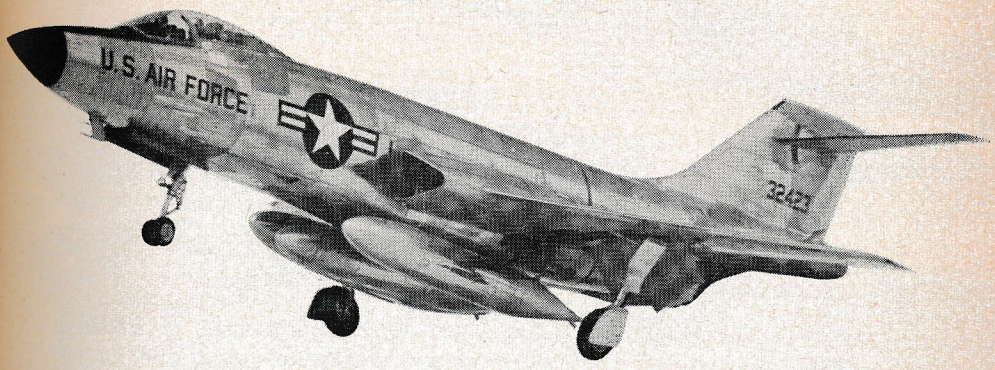
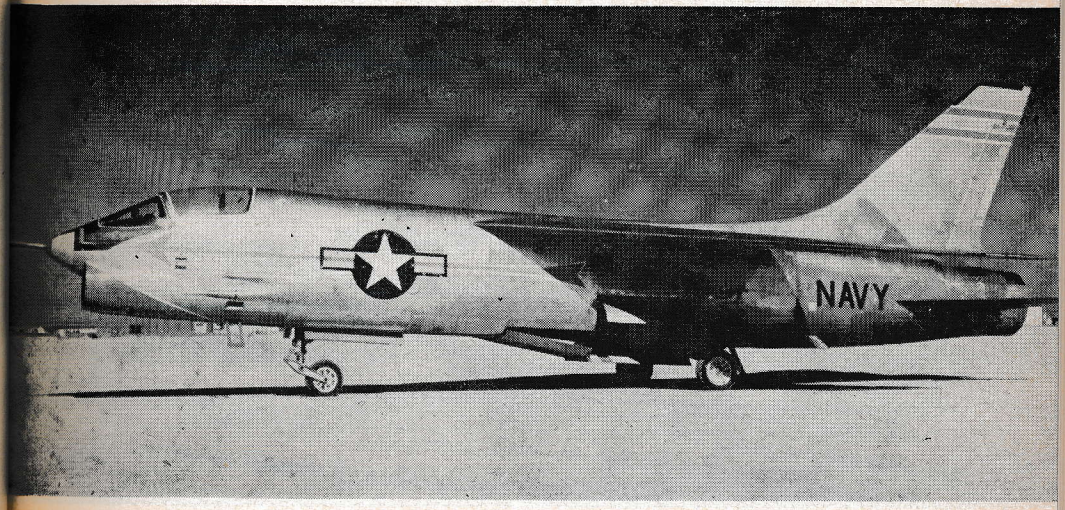


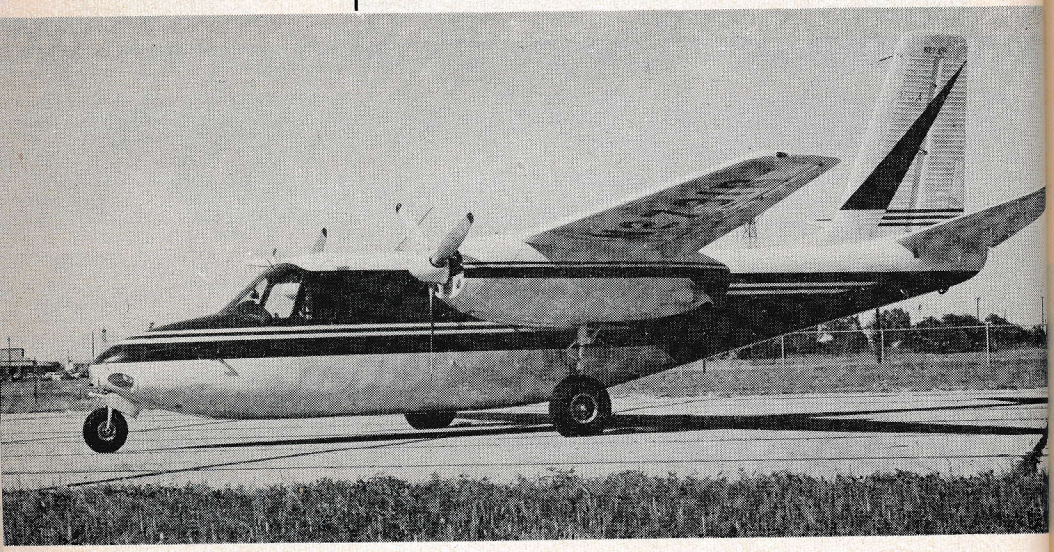
• BATTLE JETS

Nearly half a score battle planes flashed from behind the security curtain and, often, disappeared from the news with equal speed. Others still remain top secret. Those on which some news became available included the highly-classified and top speed Lockheed F-104, the McDonnell F-101A Voodoo (above), and Chance Vought's plus-1000-mph F-8U1 Navy Crusader (below), a medium sized day fighter.



• BUSINESS FLYING

Dramatized by the patronage of President Eisenhower and sparked by a demand for fast transportation that led to more hours in the air with passengers than those run up by the airlines, business aircraft had their biggest year in history. The President chose an Aero Commander for commuting from Washington to his Gettysburg, Pa., farm. The plane is built by Aero Design & Engineering Co.



• HELICOPTERS IN ACTION

In the workaday aviation world, helicopters also made history, notably in rescue work during disastrous floods in 1955, when hundreds of persons were rescued from the air or given emergency supplies by the whirlybirds. Pictured here the Piasecki HUP-2 makes a dramatic rescue in a badly-flooded area.

• AWARDS

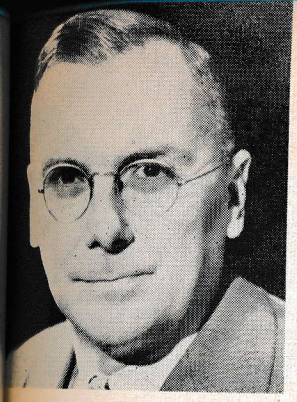
In recognition of outstanding contributions to aviation during the year many awards were given. Among these:

• HARMON TROPHY

The Harmon Trophy was presented to Lt. Col. James F. Coleman, USMCR (left) for piloting the Convair Navy XFY-1 vertical-rising and landing aircraft on its first flight November 2, 1954, and to Capt. Marion E. Eppes, USN (right) for piloting the Navy Airship ZPG-2 on an eight-day record flight simulating an anti-submarine patrol. Pictured here the award winners are congratulated by Adm. Arleigh A. Burke, USN.

• H. H. ARNOLD TROPHY

For contributing "the leadership necessary to bring the Air Force to its present state of maturity and world importance," Air Force Chief of Staff, Gen. Nathan F. Twining was named "Aviation's Man of the Year" for 1955 by the Air Force Association.



• WRIGHT BROTHERS MEMORIAL TROPHY

Dr. Hugh L. Dryden, Director of the National Advisory Committee for Aeronautics, was awarded the Wright trophy "for significant public service of enduring value to aviation in the United States."

• COLLIER TROPHY

For his discovery and experimental verification of the "Area Rule," Richard Travis Whitcomb, a research scientist for the National Advisory Committee for Aeronautics, received the Collier Trophy Award.

• BREWER TROPHY

Willis C. Brown, staff specialist for aviation education with the U. S. Office of Education, received the 1955 Frank G. Brewer Trophy, the nation's highest award in the field of youth aviation education and training.

• THOMPSON TROPHY

For piloting the record-breaking F-100C at 822.135 miles per hour (see Records), Col. Horace A. Hanes was awarded the Thompson Trophy at the National Aircraft Show in Philadelphia.

• RECORDS

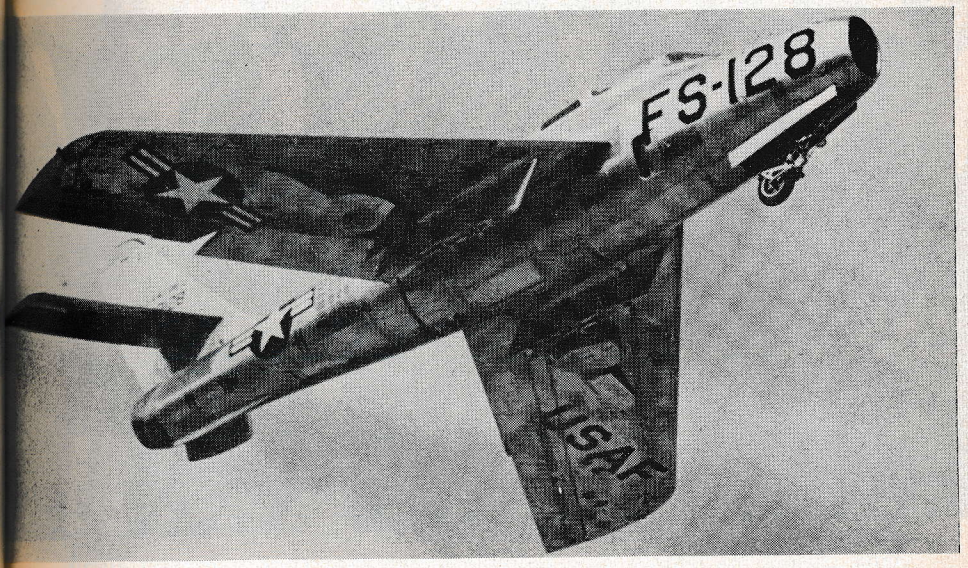
In 1955 U. S. airplanes continued to make and break records:

The *North American F-100C* set the first supersonic world's speed record of 822.135 miles per hour. Flown by Col. Horace A. Hanes on August 20, 1955, the plane traveled over the Mojave Desert in California almost 70 miles faster than the previous record set in 1953.

Republic's F-84F Thunderstreak set two records during the year: On March 9, Lt. Col. Robert R. Scott set a new official transcontinental speed record, flying his Thunderstreak 2,445 miles non-stop from Los Angeles to New York in 3 hours 44 minutes at an average speed of 652 miles per hour. On August 17, the Thunderstreak set a new world's non-stop jet fighter distance record of 5,118 miles from London, England, to Texas.

Pictured here the *Douglas A4D Skyhawk* is rounding a pylon and smoke column marking the 500-kilometer course at California's Edwards Air Force Base, where Lt. Gordon Gray, Jr., set a new world's speed record of 695.163 miles per hour on October 15.


U.S. AIR FORCE
31709
FW-709


FS-128
USAF

• ELDER STATESMEN OF AVIATION

In December, 1955, the National Aeronautic Association honored fifteen Elder Statesmen who have made contributions of significant and enduring value to aeronautics. Pictured above, left to right, are: Jerome C. Hunsaker, Brig. Gen. Frank P. Lahm, Lester D. Gardner, William P. MacCracken, Jr., Paul W. Litchfield, Grover Loening, Vice Adm. Emory S. Land and Congressman Carl Vinson. Also elected Elder Statesmen were: William F. Durant, Godfrey L. Cabot, Hiram Bingham, Frederick B. Rentschler, Igor Sikorsky and Edward V. Rickenbacker.

CHAPTER ONE

The Industry

DRAMATIZED BY THE PRESIDENT'S mid-year announcement that U. S. scientists were at work on a satellite, and fed by solid research and development achievements in all fields, the nation's aviation industry in 1955 progressed farther than in any other year since the crisis in Korea. Scientific developments pointed the way toward a highly accelerated production of guided missiles, and there were scores of indications that tremendous advances were being made behind the security curtain toward solving problems concerned with atomic air power, interstellar flight and jet transports.

The nation's airlines responded to this last by placing more than $1-billion in orders for jet transports, meanwhile chalking up the biggest operational year in their history. This and other factors made possible sales volume for the industry of an estimated $8.4-billion, $100-million ahead of the preceding year despite the decline in unit production of military aircraft.

With an average of 750,000 employees per month, aircraft manufacturing industries ranked second only to the automobile industry as the nation's largest employer.

For the second year, sales of U. S. utility aircraft to businessmen and farmers set new records. More than 4,500 civil aircraft were sold during the year, a gain of approximately one thousand units over 1954, and dollar volume rocketed to $75-million from the 1954 high of $43.4-million.

Individual company achievements during the year appear on the following pages in alphabetical order.

AIRCRAFT MANUFACTURERS

Aero Design and Engineering Co.

During the year 1955, the Aero Design & Engineering Co. was in production on the Aero Commander business executive air transport model 560. The production of the 560 was phased out early in 1955 and production was commenced on the 560A model. The 560A model production was continued throughout the year. Fifteen of the 560A models were sold to the Air Force and given the designation of L-26B and assigned to Washington, D. C., area for VPI transports.

The 680 Super model, announced in September, 1955, was the first supercharged airplane in its category manufactured in the U. S. and also was the fastest airplane produced for business use in the U. S.

The company was employing around 425 people the first of 1955 and expanded its employee number throughout the year to a total of 600. The main operation has been continued in the Tulakes facilities. However, 34 acres of land were purchased in the immediate vicinity of the Tulakes Airport for future expansion. Hangar space of approximateliy 10,000 sq. ft. was leased on Cimarron Field, near Oklahoma City.

The company had a gross sales during 1955 of $7.5-million and at the end of the year had a back-log of orders of approximately $7-million. This back-log of orders was for the 560A and the 680 Super models. The estimated inventory was approximately $2-million.

A research and Development branch of the company was operated at Max Westheimer Filed at Norman, Oklahoma, some 40 miles southeast of the Tulakes plant. This department expanded during the year and its major work was centered on product improvement on the basic Aero Commander configuration.

Beech Aircraft Corp.

During 1955 Beech Aircraft Corporation strengthened its position as one of the dollar-volume leaders in the executive aircraft field with total fiscal year sales of commercial aircraft climbing to a new record of approximately $27.4-million. This 1955 record-breaking total compares with a total of $19.6-million for the previous year, indicating that Beechcraft commercial sales were increased almost 40 percent during 1955. Total sales for the company were in excess of $77-million for the 1955 fiscal year.

During the 1955 Beechcraft fiscal year, unit sales for each of the company's three commercial executive aircraft models showed an increase over the previous year: unit sales of the Beechcraft Super 18 eight-place twin-engine executive transport showed a gain of 84 percent; unit sales of the Beechcraft six-place twin-engine Twin-Bonanza executive airplane showed a gain of 21.6 percent; unit sales of the four-place single-engine Beechcraft Bonanza showed a gain of 20.5 per cent.

To meet the demand for these 1955 models, the company increased production rates during the year; and at year-end was experiencing distribu-

tor-dealer advance demands for 1956 models, indicating the continuance of a greater sales trend for the year ahead.

In mid-1955 the company delivered the 100th new Super 18 Beechcraft, which represented the 8,157th plane built from the basic Beechcraft Model 18 configuration.

During the year, the company announced its new "floor plan." As the first bank financing program of its kind ever presented in the aircraft industry, the Beechcraft plan opened new lines of credit for distributors. Through the new plan company distributors were able to finance their demonstrator airplanes at low bank interest rates and to intensify their sales efforts by stocking and maintaining a complete line of Beechcraft models "on the floor" at all times.

Also announced in 1955 was the Beechcraft "Aircraft Leasing Plan." Under this special distributor plan, U. S. business firms were able to lease a new Beechcraft executive transport with all insurance and financing charges included in a low monthly rental charge. During 1955 more than $1.5-million of new Beechcraft sales were provided for as a result of this new leasing program.

And for the seventh consecutive year the company offered to the owners of Beechcraft planes the services of special teams of factory-trained personnel during the manufacturer's coast-to-coast annual series of "Beechcraft Safety and Efficiency Clinics" conducted at distributor locations.

In June of 1955, Beech Aircraft announced its entry into the jet field by bringing to North America for a demonstration-tour the Morane-Saulnier 760, the world's first jet airplane designed for executive air travel. This 410-mph, twin-jet, low-wing monoplane seats four, has a fully pressurized cabin, and offers the same cross-country speed as the most advanced airline transports. Beech Aircraft holds an option for exclusive manufacturing rights in North America.

Following press premier showings in New York City and Washington, D. C., a nation-wide schedule of demonstrations was established to present the airplane to U. S. Military authorities and business executives and pilots throughout the United States and Canada.

First flight of the new Beechcraft Model 73 "Jet Mentor" was made on December 18, 1955. This privately financed, two-place tandem jet trainer will be offered to the military services as an "off-the-shelf" airplane.

Military sales during Beechcraft's 1955 fiscal year totaled $50-million. Backbone of the company's military plane production was the Beechcraft T-34 Mentor, a two-place, all metal trainer. This Beechcraft is now the official trainer of the U. S. Air Force, the U. S. Navy, and the military services of Canada, Chile, Colombia, El Salvador, and Japan.

In addition, the company produced in quantity two Beechcraft-designed jet-engine starters, the C-26 and the MD-3 generators, both still being extensively manufactured by Beech as ground power units for the Air Force.

For prime military contractors, Beech continued production of major

parts, components, and sub-assemblies for: Lockheed's USAF T-33 and USN T2V; McDonnell's F-101; Republic's RF-84F.

While most of the 1955 projects in Beechcraft's accelerated research and development program remained under wraps as classified information, one new design was announced during August of 1955. Beech was declared the winner among nine aircraft companies invited to submit design proposals for a U. S. Navy pilotless target-plane, a remote-controlled target drone to be used in training ship-to-air and air-to-air Navy weapons systems crews. Announcement of the SKDB-1 contract was the first information made public of the work of Bechcraft's new missiles division established in September of 1954.

Employment at year-end was approximately 6,000, including the company's three major plant facilities at Wichita, Kans., the company's two leased production facilities at Herington and Liberal, Kans., and Beechcraft's new Boulder, Colo., engineering facility opened in July of 1955.

Bell Aircraft Corp.

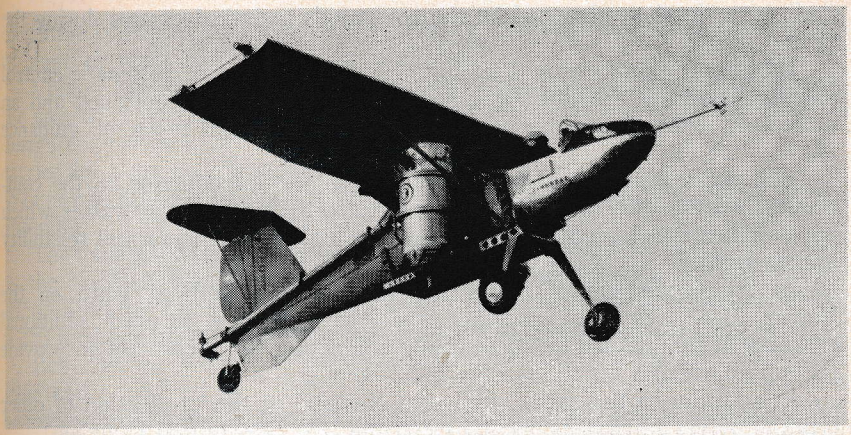
Bell's twentieth year of operation in 1955 was a period of further growth in overall activity. A series of new products came into being and continued emphasis was placed on research and development to insure future progress. In line with this policy the Bell Exploration and Development Corporation was formed to further explore and expand the utility of Bell helicopters in the geophysical and geodetic field. This brings to five the company's wholly-owned subsidiaries.

In the Niagara Frontier Division, where programming is largely directed toward government work, efforts were concentrated in the fields of guided missiles, electronics, servomechanisms, rocket engines, special research aircraft, remote control systems for missiles and aircraft, flight simulation equipment and the production of various types of airframe and electronics components for bomber aircraft.

The year was an auspicious one for Bell in the field of special research aircraft and in the development of two revolutionary vertical-rising airplanes, VTOL and XV-3 Convertiplane.

VTOL enables the plane to rise and descend vertically without altering its horizontal attitude. It can turn in almost the width of its wing span and while it employs conventional control surfaces, the Bell-developed method of control provides ample pitch, yaw and roll control for take-offs, landings and normal flight. The jet engines are converted to vertical position for take-offs and landings and are rotated to horizontal position for forward flight.

The XV-3, produced in the Texas Division, represents a principle of flight which has an appeal to commercial aviation as a door-to-door vehicle. However, like the VTOL, the XV-3's immediate future will be military with promising applications for observation-reconnaissance, evacuation of front-line wounded, liaison and air rescue missions and a definite potential of larger cargo-assault transport.



Bell's vertical-rising aircraft

For take-off and landing the XV-3 resembles a helicopter in operation but for forward flight the rotors are tilted 90 degrees and become normal fixed-wing aircraft propellers.

Bell's stainless-steel, rocket-powered X-2, one of the now-famous "X" series, successfully completed guide tests during the year. The X-2, the first airplane specifically designed to investigate the effects of high temperatures on aircraft structures at very high speeds, is expected to outrun the X-1A which achieved a top speed of 1,650 miles an hour and reached an altitude of 90,000 feet, both unbroken records.

The company's guided missile effort continued on an integrated and unified weapons system basis. Much technical skill was devoted to such projects as the GAM-63 Rascal (guided aircraft missile) for the Air Force, and new contracts were secured from other missile prime contractors for the production of different missile components.

Design, development and testing of high precision electronics and servo-mechanisms also played a key part in the company's program.

Deliveries at an increased tempo were made of the Bell proportional control system for use in the launching and recovery program during flights of the Navy's Regulus missile.

The Navy also announced the successful testing of a Bell-developed automatic carrier landing system, capable of landing aircraft safely despite zero-zero visibility.

This system, a complex electronic combination of radio and radar, is operable both on airports and on aircraft carriers and has the advantage of being able to land aircraft whose pilots are either wounded or overly fatigued after flying long missions.

Other forms of flight safety, such as autopilots for helicopters and air-

craft, were further advanced by the company's technical groups during the year.

Design, development and testing of high performance automatic control and maneuvering systems for guided missiles also was continued and an increasing effort was expended on several different types of guidance systems for missiles.

Bell engineers were also instrumental in the introduction to the commerical market of a line of two-stage electro-hydraulic servo valves which have applications in control systems where high performance and reliability are required.

In the production of major components for bombers, work on the Boeing B-47 remained constant and the company secured additional bsuiness of this nature by successfully competing for a contract to provide jet engine nacelles for the Boeing B-52 bomber.

In addition to this work, Bell also engaged in the production of other types of major assemblies, mostly electronic, for Boeing and Douglas.

In 1955 the company continued to supply entire rocket systems for the company's own missiles, such as the GAM-63, and received several new contracts to supply rocket engines for the missiles of other contractors. The U. S. Army revealed the identity of one of the latter missiles when it disclosed the company is in production of rocket power plants for the Nike anti-aircraft guided missile, a missile Bell Aircraft has been associated with since 1951.

The company's rocket engine program continued to expand in research and development, in personnel and facilities. Two test sites, one for research and the other for production engines, were augmented to accommodate increased efforts as well as to accommodate the new business secured. Over 600 engineers and technicians were engaged in rocket propulsion, exclusive of production workers.

Diversification also highlighted research, development and production activities at Bell's Texas Division.

Volume production continued on both single and tandem rotor helicopters, including three variations of the basic three-place Model 47 series Bell helicopters. The standard 200 hp Franklin-powered Model 47G machine was built and delivered during the year for commercial helicopter operators throughout the world. The same craft, with the addition of hydraulic boost control, was manufactured and delivered to the U. S. Navy as the HTL-6.

A more powerful version of the standard 47 was developed and produced for both commercial users and the Army. Designated the Model 47G-2 by Bell and the H-13H by the Army, the modified machine uses a 250 hp Lycoming engine to obtain improved hot weather and high altitude performance. The engine is derated to 200 hp for use in the helicopter, resulting in reduced maintenance and longer engine life.

The Texas Division of Bell, during the year, was manufacturing a streamlined, customized version of the Model 47, identified as the Model 47H-1. Private businesses use the three-place, 200 hp helicopter as an

executive transport, reducing time spent by executive traveling from plant to plant, or plant to airport, to a minimum.

Volume production of the tandem-rotor Bell HSL continued throughout the year with deliveries being made to the Navy. The winner of the Navy's design competition, the HSL is an anti-submarine warfare helicopter and carries its own detection and destruction devices. A 1900 hp Pratt & Whitney R2800 engine powers the craft, which also features a Bell-designed autopilot.

The four-place Bell Model 47J, in limited production for the U. S. Navy as the HUL-1, was being developed for commercial sale the middle of 1956. Both the commercial and military production models are powered by a 250 hp Lycoming, derated to 220 hp for use in the Bell helicopter.

Bell Aircraft won the Army's utility helicopter design competition in 1955 and expedited the development of the turbine-powered, streamlined helicopter. Known as the XH-40, the Bell Model 204 is designed for frontline evacuation missions, general utility assignment and as an instrument trainer. It is scheduled to be powered by the Lycoming XT-53 turbine engine. The Bell XH-40 is classified as a closed cabin, single rotor, light weight helicopter in the 100-knot-plus cruising speed range. It can hover at 6,000 feet or more, climb at a rate of 1,500-feet-per-minute, and carry loads in excess of 800 pounds.

Work was started during the year on a long range helicopter instrumentation program, sponsored jointly by the Office of Naval Research and the Army Transportation Corps. Purpose of the study was to determine what basic information a pilot needs to fly a helicopter in any weather condition, and how to best present this information. The division also was developing a helicopter instrument trainer.

For the nine-month period ended October, 1955, Bell reported sales of $154,502,403 and net income of $4,547,756. Unfilled orders amounted to $241-million.

Consolidated net working capital increased $3,397,630 during the first nine months of 1955 and amounted to $22,898,416 at the end of the period.

Employment totalled 17,338 persons including 12,890 in the firm's Niagara Frontier Division and 2,971 in the Texas Division at Fort Worth. The remainder were employees in the company's subsidiaries.

Boeing Airplane Co.

B-52 Stratofortress production continued at an increasing tempo, and B-47 and KC-97 programs maintained their on-schedule deliveries to the U. S. Air Force, but it was the 707 jet tanker-transport which provided the major portion of the Boeing Airplane Company highlights for 1955.

With the airplane already ordered into production by the Air Force to fill its jet tanker-transport requirements, Boeing was advised by Secretary of the Air Force Talbott in July that there was no objection to building commercial jet aircraft concurrent with its production of military tankers. The Air Force was satisfied, Secretary Talbott said, that such commercial

production would not interfere with, nor delay, scheduled delivery of military tanker-transports.

On October 13 the first contract for the commercial version of the new Boeing was signed, Pan American World Airways ordering a fleet of 20. American Airlines followed on November 9 with an order for 30. Delivery of the new jets to Pan American will start late in 1958, and to American in March of 1959. By year-end, jet transport sales totaled 72.

Meanwhile, the 707 prototype continued its intensive flight test program, turning in consistently outstanding performances as it reached and passed the 300-hour mark in flight time. Included were three long-range flights in which the airplane convincingly demonstrated what airline travel of the future would be like. The first, on October 7, saw the 707 average 550 miles per hour on a 3,038-mile non-stop test flight that took the airplane from Seattle to Denver to Los Angeles and return. The others, on October 16, broke transcontinental speed records in both directions, the 707 flying from Seattle to Washington, D. C., in three hours and 58 minutes for an average speed of 592 miles per hour, and returning the same day in four hours and eight minutes, an average of 567 mph. Top speed attained on the two trips was 662 miles per hour averaged for the 51-minute run from Rapid City, S. D., to Kansas City.

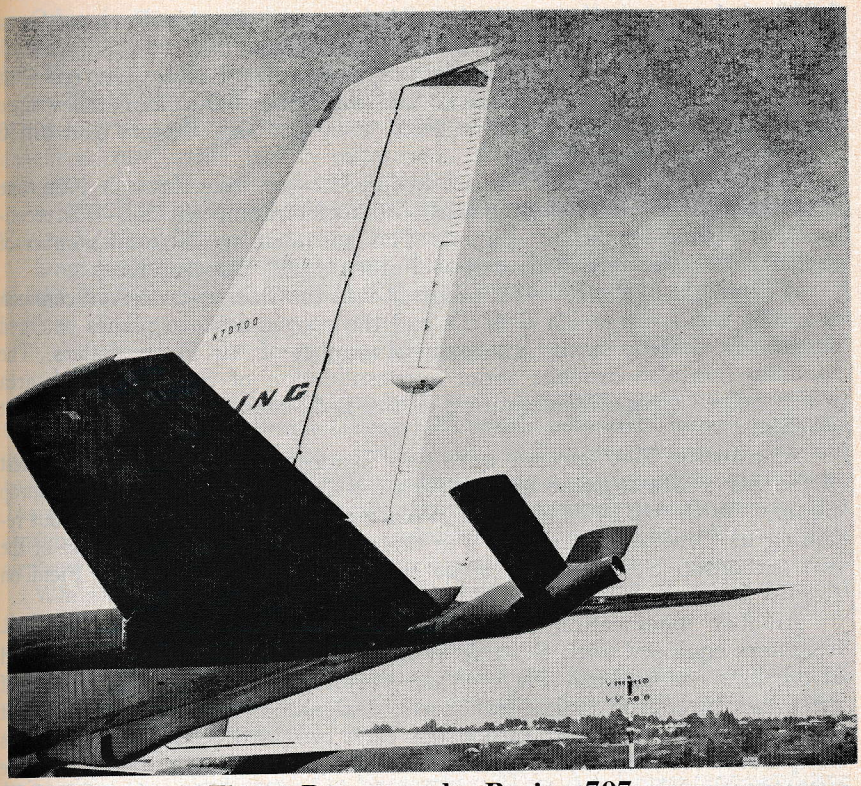
Mid-year also saw the 707 equipped with a new high-speed Flying Boom for aerial refueling tests. Considerably streamlined as compared with the boom used by Boeing KC-97 piston-engine tankers to refuel B-47 Stratojets, the device was thoroughly tested at high speeds and altitudes, with numerous contacts made with B-52's. The new boom will be installed on the KC-135, now in production at the Boeing plant in Renton, Wash., near Seattle.

With B-52 Stratoforts steadily rolling from the Boeing Seattle plant, the new Boeing flight test facility at Larson Air Force Base, Moses Lake, Wash., received its first Stratofortress for pre-delivery flight testing late in February. The Strategic Air Command's 93rd Bomb Wing took delivery of its first B-52 on June 28, flying the 350,000-pound, 650-miles-per-hour ship to Castle Air Force Base, Calif., to enter service.

Use of cross-wind landing gear as a standard production item on the B-52 was also revealed in mid-year, marking three world's "firsts" for the big bomber. It was the first use of this type gear on a production jet airplane, the first use of the gear on any production military airplane, and the first use of the gear on any heavy bomber.

The new gear can be prepositioned from the control cabin to permit the airplane to take off or land in a "crabbing" attitude that cancels out the effect of the wind across the runway. In this way, the gear simplifies the operation of the B-52 during what would otherwise be difficult landing and takeoff conditions, and in addition makes it possible for the plane safely to utilize many more existing airfields throughout the world than would be possible with a standard, unidirectional landing gear.

Meanwhile, in the huge Boeing Flight Center hangar at Seattle one B-52 was being put through a complete and deliberate scientific torture



Flying Boom on the Boeing 707

test to prove its structural integrity. In one of the most important phases of a year-long series of tests, the bomber's wings were stressed past the breaking point as approximately one million pounds of load were applied over the wing-span of 185 feet. The tests proved that the eight-jet heavy bomber structurally can withstand far more than the maximum load it may be expected to encounter in the most rigorous combat career.

The tests supplied information to Boeing and Air Force experts which was obtainable in no other manner. Specifically, they acquired precise knowledge of how much strain each part of the airplane would be able to withstand under every anticipated condition of flight. They learned how much room there was for "growth" in the design and made certain that everything designed into the airplane was built into it. The Boeing structures men had designed into the plane sufficient strength for any job it may be called upon to perform, but they had to prove this safety factor both to their own satisfaction and to the satisfaction of the Air Force.

With B-47 Stratojets continuing to roll from the Kansas plant, the Wichita Division announced in October that it had delivered more than

1,200 of the swept-wing medium jet bombers to the Air Force and was in its 47th successive month of on-schedule operation.

Early in the year the company reported that Boeing test crews at Wichita had test flown Stratojets for more than 4.5-million miles since the first production model flew in 1950. They had logged more than 10,150 hours in the air in 4,685 flights.

Although B-47 production is scheduled to continue through 1956, one important portion of Stratojet work—that of building the RB-47E reconnaissance plane—ended in August. The last of an undisclosed number of the "RB" version was delivered to Forbes AFB, Topeka, Kans.

A highlight of the RB-47E program was the Boeing-conceived common assembly line from which B-47E's and the reconnaissance planes emerged alternately, thereby saving a substantial number of Air Force dollars. The common line also brought about a consolidation of Stratojet work area which helped to speed integration of the B-52 manufacturing program at Wichita.

Also in the B-47 picture were two Stratojets modified at the request of the Air Force to serve as test beds for Curtiss-Wright T49 turboprop engines. With the T49's installed in place of the inboard twin pods, but retaining its General Electric J47's in the outboard positions, the first of the two turboprop Stratojets made its maiden flight from Boeing Field on August 26. It was designated XB-47D.

Another modification job, also at Seattle, saw two C-97G Stratofreighters equipped with Pratt & Whitney T34 turboprop engines instead of the four conventional P&W Wasp Major piston engines. The first of these two turboprop tanker-transports, designated YC-97J, made its first flight April 19. The four turboprops each provided 5,700 horsepower as compared with the 3,500 hp of the Wasp Majors. Both YC-97J's were subsequently delivered to the Air Force for testing at Edwards AFB, Calif.

In the meantime, other Stratofreighters continued to roll from the Renton plant, although at a reduced pace from the one per working day that prevailed through most of 1954. The company reported in July that except for one break in December, 1950, when the production quota was missed by a single airplane, C-97 production had been on schedule for six straight years. More than 700 of the big double-decked tanker-transports have been delivered to the Air Force.

Production, research and development of the Boeing 502 gas turbine engine continued through the year, while successful firings continued with the highly-classified IM-99 Bomarc project.

Construction was started during the year of a new $2-million supersonic wind tunnel in Seattle with a speed range from Mach 1.2 to Mach 4. It will have a four-by-four foot test section, as compared with the eight-by-twelve foot test section of the present transonic tunnel. Known as the "blow-down" type of wind tunnel, pressure will be valve controlled, with the Mach number regulated by a flexible plate nozzle. The average test running time will be about 15 seconds. The entire new structure will be sound proofed, and will cover an area of approximately 16,000 square feet.

Other facility expansions at the Seattle plant included a new material handling building covering 288,000 square feet, a 50,000 square foot office building, and a 20,000 square foot second story to a jig building.

At Moses Lake a new hangar covering 91,700 square feet and capable of housing three B-52's was completed late in the year, with plans also announced for further facility expansion. This will include a hangar large enough to accommodate eight B-52's or KC-135's.

A new 772,000-square foot materials building also was completed at the Boeing Wichita Division during the year.

Employment at the nine-month mark in 1955 totaled approximately 65,000—40,000 at Seattle and 25,000 at Wichita.

Cessna Aircraft Co.

On November 4, 1955, the Cessna Aircraft Company publicly announced their latest model, the all-new Cessna 172 with a patented "Land-O-Matic" gear. Designed with Cessna's philosophy, building airplanes to fit the business need, the Model 172 offers a new flying and ground handling ease. The geometric design of the gear with low center of gravity makes this airplane a desirable one for the executive who wishes to pilot his own airplane with a minimum of experience plus a maximum of safety.

While exact figures were not available at press time, it was estimated that total sales for Cessna for the fiscal year ending September 30, 1955, were approximately $50-million. Commercial aircraft sales for the fiscal year were approximately $21.6-million which represents an 80 percent increase over 1954. Non-military sales, including hydraulics, were 49 percent of the total volume.

Production was on schedule for the first eleven T-37 side-by-side jet trainers for the Air Force. On September 30 an Air Force representative accepted the first production T-37 for the Air Force. The T-37 will simplify pilot transition by utilizing visual as well as oral instruction by the seating arrangement which is side-by-side. While the first three flying prototypes

Cessna's Model 180 is designed for amphibious use

were equipped with the French Turbomeca J-69 the 11 production airplanes will be powered by the Continental American-built engines.

CAA certification and completion of successful landing, hovering, and descent from Pikes Peak, altitude 14,110 feet, on September 13, 1955, was an outstanding event for the company during 1955. This Cessna CH-1 helicopter has a fan-cooled super-charged 260 horse power engine.

While 1954 saw the phasing out of the L-19 Bird Dog, 1955 saw the reinstatement of contractual requirements for 100 of these planes. On completion of this 100 contract, Cessna will have built 2,580 of these multipurpose aircraft. The Model OE-2, which is an improved version of the L-19, has been accepted for the Air Force and contract completely delivered for use by the Marine Corps. The Continental super-charged 265 bhp engine pushes the OE-2 along at speeds far in excess of the L-19.

Cessna's Hydraulics Division again showed a substantial sales increase for 1955 over 1954. The 1954 sales volume was $2.25-million with the 1955 sales showing $2.75-million. The increase is credited primarily to new items being manufactured for old customers.

During 1955, Cessna established the National Aero Finance Company, Inc., with offices in Wichita, to assist the Cessna dealer organization in the United States and Canada in financing its aircraft operations. The financing program will cover demonstrators, stock airplanes and leased airplanes.

Chance Vought Aircraft, Inc.

Chance Vought Aircraft, Incorporated, completed its 38th consecutive year of designing and building aircraft in 1955 with two of its products in active use by the Navy and a third in production following a successful flight test program.

Highlight of the year was the successful testing of the F8U-1 Crusader, followed by the receipt of an initial Navy production order of approximately $100-million for the airplane. Existence of the Crusader, designed to operate from aircraft carriers at speeds faster than sound, was announced in June, 1955, when the Navy revealed that the airplane had completed a series of successful test flights. The experimental prototype XF8U-1 made its first flight on March 25, 1955, exceeding the speed of sound in level flight. The first F8U-1 production model flew on September 30, 1955, and the initial production order was received in December.

On active duty with the Navy were the F7U-3 Cutlass, which reached fleet squadrons during 1955, and the Regulus guided missile, designed for launching from ships, submarines and shore bases.

First fights of the F8U-1 came less than a year after Chance Vaught Aircraft, Incorporated, separated from United Aircraft Corporation. From 1929 until July 1, 1954, Chance Vought had been a division of United.

Specifications for the F8U-1 called for a high rate of climb, exceptional combat ceiling and penetration of the speed of sound in level flight. The engine is the Pratt & Whitney J-57-P-4, a proven powerplant which has demonstrated a fuel economy which promises to give the Crusader the long endurance required in carrier operations.

The Cutlass program, which established a number of "firsts" since its inception, continued throughout the year with aircraft going to squadrons on both coasts. The first Navy jet production airplane to achieve supersonic flight, the F7U-3 was scheduled to phase out early in 1956.

The Cutlass also was the first Navy jet production fighter to release bombs at a speed greater than that of sound and to catapult from a carrier with nearly two and one-half tons of external stores and weapons.

While maintaining production of the F7U-3, Chance Vought also continued its development work in the guided missile field while producing the Regulus guided missile. A new high performance missile program was disclosed in March, 1955, but details were kept under a tight security cloak.

A surface-to-surface jet-powered guided missile, Regulus is manufactured in two versions—a recoverable test and training missile with a retractable landing gear and a non-recoverable tactical missile. Previously, the life expectancy of most missiles had been one flight, but the recoverable feature of Regulus meant that crews could be trained and test data gathered without the loss of the missile and the consequent cost to the national defense. Regulus missiles have been flown and recovered as many as 15 times.

In addition to being a prime contractor for the Navy, Chance Vought manufactured components for the North American F-100 Air Force jet fighter, the Boering B-57 Air Force jet bomber and the Lockheed P2V long-range Navy patrol bomber.

Early in 1955, the company completed a $900,000 low speed wind tunnel as an improvement to the 2.4-million square-foot of floor space it occupies at the Naval Industrial Reserve Aircraft Plant in Dallas, Texas. In December, bids were requested for construction of a $3.5-million high speed wind tunnel to expand the company's aerodynamic testing facilities, with completion scheduled for 1958.

The plant population during 1955 averaged 12,500 with approximately 250 employees stationed in California in connection with Regulus and Crusader testing operations. Chance Vought's engineering department includes approximately 2,200 trained employees.

Sales of aircraft, guided missiles, parts and services for the nine-month period ending September 30 amounted to $93.7-million. The company had a backlog at that time of approximately $162-million.

Convair
A Division of General Dynamics Corp.

Highlighting the 1955 production and facilities progress and employee activities of the Convair Division of General Dynamics Corporation at its San Diego and Pomona, Calif., and Fort Worth and Daingerfield, Texas, plants were these events of record:

Acceptance of the Convair Terrier as a U. S. Navy operational guided missile, marked by the commissioning of the USS Boston (CAG-1) as the world's first guided missile cruiser;

Receipt of new multimillion-dollar Air Force production contracts for F-102A supersonic interceptors and TF-102A combat proficiency trainers;

Ground breaking at Palmdale, Calif., for a $10-million F-102A-TF-102A flight test and acceptance facility;

Start of production on Metropolitan 440 transports, succeessors to the Convair-Liner 240 and 340 series;

Start of production on the Air Force B-58 supersonic bomber and intensified development leading toward application of nuclear power for aircraft.

As the primary armament for the USS Boston, the surface-to-air supersonic Terrier guided missile was in quantity production during the year at Convair-Pomona for the U. S. Navy Bureau of Ordnance at the government-owned Naval Industrial Reserve Ordnance Plant.

Meanwhile, at San Diego, Convair was producing Air Force F-102A all-weather delta-wing interceptors and had initiated output of Air Force TF-102A combat proficiency trainers. In connection with these programs, ground was broken in October at Palmdale, Calif., for a $10-million Air Force F-102A-TF-102A flight test and acceptance faciilty to be operated by Convair and to include nine major structures comprising more than 500,000 square feet.

An active market developed during 1955 for Convair's Metropolitan 440, an advanced version of the Convair-Liner 340 that, temporarily during the year, had been designated Model 340B. More than 60 Model 440s were on order by the airlines and military and private customers at year's end, even as negotiations continued for additional business.

Meanwhile, Convair-Fort Worth developed designs for and began production of components for the world's first supersonic bomber, the Air Force B-58, at the same time intensifying its development program in continuing an Air Force study of the application of nuclear energy in the production of aircraft.

And at Daingerfield, Convair continued its operation for the U. S. Navy Bureau of Ordnance of an Ordnance Aerophysics Laboratory, where research and development progressed for the armed services in the testing of large-scale ramjet engines and other classified projects.

Marking a milestone in a comprehensive Convair-Navy program of research, development and production of Terrier guided missiles, the Terrier-equipped USS Boston was commissioned November 1, 1955, at the U. S. Naval Base, Philadelphia, as the world's first guided missile ship. Far deadlier even than the largest anti-aircraft guns, the Terrier also will be the primary armament on the Navy's second guided missile cruiser, the USS Canberra (CAG-2), scheduled for commissioning in the spring of 1956.

The Terrier may be launched readily from a ship or from the ground to search and and destory with deadly accuracy any type of attacking aircraft. Because of its adaptability to amphibious warfare, the U. S. Marine Corps has selected the Terrier as its first anti-aircraft missile.

First of the future anti-aircraft weapons at sea, the Terrier will be fired

from two twin launchers located on the after main deck of the Boston, a converted heavy cruiser which has been completely modernized from the hull up. The Boston's after 143-ton 8-inch gun turret has been removed and replaced with a missile launching platform. Another twin launcher has been installed on a higher level of the warship's decks. On the Boston, the Terrier is stowed below decks in two magazines. Dubbed the Coke machine, because of its resemblance to the soft drink dispenser, it is a completely automatic loading device.

Equally effective at night, the Terrier is guided by several different electronic devices aboard the Boston. Radar and electronic equipment for detecting targets and for "homing in" the missiles represents a most drastic change.

The Convair-Navy research, development and production program at Pomona includes weapons, systems analysis, and the preliminary design of new and improved guided missile components.

Largest at Convair-Pomona, the Manufacturing Building covers 17 acres and includes more than half the 1,286,000 square feet of floor space available at the facility.

In connection with the Boston commissioning, the Navy permitted Convair to announce that more than 30,000 inspections, tests and check-outs are made on Terriers before they are released from the nation's first fully integrated guided missile plant.

The Engineering Building, which contains an analog computer, a complete experimental factory and chemical and structural test laboratories, covers 384,000 square feet. It is flanked by several small structures that include two drop towers (one 200 feet high), two 34-foot centrifuges and two smaller laboratories. Missiles and components can be subjected to acceleration forces up to 60 times the force of gravity in the drop towers and centrifuges.

Total employment at the Pomona plant totaled 4,175 on Dec. 31, 1955.

While Convair-San Diego was turning out F-102A interceptors and TF-102A combat proficiency trainers, TF-102A nose sections were being built at Convair-Fort Worth and shipped to San Diego for final assembly. First trainer developed specifically for any of the "century series" of combat aircraft, the side-by-side, two-seat TF-102A was in the air 32 minutes during its initial flight Oct. 31, 1955, from the Air Force Flight Test Center, Edwards AFB, Calif. Although the trainer, if need be, could be flown as a fully tactical interceptor aircraft by either one or two pilots (Convair Engineering Test Pilot R. L. Johnson was alone on the TF-102A first flight), the TF-102A was designed primarily to familiarize trained jet pilots with F-102A performance as an integrated weapon, not simply as another jet airplane. A widened nose section forward of the leading edge of the delta wing is the principal external feature distinguishing the TF-102A from the F-102A. Air inlet ducts for the Pratt & Whitney J-57 turbojet engine that powers both aircraft were redesigend in the TF-102A and its windshield and canopy also differ slightly from those of the F-102A.

A later, improved version of the F-102, designated YF-102A and com-

pleted in the record time of 117 working days, was given engine and taxi tests at San Diego's Lindbergh Field and trucked to Edwards AFB Dec. 16, 1954, for flight tests. Convair Pilot R. L. Johnson made a shakedown flight Dec. 20 and the next day flew the new plane supersonically in a climb—only six months after design work had been completed and manufacture begun.

One of the first two U. S. aircraft to incorporate the now-famous NACA area rule, the YF-102A and its successors, the F-102A and TF-102A series, differ from the early F-102s in their longer fuselages with "Coke bottle," "wasp-waist," or "Marlin Monroe" configuration, cambered leading edges, reflex wing tips and streamlined fairings at the aft end of the fuselage. The canopy and air inlet ducts also were redesigned. The Air Force accepted the first F-102A late in June 1955.

At Palmdale, first units in the new Air Force flight test and acceptance facility are due for completion by mid-summer of 1956. Convair employment at Palmdale is expected to reach 1,200 by mid-August 1956. Convair also operates F-102A flight test programs at Edwards AFB and at Holloman AFB, N. M.

Loaded with the latest electronic gear, the supersonic F-102A will intercept enemy bombers at stratospheric altitudes at any time of day or night, in any kind of weather. Both F-102As and TF-102As will be assigned to the Air Defense Command.

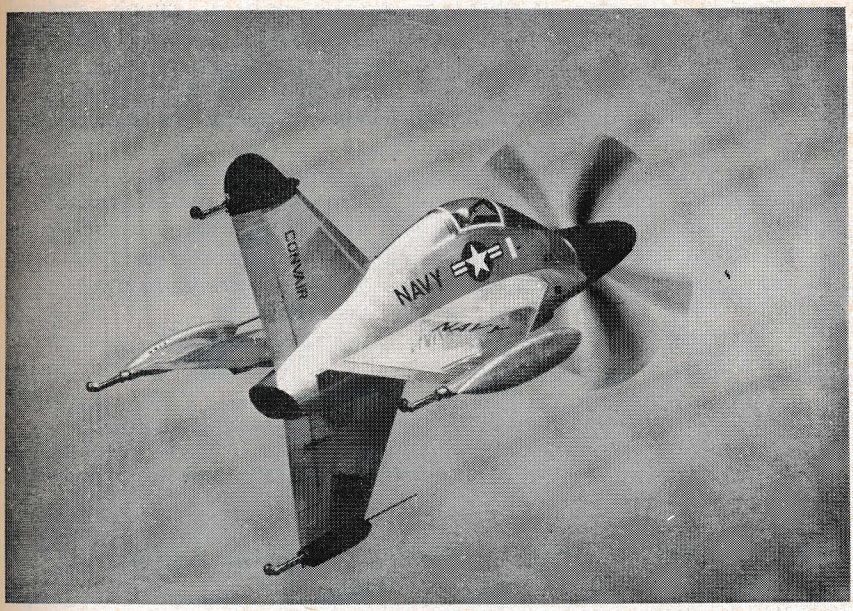
Meanwhile, two off-the-shelf San Diego-built Convair-Linear 340s, which in 1954 had been flown to Convair-Fort Worth for installation of Allison YT-56 turboprop engines and re-designation as YC-131Cs underwent an intensive evaluation flight test by the Military Air Transport Service during 1955. Flying coast-to-coast and border-to-border out of Kelly AFB, San Antonio, Texas, the two transports had logged 3,018 hours 35 minutes up to Dec. 17, when the program ended.

An active market developed during 1955 for Convair's Metropolitan 440, and advanced version of the Convair-Liner 340.

The "quiet cabin" Metropolitans incorporate power and aerodynamic improvements that were designed to increase payload and cruising speed of the aircraft. Most noticeable improvement in the Model 440, and one of the most important, was the exhaust silencer. This provides a single rectangular exhaust at the aft end of each nacelle instead of the two familiar circular openings on Model 240 and 340 augmenter tubes.

Model 440s may have a removable bulkhead in the forward cabin area, making it possible to convert to 52-passenger capacity by installing two extra rows of seats. By Dec. 31, 52 Model 440s had been ordered by three domestic and six foreign airlines, two others by private customers, six by the Royal Australian Air Force and six by the Air Force, with 60 additional Model 440s under option or in negotiation.

Also at San Diego, Convair was producing Air Force C-131D personnel transports and at work on an order for 36 Navy R4Y-1 cargo-personnel transports based on the Model 340 design . On Oct. 4 the last C-131B electronic test-bed aircraft was delivered to the Air Force; also completed



Convair's XFY-1 is test flown in California

during the year was a contract for Air Force T-29D trainers. Work began on the $8.5-million Air Force order for ten R4Y-type cargo-personnel transports designated TC-131E (3), RC-131F (6) and RC-131G (1). They will be put to a variety of military uses.

On Feb. 24, in a six-hour, non-stop, delivery flight which established a record for seaplanes, a Convair crew flew a Navy R3Y-1 Tradewind turboprop seaplane from San Diego to Patuxent Naval Air Test Center, Maryland, for subsequent Navy evaluation tests. The first bow-loading R3Y-2 assault transport also was flown non-stop from San Diego to Patuxent. Additional R3Y-1s and R3Y-2s were readied for delivery to the Navy.

In its F-102A and TF-102A production programs, Convair-San Diego introduced the process of chemically milling, or etching, the aluminum doors and doublers for these aricraft. Milled by the etching action of chemicals, these production parts proved to be lighter, stronger and less expensive than those previously made by conventional machining methods. Chemical milling was considered particularly useful in producing curved parts which would be difficult and expensive, if not impossible, to produce with a machine tool. A research program undertook to improve chemical milling techniques in order to expand the uses of this new method, which also was initiated at the Fort Worth plant during the year.