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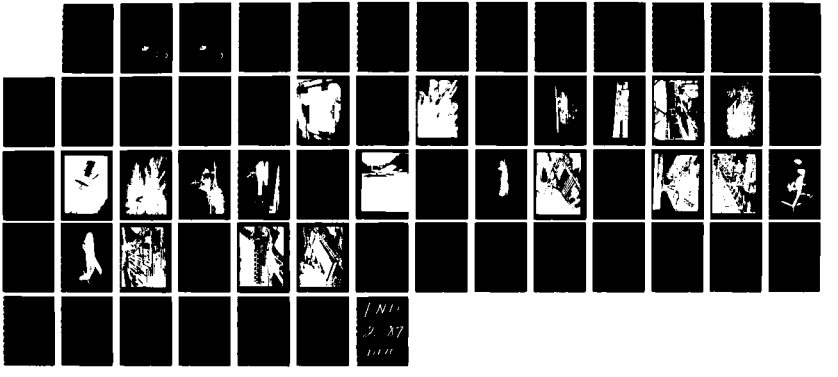

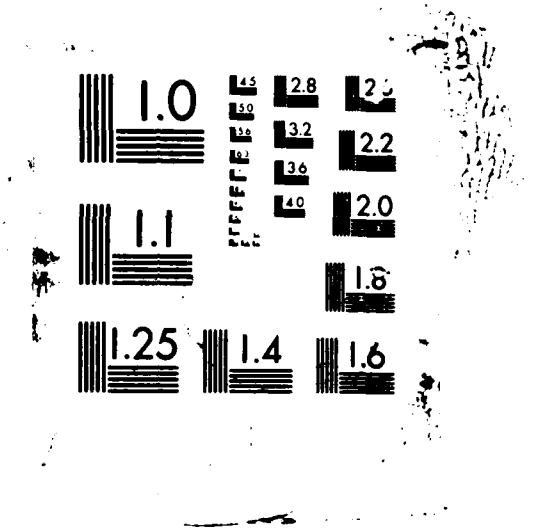
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HISTORIC PROPERTIES REPORT

STRATFORD ARMY ENGINE PLANT, CONNECTICUT

FINAL REPORT

JULY 1984

This document was prepared under Contract CX-0001-2-0033
between Building Technology Incorporated, Silver Spring, Maryland
and the Historic American Building Survey/Historic American
Engineering Record, National Park Service
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EXECUTIVE SUMMARY

The Stratford Army Engine Plant, located in Stratford, Connecticut, is a Government-owned contractor-operated industrial facility currently operated by the Avco Lycoming Division of the Avco Corporation. It is under the operational control of the U.S. Army Troop Support and Aviation Materiel Readiness Command (TSARCOM). The facility is situated along the Housatonic River on 115 acres of land and is comprised of 44 buildings, including two major manufacturing facilities. The earliest buildings were constructed in 1929 for the Sikorsky Aviation Corporation. Major additions were completed by the office of the noted industrial architect Albert Kahn during World War II when the plant was used by Chance-Vought Aircraft to manufacture the Corsair fighter plane. Presently, the Avco Lycoming Division uses the facility to develop and manufacture gas turbine engines.

There are no Category I or Category II historic properties at the Stratford Plant. The additions by Albert Kahn possess architectural importance and are Category III historic properties. An Aircraft Engines Test Facility, a highly intact example of an engineering type, is also a Category III historic property.

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PREFACE

This report presents the results of an historic properties survey of the Stratford Army Engine Plant. Prepared for the United States Army Materiel Development and Readiness Command (DARCOM), the report is intended to assist the Army in bringing this installation into compliance with the National Historic Preservation Act of 1966 and its amendments, and related federal laws and regulations. To this end, the report focuses on the identification, evaluation, documentation, nomination, and preservation of historic properties at the Stratford Army Engine Plant. Chapter 1 sets forth the survey's scope and methodology; Chapter 2 presents an architectural, historical, and technological overview of the installation and its properties; and Chapter 3 identifies significant properties by Army category and sets forth preservation recommendations. Illustrations and an annotated bibliography supplement the text.

This report is part of a program initiated through a memorandum of agreement between the National Park Service, Department of the Interior, and the U.S. Department of the Army. The program covers 74 DARCOM installations and has two components: 1) a survey of historic properties (districts, buildings, structures, and objects), and 2) the development of archeological overviews. Stanley H. Fried, Chief, Real Estate Branch of Headquarters DARCOM, directed the program for the Army, and Dr. Robert J. Kapsch, Chief of the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) directed the program for the National Park Service. Sally Kress Tompkins was program manager, and Robie S. Lange was project

manager for the historic properties survey. Technical assistance was provided by Donald C. Jackson.

Building Technology Incorporated acted as primary contractor to HABS/HAER for the historic properties survey. William A. Brenner was BTI's principal-in-charge and Dr. Larry D. Lankton was the chief technical consultant. Major subcontractors were the MacDonald and Mack Partnership and Melvyn Green and Associates. The authors of this report were David G. Buchanan and John P. Johnson. The authors gratefully acknowledge the staff of the United Technologies Archives for their help in researching the history of the Stratford Industrial Plant.

The complete HABS/HAER documentation for this installation will be included in the HABS/HAER collections at the Library of Congress. Prints and Photographs Division, under the designation HAER No. CT-14.

Chapter 1

INTRODUCTION

SCOPE

This report is based on an historic properties survey conducted in 1983 of all Army-owned properties located within the official boundaries of the Stratford Army Engine Plant. The survey included the following tasks:

- Completion of documentary research on the history of the installation and its properties, and selected research on the history of aircraft manufacturing.
- Completion of a field inventory of all properties at the installation.
- Preparation of a combined architectural, historical, and technological overview for the installation.
- Evaluation of historic properties and development of recommendations for preservation of these properties.

Also completed as a part of the historic properties survey of the installation, but not included in this report, are HABS/HAER Inventory cards for 10 individual properties. These cards, which constitute HABS/HAER Documentation Level IV, will be provided to the Department of the Army. Archival copies of the cards, with their accompanying photographic negatives, will be transmitted to the HABS/HAER collections at the Library of Congress.

The methodology used to complete these tasks is described in the following section of this report.

METHODOLOGY

1. Documentary Research

The Stratford Army Engine Plant is a major Government-owned contractor-operated industrial plant with an interesting history pertaining to the development of aviation manufacturing. Documentary research on aviation was conducted at the Library of Congress in Washington, D.C., and research on the Sikorsky Aviation Corporation and Chance Vought Aircraft was conducted at United Technologies Archives in East Hartford, Connecticut. Material on Avco Corporation and Avco-Lycoming Division was gathered at the Stratford Army Engine Plant. The Connecticut State Historic Preservation Office was also contacted, but no properties of historic significance at the Stratford site were identified through this source.

Army records used for the field inventory included current Real Property Inventory (RPI) printouts that listed all officially recorded buildings and structures by facility classification and date of construction; the installation's property record cards; and base maps and photographs supplied by installation personnel. A complete listing of this documentary material may be found in the bibliography.

2. Field Inventory

The field inventory was conducted by David G. Buchanan and John P. Johnson during April 1983. Lt. Col. Clyde E. Gray III, Commander, DCASPRO, Avco Lycoming Stratford Division, served as the point of contact for the survey team, and Maj. Jimmy A. Watt escorted the team during the tour of the installation. Nick Costakos, Real Property Officer, provided building data and access to drawings of Albert Kahn

additions. The staff of United Technologies Archives, in particular Harvey H. Lippincott, Corporate Archivist; Anne Millbrooke, Assistant Corporate Archivist; and Roy Stein, Intern, supplied valuable research materials, including photographs and company documents unavailable elsewhere.

Field inventory procedures were based on the HABS/HAER Guidelines for Inventories of Historic Buildings and Engineering and Industrial Structures.[1] All areas and properties were visually surveyed. Building locations and approximate dates of construction were noted from the installation's property records and field-verified. Interiors of all buildings were also visually surveyed to assess their present condition.

Field inventory forms were prepared for, and black and white 35 mm photographs taken of all buildings and structures through 1945 except basic utilitarian structures of no architectural, historical, or technological interest. When groups of similar ("prototypical") buildings were found, one field form was normally prepared to represent all buildings of that type. Field inventory forms were also completed for representative post-1945 buildings and structures.[2] Information collected on the field forms was later evaluated, condensed, and transferred to HABS/HAER Inventory cards.

3. Historic Overview

A combined architectural, historical, and technological overview was prepared from information developed from the documentary research and the field inventory. It was written in two parts: 1) an introductory

description of the installation, and 2) a history of the installation by periods of development, beginning with pre-military land uses. Maps and photographs were selected to supplement the text as appropriate.

The objectives of the overview were to 1) establish the periods of major construction at the installation, 2) identify important events and individuals associated with specific historic properties, 3) describe patterns and locations of historic property types, and 4) analyze specific building and industrial technologies employed at the installation.

4. Property Evaluation and Preservation Measures

Based on information developed in the historical overviews, properties were first evaluated for historical significance in accordance with the elegibility criteria for nomination to the National Register of Historic Places. These criteria require that eligible properties possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that they meet one or more of the following:[3]

A. Are associated with events that have made a significant contribution to the broad patterns of our history.

B. Are associated with the lives of persons significant in the nation's past.

C. Embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction.

D. Have yielded, or may be likely to yield, information important in pre-history or history.

Properties thus evaluated were further assessed for placement in one of five Army historic property categories as described in Army Regulation 420-40:[4]

Category I	Properties of major importance
Category II	Properties of importance
Category III	Properties of minor importance
Category IV	Properties of little or no importance
Category V	Properties detrimental to the significance of of adjacent historic properties

Based on an extensive review of the architectural, historical, and technological resources identified on DARCOM installations nationwide, four criteria were developed to help determine the appropriate categorization level for each Army property. These criteria were used to assess the importance not only of properties of traditional historical interest, but of the vast number of standardized or prototypical buildings, structures, and production processes that were built and put into service during World War II, as well as of properties associated with many post-war technological achievements. The four criteria were often used in combination and are as follows:

1) Degree of importance as a work of architectural, engineering, or industrial design. This criterion took into account the qualitative factors by which design is normally judged: artistic merit, workmanship, appropriate use of materials, and functionality.

2) Degree of rarity as a remaining example of a once widely used architectural, engineering, or industrial design or process. This criterion was applied primarily to the many standardized or prototypical DARCOM buildings, structures, or industrial processes. The more widespread or influential the design or process, the greater the importance of the remaining examples of the design or process was considered to be. This criterion was also used for non-military structures such as farmhouses and other once prevalent building types.

3) Degree of integrity or completeness. This criterion compared the current condition, appearance, and function of a building, structure, architectural assemblage, or industrial process to its original or most historically important condition, appearance, and function. Those properties that were highly intact were generally considered of greater importance than those that were not.

4) Degree of association with an important person, program, or event. This criterion was used to examine the relationship of a property to a famous personage, wartime project, or similar factor that lent the property special importance.

The majority of DARCOM properties were built just prior to or during World War II, and special attention was given to their evaluation. Those that still remain do not often possess individual importance, but collectively they represent the remnants of a vast construction undertaking whose architectural, historical, and technological importance needed to be assessed before their numbers diminished further. This assessment centered on an extensive review of the military construction of the 1940-1945 period, and its contribution to the history of World War II and the post-war Army landscape.

Because technology has advanced so rapidly since the war, post-World War II properties were also given attention. These properties were evaluated in terms of the nation's more recent accomplishments in weaponry, rocketry, electronics, and related technological and scientific endeavors. Thus the traditional definition of "historic" as a property 50 or more years old was not germane in the assessment of either World War II or post-war DARCOM buildings and structures; rather, the historic importance of all properties was evaluated as completely as possible regardless of age.

Property designations by category are expected to be useful for approximately ten years, after which all categorizations should be reviewed and updated.

Following this categorization procedure, Category I, II, and III historic properties were analyzed in terms of:

- Current structural condition and state of repair. This information was taken from the field inventory forms and photogaphs, and was often supplemented by rechecking with facilities engineering personnel.

- The nature of possible future adverse impacts to the property. This information was gathered from the installation's master planning documents and rechecked with facilities engineering personnel.

Based on the above considerations, the general preservation recommendations presented in Chapter 3 for Category I, II, and III historic properties were developed. Special preservation recommendations were created for individual properties as circumstances required.

5. Report Review

Prior to being completed in final form, this report was subjected to an in-house review by Building Technology Incorporated. It was then sent in draft to the subject installation for comment and clearance and, with its associated historical materials, to HABS/HAER staff for technical review. When the installation cleared the report, additional draft copies were sent to DARCOM, the appropriate State Historic Preservation Officer, and, when requested, to the archeological contractor performing parallel work at the installation. The report was revised based on all comments collected, then published in final form.

NOTES

1. Historic American Buildings Survey/Historic American Engineering Record, National Park Service, Guidelines for Inventories of Historic Buildings and Engineering and Industrial Structures (unpublished draft, 1982).

2. Representative post-World War II buildings and structures were defined as properties that were: (a) "representative" by virtue of construction type, architectural type, function, or a combination of these, (b) of obvious Category I, II, or III historic importance, or (c) prominent on the installation by virtue of size, location, or other distinctive feature.

3. National Park Service, How to Complete National Register Forms (Washington, D.C.: U.S. Government Printing Office, January 1977)

4. Army Regulation 420-40, Historic Preservation (Headquarters, U.S. Army: Washington, D.C., 15 April 1984)

Chapter 2

HISTORICAL OVERVIEW

BACKGROUND

The Stratford Army Engine Plant is a Government-owned contractor-operated industrial facility presently operated by the Avco Lycoming Division of the Avco Corporation. The facility is located in Stratford, Connecticut, on 115 acres of land situated along the Housatonic River near its mouth at Long Island Sound. There are 44 buildings at the plant, including two major manufacturing buildings. The Sikorsky Aviation Corporation constructed the original facility in 1929 as a manufacturing plant. During World War II, Chance-Vought Aircraft enlarged the plant for the manufacture of the Corsair Airplane. Currently, the Stratford Army Engine Plant is under the command of the U.S. Army Troop Support and Aviation Materiel Readiness Command (TSARCOM). The Avco Lycoming Division uses the facility to develop and manufacture gas turbine engines for aircraft, tank, marine, and industrial applications.

SIKORSKY AVIATION CORPORATION, 1929-1939

The Sikorsky Aero Engineering Corporation was established at College Point on Long Island, New York, in March 1923 to manufacture twin engine all-metal flying boats. The company's founder, Igor I. Sikorsky (1889-1972), was a Russian born aeronautical engineer whose success with fixed-wing aircraft led him to a position in 1912 as head of the aviation subsidiary of the Russian

Baltic Railroad Car Works. In this capacity, Sikorsky had been responsible for engineering and constructing the world's first multi-engine aircraft, a four-engine airplane known as "The Grand." The Russian Revolution, however, put an end to Sikorsky's aeronautical career in Russia, and in 1919 he emigrated to the United States.[1]

From 1923 until 1929 Sikorsky manufactured flying boats at College Point for various clients including the U.S. Navy. In July 1929 a majority of Sikorsky stock was acquired by United Aircraft and Transport Corporation of East Hartford, Connecticut, and the Sikorsky Aero Engineering Corporation became the first subsidiary of United Aircraft.

Following the takeover, the Sikorsky Aero Engineering Corporation erected a new factory in Stratford, Connecticut, adjacent to the Bridgewater Airport on a 36 acre site located on the Housatonic River near its mouth on Long Island Sound. The site had previously been used as farmland and contained no buildings. The College Point, Long Island plant closed in late 1929 and its equipment was moved to the Stratford site.

The new Sikorsky factory was designed by W. A. Bary, Vice-President and General Manager, and N. O. Smith-Petersen, Plant Engineer, in co-operation with Fletcher-Thompson, Architects, of Bridgeport, Connecticut. The new plant consisted of three buildings: a large factory section (Building 2) constructed principally of steel and glass and consisting of a large assembly bay 80 feet high, flanked by six smaller assembly bays; a two-story brick administration building (Building 1); and an all-purpose service building (Building 10).[2] (Illustration 1)

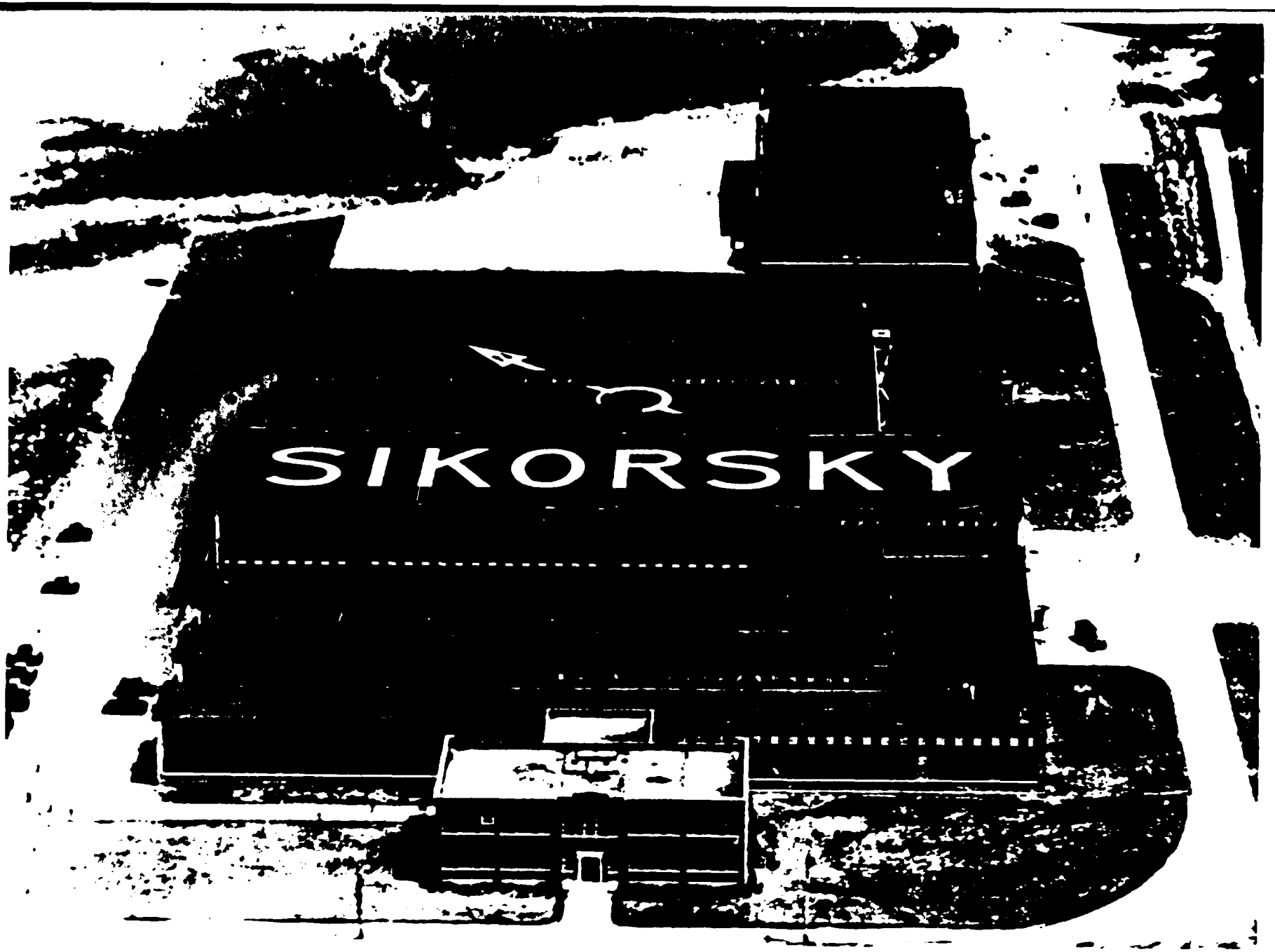

Illustration 1: The Sikorsky Aero Engineering Corporation factory in Stratford, Connecticut, c. 1929, showing Administration Building in foreground, Factory Section and Service Building in background (Source: United Technologies Archives).

An engineering building (Building 3), completed in 1930, was composed of three sections: a large experimental assembly bay, a test laboratory section with a machine shop, and an engineering office with a drafting room. This building also housed a model museum and an aeronautical engineering library.[3]

A wind tunnel, also completed in 1930, was connected to the engineering building by a passageway. The wind tunnel—an unusual "vertical-type," rarely used in the United States—was housed in an octagonal building, 26 feet wide and 33 feet high. The wind tunnel itself, five feet in diameter, could test scale models up to four feet in width. This unusual structure was demolished sometime during World War II.[4]

The next major site improvement was the construction of a causeway, 1500 feet long and 30 feet wide, which led to the deep water of the Housatonic River. This platform served as a seaplane base for launching and testing the large Sikorsky amphibian aircraft.[5] (Illustration 2)

The first Sikorsky aircraft, an S-38 flying boat powered by Pratt and Whitney Wasp engines, left the Stratford plant in November 1929. At this time, the new facility was valued at approximately $886,000. Initially, the work force manufactured an average of two planes per week, but it was estimated that five planes per week could be built if the facility were used to full capacity. During the first year of production, the Stratford plant produced over 100 S-38 amphibian airplanes.[6]

The Sikorsky flying boat, distinguished by its sesquiplane wings and twin-boom tail arrangement, became well known in the 1930's in commercial, military

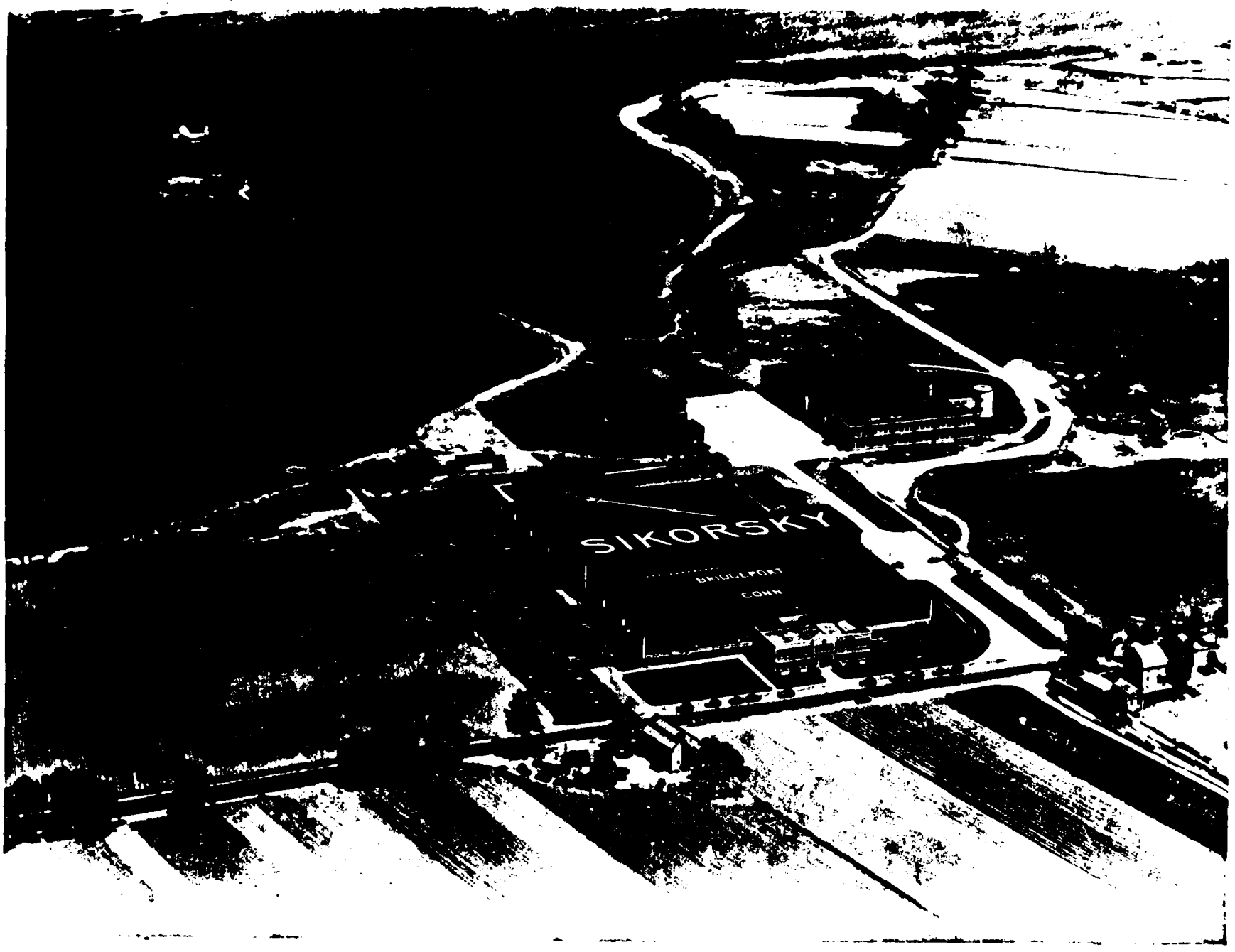

Illustration 2: The Sikorsky Aero Engineering Corporation factory in 1934 showing the Engineering Building completed in 1930 with the "vertical-type" wind tunnel and the seaplane causeway leading into the Housatonic River (Source: United Technologies Archives).

and passenger service. From 1927 until 1934 Sikorsky amphibians saw service with a number of Navy and Marine Corps units. An early S-38 amphibian aircraft, designated the XPS-1, was evaluated as a potential patrol aircraft but was relegated to transport and utility duties soon after delivery. The typical S-38 held four crew members and four passengers. It had twin Wright J-5 engines and could reach a maximum speed of 124 miles per hour at sea-level, with a maximum cruising speed of 110 miles per hour and a range of 594 statute miles.[7] (Illustration 3)

Sikorsky's friendship with Charles Lindbergh, an advisor with Pan American Airlines, led to the development of a four-engine amphibian known as the S-40, "Flying Clipper." The "Flying Clipper" could carry a load of 4800 pounds for 700 miles at a cruising speed of 115 miles per hour. The design of this aircraft was completed in the late spring of 1931, and the plane began passenger service with Pan American in the fall of that year. Sikorsky also developed the first true transoceanic airplane for Pan American. Known as the S-42, it was designed in 1932, and production began at the Stratford plant in 1933. With this aircraft, Pan American began flights to Argentina, Hawaii, and New Zealand, and by August 1934 the Sikorsky S-42 airplane had set world records for load, distance and miles flown.[8] (Illustrations 4-6)

In 1934 the company's name changed to Sikorsky Aviation Corporation, and in 1935 the company began taking orders for its first four-engine military flying boat. This aircraft, known as the S-44, was the first American military aircraft which included tail, nose and waist gun turrets. Between 1937 and 1939, Sikorsky delivered seventeen of these planes to the Navy and the Marine Corps.[9]

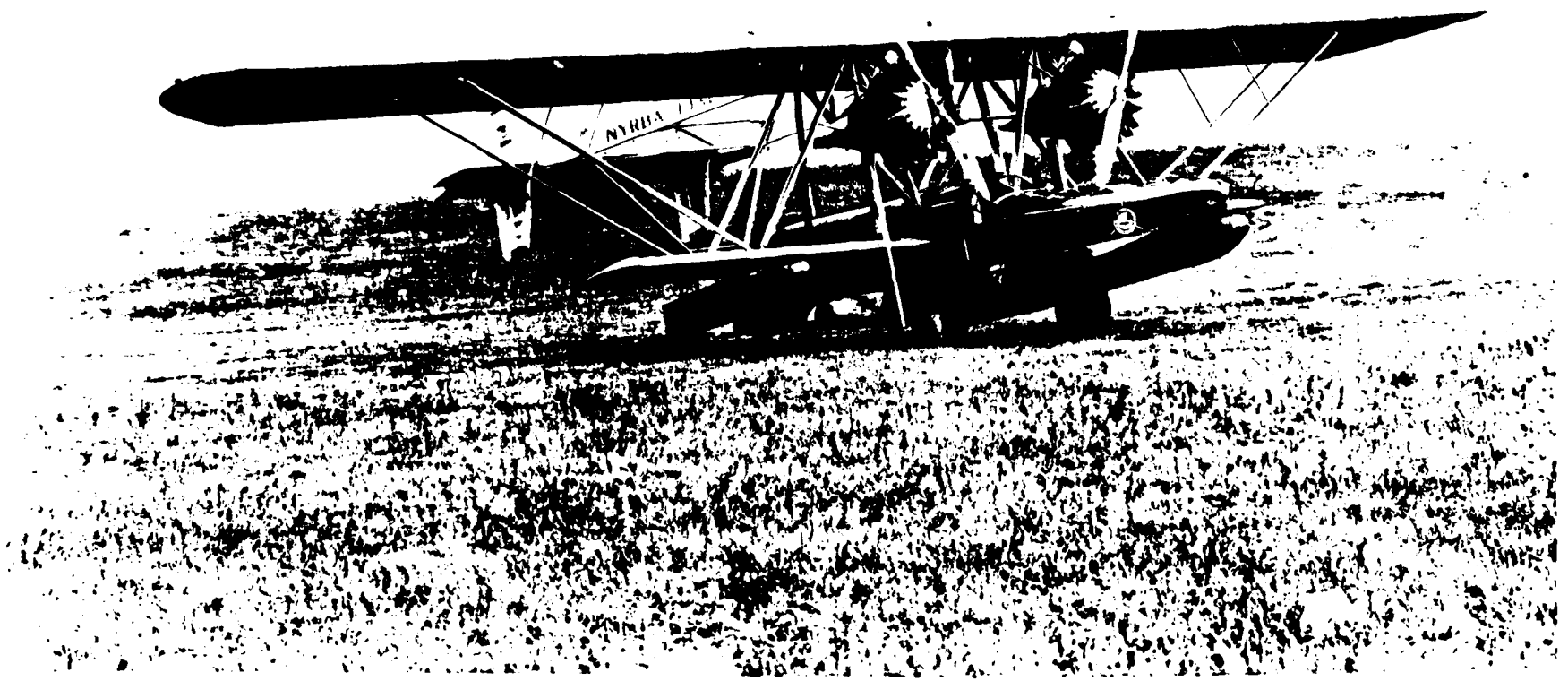

Illustration 3: The Sikorsky S-38 Flying Boat, c. 1929 (Source: United Technologies Archives).

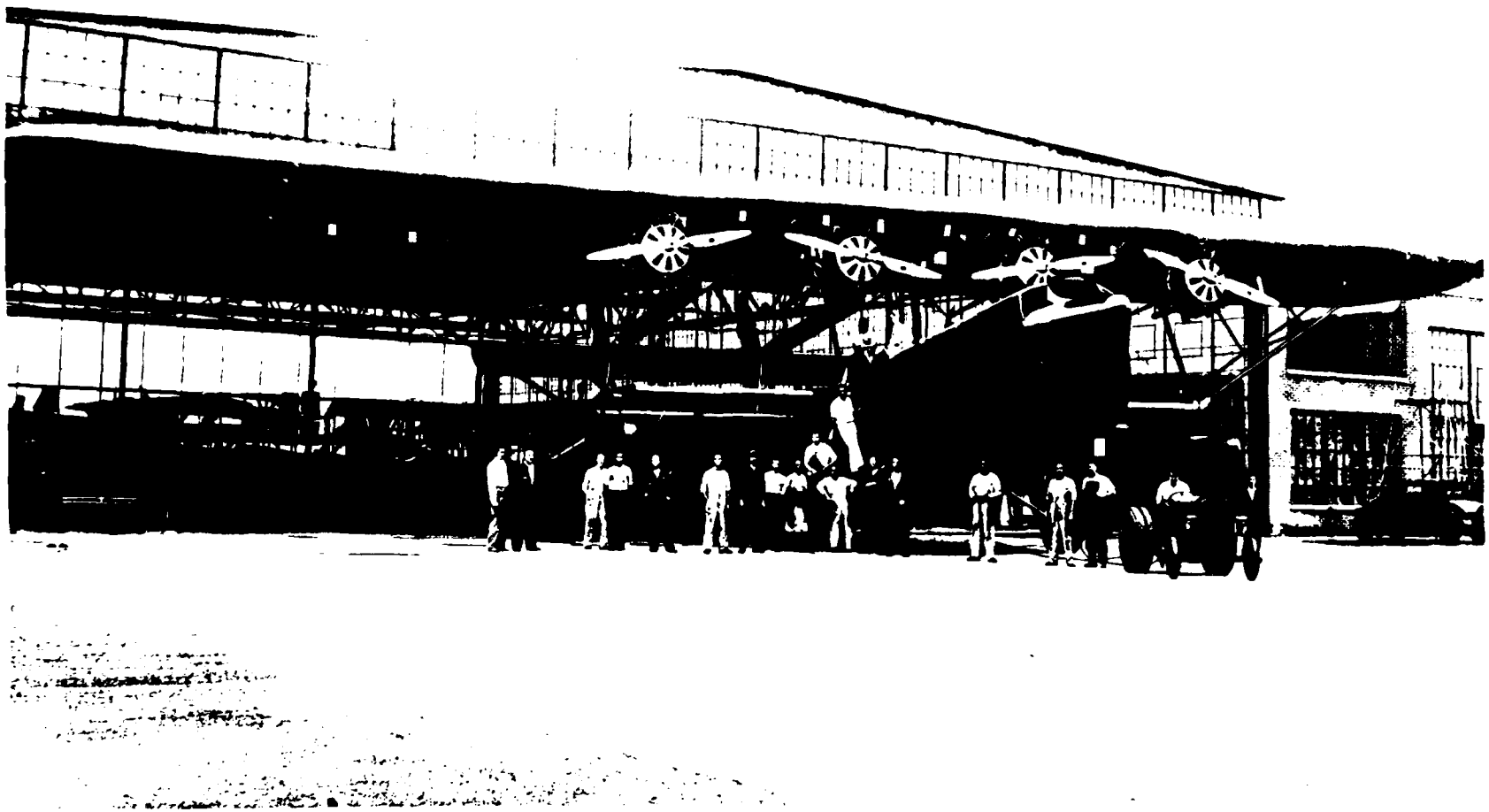

Illustration 4: The Sikorsky S-40 "Flying Clipper" in 1931 at the Stratford Plant (Source: United Technologies Archives).

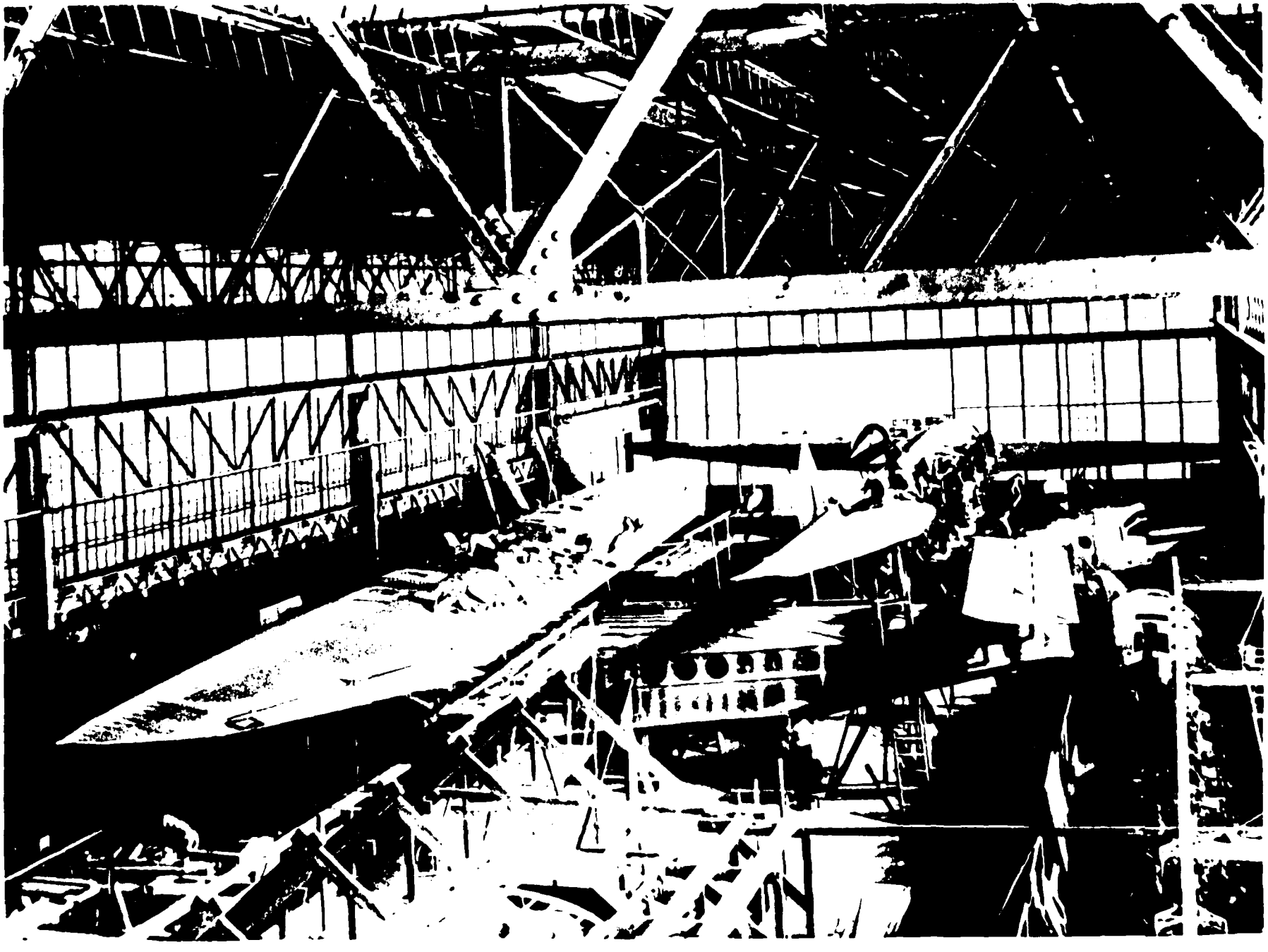

Illustration 5: The Sikorsky S-42 airplane under construction at the Stratford Plant in 1934 (Source: United Technologies Archives).

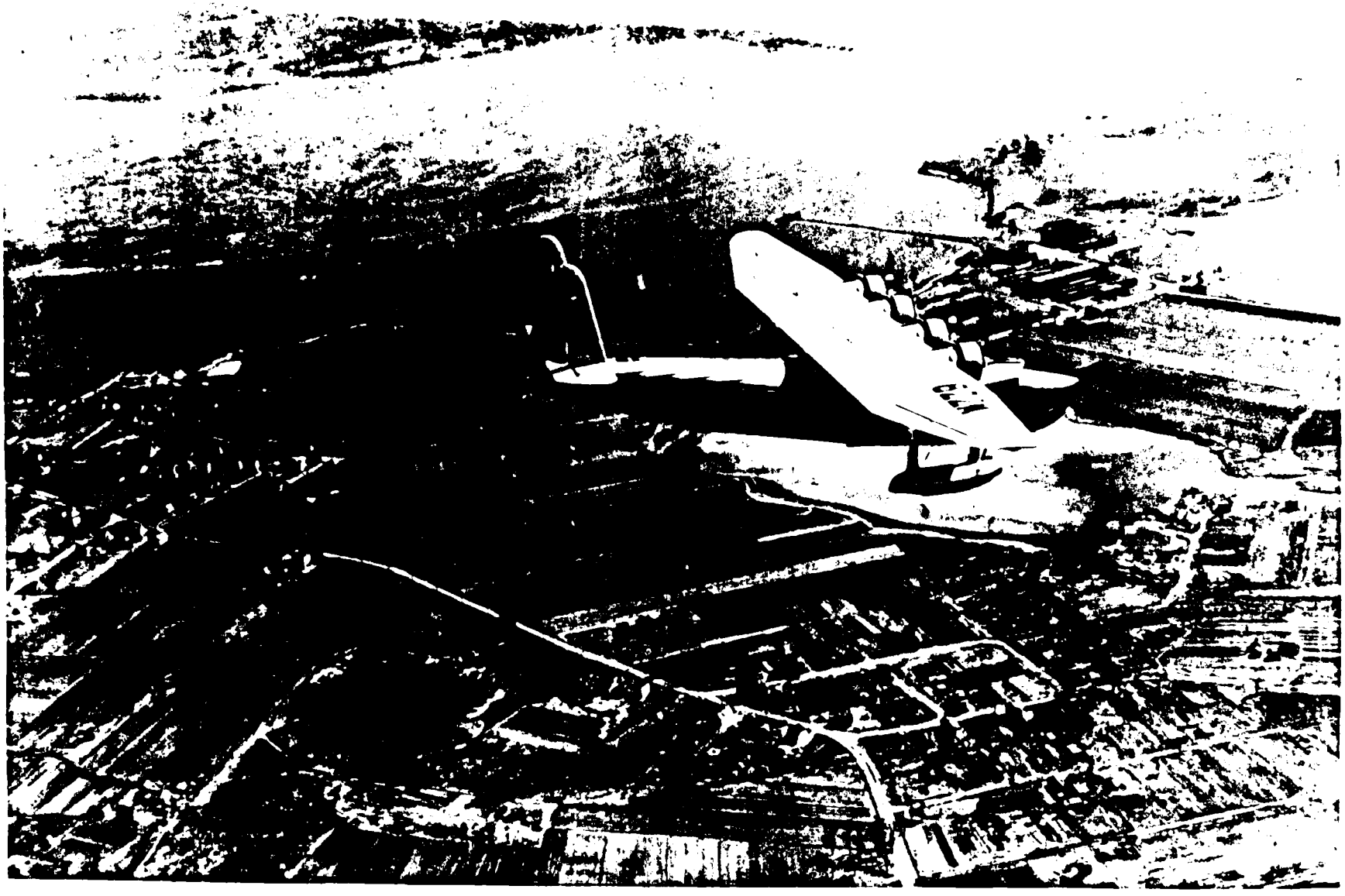

Illustration 6: The Sikorsky S-42 in 1934. The Stratford Plant can be seen in the background (Source: United Technologies Archives).

The years immediately following the takeover of the Sikorsky Company by United Aircraft and Transport Corporation were prosperous, but by the end of the 1930's the Sikorsky Aviation Corporation began experiencing economic difficulty. Although the S-44 aircraft had won a competition for a major production contract with the U.S. Navy in 1937, the company lost the contract over a price dispute. In the late 1930's, Pan American Airlines, another major client, also began cancelling its orders for the S-42 aircraft, and during 1938 airplane production at the Sikorsky plant nearly halted.[10]

VOUGHT-SIKORSKY AIRCRAFT/CHANCE VOUGHT AIRCRAFT, 1939-1948

Due to the poor condition of Sikorsky's flying boat business by the end of the 1930's, Chance Vought Aircraft, another subsidiary of United Aircraft, was relocated to the Stratford Plant. In April 1939 the new subsidiary became known as Vought-Sikorsky Aircraft Division.[11] The Stratford plant was extensively refurbished, and manufacturing methods, including installation of a conveyor line system and the extensive use of spot welding, resulted in vastly improved plant efficiency.[12]

Meanwhile, Vought-Sikorsky continued production of Sikorsky's twin engine S-43 flying boat, and a new model amphibian aircraft, the VS-44A--a passenger airplane with the capacity of 32 day passengers and 11 crew members--was ordered by American Export Airlines for luxury liner service between the United States and Europe. With the outbreak of World War II, however, American Export abandoned its plans for passenger service to the continent and cancelled its order with Vought-Sikorsky. The Navy utilized the VS-44A

as a transport plane to carry personnel and supplies to Ireland and North Africa, but after losing money on the VS-44A, United Aircraft decided to abandon the production of amphibian aircraft. Following this decision, Igor Sikorsky launched a new research program to develop a rotary wing aircraft, the helicopter.[13] (Illustrations 7-8)

Sikorsky built his first two helicopters in Russia in 1909, but neither model had actually flown. Sikorsky and a small team of engineers had been experimenting with rotary wing aircraft at the Stratford plant since the early 1930's, and in September 1939 the VS-300, an experimental model, made a tethered debut flight in an open field adjacent to the Stratford plant, with Sikorsky at the controls. After more development, the VS-300 made its first free flight in May 1940. This early helicopter had a 75 horsepower air-cooled engine with a power transmission consisting of V-belts and bevel gears. The engine drove a three-bladed main rotor 28 feet in diameter. The body had a welded, tubular steel frame, a three wheel landing gear and a completely open pilot's seat.[14] (Illustration 9)

The Army Air Corps became interested in Sikorsky's success and ordered a production model helicopter. Manufacture of Sikorsky's R-4, the world's first production helicopter and the only one to see action in World War II, began at the Stratford plant in 1942. The production plant was quickly overcrowded, however, and in January 1943, Sikorsky moved to Bridgeport, Connecticut for the sole purpose of helicopter production. (Illustration 10)

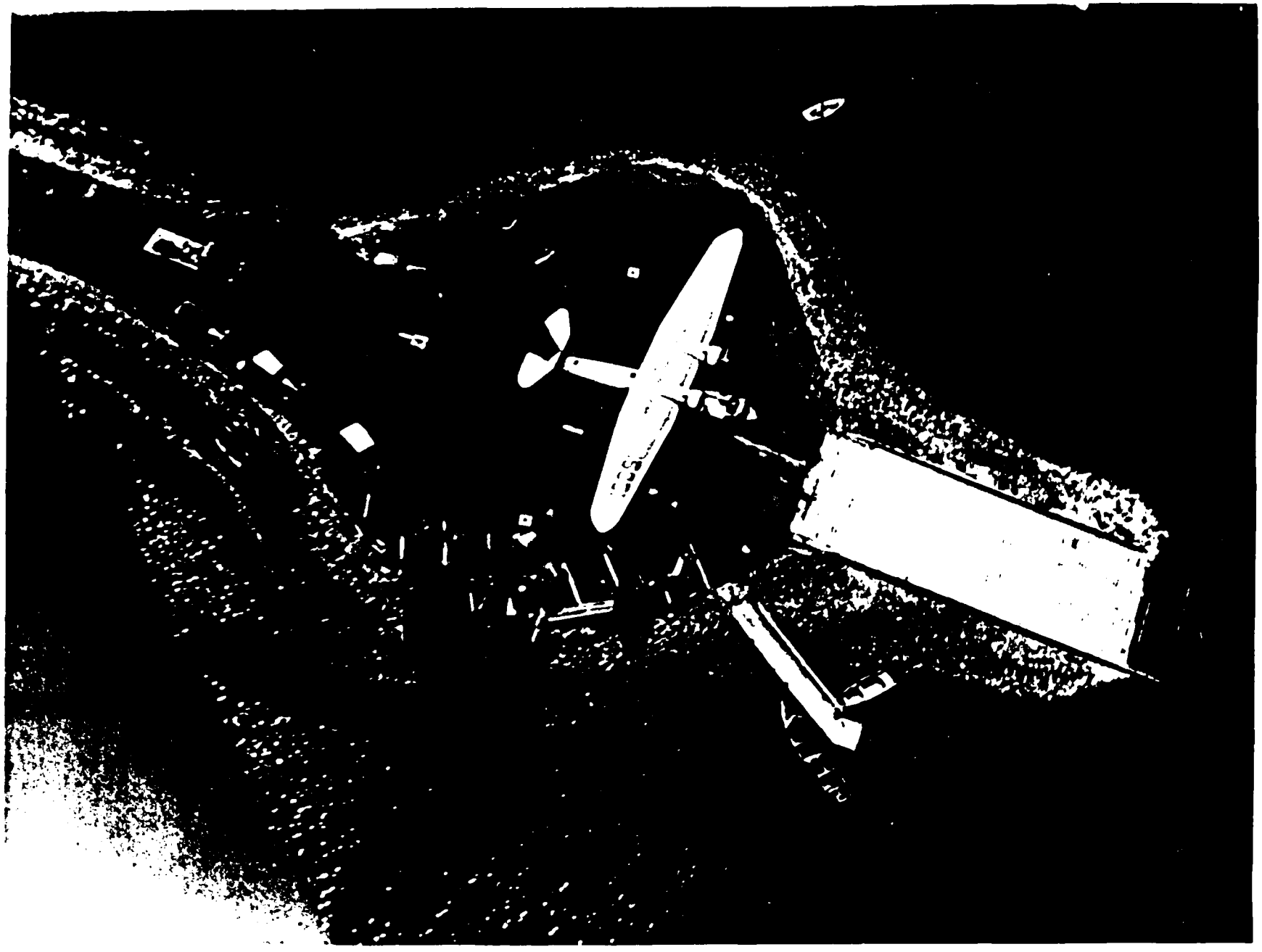

Illustration 7: The Sikorsky S-43 on the seaplane causeway at the Stratford Plant in 1935 (Source: United Technologies Archives).

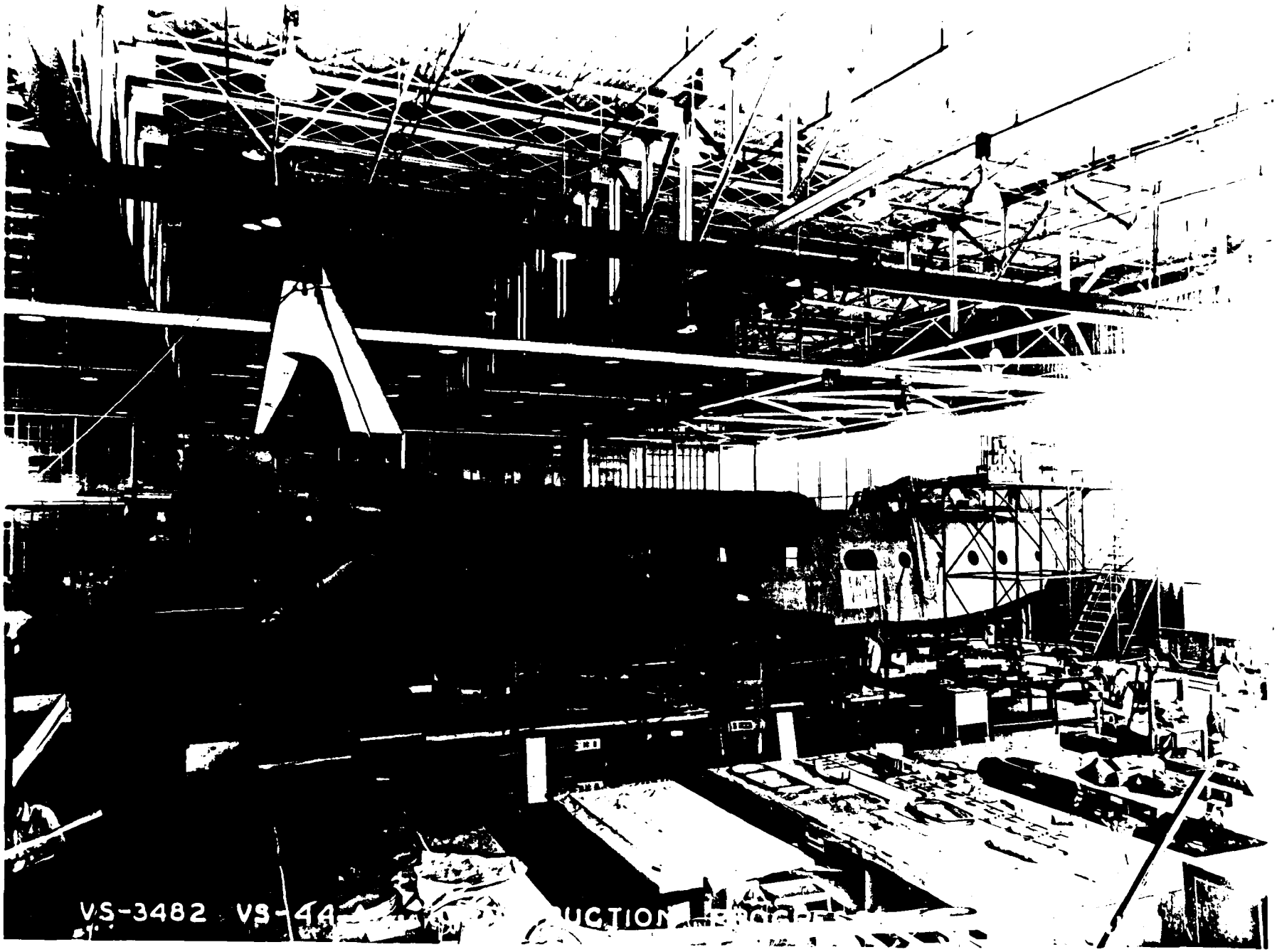

Illustration 8: The Vought-Sikorsky VS-44A passenger aircraft under construction at the Stratford Plant in 1941 (Source: United Technologies Archives).

Illustration 9: Experimental flight of the VS-300 helicopter in a field adjacent to the Stratford Plant with Igor Sikorsky at the controls (Source: United Technologies Archives).

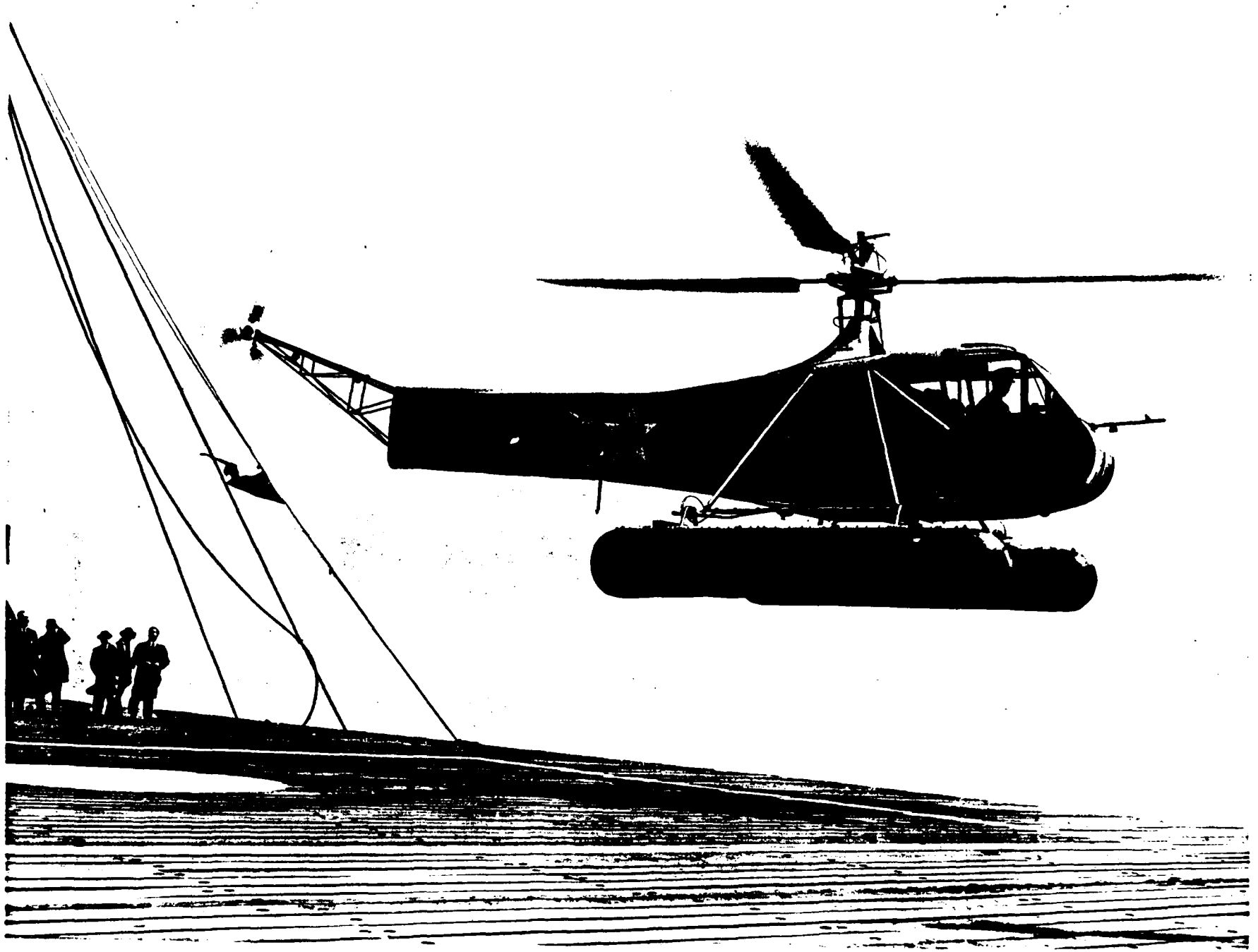

Illustration 10: The Vought-Sikorsky XR-4 helicopter in a test flight for the U.S. Army in 1943 (Source: United Technologies Archives).

While Sikorsky was developing the helicopter, Chance Vought developed a new monoplane for the Navy. Vought's monoplane design incorporated spot-welded aluminum alloy construction (as opposed to the usual riveted surface construction). Spot welding created a non-buckling smooth surface which was conducive to higher air speeds. This new airplane, the XOS2U-1, made its first experimental flight in May 1938. Vought later introduced the OS2U-2, also known as "The Kingfisher." These aircraft, powered by Pratt & Whitney Wasp Junior Engines, were convertible to either land or seaplane use and could therefore be operated as a float plane from a battleship or a cruiser catapult. Vought-Sikorsky delivered the first 158 airplanes to the Navy in 1940-1941, and in the following year it sent 1,006 OS2U-3's to the Navy before halting production in 1942. Throughout World War II, the Kingfisher enjoyed a solid reputation in anti-submarine patrols and sea rescue missions.[15] (Illustration 11)

During 1938 and 1939, Chance Vought engineers organized a research team, led by Rex B. Beisel, to develop the Corsair, a high speed fighter plane for the U.S. Navy. Beisel's team designed the smallest possible airframe around the most powerful available engine, the Pratt & Whitney XR-2800 Double Wasp. The Corsair's most distinguishing feature was its inverted gull wings with a landing gear located at the wing knuckles. This design, dictated by the large diameter propeller of the XR-2800 engine, kept the retractable landing gear legs short despite the height of the fuselage from the ground. A prototype Corsair, the XF4U-1, first flew in May 1940. This model had two guns in the forward fuselage, one in each wing, and compartments in the wings for ten small bombs. Before the end of 1940, this aircraft had flown at over 400 miles per hour, and in June 1941 the Navy ordered 548 Corsairs.[16]

Illustration 11: Chance Vought's OS2U-2 "Kingfisher" aircraft, no date (Source: United Technologies Archives).

The production model Corsair, the F4U-1, had a Pratt & Whitney R-2800-8 Double Wasp engine, an additional two guns in the wings with extra ammunition, self-sealing fuel tanks, and armor protection. Delivery of the F4U-1 model Corsairs to the U.S. Navy began on October 3, 1942.[17] (Illustration 12)

To accommodate the war-time production demands for the Corsair, Chance Vought Aircraft hired the noted industrial architects, Albert Kahn, Associated of Detroit, Michigan, to design extensive additions to the existing manufacturing facility. From 1942 until 1944, Kahn's office oversaw industrial and administrative additions to the original Sikorsky plant. (Illustration 13)

An aircraft assembly plant addition (Building 2) was designed by Kahn (Job No. 1804) and constructed in 1942. This major addition, measuring 380' by 250', was located on the north end of the existing assembly plant and roughly doubled the manufacturing capacity of the Chance Vought plant. The addition typifies Kahn's World War II era industrial designs, with a high central bay (dictated by the existing assembly plant) flanked by two industrial bays, with Kahn's characteristic V-shaped monitor windows.

In 1943, Kahn's office designed a two-story brick office addition and a three-story brick office addition adjacent to the original Sikorsky administrative building. In 1944 the firm completed another major addition to the assembly plant. This section, measuring 380' by 400', was the same design as Kahn's 1942 addition. The north factory extension, an L-shaped addition, was also completed in 1944 and added shipping and receiving warehouse space, as well as three stories of office and drafting space.

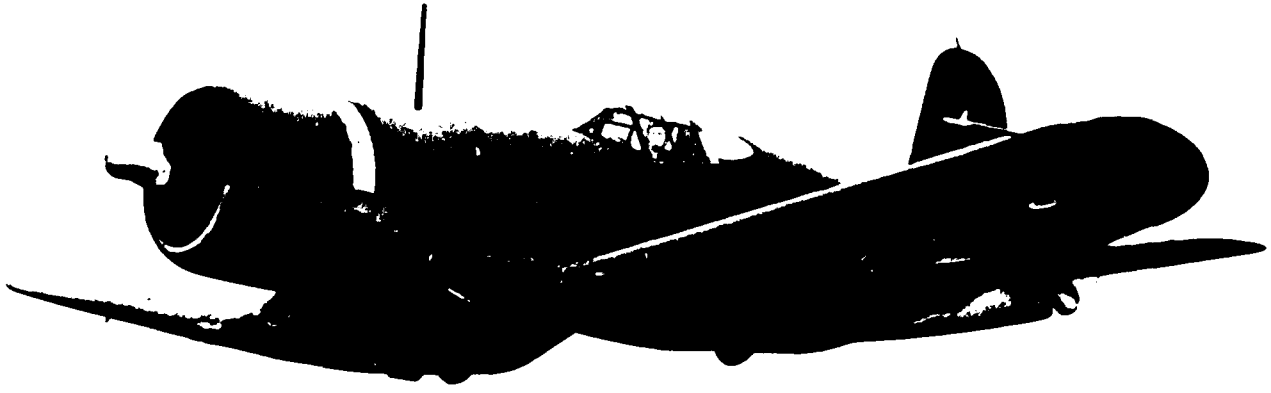

Illustration 12: Chance Vought's F4U-1 "Corsair" in flight near the Stratford Plant, no date (Source: United Technologies Archives).

Illustration 13: Chance-Vought Plant at Stratford, c. 1943, showing 1942 Albert Kahn additions to the Assembly Plant (Source: United Technologies Archives).

These additions, as well as others (including the large final assembly bay in 1943), provided a greatly expanded industrial plant capable of handling production of the Corsair airplane. During World War II, Chance Vought produced 4,120 Corsairs of the initial F4U-1 version at the Stratford plant. To increase war-time production of the Corsair, the Navy also hired two subcontractors, Brewster Aeronautical Corporation of Long Island and Goodyear Aircraft Corporation of Akron, Ohio. Together they produced 4,543 Corsairs during World War II.[18] (Illustrations 14-15)

The Corsair was in production longer than any other World War II American fighter plane. Credited with an 11:1 ratio of kills to losses in action against Japanese aircraft, it was said to be perhaps the best of the U.S. fighters in the war.[19] Chance Vought was awarded several Army-Navy "E" awards for excellence in the design of the Corsair aircraft. Following the war, despite large-scale cancellation of contracts, production of the F4U-1 Corsair and other model Corsair airplanes continued until 1952.

During World War II, Chance Vought also experimented with Charles F. Zimmerman's VS-173, known as the "Flying Pancake." The Navy, however, was unable to justify further funds for propeller driven aircraft after the war. It abandoned the VS-173 program, citing unsolved technical problems, and required Chance Vought to spend future research and development funds on jet aircraft.[20] (Illustration 16)

Chance Vought conceived its first jet aircraft, the XF6U-1, known as "The Pirate," in 1944. It designed the Pirate as a 500 mile-per-hour-plus aircraft. The Pirate was the first production aircraft equipped with an afterburner.

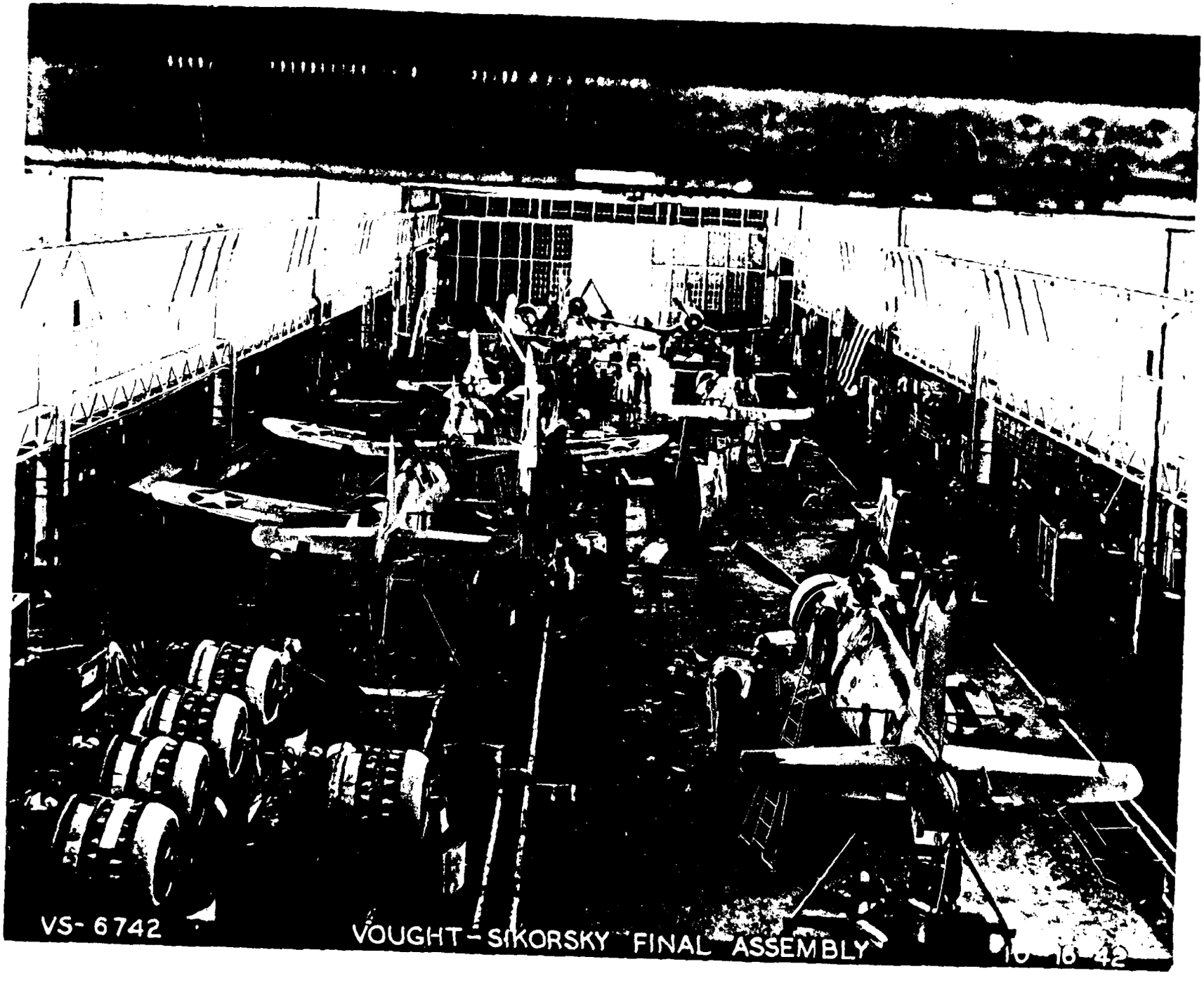

Illustration 14: Final assembly of the Corsair aircraft at the Stratford Plant in 1942 (Source: United Technologies Archives).

Illustration 15: Final assembly of the Corsair aircraft at the Stratford Plant in 1943 (Source: United Technologies Archives).

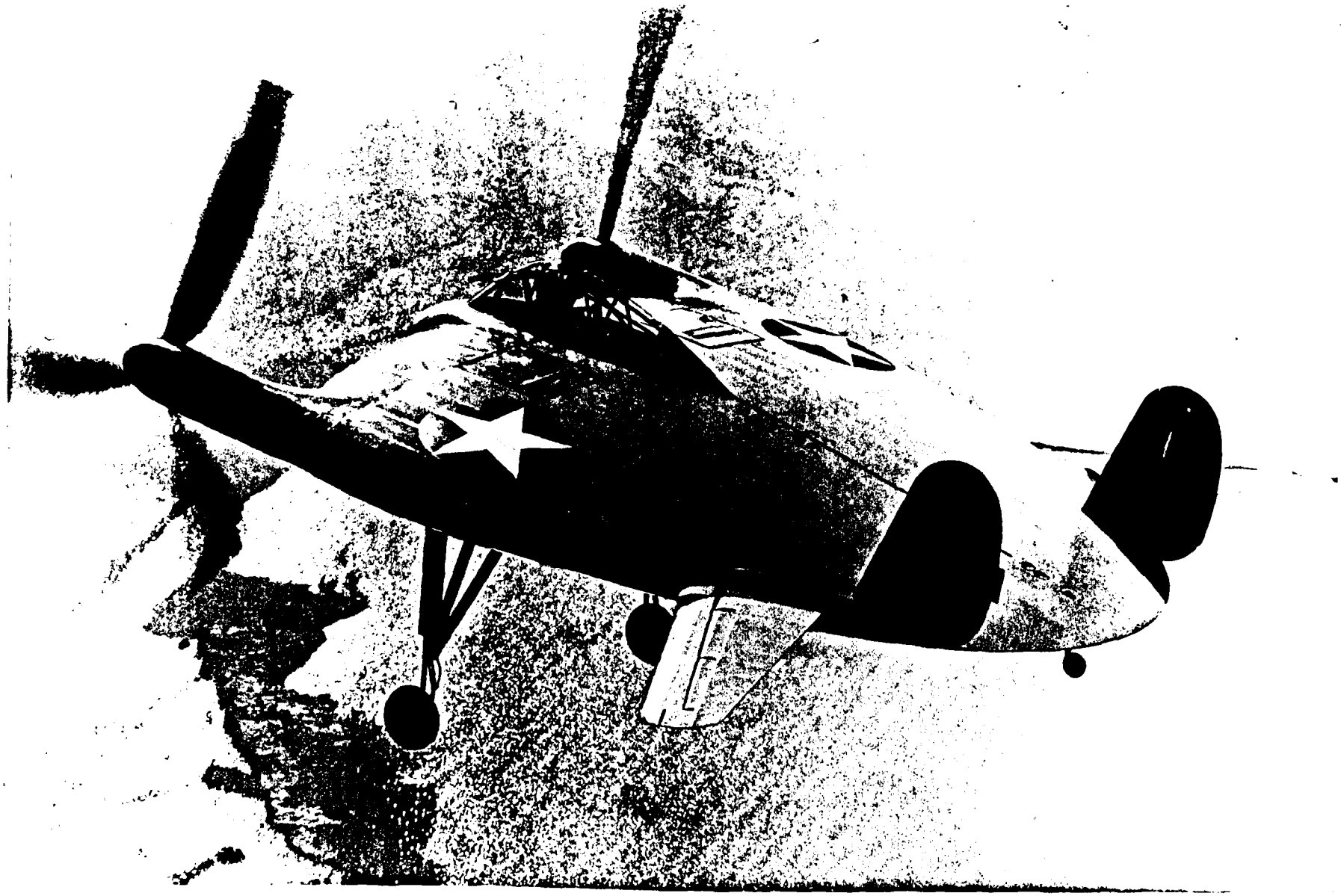

Illustration 16: Charles F. Zimmerman's VS-173 aircraft, also known as the "Flying Pancake," no date (Source: United Technologies Archives).

which increased air speed by 35 percent for short durations. It first flew in October 1946 in California (rather than Connecticut due to safety and security requirements), and production of the first three Pirates began in April 1948 at the Stratford plant. During the same year, however, the Navy offered Chance Vought the empty Naval Weapons Industrial Reserve Plant in Dallas, Texas as a manufacturing facility. Chance Vought accepted the offer and moved the entire Stratford, Connecticut manufacturing operation to Texas in 1948.[21] (Illustration 17)

Following Chance Vought's move to Texas, a severe flood of the Housatonic River rendered the Stratford plant's 1,580,000 square feet of manufacturing space unusable, and United Aircraft put the vacant plant up for sale.

AIR FORCE PLANT NO. 43/BRIDGEPORT LYCOMING DIVISION, 1951-1976

The Air Force purchased the abandoned Chance Vought plant in Stratford in 1951 and renamed it Air Force Plant No. 43. To operate the government-owned facility, Avco Corporation, plant contractor for the Air Force, created the Bridgeport Lycoming Division, later referred to as Avco Lycoming, Stratford Division.[22] (Illustration 18)

The Bridgeport Lycoming Division occupied the Stratford Plant in February 1951. It immediately completed repairs to all flood damaged buildings and built dikes to prevent further flooding. Machinery for aircraft engine manufacturing arrived at the factory in May 1951, and the first aircraft engine, a Curtis Wright 9 cylinder R1820 radial, came off the assembly line in March 1952.

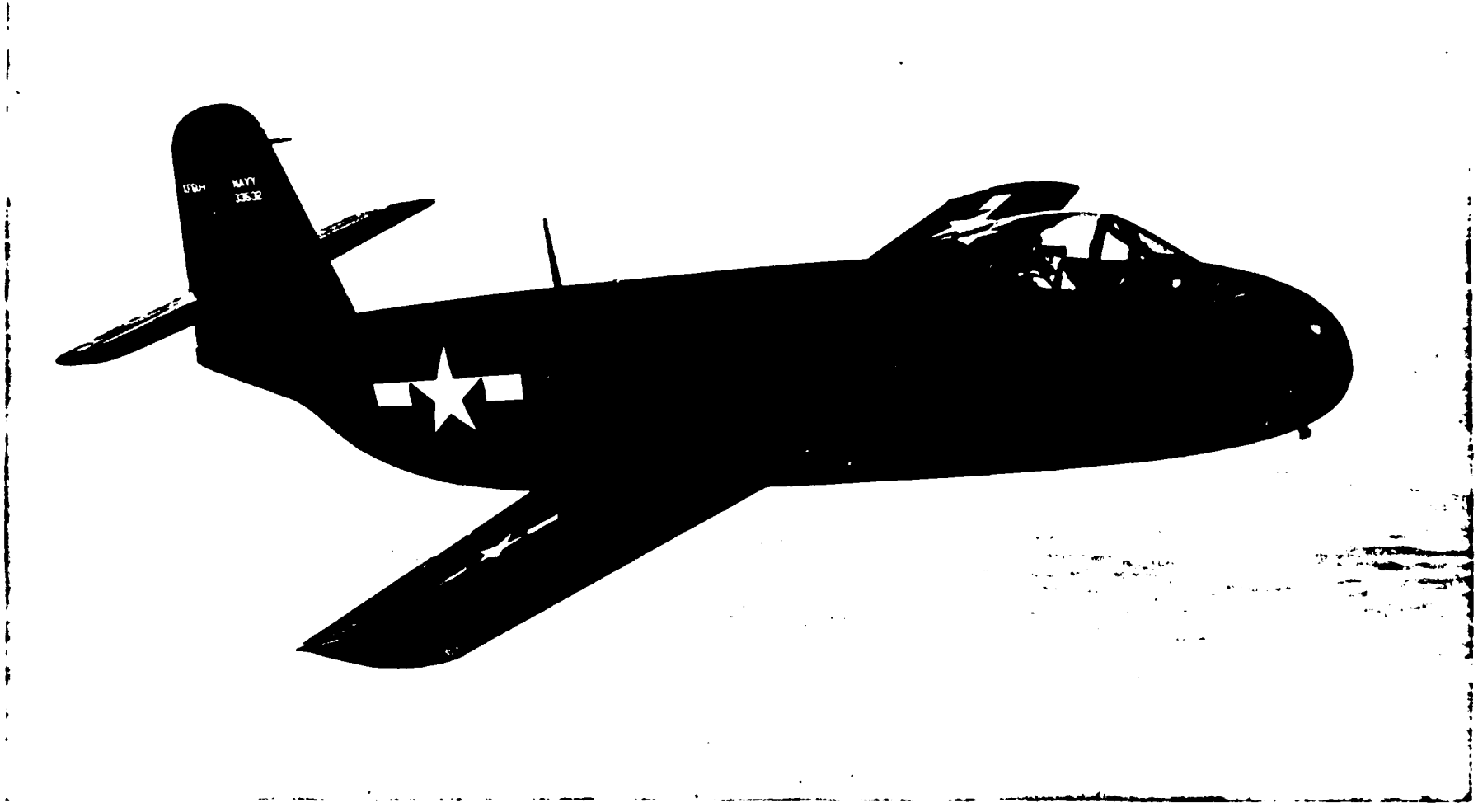

Illustration 17: Chance Vought's first jet aircraft, the XF6U-1, also known as "The Pirate," no date (Source: United Technologies Archives).

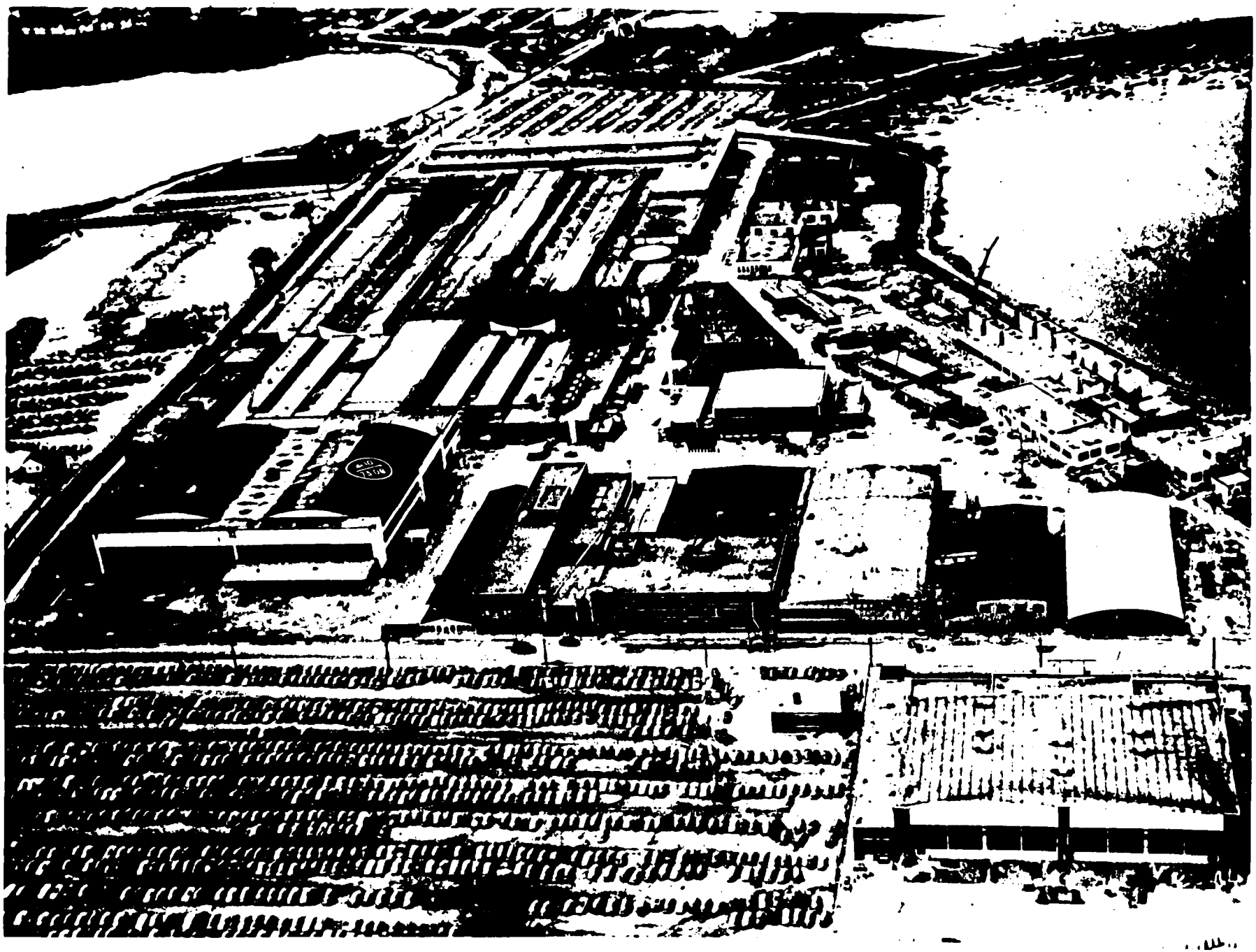

Illustration 18: Aerial photo of the Bridgeport-Lycoming Plant in 1952 (Source: Avco Lycoming Division).

At this time the Bridgeport Lycoming Division also produced the major components for the J-47 jet aircraft engine for the U.S. Air Force under a license agreement.[23]

Because of increased specialized manufacturing requirements, Avco Corporation constructed an aircraft test cell (Building 16) in 1953 to provide a facility for acceptance testing of the Curtis Wright R1820 and R1300 aircraft engines.[24] (Illustration 19)

In 1953 the Avco Corporation introduced the T-53 helicopter engine, the first gas turbine engine of its horsepower range (600 shaft horsepower) to be completely designed and produced in the United States. The Bridgeport Lycoming Division, responsible for the manufacture of this engine, delivered the first production model T-53 in 1958. These engines were used in Bell Helicopter's H-40, one of the first specially built medical evacuation helicopters, known as "Medevacs." In 1954 the Avco Corporation received a government contract for an even higher-powered gas turbine engine (rated at 1600 shaft horsepower), and in 1955 Avco introduced the T-55 helicopter engine. The Stratford plant also manufactured this engine and delivered it for production in 1961.[25]

During the 1960's, Stratford engineers designed and produced ALF502 turbofan engines (1961), T-55 engines adapted for cargo helicopters (1963), engines for amphibious hydrofoils (1964), AGT 1500 vehicular turbine engines (1965), and gas turbines for the first commercially-powered hovercraft in the United States (1972).[26] In addition, the Bridgeport Lycoming Division was also a prime manufacturer of reentry vehicles for the Titan and Minuteman ICBM systems.[27]

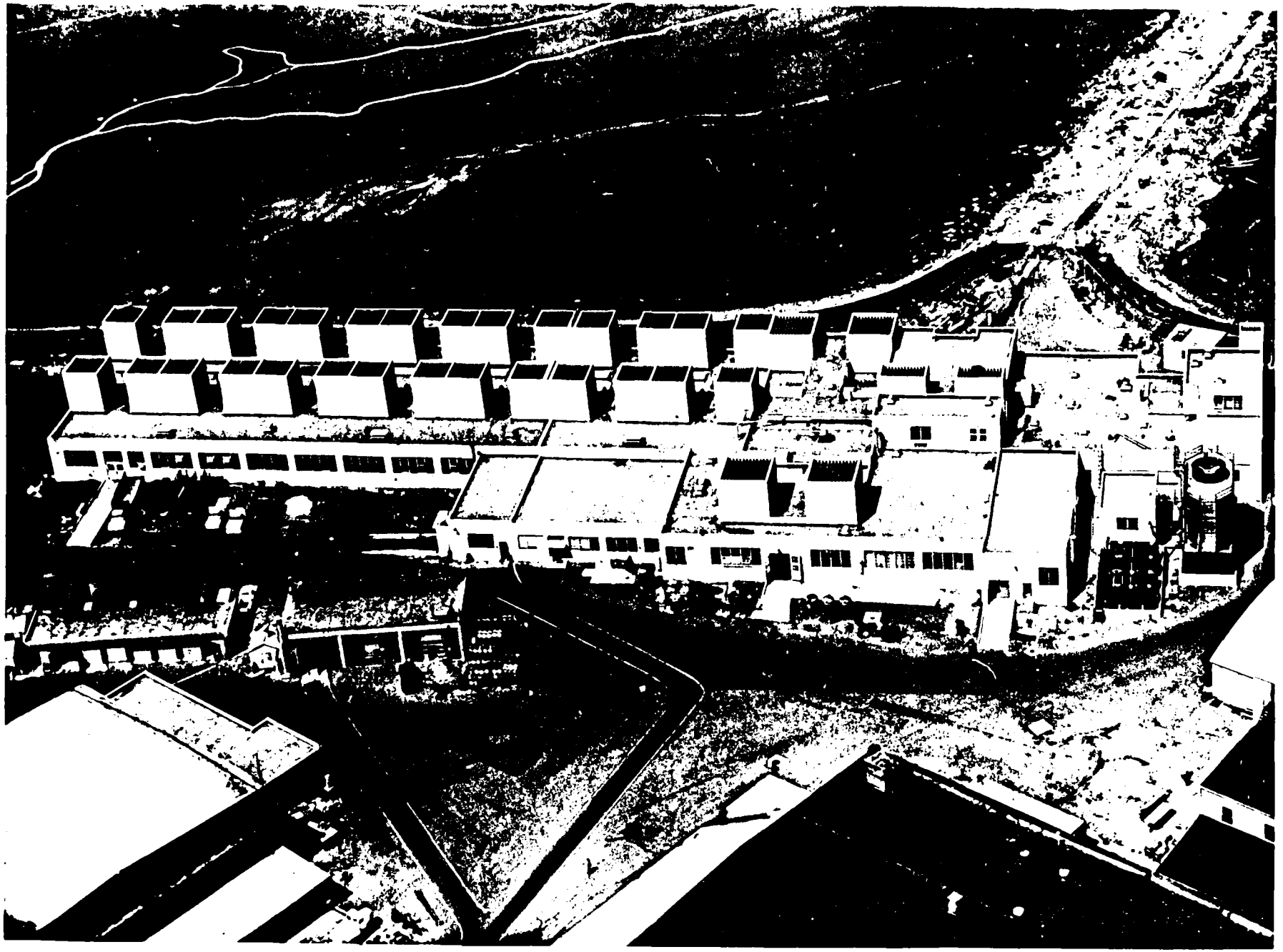

Illustration 19: Aircraft Engines Test Cell Building, c. 1955 (Source: Avco Lycoming Division).

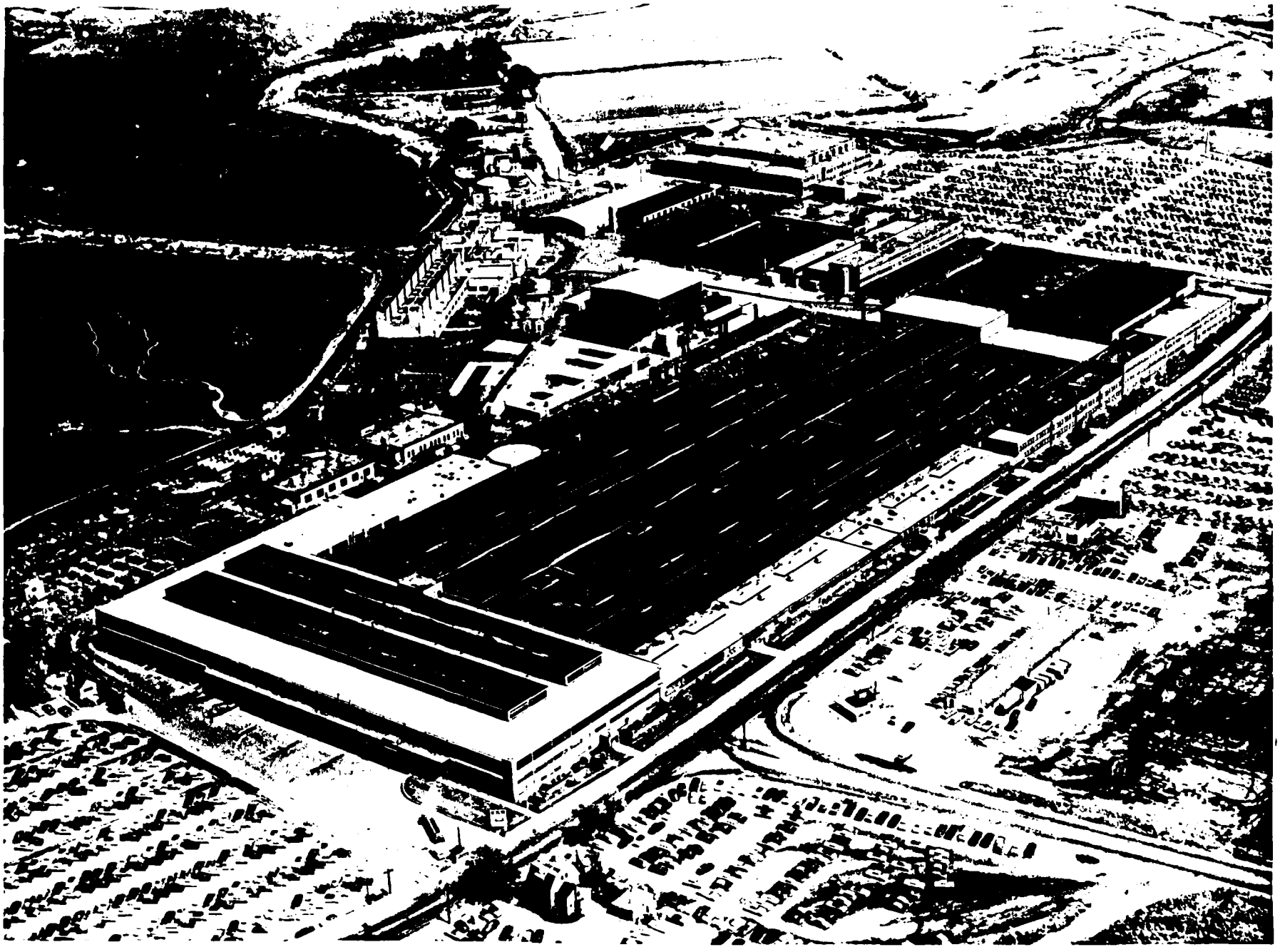

Illustration 20: The Stratford Industrial Facility, c. 1960 (Source: Avco Lycoming Division).

STRATFORD ARMY ENGINE PLANT/AVCO LYCOMING STRATFORD DIVISION

1976 - PRESENT

The Stratford manufacturing plant was transferred from the Air Force to the Army in 1976 and renamed the Stratford Army Engine Plant. At this time, Avco's AGT 1500 engine was selected to power the Army's new Abrams XM1 Main Battle Tank. In May 1979 Stratford Division contracted for the first 110 XM1 production engines.[28]

Avco Lycoming also introduced the "Super TF" series of marine and industrial engines in 1976. These engines power ferry boats, air cushion vehicles, landing craft and coastal patrol boats. Industrial applications for these engines include compressor sets, pump sets, generator sets, and railroad engines.[29]

Today the Stratford Army Engine Plant is an element of the U.S. Troop Support and Aviation Materiel Readiness Command (TSARMCOM), one of two materiel readiness commands of the Army's Materiel Development and Readiness Command (DARCOM). The industrial facility continues to produce both the T-53 and T-55 series of gas turbine engines for commercial and military helicopters.[30] (Illustration 20)

NOTES

1. The best source of primary information about Igor Sikorsky's career is found in the corporate archives of United Technologies Corporation in East Hartford, Connecticut. See also his autobiography, Igor I. Sikorsky, The Story of the Winged-S (New York: Dodd, Mead, 1952), pp. 183-188; and Carlos S. Wood, "Igor Ivan Sikorsky," Memorial Tributes, Vol. I (Washington, D.C.: National Academy of Engineering, 1979), pp. 253-265.

2. Sikorsky, The Story of the Winged-S, p. 184; Sikorsky Aviation Corporation, The Winged-S (Stratford, Connecticut: Sikorsky Aviation Corporation, December 1929), p. 4; United Aircraft & Transportation Corporation, First Annual Report to Stockholders (New York: UA and TC, 1929, pp. 32-33.

3. Sikorsky Aviation Corporation, The Winged-S, p. 4.

4. Ibid; "A New Vertical Wind Tunnel," Aero Digest, 18 No. 1 (January 1931).

5. Sikorsky Aviation Corporation, The Winged-S, p. 4.

6. Ibid, p. 5; Gordon Swanborough and Peter M. Bowers, United States Naval Aircraft Since 1911 (New York: Funk & Wagnalls, 1968), pp. 343-344.

7. Swanborough, United States Naval Aircraft, pp. 343-344.

8. Wood, "Igor Ivan Sikorsky," pp. 260-261.

9. Swanborough, United States Naval Aircraft, pp. 343-344.

10. Ibid; "Vought Sikorsky VS-44 Long Range Flying Boat," Aero Digest 28 No. 12 (December 19, 1941), pp. 224, 227.

11. Gerard P. Moran, Aeroplanes Vought, 1917-1977 (Temple City, California: Historical Aviation Album, 1978), p. 68; see also United Aircraft Corporation, Wings for the Navy: A History of Chance Vought Aircraft (Stratford, Connecticut: Chance Vought Aircraft Division, 1943); and The Chance Vought News, the company newspaper.

12. Moran, Aeroplanes Vought, p. 69; see also United Aircraft Corporation, "A Wartime History of Chance Vought Aircraft, January 1938 - October 1945" (Stratford, Connecticut: Chance Vought Aircraft Division, n.d.) for plant expansion.

13. Moran, Aeroplanes Vought, pp. 69-71; "Vought Sikorsky VS-44 Long Range Flying Boat," pp. 224, 227.

14. For Sikorsky's helicopter accomplishments see his autobiography The Study of Winged-S; Moran, Aeroplanes Vought, p. 71; Norman Polmar and Floyd D. Kennedy, Jr., Military Helicopters of the World (Annapolis, Maryland: Naval Institute Press, 1981), pp. 277-278, 343; see also United Technologies, "The Helicopter History of Sikorsky Aircraft" (Stratford, Connecticut: Sikorksy Aircraft, 1981).

15. Moran, Aeroplanes Vought, pp. 72-79; see also Swanborough, United States Naval Aircraft, pp. 376-379, for Vindicator and Kingfisher.

16. Moran, Aeroplanes Vought, pp. 81-94; Swanborough, United States Naval Aircraft, pp. 380-384; for a lengthy discussion of the Corsair, see William Green, Famous Fighters of the Second World War (Garden City, New York: Doubleday), pp. 79-92.

17. Ibid.

18. Moran, Aeroplanes Vought, p. 83; Swanborough, United States Naval Aircraft, p. 381.

19. Swanborough, United States Naval Aircraft, pp. 380-384; Moran, Aeroplanes Vought, p. 88.

20. Moran, Aeroplanes Vought, pp. 97-100.

21. Ibid, pp. 102, 104-105.

22. Avco Corporation, Avco Corporation, The First Fifty Years: 1929 - 1979 (Greenwich, Connecticut: Avco Corporation, 1979), p. 41; see also United Aircraft Corporation, "Industrial Plant Known as Chance Vought Aircraft" (Stratford, Connecticut: Chance Vought Aircraft Division, 1951).

23. Avco Lycoming Stratford Division, Look Up to Lycoming (Stratford, Connecticut: Avco Lycoming, c. 1979), pp. 1-2.

24. Avco Corporation, Avco Corporation, pp. 42-43.

25. Ibid, p. 43.

26. Ibid, pp. 59, 102-105.

27. Ibid, pp. 48-49; Avco Lycoming Stratford Division, Look Up to Lycoming, p. 7.

28. Avco Corporation, Avco Corporation, pp. 104-105.

29. Ibid; Avco Lycoming Stratford Division, Look Up to Lycoming, pp. 7, 10-13.

30. Clyde E. Gray, II, DCASPRO, Avco Lycoming Division (Stratford, Connecticut: DCASR, 1982), Stratford Army Engine Plant, Installation and Activity Brochure (Stratford, Connecticut: DARCOM, 1980), pp. 2-3.

Chapter 3

PRESERVATION RECOMMENDATIONS

BACKGROUND

Army Regulation 420-40 requires that an historic preservation plan be developed as an integral part of each installation's planning and long range maintenance and development scheduling.[1] The purpose of such a program is to:

- Preserve historic properties to reflect the Army's role in history and its continuing concern for the protection of the nation's heritage.
- Implement historic preservation projects as an integral part of the installation's maintenance and construction programs.
- Find adaptive uses for historic properties in order to maintain them as actively used facilities on the installation.
- Eliminate damage or destruction due to improper maintenance, repair, or use that may alter or destroy the significant elements of any property.
- Enhance the most historically significant areas of the installation through appropriate landscaping and conservation.

To meet these overall preservation objectives, the general preservation recommendations set forth below have been developed:

Category I Historic Properties

All Category I historic properties not currently listed on or nominated to the National Register of Historic Places are assumed to be eligible for nomination regardless of age. The following general preservation recommendations apply to these properties:

a) Each Category I historic property should be treated as if it were on the National Register, whether listed or not. Properties not currently listed should be nominated. Category I historic properties should not be altered or demolished. All work on such properties shall be performed in accordance with Sections 106 and 110(f) of the National Historic Preservation Act as amended in 1980, and the regulations of the Advisory Council for Historic Preservation (ACHP) as outlined in the "Protection of Historic and Cultural Properties" (36 CFR 800).

b) An individual preservation plan should be developed and put into effect for each Category I historic property. This plan should delineate the appropriate restoration or preservation program to be carried out for the property. It should include a maintenance and repair schedule and estimated initial and annual costs. The preservation plan should be approved by the State Historic Preservation Officer and the Advisory Council in accordance with the above referenced ACHP regulation. Until the historic preservation plan is put into effect, Category I historic properties should be maintained in accordance with the recommended approaches of the Secretary of the Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings[2] and in consultation with the State Historic Preservation Officer.

c) Each Category I historic property should be documented in accordance with Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) Documentation Level II, and the documentation submitted for inclusion in the HABS/HAER collections in the Library of Congress.[3] When no adequate architectural drawings exist for a Category I historic property, it should be documented in accordance with Documentation Level I of these standards. In cases where standard measured drawings are unable to record significant features of a property or technological process, interpretive drawings also should be prepared.

Category II Historic Properties

All Category II historic properties not currently listed on or nominated to the National Register of Historic Places are assumed to be eligible for nomination regardless of age. The following general preservation recommendations apply to these properties:

a) Each Category II historic property should be treated as if it were on the National Register, whether listed or not. Properties not currently listed should be nominated. Category II historic properties should not be altered or demolished. All work on such properties shall be performed in accordance with Sections 106 and 110(f) of the National Historic Preservation Act as amended in 1980, and the regulations of the Advisory Council for Historic Preservation (ACHP) as outlined in the "Protection of Historic and Cultural Properties" (36 CFR 800).

b) An individual preservation plan should be developed and put into effect for each Category II historic property. This plan should delineate the appropriate preservation or rehabilitation program to be carried out for the property or for those parts of the property which contribute to its historical, architectural, or technological importance. It should include a maintenance and repair schedule and estimated initial and annual costs. The preservation plan should be approved by the State Historic Preservation Officer and the Advisory Council in accordance with the above referenced ACHP regulations. Until the historic preservation plan is put into effect, Category II historic properties should be maintained in accordance with the recommended approaches in the Secretary of the Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings[4] and in consultation with the State Historic Preservation Officer.

c) Each Category II historic property should be documented in accordance with Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) Documentation Level II, and the documentation submitted for inclusion in the HABS/HAER collections in the Library of Congress.[5]

Category III Historic Properties

The following preservation recommendations apply to Category III historic properties:

a) Category III historic properties listed on or eligible for nomination to the National Register as part of a district or thematic group should be treated in accordance with Sections 106 and 110(f) of the National Historic Preservation Act as amended in 1980, and the regulations of the Advisory Council for Historic Preservation as outlined in the "Protection of Historic and Cultural Properties" (36 CFR 800). Such properties should not be demolished and their facades, or those parts of the property that contribute to the historical landscape, should be protected from major modifications. Preservation plans should be developed for groupings of Category III historic properties within a district or thematic group. The scope of these plans should be limited to those parts of each property that contribute to the district or group's importance. Until such plans are put into effect, these properties should be maintained in accordance with the recommended approaches in the Secretary of the Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings[6] and in consultation with the State Historic Preservation Officer.

b) Category III historic properties not listed on or eligible for nomination to the National Register as part of a district or thematic group should receive routine maintenance. Such properties should not be demolished, and their facades, or those parts of the property that contribute to the historical landscape, should be protected from modification. If the properties are unoccupied, they should, as a minimum, be maintained in stable condition and prevented from deteriorating.

HABS/HAER Documentation Level IV has been completed for all Category III historic properties, and no additional documentation is required as long as they are not endangered. Category III historic properties that are endangered for operational or other reasons should be documented in accordance with HABS/HAER Documentation Level III, and submitted for inclusion in the HABS/HAER collections in the Library of Congress.[7] Similar structures need only be documented once.

CATEGORY I HISTORIC PROPERTIES

There are no Category I historic properties at the Stratford Army Engine Plant.

CATEGORY II HISTORIC PROPERTIES

There are no Category II historic properties at the Stratford Army Engine Plant.

CATEGORY III HISTORIC PROPERTIES

Engine Assembly Plant (Building 2) 1942, and Additions:

Office Building Extension, 1943-1944.

Assembly Plant Addition, 1944.

North Factory Extension, 1944.

- Background and significance. The Assembly Plant and additions were designed by Albert Kahn, Associated Architects & Engineers, in World

War II to greatly expand the manufacturing capacity of Chance Vought Aircraft, which at the time was responsible for producing the Corsair fighter plane for the Navy (see Chapter 2: Vought-Sikorsky Aircraft/ Chance Vought Aircraft, 1939-1948, and Illustration 13). These buildings are typical of the many industrial plants designed by Kahn's office during this period as part of a national war plants construction program. They are good examples of Kahn's industrial design and are Category III historic properties because they possess importance as works of architecture and industrial design.

- Condition and potential adverse impacts. These structures are maintained in good condition and, although several modifications have been made, they still retain their integrity and reflect Kahn's original design intentions. The addition of an elevator tower to the main facade of the office building section and the replacement of the original windows in both the office building section and the north factory extension have been the most detrimental alterations to Kahn's buildings. Many of Kahn's details, however, including the moderne door surrounds in the office building section, still remain. There are no current plans to alter or demolish these properties.

- Preservation options. Refer to the general preservation recommendations at the beginning of this chapter for Category III historic properties.

Aircraft Engines Test Cells Building (Building 16)

- Background and significance. The Aircraft Engines Test Cells Building was originally constructed for production acceptance tests of aircraft engines. Built by Avco Lycoming, this specialized test facility was completed in 1953 after a design by Giffels & Vallet Inc., L. Rossetti Associated Engineers and Architects. It replaced a similar but smaller test structure built during World War II by Chance Vought Aircraft that was used for acceptance tests of Corsair aircraft engines. The present facility consists of concrete test cell chambers that are designed to suspend an aircraft engine for full-speed acceptance testing. Two of the cells are currently capable of testing Lycoming fan-type gas turbine engines. The building is a Category III historic property because of its local importance as a work of engineering design.

- Condition and potential adverse impacts. This building has been continually modified and as a result has received numerous additions, but none have destroyed the basic integrity of this facility. There are no current plans to alter or demolish these properties.

- Preservation options. Refer to the general preservation recommendations at the beginning of this chapter for Category III historic properties.

NOTES

1. Army Regulation 420-40, Historic Preservation (Headquarters, U.S. Army: Washington, D.C., 15 April 1984).

2. National Park Service, Secretary of the Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings, 1983 (Washington, D.C.: Preservation Assistance Division, National Park Service, 1983).

3. National Park Service, "Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines," Federal Register, Part IV, 28 September 1983, pp. 44730-44734.

4. National Park Service, Secretary of the Interior's Standards

5. National Park Service, "Archeology and Historic Preservation."

6. National Park Service, Secretary of the Interior's Standards.

7. National Park Service, "Archeology and Historic Preservation."

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