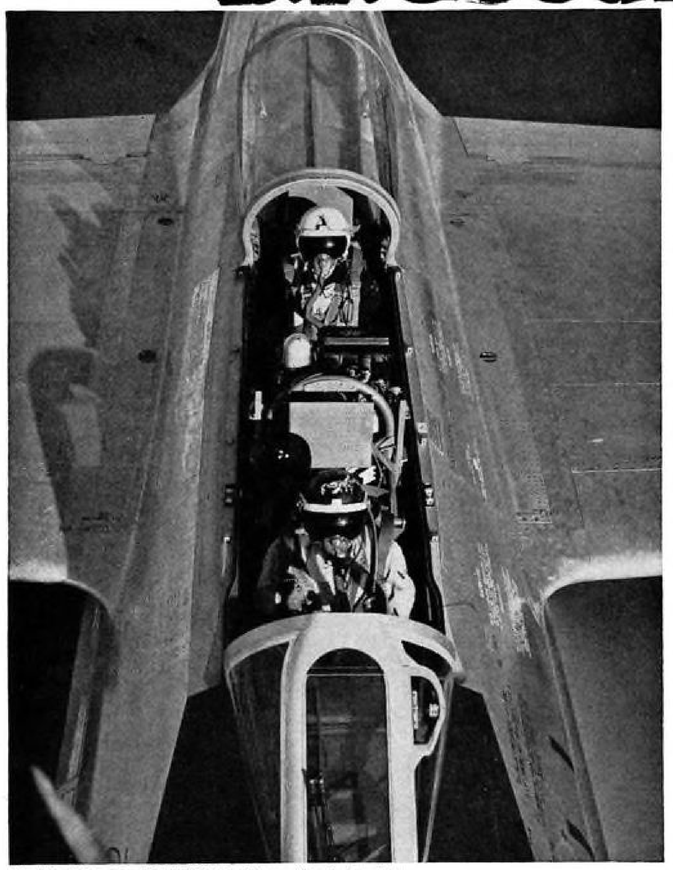
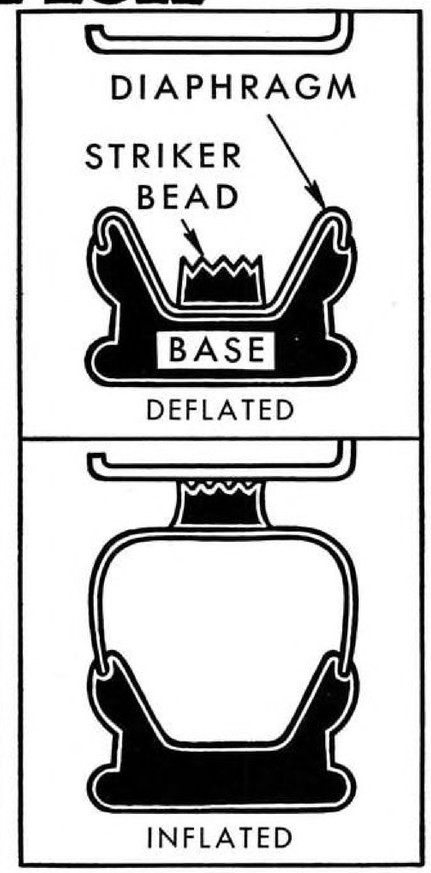
CONSTANT SPEED DRIVES • AIRCRAFT ACCESSORIES

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Northrop Scorpion F-89, USAF All-weather Interceptor



Prevents blowouts 8 miles above ground

PILOTS OF FAST FIGHTERS like the Northrop F-89D, above, used to worry about their pressurized canopies when flying at altitudes of 8 miles and up. The effect of high pressure on the inside and low pressure on the outside would often blow out the inflatable seal between canopy and cockpit.

B. F. Goodrich engineers went to work on the problem. They believed a really effective seal ought to inflate with low pressure and stretch very little or not at all. Less stretch would mean less strain. The seal they developed has a U-shaped solid rubber base and a rubberized fabric diaphragm nested inside the base. (See diagram above). The diaphragm simply *lifts* when inflated, works like blowing up a paper bag. Low pressure gives full expansion with practically no stretch. Dangerous stretching, like blowing up a toy balloon, is eliminated.

The new inflatable strip seal works almost instantly. Even at minus 65°, it inflates with less pressure than ordinary seals needed at room temperature. There are other advantages. It resists wear and damage better than ordinary seals. It fits complex curves better. It seals and unseals faster. Sliding wear and scuffing are minimized.

The new B. F. Goodrich inflatable seal is now in use on more than a dozen makes of planes, including latest jet fighters and bombers.

Other B. F. Goodrich products for aviation include: tires, wheels and brakes; De-Icers; heated rubber; Pressure Sealing Zippers; fuel cells; Avtrim; Rivnuts; hose; other accessories. *The B. F. Goodrich Company, Aeronautical Sales, Akron, Ohio.*

B.F.Goodrich
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NEWS DIGEST

Turboprop Convair YC-131C Nears Flight Status

Scheduled to make its first flight early next month, the new Convair YC-131C Turboliner is seen at Ft. Worth during a USAF development engineering inspection. The transport is a Model 340 Convair-Liner powered by two Allison YT56-A-3 turboprops rated at approximately 3,750 eshp. each. The YC-131 is the first U. S. military twin-engine turboprop transport. Convair modified a Model 240 in 1950 to take two Allison 501 turboprops for study by Allison Division of General Motors.

Domestic

Trans World Airlines president Ralph S. Damon told Lockheed Aircraft Corp.'s management club last week that TWA is concerned about the DC-7's appreciable speed edge over the Super Constellation, challenged the plane builder to "do something about this problem." TWA flies Super Connies, no DC-7s.

Cessna Aircraft Co. has won a $1.2-million Navy contract to produce 25 OE-2 observation planes at Wichita. The new aircraft is similar in appearance to Cessna's L-19 Army liaison craft but has higher dorsal and vertical fins, is powered by the more powerful 260-hp. Continental S0470 engine.

Windtunnel model of Sncase's twin-jet Caravelle transport will be tested by Cornell Aeronautical Laboratory at Buffalo, N. Y. Cornell is building a 1/25th-scale model of the medium-range airliner, expects to begin tests next August.

Beech Aircraft Corp. has boosted production of its commercial Bonanzas 50% to meet increased orders for the Model E35.

Lightplane builders Aero Design, Beech, Cessna, Piper and Taylorcraft shipped 211 utility and executive craft valued at $2,685,000 during February, Aircraft Industries Assn. reports. The total compares with January shipments of 253 planes at $2,995,000.

Clarence N. Sayen, president of Air Lines Pilots Assn., was re-elected president of the International Federation of Air Line Pilots Assn. at the union's annual conference in Zurich, Switzerland. Capt. W. J. I. Montgomery of Canada was elected vice president.

Cyril C. Thompson, former executive secretary of the Airport Operators Council, has been appointed special consultant on airport affairs to Civil Aeronautics Administration.

Gustav Henry Rohr, president of Rohr Aircraft Corp. during World War II and father of the company's present chief executive, died Apr. 3 in Fresno, Calif.

Financial

Piasecki Helicopter Corp., Morton, Pa., reports record sales of $86,726,430 for 1953, 35% higher than 1952's $64,450,014. Net earnings increased 48% to $1,226,938. Backlog Dec. 31: $130 million.

Republic Aviation Corp., Farmingdale, N. Y., has declared a $1 dividend on common stock, payable Apr. 20 to holders of record Apr. 9.

National Airlines has declared a regular quarterly dividend of 15 cents per share on common stock, payable July 15 to holders of record July 5.

International

Crash investigators last week probed the inflight collision of an RCAF Harvard trainer and a Trans-Canada Air Lines North Star over Moose Jaw, Sask., Apr. 8. The crash killed 37 persons, ending TCA's safety record of more than three billion passenger-miles without accident. One of the victims was T. M. Reid, 59, Canadian aviation pioneer and veteran pilot.

Aeronaves de Mexico took delivery on its first two Convair 340s last week, flew the twin-engine transports nonstop from San Diego to Mexico City to get them into service in time to handle Easter holiday traffic. The airline was scheduled to accept delivery of two additional 340s later in the week.

Record total of 146 jet aircraft was delivered to RCAF by Canadair during March. The breakdown: 64 F-86 Sabres, 73 T-33 trainers and nine overhauls.

The Aviation Week

April 19, 1954

Picture Credits

7—Convair; 9—(top) Howard Levy; (center, left) Wide World; (center, right) British Information Services; (bottom) Charles Brown; 18—Lockheed; 88-89—PAA; 90—Vickers-Armstrongs; 92—IATA.

WINGTIP JET TESTS—French are testing a Sncaso S.O. 6020 Espadon jet fighter (above) with small wingtip-mounted Turbomeca turbojets fitted with afterburners.

New Jet and Turboprop Aircraft Fly Abroad

SMOKY START—Dense smoke from cartridge starters of Hawker Sea Hawk jet fighters rolls over the deck of 36,800-ton HMS Eagle during recent maneuvers in the Mediterranean Sea.

JET COPTER ALOFT—British Fairey Gyrodyne starts flight tests. Piston engine drives compressors supplying air to pressure jets at rotor tips. Wing stubs have pusher props.

BRITISH SUB HUNTER—Turboprop-powered Fairey Gannet (below) banks low over the water with its radar "bin" extended.

WHO'S WHERE

In the Front Office

J. F. Schirtzinger, former assistant chief engineer at Convair's San Diego Division, is new president and general manager of Consolidated Tool & Products Co., Los Angeles, Calif.

Edward J. Odlum has been elected vice president of Kaman Aircraft Corp., Bloomfield, Conn. Other changes: **Bruce F. Clark,** treasurer; **Charles Kirchner,** assistant secretary as well as assistant to president.

Robert T. Frisbie, former president of New Britain Machine Co., has become chairman of the executive committee of the board. Also promoted by the New Britain, Conn., firm: **Ralph S. Howe,** president; **Julian C. Pease,** executive vice president; **Clarence E. Bachman,** vice president in charge of the Products Division; **George G. Wilcox,** vice president in charge of the Hand Tool Division.

Harold Woodhouse has been appointed chairman of Arizona's Aviation Authority.

George W. Rice, Houston attorney, and Dallas lawyer **James H. Walker** have been elected to the board of Braniff International Airways. New officers: **Miss Velta Bowlware,** assistant secretary; **R. L. Barrier, F. J. Beisecker** and **Loyd Eden,** assistant secretaries.

Changes

Louis Davis has joined Fairchild Engine & Airplane Corp. as manager of public relations and advertising for the Engine Division at Farmingdale, N. Y. **Don Jensen,** former public relations manager for the division, has resigned to go into personnel communications work.

Peter T. Craven is new treasurer and comptroller for Riddle Airlines.

L. F. Hampel has been promoted by United Air Lines to assistant to the vice president-economic controls. Other changes: **J. Donald Bowers,** manager of market and economic research; **L. D. Livermore,** supervisor of economic forecasting.

Edgar F. Shannon has been appointed comptroller for Price Electric Corp., Frederick, Md.; **Charles A. Carlson** is new personnel manager.

Reinout P. Kroon has become research director for Westinghouse Electric Corp.'s Aviation Gas Turbine Division at Philadelphia. **Edmund C. Sedlack** has been named administrative assistant to the division manager.

Walter J. Currie is new administration manager of Lockheed Aircraft Service's New York base, succeeding **William D. Hammond,** who has completed an East Coast tour of duty and returned to headquarters at Burbank, Calif.

Honors & Elections

Donald N. Meyers, chief of Piasecki Helicopter Corp.'s Preliminary Design Division, and **Z. M. Ciolkosz,** the copter builder's chief development design engineer, received the Society of Automotive Engineers' Wright Brothers Award for 1953 at SAE's Aeronautic Meeting dinner last week in New York.

INDUSTRY OBSERVER

► Allison Division of General Motors Corp. is delivering its T54 turboprop rated at 7,500 eshp. The T54 uses twin power sections geared to a single set of contra-rotating propellers. Aircraft scheduled to use the T54 include the Lockheed and Convair VTO fighters and the Convair R3Y flying boat.

► **Douglas El Segundo Division is about half-way through building the 10 A2D Skyshark Navy attack planes left in the program after its severe cutback late last year. A2D was originally scheduled for large-scale production to replace the AD Skyraider as the standard carrier-based attack plane, but gear box and prop control problems with the T40 delayed development.**

► Convair now has a production order for a small quantity of TF-102 supersonic delta-wing trainers (AVIATION WEEK Mar. 29, p. 11).

► **Grumman is building a lightweight fighter prototype for the Navy. Designated the F9F-9, the new fighter is radically different from any of the previous F9F series. It is scheduled to fly soon.**

► Sikorsky has delivered its third S-55 to Okanagan Helicopters, Ltd., of Vancouver which has leased the copter to the Canadian National Fisheries Department for use in Newfoundland to replace several patrol boats.

► **USAF is looking for a long-range all-weather fighter capable of intercepting enemy bombers close to the early warning zone and conducting sustained attacks all the way to the target. During World War II, heaviest attrition of attacking bombers occurred after bombs were dropped. With atomic and hydrogen bomb-carrying aircraft, the defenders' emphasis must be on cutting down bombers before they reach their target.**

► North American F-86D all-weather Sabre interceptor will have a total of 113 changes and modifications on each aircraft during the "operation pull-out" program (AVIATION WEEK Mar. 8, p. 11).

► **Lear, Inc., under a Convair contract, has conducted a drag-reduction program on a Convair 340 aimed at improving performance. The modified 340 is being flight tested by Convair at San Diego to evaluate the proposed Lear changes.**

► USAF has switched an order for 36 Convair 240 aircraft modified as airborne electronic test beds to the later Model 340. No change in price or delivery dates is involved. Navy also has ordered a Convair 340 as a VIP transport and is negotiating for purchase of several more.

► **Engineering department of American Machine and Foundry Co. has developed a reverse-thrust device for turbojet engines and is trying to interest USAF in further development.**

► British finally have admitted officially the existence of the 30-mm. Aden aircraft cannon to be used as a standard armament on the latest crop of RAF fighters, including the Hunter, Swift and Gloster Javelin. The Aden gun has a rate of fire of 1,200 rounds per minute, but a relatively low muzzle velocity.

► **Douglas El Segundo Division has completed the first production model F4D Skyray for Navy.**

► Design studies by Douglas Aircraft Co.'s helicopter group have indicated that turbojet engines located at rotor tips hold considerable promise for the future. However, rotor-tip turbojets have not passed beyond the design study stage.

► **North American Aviation's $10-million atomic power plant scheduled to be built for the Atomic Energy Commission (Aviation Week Apr. 5, p. 13) will be located in the Santa Susana Mountains near the NAA rocket test facility. The 20,000-kw. plant is scheduled for completion in 1958. AEC will spend $7.5 million on the project, with NAA contributing $2.5 million.**

Washington Roundup

Indo-China

Watch for continuing trend of increasing U. S. military involvement in Indo-China war. Explosive airpower mixture is brewing in southeast Asia. Chinese Communist air force is re-deploying from Manchuria to bases on mainland opposite Formosa and along Indo-China border. Air strikes by Communists against either Formosa or Indo-China probably would provoke retaliation by carriers of U. S. Seventh Fleet and landbased USAF planes in the Philippines.

Airlift Shift

Plans are well advanced toward a sizable trans-Pacific airlift to Indo-China. Military transports already are being shifted from Korean operations to fly U. S. military supplies to French in Indo-China, and trans-Pacific commercial contract operations may be revived. California Eastern Airways and Overseas National Airways now are completing last of the Korean contract airlifts, but Indo-China crisis probably will see larger role for nonscheduled C-54 operators in the Pacific.

Burke Airport Issue

Military and civil aviation officials still are wrangling over possible commercial use of Andrews Field as alternate for Washington National Airport, but CAA Administrator Fred B. Lee warns that the new Burke Airport is not yet a dead issue. Reason: CAA has $849,000 investment in 1,000 acres of land at Burke.

ACC in High Gear

Air Coordinating Committee's drive to meet the May 1 deadline for submission of its air policy review to the President (Aviation Week Apr. 5, p. 11) is in high gear. Drafts of papers on all but 11 of the approximately 50 subjects under review are being circulated to industry organizations.

Papers not yet sufficiently along for submission to industry include such knotty, controversial subjects as subsidies, routes, mail, and role of domestic and international air transportation system.

Talbott's Advisors

Grover Loening and Charles A. Lindbergh are emerging as top behind-the-scenes advisors to USAF Secretary Harold Talbott on technical matters.

Radar Network

Echoes of Defense Secretary Wilson's confirmation that a new and secret early warning radar network was being built jointly by the U. S. and Canada hardly had died before alert Canadian newspapers noted that locations of eight of the secret arctic radar locations had been revealed by the Royal Canadian Air Force.

Personnnel transfers to the bases were announced by the Roundel, official RCAF publication, an unclassified magazine distributed publicly.

More AEDC Money?

Washington observers are speculating on whether USAF will ask for a special supplemental appropriation to continue construction work at the Arnold Engineering Development Center at Tullahoma, Tenn. No AEDC money was contained in the military public works bill recently submitted to Congress.

SAS Decision

Decision is expected soon from State Department and Civil Aeronautics Board on the request by Scandinavian Airlines System (Aviation Week Mar. 29, p. 59) for use of Los Angeles as the West Coast terminal on SAS's proposed transpolar route between the U. S. West Coast and Scandinavia.

Airport Funds

Although the Administration is penny-pinching on airport development, it is being notably liberal on funds for highways and other public works. For fiscal 1955, the Administration is asking $567 million for road building—$66 million more than is available this fiscal year. The Administration also is recommending that $875 million—an increase of more than $300 million—be authorized for fiscal 1956.

After having funds for new airport developments cut off completely this fiscal year, aviation interests are happy over the $33 million Undersecretary of Commerce for Transportation Robert Murray says will be requested for fiscal 1955. They think that much more than this could easily be justified, however. Airport development is lagging far behind the schedule set by Congress.

The 1946 Airport Act provides $500 million in federal funds over a 10-year period. With the $33 million to be proposed for fiscal 1955, only $247 million, or less than half of the total $500 million, will have been appropriated over a nine-year period.

Hydrogen Bomb Angles

Repercussions of the recent series of hydrogen bomb blasts are being felt in the Pentagon where they raise grave questions on future development of the three services. Increased vulnerability of Naval carrier task forces to both large-scale atomic and hydrogen bomb attacks by enemy land-based airpower will stir sharp debate over the future of this type force. Also, size and weight of the present "deliverable" hydrogen bombs are too much for carrier-based aircraft, leaving USAF with a virtual monopoly in the field for the immediate future.

Airpower Debate

Watch for the debate on the future of U.S. airpower to continue in the Senate with Sen. Stuart Symington leading Democratic attacks on Republican cuts in the airpower budget. Symington's inside knowledge of Pentagon procedures sharpens the barbs he tosses at the opposition and is causing deep concern among Republican leaders on Capitol Hill and in the Pentagon.

USAF Recruiting

Brig. Gen. Arno H. Leuhman, deputy director of USAF Information Services, is scheduled to command the new Air Force recruiting organization at Wright-Patterson AFB. The Recruiting Command will operate under the jurisdiction of the Air Training Command.

—Washington staff

AVIATION WEEK VOL. 60, NO. 16 APRIL 19, 1954

Key Senators Balk at Civil Air Program

- **McCarran hits proposal that Commerce decide where airport money goes, says Murray aims to be 'czar.'**
- **Bricker says Congress, not Administration, should set fees to make CAA and CAB self-sustaining.**

By Katherine Johnsen

Key senators are balking at the Administration's economy program for civil aviation.

Here are two major developments:

• Request by Undersecretary of Commerce for Transportation Robert Murray that the department be given far greater discretion in deciding where airport money should go to assure economy aroused the ire of Sen. Pat McCarran, co-author of the 1946 Airport Development Act.

McCarran said at a session of the Senate Appropriations Subcommittee on Commerce that Murray was aiming to become a "czar" and criticized him for chopping off airport funds for a year.

• Senate Interstate and Foreign Commerce Committee unanimously approved a resolution directing the Administration to postpone its program to have the aviation industry finance the operations of Civil Aeronautics Board and Civil Aeronautics Administration through a system of fees and charges.

A proviso tacked onto the fiscal 1954 Independent Offices Appropriation Act declared federal agencies "shall be self-sustaining to the fullest extent possible" and directed the development of programs looking toward this objective. With this provision as a basis, the Budget Bureau directed CAB, CAA and other agencies to submit programs for financing their operations by May 1.

The Senate resolution does not have the force of law. This raises the question as to whether the Administration will move ahead with the assessment program.

▶ **Fees and Charges**—Opposing a quick dive into systems of fees and charges, Senate Interstate Commerce's chairman John Bricker explained: "The committee is not hostile to the idea of assessing fees and charges; in fact, I think it favors it almost unanimously.

"But the members are of the unanimous opinion that such a proposal raises basic questions with regard to the fundamental philosophy of regulations. They feel that the Congress should set up the basic standards for each agency to follow in imposing charges for licenses."

The Budget Bureau directive sets up rigid assessment standards. The Senate Interstate Commerce Committee plans to consider legislation in the near future setting up other, and probably more lenient, standards.

▶ **Aid Threatened**—The Administration-Senate fight threatens the $33-million airport aid program planned for fiscal 1955. Present law allows CAA to spend 25% of airport funds at its discretion, the remaining 75% to be apportioned among the states according to a formula based on area and population.

It appears certain the Senate will wage a showdown fight against increasing the discretionary fund to 50% as recommended by Murray. Question is whether Murray will support the $33-million program without being granted more leeway as to where the outlays should go.

▶ **Sharp Criticism**—At the outset, McCarran remarked that Murray's decision to go ahead with an airport program after a year's postponement was "heartening," but he turned to sharp criticism after the Undersecretary recommended these two policy changes in the program.

• "The basic standards of determining eligibility of specific airports should be substantially tightened, using the criteria of national aeronautical importance," Murray said.

• In addition, he called for "more flexibility" in administration through the increase in the discretionary fund.

These proposals, McCarran responded, "can mean anything and everything. They mean Congress completely abdicates its function and vests in the department absolute authority to determine on whatever basis they may choose, be it political or otherwise, just what airports will receive federal help."

▶ **'Lot of Fun'**—Murray pointed out that in fiscal 1953, most airport projects received federal grants too small to accomplish much: 39 states received apportionments of less than $200,000, nine states less than $100,000, and 89 projects less than $5,000.

With the 50% discretionary fund, McCarran told Murray: "You will have a lot of fun. That means your department would take over control of where airports would be placed. You would be the czar of that—I suppose you would kind of like that."

Murray replied: "I have very little to do with where we put funds for airports."

The increase in the discretionary fund was not recommended by the Transportation Council, advisor to Commerce Department on the airport program.

Murray added that there was "wide disagreement as to whether it was desirable to continue the federal-aid program at all." General opinion in the aviation industry is that Murray is opposed to the program but decided to go along with it in view of the recommendation of the Transportation Council.

▶ **Skepticism**—Sen. Styles Bridges, chairman of the full committee and the Commerce Subcommittee, expressed skepticism of the management survey being made for Commerce Department by Cresap, McCormick and Paget. "We are interested in surveys that will provide efficiency, and yet we don't want surveys that will result in changes that will change fundamentals," Bridges said.

"I agree with you," McCarran interceded, "that this management survey is a complete waste of funds." McCarran said Congress did not appropriate funds for the purpose. When Assistant Secretary of Commerce James Worthy said the department felt free to use its general operational money for the contract, McCarran warned: "If you fall into the same disregard for Congress, I am sure you will get into the same category with Mr. Murray, which isn't an enviable position at this time."

The committee requested complete data on the management contract, including information as to whether there are any personal ties between the firm and Commerce.

The subcommittee also requested a report on Commerce Department participation in CAB activities. "To my

Turboprop-Jet B-47

Boeing Airplane Co.'s XB-47D, slated to be powered by a combination of turboprop and turbojet engines, is scheduled to fly sometime this summer. Aim of the new arrangement of powerplants for this experimental B-47 model is to squeeze more range out of the basic airframe.

The turboprops will be Wright Aeronautical's T49s. One of these engines will be substituted for each inboard pod installation housing two General Electric J47 turbojets.

▶ **Four-Engine B-47**—This will make this version of the six-jet B-47 a four-engine model—one T49 inboard on each wing, while a J47 remains in each of the outboard positions.

Fitted with very wide four-blade Curtiss Turbolectric propellers, each T49 will have about the same thrust as the two jets it will replace.

▶ **Other Turboprops**—Other aircraft scheduled to fly soon with turboprop power:

• **Boeing C-97J Stratofreighter.** This craft, scheduled to go aloft late this year, will be powered by Pratt & Whitney Aircraft T34s driving Curtiss Turbolectric three-blade, 16-ft.-diameter propellers.

• **Lockheed C-130A.** Expected to take to the air in the next two months, this transport will be fitted with four Allison T56s turning Curtiss Turbolectric three-blade, 15-ft.-diameter propellers.

• **Vertical-takeoff planes.** Both the Lockheed XFV-1 and Convair XFY-1 VTO craft (AVIATION WEEK Mar. 22, p. 14) are scheduled for first flights in the next three or four months. Each plane is powered with an Allison T40 driving two contra-rotating, three-blade, 16-ft.-diameter Curtiss Turbolectric props.

knowledge," Murray said, "we have intervened in no cases before the regulatory agencies. And, I might add that is in contrast to the experience of previous years."

▶ **Charges, Replies**—McCarran said policies expressed in Murray's speeches "would lend credence" to charges the senator claimed have been made to him and others on the Appropriations Committee Murray is "giving the most favored treatment to the railroads."

McCarran said Murray supported "more and more toll highways," which would handicap trucking, and charged the Undersecretary would "cripple and eventually abolish any government help for the maritime industry."

On the other hand, the senator observed, Murray proposed to increase railroad management's power over rate-making. Murray replied that the Administration has recommended a large increase in maritime subsidies in fiscal 1955.

▶ **Service Charges**—The Budget Bureau directive on fees and charges specifically directs the imposition of fees on participants in proceedings for certificates of convenience and necessity before CAB and for the issuance of airman certificates by the CAA. But it also directs the two agencies to impose all other feasible charges for services.

Commerce Department already has plans to levy charges for airman's certificates and increase charges for certification of aircraft. Revenue from certifications now approximates $175,000 a year, compared with a cost of the services of $600,000. Murray told the House Appropriations Committee a system of charges is to be instituted "which is calculated to return revenues at least equalling the cost of the services provided."

The directive orders charges for "the issuance, renewal, modification, transfer, or termination of any license, permit, certificate, charter, registration, exemption, or similar form of authorization granted or otherwise provided."

Fees and charges imposed, the directive states, should reflect "an additional cost factor of not less than 15% (above the direct cost) to cover generally such indirect costs as overhead, maintenance, operation and depreciation of buildings, the government's share of the retirement or social security benefits for the employes, workmen's compensation, and work performed by central agencies."

Payne May Succeed Griswold in Air Unit

Death of Sen. Dwight Griswold leaves vacant the chairmanship of the Senate Interstate and Foreign Commerce Subcommittee on Aviation. Griswold died last week.

One prospect to fill the post is Sen. Frederick Payne, only Republican committee member who does not now hold a subcommittee chairmanship.

Since hearings on the comprehensive McCarran Bill are being held before the full committee, headed by Sen. John Bricker, the subcommittee is not expected to be active this session.

Comet Gloom

- **Crashes stagger British; certificates rescinded.**
- **Turbulence at altitude, sabotage top theories.**

Fate of de Havilland Aircraft Co.'s Comet 1 hung in the balance last week after the second unexplained fatal crash in four months—seventh accident in one and a half years. But U. S. observers were inclined to doubt the mishaps would have more than temporary effect on development of jet air transportation.

However, this much appears certain: The British must find the cause or causes for the string of accidents before the Comet 1s will fly again and before new orders for later Series 2s and 3s can be expected.

Airworthiness certificates for all Comets operated by British Overseas Airways Corp. were rescinded by the government, and the two other commercial Comet operators—Air France and Union Aeromaritime de Transport (French UAT)—grounded their jet liners pending detailed investigations into crash causes.

▶ **Parallel Tests**—De Havilland began parallel tests with those conducted since last fall by the Royal Aircraft Establishment at Farnborough to duplicate apparent flight conditions of the two latest crashes.

Since it began extensive fatigue tests on the prototype Comet 1 late in 1953, RAE reported no failure after the equivalent of 10,000 hours flying time. That is more than three times the hours any one Comet has flown in service.

▶ **Jet Stream Barrier?**—Theories on what caused the two crashes after takeoff from Rome this year ranged from sabotage to disintegration at altitude.

A West Coast industry observer suggests that turbulence on entering the jet stream—ribbons of highspeed winds at high altitudes—could have caused both accidents. He pointed out that a plane crossing a jet stream at right angles would run into tremendous turbulence. If hit at high speed, severe turbulence also would result.

If the airplane were in a poor angle of attack, it would impose a terriffic structural load that could tear it apart.

However, the British have not ruled out sabotage.

Whatever the cause, the latest crash, in the Mediterranean off the island of Stromboli, Italy, staggered British aviation. The Comets had been back in service less than three weeks after being grounded since Jan. 11 following the mysterious Elba crash.

▶ **Blew Up**—The crash occurred under circumstances almost identical to those surrounding the Elba accident:

- Both planes took off from Rome.
- Both blew up at 26,000 ft.
- Both were close to 30 minutes from takeoff.
- Both were at climbing power.
- Both mishaps came without warning, as pilot in neither case radioed trouble.

▶ **Violent Explosion?**—Salvage work in the Elba crash resulted in recovery of major parts of the plane but gave no conclusive information. Every indication, however, points to disaster without warning, such as a sudden violent explosion. No useful parts were recoverable in the Stromboli crash, and there will be no effort at salvage since the Mediterranean at that point is more than 3,000 ft. deep.

Nearly all recovered parts of the Elba crash now are in Britain. Only superficial inspection has been made so far, with these points known: The third engine recovered definitely lost its turbine wheel as the result of impact after fall, did not cause crash; fourth engine found was not subject to terrific heat as earlier reported but was damaged as the result of immersion in water.

▶ **Scoreboard**—Here is the history of Comet accidents:

• **Oct. 26, 1952,** BOAC Comet failed to become airborne at Rome. Plane demolished, no deaths.

• **Mar. 2, 1953,** Canadian Pacific Airlines Comet 1A crashed at Karachi, India, on delivery flight. Eleven crew and technicians killed.

• **May 2, 1953,** BOAC Comet crashed after takeoff from Calcutta. Forty-three persons died.

• **June 25, 1953,** Union Aeromaritime de Transport (French UAT) Comet landed too far down runway at Dakar, French West Africa, and plane plowed into a concrete abutment. Plane demolished, no deaths.

• **July 25, 1953,** BOAC Comet skidded off runway while taxiing for takeoff at Calcutta. Plane's port wing spar damaged.

• **Jan. 10, 1954,** BOAC Comet crashed off Elba Island after taking off from Rome. Thirty-five killed. Parts of plane salvaged.

• **Apr. 8, 1954,** BOAC Comet crashed off Stromboli after taking off from Rome. Twenty-one persons killed, wreckage sank in Mediterranean.

Current operators of Comets are BOAC, Air France, UAT and Royal Canadian Air Force.

Orders for Comet 2s stand at 33: BOAC, 12; Canadian Pacific, three; UAT, three; Air France, six; LAV (Venezuela), three; Japan Air Lines, two; and Pan American do Brasil, four. No orders have been canceled due to crashes.

Orders for Comet 3s total 10, of which five are for BOAC, three for Pan American World Airways and two for Air India.

Up to the time of initial grounding of British-owned Comets, 15 of the transports were in service and had accumulated a total of more than 30,000 route-hours experience, covering more than 12 million miles. The three commercial operators were averaging 180,000 miles per week.

Considerable modification already has been made on the Comet 2 as a direct result of previous crashes. The Series 2 has been undergoing operational tests preparatory to being placed in service.

BuAer Chief Sees Industry as Partner

A plea for the aircraft industry to assume a more responsible attitude toward the delivery of combat-ready equipment to the military services on time was made by Rear Adm. Apollo Soucek, Chief of the Navy Bureau of Aeronautics, before the second annual avionics symposium of the Westinghouse Air Arm in Baltimore.

The military services and the aircraft industry must have more of the relationship of partners in the enterprise of national defense rather than the traditional buyer and seller concept, Adm. Soucek said.

▶ **Partner Concept**—"If we are partners, and truly we are," he said, "I feel that we must conduct ourselves as partners. This generates a totally different relationship than that of the normal business relationship where one party is the seller and the other is the buyer.

"Ours is not the kind of arrangement whereby one goes into a store and buys an article totally at his own risk. Ours is not the kind of union where the buyer must beware."

Executives, engineers and management in the aircraft industry bear the same responsibilities for national defense in the present era as soldiers, sailors and airmen in uniform, according to Adm. Soucek.

He urged engineers not to consider their work on government contracts finished until a project has completed its final testing in the fleet or Air Force combat units.

▶ **Customer Satisfaction**—"The engineer cannot be complacent and consider that his product is finished when it completes specified tests on a test stand," said BuAer's chief. "That is only the graduation exercise. . . . I feel that the designer or engineer cannot consider his work accomplished until it has reached the final objective and met the final service test.

"By exactly the same token the business executive cannot consider his work done when the ferry pilot comes to the plant and flies the plane away. He cannot be satisfied until that plane has reached the ultimate consumer and he knows that the ultimate consumer is satisfied with it in every respect."

Adm. Soucek also noted that the aircraft executive has an equal responsibility with military officials in delivering

P&WA to Operate New A-Engine Facility

Air Force has asked Congress for $5,750,000 to build a new research, development and test facility for atomic aircraft engines for the Pratt & Whitney Aircraft Division of United Aircraft Corp., East Hartford, Conn.

The new facility will be a joint USAF-Atomic Energy Commission project to be operated by P&WA. It will be known as the Hartford Research Facility. USAF has not indicated the specific location of the facility in the Hartford area.

▶ **Significant Progress**—P&WA has been engaged in research and development work on an atomic engine to power aircraft for several years under both Air Force and AEC contracts.

AEC recently announced that the powerplant builder would get $8.6 million of its $14.2-million fiscal 1955 program for atomic aircraft engine development (AVIATION WEEK Apr. 5, p. 13). This is in addition to the $5,750,000 USAF request for the P&WA research facility.

USAF Chief of Staff Gen. Nathan Twining has predicted that an atomic-powered aircraft is much closer to reality than generally is realized.

The scope of Air Force and AEC operations at P&WA may be taken as confirmation that significant progress is being achieved in this field.

▶ **Stringent Security**—P&WA traditionally has financed its own research and development facilities and has invested about $14 million in its postwar Andrew Willgoos Turbine Laboratory in East Hartford.

The extremely advanced nature of atomic engine research and the stringent security requirements of the Atomic Energy Commission probably account for government financing of this facility.

trouble-free equipment to the fleet and Air Force on time.

▶**Contract Compliance**—"Of course it must be recognized that the contractor has to make money," Soucek said. "It is obviously necessary for him to make a profit in order that he may live. As a partner of his I want him to make money and to make a profit. . . .

"But there must be a consciousness on his part of service to the fleet or to other defense organizations of which he is a part. It is not sufficient that he make a contract or agreement without feeling full responsibility for complying with every minute part of his contract including the mountainous piles of specifications and that he complete the equipment exactly on time.

"The business end of the partnership, the part whereby the contractor is to make a profit, should never be the most prominent factor in the considerations. It is an important factor but it must never be the predominant one. I feel that profit will come and will come in ample quantities if the requirements of the contracts including timely deliveries are complied with in every respect."

USAF, Navy Obligate $536 Million for Air

Air Force and Navy obligated $536 million for aircraft and related procurement during the first eight months of fiscal 1954 out of a total $8.1 billion available during the year.

This was the net obligation—the result after subtracting deobligations (resulting from contract cancelations, more regid criteria as to what constituted an "obligation" and other factors) from the gross. Procurement details:

- **Air Force** obligated only $164 million out of total availability of $6.1 billion during the July-through-February period. USAF's net obligation for February was only $61 million.
- **Navy** obligated $372 million during the July-through-February period out of a total availability of $1.8 billion. Navy de-obligated $31 million more than was obligated during February.
- **By March,** neither USAF nor Navy had started to use up fiscal 1954 appropriations. Both services still had unused carryover funds from previous years.
- **With $6 billion** in unobligated funds on hand Mar. 1, USAF still had $2.5 billion to obligate before starting to use the $3.5 billion appropriated for fiscal 1954.
- **With $1.48 billion** in unobligated funds on hand Mar. 1, Navy still had $90 million to obligate before starting to use the $1.39 billion appropriated for fiscal 1954.

The unexpended balance on hand Mar. 1: $25.3 billion—$18.1 billion for USAF and $1.4 billion for Navy.

Aircraft May Lose Titanium Flow

Plane and engine builders hold back on using scarce metal, causing producers to seek other markets.

Scarce titanium may be diverted from the aircraft industry into other fields.

This was developed at hearings before the Senate's Subcommittee on Strategic Metals and Minerals, headed by Sen. George Malone.

Although airframe and engine manufacturers have testified that the industry in time could utilize up to 500,000 tons of titanium a year, a stockpile is being built up out of current production of only 5,000 tons a year. By the end of 1954, on the basis of current commitments, an inventory of 3,000 tons is expected.

▶**The Situation**—Aircraft industry, because of the scarcity of titanium and prospect of short supply, is holding back on including the metal in production plans.

Meanwhile, producers are becoming impatient to seek other markets.

The issue the government faces is whether to permit the output of government-financed facilities to accumulate to a sufficient amount to assure supplies to the aircraft industry, which has the first priority for the metal, or to let it go to other manufacturers and keep titanium supply and demand on a hand-to-mouth basis.

▶**Civil Allocation**—Defense Mobilization Director Arthur Flemming pointed to the advantage of introducing titanium to other-than-aircraft industries: "Although it would delay the time when aircraft companies could use it, this would strengthen the mobilization base. Clearly that is one factor we should take into consideration from the security point of view."

Malone said the chemical industry "needs titanium very badly even at the present price."

An industry advisory committee of Commerce Department's Business Defense Services Administration has recommended that 10% to 25% of titanium output be allocated to civilian markets.

▶**Piece by Piece**—Curtiss-Wright Corp. president Roy Hurley is taking the lead to stave off a diversion of titanium from the aviation industry. His firm has drawn up a plan for piece-by-piece inclusion of titanium in CW engines, which would utilize half of the titanium output over the next few years.

"If one other engine firm did the same, we would use the whole supply," he reported to the subcommittee.

Under the plan, CW would use 200 tons a month, or 2,400 tons in the J65 engine in 1955. When the J67 comes into production, Hurley said, the firm would utilize "upwards of another 100 tons a month"—or more than 3,600 tons a year.

▶**Production Use Urged**—"I am personally convinced that every piece we propose, plus many, many more, can be made of titanium—if we just start," Hurley declared. "That is what we need to do—get it into production,"

He observed that "we do not dare put titanium in engines unless we put it in to stay, because if we were to put it into an engine and then suddenly had to take it out of the engine, the airplane. . . would not perform well."

Flemming concurred with Hurley that "the thing to do is to put it into actual production."

▶**Temporary Surplus**—There was general agreement at the Senate hearing that the surplus in titanium is "temporary," coming between overall famines for the metal.

Reports that too much titanium is being produced, Flemming declared, "are completely and utterly unrealistic."

Office of Defense Mobilization and General Services Administration reported on steps being taken to increase production.

Dr. Herbert Kellogg, professor of metallurgy at Columbia University and chairman of ODM's Titanium Advisory Committee, supported the estimates of aviation executives (AVIATION WEEK Dec. 7, 1953, p. 14; Nov. 23, 1953, p. 22) that the requirement for titanium in a few years will be fantastically greater than the production which is programmed to reach 13,200 tons a year by 1956.

"It wouldn't surprise me to see the titanium industry grow to the order of magnitude of 150,000 tons a year in five or so years," he said.

▶**Negotiations**—General Services Administrator Edmund Mansure reported that contract negotiations to boost titanium production are underway with:

- **E. I. du Pont de Nemours Co.,** for 8,000 tons a year additional production (AVIATION WEEK Feb. 8, p. 17).
- **Electro-Metallurgical Co.,** subsidiary of Union Carbide and Carbon Corp., for 10,000-tons-a-year capacity.
- **Dow Chemical Co.** for 1,260- to 1,800-tons-a-year capacity.
- **Horizons, Inc.,** with a contract now in the drafting stage.
- **Monsanto Chemical Co.** has been invited to submit a proposal involving a new process it has developed in cooperation with National Research Corp. and also a proposal for a 3,000-ton-a-year Kroll process reduction plant.
- **Aerometals Co.** contract negotiations are to start soon.
- **Western Pyromet Co.** Permission has been requested of Defense Department to utilize a plant under its cognizance for experimental titanium work.

In addition, Mansure reported, discussions looking to further increases in titanium capacity are underway with: Anaconda Copper Co.; Wyandotte Chemical Co.; Chicago Development Co.; Kaiser Aluminum and Chemical Co.; Eagle-Picher Co.; Columbia Southern Chemical Co.; The Glidden Co.; National Distillers Products Corp.; New Jersey Zinc Co.; United International Research, Inc.

▶**Problems**—Maj. Gen. Kern D. Metzger, chief of Air Materiel Command's Product Resources Division listed four deterrents to large-scale introduction of titanium into airframes and engines:

- Quality of pure material being produced is not uniform and the quality of alloys is neither uniform nor satisfactory. This involves problems "common to the growth of any new material," he said. "The poor quality and lack of alloys are programmed to be cured and will be cured, I am sure."
- There is a shortage of processing and fabricating know-how. "The aircraft industry is confronted with learning how to use it," Metzger said, noting that testing involved in introducing new titanium parts, is time-consuming and costly.
- The limited supply. "We cannot permit titanium to be committed unalterably in design," he explained, "unless we are assured that supply will be available."
- The high cost. However, Metzger said that because of the military advantage of titanium, little consideration now is being given to its cost in connection with military planes.

Navy Trainer

Navy is asking new cost proposals, including spare parts, from Beech Aircraft Corp. and Temco Aircraft Corp. in the trainer design competition.

The decision, in effect, reopens the competition. However, Ryan Aeronautical Co., which had entered a Model 72 trainer, will not participate in the new proposal.

Bureau of Aeronautics is preparing new specifications for the Beech Mentor and Temco's Plebe with several minor modifications. Principal change is a larger fuel tank in both models.

New trainer will replace the North American SNJ.

Capitalization of Surviving Corporation In Convair-General Dynamics Merger

Preferred stock $2 cumulative no par convertible $50 per share	
Authorized and outstanding	157,383 shares
Common stock (par value $3)	
Authorized	6,000,000 shares
Outstanding and fully paid	1,973,560 shares
Outstanding and partly paid under stock purchase plan	171 shares
Reserved:	
For conversion of preferred stock	165,253 shares
For restricted stock option plan	197,356 shares
Restricted stock options for purchase of common stock authorized with respect to 10% of outstanding common stock	197,356 shares

Convair Makeup Under Dynamics

Stockholders of Consolidated Vultee Aircraft Corp. and General Dynamics Corp. are expected to approve next week (Apr. 29) the merger of the two firms (AVIATION WEEK Mar. 8, p. 18) when they vote at a special meeting in Dover, Del.

Under terms submitted to the Securities & Exchange Commission, Convair will become a division of Dynamics without changing management or structure.

▶**Control Achieved**—General Dynamics achieved stock control of Convair May 15, 1953, when it purchased a controlling block of 400,000 common stock shares (AVIATION WEEK Apr. 6, 1953, p. 13) from Floyd B. Odlum's Atlas Corp. Atlas had held control since 1947. The block represents about 17% of the aircraft builder's 2,379,298 outstanding common shares.

The merger makes Convair the fourth subsidiary of General Dynamics;

- **Convair,** incorporated as Consolidated Aircraft Corp. May 29, 1923; merged with Vultee Aircraft, Inc., Mar. 18, 1943; builder of military and commercial aircraft, guided missiles.
- **Canadair, Ltd.,** subsidiary of Dynamics since 1947; builder of military and commercial aircraft as well as developmental work in the Canadian guided missile program.
- **Electro Dynamic Division,** Bayonne, N. J., original firm of the group; builder of electric motors and generators for marine and industrial use.
- **Electric Boat Division,** Groton, Conn., submarine manufacturer currently building the atomic-powered Sea Wolf after completing the Nautilus and engaged in Atomic Energy Commission work.

In 1953, Convair netted $10,254,821. Its backlog of orders Nov. 30, 1953, was $1 billion, 92% of which was in government orders. Dynamics netted $6,218,803 and had a $231-million backlog Feb. 28, representing 96% government orders in the U.S. and Canada.

▶**Unanimous Decision**—The merger is an outgrowth of a study begun in the latter part of 1953, when each company formed a committee of directors to explore the mechanics of such a move. Convair's committee retained Blyth & Co., and Dynamics hired Lehman Brothers to determine if a merger would be feasible and desirable from a financial standpoint.

The two committees jointly retained Sanderson & Porter, an independent engineering firm, to survey properties, products and operation of both corporations. All were unanimous for the merger and both boards of directors approved the move in February.

▶**Scrip Certificates**—Common stock of the merged firm will have a par value of $3. Each share of Convair common stock, with a par value of $1, will be converted into four-sevenths of a share of Dynamics common. Each of the 400,000 common shares of Convair held by the parent company will be surrendered for cancelation. No fractional share of the surviving corporation nor certificates will be issuable in connection with the merger. Scrip certificates for fractional shares will be issued, but the holder will not be entitled to any vote or dividend. All scrip certificates will be void after Apr. 30, 1960.

Three-hundred common shares paid under Convair's stock purchase plan will be converted into 171 partly paid shares of Dynamics stock. Upon the merger, the authorized preferred stock will be 157,383 shares. Authorized common stock will be 6 million shares at $3 par value.

Banks concerned have approved the merger. Convair owes $35 million on a 90-day basis. Dynamics owes $8.7 million on a four-year installment basis. It is expected that a new three-year credit agreement will be initiated, making adequate credit available to the new corporation on a 90-day basis for working capital purposes.

▶**Members**—John Jay Hopkins, board

chairman of Convair, chairman and president of Dynamics, and managing director of Canadair, will continue as chief executive of the parent firm.

Hopkins will be a member of the executive committee, along with:

George W. Codrington, Dynamics director since 1937; Otto Marx, chairman of the executive committee and a director since 1925; Joseph T. McNarney, Convair president and a director since 1952; Clifton M. Miller, director of Dynamics since 1948; J. V. Naish, executive vice president of Convair and a director since 1953; and Frank Pace, Jr., former director of the Budget Bureau and Army Secretary, now executive vice president of Dynamics and vice chairman of the boards of both Canadair and Convair.

Latest Views of Lockheed VTO Fighter

New pictures of Navy's Lockheed XFV-1 vertical-takeoff fighter show the unusual plane on special horizontal taxi test landing gear (top photo). Behind tail is the liftup cart used to maneuver XFV-1 into vertical stance. Other photo details the XFV-1's underbelly and shows the scoop-shaped exhaust opening (just ahead of tail).

► **Incentive Plan**—Along with the merger, Convair has devised a new incentive compensation plan for its employes along the same lines as that used by General Dynamics. It would be retroactive to Nov. 30, 1953.

No profit sharing will be made under the plan until after 6% has been earned upon capital after taxes. The plan provides for distribution in each year of a maximum of 5% of the profits before taxes after deducting an amount after taxes equal to 6% return on capital employed.

► **Salaries**—Aggregate salaries paid Dynamics officials during 1953:

Hopkins, $123,784; J. Geoffrey Notman, senior vice president and president of Canadair, $88,400; Lawrence B. Richardson, senior vice president and vice chairman of the board, $48,520; O. Pomeroy Robinson, Jr., senior vice president, $43,200; Pace, $36,648.

In addition to the above salaries, the officers received as Convair directors (since 1953); Hopkins, $7,474; Notman, $3,224; Richardson, $4,974; Robinson, $5,224; and Pace, $5,724.

AF Goal Is Quality, Lewis Tells SAE

U. S. Air Force has reached its desired numerical strength and now is concentrating on quality and readiness, Assistant AF Secretary Roger Lewis told the Society of Automotive Engineers National Aeronautic Meeting in New York last week.

He said this shifts the aircraft industry's emphasis to reliability, quality and deliveries "at the right time and in the right quantity."

► **Tool Expansion**—Roy T. Hurley, chairman and president of Curtiss-Wright Corp. and sponsor of the SAE Aeronautic Production Forum, emphasized the need for government cooperation in tool expansion programs necessary to keep abreast of aircraft design progress and to meet emergencies.

He said stockpiling outmoded machine tools of World War II vintage is a mistake. These should be junked, he added, and new ones bought to replace them, with allowance permitted for accelerated depreciation on a major portion of the tools within five years.

► **Up-to-Date-Status** — Curtiss-Wright should be spending about $10 million per year on new machine tools, he reported, and would do so if tax legislation were passed sufficiently liberalizing depreciation.

Hurley maintained that a plant should be equipped with modern equipment, operated on a 40-hr., single-shift basis and be able to switch over to a three-shift, six-day operation without any considerable reorganization as a result of its up-to-date machine status.

Copter Line Wins High Mail Rate

But Board voices concern over NYA'S subsidy need, plans periodic reviews; Pioneer also gets final pay.

By Frank Shea, Jr.

Civil Aeronautics Board, continuing to push settlement of outstanding mail pay cases, has established final rates for two more airlines:

• **New York Airways**—For transportation of mail over its entire system from Oct. 15, 1952, through Dec. 31, 1953, will receive $1.35 million, equivalent of $3.78 per revenue plane-mile flown in scheduled service.

• **Pioneer Airlines**—For continued transportation of mail over its system from Oct. 12, 1953, will receive an effective rate per designated mile flown of 45 cents multiplied by the ratio of scheduled miles operated during each month (not in excess of 9,000 mi. times the number of days in the month) to the designated miles flown. Pioneer is scheduled to merge with Continental Air Lines (Aviation Week Mar. 8, p. 7).

▶ **High Subsidy**—In setting the rate for NYA, first scheduled helicopter airline in the U. S., CAB admits concern over the high subsidy requirement, noting that it far exceeds original estimates. For this reason, a periodic re-evaluation of the helicopter experiment is planned by the Board to "assess subsidy requirements in terms of benefits derived." This will encompass the operations of Helicopter Air Service of Chicago and Los Angeles Airways, as well as NYA.

Despite NYA's high subsidy requirement, CAB says the copter lines accomplishments thus far are worthy of commendation in view of the highly developmental character of helicopter operations.

NYA's temporary five-year certificate authorizes passenger, cargo and mail service over the following routes:

• **Airport triangle,** from La Guardia to Newark and Idlewild Airports and a point in mid-Manhattan.

• **Northern route,** between La Guardia Airport and Bridgeport, Conn., via various intermediate points in Westchester and lower Connecticut.

• **Southern route,** from Newark Airport to Princeton and Asbury Park, N. J., via intermediate points.

• **Eastern route,** between La Guardia Airport and Hicksville, N. Y., via intermediate points.

• **Western route,** between Newark Airport and Patterson and Morristown, N. J., via intermediate points.

At present, passenger operations are limited to service between the three New York airports. Mail and cargo service is in effect on the northern and southern routes as well as between the three airports.

Service over the eastern and western routes has not yet been inaugurated, nor has the carrier introduced operations directly into Manhattan. Chief difficulty with regard to Manhattan service has been location of a suitable helicopter landing site adjacent to the business district with an over-water approach. (Aviation Week Sept. 14, 1953, p. 115).

▶ **Copter Record**—Using five Sikorsky S-55s, NYA transported 42,736 ton-miles of mail and 4,121 ton-miles of passengers and freight at an average load factor of 29.2% during the subsidy review period.

Average fleet utilization during this period was equivalent to 3:48 hr. per day. Although this figure is substantially below levels obtained by operators of fixed-wing aircraft, CAB holds that it is not unreasonably low for the type operations performed by the New York helicopter line.

The Board says the airline's route structure entails extremely shorthaul operations, by fixed-wing standards, and the schedule pattern has in a large part thus far been tailored to requirements of the postal service that calls for reduced service on weekends and holidays.

▶ **Pioneer Rates**—In a show-cause order establishing Pioneer's subsidy rate, CAB stipulates that in no month shall the amount of mail pay computed be less than:

• Amount obtained by multiplying the service rate established for transportation of mail by the ton-miles of such mail carried during the month.

• Amount obtained by multiplying the service rate established for transportation of classes of mail other than first-class by the ton-miles of such mail carried during the month.

All ton-miles are to be computed on the basis of direct airport-to-airport mileage between points served for mail carriage, CAB says.

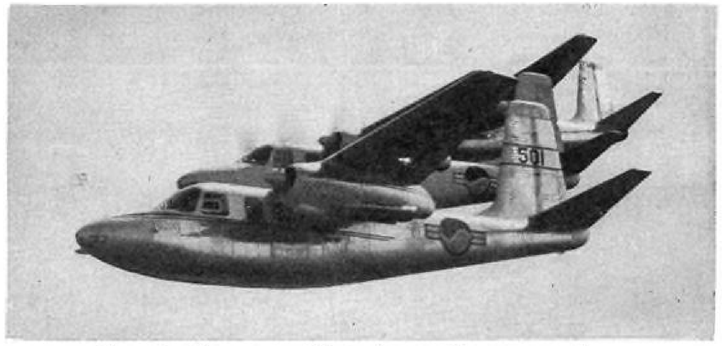
▶ **Inadequate Rate**—The Pioneer proceeding was instituted before the Board on Oct. 12, 1953, when the airline filed a petition holding that the originally established final mail rate no longer was adequate.

Pioneer said its mail pay requirements had increased because of increased operating expenses and a reduction in commercial revenues. The airline had forecast that it would schedule 3,689,710 mi. over its system during 1954 at a performance factor of 99% actually flying 3,652,813.

The Board holds, however, that based on Pioneer's operating experience from October through January and current schedules on file, it appears that the carrier will schedule only 3,497,117 mi. for 1954 at a performance factor of 99.08% resulting in operation of 3,464,944 plane-miles.

At this reduced volume of mileage, says CAB, it is reasonable to anticipate, in light of Pioneer's forecast and results to date, a load factor of 48.30% during 1954, equivalent to 10.14 passengers per mile.

With this adjusted schedule pattern and passenger load factor, the Board concludes that all of the airline's projected mileage is required in the inter-



South Koreans Get Aero Commanders

These three twin-engine Aero Commanders, bearing South Korean air force insignia, recently were flown from Aero Design & Engineering Co.'s plant at Oklahoma City, Okla., via the circuitous North Atlantic route to Korea by Fleetway, Inc., a ferrying organization. The South Koreans will use the planes for transportation of government officials as well as military liaison work. The transports are the first twin-engine planes to carry South Korean air force markings, a government official reports.

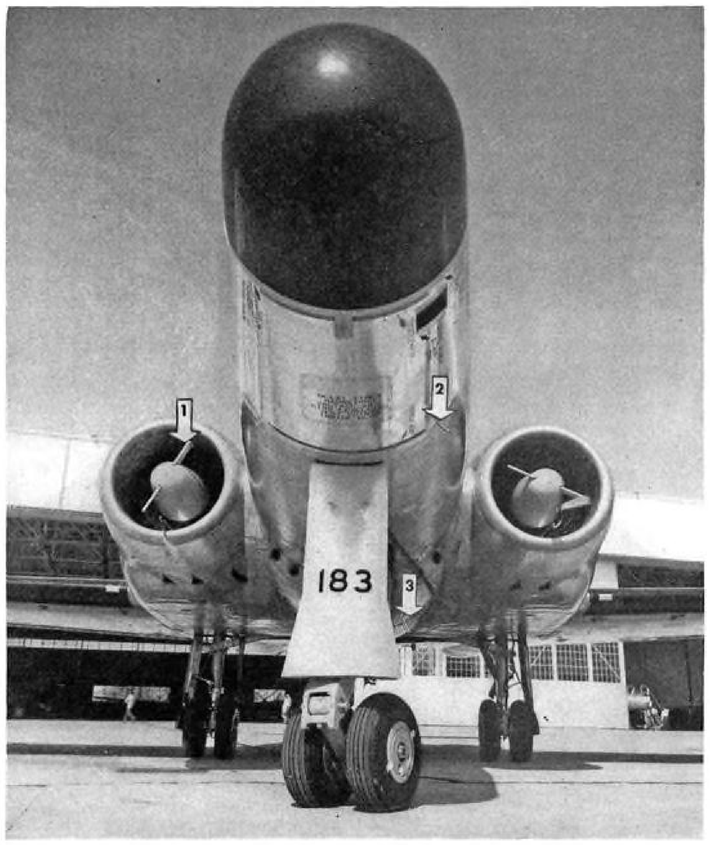
est of one or more objectives of the Civil Aeronautics Act.

►**2-0-2s vs. DC-3s**—CAB points out that, inasmuch as Pioneer's operations were conducted with Martin 2-0-2 aircraft for a year and a half prior to beginning of this final rate proceeding last October, such experience was not of significant assistance in development of the rates proposed for DC-3 operations. The airlinen ow flies 10 DC-3s.

In the last Pioneer mail rate case (AVIATION WEEK Mar. 23, p. 73), the Board found that the maintenance and development of local air transportation over the carrier's routes did not warrant replacement of its fleet of DC-3s with 2-0-2s and, as a result, it was decided not to support operation of such aircraft.

Accordingly, CAB held that it would establish a mail rate suitable for service with the DC-3 fleet. In other words, for mail rate purposes, the Board declined to recognize the impact of Pioneer's decision to convert to a 2-0-2 operation and established final rates on the assumption that there had not been any change in equipment.

►**2-0-2 Profit**—CAB emphasizes that, consistent with the principles applied in refusing to recognize the 2-0-2 operation, Pioneer was permitted to retain the profit of approximately $950,-



Business End of Mark 4 CF-100

A. V. Roe-Canada Mark 4 CF-100 interceptor, now going into multi-squadron service with RCAF, has radar fire control system package extending forward from junction of nosewheel fairing with fuselage. Plane's radar package (APG-40) is built by Hughes Aircraft Corp., Culver City, Calif. Other details: aerodynamically operated perforated booms (1) projecting from bullet nose in engine air inlet are used to spray intake screen with alcohol to prevent ice-over, which could cause engine failure in 60 sec. Sensing unit (tagged with flag) for spray radar system is seen jutting from bottom of nacelle. Another sensing unit (2) is hooked to electrically operated wing deicing system, which includes leading edge parting strip that "cuts" ice for breakway. Fins (3) projecting down behind eight-gun pack serve to deflect shells, thus avoiding damage to skin. Rocket pack (not visible) is located behind gun pack.

000 realized on the sale of DC-3s to Air Force.

Normally, such profit would constitute "over revenue," which would have been utilized to reduce the subsidy in the final rate. Because the entire 2-0-2 operation was ignored and continued operation of DC-3s assumed, the Board held that such profit was not properly available as "other revenue" in reduction of the carrier's need.

The carrier has since sold its 2-0-2s, and now operates DC-3s exclusively.

Republic Sales Drop; Fairchild Sets Record

Republic Aviation Corp.'s sales during 1953 dipped slightly to $411,810,885, compared with $412,235,088 the previous year, the firm's annual report reveals.

Net income, however, increased to $8,314,301 from 1952's $8,096,001. Included in last year's income was $700,000, estimated to be due Republic when negotiations on F-84 Thunderjet contracts are completed.

► **Record Earnings**—Fairchild Engine & Airplane Corp. reports last year's sales and earnings were the highest in its history.

Sales increased to $170,135,266, compared with the previous year's high of $141,642,703. Net earnings after federal taxes climbed to $4,013,541 from $3,148,621 in 1952.

(Sales and backlogs of other major aviation firms were presented in Aviation Week Apr. 12, p. 21).

► **22,000 Planes**—At the start of 1954, Republic Aviation was nearing delivery of the 22,000th plane built by the company since its inception, including 15,329 P-47 Thunderbolt piston-engine fighters and 4,457 F-84 Thunderjets, last of which was delivered July 29, 1953. The last F-84 went to the Turkish air force.

Republic's Guided Missiles Division last year was handling preliminary design, systems feasibility and operations analyses under military contracts, the company says, and its missiles facilities are to be expanded this year.

► **Volume Production**—Fairchild's Aircraft Division last year started volume production of outer wing panels and vertical fins for the Boeing B-52A Stratofortress eight-jet bomber and is continuing experimental work with the Fairchild XC-120 Packplane.

Output of C-119s will continue at reduced levels through 1954 and 1955, and the Chase-designed C-123 is to be turned out on parallel assembly lines.

The Engine Division has received a prime production contract from the Atomic Energy Commission for equipment to go to AEC's processing facilities. Reduced output of components

for General Electric Co.'s J47 jet engine partially was balanced by increased production of Fairchild's J44 and prototype work on components of new USAF engines scheduled to replace the J47 over the next few years.

Fairchild's Guided Missiles Division has begun production of a highly classified new missile and received a contract for another missile last year. The division also is handling evaluation of missile problems and missile weapons systems.

Fairchild notes it is handling a whole range of underwater propulsion projects "unlike any other existing" in U. S.

Magnuson Is Slated To Succeed Johnson

Sen. Warren Magnuson will become ranking Democrat on the Senate Interstate and Foreign Commerce—and chairman in the event of a Democratic Senate—on the retirement of Sen. Edwin Johnson.

Johnson, who has been active in the Senate on civil aviation affairs over the past few years, formally declared that his decision not to seek re-election this year is "irrevocable" (AVIATION WEEK Jan. 11, p. 11). He is a veteran of 18 years' Senate service.

► **Blocked Bill**—Magnuson proposed the appointment of Joseph Adams to Civil Aeronautics Board. Over the past eight years, he has concentrated on merchant marine affairs. Upon his election to the Senate in 1944, however, he led a drive to block enactment of legislation establishing an "all-American flag line" to monopolize U. S. overseas air transportation.

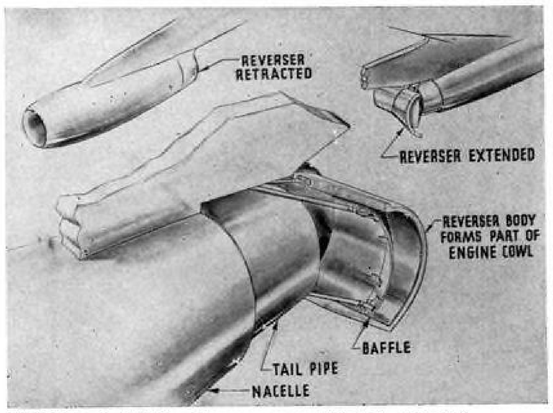
During six years service in the House, Magnuson was active in commercial aviation and Naval Aviation as a member of the old Naval Affairs Committee. Representing this committee, he opposed the move led by present Speaker of the House Rep. Joseph Martin and the late Rep. Jack Nickols to set up a separate standing aviation committee.

Douglas Receives $150,000 Salary

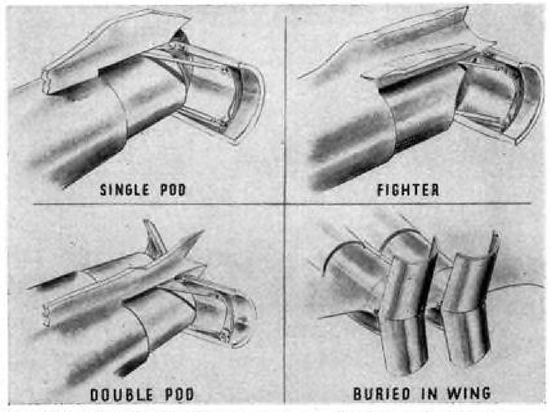
Donald W. Douglas, president of Douglas Aircraft Co., received a $150,174 salary in 1953, a report to Securities & Exchange Commission reveals.

Other salaries reported to SEC: F. W. Conant, senior vice president and director, $93,848; Donald W. Douglas, Jr., vice president and director, $37,923; Frederick E. Hines, vice president-tax counsel, $34,481; Nat Paschall, vice president, $32,404; and Arthur E. Raymond, vice president, $70,685.

Combined salaries of all officers and directors totaled $702,075.



TYPICAL installation shows reverser extended, retracted.



REVERSER SCHEMES seen for pod, fuselage and wing jets.

Boeing Studies Reveal that . . .

Jet Thrust Reverser Is Safe, Practical

Device does not change turbojet operating characteristics and minimizes effects of uncontrolled reversals, SAE hears.

First details from an American manufacturer on the feasibility of reverse thrust for assisting in the landing deceleration of jet transports have been revealed by a Boeing Airplane Co. engineer.

These details indicate:

• **A practical jet reverser** installation can be available in the near future to give jet-type planes the operational flexibility of present-day reversible-propeller-equipped aircraft. It will probably be a clamshell type.

• **Jet-reverse is adaptable** to a wide variety of engine installations, will not decrease engine fuel economy.

• **An inherently safe and reliable** installation results from separation of the reverse thrust system from the forward thrust system. With this separation, consequences of reverser failure are considerably less severe than comparable failure of reversible-type propellers. Even the most critical type of jet reverser failure will result in conditions only slightly more severe than a simple engine failure.

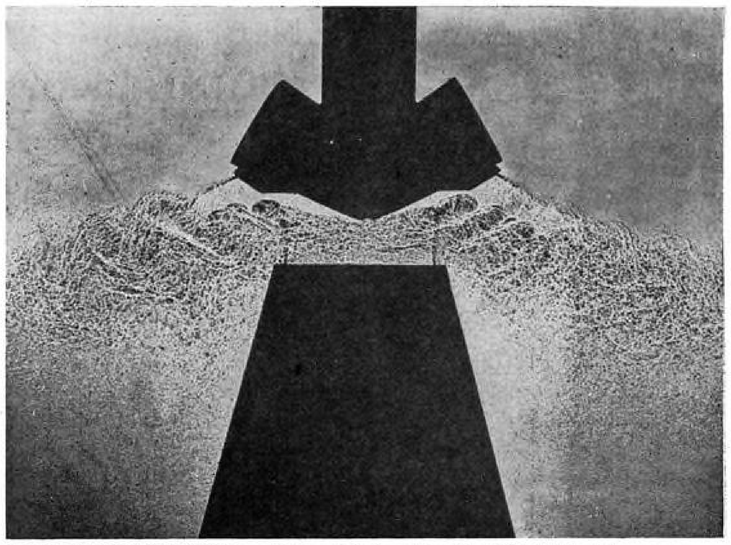
• **A small increase in weight** will be necessary to obtain the operational flexibility available from reverse thrust.

► **Pistons and Jets**—These are the opinions of Boeing Airplane Co.'s Joseph Sutter. He analyzed and compared reverse thrust requirements for jet and piston transports during a discussion of design work and testing of jet reversers, before the recent National Aeronautic Meeting of the Society of Automotive Engineers in New York.

Top Boeing officials have told AVIATION WEEK (Mar. 29, p. 22) that production versions of their new jet transport, the 707, will be equipped with thrust reversers.

Presumably, Boeing's B-52 and B-47 bombers will also get the devices.

Sutter points out that for the present-day piston-powered transport landing on a minimum-length, dry, concrete runway, an adequate margin in stopping distance exists using brakes only. On an icy runway, a large part of this margin is used up. Application of reverse thrust after landing on an icy runway, plus use of brakes, gives a margin in stopping distance which is more than equal to that achieved on a dry runway using brakes alone.



BLAST SHADOWGRAPH reveals how tailpipe exhaust is deflected by jet reverser.

Fairly complete design studies show that a well-balanced jet transport will be able to land and stop in the same distance as contemporary transports on a dry runway, Sutter says. But any future jet transport, since it will be required to operate during all types of weather and runway conditions, also will have to incorporate additional stopping devices, as does the piston-powered counterpart.

► **Drag Chutes**—Of several methods developed to improve stopping capabilities of planes without propellers, Sutter claims that one of the most noteworthy is the drag chute.

Though quite successful in military operations, this device has limitations which cut operational flexibility. One of these limitations is that outside facilities are required to handle a chute once it is deployed. Another disadvantage is that the chute must be deployed quite close to touchdown to be fully effective, since the drag effect is a function of airspeed.

The chute becomes least effective near the lowspeed end of the ground roll, which may be the point at which maximum braking is needed, Sutter claims.

Study of various stopping methods brought the conclusion that reverse thrust would have to be developed for jet engines if jet transports were to have the operational flexibility of present-day transports.

► **Boeing Aims**—Boeing's program to develop a jet reverser began with the establishment of a set of design objectives. Most important of these aims:

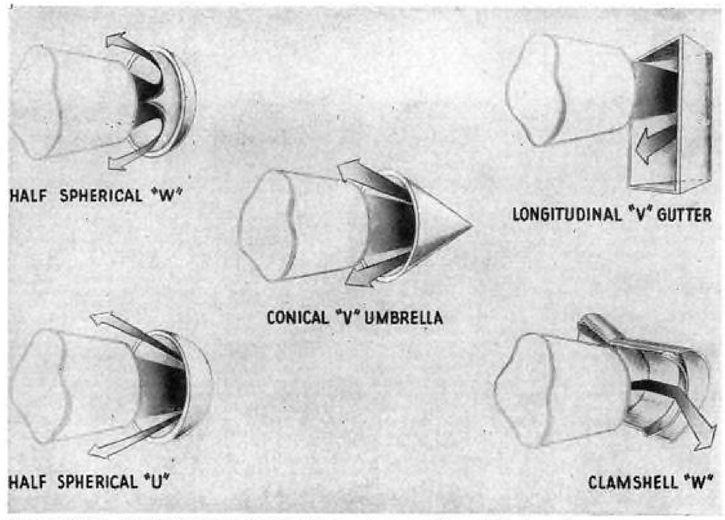
• **Safety and reliability.** These characteristics are to be attained through basic design and simple structural features. Use of electronic controls and intricate protective devices is avoided.

• **Operational flexibility** comparable to present transport equipment. This would be achieved if, on an icy runway, the plane could be stopped with brakes and reverse thrust in the same distance it could be stopped with brakes alone on a dry runway. Analysis indicates reverse thrust of about 40% of maximum forward thrust is required to meet this objective, Sutter reveals.

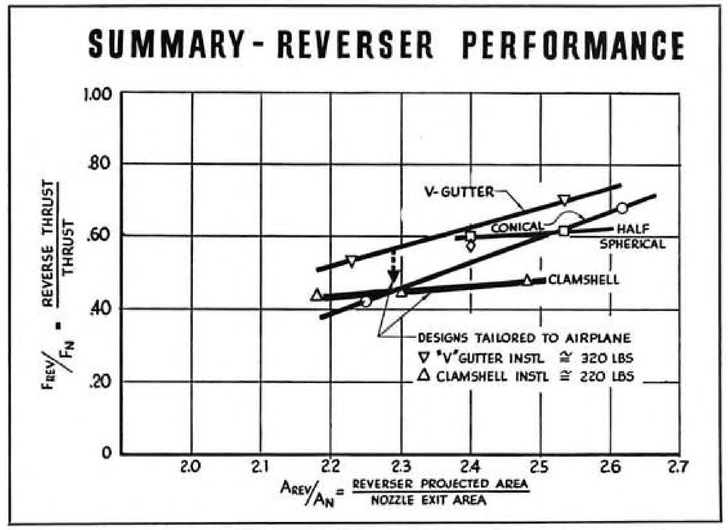
• **Use for ground run control only.** Because the basic glide path control of a jet transport can be quite satisfactory, inflight reverser operation is ruled out. This insures the simplest device possible, Sutter says.

• **Engine economy** should not be affected by the reverser when the latter is not in operation. Another requirement is that the reverser should not adversely affect engine life or engine control characteristics when in operation.

Requirements of safety, reliability, and independence of the reverser from the basic engine indicated that the device would have to be completely out of the jet blast during normal engine operation.



REVERSER CONFIGURATIONS Boeing tested. Clamshell showed most promise.



REVERSER CONFIGURATIONS Boeing tested. Clamshell showed most promise.

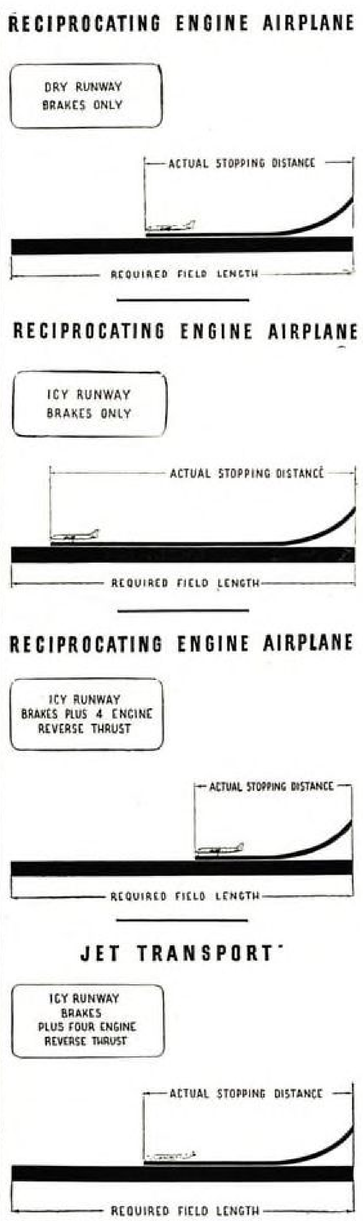
► **Shapes and Types**—Many shapes of reversers were tested in Boeing's nozzle test facility, some as early as 1951. Some of the reverser configurations tested are illustrated above. The tests of these configurations showed that about 45 to 50% reversal of the jet blast is possible with units that could reasonably fit into the space available near the engine tailpipe.

As design and testing progressed, the clamshell type of reverser showed the greatest promise from a standpoint of meeting the design objectives, mechanical simplicity, installed weight, and airplane stowage, Sutter says.

► **Mainly Clamshell**—Sutter's analysis primarily concerns itself with the clamshell reverser, but he reveals that considerable design effort also has been expended in developing the V-gutter type. His conclusions on reversers are applicable to either the clamshell or the V-gutter types.

Details of the clamshell type are shown in accompanying illustrations showing various airplane-engine combinations. The reverser configuration lends itself to all the airplane installations illustrated.

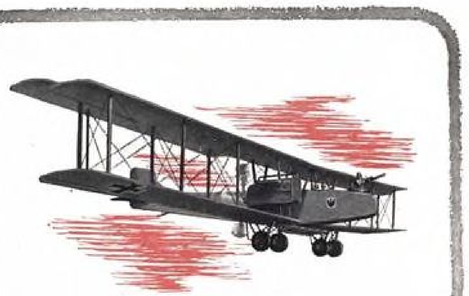
Shadowgraphs obtained of the reversed jet blast show that reverser effec-



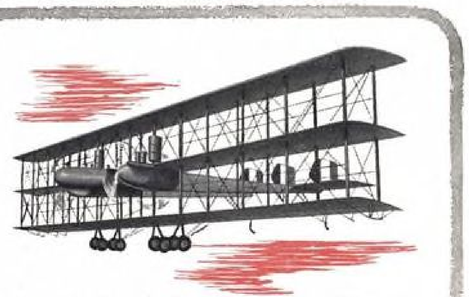
STOPPING DISTANCES for piston and jet transports are illustrated for various runway conditions and braking applications.

tiveness is proportional to the deflection angle of the blast. Also, the blast clears the adjacent structure by a considerable margin.

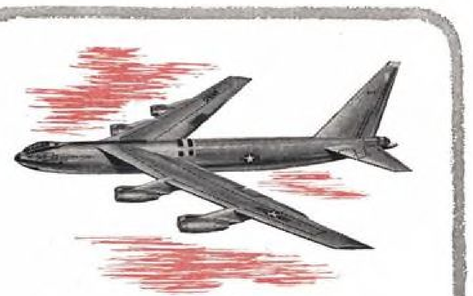
Further work is proceeding to determine the effect of the reversed blast on other areas of the airplane. Debris pickup characteristics of the blast also are being checked, Sutter says. These effects will be influenced greatly by



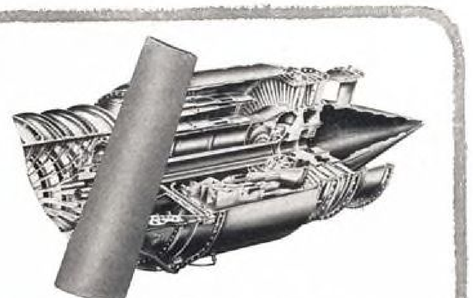
(1) German Bomber



(2) Italian Bomber, Vintage World War I



(3) A new U. S. Army Bomber



(4) Cut-away of a powerful jet engine

WHO'S WHO in aviation progress...

CAN YOU IDENTIFY THEM?

The bombers in panels 1 and 2 were fearsome objects in World War I . . . but they are babes in the woods compared to the powerful B-52 (panel 3). You may recognize the old timers as the (1) German Zeppelin "Giant" and (2) the Caproni Triplane. These were truly giants in their day, but all their engines combined couldn't produce half the power that the J-34 Turbo-jet engine (panel 4) does. This Westinghouse Electric power plant utilizes Microcast blades . . . precision cast from special alloys which can withstand the tremendous heat of the modern jet engine.

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FAILURE ANALYSIS ··· CRUISE

REVERSIBLE PROPELLER

	Condition	Severity Factor
1.	POWER FAILS PROP FEATHERS	1.0
2.	POWER FAILS – PROP TO LOW PITCH STOP	3.2
3.	POWER FAILS – PROP TO FLAT PITCH	15.0
4.	PROP FAILS – POWER NORMAL – PROP TO REVERSE PITCH	5.3

JET REVERSER

	Condition	Severity Factor
1.	POWER FAILS REVERSER RETRACTED	1.0
2.	REVERSER EXTENDED ENGINE NORMAL	2.1
3.	POWER OFF REVERSER EXTENDED	1.3

FAILURE ANALYSIS ··· TAKEOFF

REVERSIBLE PROPELLER

	Condition	Severity Factor
1.	POWER FAILS PROP FEATHERS	1.0
2.	POWER FAILS – PROP TO LOW PITCH STOP	1.2
3.	PROP FAILS – POWER NORMAL – PROP TO FLAT PITCH	2.5
4.	POWER OFF – PROP TO FLAT PITCH	1.9
5.	PROP FAILS – POWER NORMAL – PROP TO REVERSE PITCH	1.4
6.	POWER OFF – PROP TO REVERSE PITCH	1.3

JET REVERSER

	Condition	Severity Factor
1.	POWER FAILS REVERSER RETRACTED	1.0
2.	REVERSER EXTENDED ENGINE NORMAL	1.55
3.	POWER OFF REVERSER EXTENDED	1.05

CRUISE, TAKEOFF ANALYSES made by Boeing show results of failure conditions for reversible propellers, jet reversers. Severest prop conditions exceed jet's.

each particular airplane design, he claims.

►**No Ill Effect**—Engine characteristics during normal forward thrust operation are not affected by the clamshell or V-gutter reversers because no part of the device extends into the jet blast. Sutter reveals that scale model tests simulating the reverser have shown that engine accelerating characteristics are not affected.

Also, engine operating conditions are not changed, because the effective tail-pipe area is unchanged at normal pressure ratios corresponding to full power.

A reverser, plus brakes, could give a typical jet transport the ability to stop on smooth ice in about three-fifths of the required field length, thus would meet one of the main objectives of the design—that jet transport stopping capabilities under all conditions would be consistent with the dry-runway, brakes—alone stop.

Sufficient progress has been made, Sutter reveals, so that a fairly detailed airplane installation can be developed. Estimates indicate that a four-engine installation would weigh about 800 lb., a two-engine installation about 400 lb. With extensive development and operating experience, this weight undoubtedly could be cut, Sutter says.

►**Severity Factor**—In the evaluation of

the safety and reliability aspects of the jet reverser, it was felt that the device should be at least as reliable as the reversible propeller in its present state of development, Sutter says. A failure analysis was made in which the two reversing systems were compared. All conceivable types of failure were considered which could be attributed either to the reversible propeller or the jet reverser.

To provide a common basis of comparison, the results of the analysis were referenced in terms of a "severity factor." A severity factor of unity means that for that particular combination of airplane, flight condition and failure, the effect of the failure would be the same as if a single engine failure occurred.

A severity factor of two, Sutter explains, would mean that the failure effect would be as severe as losing twice the thrust of one engine.

► **Takeoffs Analyzed**—Reversals occurring during takeoff and cruise were analyzed, with results as shown in the accompanying tabulations. The situation for takeoff is with the airplane near the "unstick" point.

Condition 2 given for the propeller case is shown as a reference point, since it represents the most severe failure which could occur if reversing were not incorporated in the propeller system, Sutter says.

Condition 3 represents the first failure condition involving the reversing feature, and is the most critical condition. Not only is the effect on performance and control very severe, being of the order of magnitude comparable to a double engine failure at takeoff, but a very high propeller overspeed would result, Sutter points out.

Condition 4 shows that cutting the power on the engine would alleviate the situation, but only slightly, since most of the drag is produced by the high induced lift of the blades in flat pitch rotating at high rpm.

Conditions 5 and 6 show that if the propeller passes through the flat blade condition, the reversed propeller condition is somewhat more tolerable. However, the condition is still 30% to 40% more critical than a single-engine failure where the propeller feathers, Sutter says.

For the jet reverser, condition 2 represents the most critical failure which can occur with this system. With the engine operating normally, the reverser extends fully into the jet blast. This type of failure is 1½ times as severe as a single engine failure, according to the Boeing engineer.

The effect of cutting power on the engine with reverser failure is shown in condition 3. Since the reverse thrust is directly a function of engine power, consequences of the failure can readily

be reduced by cutting the power.

► **Cruise Analyzed**—In the failure analysis shown for the cruise condition, condition 2 represents the most severe case for a propeller-driven plane not equipped with reverse thrust. This condition, Sutter says, would result in a large reduction in cruising speed to reduce windmilling drag and propeller overspeed.

Condition 3 represents the most severe failure with a reversible propeller. This would give a very high overspeed condition as well as a critical performance and control condition.

Condition 4 shows that after passing through flat pitch, the reversed propeller condition is still somewhat more critical than the low pitch stop condition.

With respect to cruise, the most severe jet reverser failure is that where the reverser extends fully into the jet blast with power on the engine—condition 2. By reducing power the reverser failure can be reduced in severity to become only 30% more severe than a simple engine failure.

► **Basically Safe**—This analysis indicates that the jet reverser offers a basically safe method for providing reverser thrust at the proper time. At the same time, the consequences of uncontrolled reversal which might occur as a result of malfunction are minimized.

The fact that engine throttling is a positive and effective method of further reducing the consequences of failure appears to be one of the attractive features of the jet reverser, Sutter claims.

He emphasizes that the failures analyzed have a very low incidence rate, judging by experience gained with reversible propellers during the last few years, but points out that there are failures that can happen if various serious malfunctions occur.

With the reversible propeller, systems which must operate continuously during normal flight also are used to control the reverse thrust cycle. Hence, exposure to malfunctions exists during the entire flight, Sutter notes.

The jet reverser and control, he says, are separate from the basic forward thrust system. For this reason, the system can be effectively disarmed, except when reversal is required. Exposure to malfunction, he says, can be reduced greatly.

ARDC Dedicates New Aircraft Weapons Lab

Eglin AFB, Fla.—Air Research and Development Command has dedicated its new Andrews Engineering building, which will serve as headquarters and engineering laboratories for the AF Armament Center here.

The $1.6-million building, named for

Lt. Gen. Frank M. Andrews, together with other buildings and precisely instrumented firing ranges now nearing completion will provide facilities for quantative evaluation of new aircraft armament (AVIATION WEEK Aug. 17, p. 210).

USAF officials—including Gen. Edwin W. Rawlings, commanding general of the Air Materiel Command; Maj. Gen. James McCormack, Jr., ARDC deputy commander, and commanding generals of other major ARDC centers—witnessed demonstrations of new weapons, many of them still highly classified, during the ceremonies.

► **Future Security**—"The future security of the nation may well depend upon weapons which will be evaluated here," Maj. Gen. P. W. Timberlake, commander of Eglin Air Proving Ground, said. He officially transferred the Andrews building to Brig. Gen. Edward P. Mechling, AFC commander. Timberlake admitted that " in certain fields of armament, progress has not kept pace with AF needs."

AFAC guests also witnessed a demonstration of newly completed air-to-ground rocket ranges that will be used to test gun and rocket fire control, dive and toss bombing systems. Another range, nearing completion, is the rocket ballistics test site where rockets will be fired from a rocket-propelled sled moving at high speeds along a launching track.

► **Data Reduction Problem**—AFAC firing range instrumentation largely is photographic because previously available automatic tracking radars lacked sufficient accuracy, making data reduction a time consuming process. Approximately 12 hours are required to produce useful data from a 30-second test run.

AFAC plans to evaluate the suitability of the tracking radar developed for the Nike missile. If this, or other types of automatic trackers can be substituted for photo recording, automatic data reducers can be used to greatly speed the process.

Researcher Spends 56 Hours in Cockpit

What's it like to spend 56 hours in a noisy cockpit?

Not too bad, says Charles Dempsey, civilian employe of Wright Air Development Center. After the 56-hr. test conducted as a phase of the Center's aeromedical work, he left the grounded cockpit and watched television before going to bed for the first time in three nights.

Dempsey volunteered for the test, which was aimed at finding out how long a man could sit in an aircraft cockpit and what improvements could be made in the equipment to make him more comfortable and efficient.

► **Reflexes Measured**—Dempsey was instrumented to transmit his brain waves, heart action, condition of his supporting muscles and galvanic skin action to recording apparatus in an adjacent building.

Other instrumentation was used to check his fatigue level and reflexes and reaction times.

One example: During the test he was required to observe a rotating drum with a mounted arrow. When the arrow reached a zero mark, Dempsey pressed a button. His reaction time was recorded.

Another example: Eight times every hour, but at irregular intervals, fellow scientists in an adjacent building pushed a button to flash a red light in the cockpit. Dempsey had to push a button to shut off the light, and that reaction time was noted.

Radio communication was maintained at all times between the grounded airplane and four other scientists and engineers of WADC. A noise level of 115 decibels was maintained in the cockpit to check the effect of that noise—comparable to that in a jet aircraft in flight—on fatigue.

► **Instruments and Apparatus**—The plane used for the tests was set up out-

side one of the buildings of the Aero Medical Laboratory.

Dempsey wore the complete pilot's regalia: Mark IV liner, Mark IV exposure suit, P-3 helmet, oxygen mask, gloves, long underwear, rubber boots and wool socks. Outside temperatures were sub-freezing, and Dempsey had to control the heat to stay comfortable.

In addition to the usual pilot equipment, Dempsey had two electrodes attached to his head, one to his chest and one to his back. These were linked to an electroencephalograf and an electrocardiograf inside the laboratory.

During the test, Dempsey's diet was liquids only. He napped at times, but most of the period had to keep his hand on the throttle and watch for signals.

Helicopter Congress

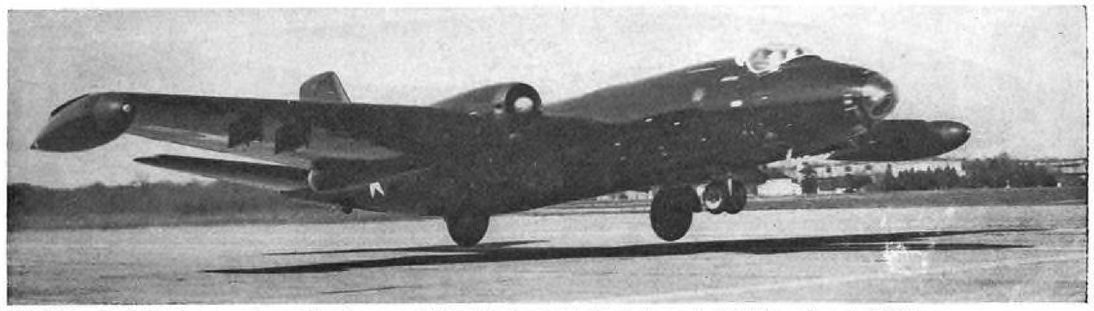
Rome—Use of helicopters in calamity stricken areas will be the main topic at the forthcoming Third International Congress of Vertical Flight, to be held at San Remo Apr. 24-26.

Airport Fog Dispersal

Rome—The Italian Army Aeronautic Service is testing the possibility of dispersing fog at airports by burning methane gas. The trials, which have not been completed, are being conducted at Milan Airport.

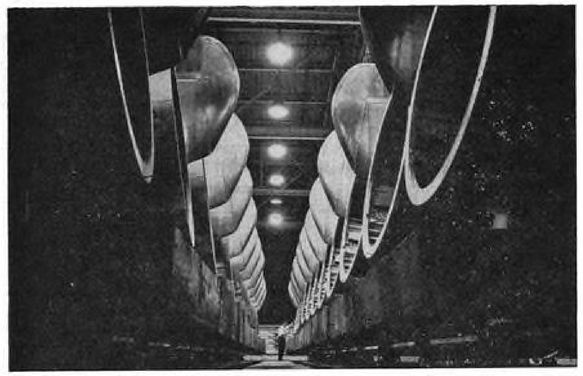
Inerts Fuel Tanks

Explosimeter readings in the hands of the man at the right show that the fuel tank of this Northrop F-89 Scorpion has been completely inerted by use of wire mesh container filled with crushed dry ice (held by man in the center) and suspended in the fuel tank a filler neck. CO_2 released by the dry ice "melting" is sufficient to inert any oxygen in the empty tank to the point where combustion within the tank cannot be supported, according to Northrop Aircraft, Inc., engineers who developed the device. The plane manufacturer has awarded an exclusive license to the Standard Safety Equipment Co. of Chicago to manufacture and market the explosion suppression device, named "Inertor."



MARTIN RB-57A jet reconnaissance bomber, on which deliveries to Air Force have started, takes off on test flight.

Martin Steps Up B-57 Deliveries to AF



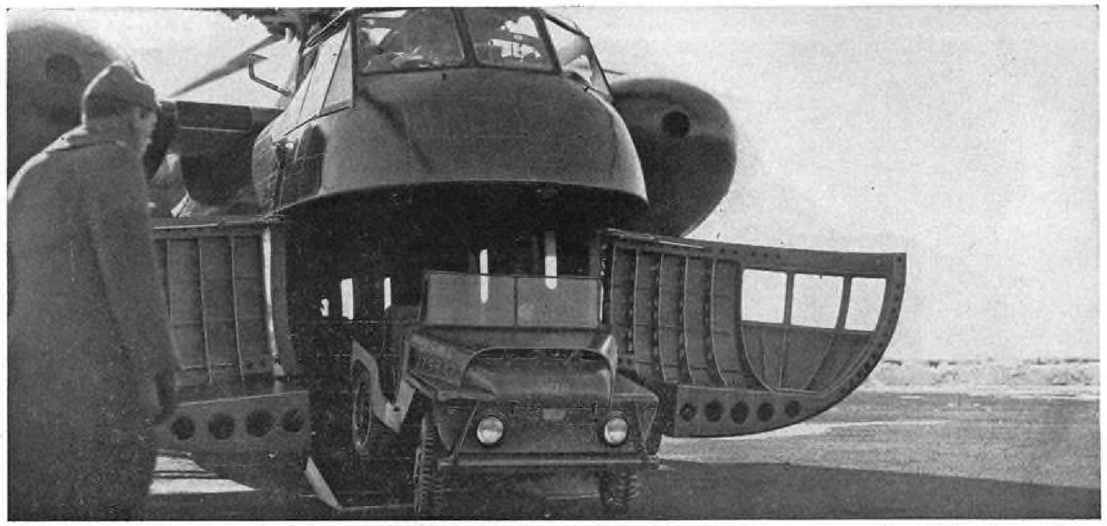
TAIL ASSEMBLIES and control surfaces are stacked on wheeled storage racks awaiting their turn to be fed into Martin B-57A production lines at the company's Baltimore, Md., factory.

NINE RB-57A reconnaissance planes undergo final ground tests on Martin ramp. First RB-57A went to 16th Tactical Reconn. Squadron at Shaw AFB. S. C.

MARTIN B-57A light bomber leaves U-shaped final assembly lines at night. Bomber deliveries began last August.

BIGGER PUNCH—Two squads of hard-hitting Marines—26 men with full battle equipment—charge out of this new Sikorsky helicopter's wide-open nose door in a demonstration of airborne assault techniques. The huge XHR2S was designed especially to meet the Marine Corps' need for a big, fast, highly maneuverable helicopter.

WORLD'S MOST POWERFUL HELICOPTER FLIES FOR THE MARINE CORPS



PRACTICAL DESIGN—Location of two R-2800 engines in high, outboard pods leaves the fuselage open and clear for passengers, vehicles or other cargo. Wide clam-shell doors and built-in ramp permit rapid loading and unloading. The helicopter compares in size to a twin-engined airliner. A commercial model, the S-56, will be built later.

BUILT FOR BATTLE—Sikorsky Aircraft's rugged XHR2S, the most powerful helicopter now flying, was designed to carry out modern vertical assault tactics. It has flown with over 6,500 pounds of payload, and at speeds well over 150 m.p.h. with landing gear retracted into engine pods. Five-bladed main rotor and the tail both fold mechanically for easy stowage and handling aboard ship.

SIKORSKY AIRCRAFT

BRIDGEPORT, CONNECTICUT

One of the Divisions of United Aircraft Corporation

USAF Contracts

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

R. C. Allen Business Machines, Inc., 678 Front Ave., N.W., Grand Rapids, Mich., turn and slip indicators, 1,563 ea., $124,536.

Allison Div., General Motors Corp., Indianapolis, Ind., services and supplies for overhaul of XT40 series engines, $120,000.

Bell and Howell Co., 7100 McCormick Rd., Chicago, Ill., ball bearings, 360,000 ea., belt, spring, 9,600 ea., lens, 1,470 ea., $152,786.

Continental Motors Corp., Muskegon, Mich., engine containers, 94 ea., 106 ea., 206 ea., $86,339.

Douglas Aircraft Co., Inc., Tulsa, Okla., modification of additional B-47 airplanes, $4,500,000. Additional funds for the repair and rework of GFAE & GFP, $70,321.

Fairchild Aircraft Div., Fairchild Engine & Airplane Corp., Hagerstown, Md., increasing paragraph 5 of letter contract, $3,000,000.

General Electric Co., Schenectady, N. Y., generator, aircraft, 498 ea., 50 ea., 324 ea., $450,519.

Jam Handy Org., 2821 East Grand Blvd., Detroit, Mich., production of motion picture, Project 19129, $65,317.

Link Aviation, Inc., Binghamton, N. Y., spare parts for jet instrument trainers, $529,894.

Lockheed Aircraft Corp., Marietta, Ga., repair and rework of GFAE, $76,315.

Lycoming Spencer Div., Avco Mfg. Corp., Williamsport, Pa., spare parts for 0-435-17 engines, $136,150.

W. L. Maxson Corp., 406 W. 34th St., New York, N. Y., spare parts for K-4 computer, $100,000.

Minneapolis-Honeywell Regulator Co., 2600 Ridgway Rd., Minneapolis, Minn., altitude controls and mountings, 340 ea., automatic approach systems, 400 ea., $3,218,140.

Piper Aircraft Corp., Lock Haven, Pa., L-18C airplanes, 40 ea., spare parts, 1 lot, crating, 1 lot, $171,560.

A. O. Smith Corp., Milwaukee, Wis., facilities for the production of B-36 propeller blades, $90,000.

Wright Aero Div., Curtiss-Wright Corp., Wood-Ridge, N. J., J65 engine spare parts, $116,250.

Aero Service Corp., 236 E. Courtland St., Philadelphia, Pa., film development and mosaicking 4 areas, 300 ea., slides, terrain radar trainer, 25 ea., maps, plotting radar trainer, 50 ea., $85,151.

Chas. Beseler Co., 60 Badger Ave., Newark 8, N. J., projector, overhead, 1,234 ea., $211,014.

Boeing Airplane Co., Wichita, Kan., implementation of production of B-52 aircraft at a second source, $22,000,000; B-47 aircraft (overrun), $131,735.

Continental Aviation & Engrg. Corp., Detroit, Mich. Special tools and ground handling equipt. for R975 engines, $218,529.

Continental Motors Corp., 205 Market St., Muskegon, Mich., packette engine, 654 ea., spare parts, 1 ea., maint. data, 1 ea., $3,051,534.

Curtiss-Wright Corp., Electronics Div., Carlstadt, N. J., illustrated parts breakdown, $131,344.

Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., generator assy., 46 ea., generator, engine-driven, 56 ea., voltage reg. and mount. base assy., 39 ea., $62,522; spare parts, indicator, 904 ea., indicator, 368 ea., $157,544.

Electric Auto Lite Co., Toledo, Ohio, gauge, pressure, spare parts and data, $52,-298.

General Electric Co., Schenectady 5, N. Y., alternators, 388 ea., spare parts, maint. tools and test equipt., $555,180; indicator, tachometer, 687 ea., $64,825.

General Tire & Rubber Co., 1708 Englewood Ave., Akron, Ohio, wheel assy., 144 ea., spare parts and data, $30,627.

Goodyear Tire & Rubber Co., 1144 E. Market St., Akron 16, Ohio, wheel assy., 1,000 ea., brake assy., 525 ea., $47,324.

Warner News, Inc., Warner Bros., Inc., New York, N. Y., production of 35-mm. B-W motion picture project, changes, $47,606.

Navy Contracts

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

Adel Div., General Metals Corp., 10777 Van Owen St., Burbank, Calif., hydraulic valve assys., $130,472.

Air Associates, Inc., Teterboro, N. J., screw jack, 2,673 ea., $239,430; shaft, screw-jack, $33,243.

AiResearch Mfg. Co., Div. of the Garrett Corp., 9851-9951 Sepulveda Blvd., Los Angeles 45, Calif., actuator and maintenance parts for AD-1,-2,-3,-4,-5,-6 aircraft, $299,104; services and material to overhaul refrigeration units, $51,055; items for power unit, $32,689.

Atlas Paint & Varnish Co., 32-50 Buffington Ave., Irvington 11, N. J., paint, interior, white, 18,500 gal., $38,345.

Ampruf Paint Co., Inc., 10925 Schmidt Rd., P.O. Box 508, El Monte, Calif., paint, interior white, 21,500 gal., $46,820.

Bendix Products Div., Bendix Aviation Corp., 401 Bendix Drive, South Bend 20, Ind., maintenance parts for brake and strut assys., $98,296.

Thomas A. Edison, Inc., 51 Lakeside Ave., West Orange, N. J., relay panel control, 246 ea., $27,120.

Electrol, Inc., 85 Grand Street, Kingston, N. Y., items and spare parts for valves, 1,696 ea., $111,227.

Enmar, Inc., 1424 E. 25th St., P.O. Box 2153, Wichita 1, Kan., dope, cellulose nitrate, $48,904.

General Electric Co., 1405 Locust Street, Philadelphia 2, Pa., indicators, master directional, 691 ea., $816,935.

B. F. Goodrich Co., 112 19th St., N.W., Washington 6, D. C., airplane tires, 2,000 ea., $29,800.

Greer Hydraulics, Inc., 454 18th St., Brook-

lyn 15, N. Y., test stand for various aircraft components, 8 ea., $101,704.

Houdaille-Hershey Corp., 1500 Fisher Bldg., Detroit 2, Mich., damper assy., 56 ea., $35,897.

Lear, Inc., 110 Ionia Ave., N. W., Grand Rapids 2, Mich., maintenance parts used on various aircraft, $44,798.

Lord Mfg. Co., 1635 W. 12th St., Erie 6, Pa., maintenance parts and mount assys. for various aircraft, $218,571.

Maine Specialty Co., 98 Exchange St., Portland 3, Me., connectors, wire rope type, $29,025.

Mine Safety Appliance Co., 201 North Braddock Ave., Pittsburgh 8, Pa., mask, oxygen, Type A13A, for all jet aircraft, 10,441 ea., $189,508.

National Brief Case Mfg. Co., 512 S. Peoria St., Chicago 7, Ill., case, brief, navigational, leather, 3,749 ea., $44,403.

New York Rubber Corp., 100 Park Ave., New York 17, N. Y., kit, PK-2, 727 ea., $51,388.

North American Aviation, Inc., Columbus Div., 4300 E. Fifth Ave., Columbus 16, Ohio, maintenance parts for SNJ spares, $486,247.

Parker Aircraft Co., 5827 W. Century Blvd., Los Angeles 45, Calif., valves, hydraulic, $27,588.

Pesco Products Div., Borg-Warner Corp., 24700 N. Miles Rd., Bedford, Ohio, maintenance parts for pump assys., $104,418, $113,747.

Sherwin-Williams Co., 325 North Broad St., Philadelphia 7, Pa., enamel, 40,000 gal., $97,800.

Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J., ignition harness assy. for R1820-86 aircraft engine, 188 ea., $53,044.

Pratt & Whitney Aircraft Div., United Aircraft Corp., East Hartford 8, Conn., bearing, 1,148 ea., $110,323, items for J57-P7 engines, $56,842; parts for retrofit on P&W engines, $275,320, spare parts for P&W engines, $202,518.

Hamilton Standard Div., United Aircraft Corp., Windsor Locks, Conn., items for HSD propellers, $25,834.

United Aircraft Prods., Inc., 1116 Bolander Ave., Dayton 8, Ohio, valve assy., 315 ea., $49,698.

ARDC Contracts

The following contracts have been announced recently by Headquarters, Air Research and Development Command, Baltimore 3, Md.:

• **CENTURY ENGINEERS,** 2741 N. Naomi St., Burbank, Calif., pressure transducer calibrator, job, $49,936.

• **COLEMAN ENGINEERING CO.,** 6040 Jefferson Blvd., Los Angeles 16, Calif., study and development of dive angle control and position indicator, job, $140,265.

• **HASTINGS INSTRUMENT CO.,** Hampton, Va., digitalized readout equipment for Raydist thru Dimensional Tracking systems, job, $92,143; design and development of expendable Raydist missile transmitter, job, $48,794.

• **INDUSTRIAL RESEARCH LAB,** Hilltop and Frederick Rds., Baltimore 28, Md., accoustical firing error indicator improvements, job, $224,535.

• **UNIVERSITY OF WISCONSIN,** Madison 6, Wisconsin, expansion of work and extension of time for "Research on Flexible Gunnery Personal Problems," job, $97,446.

• **AEROJET GENERAL CORP.,** Azusa, Calif., research and reports on "Investigation of the Kinetics of Solid-Phase Reactions," $32,558.

• **CORVEY ENGINEERING CO.,** 1737 DeSales St., N.W., Wash., 6, D. C., research on "Analytical Studies," $25,000.

• **DUKE UNIVERSITY,** Durham, N. C., research and reports on "Microwave and Radio Frequency Spectrocopy," $99,427.

• **PENNSYLVANIA STATE COLLEGE,** State College, Pa., research and reports on "Theromodynamics Properties of Compounds," $25,200.

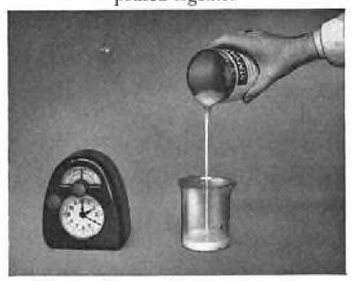
• **RAND CORP.,** Santa Monica, Calif., research covering "Intercontinental Warfare," $3,000,000.

Stafoam Offers Astounding Variety of Properties and Applications

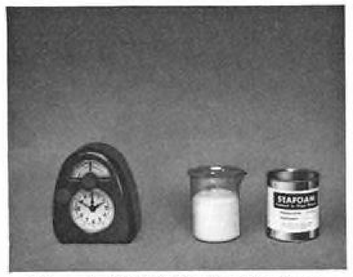
STAFOAM is the name applied to all foamed-in-place plastics manufactured by American Latex Products Corporation. It is truly a miracle material! Its applications are so varied, and the results obtained in extreme conditions are so gratifying that it will revolutionize many manufacturing methods and procedures. At present STAFOAM is produced in three major types: (1) Rigid Alkyd STAFOAMS, (2) Rigid Phenolic STAFOAMS, (3) Flexible Alkyd STAFOAMS.

The two liquid components are poured together

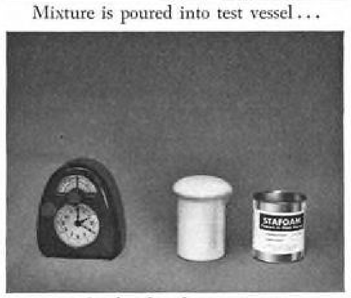
and mixed thoroughly for 20 seconds.



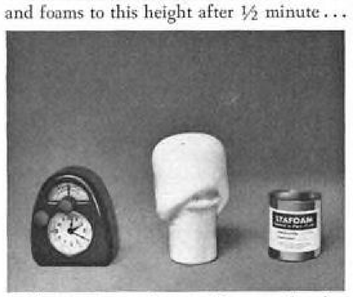
Mixture is poured into test vessel . . .



and foams to this height after ½ minute . . .



to this height after 1 minute.

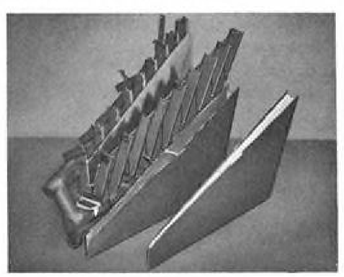


After 2 minutes, foaming has ceased and mixture has become rigid

Nothing can be simpler than to pour liquid into the cavity which is to be strengthened

Filling cavities with Rigid Alkyd STAFOAM does away with necessity for cutting and shaping a core and then painstakingly fitting other structural members around the core material. The parts and labor needed for such fabrication are also eliminated, together with the blueprints and engineering involved. Quickly-trained workmen can pour liquid into the cavity which is to be strengthened. STAFOAM sets into a strong, lightweight core that does the job all by itself.

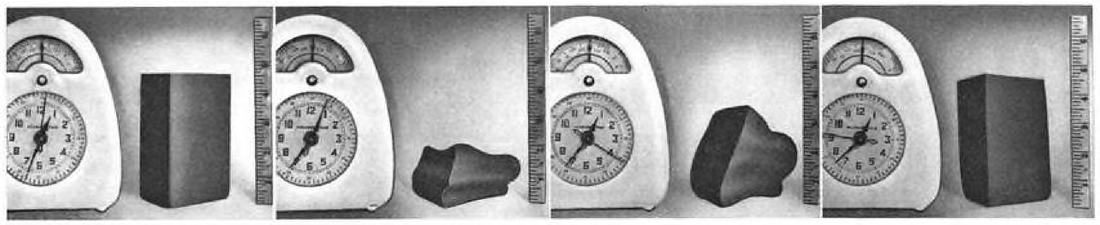
Here workmen are pouring the entire core of a complete wing assembly.



From left to right: (1) Open jig for wing assembly. (2) Skin of same wing assembly before core is poured. Note that no interior strengthening members or re-inforcements are necessary. (3) Finished assembly. Stronger, lighter, and more economically produced.

Foam-in-place Stafoam simplifies manufacture

Ease of mixing the two components — the resin and the foaming agent — and speed of foaming action is shown in the above six illustrations. The fact that STAFOAM can literally be poured into place, regardless of the configuration of the part or the size of the orifice, eliminates both the necessity for stress parts or prefabrication, and assembly labor. Predetermined variation in the ratio of the liquid components and variation of the formula produce corresponding changes in physical properties.



Undistorted — Fully Compressed — After 20 Seconds — After 1 Minute, 45 Seconds

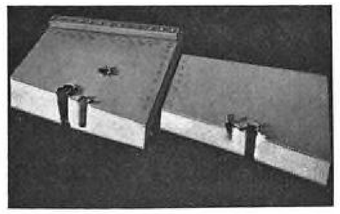
Rapid compressibility and slow return-cycle makes flexible alkyd Stafoam unique

Composition of Flexible Alkyd STAFOAMS is similar to that of Rigid Alkyd STAFOAMS, but its properties vary in the cured product. The essential difference is the effect of distortive forces on them. Flexible STAFOAMS can be compressed, elongated, or twisted without damage. Their unique properties are their wide range of rate-of-return to original shape when distorting forces are removed. It is an ideal product for absorption of effects of collision and impact; also for noise and vibration dampening. It is unaffected by low temperatures. Its uses are just being explored. Our engineers will welcome your inquiries.

Flexible STAFOAM is here shown as helmet liner. Earpads of this material protect pilots against noise of jet engines. It is ideal as a packaging material.

Ease of compressibility of Flexible STAFOAM is shown here. Other STAFOAMS can be made tough and leathery.

Shatter resistant

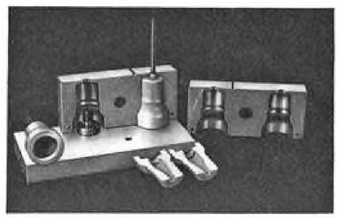


Cross section through STAFOAM-filled aileron showing firmness and lack of crumbling near holes made by .50 caliber machine gun bullet.

Rigid Alkyd STAFOAM is highly shatter-resistant. Structures re-inforced with Rigid STAFOAM have extraordinary vibration-resistance at working frequencies and amplitudes encountered in many industries.

Electrical adaptability

Rigid Alkyd STAFOAM is highly adaptable for insulating, cushioning, and potting transformers, and other electronic devices, because of ability to be poured through tiny orifices. Dielectric constants and power factors also lend themselves to electrical applications. In addition to STAFOAM's use in liquid forms, STAFOAM parts can be pre-cast and bonded in place for some applications.



Insulators for electrical contacts molded with Rigid Alkyd STAFOAM.

Range of densities

Cell size and uniformity of cell distribution can be closely controlled, varying from a nearly amorphous structure to cells of ¼ inch diameter. Formulations will also affect weight. Established formulations can be reproduced with regard to texture, density and strength. STAFOAM is readily adapted to specific engineering problems because of the variety of properties that can be attained on formulation. Range of densities is indicated in the two illustrations at the right.

Extreme light weight of this STAFOAM formulation is shown in relation to weight of cork.

The small sample and the large sample weigh the same, further emphasizing wide range of densities possible in STAFOAM formulation.

NOTE

Because of space limitations in this ad, information is necessarily incomplete. STAFOAM is supplied in hundreds of variations in density, texture, color, strength, insulation and thermal characteristics. For more general information on this truly miracle foam plastic, write for our STAFOAM brochure.

• **REGENTS OF THE UNIVERSITY OF MINN.,** Minneapolis, Minn., research covering "Free Jet Configuration," $42,108.
• **UNIVERSITY OF MINN.,** Minneapolis, Minn., research on "Study of Scavenging Scoop-Diffuser Combination," $28,771.

BuAer Contracts

The following contract awards of $25,000 and more have been announced recently by the Bureau of Aeronautics, Department of the Navy, Washington 25, D. C.

GENERAL ELECTRIC CO., Schenectady, N. Y., a.c. generators and static regulators, 9-kva., 3-phase, 380-420 cps., 5,700-6,300 rpm.; reports, 3 ea., $31,000.
GREER HYDRAULICS, INC., Brooklyn, N. Y., matl. and serv. to acquire, rehabilitate where necessary, and install in the contractor's plants at Brooklyn and at International Airport, Idlewild, N. Y., machine tools and other capital equip. necessary to the production of hydraulic components and test stands, $697,106.
HILLER HELICOPTERS, Palo Alto, Calif., kits of parts for the installation of ARC type 11A navigation receiver with fixed-wire antenna in delivered Model H-23B helicopters, serv. bulletin, 251 ea., $29,716.
NORTH AMERICAN AVIATION, INC., Los Angeles, Calif., conduct drop tests on prototype Model T-28D airplane to determine the limit and ultimate strength available for landplane landings in translational drops. Reports, $79,478.
WESTINGHOUSE ELECTRIC CORP., Washington, D. C., spec. tools and ground-handling equip. to support J46-WE-2/-8/-12/-16 engines being procured under separate contracts, $450,000.

Fast Writeoffs

Accelerated tax amortization for manufacturers expanding their defense facilities is granted by the government in the form of certificates of necessity.

In the following list of recent certificates, company name is given, followed by product or service, cost of construction deemed necessary for defense expansion, and the percentage of the expansion cost allowed for fast writeoff. Fast writeoff permits property to be depreciated in five years.

• **Zarkin Machine Co., Inc.,** Long Island City, N. Y., aircraft parts, $5,800, 70%.
• **Boeing Airplane Co.,** Seattle, Wash., aircraft, $154,985, 65%.
• **Douglas Aircraft Co., Inc.,** Santa Monica, Calif., aircraft and aircraft parts, $157,405, 65%.
• **Lear, Inc.,** Grand Rapids, Mich., aircraft parts, $128,653, 65%.
• **Bendix Aviation Corp.,** Friez Instrument Div., Towson, Md., military electronic equipment, $24,451, 65%.
• **Harvey Machine Co., Inc.,** Torrance, Calif., heavy aluminum aircraft extrusions and forgings, $3,500,000, 85%.
• **Metal Products Co.,** Lancaster, Ohio, aircraft parts, $23,678, 60%.
• **Fairchild Engine & Airplane Corp.,** Hagerstown, Md., aircraft parts, $374,212, 65%.
• **Goodyear Aircraft Corp.,** Akron, Ohio, aircraft and aircraft components, $266,204, 65%.
• **United Aircraft Corp.,** East Hartford, Conn., aircraft engines and parts, $690,000, 60%.
• **Chicago Cutting Die Co.,** Chicago, Ill., aircraft parts, $12,171, 70%.
• **Weba, Inc.,** New Hyde Park, L. I., N. Y., aircraft parts, $82,500, 55%.
• **Green Machine Co., Inc.,** Glastonbury, Conn., precision machining of aircraft parts, $7,675, 70%.

Study Points Way to Tube Improvement

• Detailed analysis covers 20 major military types taken from 44 different kinds of equipments.

By Philip Klass

A detailed analysis showing the individual weaknesses of 20 different types of electron tubes widely used in military equipment—information of interest both to tube and equipment designers—is revealed in the recent report by Aeronautical Radio, Inc., on the first two years of its military tube-surveillance program.

The Arinc report contains specific recommendations aimed at improving the intrinsic reliability of tubes. Some of its suggestions for equipment designers, the military services, and aircraft manufacturers on their contributory role in improving tube reliability were discussed in AVIATION WEEK Apr. 5, p. 52.

► **45,000 Samples**—The Arinc analysis is based on 45,000 tubes removed as defectives from 44 different types of Air Force, Navy, and Army equipments at eight different installations.

The program is continuing and future reports will compare the reliability of newer premium tubes, incorporating some Arinc suggested changes, with their predecessors.

► **Typical Examples**—Here are a few typical Arinc findings on specific tube types:

• **6AK5.** Major weakness is in heater, designed for operation at too high a temperature, particularly when used in aircraft where four heaters are connected in series.

• **6J6.** When used at maximum rating, failure rate is usually high. Tube appears to be overrated.

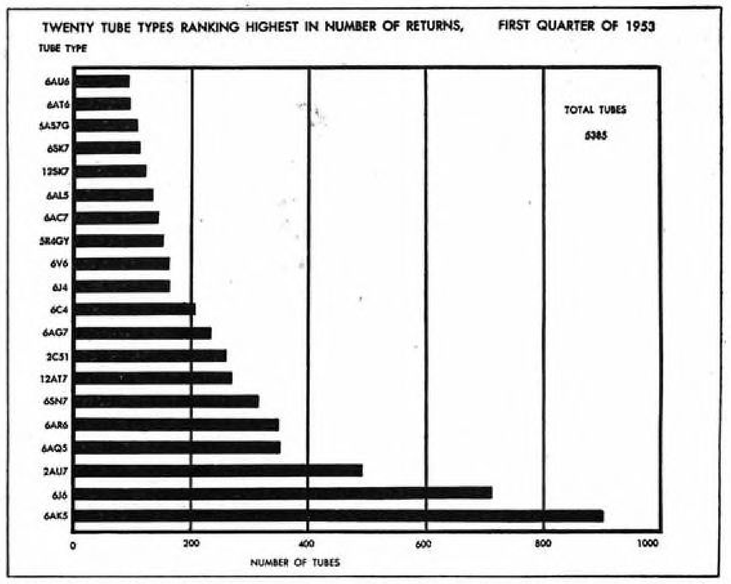
• **12AU7.** Rugged, with no apparent weakness except for deterioration due to formation of interface layer on cathode. Arinc data indicates that this double triode is more reliable than two separate triodes.

• **6AQ5.** Power rating appears to be too high for good reliability.

• **6AR6.** Suffers high failure rate when bulb temperature exceeds rated value.

• **12AT7.** Subject to interface formation, suffers heater failures and interelectrode leakage.

► **Getting the Facts**—Arinc technicians, stationed at each of the military bases and on the aircraft carrier Midway, are responsible for collecting all tubes removed as defective. These technicians test the tubes to prescribed procedures using standardized testers. They fill out data sheets indicating their test findings and identifying the equipment and particular socket from which the tube came. Data sheets and tubes are then returned to Arinc headquarters in Washington.



RANKING OF 20 TUBE TYPES producing highest number of replacements, according to Arinc study. High ranking may indicate tube weakness or widespread use of unit.

Arinc data for the report was obtained principally from two types of tests:

• **Semi-controlled,** in which no records are maintained until tube is removed as defective. Primary objective is to determine cause of tube failure and inherent weaknesses of the various tube types.

• **Controlled,** in which the life history of every single tube is painstakingly maintained, including performance characteristics before and after removal. Objective is to determine change in tube performance with use, exact time to failure, comparison of new premium type tubes with their JAN predecessors, comparison of tubes made by different manufacturers.

Approximately 90% of the tubes under surveillance were under semi-controlled conditions; the balance under controlled tests.

► **Careful Scrutiny**—Arinc headquarters in Washington tests all the controlled tubes and those semi-controlled tubes which show high failure rates or other unusual conditions. Tubes are then reshipped to other facilities in order that more detailed analysis may be made. These testing facilities include Cornell University, Wright Air Development Lab, New York Naval Materials Lab and tube manufacturers.

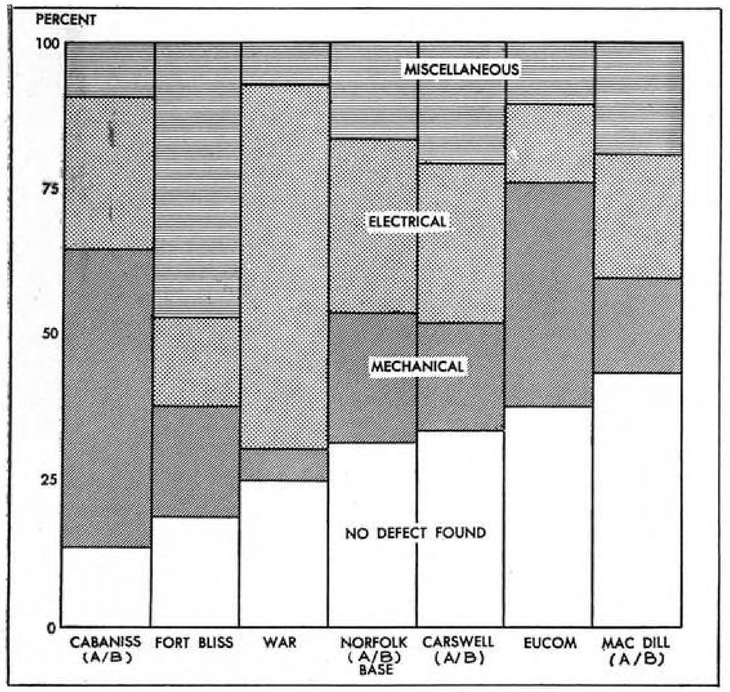
Where failure is obviously the fault of its application, the tube is sent back to the equipment manufacturer involved.

To facilitate later analysis and correlation, all tube data is recorded on IBM punch cards.

► **Types of Defects**—A breakdown of tubes returned from all bases (except one on which surveillance program started late and had produced few returns at the time report was prepared) according to the general category of defect shows the following types of faults:

• **Electrical, 28.7%.** Deterioration of performance due to faulty manufacturing, end of normal tube life, high operating temperature or excessive power dissipation.

• **Mechanical, 21%.** Physical changes in tube structure, such as shorts or opens, caused by faulty workmanship or vibration.



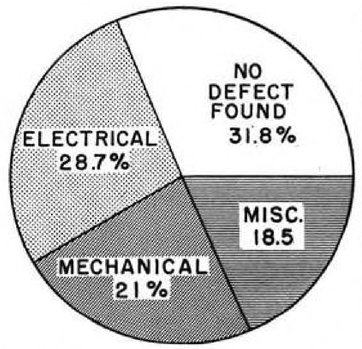
DEFECT BREAKDOWN by category shows widespread variation among seven military bases. Indication (A/B) means the tubes came from airborne equipment.

• **Miscellaneous, 18.5%.** Broken glass, noise, microphonics and defects caused by abuse or by other component failure in equipment, resulting from unknown causes, unusual environment, rough handling by maintenance personnel.

• **No defect found, 31.8%.** Replaced because of critical socket conditions requiring special tube selection, as part of preventive maintenance removals, or to correct equipment malfunctions when no tube testers are available.

► **Wide Variation**—Arinc found considerable variation in the corresponding defect-category breakdown between individual bases. The variation reflects different equipment operating environments and maintenance procedures and capabilities. For example, the report points out that "maintenance of electronic equipment in aircraft in any environment is always geared to the mechanical maintenance of the plane, independently of the requirements of the electronic equipment."

The variation among organizations is shown in bar-graph form on this page. Bases which returned tubes used in airborne equipments are identified (A/B). Arinc concludes that the pattern of tube returns for a specific equipment more closely resembles the overall tube-return pattern of the base at which it is used than the tube-return pattern of an identical equipment used at another base.

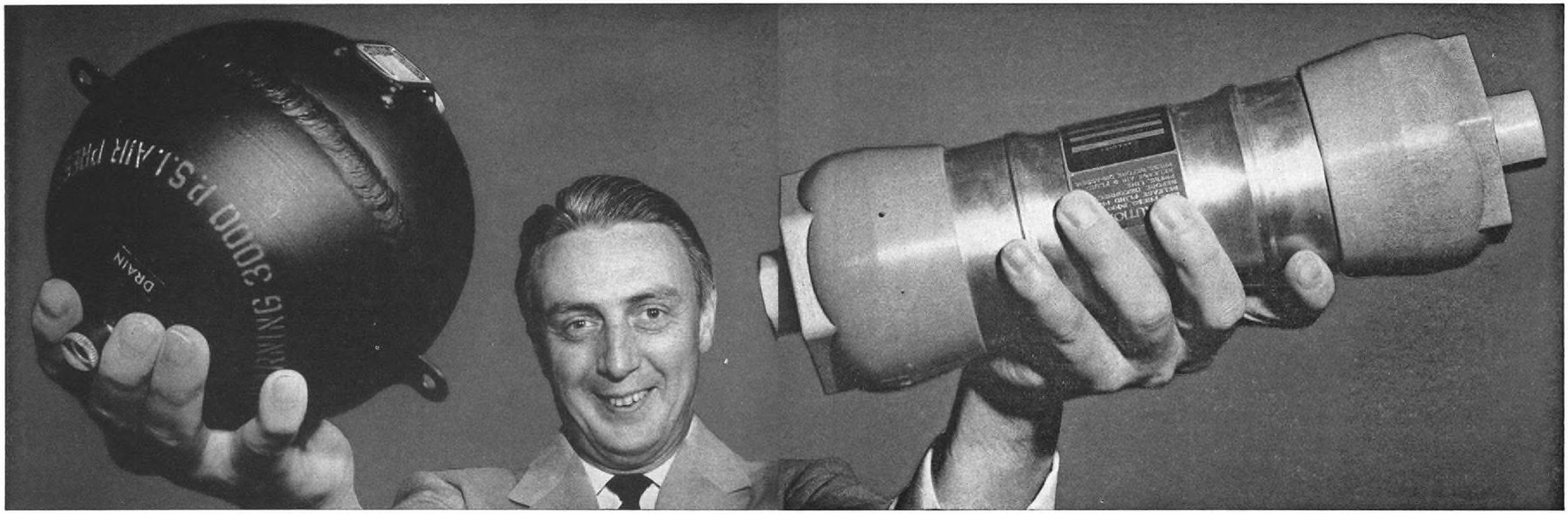


OVERALL breakdown of rejected tubes for all bases, by type of fault.

► **Ranking Tube Types**—Twenty tube types, representing 10% of the total number of types monitored in the Arinc program, contributed 50% of the tubes returned as defectives. Type 6AK5 produced almost 10% of the total returns.

Large returns may indicate an intrinsic tube weakness, widespread use of these tube types, or both.

Nevertheless, the top-20 ranking identifies those tubes which are "contributing most to equipment unreliability" and thus the tubes whose improvement would have the largest effect on equipment reliability. A bar-graph showing the relative number of tube



AVOID 3000-PSI SYSTEM TROUBLE . . .

Use Parker's air receiver and hydraulic accumulator

"Here are two 3000-psi aircraft *system components.* You'll want to know all about . . . a lightweight air receiver and a high-performance accumulator," says Bud Knox, Manager of the Hydraulic Valve Division at Parker Aircraft Co. "Let me show you why:

"For pneumatic systems, Parker's new air receivers are safe and durable. They passed the .50-caliber gun-fire test without deviation. Although they're built entirely of 4130 steel, it's the way they're made that is the secret.

"The 100 cu. in. production unit weighs only 4.2 lbs. and the 200 only 8.8 lbs. Other sizes will soon follow.

"For any application where you need stored high-pressure gas . . . pneumatic systems, emergency systems, purging, or the like, why not use these new Parker units?

"For hydraulic systems, Parker's accumulators have been proved in over two years' service.

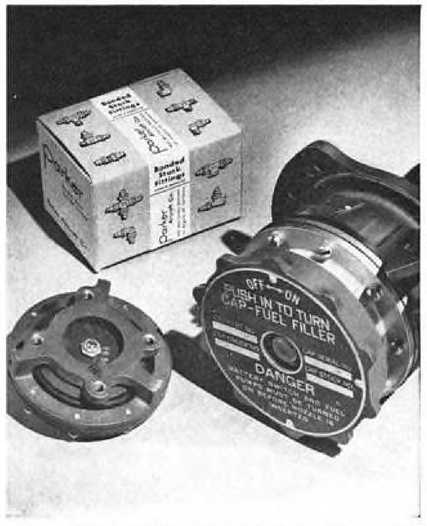
"The balanced inner-cylinder carries the piston and seal. Air pressure is applied equally to both sides of the inner-cylinder wall. Thus, the piston moves in a cylinder that always stays exactly the same diameter over its entire length. There can be no breathing to cause excessive O-ring wear. Leakage is practically eliminated.

"Parker accumulators meet *all* of the requirements of Specification MIL-A-5498, *Revision B.* All standard sizes are now in production."

Mail the coupon for complete details about either the air receiver or accumulator.

PARKER AIRCRAFT CO., 5827 W. Century Boulevard, Los Angeles 45, California
(Subsidiary of The Parker Appliance Company)

Parker
Hydraulic and fluid system components



What other Parker components for hydraulic and fuel systems interest you? Parker Aircraft Co. builds a wide variety of products for many different applications.

Send to Parker Aircraft Co. all inquiries for *aircraft* components. Both sales and engineering are now at this one location . . . offering faster service.

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Los Angeles 45, California

Please send me the following information:

☐ Parker air receiver Catalog, File No. 1358

☐ Parker aircraft hydraulic accumulator Catalog, File No. 1356

☐ Information about these other specific aircraft fuel or hydraulic products:_____

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NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____STATE_____

Mail this coupon today! Send for complete technical details about the new Parker high-pressure air receiver, hydraulic accumulator, or other products.

ELONGATED HOLES in mica spacer used to support tube elements are the result of prolonged shock and vibration, cause tube microphonics and other faults.

returns (over a three-month period which Arinc believes is representative) for the top 20 tube types is shown on page 57.

Arinc breaks these figures down into three categories, necessarily arbitrary, according to the reason for the high rate of returns:

- **Widespread usage:** 6SN7, 6AC7, 6AL5, 5R4GY, 6V6, 6C4, and 6AG7.
- **High failure rate** (in some or all applications): 6AR6, 6AT6, 6J4, 12SK7, 6AQ5, 6AU6, and 2C51.
- **Combination of both:** 6AK5, 6J6, 12AT7, 6AS7, and 12AU7.

Arinc notes that improved (premium) versions of 17 of the top 20 tube types either have been designed or are in process. Two of the 20, the 6AG7 and 12SK7, have no improved counterparts because they are used principally in obsolescent equipment and are being replaced by newer types of tubes in new equipments.

None of the premium types appear in the top 20, Arinc says. However, very few were in use up to the end of the period of the report (Apr. 1, 1953).

► **Deterioration Failures**—The Arinc report lists several causes of tube failure resulting from gradual deterioration of electrical characteristics. These are:

- **Loss of emission.** Arinc says that rate of decay of cathode emission is definitely related to the amount and quality of residual gas within the tube. During use, the cathode (and other tube elements) gradually absorb this gas, reducing emission. Noting that early emission deterioration due to gas poisoning has been observed in 6AR6s and 6AQ5s, Arinc concludes that present tube manufacturing processes are not adequate. Tube and equipment designers are warned to use conservative power ratings and ambient temperatures in order to keep "operating temperature in all tube parts below the values required to release occluded gases."
- **Formation of interface.** Tube types in

which Arinc found most frequent formation of interface layer on the cathode included 6SN7, 12AU7, 12AT7, 6AR6, 6AC7, and 6C4. Arinc is running a controlled test on 6SN7s to evaluate the effect of various cathode materials and other factors on the rate of interface formation. The use of less active nickel sleeve for the cathode is believed to reduce interface formation.

(Arinc estimates that if gas poisoning and interface formation could be eliminated, cathode emission would last until the cathode coating was completely evaporated, possibly for 100,000 hours.)

• **Evaporation of Materials.** Evaporated metal from hot tube elements is deposited on colder surfaces, such as mica and glass insulators, resulting in gradual deterioration of their insulating properties. One solution is to coat mica and other smooth surfaces with rough insulating material to increase the length of the leakage path, Arinc says. Other solutions include the use of shielding to prevent metallic deposits, use of inactive metal alloys with reduced evaporation, use of non-evaporating "getters," and limiting operating temperatures of all tube elements. Several of these solutions also reduce interface formation.

• **Vibration.** Enlargement of the holes in mica spacers which support tube elements is apt to be a problem when tubes are subjected to vibration and frequent shock, Arinc says. Enlarged holes allow tube elements to vibrate, producing spurious signal (microphonism) (see photo, p. 61). There is also evidence which indicates that the powdered mica resulting from vibration may release gas which poisons the tube cathode, reducing its emission. Arinc reports that tube manufacturers are designing tube elements for greater rigidity, using closer tolerances on mica spacer holes, and in some cases using new materials, such as "Terratex" or ceramic, in place of mica.

► **Catastrophic Failures**—The Arinc report lists the following causes of catastrophic types of tube failures which occur without advance warning:

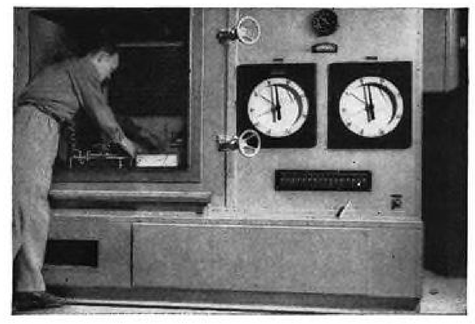
• **Gas discharge.** Gas discharge or arc-over within a tube may be caused by overheating of an electrode until it releases sufficient gas to reach gas discharge pressures, by heavy heater-cathode leakages which can become self-sustaining if heater-cathode voltage is large and the temperature is high, or by slow air leaks in the bulb due to improper seals of the lead-in wires or exhaust tube tips.

• **Glass strains.** If the glass envelope is not properly annealed during manufacture, or if subjected to high mechanical or thermal stresses during installation, the glass envelope may crack. Arinc concludes that most of bulb defects are caused by rough handling. Except for a few large tubes improperly mounted in

An impressive concentration of top aviation engineers and electronic specialists was recently assigned to the new Westinghouse Air Arm Division in Baltimore. The huge plant, occupying 75 acres next to the Baltimore Friendship Airport, has space to integrate all Westinghouse air-borne electronic engineering, testing and production facilities into one operation . . . with the opportunity for both air-borne and environmental testing.

Already this division has designed, tested and put into production some outstanding developments. One is the Westinghouse Autopilot, the first automatie pilot to utilize three "non-tumbiing" gyroscopes and to provide unlimited maneuverability. Also of great value to our nation's military needs are the tremendous advances made on complete fire-control systems and guided missile systems.

These rapid strides were possible because of unmatched resources, such as: a Flight Engineering Department with hangar and company-owned planes . . . an REAC Analog Computer with flight simulator equipment . . . environmental test facilities, such as the one illustrated below . . . and a large staff of trained service engineers. All these Westinghouse facilities under one roof for one purpose—*advancing tomorrow's pushbutton aviation.* Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-91004



This Atmospheric Chamber simulates conditions from −65° to +160° centigrade, altitudes up to 80,000 feet. It also varies humidity 20 to 95 per cent and automatically controls these variable conditions to any pre-set values.

THE SCOPE OF WESTINGHOUSE IN AVIATION

Basic aircraft systems

Turbojet Engines, Fire Control, Radar, Autopilots, Communication Equipment and Electrical Systems.

Ground equipment

Wind Tunnels, Airport Lighting, Industrial Plant Apparatus.

Air-borne system components

Transformers, Rectifiers, Instruments, Gyro-motors, Temperature Control Panels, Generating Equipment and System Control, Circuit Breakers, Contactors, Motors, Actuators and Hoists, Electronic Tubes, Magamps*, Micarta®. *Trademark

YOU CAN BE SURE...IF IT'S

Westinghouse

aircraft equipment, Arinc says it found no cases of glass cracks due to shock and vibration.

• **Shorts and opens.** The tube electrode most subject to shorts and opens is the heater, Arinc reports. This fault, in the heater or other tube electrodes, is primarily the result of high operating temperature, Arinc says. For instance, the 6AK5, whose heater temperature ranged up to 1565K for some tube manufacturers, contributed the largest number of failures due to open heaters when the Arinc program started. When the premium version (5654) of the tube was designed so its heater operated at only 1470K, heat burn-out defects practically disappeared, Arinc says.

"The importance of heater temperature during normal operation of aircraft equipments cannot be overemphasized," Arinc says. The connection of heaters in series-parallel combination across the ship's d.c. supply bus, usually regulated at 27.5 volts, applies 6.9 volts across tubes' 6.3 volt heaters. If the heater string is not perfectly balanced, even more over-voltage is applied, further raising heater temperature.

► **Summary of Weaknesses**—A brief summary of other Arinc findings on specific tube type weaknesses shows:

• **6SN7GT.** Susceptible to interface formation. Ruggedized versions do not show any significant improvement, Arinc says.

• **2C51.** Tendency to develop microphonics due to mica wear, leakage, or combination of both. Close spacing between electrodes, offering short leakage paths, has not been corrected in premium type 5670, Arinc says.

• **6AG7.** Rapid emission deterioration results from combination of high envelope temperature and high current density.

• **6C4.** This triode, identical to half of a 12AU7, shows similar ruggedness, but more emission deterioration, less interface formation than a 12AU7. Arinc offers this possible explanation: 12AU7 is generally used in circuits where plate current is reduced or cut off for long periods.

• **6J4.** Susceptible to metallic deposits on glass surface of base, producing low-resistance leakage between pins. Although fault occurs at moderate temperatures, it appears to be aggravated by tube's normally high plate dissipation and high heater temperature. Drastic redesign may be necessary, Arinc says.

• **5R4GY.** This widely used rectifier gives indication that its filament is too weak to withstand sustained vibration such as encountered in aircraft, Arinc says.

• **6AL5.** Very low removal rate and no apparent weakness.

• **6SK7, 12SK7.** Identical tubes, except for heater voltage, but the 12-volt type

more generally used in aircraft shows a higher percentage of mechanical faults, most of them heater defects.

• **6AS7G.** When operated in high ambient temperatures, in certain applications, tube grid draws excessive current, expands until it shorts out to plate.

• **6AT6.** Susceptible to electrical failures which are evenly divided between emission degradation and interface formation.

• **6AU6.** Under prolonged, severe vibration, mica spacers wear out at the cathode and grid holes, producing severe noise.

Copies of the 97-page "General Report No. 1" may be obtained for 50 cents from L. E. Davis, Aeronautical Radio, Inc., 1523 "L" St. N.W., Washington 5, D. C.

Of Ohms and Farads

New resistors and capacitors of potential use to avionics designers are interesting because of their smaller size, higher power and/or temperature rating. Among those that have recently been announced:

• **Sub-min wire-wound resistor.** NM-2 measures approximately ¼ in. dia., ¾ in. long, is called "The Runt" by its maker. Device is available with resistances up to 60,000 ohms, wound to an accuracy of 0.1%, hermetically sealed. Eastern Precision Resistor Corp., 130-11 90th Ave., Richmond Hill 18, L. I., N. Y.

• **Power resistors.** High-temperature, wire-wound seven- and 10-watt resistors, types PW-7 and PW-10, come in rectangular case with axial leads. PW-7 is available with resistance values of 0.51 to 5,100 ohms, PW-10 from 1 to 8,200 ohms, both in 5% and 10% tolerances. International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa.

• **Encapsulated wire-wound resistors.** Super Davohm resistors are available with temperature coefficients as low as 20 parts/million/deg. C and with accuracies to 0.05% if required. They are designed to meet MIL-R-93A, can operate at −65 to 125C. Daven Co., Dept. SW, 179 Central Ave., Newark 4, N. J.

• **High-power resistor.** Series C8JJ wire-wound resistor, rated 15 watts, measures ½ in. dia., 2 in. long, comes in ceramic sealed case with axial pigtail leads, in resistances of 1 to 10,000 ohms. Clarostat Manuf. Co., Dover, N. H.

• **Very-high-temperature capacitor.** Type TI has less than 5% variation in capacitance through temperature range of −80 to 200C, according to manufacturer. Units come in hermetically sealed metal cases with glass-kovar end seals, with tolerance of 10%, 5% or 2%, if required. National Capacitor Co., 385 Washington St., Quincy, Mass.

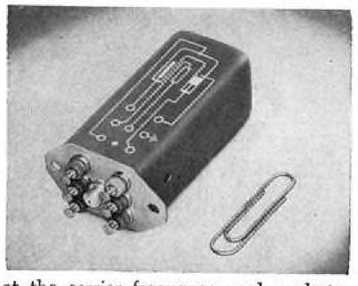
Miniature Devices Make Servos Smaller

Reduction in size and weight of servo systems continues to be a major concern of avionic designers. Several new miniaturized devices should aid engineers in this aim. Among them:

• **Miniature servo amplifier,** Type SA118H, is slightly larger than a pack of cigarettes, weighs 15 oz. It needs no external d.c. power supply, and has a gain of about 7,000, manufacturer says. When used with Type 17ID2-8 400-cycle, 2-phase motor, the combination will develop a stall torque of 0.3 oz. in. Motor has adjustable linear velocity damping, eliminating need for tach-generator stabilization. For more information, write to Servomechanisms Inc., 500 Franklin Ave., Garden City, N. Y.

• **Midget chopper,** hermetically sealed and weighing only two ounces, has an average life of 1,000 hours. Chopper can be supplied to operate from any required voltage up to 115 v., 400 cps., and can be equipped to correct phase lag in driving voltage rather than output voltage. Chopper dimensions are 2⅛ in. high, ⅛ in. square. It is available with plug-in or solder-type connections. Minneapolis-Honeywell Regulator Co., Aeronautical Div., 2600 Ridgway Dr., Minneapolis, Minn.

• **Photo cell chopper,** Model 207, employs new principle of operation in which d.c. input voltage is modulated by the action of a glow tube, excited



at the carrier frequency, and a photocell in a voltage-divider circuit. Advantages are low noise and lack of drift. Chopper weighs 1.6 oz., is 2 in. high and ⅝ in. square, is designed for 3,000 hours life. Manufacturer is Avion Instrument Corp., State Highway No. 17, Paramus, N. J.

FILTER CENTER

▶ **Navy Cut Hits RCA**—Navy decision to cut back on production of Westinghouse's new interceptor fire control system (AVIATION WEEK Apr. 5, p. 62), at least until troubles with the system computer are licked, has hit Radio Corporation of America, which was being

set up as a second source. RCA is a second source on Hughes Aircraft fire control systems.

► **New NWA Aleutian Station**—Northwest Orient Airlines is installing a radio station at Cold Bay, Alaska, eastern end of the Aleutian Island chain, to see if it can provide adequate communications between there and Japan. Service is now provided by NWA's station at Shemya Island, 825 miles west of Cold Bay at opposite end of Aleutian chain. Project results from possibility that USAF will abandon Shemya, forcing Northwest to do likewise.

► **M-H Shows New Autopilot**—Minneapolis-Honeywell recently demonstrated its new lightweight E-10 autopilot to Wright Air Development Center engineers at Dayton.

► **New RTCA Reports**—The Radio Technical Commission for Aeronautics has recently issued reports prepared by three of its special committees:

- **SC-65:** The Application of Single Sideband Techniques to Aeronautical Communications, Paper 11-54/DO-53, price 30 cents.
- **SC-61:** Calibration Procedures for Signal Generators Used in the Testing of VOR and ILS Receivers, Paper 208-53/DO-52, price 65 cents.
- **SC-35:** Standardization of Adjustment of Airborne Glide Slope Receivers, Paper 12-54/DO-54 (supersedes 54-50/DO-33), price 15 cents.

Copies may be obtained from RTCA-Secretariat, 1724 "F" St. N.W., Washington 25, D. C. Payment should be made by check or money order. Stamps are not accepted.

► **Avionics Conference**—Eighty technical papers have been scheduled for delivery at the National Conference on Airborne Electronics, May 10-12, in Dayton. Annual conference is jointly sponsored by IRE's Dayton section and Professional Group on Aeronautical and Navigational Electronics (PGANE).

► **Expanding Industry**—Recent evidences of avionics industry growth include:

- **Ketay Manufacturing Corp.,** maker of precision synchros, servo motors, and flight instruments, has expanded factory area 25% by purchasing new 43,000-sq.-ft. plant at Commack, L. I., N. Y.
- **Vicom and Co.,** Ltd., British firm specializing in aircraft radio, radar and electrical equipment, will open a factory in Kingston, Ontario.
- **Servomechanisms, Inc.,** has recently received a near-million-dollar contract for a new type of range servo analog computer, an improved version of equipment used with computing gunsights, proved so effective in Korea. —PK

NARCO DME installed in Beech Bonanza. Frequency selector switch (1) operates crystal-tuned receiver. Range scale (2) is changed from "en route" (0-200 mi.) to "approach" (0-20 mi.) by turning knob. Designated UDI-1, set costs $5,000.

Narco Puts DME Set in Production

By George L. Christian

National Aeronautical Corp. has put its new Model UDI-1 distance measuring equipment into full production, reports James M. Riddle, president.

The Ambler, Pa., company has completed its pilot run of 30 sets. Twenty have been earmarked for Civil Aeronautics Administration and the Air Navigation Development Board, and 10 have been retained by the manufacturer for test and demonstration purposes.

The UDI-1 has been three years in the making.

► **"Gold Plated Model"**—In developing the DME set, Narco took the reverse tack from the one it followed in working out its civilian omnirange equipment (the company says it has built 10,000 omni sets—more than half of all civil omnis produced). In the omni program, every effort was made to cut costs; in the DME program, Narco resolved to make the best possible piece of equipment, regardless of cost, Riddle says.

One reason for this is that the set is aimed not only at the business and executive plane market, but at the commercial airlines as well.

As a result of this "gold-plating" treatment, the $5,000 set incorporates:

• **Ruggedized tubes.** These cost considerably more than standard electronic tubes, but give a considerable increase in reliability.

• **Hermetically sealed relays.** Through use of hermetically sealed relays throughout, the set gains complete protection against moisture, dust, dirt and corrosion, and its high-altitude operation is enhanced. The set can operate up to 40,000 ft., says Riddle.

• **Crystal tuning.** Narco felt that crystal tuning was a "must" to give the DME set very accurate long-range operation at relatively low altitudes. Insistence on crystal tuning caused a year's engineering delay, Riddle says, while personnel wrestled with the problem of adapting this "locked-on" type of tuning to the equipment. Long a standard feature of airborne radio receivers, crystal tuning will now eliminate complicated alignment procedures and simplify and reduce maintenance on the DME set, Riddle believes. Many field service problems will be eliminated.

The tuning control is a standard, panel-mounted crystal tuner, with numbers indicating the desired frequency. If such a frequency selector is already installed in the aircraft, the same switch may be used both for the VHF receiver and the DME, Narco says. This saves instrument panel space.

Narco's DME works entirely on d.c.

power and converts easily to either 12-volt or 24-volt systems. The complete equipment weighs 30 lb., including shock mounts. The set uses dual transmitting and receiving antennas, each tuned for maximum efficiency.

► **Simple To Operate**—This is how Narco's DME operates:

As soon as proper frequency of the VOR/DME or ILS localizer station is selected, the needle on the indicator goes into search. It sweeps slowly from zero to full range, swings rapidly back to zero, and repeats the cycle until it locks onto the interrogator ground station. This occurs when the ground station comes approximately into line of sight.

As the plane approaches the station, the "en route" scale, calibrated from 0 to 200 mi., may change to "approach" scale, reading from 0 to 20 mi. If the plane overflies the ground station, the DME pointer will register the plane's altitude (i.e., distance) when directly over the interrogator.

► **Stress on Serviceability**—Narco engineered its DME for serviceability, Riddle says. The whole set is mounted in a standard ½-ATR rack and can be removed quickly and easily by unplugging the antenna leads and loosening two locks. Narco says the DME can be completely disassembled in less than two minutes, permitting access to all sections.

The five basic elements—receiver, transmitter, range unit, power supply and automatic channel selector—can be unplugged from each other to allow for rapid test, inspection or replacement. This makes for quick isolation of any

Instrument Checker

This portable bench tester for jet aircraft electrical instruments checks overhauled instruments such as Zero Readers, turn-and-bank indicators, gyro compasses, etc., prior to their installation in aircraft. Designed by USAF M/Sgt. Walter Rhoades (above) with the Iceland Air Defense Force's 82nd Fighter-Interceptor Squadron, Keflavik, unit was built from scrap parts, costs $10, and is believed to be one of the first portable units of this type.

trouble and speedy return of the set to service.

► **Service Centers**—In an effort to provide nationwide coverage for its customers, Narco has established 19 service centers. They are manned by factory-trained DME specialists. Each center will be supplied with necessary test equipment, including a $4,000 DME simulator, according to Riddle.

Narco says its service philosophy is: "Remove and replace," wherever possible. This way, the customer is detained a minimum time, and the service man can repair the defective component or ship it back to the factory.

'System' Tests Get Bugs Out Faster

Application of the "systems' concept" to the field of airborne equipment is being pushed by Parker Aircraft Co., Los Angeles.

Parker's idea is to test complete aircraft systems, with all accessories in place, under the equipment maker's roof, instead of in the airframe manufacturer's plant. The company is now applying the concept to the fuel system for a Grumman lightweight fighter and says results are good.

The scale-model test rig set up at Parker's plant duplicates the plane's fuel system—ground and air-to-air refueling, and fuel transfer systems, both tank-to-tank and tank-to-engine. The rig, built by Grumman, incorporates all the Parker-manufactured components such as pumps, valves, etc.

The company believes that its new test set-up results in a better-operating airplane. Designers, engineers, inspectors and field service employes of the equipment maker can remain at their home base and study their product in its final environment. Changes can then be made and malfunctions corrected as fast as they crop up.

The alternative to this, as Parker sees it, is the usual method of sending out new equipment, often untried in the system of which it is to be a component, to be shepherded along by a field service representative.

Machine Simplifies Exhaust Re-Boring

Built-in accuracy is claimed for a machine that re-bores exhaust ports and seats exhaust nipples at Pan American World Airways' engine overhaul shop at San Francisco International Airport.

Because of its great accuracy in alignment of the exhaust system's components, the machine permits speedier and easier engine build-up and helps lessen possibility of engine fires, says PAA's Pacific-Alaska Division, which developed and built the device.

With this tool a semi-skilled me-

New Broom for Jet Runways

Grumman Aircraft Engineering Corp. will use a magnetic sweeper to clear runways and hangar areas at its Bethpage, N. Y., plant of small metal objects that might be sucked into jet engines and damage them. The new runway "broom" consists of a motorized road sweeper whose rotary brushes sweep up most of the debris on the runways, and onto which has been grafted an Eriez Super Sweeper, whose 48-in. permanent magnet picks up nails, bolts and other discarded ferrous materials. The Eriez company (address: Erie, Pa.) produces its magnetic Super Sweeper in various widths and strengths. The sweeper also may be pushed by hand.

ENGINE EXHAUST PORT is re-bored on PanAm-developed and built machine.

chanic can do the job that previously required a skilled workman operating a radial drill or boring mill. Accurate cylinder alignment was difficult to achieve with the older method, says PAA. Also, the new machine has a built-in, mechanically operated ram for installing nipples in exhaust ports.

The tool's high degree of accuracy is obtained by a series of index position locks that line up the cylinder barrel and head during boring, PanAm says. The cylinder, mounted on a mast, is locked into position by an expanding mandrel.

The index locks also assure that nipples are installed at correct angle and depth.

The machine is being used currently on PAA's R4360 engines, and is being adapted to handle cylinders from R2000 and R28000 powerplants.

OFF THE LINE

Lockheed Aircraft Service-International's East Coast base at New York International Airport reports 887,746 manhours of work performed in 1953, a jump of 40% over the 1952 all-time record of 632,895 man hours. Deliveries of 965 planes were 10½% over the previous year. Of these, 926 planes were commercial, 22 were military and 17 executive. LASI performed over 1,900 manhours of work on passenger-carrying helicopters.

United Air Lines has completed engineering plans for a proposed joint airlines terminal in downtown San Francisco on the site now occupied by the airport bus garage. Because of heavy traffic congestion, the city has given the airlines a deadline of July 1955 to stop loading and unloading airport buses on downtown streets. UAL's proposal would provide terminal facilities on either a purchase or lease basis to all scheduled airlines operating to the city.

NEW AVIATION PRODUCTS

CONVENTIONAL PAINT peels off large areas of Banshee after only 37 flying hours.

CONVER PLATE on Banshee shows no visible effects after plane is flown about 140 hr.

Jet Speeds Don't Peel New Paint

The "before-and-after" flight-tested performance of a new lightweight protective aircraft paint is quickly told in the two pictures above of a twin-jet Navy McDonnell F2H-1 Banshee fighter.

Noticeable peeling of conventional lacquer used on the Banshee was apparent after only 37 flight hours (top photo).

No paint failure after approximately 140 flight hours is reported when the Banshee was coated with General Paint Corp.'s new Conver Plate (lower photo).

Following extensive testing and evaluation by Air Force and Navy, in addition to several major aircraft manufacturers, General Paint has gone into full-scale production of the product.

▶ **Converted Resin**—Aircraft Conver Plate is a co-polymerized high-polymer resin converted with a catalyst. Excellent adhesion qualities are claimed, as well as resistance to abrasion, battery acids, caustic solutions, rocket and jet exhaust gases, aromatic fuels, di-ester lubricants, hydraulic fuels, and other acid, alkali and salt solutions.

Thoroughly dry film is said to be non-flammable and will withstand temperatures up to 400F. It is moisture and corrosion resistant. The paint is designed for easy application using normal spraying techniques.

Weight savings amount to 50% compared to other paints, the manufacturer reports. A comparison: approximately 6 lb. per 1,000 sq. ft. compared with 16 lb. per 1,000 sq. ft. for conventional coatings.

General Paint Corp., 3960 E. Washington Blvd., Los Angeles 23, Calif.

Hand-Operated Press Brake Has Eight-Ton Capacity

A 24-in. hand-operated press brake, designated the Di-Acro and rated at eight-ton capacity, has been placed on the market.

The manufacturer, O'Neil-Irwin Manufacturing Co., says the unit incorporates a special cam lever mechanism which provides ample power for forming, blanking, piercing, drawing and trimming operations, plus a ratchet drive system that multiplies the power for heavy forming jobs.

The brake is compact enough to be set up quickly for use in experimental engineering and model shops, although it was primarily designed to relieve large production models of short-run operations.

The company says the brake will form 16-gage mild sheet steel across the full 24-in. forming width, 10-gage mild sheet steel across a 12-in. forming width, as well as Inconel, brass, aluminum, stainless steel, chrome molybdenum and all other ductile ma-

terials. Other features listed are: 24-in. stroke width, 2-in. ram stroke, 6-in. throat depth, 14-in. width between housings, Torrington roller bearings, and hardened steel and precision ground ram guides.

Unit is available with complete line of standard and special dies. All dies are interchangeable with other standard press brakes.

O'Neil-Irwin Manufacturing Co., 516 Eighth Ave., Lake City, Minn.

Small Electronic Timer Handles Cycling Jobs

Electronic timer, providing delayed shut-off or start, is being offered for wide variety of mechanical and electrical equipment by Benchmaster Manufacturing Co.

Known as Tele-Trol, timer is claimed to be continuously variable from 0 to 10 seconds, immediately re-cycling when triggered. It is of the accumulative types and re-cycle time is added to balance of previous cycle if triggering occurs before shut-off is reached.

Unit handles a 30-amp. non-inductive load at 125 v.a.c. It operates on 110-v. single-phase, but company reports models are available for 220- or 440-v. 3-phase operation.

Timer measures approximately 3x4x5 in.

Benchmaster Manufacturing Co., 1835 W. Rosecrans Ave., Gardena, Calif.

Glass-Plastic Template Easy to Work With

A plastic template material, of continuous glass fibers impregnated with a blend of Paraplex polyester resins, is said to have dimensional stability equal to or better than that of the metal it replaces, but with transparency greater than that of tracing paper.

Tracings can be made quickly for subcontractors by non-technical-grade personnel using the material in place of working from metal sheet with costly projection cameras. It also allows easy storage—a 4x12-ft. reproduction on the plastic can be rolled no bulkier than a window shade, says the supplier.

Material is made in widths to 60 in.

in cut sheets or in rolls 100 yd. or longer. It can be furnished normally in 5½-mil thickness but is also available in thicknesses down to 2 mils.

Tru-Scale Engineering Supply Co., Wichita, Kan.

ALSO ON THE MARKET

Fire emergency control, designed and manufactured for the Piasecki YH-16A, features handle which is also warning light. Signal from aircraft fire detector system causes knob to glow red. When pilot pulls this knob aft he actuates precision switches contained forward of instruction plate which arm fire extinguisher system for trouble zone. Operating force-5 lb.—Avionic Products Engineering Corp., Route 46, Dover, N. J.

Metal-ceramic seal, rated for brazing and service temperatures up to 1,400F, is particularly suitable for jet engine instruments such as thermocouples and other equipments which encounter extremely high temperatures and severe thermal shock, says maker—Advanced Vacuum Products, Inc., 22 Liberty St., Stamford, Conn.

Synthetic rubber compound for O-rings seals in aviation-type fuels under pressure conditions up to 1,500 psi. over temperature range of approximately 160F down to −65F. This rubber has low-temperature flexibility and rapidly recovers from shrunken condition to one of positive compression in non-aromatic fuel, manufacturer reports.—Goshen Rubber Co., Inc., Goshen, Ind.

Gas volume meter reportedly measures volume of any gas passed through it, incorporating principle of positive displacement. As gas is introduced into instrument, a set of rotors turn. This movement is carried up through timing gears, a gear train, to calibrated dial which indicates cubic centimeters in large circle and liters in small circle. Accuracy is said to be within 5% between range of 5 to 65 liters flow rate per minute.—J. J. Monaghan Co., Inc., 500 Alcott St., Denver, Colo.

Mold release liquid for plastic products, known as Vin-Rock type R-2, is used for compression molding, laminating, casting and lay-up molding. It reportedly adheres to and "smoothcoats" mold surfaces, preventing sticking of materials to molds. Liquid is packaged in 12-oz. aerosol-type can for spray application. Manufacturer claims product will not discolor any types or colors of plastics.—Vin-Rock, Inc., 8211 Almira Ave., Cleveland, Ohio.

Airwork Gets U.S. Ocean Cargo Permit

- **U.K. independent is expected to put 4-engine Hermes in Atlantic freight service almost immediately.**
- **Meanwhile CAB studies examiner's recommendation that S&W be granted a similar certificate.**

By Richard Balentine

Airwork, Ltd., a nonsubsidized, independent British airline, last week became the first foreign carrier to receive a U. S. trans-Atlantic all-cargo permit to operate between Britain and New York.

Civil Aeronautics Board and President Eisenhower approved Airwork's application as "in the public interest." The move was not unexpected (AVIATION WEEK June 29, 1953, p. 76; Mar. 22, p. 78) since it is in accord with the 1946 Bermuda bilateral agreement between the U. S. and Britain.

The airline is expected to begin trans-Atlantic cargo service almost immediately.

▶ **S&WA Bid**—Meanwhile, CAB is considering Examiner Herbert Bryan's recommendation for trans-Atlantic cargo certification of Seaboard & Western Airlines (AVIATION WEEK Mar. 1, p. 63).

Bryan said a U. S.-flag airfreight line is needed. He added, however, that more than one such competitor would weaken chances of success for all. S&WA was his choice in the seven-year fight for trans-Atlantic cargo rights because it "appears to be the most able of all the applicants to develop the trans-Atlantic cargo potential."

Pan American World Airways and Trans World Airlines vehemently oppose such a move along with nonscheduled European-American Airways, Overseas National Airlines and Transocean Air Lines, also seeking certification for the cargo route.

▶ **DC-6As Ordered**—Airwork is authorized to carry cargo between London-Prestwick, Scotland, to New York via Iceland, The Azores and Gander, Newfoundland. Initially, the company plans to carry 12,000-lb. loads westbound and 13,000 lb. eastbound on two roundtrips weekly.

Pending delivery of Douglas DC-6A cargo transports promised in two years, the British airline will fly its Handley Page four-engine Hermes transports. With the DC-6A, the airline believes it can lift 25,000-lb. loads.

Airwork expects to lose money on trans-Atlantic operation of the Hermes but anticipates making up some of the loss in future operation of DC-6As.

The company estimates that by 1955 it can build the volume of traffic between Britain and the U. S. through London to approximately 55 million ton-miles.

▶ **Charter to Sked**—It was incorporated in the United Kingdom Oct. 11, 1928, and since has engaged in all types of civil aviation, including ownership and operation of airports, contract and charter flying, aircraft maintenance and sales. Following World War II, Airwork enlarged its Air Transport Division, operating nonscheduled and contract flight operations.

At that time, the company was not permitted to operate scheduled airline service under the British Civil Aeronautics Act of 1946. It did develop regular services for single customers, some of which extended as far east as Karachi, Pakistan, and as far south as East Africa and South Africa.

In 1952, the British government announced a new policy for civil aviation in which independent operators were permitted to render scheduled services subject to recommendations of the Air Transport Advisory Council and approval by the Minister of Civil Aviation.

Airwork received British certification for scheduled trans-Atlantic service in that year.

▶ **Overseas Services**—Airwork's Overseas Operations Division presently flies in East Africa on behalf of Colonial Insecticide Research Unit, manages Sudan Airways, and operates a fleet of aircraft for the Iraq Petroleum Co. at Tripoli and Bahrein, providing local service in the Middle East.

Under a freight contract with the New Zealand National Railways, it operates Bristol freighters between the north and south islands of New Zealand.

▶ **Unanimous Decision**—In its application to CAB for a foreign air carrier permit June 19, 1953, the British airline asked for inclusion of Montreal as an intermediate point but said it does not intend to carry local traffic between Montreal and New York. The Board therefore decided not to name Montreal in the permit that precludes the carrier from providing service between Montreal and other foreign points.

CAB found Airwork is "fit, willing and able properly to perform such transportation and to conform to the provisions of the Civil Aeronautics Act, rules, regulations and requirements of the Board thereunder." All Board members concurred in the decision.

The Board also authorized the airline to pick up and deliver cargo in The Azores in emergency situations when adverse weather requires landing there.

▶ **Advantages Cited**—In its application to CAB last June, Airwork conceded that its entry into the trans-Atlantic air cargo market very likely would cause some diversion from existing carriers.

It believes, however, that the most of such diversion, if any, would be from the eight existing foreign-flag lines, rather than TWA and Pan American, the scheduled U. S. carriers lifting cargo across the Atlantic.

Airwork claims it enjoys certain strategic advantages in that it is in position to generate substantial volumes of traffic in the United Kingdom, Europe and the Middle East that will be funneled through the London gateway.

In addition to its three trans-Atlantic Hermes, Airwork operates 11 Vickers Vikings, two Douglas Dakotas and an Airspeed Consul on its other routes.

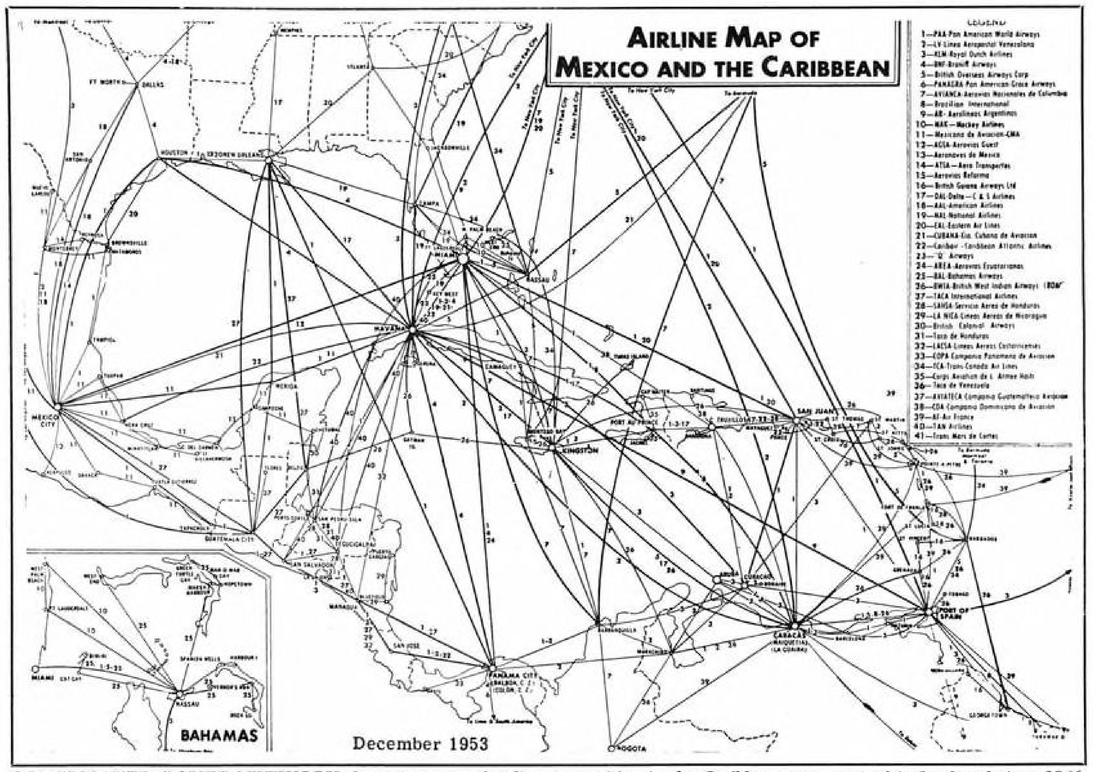
USAF Sets Up New Domestic Cargo Lift

A nationwide cargo airlift system, the Mercury Service, has been established by the Air Force to speed delivery of critically needed supplies between depots, industrial centers and aerial ports of embarkation.

Contracts have been awarded to Capitol Airways, Nashville, Tenn., and American Air Export and Import Co., Miami, Fla., after competitive bids. Capitol's contract is for three months, and American Air has been flying USAF cargo for the past 11 months. Both carriers are using C-46s.

▶ **Reorganization**—The airlift will operate on a daily schedule under the control of the Air Materiel Command, Wright-Patterson AFB, Ohio. Ground handling of supplies will be provided by USAF personnel. Passengers will not be carried.

AMC says the service is the result of a reorganization of its present transportation methods to provide USAF with more efficient and economic movement of supplies. Supplies and equipment transported on the Mercury Service will be confined mostly to high-value, high freight-tariff items.



COMPLICATED ROUTE NETWORK shows intensity of airline competition in the Caribbean area, most of it developed since 1946.

Merger Proposal Stalemates Balboa Case

General feeling among airlines involved in the three-year-old Balboa through service case is that Civil Aeronautics Board's proposed merger of Braniff Airways and Panagra routes in South America has made final settlement impossible (AVIATION WEEK Apr. 5, p. 88).

The Board's action has left the carriers in a state of complete confusion.

Here are latest developments:

• **Braniff,** standing to benefit, is pushing hard for such a merger, seeing an opportunity to bring its losing international operations out of the "red."

Rex Brock, vice president for traffic and sales, says a merger with Panagra may be effected in the near future, holding that it would be in accordance with CAB's "recommendation." The airline is preparing concrete proposals for the Board.

• **Panagra,** on the other hand, issued this statement: "It is clear that the CAB opinion does not specifically envisage a merger of the two companies." Panagra officials are careful to substitute the word "suggestion" against Braniff's use of "recommendation" when referring to the Board's action.

The Board says it proposes the merger with a view to eliminating the wastefulness of existing duplication of routes.

But Panagra offers for analysis CAB's own statement in support of such a merger: ". . . . Braniff shareholders may obtain the opportunity of disengagement from what has not been a particularly successful undertaking from their standpoint, as well as to remove the present doubt as to their ability to retain the full measure of future profit earned on their domestic system . . ."

• **Other proposals** in the case, involving provision of one-plane service between New York and Balboa, C. Z., seem doomed unless the President intervenes. These proposals include equipment interchange agreements between Pan American World Airways, Panagra and Eastern Air Lines as well as between National Airlines and Braniff.

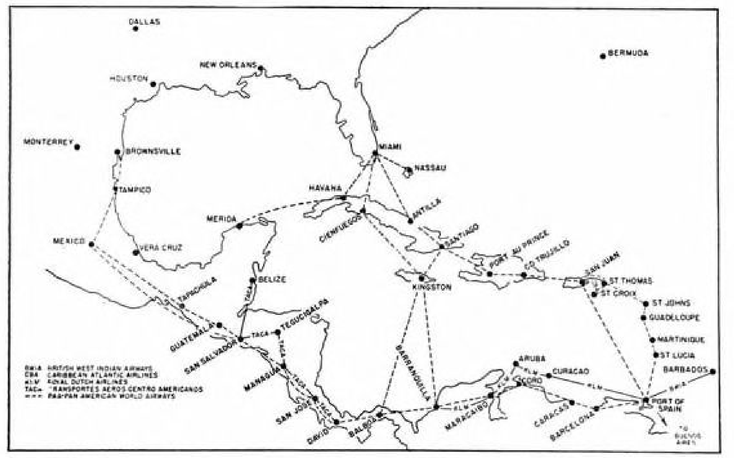
► **Strong Resistance**—From all indications there is strong resistance to the establishment of an independent airline such as the Board envisions. CAB, on the other hand, in coming up with the proposal and deferring decision for 60 days, has shown that it will not consider now any of the previous interchange requests. The result is a stalemate.

► **Losing Operation**—Some airline officials term the latest action as "the most ridiculous move made by the Board in recent years," holding that CAB is trying to make up for having introduced Braniff's losing international operation in the first place.

Originally, Braniff's sole operation was domestic, in 1946, however, CAB extended the carrier's routes via Havana to the Panama Canal, down the west coast of South America as far as Peru and across the Andes to Brazil and Argentina. At the time, Braniff had testified it would require government assistance of only $124,000 to break even.

For the next five years the airline steadily lost money on the operation. In 1951, in an effort to strengthen Braniff, the Board allowed extension of operations into Miami on a temporary basis. The effect of this was an increase in Braniff's subsidy requirements from about $2 million to an estimated $3½ million a year.

► **PAA Proposal**—The Balboa case also was instituted in 1951, when Pan American proposed that PAA planes (including those of Panagra) operating out of Miami should fly to New York



PREWAR CARIBBEAN network shows striking contrast to today's overlapping routes.

by the charter of Pan American aircraft over Eastern's route between Miami and New York. This would be at no cost to the government, passengers would not change planes and EAL would be credited for the Miami-New York segment of the flight.

This proposal was opposed by both Braniff and National. An adverse CAB decision was held up for eight months by President Truman until a few days before leaving office, when he returned it to the Board with instructions to resubmit it to President Eisenhower.

Eisenhower returned it to CAB for further hearings and a new recommendation. Following hearings, an examiner urged the Board to recommend full approval of the interchange arrangement (including through service to West Coast points). But CAB came up with the independent airline proposal instead.

Pan American holds that approval of the original interchange agreement would result in a saving of more than $1.5 million a year, even if Braniff's status was left unchanged.

► **Present Predicament**—The feeling is widespread among industry observers that the Board got the airlines and itself in this present predicament by certificating Braniff for South American service eight years ago. In the recent opinion, member Oswald Ryan, although concurring, seemed to share this feeling.

In a separate opinion, Ryan points out the following:

• The trouble really started in 1946 when the Board certificated Braniff to compete with PAA and Panagra to break their "monopoly" in the Caribbean and South America.

• The vast traffic potential upon which the 1946 decision was based has failed to materialize due to unexpected heavy foreign competition.

• As a result, Pan American—which was making a $2-million profit then—had to have an $11-million subsidy from the taxpayers last year for its Latin American operations.

• Panagra, which had a $963,000 subsidy in 1946, had to be given a $2-million-plus subsidy in 1953.

• Braniff, which was to come in and stimulate competition and generate new traffic, needed $3 million last year. Before inauguration of Latin American operations, it had needed only $563,000.

• Taking the combined subsidies of the three airlines, the total is $15 million higher than in 1946.

• Ryan had opposed the 1946 decision to certificate Braniff for Latin America.

Observers feel Ryan's statement with regard to unexpected foreign competition is well founded. As late as 1940, there were only 10 international airlines serving the Caribbean and Latin America (see map), but today there are over 50 international carriers serving the same area (see map).

► **Antitrust Suit**—There has been much criticism of the fact that CAB, in rendering its most recent opinion in the case, based a large part of its conclusion on the antitrust suit currently pending against PAA and W. R. Grace & Co. to divest them of control of Panagra (AVIATION WEEK Apr. 5, p. 88). Indications are that the Board is assuming the guilt of PAA and Grace before the case is decided.

Ryan takes strong exception to this policy, too, stating: "I cannot agree with the propriety of relying upon the pending antitrust suit as a basis for the Board's thinking in the present case. It is one of the most cherished traditions of our American jurisprudence that an accusation does not establish the fact.

"Furthermore, the Board's suggestion that Pan American and Grace might 'save the expense and hazards of the Attorney General's suit by disposition of control of Panagra' is likely to be misunderstood as an indirect pressure to force changes in the route pattern which the Board deems desirable, and which has nothing to do with the merits of the question involved in the Attorney General's suit."

Ryan points out that reliance on the antitrust suit is particularly inappropriate in the case of the through flight agreement, since CAB approved this agreement "as not being adverse to or inconsistent to the public interest." Ryan notes that at this time the Board was fully aware of the difficulties arising from the joint ownership of Panagra and had been conferring with the Department of Justice on the matter.

► **'Improvement'**—In approving the through flight agreement, CAB had stated that it considered the arrangement to be "an improvement over the past situation . . . and that such transaction does not result in creating a monopoly."

To consider that the filing of the pending suit now has a prejudicial significance for the through flight arrangement seems inconsistent with CAB's previous statements, says Ryan. —FS

House to Probe PAL Route Shutdowns

(McGraw-Hill World News)

Manila, P. I.—The Philippine House of Representatives has ordered a full-dress investigation into charges that Philippine Air Lines forced the shutdown of its long-range international services (AVIATION WEEK Apr. 5, p. 11) through extravagance plus demands for more funds.

Rep. Cabangbang, former USAF and Philippine air force officer and onetime Assistant Civil Aeronautics Administrator here, touched off the probe by charging PAL management "cornered" President Ramon Magsaysay into ordering the suspension by failure to submit an acceptable alternative.

► **PAL Conditions**—The government-airline's conditions for continuing its international operations, the legislator said, included:

• **Annual subsidy** of $750,000.

• **Government-guaranteed** loan of $1.5 million from the Philippine Reconstruction Finance Corp.

• **A $5-million** World Bank loan for purchase of jet-powered air transports.

• **Authority** to set up a separate corporation, PAL International, with 32% U.S. capital participation.

Cabangbang claimed there was no need for PAL to lose money last year on its overseas operations or to shut

down the international services, thereby sacrificing the nation's most effective medium of advertising throughout the world.

▶**High-Paid U. S. Executives**—The airline's management was extravagant, he said, kept a worldwide network of expensive offices and employed U. S. pilots and high-paid American executives in positions that could have been filled by Filipinos at much lower salaries than those paid the Americans.

The representative also revealed a hitherto-undisclosed offer by Transocean Air Lines to manage the Philippine international services for two years at a much lower subsidy than the one asked by PAL. This offer was not considered, he said.

▶**New Impetus**—Meanwhile, suspension of all overseas routes but those to Hong Kong, Bangkok and Taipei has given new impetus to the projected negotiation of a new air agreement between the governments of Britain and the Philippines.

Disagreements that last year led to abrogation of the pact by Britain now can be expected to smooth out amicably, because the Philippines no longer need protect PAL from international competition with British Overseas Airways Corp.

▶**PAL's Spoils**—Also interested in the spoils of PAL's international shutdown are Qantas Empire Airways and KLM Royal Dutch Airlines.

But the Philippine Foreign Office is not committing itself hastily. It is trying to find a formula that will do justice to the various foreign airlines while, at the same time, securing the greatest benefit to PAL's limited regional services.

TWA, EAL Forecast Coach Gains

Eastern and Trans World Airlines' officials see increased profits in 1954 because of anticipated gains in aircoach travel after the past year of declining incomes.

TWA's president Ralph S. Damon says: "The increasing tendency toward longer paid vacations and the desire of Americans to travel at home and abroad leads us to believe that 1954 will show an increase in airline revenues. TWA as a leader in the air tourist market should be able to capitalize on this opportunity."

Eastern's board chairman, Eddie Rickenbacker, reports: "Although revenue from aircoach operations is substantially less per passenger-mile than that produced by regular fare tariffs, it is confidently expected that . . . before long, new traffic volume developed through aircoach service will account for 65% of our total passenger-miles.

"All four-engine equipment in our fleet replacement program was designed for ready conversion to this type of service when needed."

▶**Specialized Operation**—Rickenbacker adds in his company's annual report, that the first-class market has been the principal source of EAL's revenue.

However, he says, with the greatly increased seating capacity that many of Eastern's present and most of its future transport aircraft will provide, "it is doubtful that this first-class market can expand proportionately."

First-class operation will become "more and more specialized for high-priority business and personal travel," he predicts.

▶**Income Drops**—TWA's net income for 1953 was $5,064,392, or $1.52 per share of outstanding stock, compared with $7,660,588, or $2.30 per share in 1952 (Aviation Week Apr. 5, p. 7).

EAL had net profit of $7,921,367 or $3.20 per share, compared with $8,513,681, or $3.43 per share in 1952 (Aviation Week Apr. 12, p. 7).

Failure of net income to keep pace with the growth of TWA's business, says Damon, resulted primarily from two factors:

- **Increase** of $6,454,781 in depreciation charges resulting from additions to the airline's fleet.
- **Continuation** of temporary mail rates applying to the International Division.

Rickenbacker blames his loss in profits from broad economic readjustment in general business that began the latter part of August. The last quarter of 1953 reflected a steadily narrowing margin between expenses and revenues.

▶**Rate Policy Criticized**—Damon reiterates his claim of last year that the temporary mail rate in the International Division "was designed by the Civil Aeronautics Board to yield no return on TWA's investment in that division." The International Division in 1953 incurred a net loss of $155,390 before provision for income tax, he points out, whereas the Domestic Division, on a nonsubsidy mail pay basis, earned a profit before income tax of $10,051,876.

The TWA chief executive calls the temporary rate policy "unfair, especially in view of the fact that no permanent rate has been established during the

Vickers Develops Jet Transport From Valiant Bomber

Scale models of the new Vickers 1000 jet transport (right), now under construction for RAF, and the Vickers Valiant jet bomber, from which the 1000 is derived, show certain similarities—particularly in wing planform and engine mounting. Comparative sizes also are shown by the models. The Vickers 1000 is to be powered by four Rolls-Royce Conway bypass jets and will have seats for 150 troops. The manufacturer says a commercial version of the 1000 could cross the Atlantic nonstop.

entire eight years of TWA's international operation."

► **Revenues Increase**—Eastern's passenger revenue reached a new high of $136,462,724 in 1953, 21% above 1952. Aircoach service accounted for $31,488,032 or 23% of the total passenger revenue, 50% higher than 1952. Airfreight increased to $1,726,601, 18% higher than 1952. Air express totaled $1,700,380, increasing 3%. Airmail revenue increased from $2,629,872 in 1952 to $3,068,285 during 1953, a gain of 16%.

TWA's passenger revenue was up from $135,291,696 in 1952 to $159,878,043 last year. Freight and express increased from $9,504,064 to $10,635,236. Transcontinental mail revenue was $5,741,654, compared with $4,969,838 in 1952. International mail was $3,823,239, compared with $3,568,170. Mail pay from foreign governments decreased from $3,199,765 in 1952 to $2,784,374 in 1953.

ATA Claims Mail Test Saves 3.5 Billion Hr.

Post Office Department's experiment in flying a portion of first-class surface mail between major cities has saved 3.5 billion hours of delivery time, Air Transport Assn. claims.

Earl D. Johnson, ATA president, says "this test mail has not only been carried more than five times as fast as when ground transportation was used, but on every ton of mail flown on these tests . . . the Post Office has received from the public $2,310 a ton for transporting and handling this mail."

After paying the airlines for flying this mail, Post Office has been able to retain more than $2,000 of that sum, ATA says.

The association has developed the following statistics on the New York-Chicago and New York-Miami, Jacksonville-and-Tampa-Chicago experiment:

"Between New York and Chicago, an air distance of 724 miles, at 18.6 cents a ton-mile, scheduled airlines received $134.66 per ton for handling the first-class surface mail. Thus, the airlines received only 5.8% of postal revenues for flying the New York-Chicago mail, while the remaining 94.2%, or $2,175.34 is available to the Post Office.

"Of the total sum of $10,325,700 the Post Office has received on all routes, it has an excess of $9,554,666 or 92.5% overpayment to the carriers."

CAB ORDERS

(Mar. 31-Apr. 8)

ORDERED:

Pioneer Air Lines to show cause why CAB should not set mail rates for the carrier.

Northwest Airlines to show cause why the Board should not set temporary mail rate over trans-Pacific routes.

Pan American World Airways to show cause why CAB should not fix temporary mail rate in trans-Pacific traffic.

Investigation into reduced fares asked by Pacific Northern Airlines, Alaska Airlines, Cordova Airlines, Northern Consolidated Airlines, United Air Lines, West Coast Airlines and Western Air Lines.

Severance of Turkish portions of PAA's application for a change in its European route system and consolidation of its application with that of Trans World Airlines for a change in its European route system.

Southwest Airways Co. to show cause why CAB should not fix its mail rates.

Investigation into Pan American's proposed rate of 10 cents per pound of foodstuffs, spices and beverages flown between San Juan, P. R., and New York.

ISSUED:

Foreign air carrier permit to Aerovias Interamericanas de Panama, S. A.

GRANTED:

Minneapolis-St. Paul Metropolitan Airports Commission leave to intervene in the application of North Central Airlines to serve International Falls, Minn., on a year-round basis.

Colonial Airlines' temporary exemption in order to serve Philadelphia-Camden, N. J., on its Syracuse, N. Y.-Washington, D. C., route, provided it does not transport local traffic from Philadelphia to Camden and Washington.

APPROVED:

Intercompany agreements between Capital Airlines and Delta-C&S Air Lines and various other carriers.

South Atlantic passenger fares and cargo rates agreed to between Pan American and various other air carriers.

Interlocking relationships of Fred R. Atkins, A. J. Baughman, Central Air Transport and Viking Air Transport Co.

DENIED:

Hawaiian Airlines' request that a report filed Dec. 15, 1953, with the Board be returned or permanently withheld from public disclosure.

Delta-C&S Air Lines' petition for reconsideration of CAB's former order denying the carrier's application for temporary exemption to serve Ft. Wayne, Ind.

Alaska Airlines' petition to reconsider suspension of its proposed reduced States-Alaska fares.

Bonanza Air Lines' motion to defer decision in its certificate renewal case.

AUTHORIZED:

Frontier Airlines' change in service pattern to omit service at Greybull, Wyo.

STAYED:

Effectiveness of its order disapproving interlocking relationship involving Robert Lehman, Joseph A. Thomas, Frederick L. Ehrman, Pan American, National Airlines, and Continental Air Lines for 30 days.

EXEMPTED:

Flying Tiger Line temporarily to enable the airline to carry farm laborers between British West Indies and the U. S.

CONSOLIDATED:

Application of Hawaiian Airlines into the trans-Pacific renewal case.

IATA Studies Jet Fuel Specs

International Air Transport Assn.'s technical committee has set up a special working group to determine uniform specifications for jet and turboprop fuels to be used by the world's scheduled airlines. The group is headed by J. T. Dyment, Trans-Canada Air Lines' engineering director. Left to right: J. T. Hendren, Pan American World Airways' chief chemist; R. C. Morgan, British European Airlines' chief project and development engineer; J. N. Robinson of IATA; Dyment; PAA vice president-chief engineer A. A. Priester; P. Lamoureux, TCA materials and process engineer, and IATA technical committee secretary Stanislaw Krzyczkowski. Other members of the jet fuel committee not present include: A. C. Campbell Orde, British Overseas Airways Corp.'s operations and development director, and Air France technical director Raymond Dupre. Group is pictured at IATA's Montreal headquarters.

SHORTLINES

► **Alaska Airlines** showed a 22% increase in ton-miles carried during 1953, with a general gain in revenues of 23%. Overall performance factor climbed nearly 10%.

► **New York Airways** carried 354 passengers in its helicopters during March, compared with 219 for February; 257,800 lb. of mail were flown, against 214,800 lbs.; airfreight totaled 27,000 lb., compared with 22,000 lb.

► **Northwest Orient Airlines,** after a lapse of almost four years, is resuming service to Seoul, Korea. Two of the four weekly flights to Pusan will be diverted to Seoul, providing each city with two weekly flights.

► **Pacific Northern Airlines** added five additional nonstop flights between Seattle and Anchorage Apr. 15, running the total to 19 per week.

► **Pan American World Airways** will fly tourists from the U. S. to Europe next May 30 on a special 41-day tour of World War II invasion beachheads in France and Italy. The trip is arranged by Transmarine Tours, New York.

► **Pioneer Air Lines** has started its fifth consecutive sales program, aiming for a 50% load factor on all flights in 1954, an average of 10.5 passengers per plane-mile and a total of 38,555,000 revenue passenger-miles.

► **Queen Charlotte Airlines** has averted bankruptcy through an $80,000 Canadian government subsidy, and resumed service to Kitimat, site of the Alcan development, about 350 mi. north of Vancouver.

► **Sabena Belgian Airlines** has stepped up daily helicopter passenger flight frequencies in Europe, increasing S-55 trips to two between Brussels and Lille, France, and to three on its Brussels-Antwerp-Rotterdam service.

► **Trans-Texas Airways** carried a total of 10,450 passengers in March, a 65% increase over the same month last year and an 8% increase over February 1954.

► **Wisconsin airports** have asked Civil Aeronautics Board to authorize airlines to enter into contracts with field operators for ticket sales, weather observations and other services now handled by airline personnel. The operators, represented by Wisconsin Aviation Trades Assn., say the agreements may remove the threat of loss of local service because of high cost to the airlines.

SPECIAL SERVICES TO THE AVIATION INDUSTRY

SEARCHLIGHT SECTION

(Classified Advertising)

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$1.80 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.	*Individual Spaces* with border rules for prominent display of advertisements.
Position Wanted undisplayed advertising rate is ½ the above rates payable in advance.	The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
Box Numbers count as one line.	*An advertising inch is measured* ⅞" vertically on one column, 3 columns 30 inches to a page.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.	*Closing Date: 11 days before issue date.*

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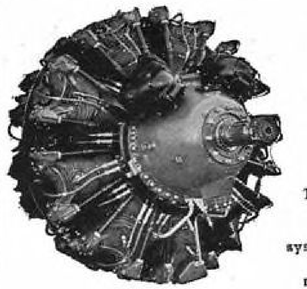

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Pump	Pesco	1H-260K	195
Pump	Thompson	TFD8600	75
Cylinder Hyd.	Grumman	5359404	417
Heater	Surface Combustion Co.	83A9	6
Heater	Stewart Warner (200,000 BTU)	921B	230
Blower	Dynamic Air Engine	4582-AA-6C	18
Blower	Joy Manufacturing Co.	U-702-15	24
Tank Unit	Minn. Honeywell	G-1098D	11
Trim Tab Controller	Pioneer	15701-1A	15
Oil Cooler Assembly	U.A.P.	U8416-MM	12
Oil Cooler Assembly	U.A.P.	U8013-MM	14
Hydraulic Pump	Vickers	PF12-713-25BCE	124
Hydaulic Pump	Vickers	PF4-713-20BCE	327
Hydraulic Pump/ 3000 P.S.I.	Vickers	MF45-3911-20Z	43
Hydraulic Cylinder	Air Associates	HC2109	29
Hydraulic Cylinder	Air Associates	HC2110	8
Fire Detector	Edison	117-47	46
Fire Detector	CO_2 Mfg. Co.	ASDC2	65
CO_2 Cylinders	Kidde	981280	185
CO_2 Cylinders	Kidde	M870036B	47
Anti-Icer Pump	Adel	D7818	125
Auxiliary Power Unit	Eclipse	NEP-2	29
Auxiliary Power Unit	Lawrence	LER-30D	16
Pump	Pesco	1E-621	8
Pump	Pesco	2E258SA	21
Separator	Pesco	3V-217-HC	32
Accumulator	Vickers	AA14002A	35
Actuator	Air Associates	M-2031	22
Wobble Pump (D-3)	Erie Meter	AN4014	17
Oxygen Cyl.	Kidde	923748	74

ENGINE ACCESSORIES

Starter	Eclipse	1416-12E	75
Generator	Eclipse (NEA-3A)	716-3A	100
Starter Motor	Jack & Heinz	JH950-R	90
Generator	G.E.	2CM46A2	4
Generator	Eclipse	1003-4	71
Carburetor	Stromberg	PD12K10	550
Carburetor	Stromberg	PR48-A1	236
Carburetor	Holley	1685-HAR	90
Carburetor	Holley	1375-F	19
Magneto	Scintilla	SF9-LN-2	407
Fuel Pump	Pesco	2P248EB	6
Fuel Strainer	U.A.P.	U635A	76
Governor	Woodward	5x18	10
Prop. Reversing Control	Ham. Standard	72400	20
Oil Separator	Eclipse	564-2A	384
Oil Filter	Purolator	27314	100
Pressure Relief Valve	Aerotec	V301B7	20
Tachometer	Eclipse	2227-11-D3A	11
Vacuum Pump	Eclipse	610-2C	6
Spark Plugs	Aero	LS4-AD1	185,000

AIRCRAFT ENGINES & PARTS

Engine	Wright	R-1820-52	1
Engine	Wright	R-1820-54	16
Engine	Wright	R-1820-60	4
Engine	P & W	R-1830-43	1
Bearing	P & W	1045A	166
Flange	P & W	3506	500
Follower Assy.	P & W	8288	130
Blower Assy.	P & W	3M814	814
Shaft	P & W	48362	53
Shaft	P & W	48363	75
Gear	P & W	48461	390
Gear	P & W	76236	78
Bearing	P & W	84289	1178
Housing	P & W	84487	113
Nose Housing	P & W	84591C	77
Crankcase Assy.	P & W	84350-D	200
Pump Assy.	Wright Aero	420313	33
Drive Assy.	Wright Aero	416421	46
O.E.C. Unit		FM1	36

AIRCRAFT ENGINES & PARTS (Contd.)

Description	Mfg.	Part No.	Quan
O.E.C. Unit		PY4M(B24)	17
Bearing	Torrington	NR6L12	25790
Bearing	Fafnir	AN200-K3L2	18273

GAUGES

Compass	Eclipse	36001-0	20
Gyro Indicator	Eclipse	14601-1F-B1	11
Gyro Indicator	Eclipse	10078-1AG	62
Position Indicator, Wheel & Flap	Weston	AN5780-2	400
Position Indicator, Wheel & Flap	G.E.	AN5780-2	1000
Position Indicator, Wheel & Flap	Eclipse	20100-11C-4-A1	23
Pitch Trim Gauge	Eclipse	15100-1B-A1	19
Cowl Flap Indicator	G.E.	8DJ29AAY	21
Oil Temp. Indicator	Lewis	77C3	23
Oil Temp. Indicator	Lewis	77C4	13
Oil Temp. Indicator	Weston	828TY13Z2	71
Manifold Pressure Gauge	Manning, Maxwell & Moore	AN5770-2	28
Fuel Quantity Gauge	Eclipse	3801-3B	128
Dual Carb. Temp. Gauge	Weston	828TY12Z2	40
Carb. Air Temp.	Lewis	77C3	22
Carb. Air Temp.	Weston	119862	40
Air Temp. Gauge	Weston	727TY70Z2	11
Air Temp. Gauge	Weston	727TY72Z2	85
Air Temp. Gauge	Weston	727TY73Z2	88
Air Temp. Gauge	Weston	727TY74Z2	83
Air Temp. Gauge	Weston	728-40Z2	10
Air Temp. Gauge	Weston	727-TY37P	298
Air Temp. Gauge	Lewis	47B22	33
Air Temp. Gauge	Lewis	47B23	28
Air Temp. Gauge	Lewis	47B24	54
Air Temp. Gauge	Lewis	47B21	30
Cylinder Head Temp.	Lewis	76B19	8
Torque Indicator	Eclipse	20100-42B-14A2	9
Tachometer Indicator	G.E.	8DJ13ABK	6
Tachometer Indicator	Eclipse	2222-1F-2A	200
Magnesyn Pos. Indicator	Eclipse	20000-8-A14	9
Magnesyn Transmitter	Eclipse	20000-43A-13A1	8
Magnesyn Indicator	Eclipse	23000-2A	67
Pressure Transmitter	Eclipse	22101-11-A4	15
Pressure Transmitter	Giannini	47114-D2.0-20	8
Differential Pressure Gauge	Kollsman	906-6-011	22
Differential Pressure Gauge	Kollsman	254BK-6-052	48

AIRCRAFT (RADIO)

Transmitter	Bendix Radio	TA-12B	20
Receiver	Bendix Radio	RA10-DB	35
Amplifier (PB10)	Eclipse	15401-1	10
W.E.D. Mount	U. S. Gauge	AW-CV-1-1	180
Amplifier	Eclipse	12086-1C	11
Radio Noise Filter	G.E.	1C-200	740
Radio Noise Filter	G.E.	NF10084	959
Tube		JAN6AL5	327
Standing Wave Ind.	Hewlett Packard	415A	3
Antenna Switch	Bendix Radio	MS49A	26
Control	Bendix Radio	3616	81
Station Box	Bendix Radio	3620	23
Insulator	Bendix Radio	MT48C	518

ELECTRICAL PARTS

Plug	CAKZ	UG-21/U	1979
Transformer	Eclipse	DW33	11
Transformer	Eclipse	DW28	80
Transformer	Eclipse	DW47	33
Transformer	G.E.	70G3	26
Servo Motor	Transcicoil	#1300-20	57
Motor	G.E.	5BA40NJ1A	425
Motor	G.E.	5DP65-MB1	189
Motor	G.E.	5BA25D-J4B	44
Motor	Airesearch	26675	25
Motor	Diehl	FD65-5	21
Circuit Breaker	Spencer	PM-5	2094
Valve	Parker	AN5831-1	60
Valve	Eclipse	612-4A	130
Valve	Kohler	K1593-6D	1888
Valve (0-500PSI)	Bendix	146102	46

ELECTRICAL PARTS (Contd.)

Description	Mfg.	Part No.	Quan.
Circuit Breaker	Spencer	C6363-1-5A	115
Circuit Breaker	Spencer	C6363-1-2A	115
Circuit Breaker	Heinemann	AM1614-80	1700
Circuit Breaker	Cutler Hammer	6141-H69A	237
Amplidyne	G.E.	5AM31JJ9A	31
Amplidyne	G.E.	5AM31NJ10	111
Switch	Kidde	A-4614	151
Ignition Switch	Scintilla	AN3213-1	70
Ignition Switch	Nesco	A-9(94-3226)	250
Master Switch	Jos Pollack	M862A	66
Thermo Switch	Fenwall	17322-2	126
Heater Control Switch	White-Rodgers	1033-4E1	287
Air Ram Switch	Minn. Honeywell	PG208AS1	148
Air Ram Switch	Minn. Honeywell	PG208AS7	40
Pressure Switch	Aerotec	M-101-B	20
Pressure Switch	Eclipse	3135-11C	88
Impact Switch	Kidde	SA/3A	18
Switch	C.H.	8909-K99	2000
Dome Light	Grimes	AN3096-4	2585
Dome Light	Grimes	AN3096-5	775
Dome Light	Grimes	AN3096-6	1365
Plug	Cannon	NAF310310-4B	2747
Plug	Cannon	NAF310310-5B	402
Relay	Leach	7264-404	47
Relay	Leach	7210	24
Relay	Allied	BOBX-2	31
Relay	Square D	82A	718
Relay	G.E.	CR2791-G100-K4	281
Relay	G.E.	CR2792F101-A3	626
Relay	Guardian	G34464	41
Relay	Guardian	G31502-A	350
Relay	C. P. Clare	D2060	45
Control Box	Vapor Car Heating Co.	9804B	34
Compensator	Vapor Car Heating Co.	46B311	25
Solenoid	Interstate Aircraft & Eng. Co.	A812	202
Flex. Cable	Airesearch	25432	66
Temp. Control	Fulton Syphon	715E	52
Noise Filter	Mallory	NF3-5	500
Regulator	G.E.	3GBD1A18A	13

VALVES

Valve	Kidde	982585	326
Valve	Oh. Chem.	AN-60009-1B	325
Valve (3000 PSI)	Parker	2-1046-76	47
Restrictor Valve	Parker	SP4-2746-77	68
Restrictor Valve	Parker	SP4-2746-78	105
Restrictor Valve	Parker	SP4-2746-79	40
Restrictor Valve	Parker	SP4-2746-80	48
Restrictor Valve	Parker	SP4-2746-81	60
Restrictor Valve	Parker	SP4-2746-76	142
Restrictor Valve	Adel	18784	33
Cone Check Valve	Parker	PL2-2546-75	127
Cone Check Valve	Parker	PL2-2546-76	123
Cone Check Valve	Parker	PL2-2546-77	620
Cone Check Valve	Parker	PL2-2546-78	540
Check Valve	Parker	PLY-843-54	112
Check Valve	Parker	PL2-1846-77	23
Check Valve	Kenyon	19100-2-101B	67
Check Valve	Eclipse	557-5	9
Check Valve	U. S. Gauge	AW-CV-1-1	180
Valve	Parker	6-746-10	68
Valve	Vickers	AA31400	28
Restrictor Valve	Adel	18784	33
Lock Valve	Adel	12924-2	85
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Selector Valve	Adel	D9530	478
Selector Valve	Adel	D9530-2	668
Selector Valve	Adel	D9560-2	428
Selector Valve	Adel	D9632	179
Selector Valve	Adel	D9696	237
Selector Valve	Adel	D10044	744
Selector Valve	Adel	D10051	244
Solenoid Valve	United	37D6210 (AN4078-1)	2200
Magnetic Valve	General Control	AV1B1174	114
Throttling Valve		73-A-01	1865
Relief Valve	Airex	1265-900	240
Pressure Relief Valve	Aerotec	V301B7	20
Valve	Aero Supply	74247 (TyPH3)	814
Valve	Whittaker	AN5830-1	335
Valve	Whittaker	AN5830-6	74
Underwing Fueling Valve	Parker	7-2646-12	5
Disconnect Valve	Allen	5QD1800N	148
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FEATURE PAGE

ANDB's New Executive Director

One of the best things that has happened to aviation in a long time was the recent White House appointment of USAF's Col. J. Francis Taylor as the executive director of ANDB. This being one of the top jobs in the industry, it follows that the person in it can have a mighty effect on things—whether they be Cub or jet flying or manufacturing. It is therefore a distinct pleasure to see a man of the calibre of Col. "Jack" get the nod.

Readers of this space may have noted over the years a refrain concerning the need for more operational know-how on planning committees and in policy-making offices. There have, of course, been many instances of good pilots in key jobs—ANDB previously had one in the person of USAF's Col. Sam Mundell—and here and there another can be found. But still, as a general observation, it seems that this type of person is more often conspicuous by his absence.

Personnel trained solely in engineering, electronics, etc., while sorely needed on many projects, are severely handicapped if they are lacking in an understanding of the operational aspects of aviation. This one-sidedness has been responsible for some wonderfully weird systems and gadgets.

► **Fortunate Choice**—It therefore is a fortunate choice to see a man at the head of ANDB who has a thorough understanding of the primary aims of aviation. While it would be unfair to attempt to list the dozen or so most outstanding aviation people in the country (because someone would undeservedly be left out), there is no question that the name of J. Francis Taylor would have to appear on it. Running ANDB is certainly no picnic, and the colonel will surely meet his share of headaches. But the organization will be the better for his presence and from this cockpit we wish him luck.

Part 40 Revised—or Back to Sense

Way back last summer (AVIATION WEEK Aug. 3, 1953), this writer pointed out the fallacy of prescribing a synthetic trainer to substitute for certain aeronautical operations. Specifically, I called attention to the then new CAR Part 40 wherein a pilot, in order to maintain route qualifications, was allowed to make a synthetic trainer approach in lieu of an actual entry to each airport along the route.

It was pointed out at that time that besides the stupendous bookkeeping entailed it was just plain stupid to believe that a synthetic trainer could substitute for a look at an airport. So, it is indeed a happy occasion to see that CAB has ruled in favor of our point of view by eliminating this irritating regulation.

Pilots henceforth will revert to the old method of merely making a round-trip over the route. CAB attributes the change to an impossible task of bookkeeping. Well, anyway, its nice to get back to common sense again.

Word From the East

This past Christmas we printed in this space an "Aviation Tale" (AVIATION WEEK Dec. 21, 1953). It concerned the emperor of Ethiopia and three "royal wishes." Since the business of royalty is strictly out of my line, I consulted one of those dollar almanacs to learn the gentleman's title.

Shortly thereafter the mail arrived chiding me for my improper etiquette in referring to his imperial majesty as a plain royal highness and his empire as a mere kingdom. Thank you Reader Struck, and my apologies to the Lion of the Conquering Tribe of Judah.

AVIATION CALENDAR

Apr. 21-23—Air Line Pilots Assn., second annual Air Safety Forum, Chicago.

Apr. 22-23—Joint meeting of Radio Technical Commission for Aeronautics, Franklin Institute Laboratories, Institute of the Aeronautical Sciences (Philadelphia Section) and Institute of Radio Engineers (Philadelphia Section), Franklin Institute, Philadelphia.

Apr. 26-30—American Society of Tool Engineers, 10th biennial industrial exposition, Convention Hall, Philadelphia.

Apr. 29—Institute of Navigation, eastern regional meeting, Friendship International Airport, Friendship, Md.

May 5-7—Third International Aviation Trade Show, managed by Aircraft Trade Shows, Inc., 71st Regiment Armory, New York.

May 6-8—Institute of the Aeronautical Sciences, first annual West Coast Industry-Faculty Conference and fourth annual West Coast Student Conference, Los Angeles.

May 5-7—American Society of Training Directors, 10th annual conference, Hotel Schroeder, Milwaukee.

May 10-12—Institute of Radio Engineers, National Conference on Airborne Electronics, Biltmore Hotel, Dayton, Ohio.

May 10-13—Society of Aeronautical Weight Engineers, 11th annual conference, Lord Baltimore Hotel, Baltimore.

May 11—Daniel Guggenheim Medal Board of Award, annual meeting for preliminary selection of 1954 candidates, Engineering Society Building, New York.

May 16-19—American Association of Airport Executives, convention, Louisville, Ky.

May 17-18—National Fire Protection Assn., Aviation Seminar, Hotel Statler, Washington, D. C.

May 17-20—Basic Materials Exposition and Conference, International Amphitheater, Chicago.

May 20—Women's National Aeronautic Assn., 1954 Skylady Derby for stock model aircraft of 300 hp. or less, Raton, N. M. to Kansas City, Mo.

May 21-22—Operations Research Society of America, second annual meeting, Edgewater Beach Hotel, Chicago.

May 31-June 11—Canadian International Trade Fair, to be held in conjunction with the National Air Show and Canada's Aviation Day, Toronto.

June 2-4—Triennial industry inspection of NACA's Lewis Flight Propulsion Laboratory, Cleveland, Ohio.

June 5-12—Philadelphia Junior Chamber of Commerce, second annual Transcontinental Air Cruise for stock model aircraft of 300 hp. and less, Philadelphia to Palm Spring, Calif.

June 9-11—American Society for Quality Control, 8th annual convention, Jefferson Hotel, St. Louis.

June 21-24—Institute of the Aeronautical Sciences, annual summer meeting, IAS Building, Los Angeles.

June 24-26—American Helicopter Society, 10th annual forum, Washington, D. C. Technical sessions: Mayflower Hotel, June 24-25; copter air show at Polo Field, June 26.

ADVERTISERS IN THIS ISSUE

AVIATION WEEK—APRIL 19, 1954

SEARCHLIGHT SECTION

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

EDITORIAL

Supplemental Services Promote Aviation

Utmost economical development and utilization of the airplane is vital in this era, when speed means so much to commerce and military affairs.

The government's Air Coordinating Committee will have an opportunity shortly in its forthcoming statement of air policy to clear away some of the confusion and enunciate a firm stand for maximum use and encouragement of the country's irregular operators without imperiling the financial foundations of any other segments of the commercial airline industry.

The big certificated carriers have aimed most of their fire at the low-fare passenger services a few of the irregular carriers have been conducting parallel to the scheduled airlines' transcontinental and seaboard runs.

Actually, there are few independents still engaged in this route-type, ticket-selling service between major cities. The few still operating claim they generate new traffic and compete very little with scheduled lines. This may be true, but surveys made by AVIATION WEEK in New York and Washington seem to indicate that the certificated carriers have taken up most of the slack in the public demand for low-fare transcontinental service, between four cities—New York and Washington to Los Angeles and San Francisco—and there is no question that they are offering fast, frequent and otherwise-excellent service to the public for the money—thanks mainly to the nonskeds for revealing the potential size of the market in the first place! There still is much to be done to develop this traffic further, however, as both scheduled and nonscheduled lines themselves probably realize.

Opposition to allowing any degree of regularity by the independent carriers in parallel services is deeply rooted, and perhaps the maximum need for such operations is past, although the independents point out that only about 50 out of 560 scheduled-airline cities are served by scheduled coach, and some of these flights are at night and odd hours.

It is certainly unfair and unrealistic to refuse to permit the independent carriers any legal place in the domestic commercial air transport picture.

Senator Pat McCarran, co-author of the Civil Aeronautics Act, in pointing out that the independents (nonscheduled or irregular operators) are not covered by the act, puts it succinctly:

"By seeking to write a definition of an irregular carrier they (Civil Aeronautics Board) have made it difficult for a conscientious operator, who honestly seeks to run an irregular service, to know whether he is operating within the law or not. In the same way, they have opened up an avenue for evasion of the law, of which great advantage has been taken."

Yet the Civil Aeronautics Act is dedicated to the principle of promoting and developing **all** aviation—not a part of it—for the postal service, commerce, and national defense.

Despite all the attention that has been directed at the so-called parallel common carrier passenger services, the independent companies draw part—in most cases all—of their livelihood from plane-load charter work that does not compete with scheduled, certificated airlines. It seldom is made clear to the public that the scheduled, certificated airlines are limited by Civil Aeronautics Board in off-line charter mileage to 2-½% per quarter of the revenue scheduled miles in the previous 12 months, or about 10% of the scheduled revenue miles. This means that a great potential is left for independent enterprise.

Since World War II, the charter potential has been indicated by independent traffic in passengers as well as a variety of cargo. Plane-load rates give wings to athletic teams and fans, convention groups, executives, religious groups, and a widening range of other uses.

At present, the main work of the independent lines is in transporting troops, for which they have CAB exemptions to pool their resources through associations to place bids and dispatch aircraft through central control boards. If this system could be tied in legally with civilian charters, it should be possible to fill many of the military return loads that now fly empty, and to generate much added traffic that supplements the scheduled carriers but does not compete with them. The largest possible transport aircraft fleet that can be supported independently, without government subsidy, would be a military asset in emergency.

Since the major reason for economic regulations is to prevent undue competition that might weaken the scheduled airline system, officials of these independents point out, there should be no artificial barriers against letting free enterprise develop new traffic that is not competitive at all, and win permanent operating authority as a reward. How else is aviation to be permitted to grow to its maximum usefulness?

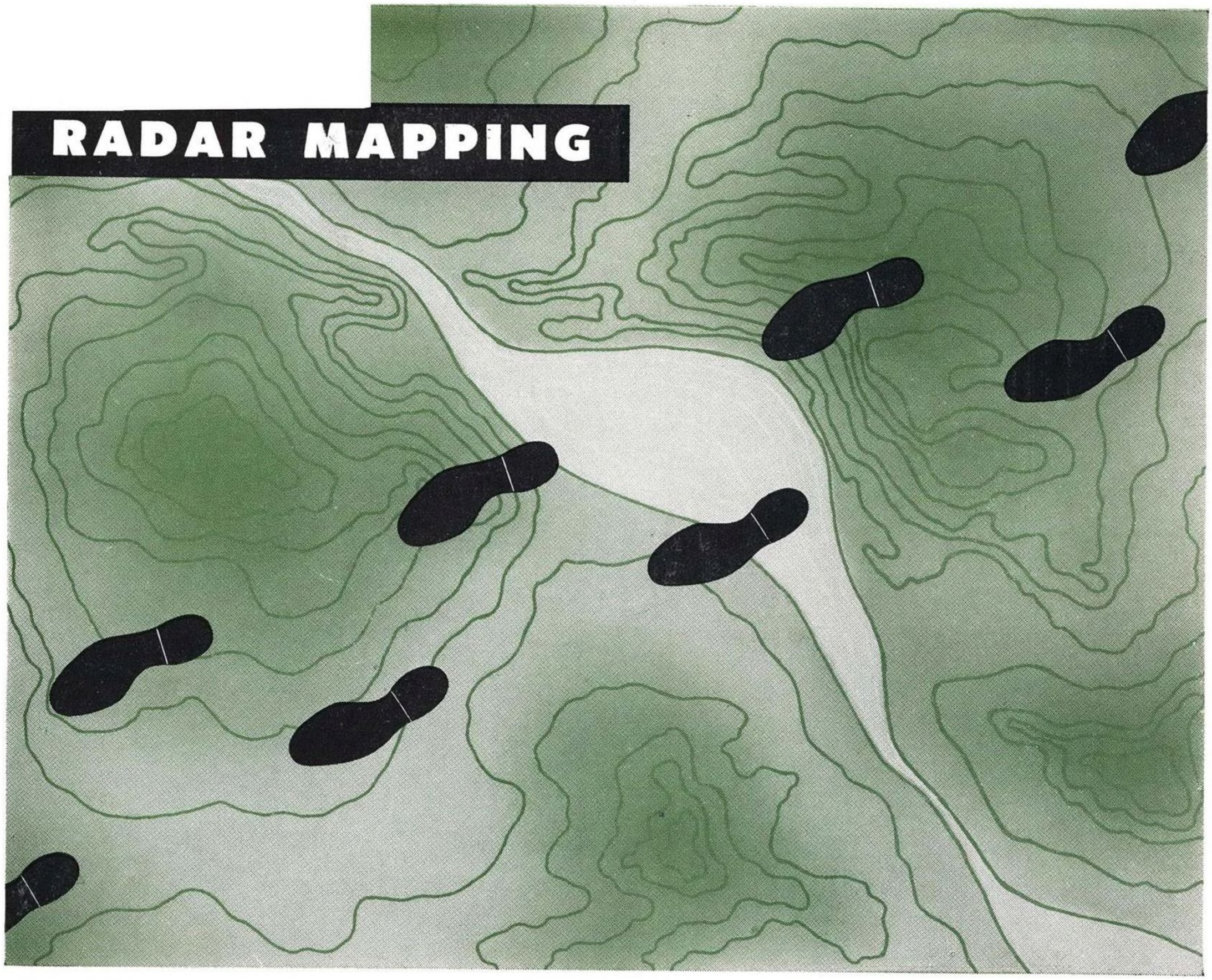
Some progress already is discernible.

The air exchange idea, for pooling of sales effort and equipment of small airlines for combined operations, already has been approved by the Senate Small Business Committee.

CAB has agreed to consider a proposal of Aircoach Transport Assn. for such an air exchange, so a decision can be expedited rather than wait behind 200 other agreements in the Board's files. This is commendable, and it is to be hoped that the Board will act favorably, as well as expeditiously.

Most important, the Air Coordinating Committee, representing the studied opinions of all government agencies associated with aviation, is in a position to speak strongly and decisively for fullest commercial and military use of the independent operators, without subsidy and without hurtful competition to others in aviation. The ACC thus can do much to remove the uncertainty that has beset the independent companies for so long. It also can enunciate the sound principle that in the yet-undeveloped fields of aviation there is a place for risk capital and pioneering in the American tradition.

—Robert H. Wood



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