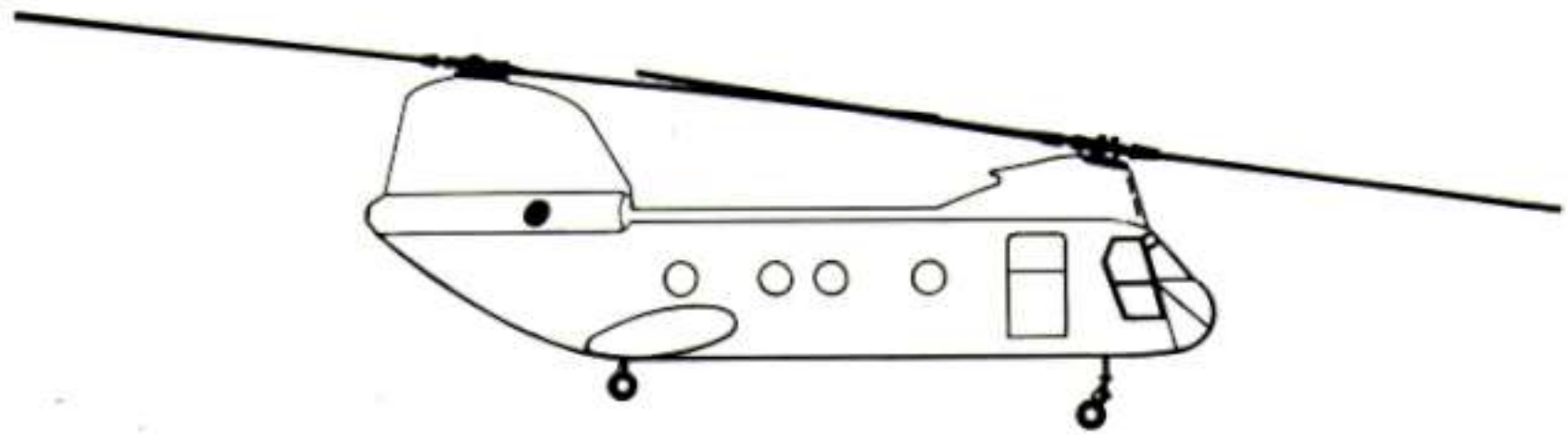
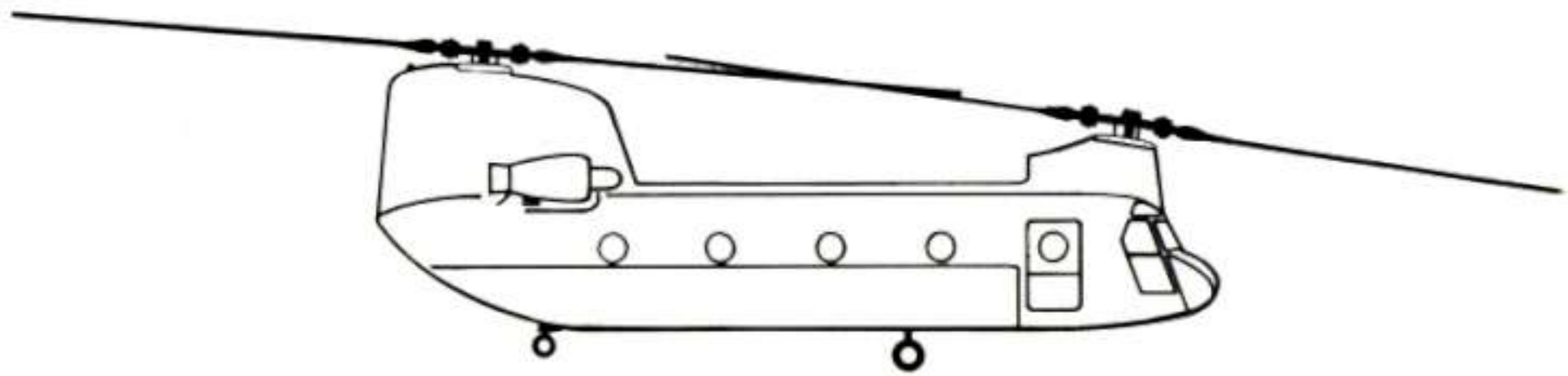


THE BOEING COMPANY/VERTOL DIVISION

MISSIONS AND MILESTONES



MISSIONS AND MILESTONES

CHRONOLOGY OF PRODUCTS

* *DENOTES FIRST FLIGHT DATE*

H-16 SERIES

YH-16

HUP-2

XHJP-1

HUP-1

H-25A

HUP SERIES

H-21 SER

HRP-1

XHRP-1

YH-21

XHRP-X

HRP SERIES

HRP-2

H-21A, B&C

1945 1946 1947 1948 1949 1950 1951 1952 1953 1954

YH-16A

CH-47A

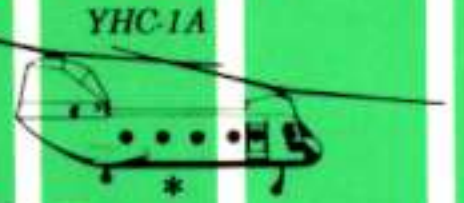
CH-47A

HKP-4

107 SERIES

CH-113

YHC-1A



HUP-4

CH-46A

107 Prototype

Airliner

CH-113A

105

KAC

H-21D

V-44

42 & 43

VERTOL-76

tilt-wing

1955 1956 1957 1958 1959 1960 1961 1962 1963 1964

CHRONOLOGY OF PRODUCTS

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FOREWORD

In man's earliest attempts at designing a machine for flight, he emulated the principle of the birds, which could rise up from a given point and land in the same manner. Since the flapping wing principle proved too complex for contemporary technology, pioneers tried rotating the wings. The concept of a running takeoff or landing was apparently not considered, since this was characteristic of only a few bird species.

These imaginative attempts at vertical flight were doomed to failure, however, because many basic aerodynamic principles were yet to be discovered, and because power sources were totally inadequate.

Near the end of the nineteenth century, the glider—a different approach toward emulating the birds—was perfected to the point where it could carry a man. From there it was only a short and logical step to install a power plant, which by then had achieved practicality.

From this small beginning, the fixed-wing aircraft has seen phenomenal growth in size, speed, range, and usefulness as advances in technology snowballed. Since many of the newly discovered aerodynamic principles had direct application to the rotary-wing aircraft, it achieved a renascence—this time with prompt success. In less than three decades, the helicopter has made tremendous progress in capability and reliability—man finally realized his first ambition, that of true vertical takeoff and landing.

This book is the story of the efforts and accomplishments of the Vertol Division of Boeing in vertical lift technology. The story is told through the evolution of models of aircraft designed, developed, produced, and successfully flown over twenty years.

The missions and milestones that mark Vertol Division's refinement of the helicopter design over the years are presented as a matter of interest to those whose opinions are valued, and as a tribute to those who made these accomplishments possible.

HISTORY

Since its original incorporation in 1943 by a group of young helicopter-minded engineers, the Vertol Division of the Boeing Company has been engaged in research, design, and manufacture of vertical takeoff-and-landing aircraft. Although the Company's initial effort was one of the first successful helicopters in America, it was the only small single-place, single-rotor helicopter ever built by the Company, and it soon gave way to the tandem configuration design philosophy which has prevailed since that time. Based on this development in the state-of-the-art, the firm received its initial contract in 1945 from the U.S. Navy for the world's first tandem-rotor transport helicopter, the ten place XHRP-1.

The year 1946 brought a name change from P-V Engineering Forum to the Piasecki Helicopter Corporation, plus a Navy contract for a fleet utility helicopter, the HUP, and a United States Air Force contract for a helicopter capable of accomplishing long-range rescue missions. The Company expanded rapidly and it became necessary to move out of rented quarters and build a facility which is now the division's Manufacturing Center.

During the following decade the Company designed, developed, and produced the six-place HUP, now designated UH-25, for the Navy; the 14- to 22-place H-21 Work Horse, now the CH-21 for the Air Force, as well as the 40-passenger YH-16, the largest helicopter in the world at the time. HUP's were delivered to the United States, Canadian, and export military services. The H-21 joined the military forces of the United States, Canada, West Germany, France, Sweden, Japan, and the Union of Burma.

From the highly successful H-21 evolved the tandem-rotor Vertol 42, 43 and 44, which have seen service on the Mid-Canada Line, the Arctic, in Europe and Asia, as well as in the petroleum and construction industries. New York Airways replaced its entire helicopter fleet with the Air-

liner version of the Vertol 44 in 1958.

In March 1956, the company name was changed to the Vertol Aircraft Corporation to reflect its broader interest in the field of Vertical Take-Off-and-Landing aircraft.

After producing more than 1,000 tandem-rotor helicopters which accumulated over 800,000 hours of flying time, Vertol initiated, in 1956, an eighteen-month program of research and design for a twin-turbine transport helicopter to meet military and civilian requirements. This program first led to the 107 Prototype and eventually the new generation of turbine-powered aircraft, the 107 and the Chinook.

The 107 represented a significant advance in the art of helicopter design. This aircraft was ordered by the United States Marine Corps, Royal Canadian Air Force, Canadian Army, the Royal Swedish Navy and Air Force, New York Airways, and under licensee agreement to Kawasaki Aircraft Company in Japan. 107's have been ordered by Kanki Airlines, Thailand Government, and the Japanese Maritime Self Defense Force. Pan American World Airways has also ordered the 107 airliner.

Versions of the 107 ordered by the Marine Corps and designated the CH-46A are in full production and have been delivered to the customer.

Also stemming from the research and development of turbine-powered helicopters is the U.S. Army's CH-47A Chinook. This aircraft, now being produced and delivered to units of the 11th Air Assault Division, will be used primarily as a tactical transport helicopter. The primary mission of the Chinook is to quickly deploy large numbers of small tactical units with crew-served weapons to anywhere in the battle area.

In April 1960, Vertol Aircraft Corporation became the Vertol Division of the Boeing Company, with access to Boeing's world-wide facilities, its testing installations, its skilled personnel, and to Boeing's manufacturing know-how and resources. This has added strength and depth to the Division's position as a major source for the design and production of the vertical takeoff-and-landing aircraft.

In 1962 the first phase of a complex was constructed and occupied on 290 acres of land located in Ridley Township to supplement Vertol Division's existing Manufacturing Center facilities at Morton, Pennsylvania, and to consolidate activities located at several leased sites. This new facility is composed of an Engineering Center and Dynamic Center which includes a Rotor Blade Manufacturing Plant and a Transmission Assembly and Test Building. These manufacturing facilities are the most modern in the free world.

XHRP-X . . . 1946

XHRP-1 . . . 1945

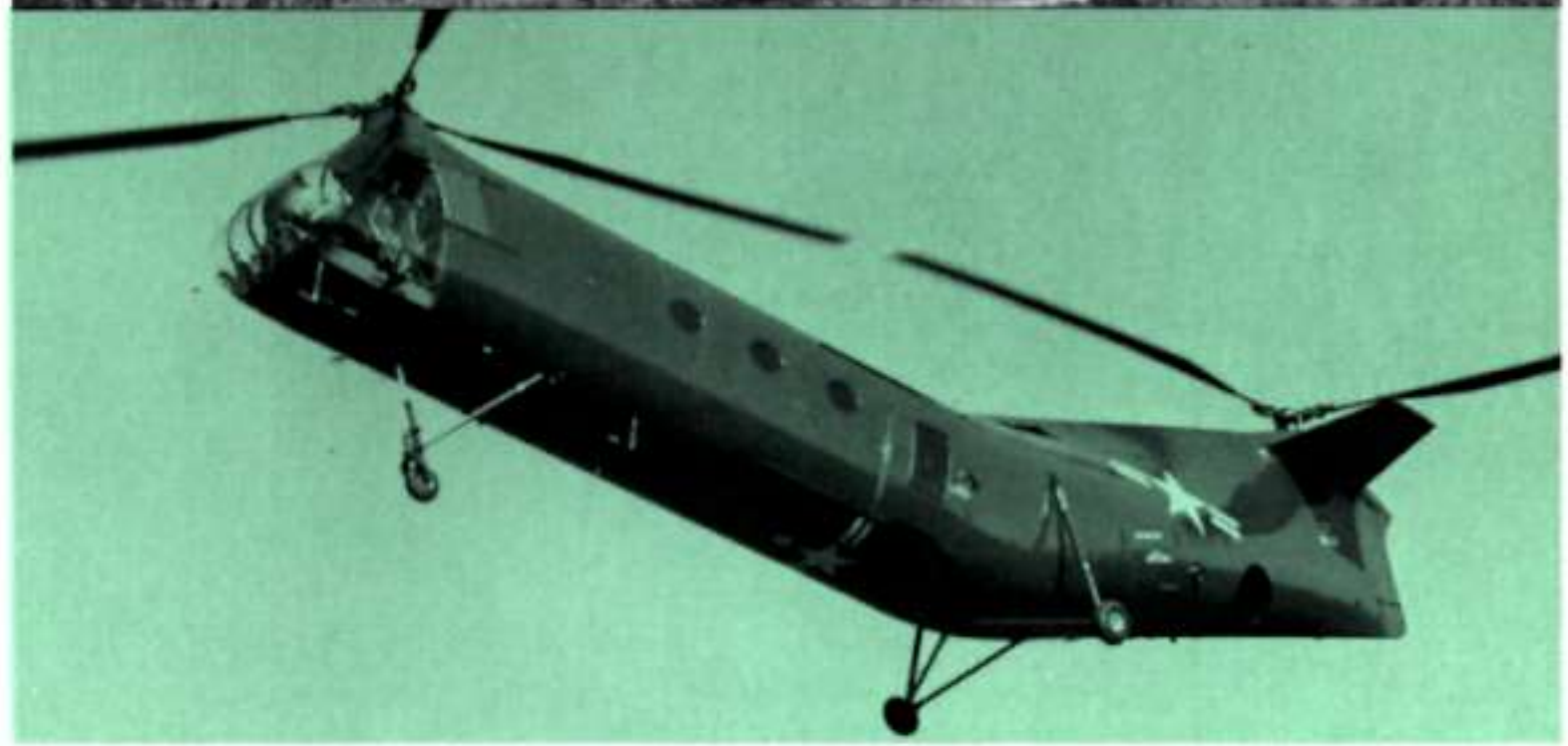
HRP SERIES

The XHRP-X "Dogship" was the first helicopter produced under military contract. Designed and built in record time for the U.S. Navy in March 1945, it not only was the first successful tandem-rotor helicopter but also the largest helicopter to fly successfully at the time. Two XHRP-1's quickly followed and served as static/dynamic and flight test articles. From these helicopters the basic principles of control were developed for the subsequent HRP-1, on which an extensive flight test program was conducted.

The HRP-1 was a ten-place helicopter powered by a 600 horsepower Pratt & Whitney R-1340 engine. Twenty aircraft were constructed under a Navy contract, and deliveries were completed in 1948. These helicopters performed numerous rescue missions with both the Navy and the Coast Guard. Using the HRP-1, rescues and medical missions up to 90 miles at sea were successfully completed by the U.S. Coast Guard.

The HRP-2, five of which were produced, was an all-metal fuselage version of the HRP-1, with a number of refinements and modifications.

The HRP series helicopters were the first to demonstrate the towing capability of VTOL aircraft, and to establish the superiority of the tandem-rotor configuration for this operation. As mine sweepers their speed was comparable with that of surface vessels, without the inherent danger of striking mines. Their ten-passenger capacity ushered in the era of transport helicopter operations. Six HRP's are currently licensed by the Federal Aviation Agency.



Designation—HRP-2

MISSION	Rescue & transport
CREW	2
PASSENGERS	10
ENGINE MAKE	(1) P & W R-1340-AN-1
H.P.	600
ROTOR DIAMETER	41 ft
FUSELAGE LENGTH	54 ft
WEIGHT EMPTY	5,301 lb
USEFUL LOAD	1,924 lb
MAX. SPEED	91 kt
CRUISING SPEED	80 kt
RANGE	300 + n. mi
CEILING WITH NORMAL LOAD	9,840 ft

XHJP-1 . . . 1946

Designation—HUP-2 Retriever

MISSION	Rescue & utility
CREW	2
PASSENGERS	4
ENGINE MAKE	(1) Continental R-975-34
H.P.	550
ROTOR DIAMETER	35 ft
FUSELAGE LENGTH	32 ft
WEIGHT EMPTY	4,236 lb
USEFUL LOAD	1,514 lb
MAX. SPEED	94 kt
CRUISING SPEED	73 kt
RANGE	310+ n. mi
CEILING WITH NORMAL LOAD	10,200 ft

HUP SERIES

The Navy Bureau of Aeronautics wrote requirements in 1945 for a high-performance utility helicopter to operate from aircraft carriers, battleships, and cruisers. The competition for this type was won by the tandem-rotor HUP, or as it was then known, the XHJP-1.

The prototype XHJP-1 had won a Navy production contract in competition with a single-rotor helicopter built to identical operational specifications. It was the first helicopter to incorporate overlapping tandem-rotor blades and prove the all-around advantages of this configuration.

The HUP, now designated the UH-25 "Retriever" by the Navy, is a six-place, single-engine rescue and utility helicopter. The fuselage is of all-metal, semimonocoque construction with a conventional fixed landing gear. The overlapped tandem design provides a compact fuselage and rotor system, permitting the HUP to be handled on any aircraft carrier elevator without folding the blades and

on any cruiser elevator with blades folded. The mission of the HUP is ship-based rescue, observation and utility, personnel and cargo transport.

The HUP-2 was the first production helicopter to be equipped with an auto-pilot which permits "hands off" flying. A total of 339 HUP type helicopters were delivered to the U.S. Navy, the U.S. Army (H-25's), the Royal Canadian Navy, and the French Navy. The Army's H-25 was known as "Army Mule" and doubled as a troop carrier and flying ambulance.

An example of the HUP's versatility was the performance of a single U.S. Navy squadron of twelve HUP-2's during rescue and relief operations at Tampico, Mexico, after the area had been badly damaged by a hurricane. In 2,298 day sorties and 88 night sorties, a total of 184,037 pounds of food was delivered to Mexican flood victims; 81 medical teams were transported together with 1,867 pounds of medical supplies. In a single day 2,280 persons were evacuated—1,425 of them rescued by hoist. One pilot transported 21 persons—a remarkable achievement for a six-place helicopter.

HUP-2 (H-25) . . . 1947

HUP-1 . . . 1948

FEBRUARY, 1962

A U.S. Navy UH-25 played a typically useful role in the sea operation following Lt. Colonel John Glenn's history-making orbital flight in space, air-lifting the astronaut from the pick-up destroyer the U.S.S. Noa to the carrier U.S.S. Randolph.

H-16 SERIES

Originally selected by the United States Air Force as a long-range transport helicopter, the YH-16 also incorporated the United States Marine Corps and United States Army Field Force characteristics for an assault transport helicopter capable of transporting large quantities of troops and equipment into critical combat areas. It was the largest helicopter in the world at the time, with space provisions for 40 troops or seven tons of cargo in its 2,250-cubic foot cabin.

Two of these big experimental helicopters were built for the USAF: the YH-16 "Transporter," test flown in 1953, and powered with two reciprocating engines delivering a total of 3,600 horsepower, and the YH-16A "Turbo Transporter," powered with two Allison YT38 turbines geared directly to the 82-foot diameter rotors. The first public showing of the latter took place at Philadelphia's International Airport on December 1955.

The YH-16A unofficially broke the existing helicopter record in 1956 with a speed of 166 miles per hour. Its service ceiling was over 18,000 feet. Data gathered from ground and flight tests of the YH-16A were instrumental in the further development of large turbine-powered, tandem-rotor helicopters.

Designation—YH-16A Turbo-transporter

MISSION	Long Range Rescue & transport
CREW	3
TROOPS	40 or 32 litters
ENGINE MAKE	(2) Allison YT38-A-10
H.P.	1,800 hp @ 14,300 rpm (each)
ROTOR DIAMETER	82 ft
FUSELAGE LENGTH	77 ft 7 in
WEIGHT EMPTY	22,506 lb
USEFUL LOAD	11,071 lb
MAX. SPEED	127 kt
CRUISING SPEED	122 kt
RANGE	200 n. mi
CEILING WITH NORMAL LOAD	19,100 ft

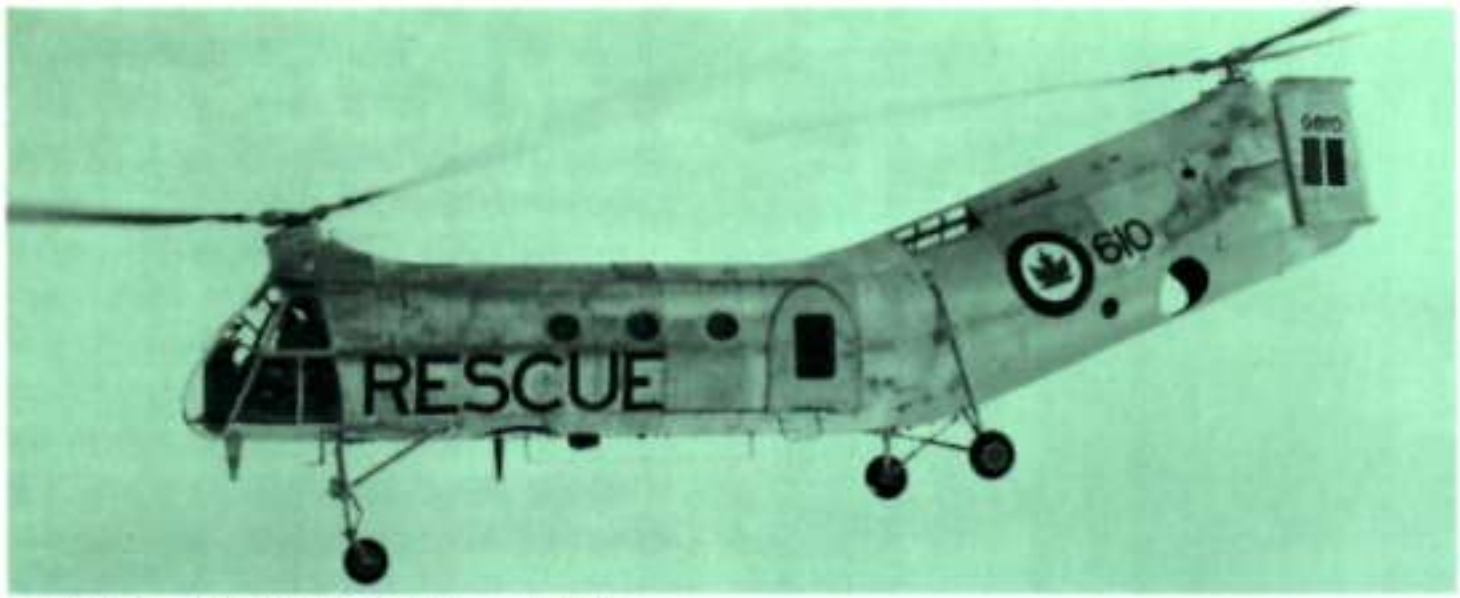
CH-21 SERIES

When the first YH-21, now designated CH-21, was delivered to the United States Air Force in 1953 it was immediately placed into rescue service in the Arctic without the benefit of any formal service evaluation of its performance. This "beefed up" version of the HRP-2, which had won the USAF competition for a long-range rescue helicopter, had to prove its reliability and ruggedness under the severest conditions as an operational aircraft.

Because of its excellent performance, its winterization features which permitted operation at temperatures as low as minus 65° F., and its capability of being routinely maintained under the same severe conditions, the CH-21A was given additional duties by the Air Force as a cargo and personnel transport in the most northern areas of Alaska, Canada, and Greenland, and in support of the DEW Line, CH-21B's were used as the prime support of the Texas Tower radar stations situated out in the Atlantic, off the coast of the United States.

The Royal Canadian Air Force employed CH-21 type helicopters in active support of the Mid-Canada

YH-21 . . . 1953



R C A F VERTOL 44A . . . 1958

Radar Line before turning the job and the helicopters over to Spartan Air Service. The U.S. Army uses the CH-21C "Shawnee" as a tactical and logistical support vehicle.

The CH-21C and an export model designated the Vertol 43 have both reeeived their baptism under fire, serving with distinction in combat with the French Army in Algeria and, more recently, achieved a notable combat record with U.S. Army Military Assistance Groups serving with Government forces fighting Communist Viet Cong guerrillas in the jungles, mountains, and rice paddies of South Vietnam. These helicopters have proven to be surprisingly invulnerable to small arms ground fire, suffering as many as eight bullet hits in a single blade without causing the mission to be aborted.

An experimental model, powered with twin T53 turbine engines, was the forerunner of the turbine-powered transports. This was designated the Vertol 105. Another twin-turbine installation, using T58s, was developed and flown under a U.S. Navy contract. This helicopter was designated the CH-21D.

The Vertol 44 is an improved, FAA-certificated CH-21 type helicopter for military and commercial operations. Some of the prime differences between the 44 and the H-21C are:

H-21C and 44A in combat in Vietnam and Algeria

VERTOL 44B . . .1958

all-metal rotor blades, increased power, reduced drag, and a roll rate damper stability device which resulted in improved flying qualities.

The CH-21's have served as air rescue helicopters with the RCAF and USAF, as utility transports with the U.S. Army and German Army, on ASW and minesweeping operations with the Royal Swedish Navy and the French Navy.

The commercial version, the 44B, was operated by New York Airways, Sabena Belgian World Airlines, and Spartan Air Service, as well as in the petroleum and construction industry.

This outstanding series of helicopters has amassed a truly remarkable record of service and versatility since the first CH-21 was delivered to the USAF in 1953.

Designation—CH-21B (& C)
Work Horse (& Shawnee)

MISSION	Transport & rescue
CREW	2
TROOPS	20 or 12 litters
ENGINE MAKE	(1) Wright R-1820-103
H.P.	1,425
ROTOR DIAMETER	44 ft
FUSELAGE LENGTH	52.6 ft
WEIGHT EMPTY	9,148 lb
USEFUL LOAD	5,556 lb
MAX. SPEED	109 kt
CRUISING SPEED	88 kt
RANGE	350 n. mi
CEILING WITH NORMAL LOAD	7,750 ft

Designation—44A (& 44B)

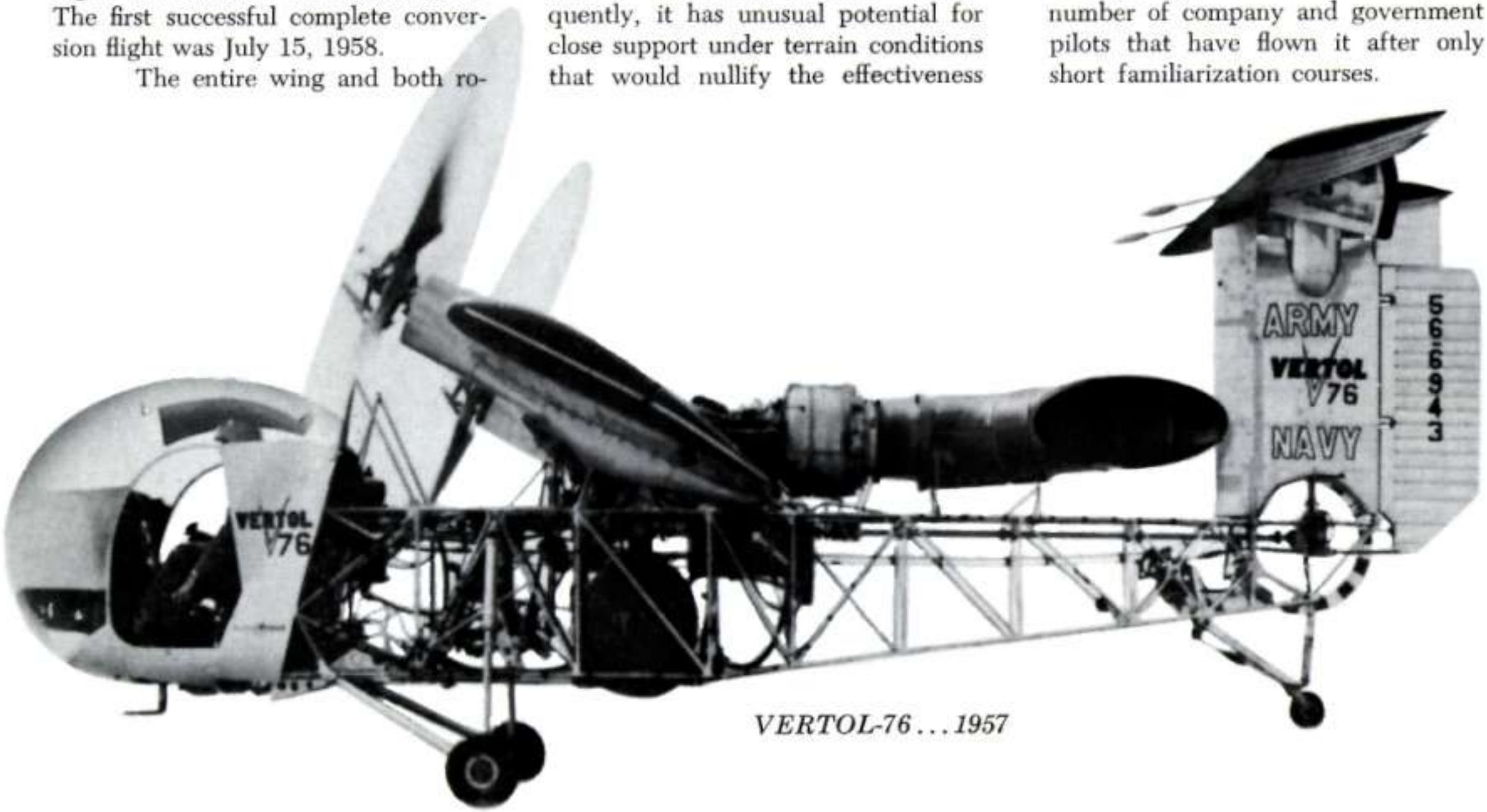
MISSION	Utility (& airliner)
CREW	2
PASSENGERS	19 (15)
ENGINE MAKE	(1) Wright Cyclone 977C9HD2
H.P.	1,425 (takeoff)
ROTOR DIAMETER	44 ft
FUSELAGE LENGTH	52.6 ft
WEIGHT EMPTY	8,990 lb (9,786 lb)
USEFUL LOAD	5,360 lb (4,564 lb)
MAX. SPEED	110 kt
CRUISING SPEED	88 kt
RANGE	250 n. mi
CEILING WITH NORMAL LOAD	8,900 ft

VERTOL 76

This experimental aircraft, pioneered in 1957, was the first tilt-wing VTOL ever built. It was developed for the U.S. Army and the Office of Naval Research as the Vertol 76 (VZ-2), the first and only tilt-wing to go through conversion from vertical flight to horizontal and back again. The first successful complete conversion flight was July 15, 1958.

The entire wing and both rotor-propellers can be tilted to a vertical position, thus enabling the 76 to take off and land like a helicopter. The aircraft transitions from hover to forward flight as the wing and rotor-propellers are tilted forward to the horizontal position. The 76 then flies like a fixed-wing aircraft. Consequently, it has unusual potential for close support under terrain conditions that would nullify the effectiveness of a less versatile aircraft.

The Vertol 76 has successfully completed an extensive three-year flight test program and is currently undergoing flight tests of an advance wing configuration. The ease with which this plane can be flown through all flight regimes is attested to by the number of company and government pilots that have flown it after only short familiarization courses.



VERTOL-76 . . . 1957

107 SERIES

The Boeing-Vertol 107 was the result of foresight, investigation, and research.

Early in 1956, Vertol initiated a program to determine the optimum configuration for a twin-turbine-powered transport helicopter to meet the world-wide requirements of the coming turbine-engine era of the 1960's. This program, which lasted eighteen months, resulted in the 107 prototype design which made its initial flight in April 1958. The aircraft was widely and successfully demonstrated in the United States, Canada, Europe, and Asia.

PROTOTYPE
1958

photo: courtesy of British European Airways

By 1958, when the prototype first flew, Vertol had developed a successful interchangeable steel-spar rotor blade which had reduced vibration significantly. Another important advancement introduced in the 107 design was a flight control system that had been simplified by the elimination of longitudinal cyclic pitch. Differential collective pitch, for which the control components were already included, was used to effect longitudinal control. As a result, vibration actually decreased at speeds from 100 to 140 knots.

Emphasis was placed upon the compactness of the 107 design to minimize the amount of space occupied by aircraft aboard ship, and to reduce the vulnerability and camouflage problems under combat conditions. Ease of maintenance and low maintenance cost were stressed throughout the design phase, and each design detail by part, component, and installation was reviewed with these goals in mind. Whenever warranted, a "packaging" concept was adopted for removing and replacing assemblies, thereby simplifying and speeding maintenance on the 107. As many parts as possible were made interchangeable, and the number of parts was reduced because of the unusual simplification of design, resulting in low-cost production.

Refinements to the basic design resulted in the YHC-1A, developed for the U.S. Army, and first flown in August 1959.

Flight evaluations in both the YHC-1A and the 107 prototype were carried out by seven foreign military agencies, in addition to the U.S. Air Force and the U.S. Navy which concurred in the opinion that this aircraft represented a marked advance in design development.

The fuselages of these twin-turbine-powered helicopters (redesignated by Dept. of Defense as CH-46Cs) are sealed at the factory, giving them flotation capability—able to land and take off on water without special equipment. The landing-gear/fuel cell stubs are also sealed, providing the helicopter with good stability when afloat.

The Boeing-Vertol 107-II was certificated in early 1962 by the Federal Aviation Agency as a transport helicopter, and entered commercial airline service with New York Airways the same year in a 25-seat Airliner configuration, replacing the older Vertol

CH-46C . . . 1959

CH-46A . . . 1961

Designation—CH-46A (HRB-1) Sea Knight

MISSION	Assault & transport
CREW	3
TROOPS	25 troop seats or 15 litters and 2 attendants
ENGINE MAKE	(2) T58-GE-8B
H.P.	1,250 hp @ 19,500 rpm (each)
ROTOR DIAMETER	50 ft
FUSELAGE LENGTH	44 ft 10 in
WEIGHT EMPTY	11,532 lb
USEFUL LOAD	6,952 lb
MAX. SPEED	139 kt
CRUISING SPEED	130 kt
RANGE	200 n. mi
CEILING WITH NORMAL LOAD	12,800 ft

44's. On October 4, 1963, New York Airways carried a daily record number of 1,464 passengers. As of April 1, 1964 New York Airways 107's have carried 375,472 passengers.

Upon return of their last Vertol 44 to the Vertol Division, New York Airways became the first all turbine-powered helicopter airline.

Kawasaki Aircraft Company of Japan also ordered the 107-II for passenger and cargo service in Japan. Under a license agreement Kawasaki has received orders for 107's from Kanki Airlines, Thailand Government, Osaka Airlines, Fuji Airlines, Tokyo Airlines and the Japanese Maritime Self Defense Force.

The Airliner version not only provides a high degree of passenger comfort and safety, it also features a removable baggage bin which rolls out of the rear of the helicopter like a drawer, on overhead tracks. It can be replaced with a preloaded bin at terminal points, thus reducing baggage loading time to less than five minutes. Like all 107-type helicopters, the Airliner possesses flotation capability without the addition of a special kit.

In 1961, the Royal Canadian Air Force and Royal Swedish Navy and Air Force ordered 107-II's for their military forces. Also, in 1961,

a special version of the 107-II won a U.S. Navy design competition for a light assault transport helicopter for the United States Marine Corps, and production orders followed. This model is designated the CH-46A Sea Knight. The CH-46A now being delivered to the Marine Corps will join the fleet during 1964. The primary mission of the Sea Knight is to rapidly deploy large numbers of combat-equipped Marines to remote areas. It has blade folding for aircraft carrier compatibility, de-icing, an APP, and a rapid integrated cargo-handling system. A straight-in rear loading ramp in the CH-46A utility replaces the roll-out baggage bin of the Airliner version.

In 1962, the 107-II was declared the winner of the U.S. Air Force competition for a light transport helicopter. In February of 1963, the 107 was ordered by the Canadian Army.

In January of 1964 Pan American World Airways ordered two Boeing-Vertol 107 Helicopter Airliners.

RCAF CH-113 . . . 1961

CANADIAN ARMY CH-113A . . . 1963

SWEDEN HKP-4 . . . 1961

KAWASAKI AIRCRAFT, JAPAN . . . 1961

The 107-II Airliner interior provides the highest degree of passenger comfort available in any commercial transport helicopter flying today.

107-II . . . New York Airways . . . 1962

Designation—107-II

MISSION	Airliner
CREW	3
PASSENGERS	25
ENGINE MAKE	(2) GE CT58-110
H.P.	1,250 hp (each)
ROTOR DIAMETER	50 ft
FUSELAGE LENGTH	44 ft 7 in
WEIGHT EMPTY	10,732 lb
USEFUL LOAD	8,268 lb
MAX. SPEED	146 kt
CRUISING SPEED	135 kt
RANGE	216 n. mi
CEILING WITH NORMAL LOAD	13,700 ft

VERTOL 107 . . . PAN AM . . . 1964

CH-47A CHINOOK

CH-47A "CHINOOK" . . . 1961

In September, 1958, following a design competition, the joint U.S. Army/U.S. Air Force Source Selection Board recommended to the Army that Vertol be selected to design and develop a new medium transport helicopter called the Chinook as a replacement for its obsolescent piston-engine powered transport helicopters. By May, 1959, the model specifications were approved and a contract issued. Now designated the CH-47A, the Chinook immediately went into design and development testing, and the first flight took place in September, 1961.

The Chinook, a twin-turbine tandem-rotor transport, is proving to be an effective and efficient infantry assault platoon carrier—having transported, repeatedly, a complete infantry platoon consisting of 44 combat-equipped soldiers. The Chinook has lifted a useful load of over 10½ tons. The first production Chinooks were powered by twin Lycoming T55-L-5 gas turbine engines, each with a military rating of 2,200 horsepower. The more powerful T55-L-7 engine, with a rating of 2,650 horsepower, has superseded the L-5, thereby increasing significantly the lifting capability of the Chinook. The Chinook is now in

quantity production for the U.S. Army.

The Chinook incorporates features which give it excellent instrument flight characteristics as well as flotation capability. A rear ramp permits rapid straight-in loading and unloading of troops, vehicles, and cargo. It is fitted with an external cargo hook, enabling it to carry objects too bulky to fit within its payload compartment. Seats are provided for 33 combat-equipped troops, and a jump seat for either the crew chief or a troop commander. In combat operations, additional troops can be seated on the floor —as they were in Algerian operations and as they are being transported in South Vietnam. With seats folded against the compartment walls, there are provisions for 24 standard pole-type litters.

The Chinook can accommodate any helicopter mode component of the Pershing Missile Weapons Systems. Capable of carrying modern artillery systems, the Chinook will provide tactical mobility for the fire support required by air assault infantry units.

This versatile medium assault transport was designed with a minimum of maintenance requirements, to be independent of elaborate ground support equipment in order to operate efficiently in forward combat areas with the troops. An installed APU permits ground operation of all utility and starting systems, thereby eliminating the need for external power sources. No special tools are required for maintenance at the operating level.

Designation—CH-47A Chinook

MISSION	Troop and cargo transport
CREW	3
TROOPS	A combat-equipped platoon
ENGINE MAKE	(2) Lycoming T55-L-7
H.P.	2,650 hp (each)
ROTOR DIAMETER	59.1 ft
FUSELAGE LENGTH	51 ft
WEIGHT EMPTY	approx. 17,000 lb
USEFUL LOAD	up to 10½ tons
MAX. SPEED	157 kt
CRUISING SPEED	130 kt
RANGE	215 n. mi. (Normal)
CEILING WITH NORMAL LOAD	over 20,000 feet


ARMY


ARMY

DISTRIBUTION

MODEL	USER DESIGNATION	CUSTOMER
PV-3	XHRP-X—Dog Ship	U.S. Navy
PV-3	XHRP-1	U.S. Navy
PV-3	HRP-1	U.S. Navy
PV-14	XHJP-1	U.S. Navy
PV-15	YH-16 Transporter	U.S. Air Force
PV-15	YH-16A Turbo-transporter	U.S. Air Force
PV-17	HRP-2	U.S. Marines
PV-18	HUP-1 Retriever	U.S. Navy
PV-18	UH-25B (HUP-2) Retriever	U.S. Navy; French Navy
PV-18	UH-25A (H-25A) Army Mule	U.S. Army
PV-18	UH-25C (HUP-3)	Royal Canadian Navy
PD-22	YH-21 Work Horse	U.S. Air Force
42	CH-21A (H-21A) Work Horse	U.S. Air Force; Royal Canadian Air Force
42	CH-21B (H-21B) Work Horse	U.S. Air Force; Royal Canadian Air Force
43	CH-21C (H-21C) Shawnee	U.S. Army
63	HUP-4	U.S. Navy
71	H-21D	U.S. Army
76	VZ-T (Tilt-Wing)	U.S. Army-Navy
107	Y/CH-46C (YHC-1A)	U.S. Army
107 M	CH-46A (HRB-1) Sea Knight	U.S. Marines
114	Y/CH-47A (YHC-1B) Chinook	U.S. Army
114	CH-47A (HC-1B) Chinook	U.S. Army

DISTRIBUTION

MODEL	USER DESIGNATION	CUSTOMER
42A	Vertol 42	Royal Canadian Air Force; Rick Helicopter
43	Vertol 43	German Air Force German Army French Army
44A	Boeing-Vertol 44A	U.S. Air Force Royal Canadian Air Force Royal Swedish Navy Royal Swedish Air Force
44B	Boeing-Vertol 44B	New York Airways, Atlas, Russia German Army Royal Swedish Navy
44C	Boeing-Vertol 44C	Russia
107-II	Boeing-Vertol 107	New York Airways
107-II	CH-113	Royal Canadian Air Force
107-II	HKP-4	Royal Swedish A.F.
107-II	HKP-4	Royal Swedish Navy
107-II	Kawasaki-Vertol 107	Kawasaki
107-II	CH-113A	Canadian Army
107-II	Boeing-Vertol 107	Pan American World Airways

SUMMARY

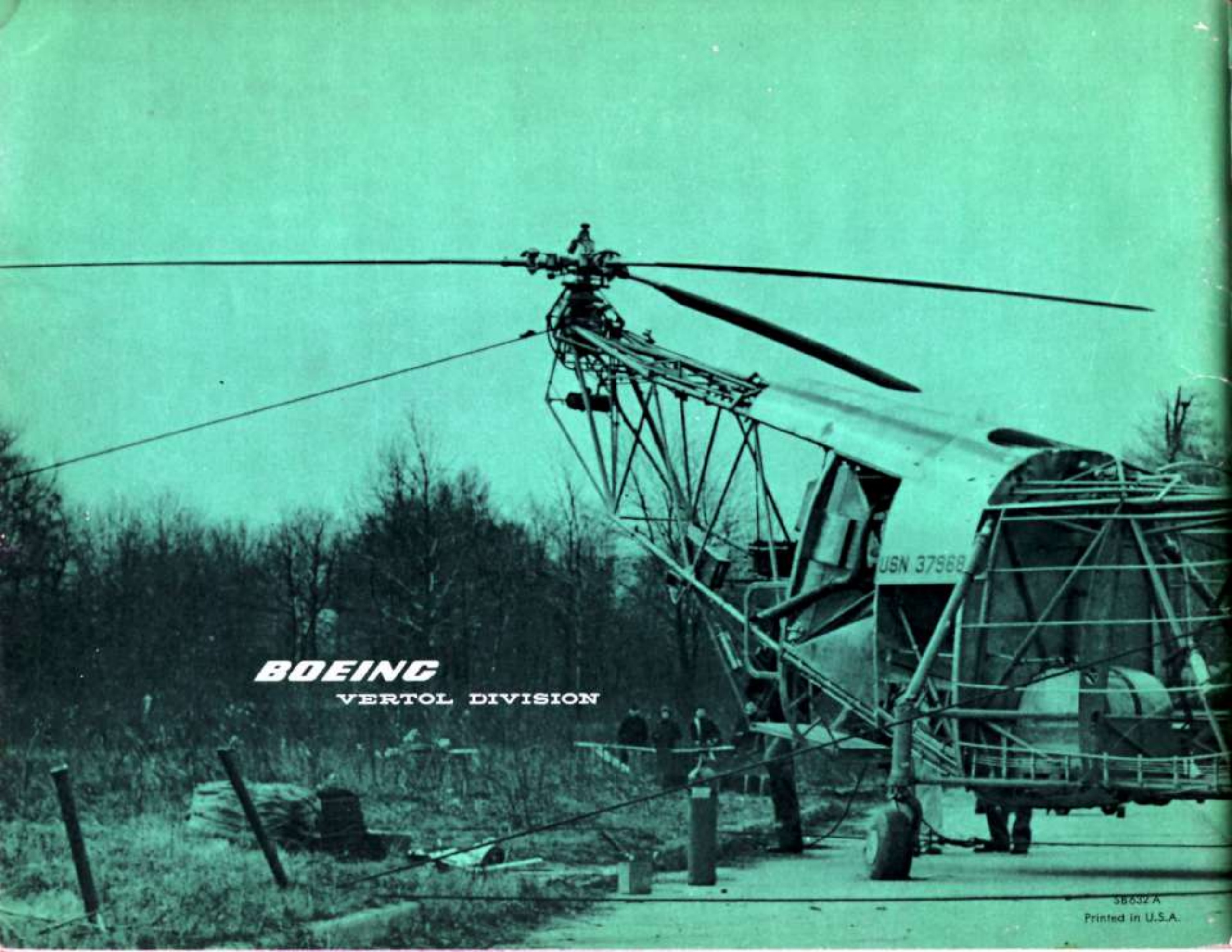
During nearly two decades of continuous design and production of VTOL aircraft, the Division has established itself on the forefront of the industry as a manufacturer of transport helicopters. Vertol Division helicopters have logged over a million and a half flight hours. A notable list of VTOL firsts has been compiled by the Vertol Division since its inception in 1943 by a group of young engineers.

This group designed and built the world's first successful tandem-rotor helicopter, the XHRP-X, for the U.S. Navy, and has since exploited to the fullest the inherent advantages of the tandem configuration. The Division successfully demonstrated the towing capability of tandem-rotor VTOL aircraft, the indiscriminate in-flight loading afforded by its large allowable center-of-gravity range.

Vertol designed the first successful helicopter autopilot installation, established helicopter world records for speed and altitude, designed and first successfully demonstrated minesweeping by helicopters, successfully demonstrated the first automatic altitude control on a helicopter, and built and successfully flight tested the first tilt-wing VTOL. Vertol also developed the Stability Augmentation System (SAS) which provides a helicopter with flying qualities approaching those of fixed-wing aircraft.

This is but a partial list of technical accomplishments resulting from a continuous and extensive research and development program.

Vertol Division, as a pioneer in the field of vertical flight, with access to the vast resources of the Boeing Company, has become a fully integrated aircraft manufacturing facility, with the experience, technical knowledge, managerial and engineering talent required to meet the problems and challenges in the broad field of VTOL/STOL mechanical and aeronautical technology.



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VERTOL DIVISION

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