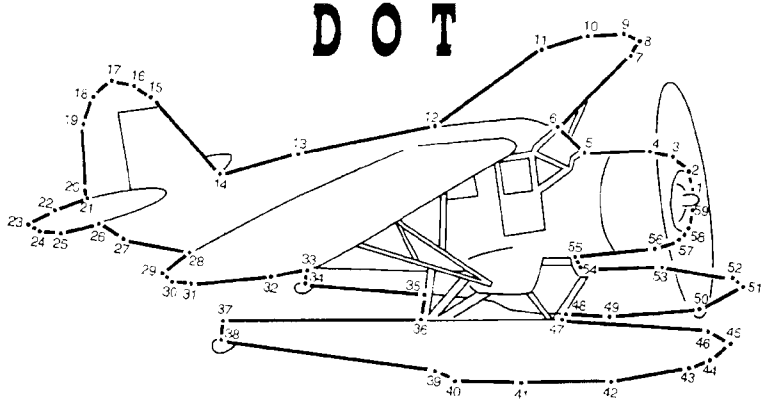
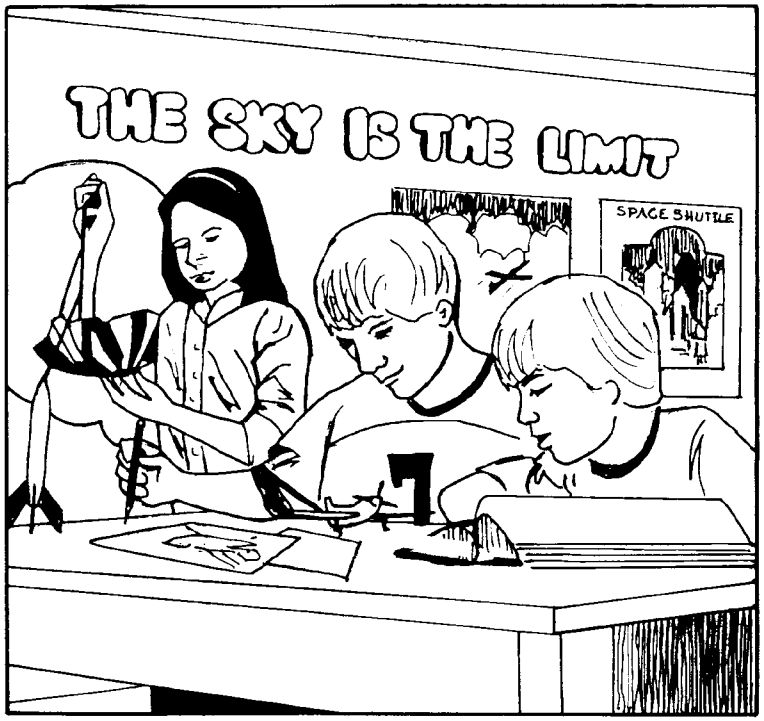
HISTORICAL AIRCRAFT by DOT



DRAWING LESSONS from AEROSPACE HISTORY



FAMOUS FLYERS from AMERICA'S HERITAGE

A COLLECTION OF CONNECT-THE-DOT PUZZLES

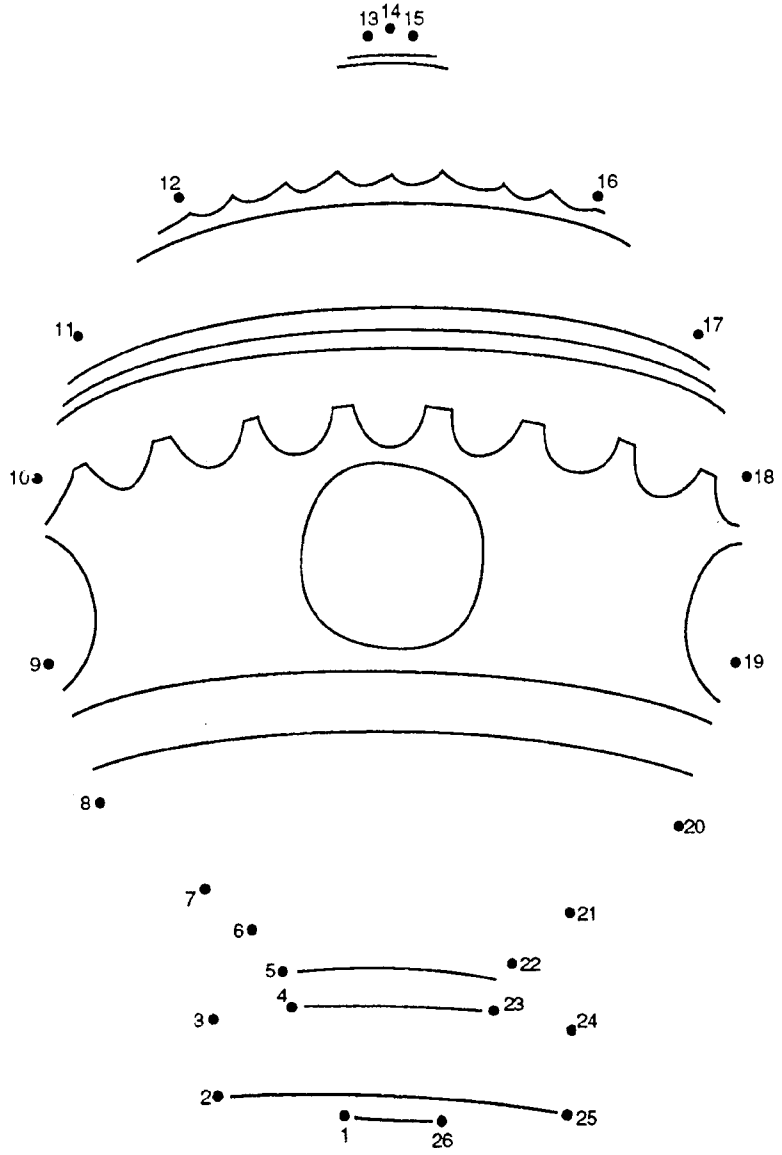
BY THE MINNESOTA DEPARTMENT OF TRANSPORTATION OFFICE OF AERONAUTICS
GRAPHICS BY RICH STROMWALL

TO FURTHER AEROSPACE AWARENESS IN AMERICA

DISTRIBUTED BY THE CIVIL AIR PATROL

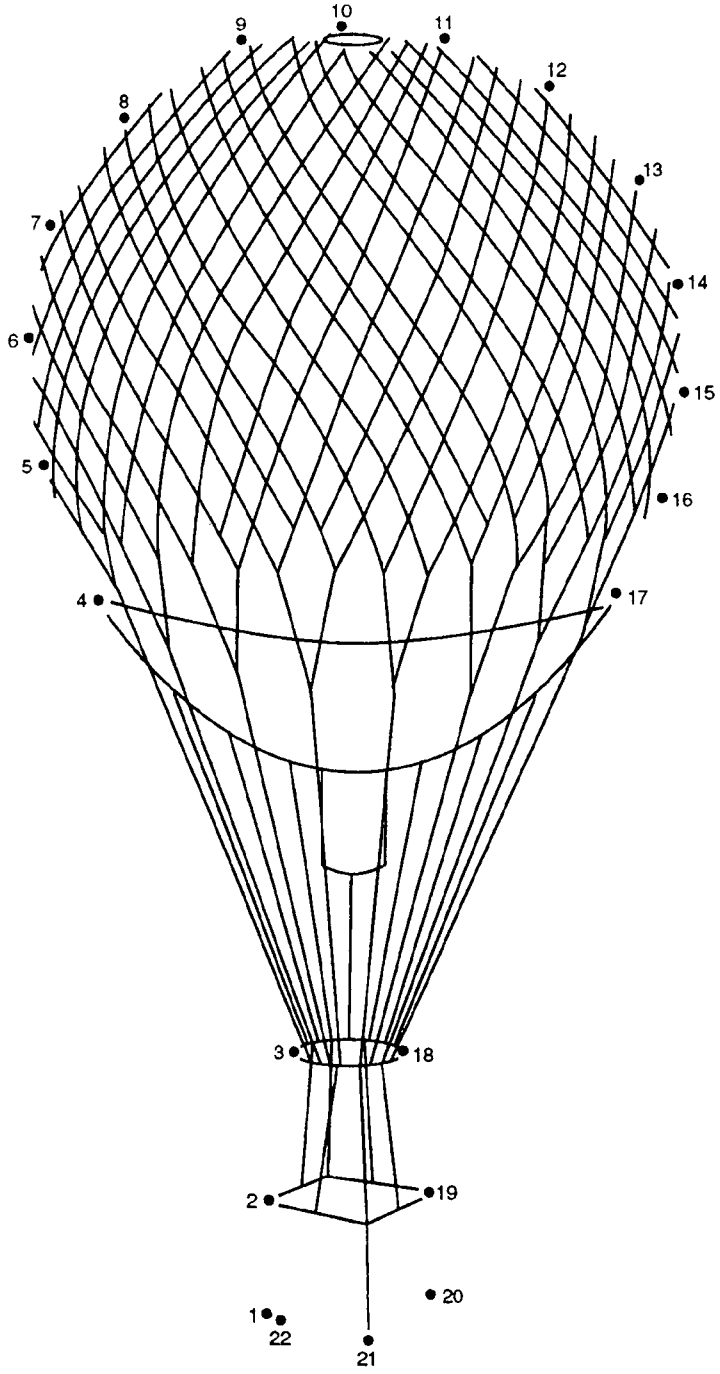
Montgolfier Balloon

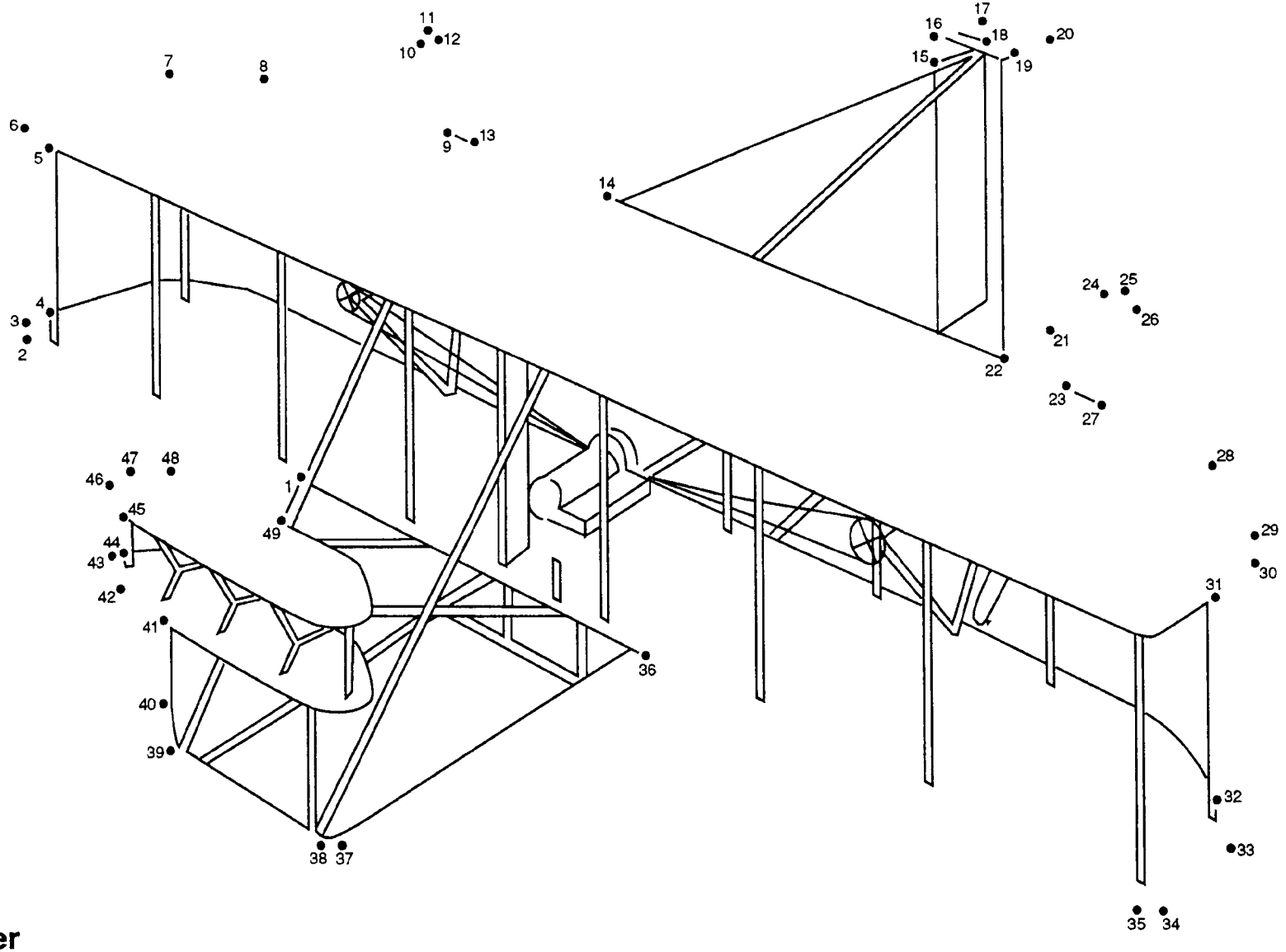
This balloon, built by Joseph and Etienne Montgolfier, was made of cloth and paper. The first living creatures to fly under a Montgolfier hot-air balloon were a sheep, a duck and a rooster. The balloon was launched in Versailles on September 19, 1783 before the French Royal Family, the court and 130,000 spectators. The first manned flight of a Montgolfier hot-air balloon was in Paris on November 21, 1783. Pilatre de Rozier and Francois Laurent (the Marquis d'Arlandes) flew across Paris for 25 minutes and travelled just over fives miles.



Gas Balloon

This is an early gas balloon. It was usually made of a tightly woven fabric and coated with varnish or a rubber solution to stop tears and slow the escape of gas. A netting of hemp covering the balloon envelope uniformly distributes the weight of the basket which hangs below the balloon. Sandbags were dropped to make the balloon rise higher and gas is released by a valve to cause it to descend.



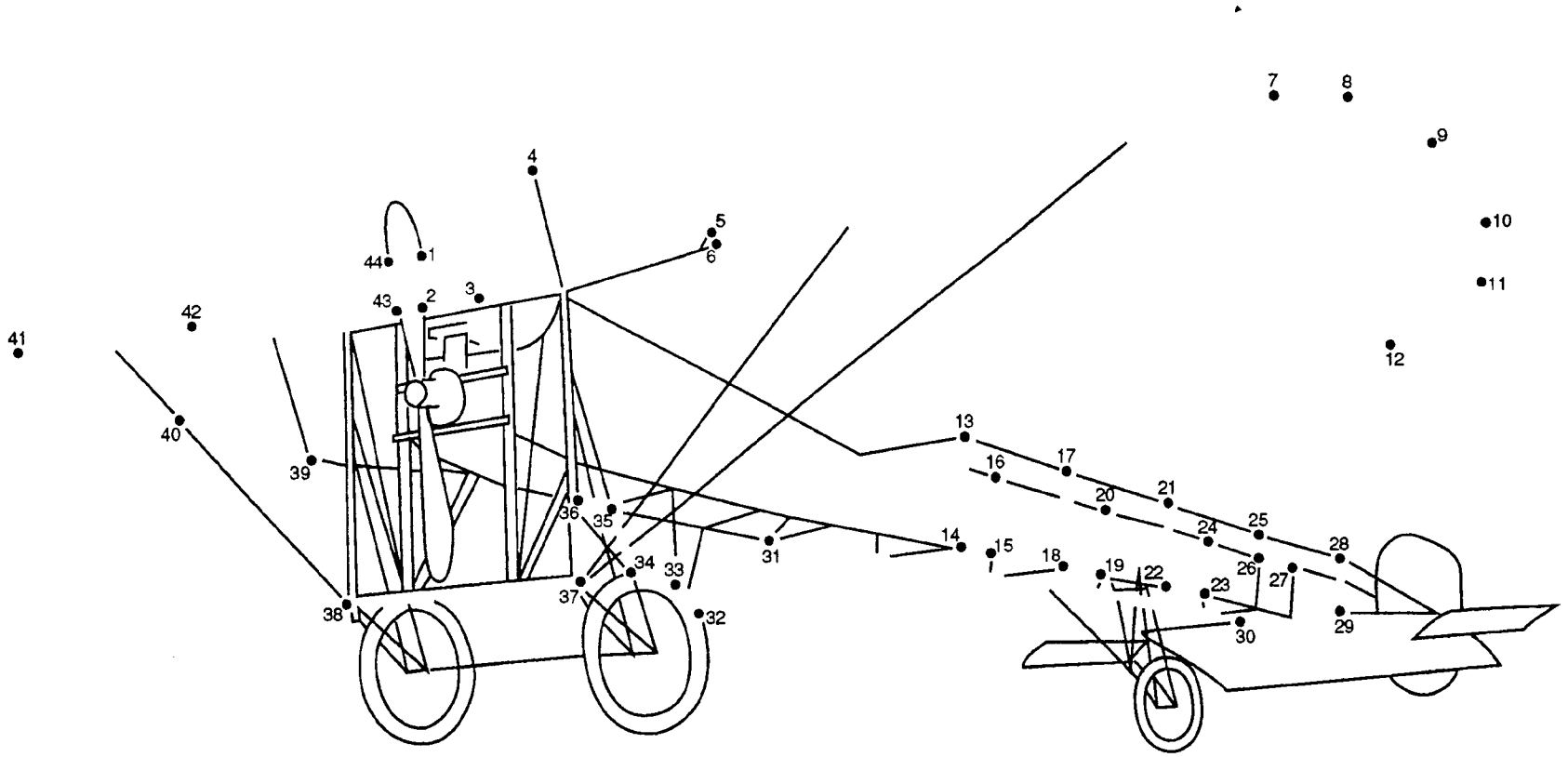


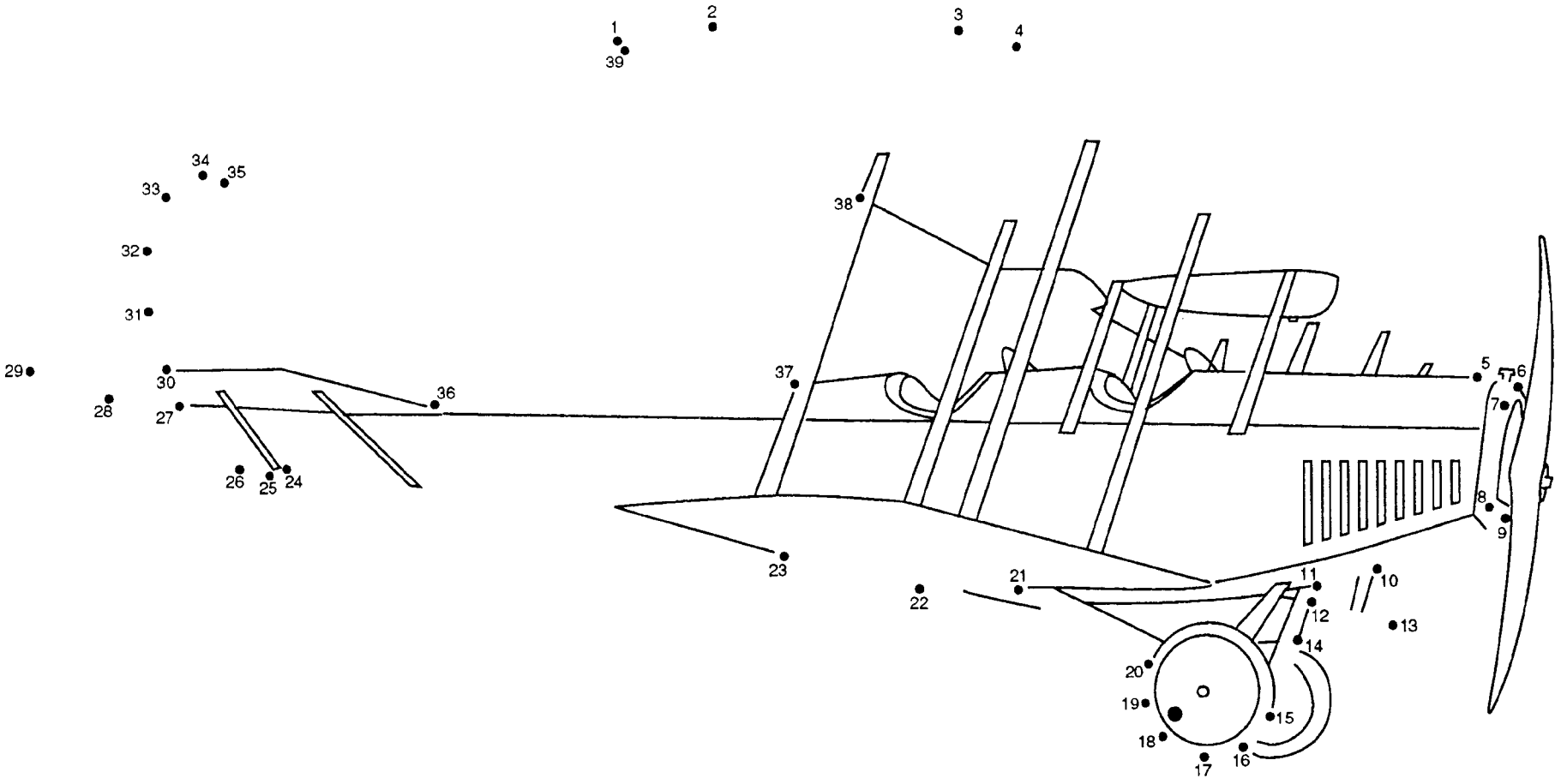
The Wright Flyer

The Wright Brothers' 1903 Flyer was a marvel of wood, wire and fabric. The Flyer's wings spanned 40'4" and it was powered by a 12-horsepower, 140 pound engine. In flight, the pilot laid on the lower wing. The Wright Flyer flew just four times —- a total of 98 seconds —- all on December 17, 1903. Later that day, it was damaged by high winds and never again flown.

Bleriot XI

The Bleriot XI was the first aircraft to be flown across the English Channel. On July 25, 1909, Louis Bleriot flew from Calais, France to Dover, England. The 38-kilometer (24 mile) flight took 37 minutes. The Bleriot XI had a 25 horse power engine and a speed of approximately 75 kilometers per hour (47 miles per hour).



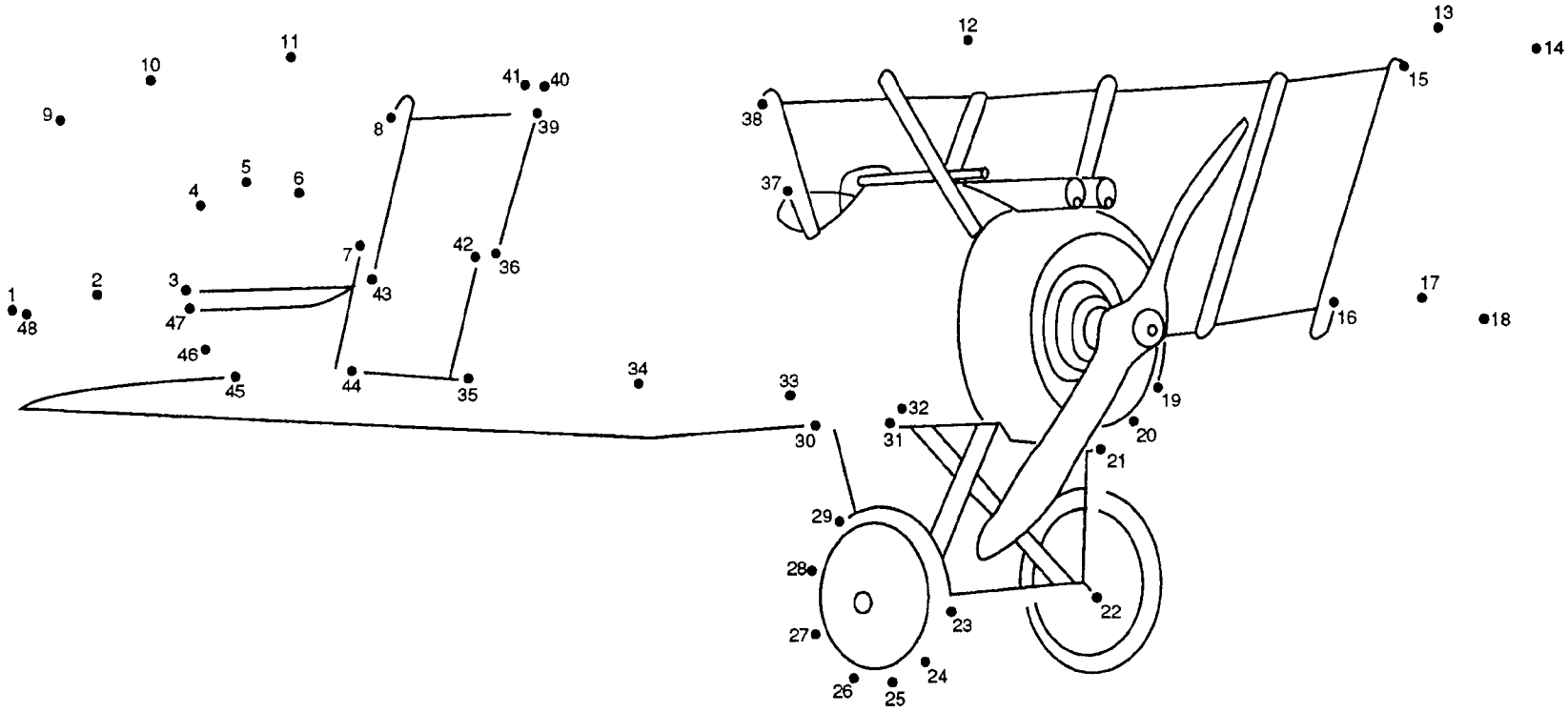


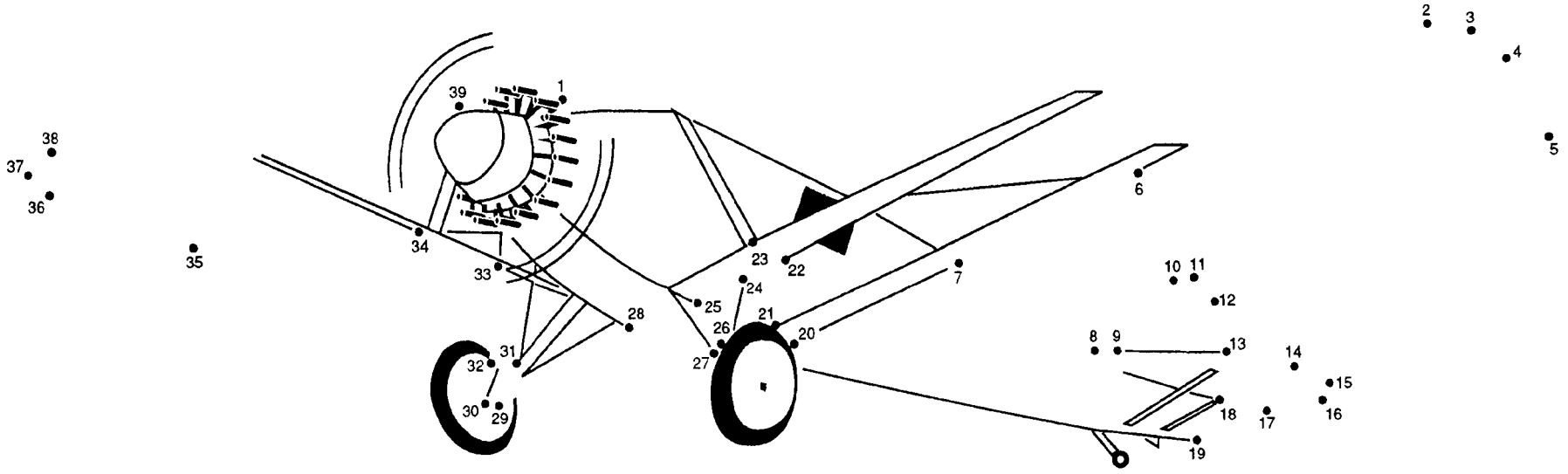
Curtiss JN-4D — Jenny

The Jenny was America's most popular aircraft of the early 1920s. Its short exhaust pipes spat fumes and oil in the pilot's face and on some occasions even ignited the plane's fabric covering. As in many aircraft of the day, wing skids were added after wobbly landings on the narrow landing gear frequently ended with one wing dug into the ground. For all its flaws, the Jenny was an important step in aircraft design, even though it was sometimes described as "a bunch of parts flying in formation." Over 10,000 Jennies were produced during and just after World War I.

Sopwith F.1 "Camel"

The Sopwith "Camel" was one of Britain's most advanced fighter aircraft during World War I. Sopwith "Camel" pilots are credited with the most aircraft victories during WWI. It was nicknamed the "Camel" because of the humped fairing over its twin machine guns. Canadian Captain A. Roy Brown, was flying a "Camel" when he was credited for shooting down German Ace Baron von Richthofen (The Red Baron).



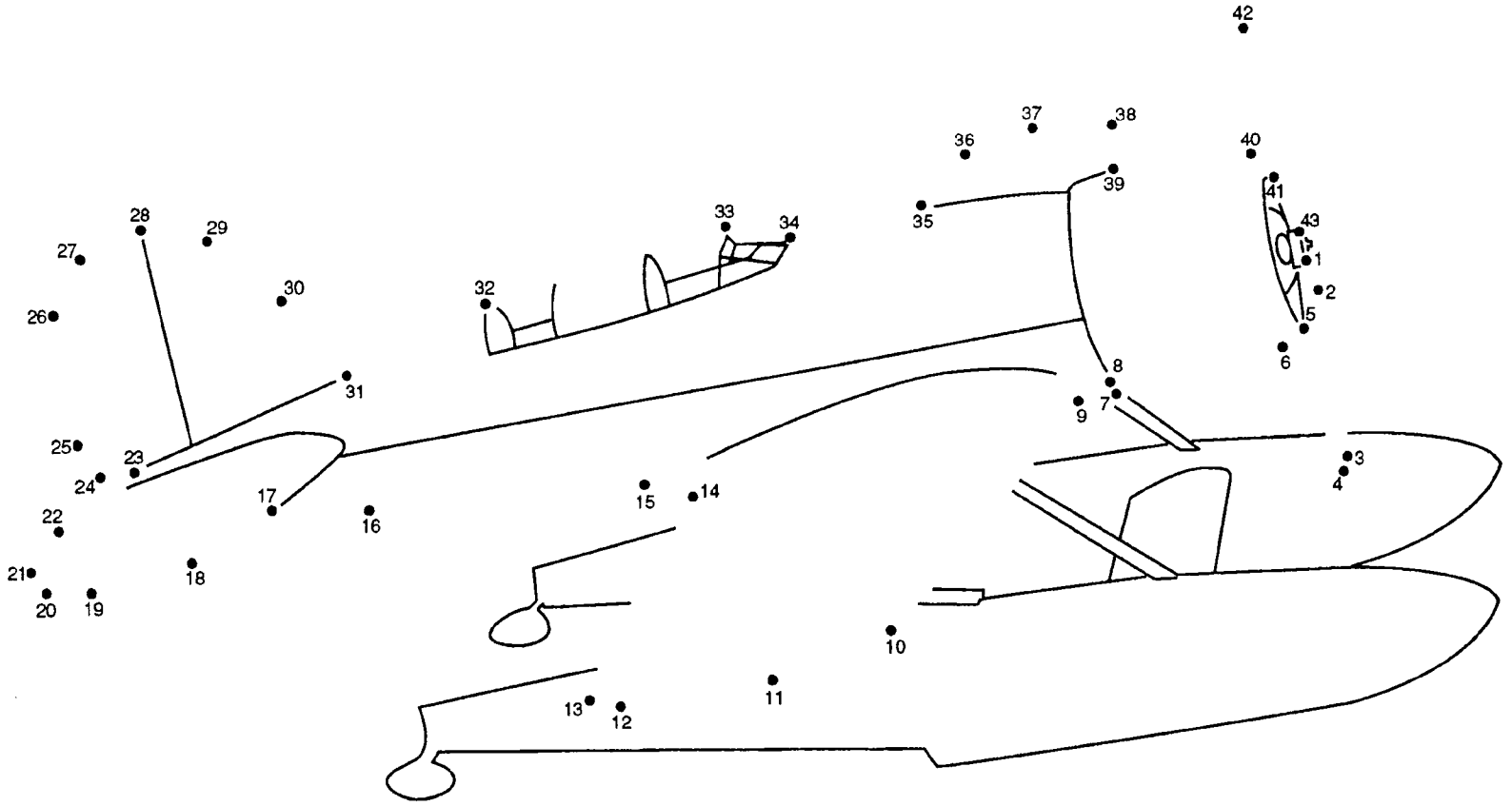


Spirit of St. Louis

Charles Lindbergh was the first aviator to fly solo across the Atlantic Ocean. The flight from New York to Paris was 3,610 miles and took over 33 hours. Lindberg landed in Paris on May 21, 1927. He was born and raised in Little Falls, Minnesota. The Spirit of St. Louis is the most celebrated aircraft in the history of aviation and was designed and built in just two months. Lindbergh insisted that the main fuel tank be in front of the cockpit, to keep it from crushing the pilot against the engine in a case of a crash landing. A periscope was installed to provide forward visibility.

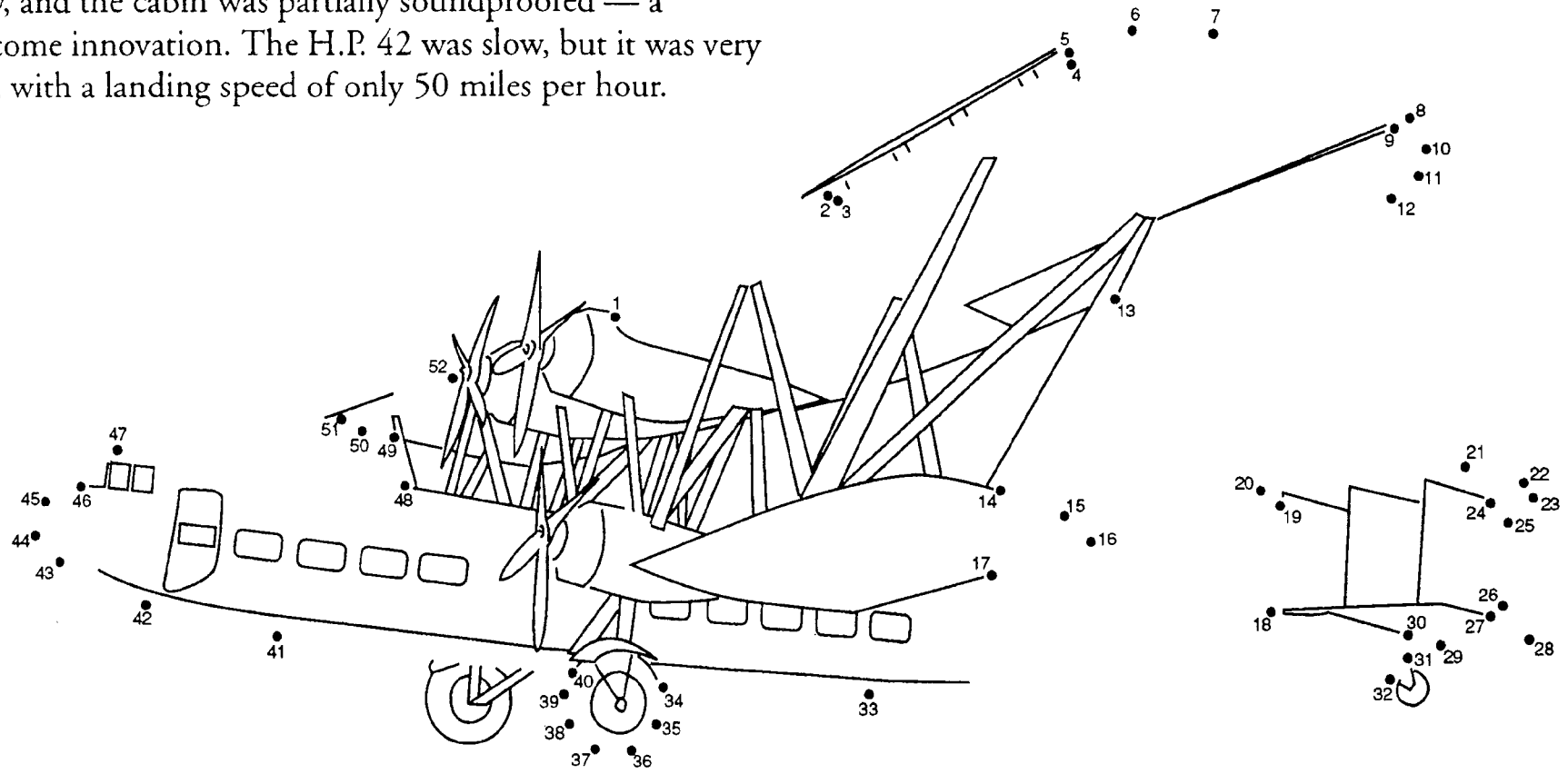
Lockheed Sirius

Charles and Anne Lindbergh designed this trim two-seater for their 1931 New York-Tokyo flight by adding internal fuel tanks to the wings and pontoons. The additional tanks gave the Sirius a range of 2,100 miles. This flight was a forerunner of today's transpolar flights between North America and Asia.



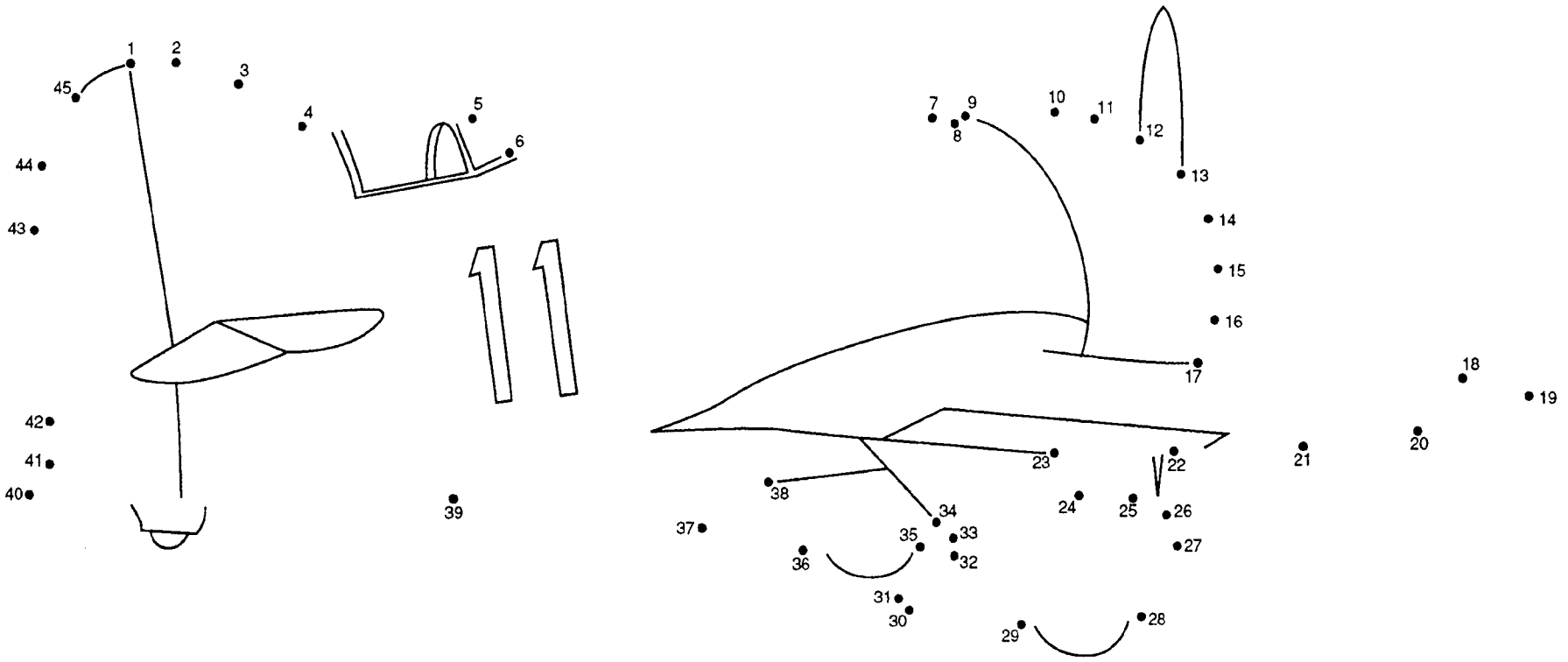
Handley Page H.P. 42

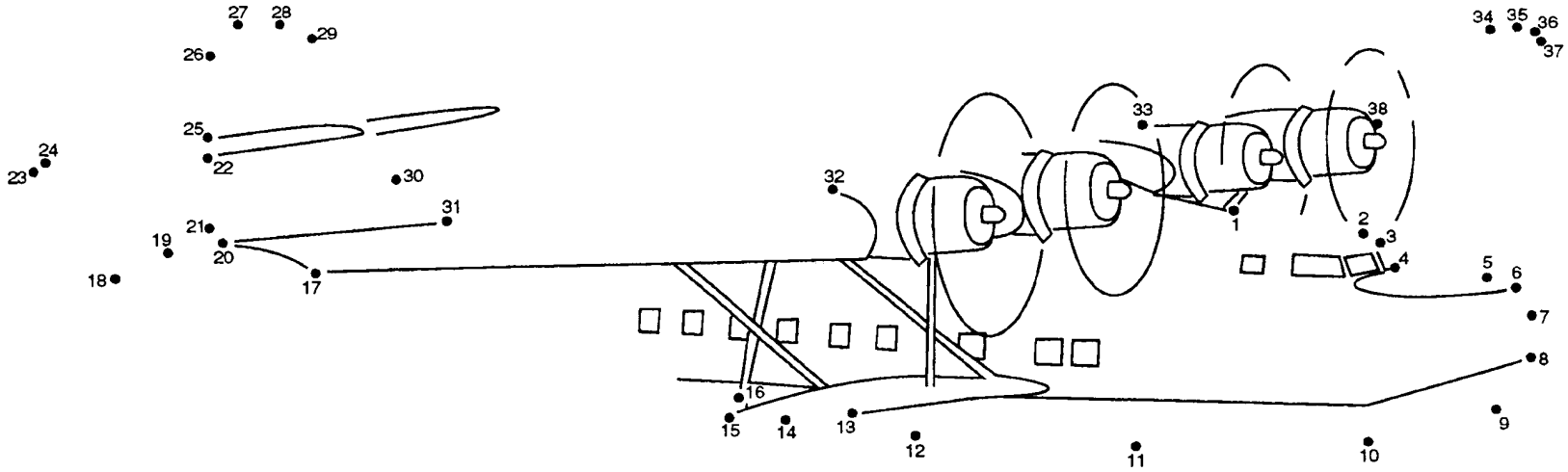
The Handley Page H.P. 42 (in airline service from 1931 to 1941), was a massive four-engined biplane. Two versions were built; the Hannibal which carried 24 passengers and the Hercules which carried 38. The H.P. 42 had a fuselage nearly as long and wide as a railroad Pullman car and fully as comfortable, with wall-to-wall carpeting and stewards who served seven-course meals at tables that were set up between facing seats. Large windows provided an ample view, and the cabin was partially soundproofed — a welcome innovation. The H.P. 42 was slow, but it was very safe, with a landing speed of only 50 miles per hour.



Gee Bee R-1

Built in the early 1930s, the Gee Bee was the most famous of American racing aircraft, but was hard to fly. Zantford Granville (Gee Bee designer) and his colleagues built the aircraft for speed. They shortened the fuselage, shortened the wings and added a bigger engine. Unfortunately, their single-minded passion for speed resulted in an aircraft that, at best, was dangerous to fly. Only three were built and all crashed trying to set new speed records.



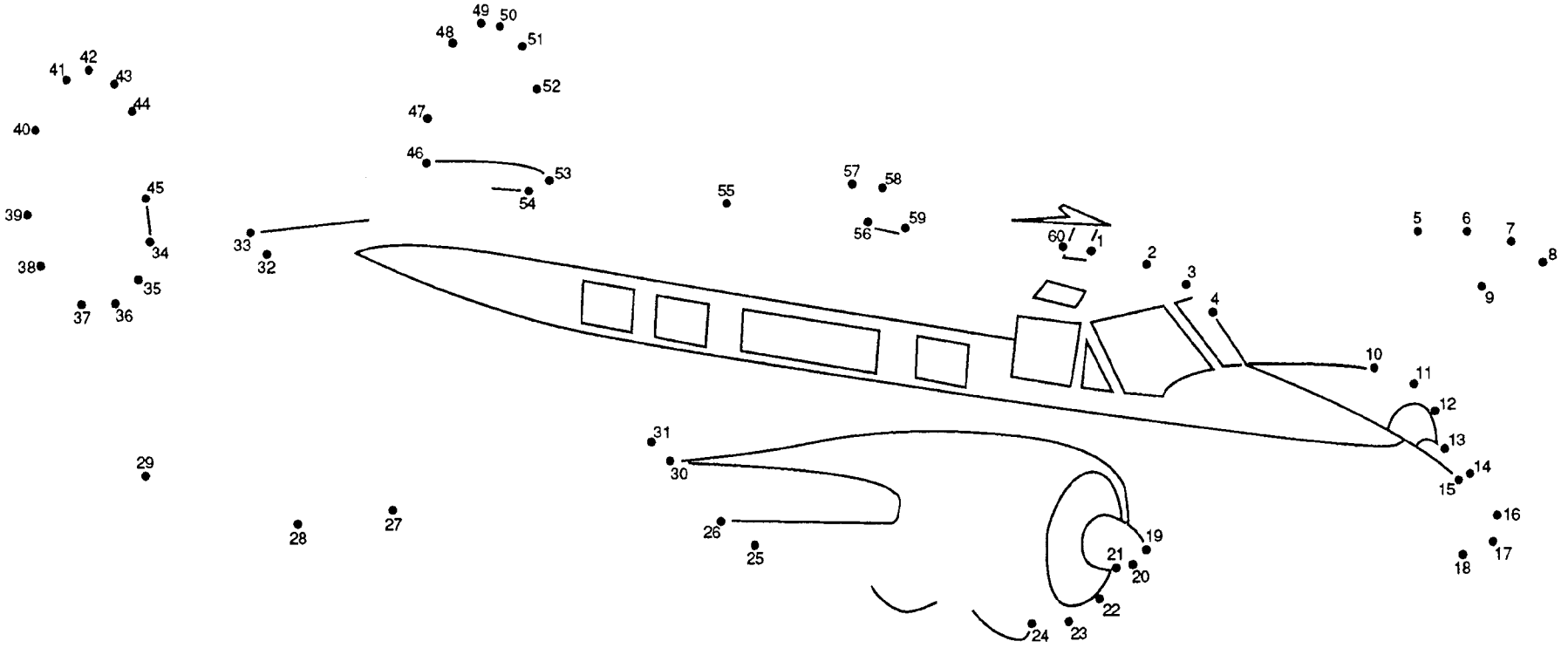


China Clipper

The Martin M-130 (better known as the China Clipper) first carried passengers on October 21, 1936. Although it was the largest flying boat ever, it gave a feeling of grace and style. The Clipper's central lounge, which was wider than a Pullman club car, was fitted with broad armchairs, and its meal service included china and silverware. The first nine passengers paid $1,438.20 for a round trip from San Francisco to Manila. It cruised at 150 miles per hour and had a range of 3,200 miles.

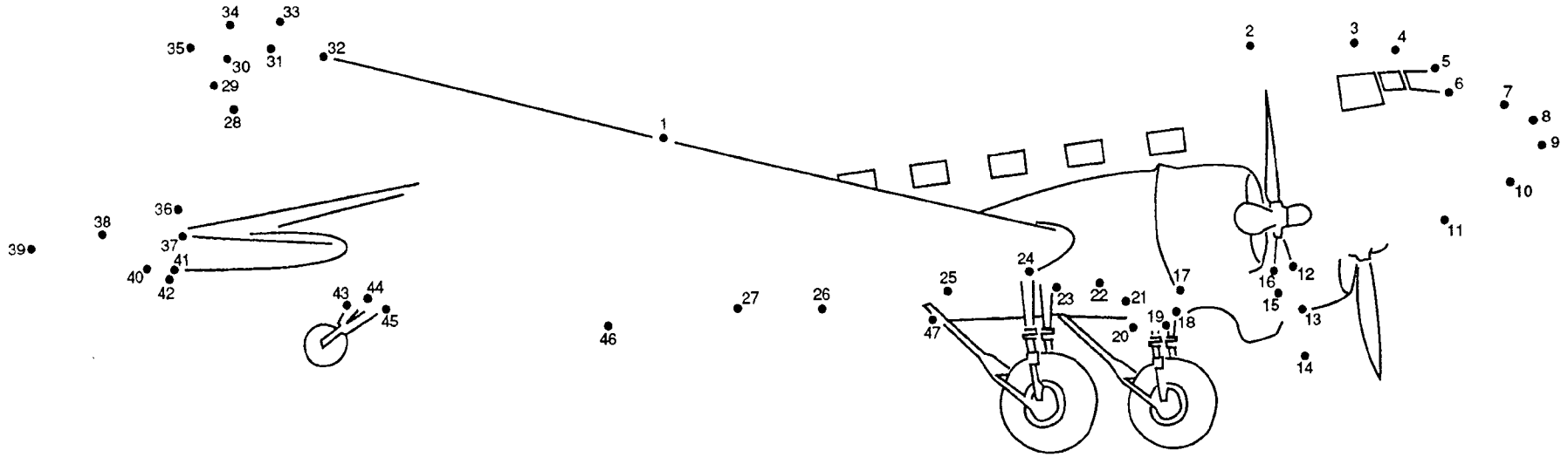
Beechcraft

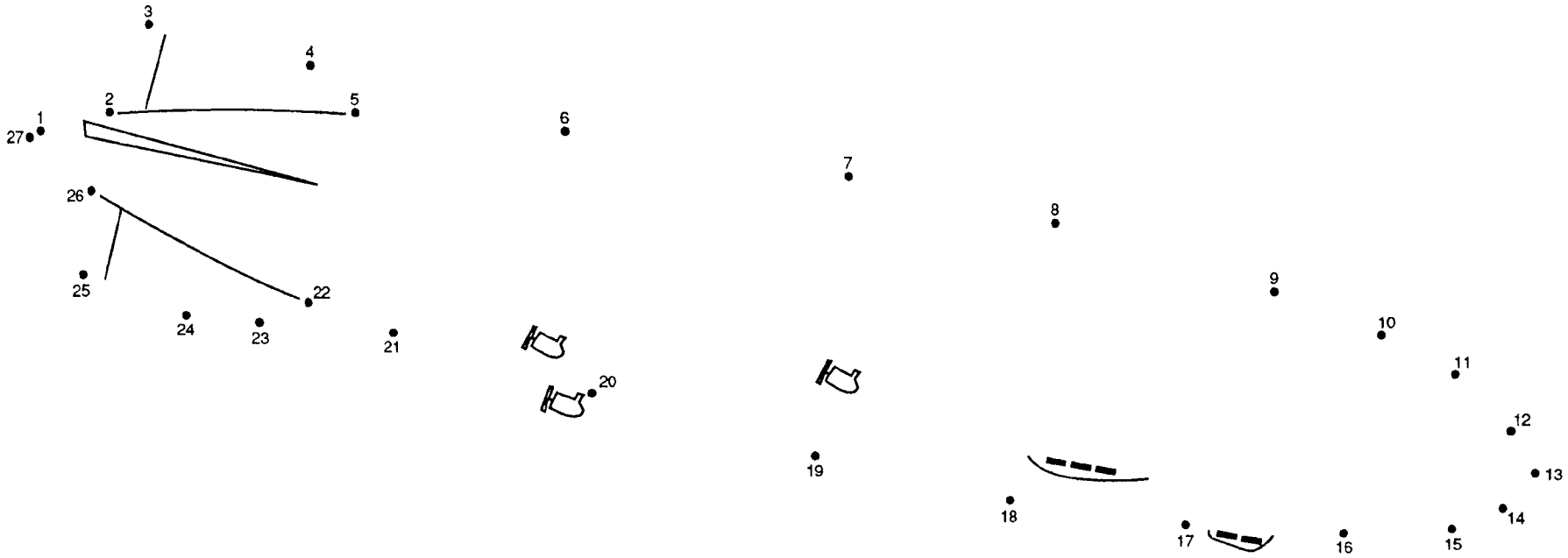
The Beech 18 was first flown in January of 1937 and became a standard for business aviation aircraft. The original Beech 18s had a cruise speed of 196 miles per hour and a range of just over 1,000 miles. It cost about $30,000. The last Beech 18 rolled out of the factory on November 26, 1969, it was Beechcraft Super H18 model, had a cruise speed of 220 miles per hour, a range of just over 1,500 miles and cost around $180,000.



Douglas DC-3

The DC-3, first flown in 1935, was the most widely used passenger aircraft of its time. Its landing speed was a safe and comfortable 64 miles per hour. The DC-3 was used during World War II as a military-transport for the United States Army. Of the nearly 11,000 DC-3s made, hundreds were still flying in the 1980s. The all-time champion DC-3 flew more than 50,000 hours in the air for Eastern Air Lines after its delivery in 1939. In 1952 it was sold to North Central Airlines and flew until 1965, when it was retired from regular service. During its 36 years of service it had flown nearly 85,000 hours, almost 10 full years in the air, wore out 550 tires, 25,000 spark plugs and 136 engines.



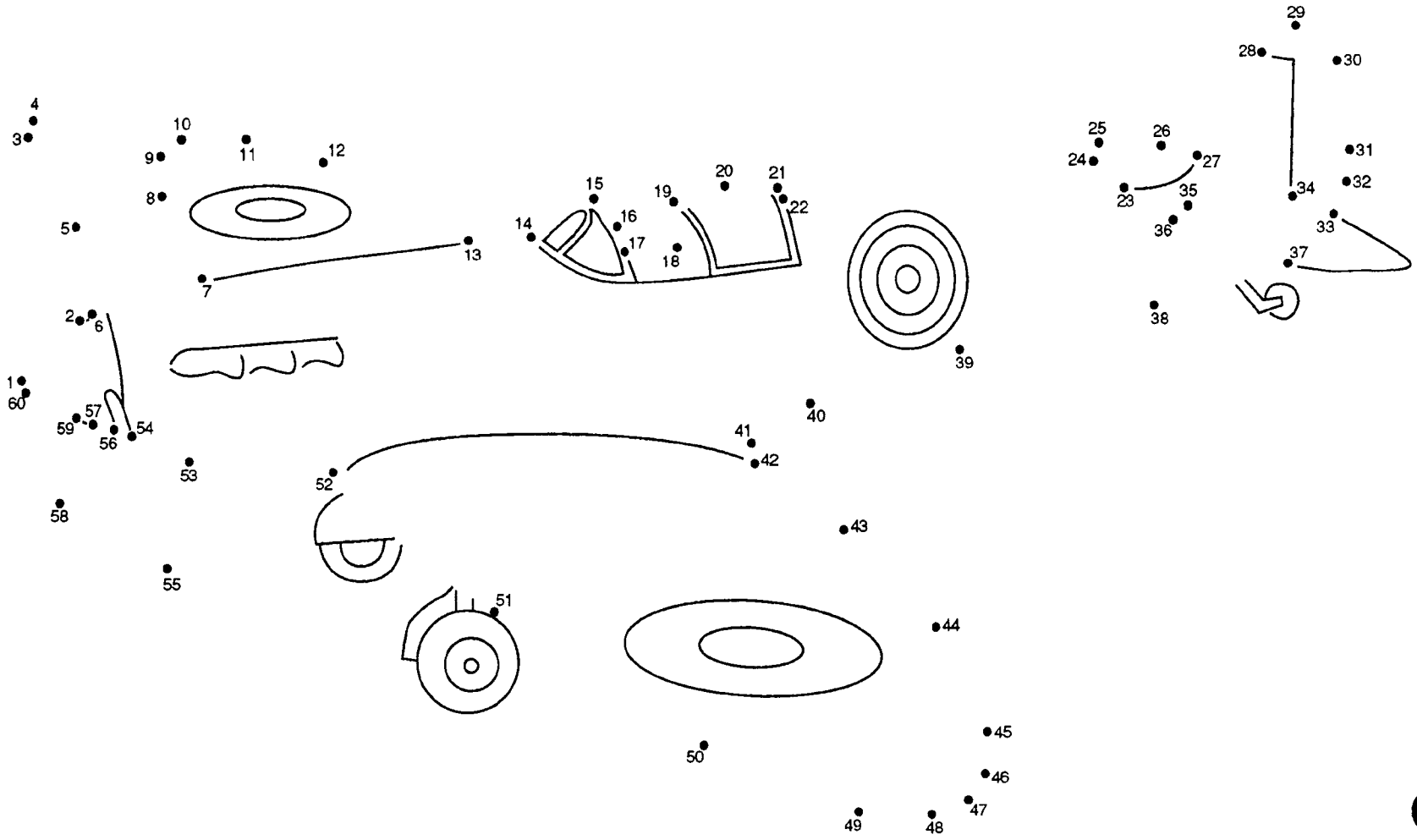


The Hindenburg

The largest dirigible was the Hindenburg. It was almost as long as an ocean liner. It carried 50 people in luxury unmatched by any other aircraft. The Hindenburg offered a dining room 50 feet long, a 34 foot lounge, a writing room, a bar and a hydrogen proof smoking room. The Hindenburg began carrying passengers in the summer of 1936. It had a range of 11,000 miles and a cruising speed of 84 miles per hour.

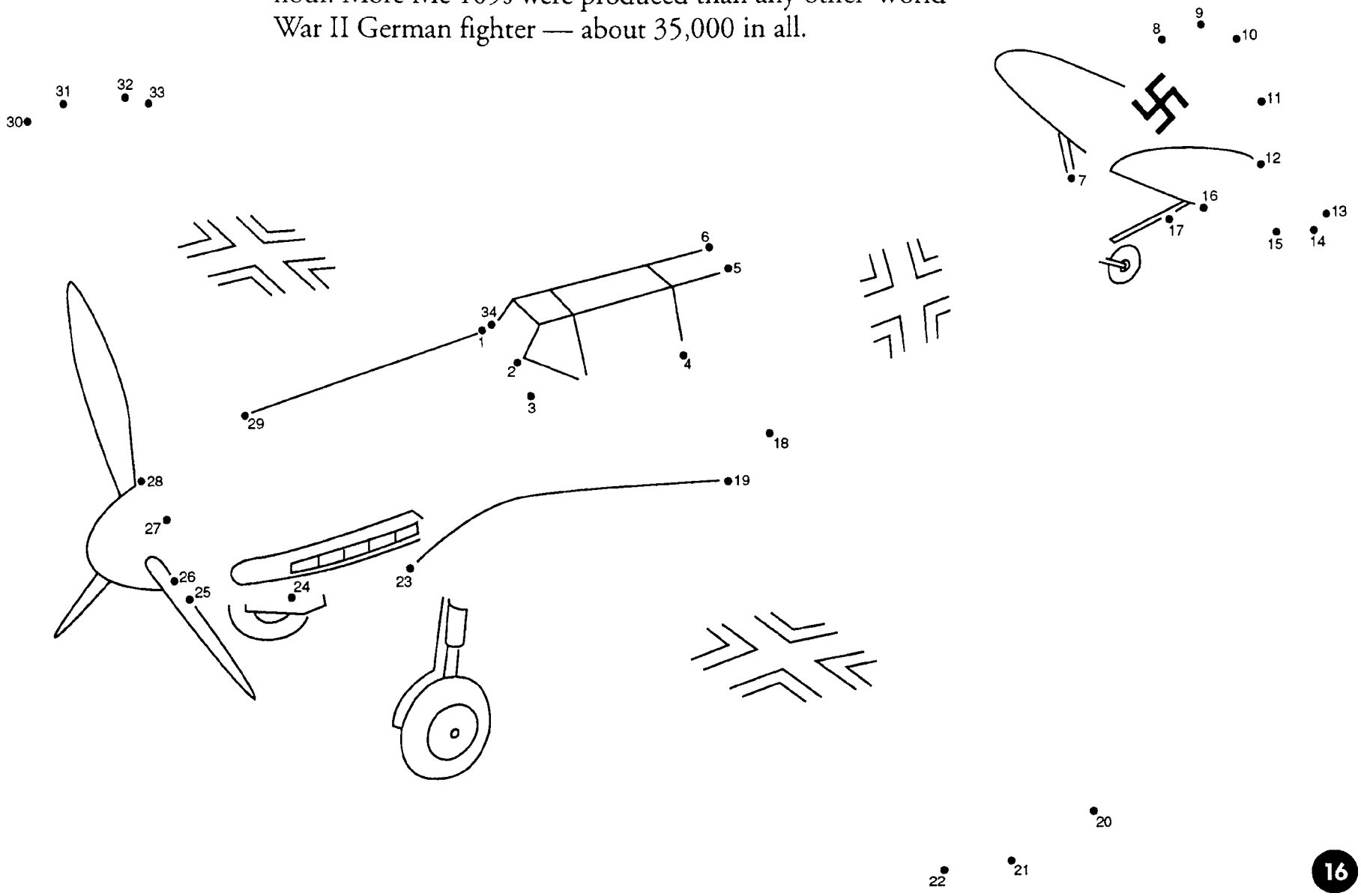
Spitfire

The Spitfire, first flown in 1935, had an all metal skin. This design helped make the aircraft lighter. The Spitfire was armed with eight machine guns, mounted in the wings. It's top speed was about 320 miles per hour.



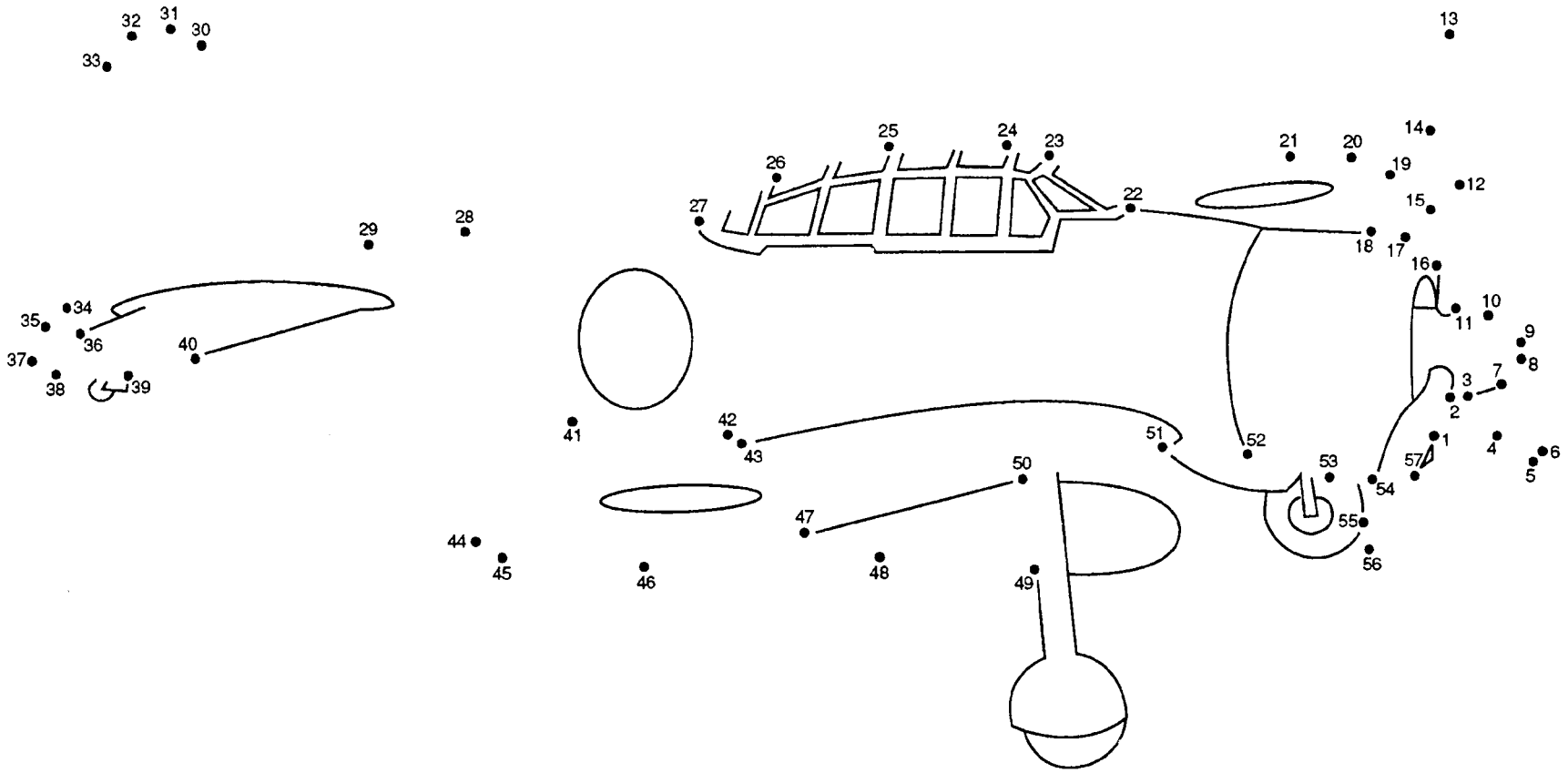
Messerschmitt Me 109

The earliest Messerschmitt Me 109 monoplane fighter was flown in 1935. Like the British Spitfire, it had an all metal skin. The Me 109's top speed was about 350 miles per hour. More Me 109s were produced than any other World War II German fighter — about 35,000 in all.



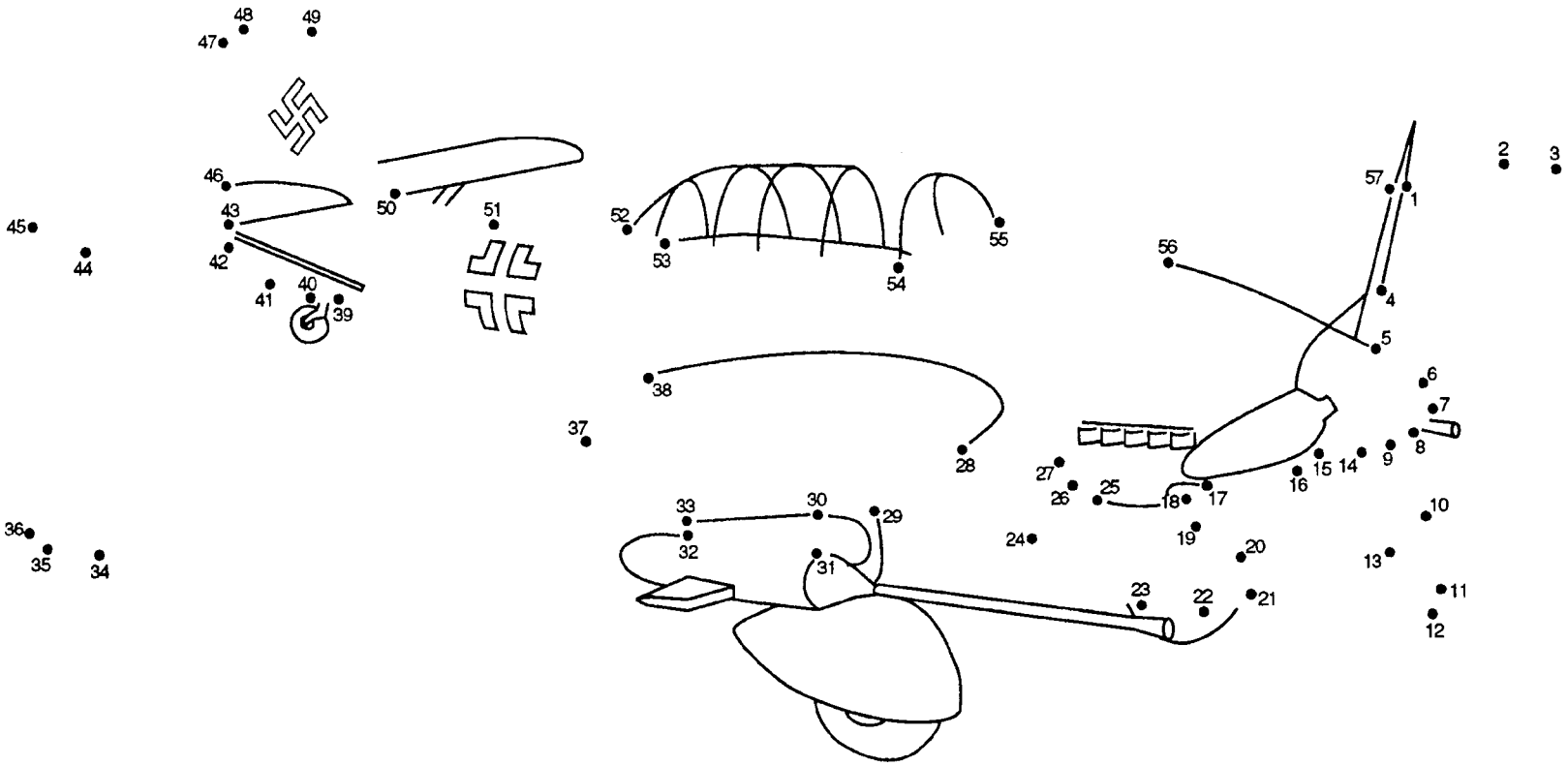
Mitsubishi A6M2 — Zero

The Mitsubishi A6M2 was better known as the Zero. First built in 1937, the Zero could fly about 330 miles per hour and had a range of 1,930 miles with its belly fuel tank. It had two 7.7-mm machine guns and two 20-mm cannon.



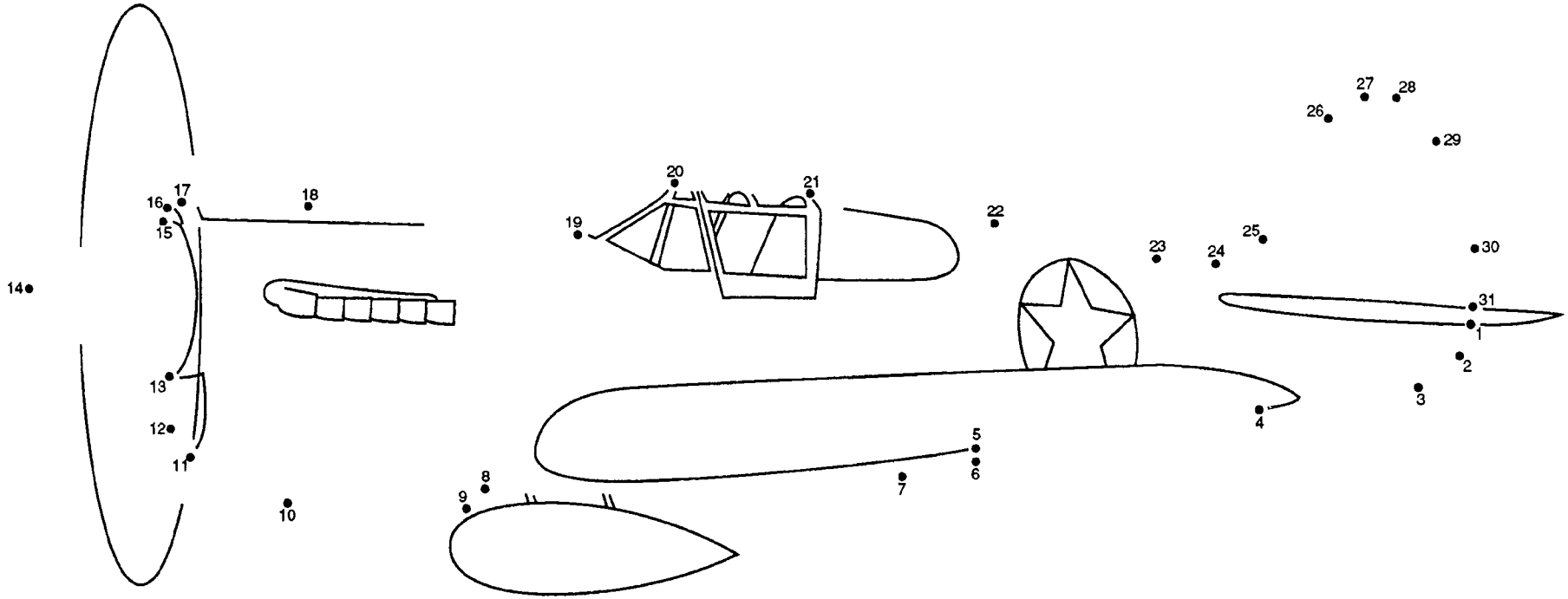
Junkers Ju 87

Best known as the Stuka, the Ju 87 gained a reputation as the ultimate dive bomber in the early months of World War II. The Stuka seldom flew farther than 400 miles, and could drop its bombs within 40 yards of its target. Some later models, like this plane, were armed with twin 37-mm anti-aircraft guns to destroy tanks.



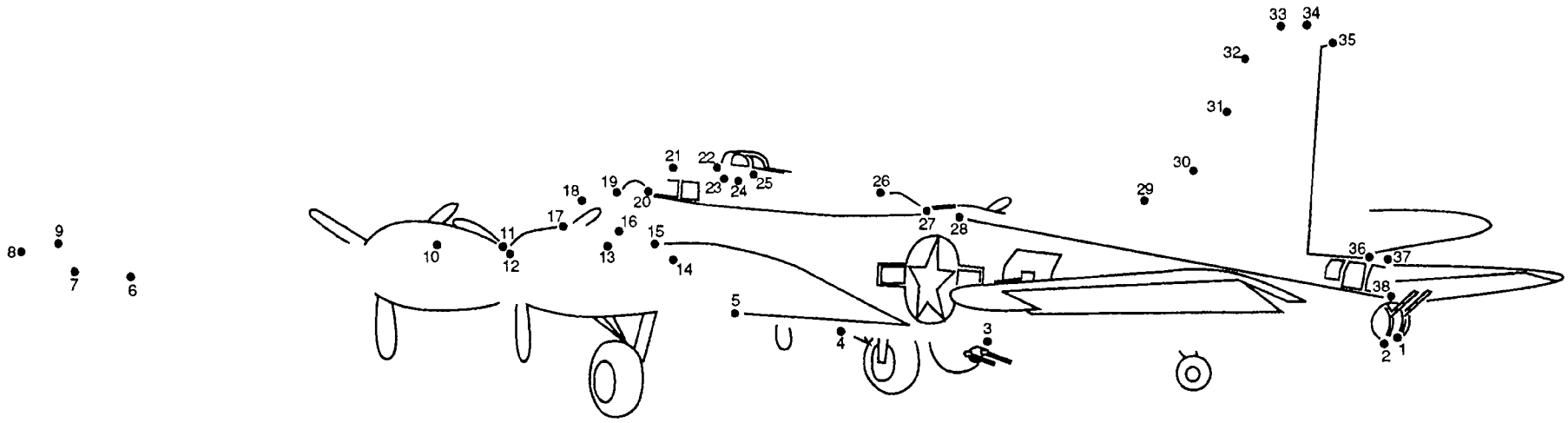
Curtiss P-40

The Curtiss P-40 was made famous in the early stages of World War II by General Chenault and the Flying Tigers. The P-40 had a liquid-cooled engine with a top speed of 378 miles per hour and a range of 1,400 miles. It was armed with six 50 caliber machine guns. The P-40 was the first mass-produced U.S. single-seat fighter. More than 14,000 were built.



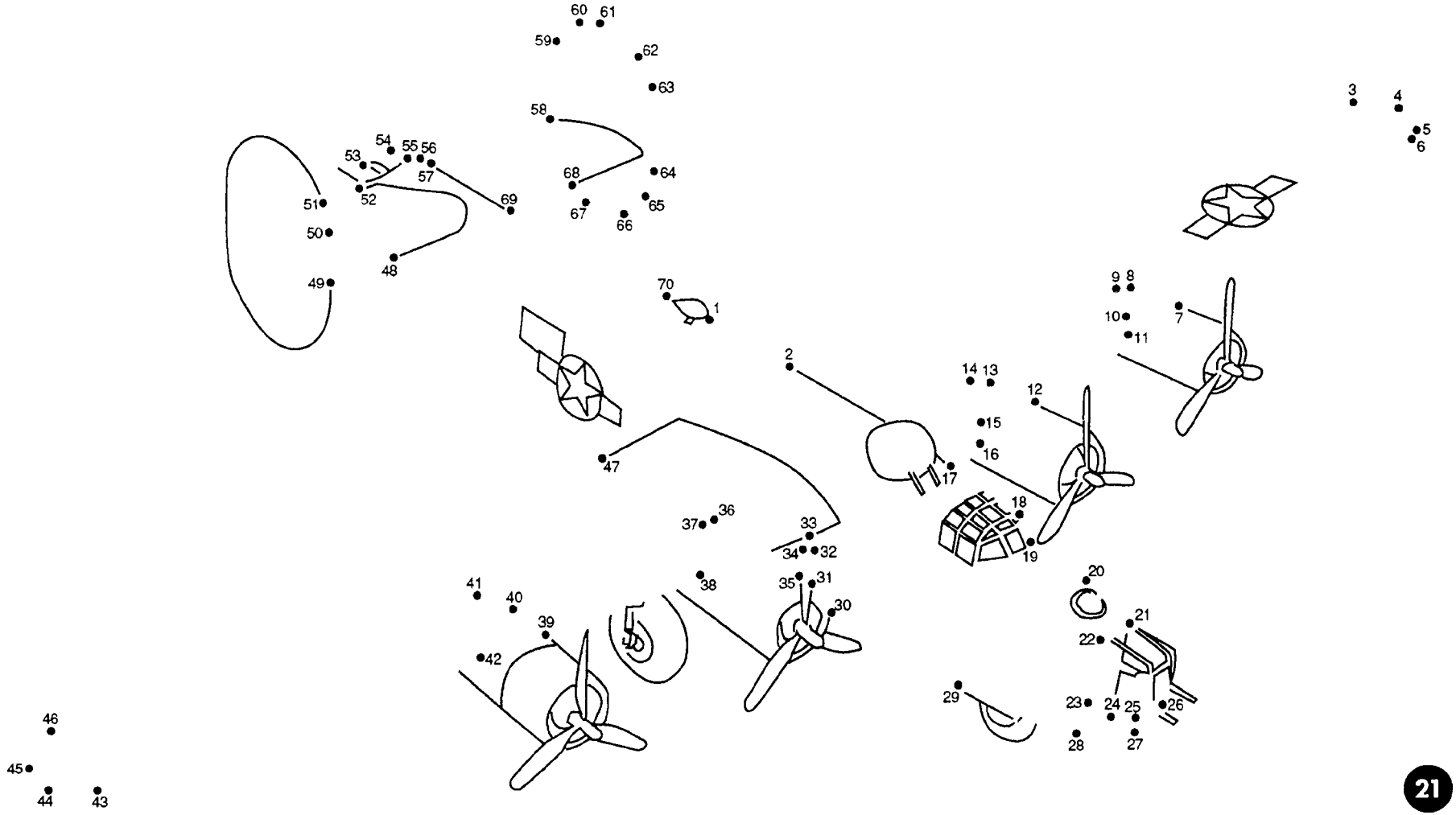
Boeing B-17 Flying Fortress

The first B-17 flew on July 28, 1935. During World War II 12,731 Flying Fortresses were built. It carried a crew of 10, had a wingspan of 104 feet, weighed 65,000 pounds, carried 17,600 pounds of bombs and 13 machine guns.



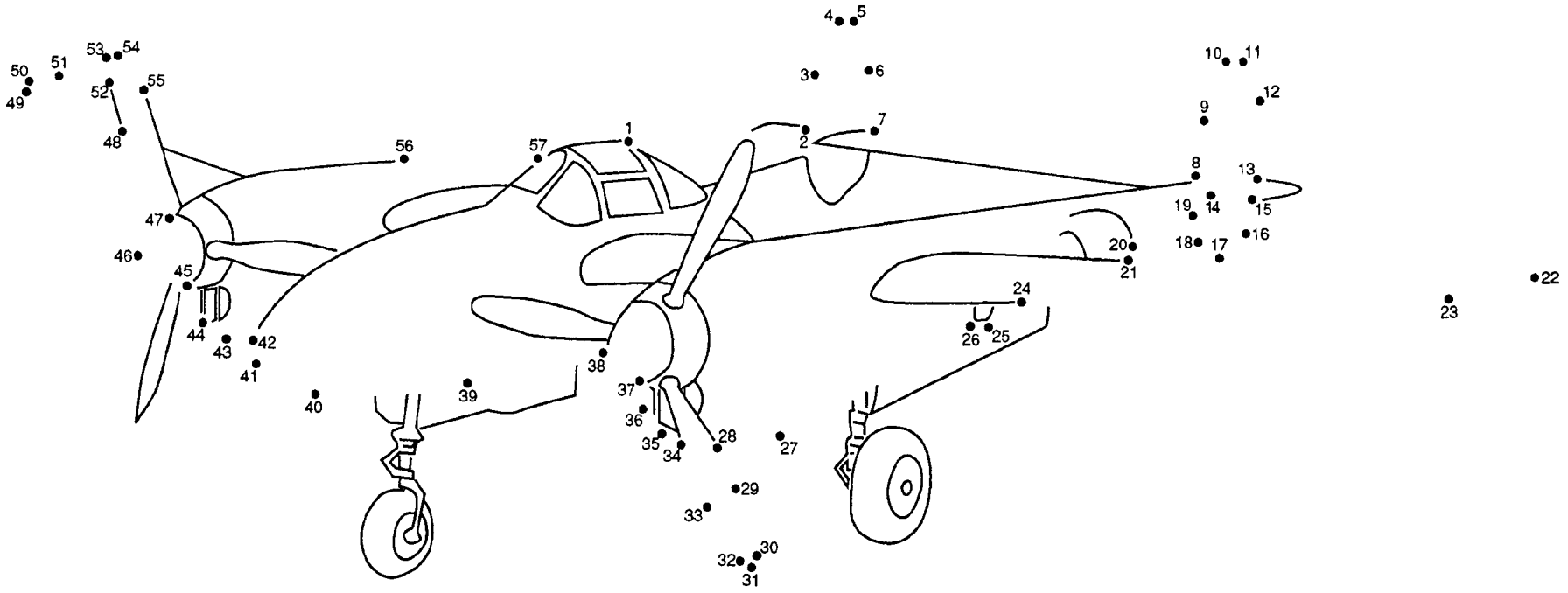
Consolidated B-24 Liberator

The Consolidated B-24 Liberator was built in greater numbers than any other American plane of World War II —- 18,188. The B-24 was manned by a crew of 10 and carried an 8,800-pound bombload. It had 10 machine guns, a top speed of 290 miles per hour and a range of 2,100 miles.



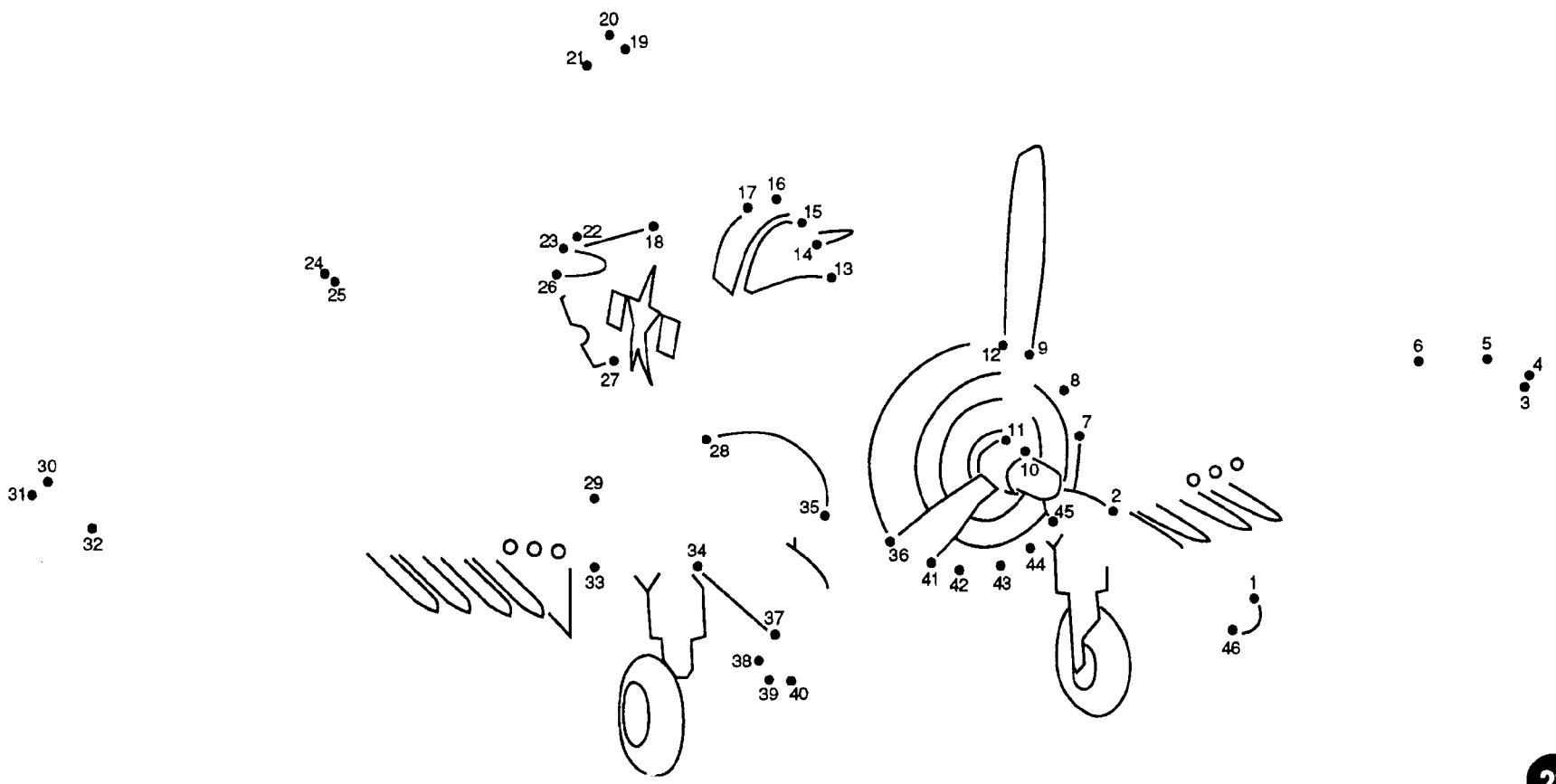
Lockheed P-38 Lightning Fighter

Powered by two liquid-cooled engines, the P-38 had a top speed of 414 miles per hour and carried a 20-mm cannon and four machine guns in its nose. Designed as a high-altitude interceptor, the P-38 shot down more Japanese planes during World War II than any other U.S. fighter.



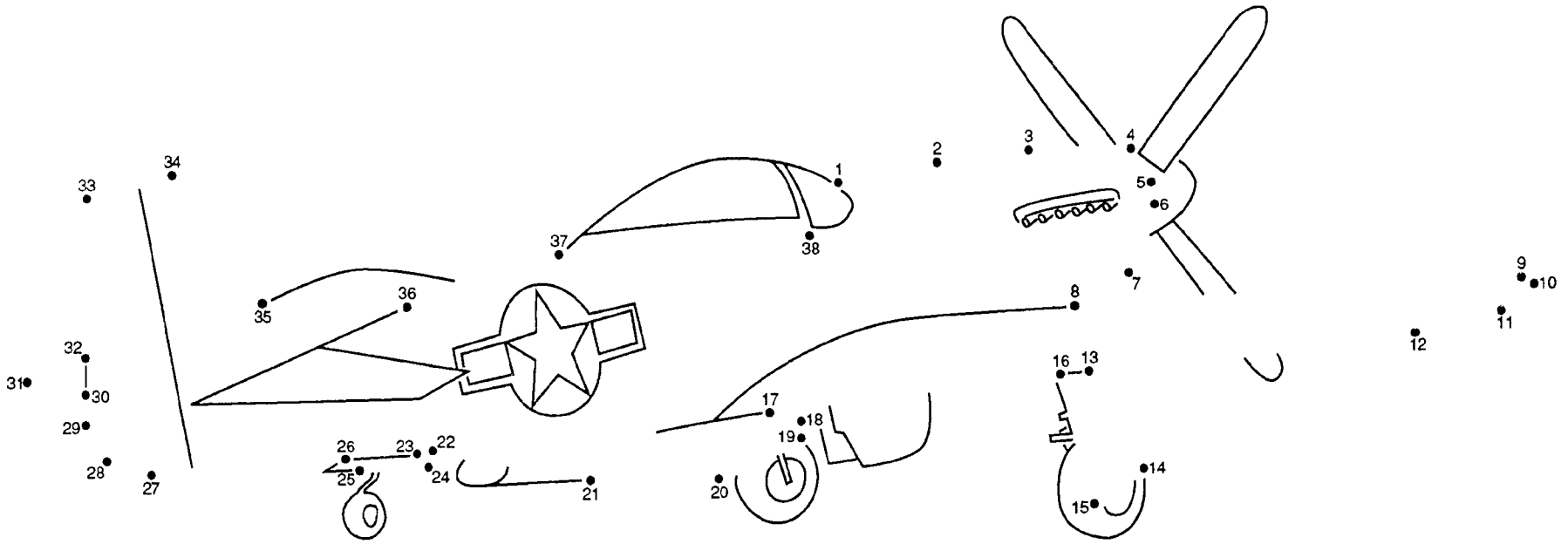
Chance Vought F4U-1D — Corsair

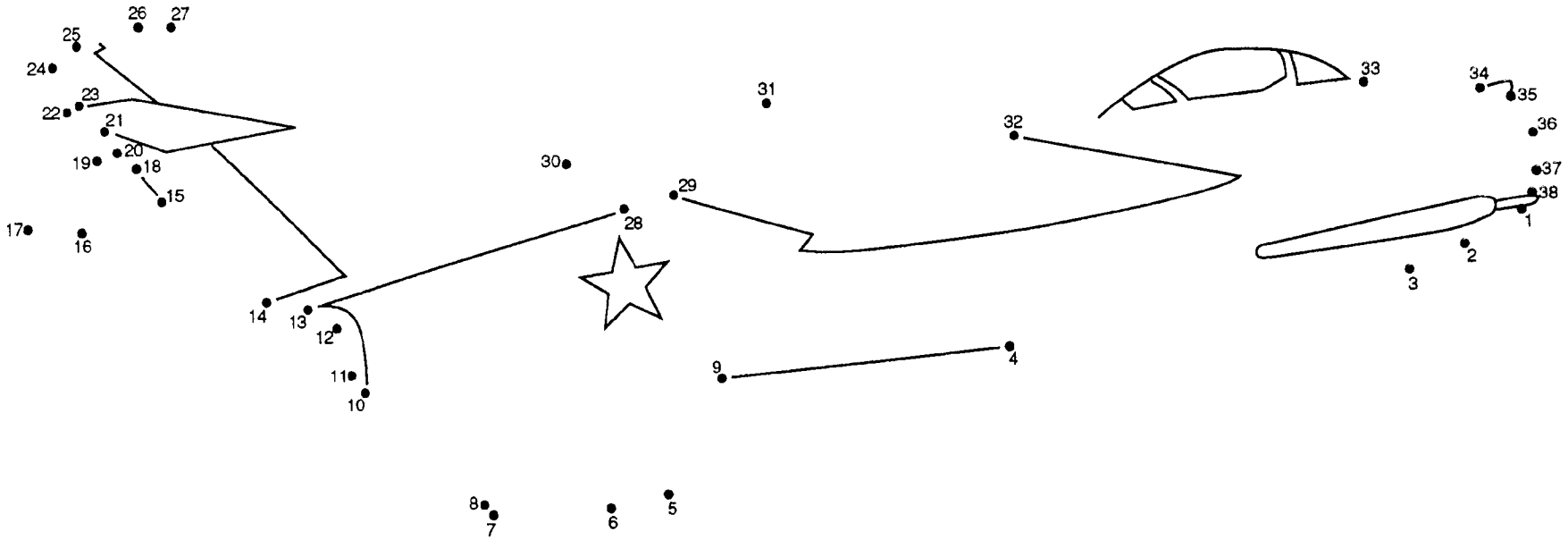
Carrying four rockets under each of it's gull wings, — and a fuel tank under the right wing — the 417-miles per hour Corsair was the fastest fighter on board U.S. carriers during World War II.



North American P-51 Mustang

Six wing-mounted machine guns, a top speed of 437 miles per hour and unmatched maneuverability made the P-51 an excellent fighter plane. The Mustang was one of the most famous planes of World War II with more than 15,000 being built.



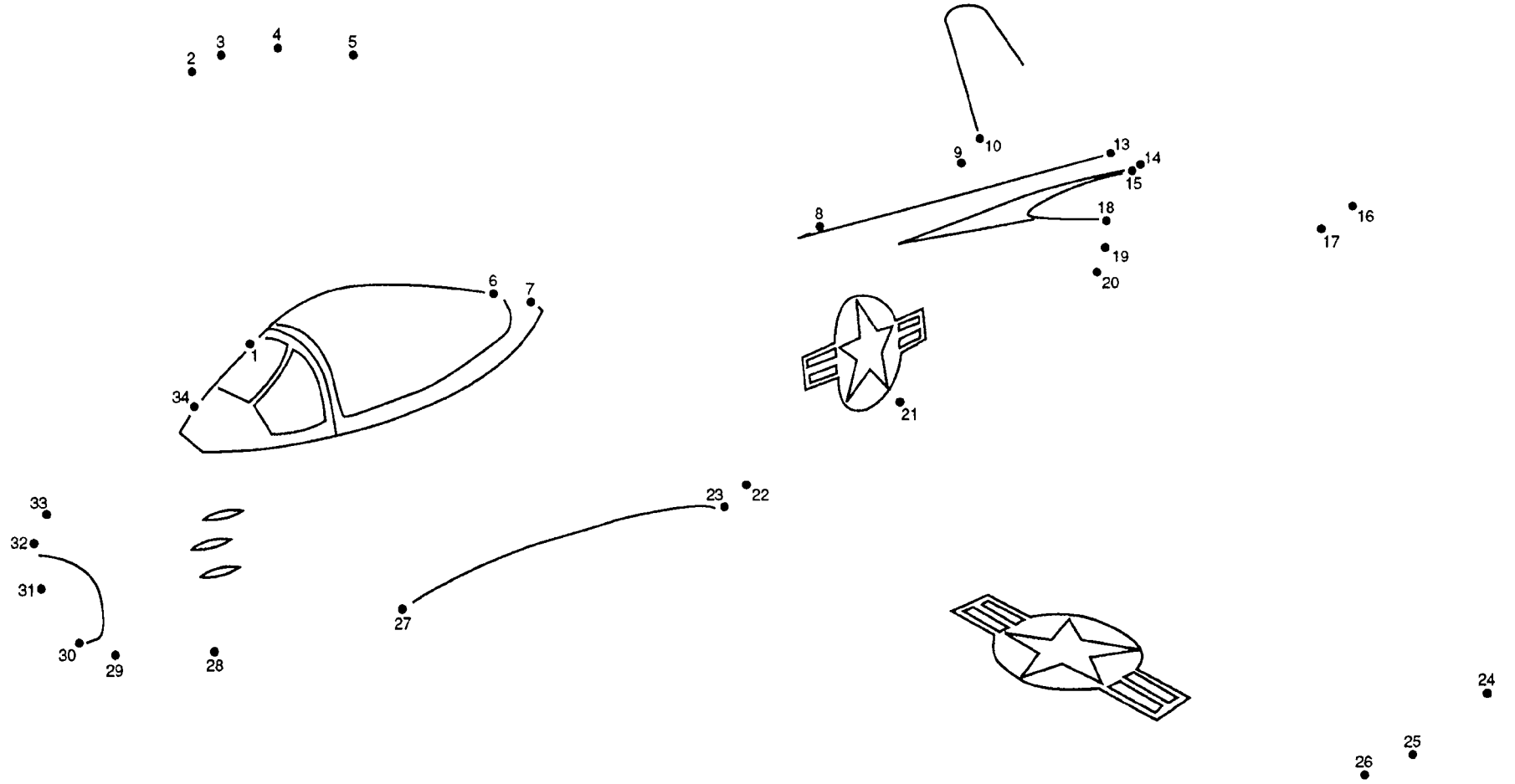


Mikoyan/Gurevich MiG-15

The Soviets built more than 8000 MiG-15s using German and British design ideas. Like German models, it's wings "sweep back" to reduce drag, and it's jet engine was a copy of the latest engine that Great Britain made. It first flew in 1947. It had two machine guns, a 37-mm cannon, and it could fly at 668 miles per hour.

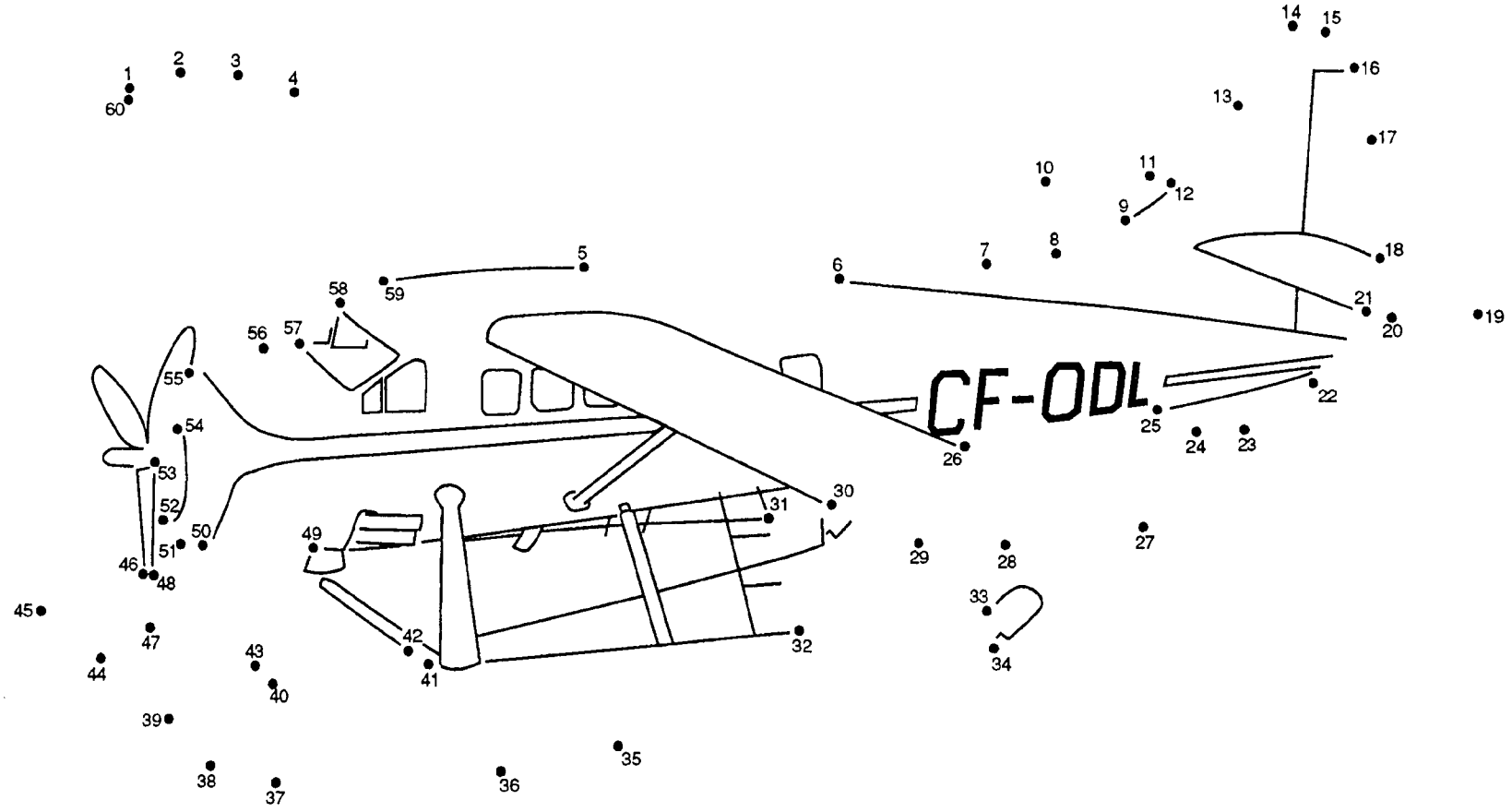
North American F-86 — Sabre

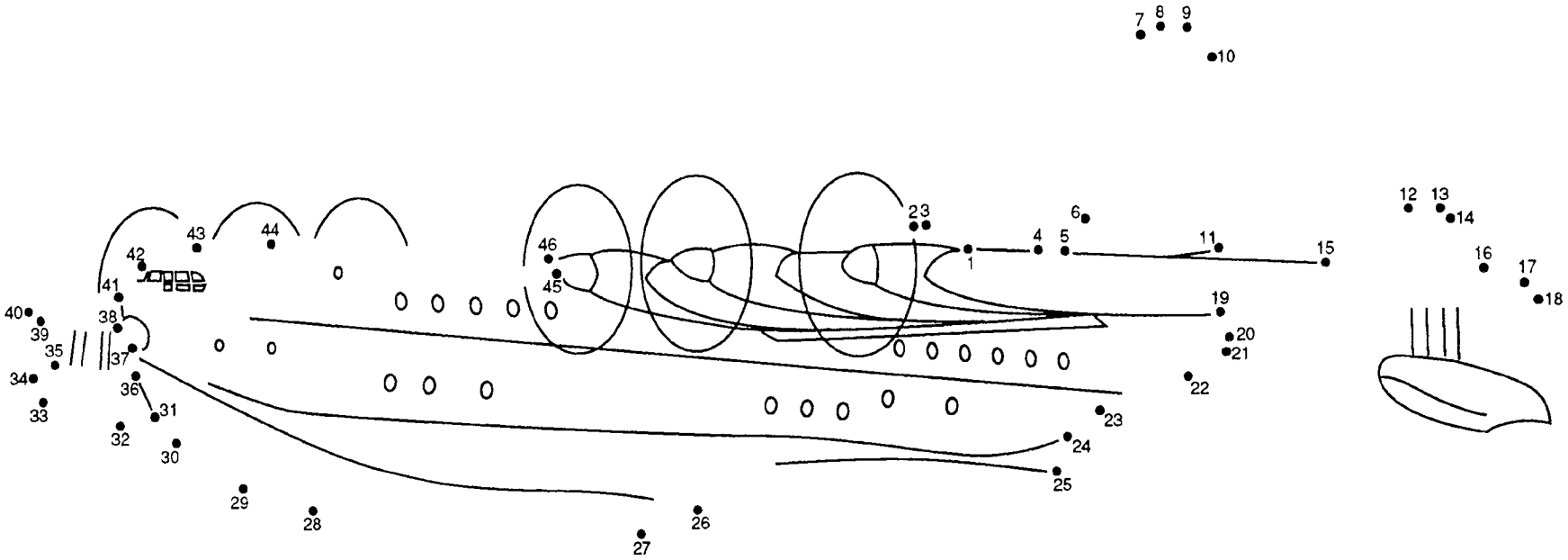
One of the classic jet fighters of all time. The F-86 Sabre first flew in October 1947. It had a top speed of 693 miles per hour and was armed with six machine guns. Almost 10,000 Sabres were built.



De Havilland Canada D.H.C.-3 Otter

This all-metal utility aircraft could carry up to 14 passengers or a ton of freight. The Otter hauled passengers and supplies through every type of weather and over some of the world's wildest terrain. Every piece of equipment had to be useful on a "bush plane."



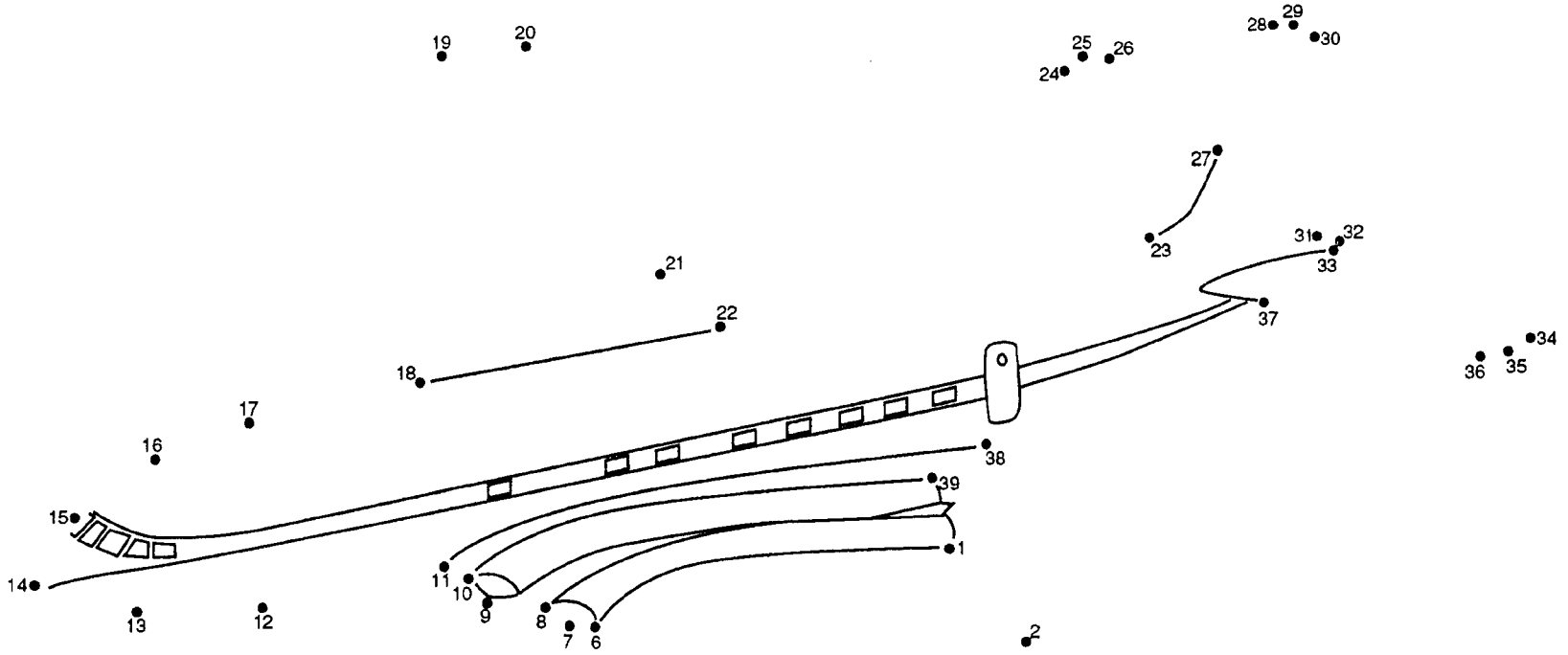


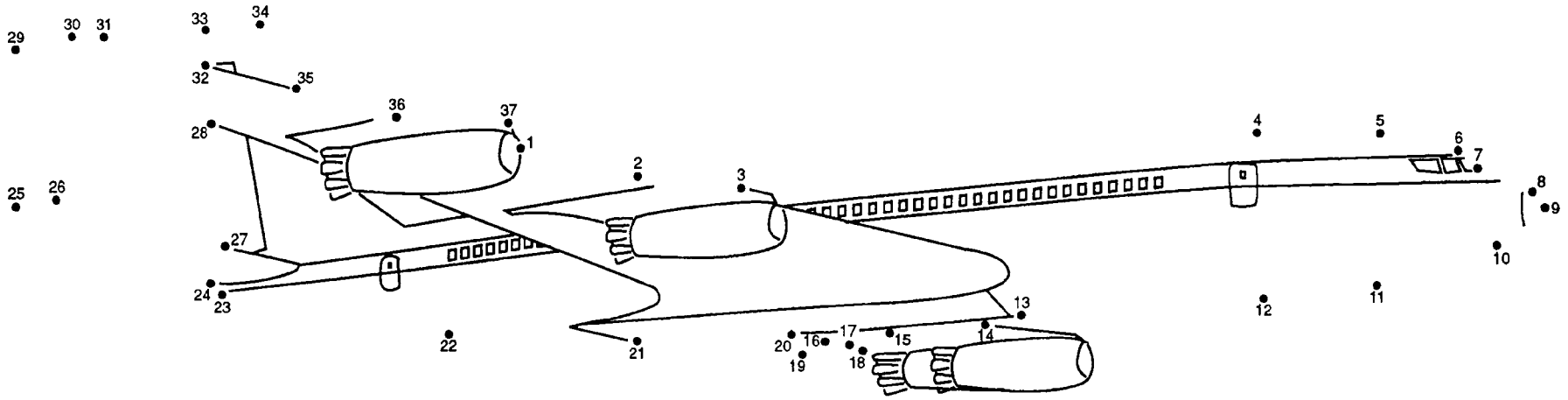
Saunders-Roe Princess

This majestic ten-turboprop giant was designed to carry 105 passengers in ocean-liner luxury at 385 miles per hour over trans-Atlantic distances. It first flew on August 22, 1952.

De Havilland Comet

With its streamlined fuselage, its gracefully swept wings and a cruising speed of just under 500 miles per hour, the Comet began a new era of air travel in 1952. The Comet's four jet engines made it the fastest commercial transport of its day. It could fly eight miles high and had a range of 1,750 miles.



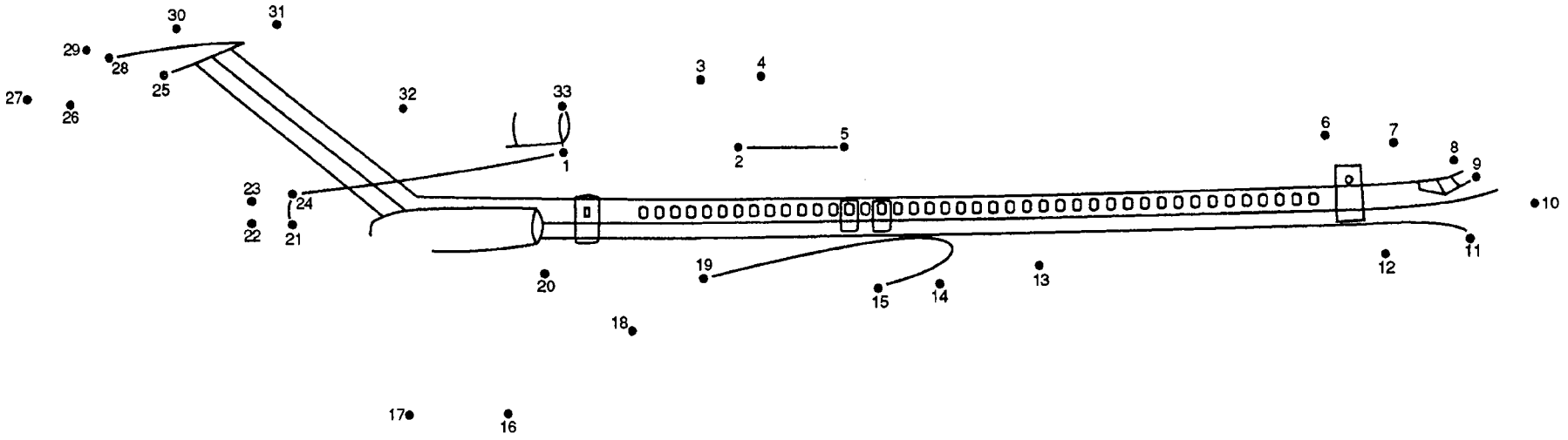


Boeing 707

The 707 was the world's largest airliner when it appeared in 1958. Its cruising speed of 535 miles per hour made it the fastest as well. The 707's could carry up to 130 passengers and fly nonstop across the United States.

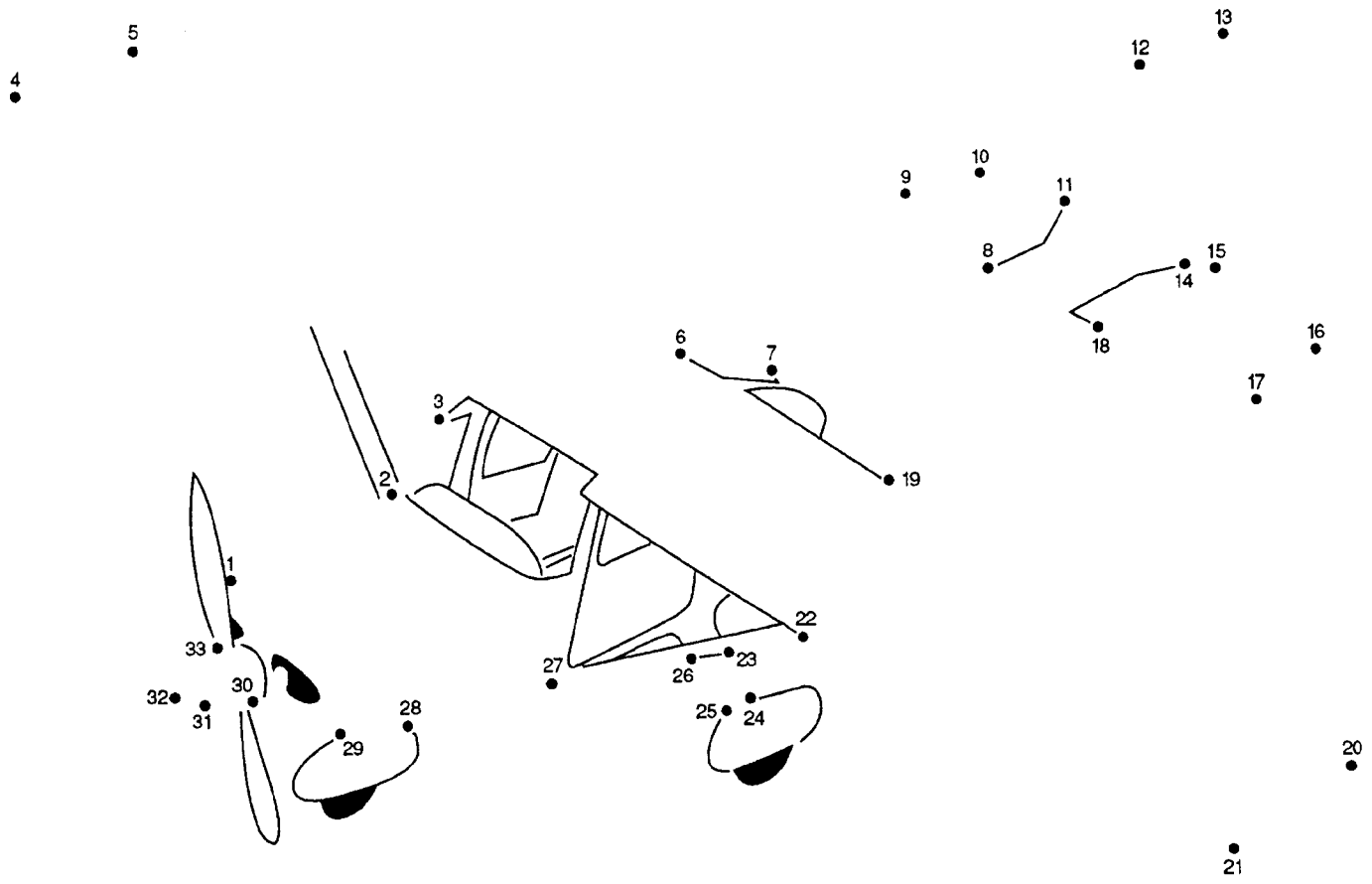
Boeing 727

The 727 was the first American trijet and became the world's best selling airliner. The first 727 rolled out of the factory on November 27, 1962. The 727 was known as a pilot's airplane because it handled quickly and easily. The 727 seats up to 131 passengers, cruises at 530 miles per hour and has a range of 2,500 miles.



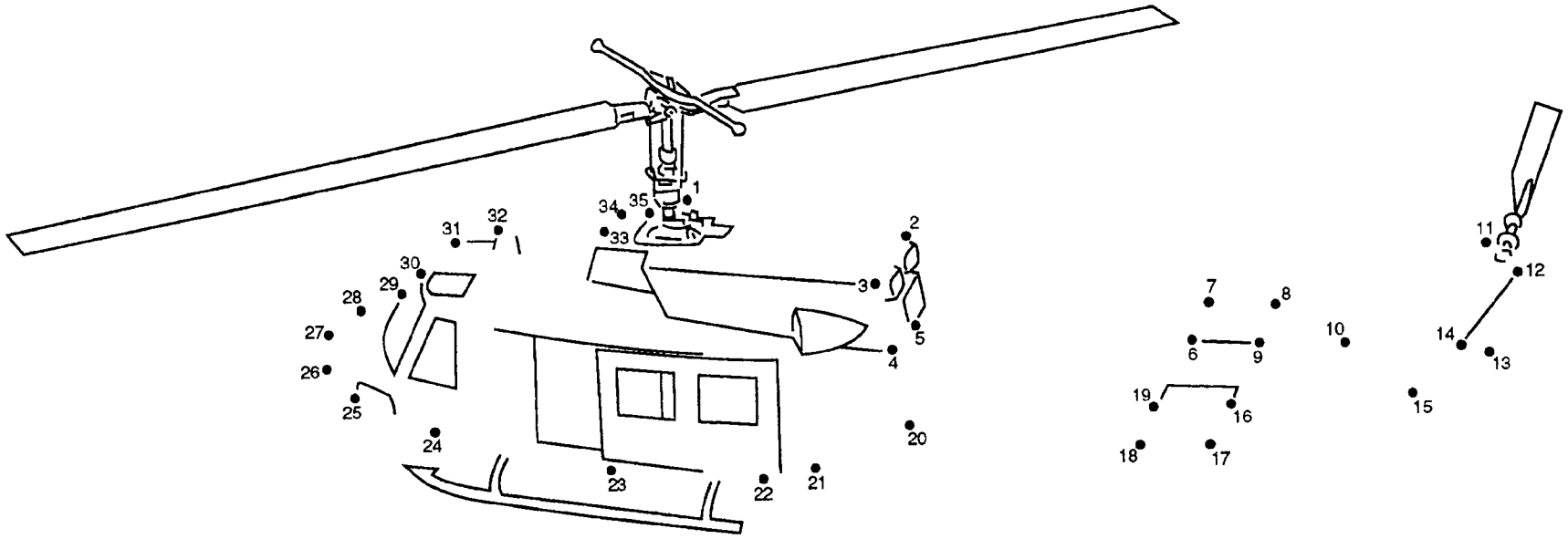
Cessna 150

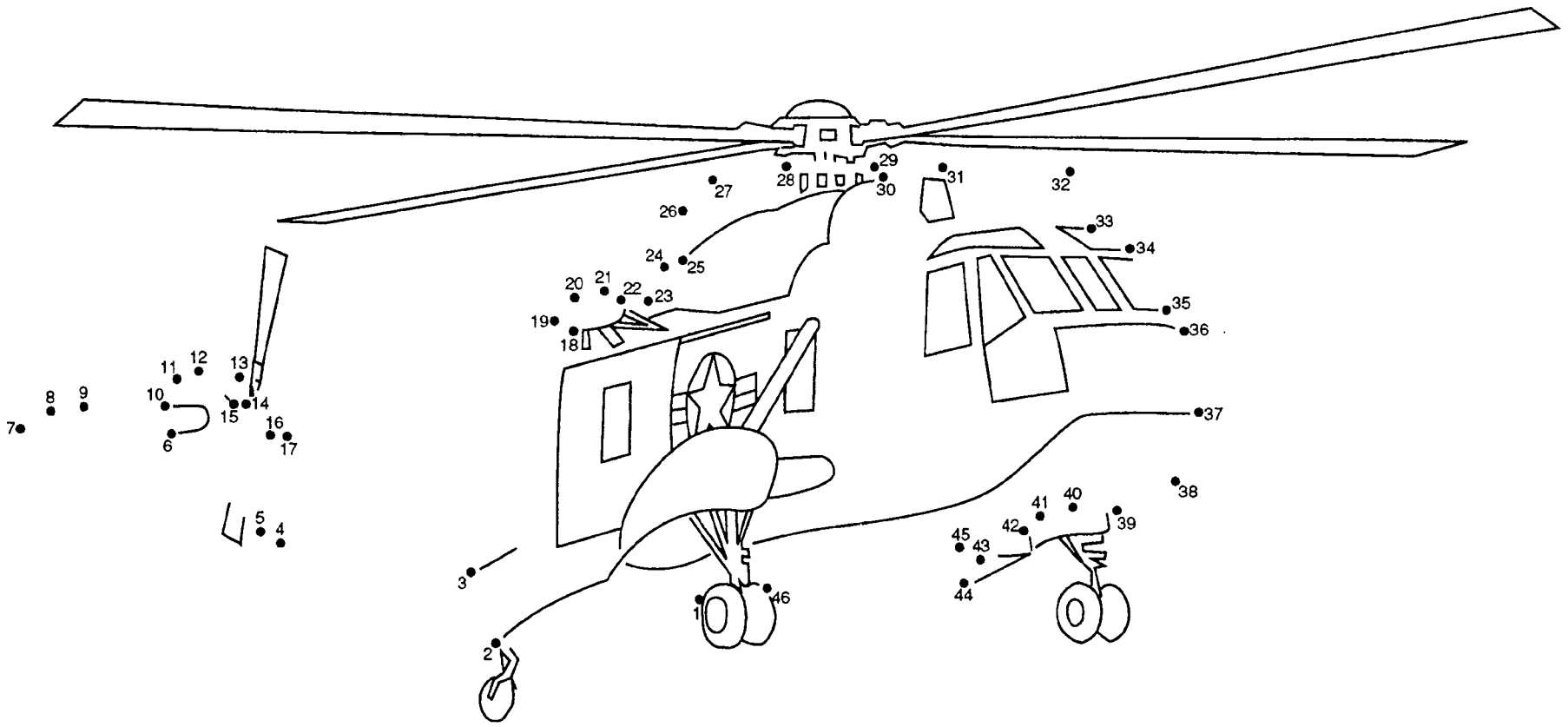
Over 22,500 of this high wing, two seat training aircraft were built from 1959 to 1977. It was sold all around the world and many of today's pilots learned to fly in the Cessna 150.



Bell UH-1 — Huey

Of all the military helicopters built, none is more common than the Bell UH-1, better known as the Huey. From 1962 onward, thousands of Hueys took to the air daily in every type of weather to perform countless tasks.



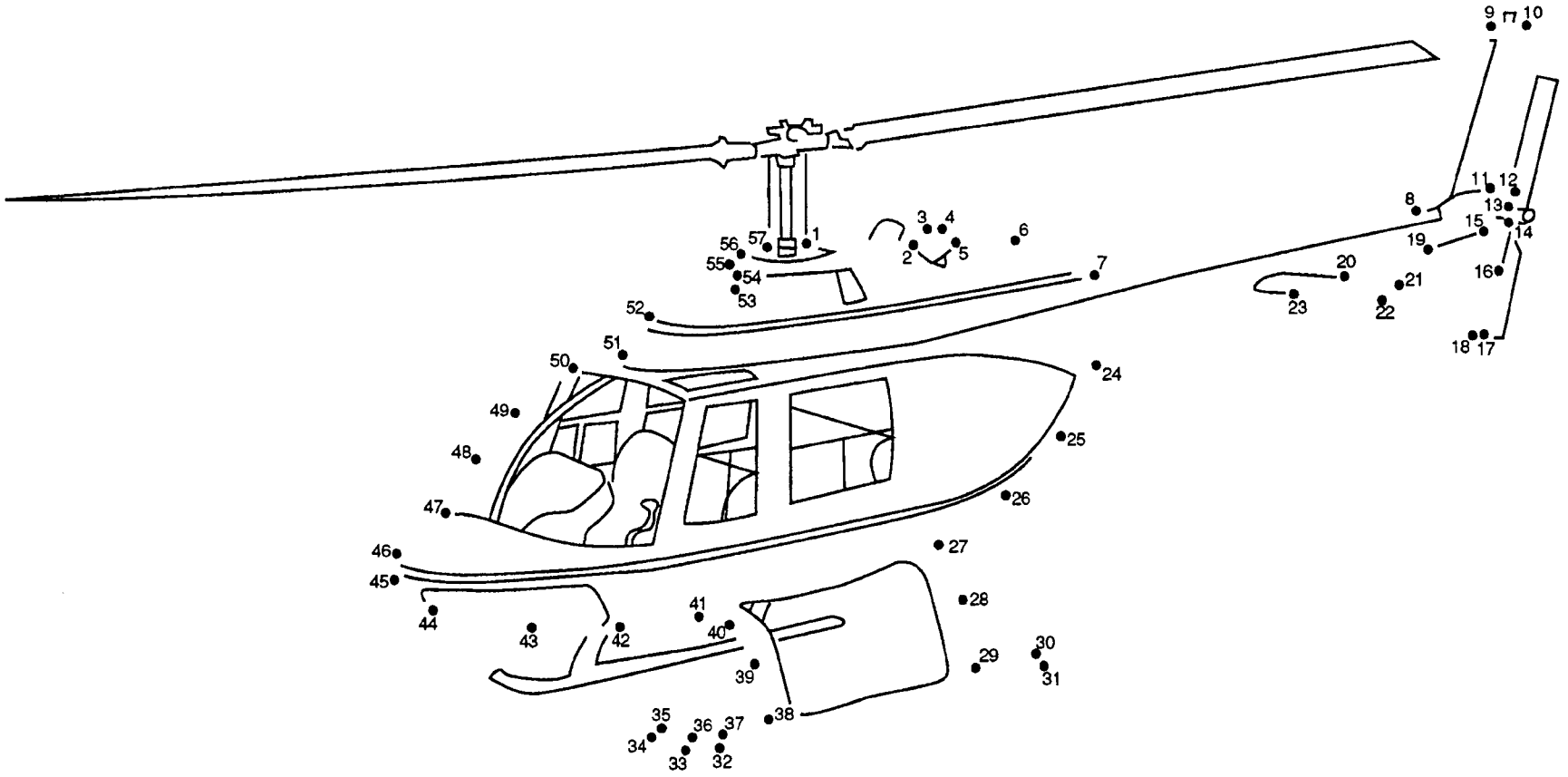


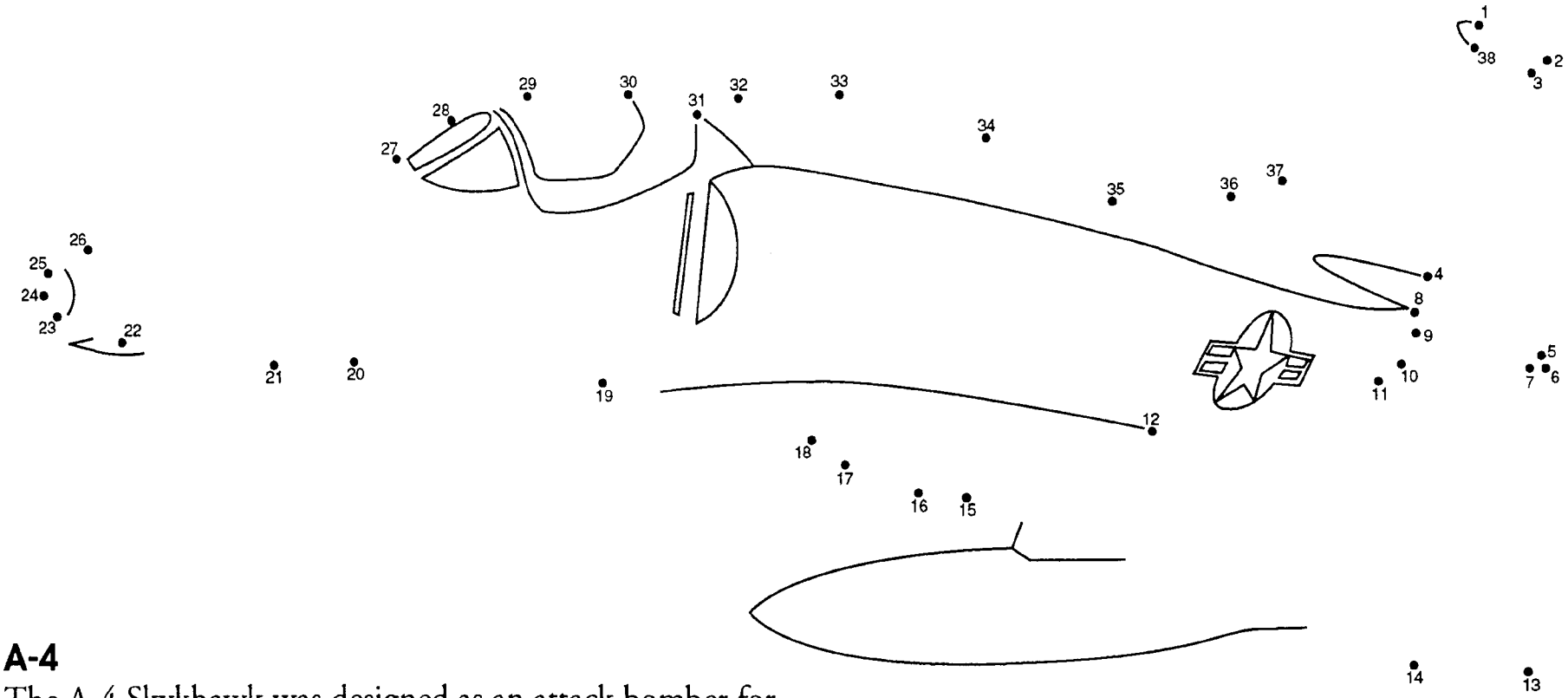
Sikorsky

The Sikorsky Sea King was designed as a submarine hunter for the Navy, but is also widely used for search and rescue missions. The Sea King is probably best known as the type of helicopter which stood by to recover astronauts returning from missions in space. It first flew on March 11, 1959. It has a cruising speed of 136 miles per hour, a range of 625 miles and carries a crew of 4.

Bell Jetranger

Built in the mid 1960s, the Bell Jetranger was one of the first helicopters to use a jet engine. In the 15 years following its introduction, approximately 4,000 Jetrangers were sold for commercial use.



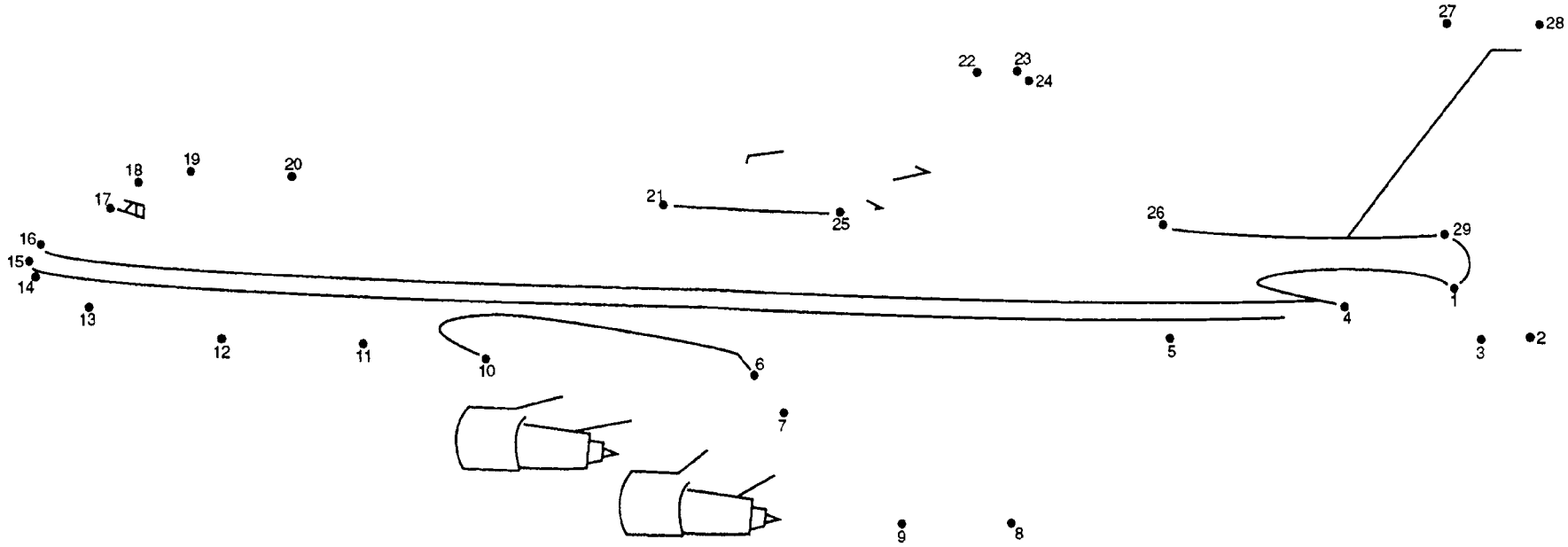


A-4

The A-4 Skykhawk was designed as an attack bomber for the U.S. Navy and Marine Corps. It had a top speed of 646 miles per hour and range of 2,300 miles with external fuel tanks. The first test flight of an A-4 was on June 22, 1954. The last year the A-4 was used by U. S. military forces was 1974. Over 2,900 A-4 Skyhawks were produced.

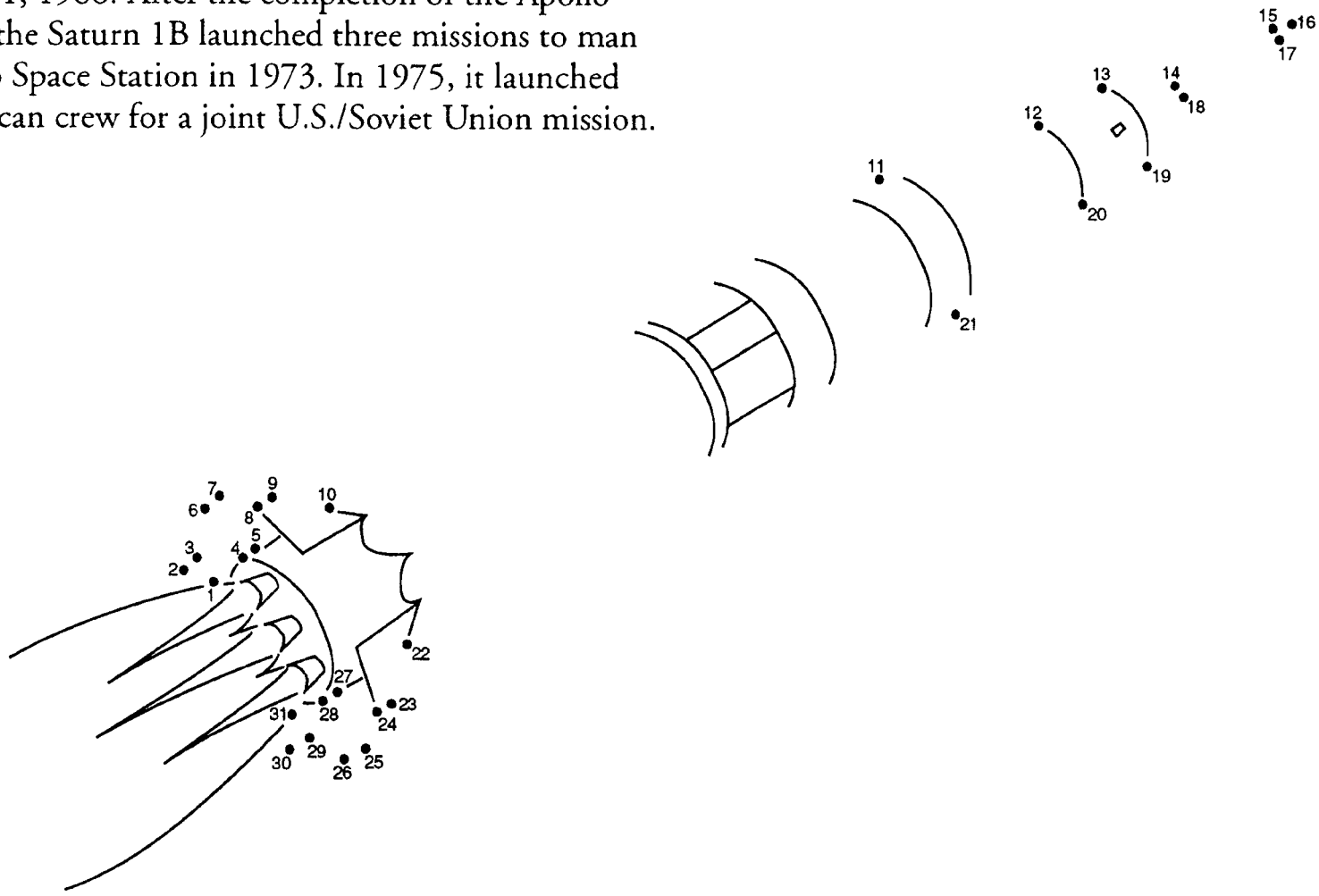
Boeing 747

The four-engined 747, with its 499-seat capacity, was built for long-range routes. It requires nearly an acre of parking space. The first test flight of a Boeing 747 was on February 9, 1969. The 747 cruises at 560 miles per hour and has a range of approximately 8,000 miles.



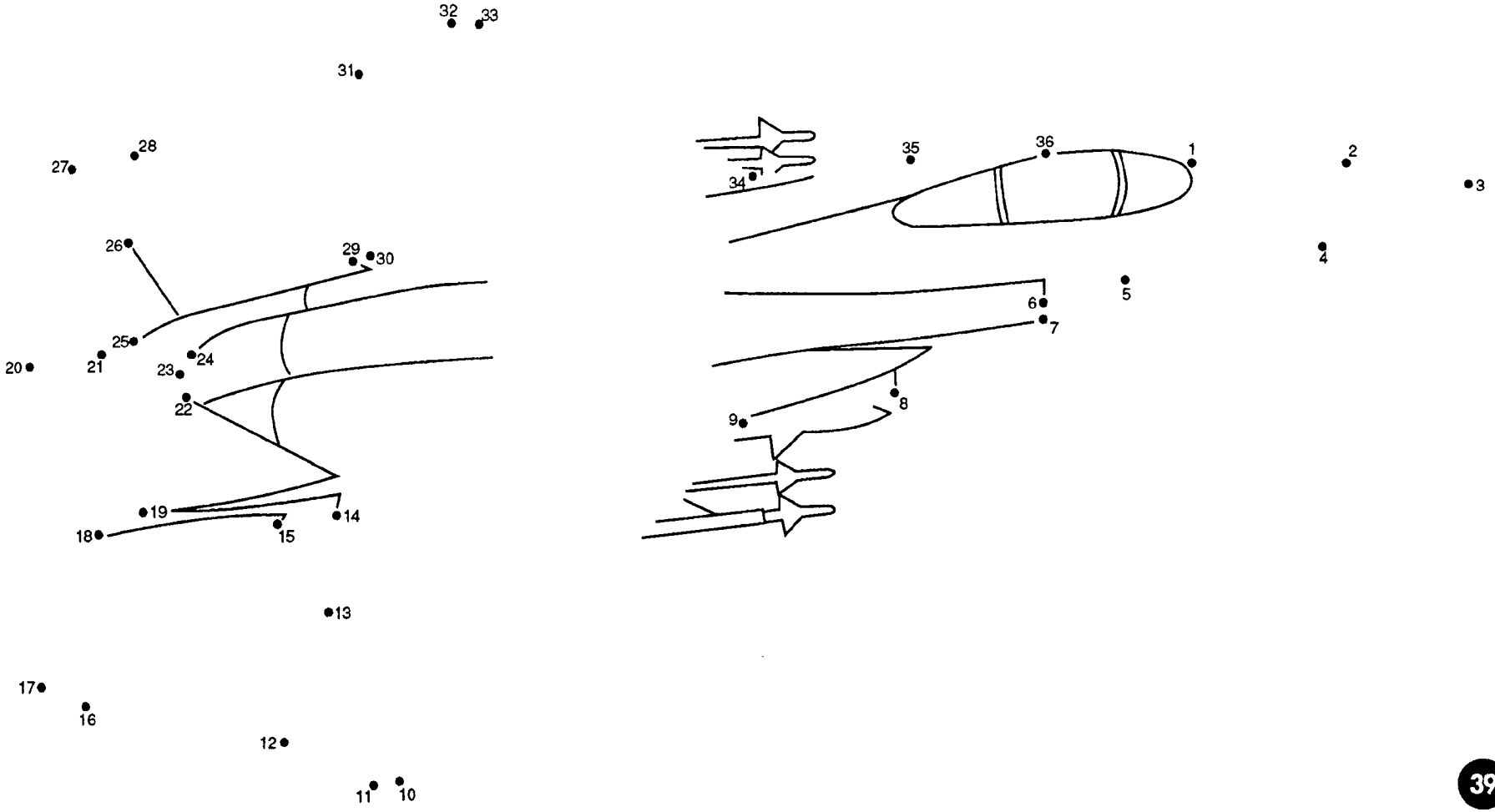
Saturn 1B

The Saturn 1B was used to launch Apollo lunar spacecraft into Earth orbit to train for manned flights to the Moon. The first launch of a Saturn 1B with an unmanned Apollo spacecraft took place in February 1966. A Saturn 1B launched the first manned Apollo flight, Apollo 7, on October 11, 1968. After the completion of the Apollo program, the Saturn 1B launched three missions to man the Skylab Space Station in 1973. In 1975, it launched the American crew for a joint U.S./Soviet Union mission.



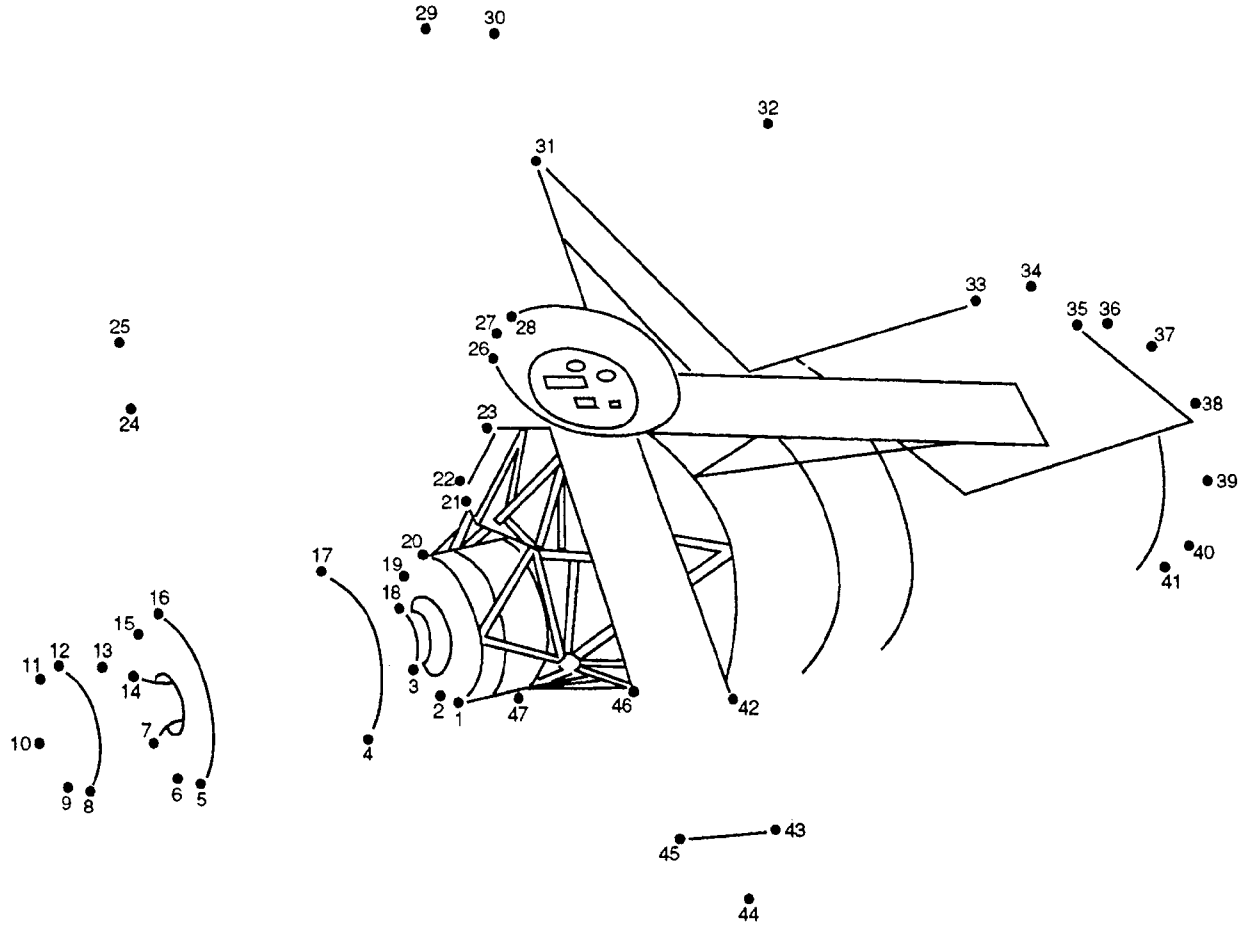
McDonnell Douglas F-15 — Eagle

The versatile, all-weather Eagle was introduced in 1970. The Eagle has a top speed of more than 1,650 miles per hour and carries eight Sidewinder and Sparrow missiles in addition to its 20-mm cannon. Pilots of an earlier day spoke of forcing their birds (planes) into a vertical climb; they were exaggerating. The F-86 Sabre could achieve perhaps a 45-degree angle; the F-4 Phantom about 70 degrees. However, the Eagle could stand on its tail and rocket straight up into the sky, accelerating to supersonic speed as it went. It could climb to 60,000 feet — more that 11 miles up — in two minutes.



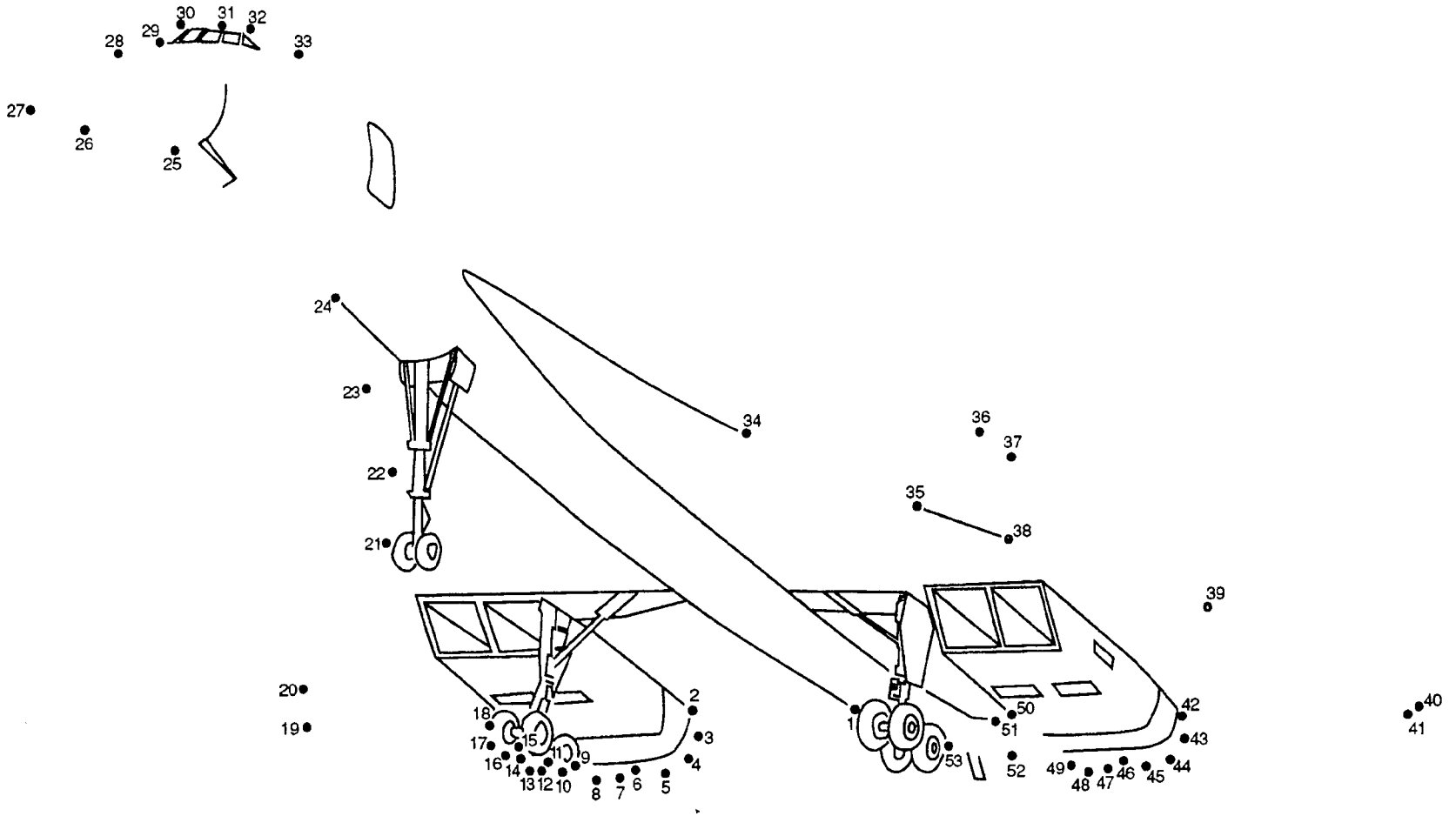
Skylab

Skylab was America's and the world's first space station. It was launched May 14, 1973. Three different crews of three men each flew missions to Skylab. The final mission lasted 84 days. On July 11, 1979, Skylab re-entered the Earth's atmosphere and was destroyed.



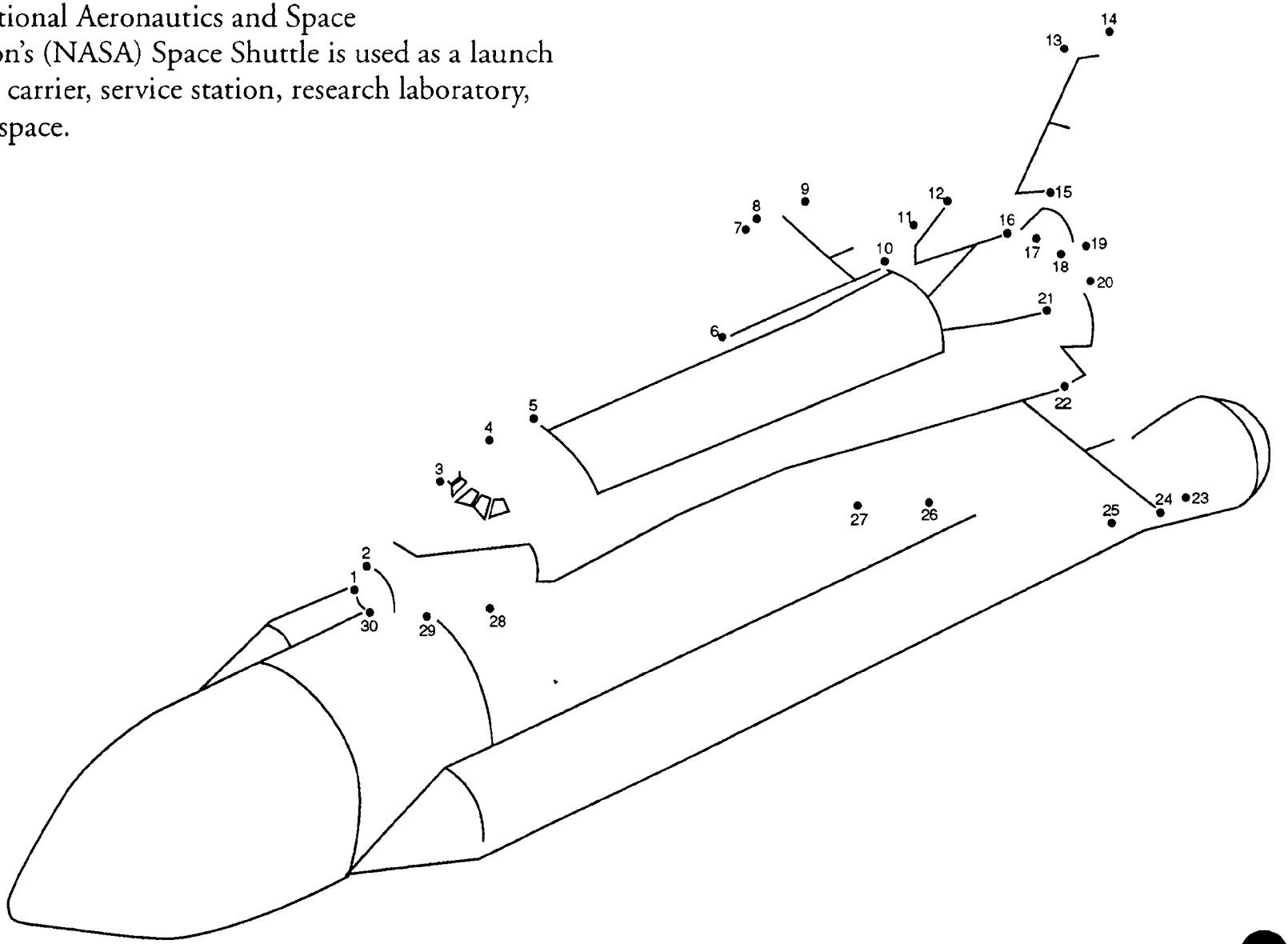
Concorde

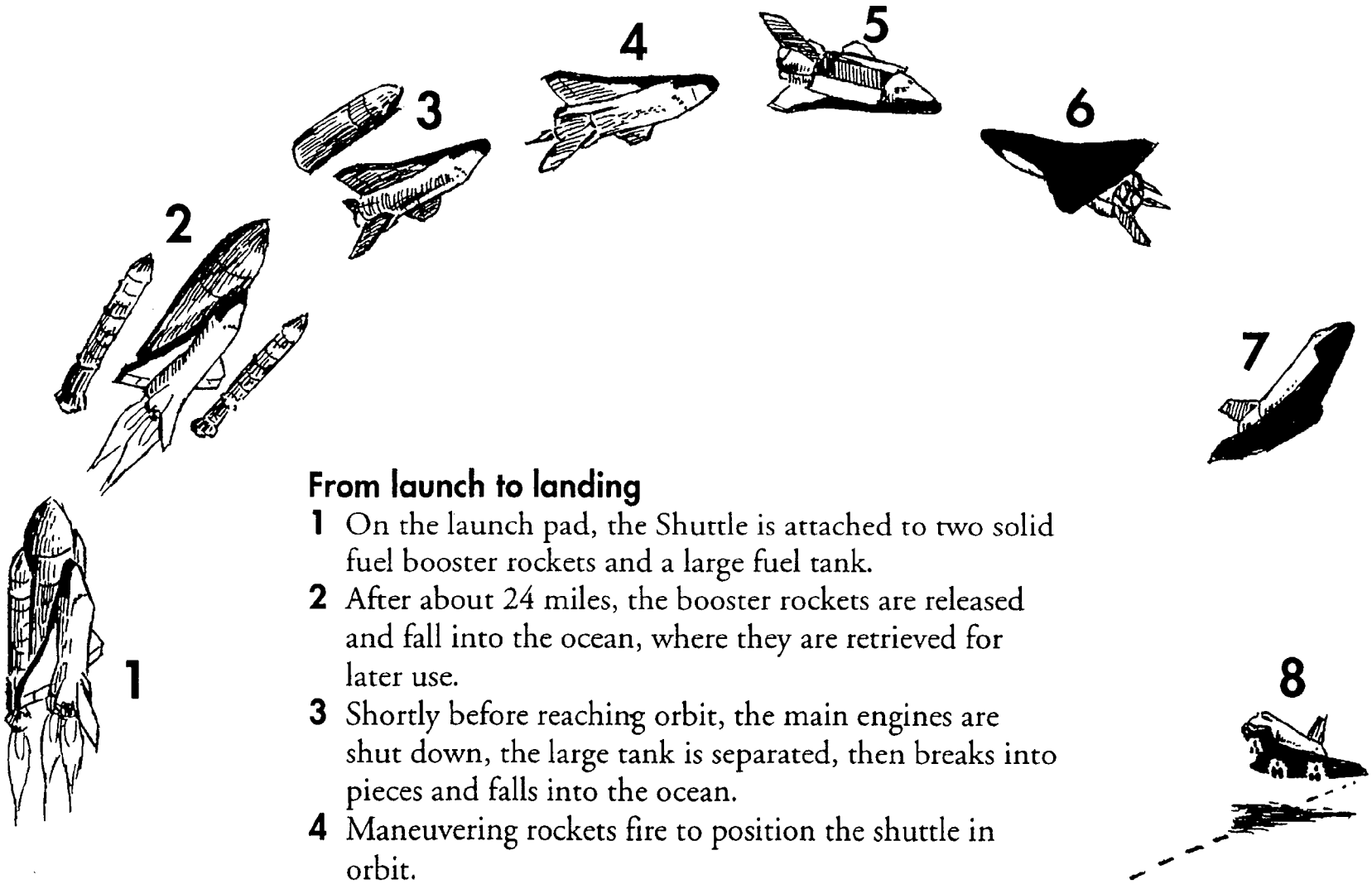
First put into service in 1976, the Concorde cruises at twice the speed of sound and has a range of 3,050 miles. 100 passengers are seated inside the Concorde's slim fuselage where they can see the plane's speed displayed on small screens called Machmeters.



Space Shuttle System

The Space Shuttle System consists of the winged orbiter spacecraft and three propulsion elements — two solid rocket boosters and an external fuel tank. First flown in 1981, the National Aeronautics and Space Administration's (NASA) Space Shuttle is used as a launch vehicle, cargo carrier, service station, research laboratory, and home in space.





From launch to landing

1 On the launch pad, the Shuttle is attached to two solid fuel booster rockets and a large fuel tank.

2 After about 24 miles, the booster rockets are released and fall into the ocean, where they are retrieved for later use.

3 Shortly before reaching orbit, the main engines are shut down, the large tank is separated, then breaks into pieces and falls into the ocean.

4 Maneuvering rockets fire to position the shuttle in orbit.

5 The cargo bay doors open and the crew performs its mission.

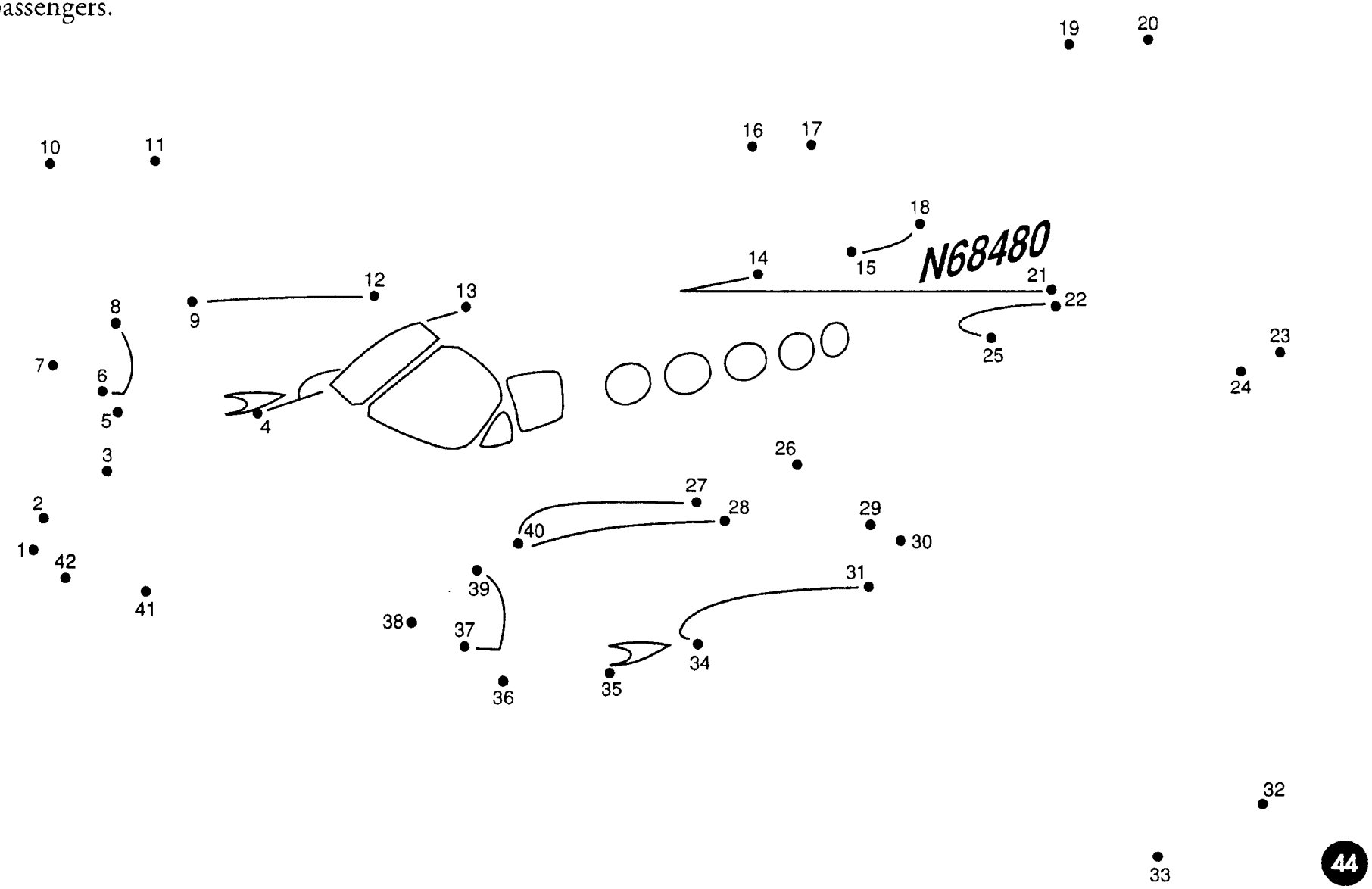
6 The bay doors close and the shuttle leaves orbit with the help of maneuvering rockets.

7 It reenters the atmosphere.

8 It lands on a runway like an airplane.

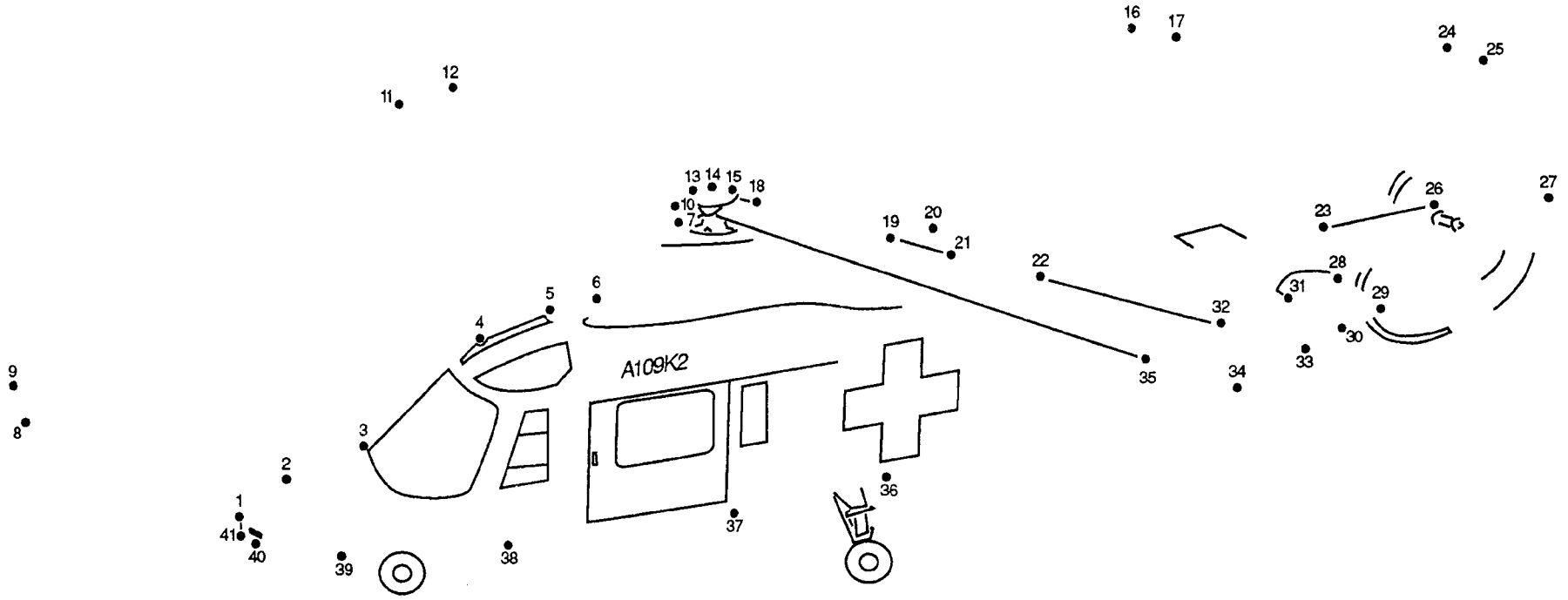
Conquest I

The Conquest I was one of the first turboprop aircraft built for business aviation (a company owned aircraft). It was built between 1981 and 1986. It cruises at 236 miles per hour with a range of 1,400 miles, and carries up to 8 passengers.



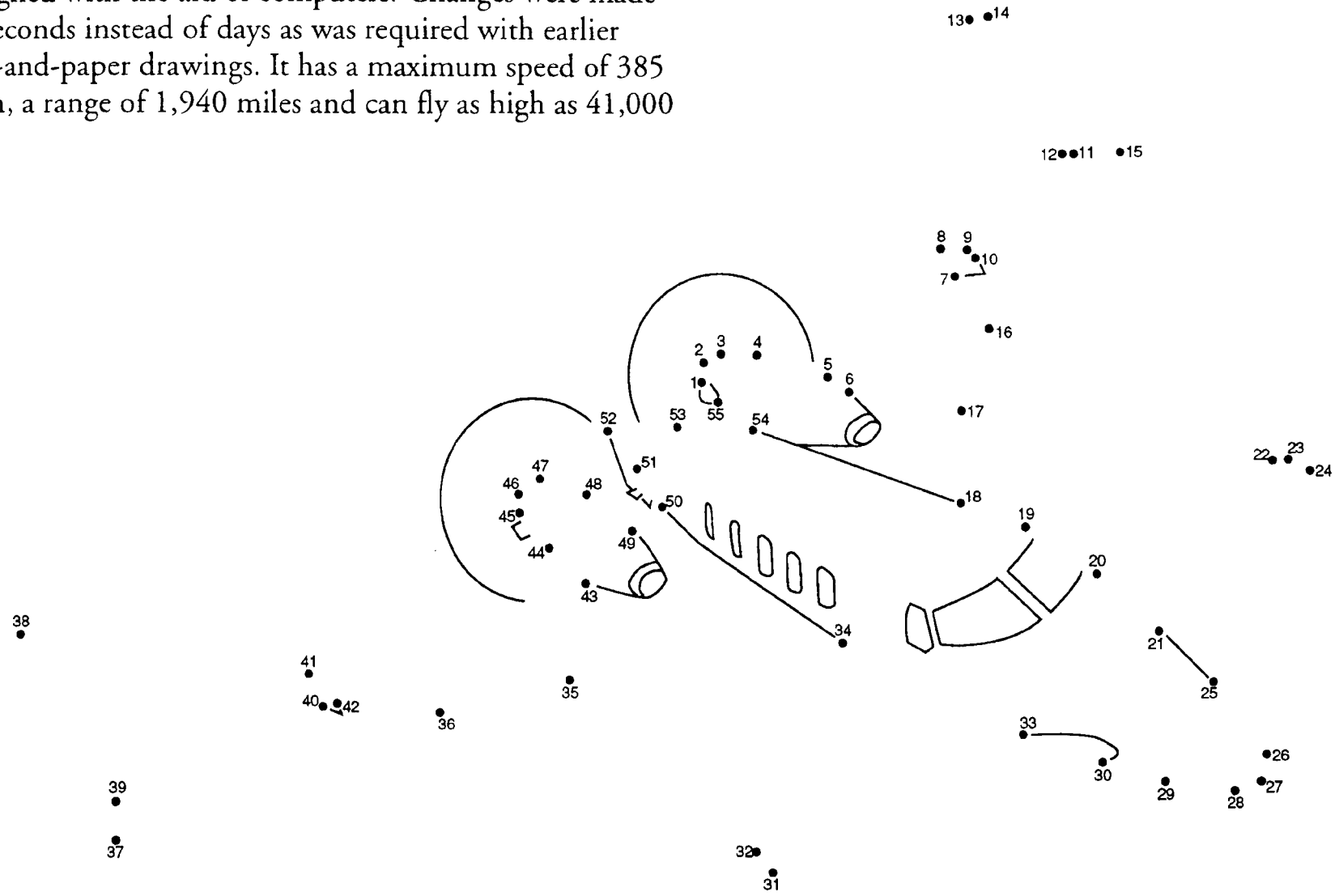
Augusta Model 109 Twin Engine Helicopter

Shown with Swiss Air Rescue markings, this helicopter is normally used as a corporate transport and for transporting medical patients.



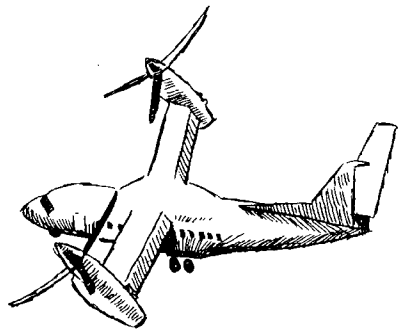
Starship

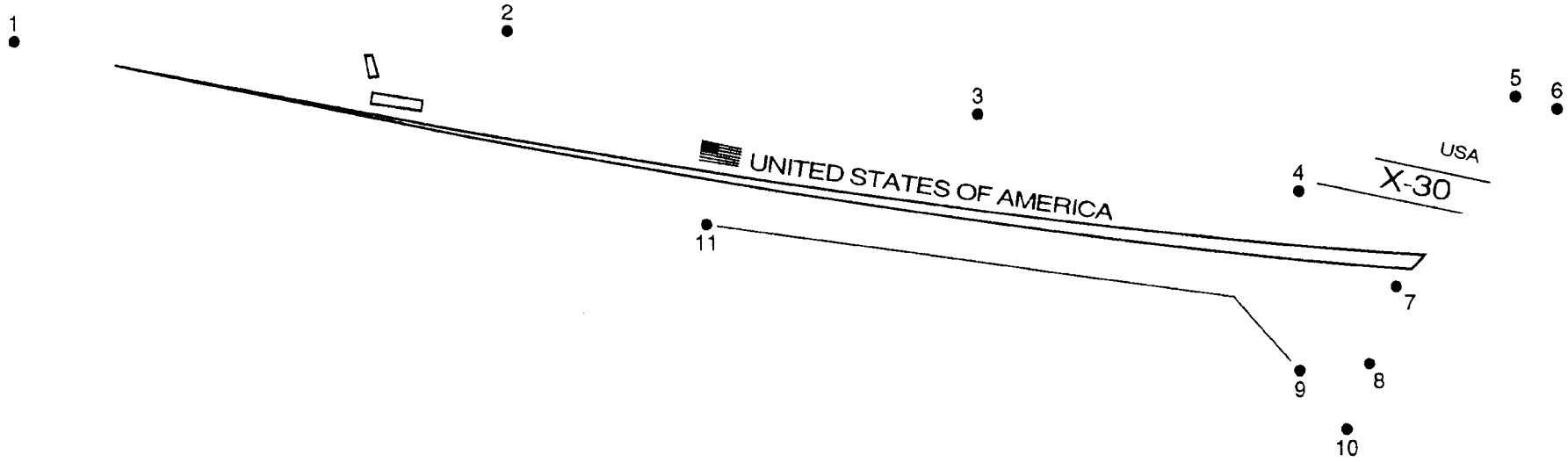
Starship 1 is the first business aircraft to be totally designed with the aid of computers. Changes were made in seconds instead of days as was required with earlier pen-and-paper drawings. It has a maximum speed of 385 mph, a range of 1,940 miles and can fly as high as 41,000 feet.



NASA Tiltrotor Transport Aircraft

An artist's concept of a Tiltrotor Transport Aircraft, capable of helicopter-like takeoffs by tilting the rotors upward (see insert). In level flight the Tiltrotor aircraft is expected to reach speeds of over 300 miles per hour.





X-30 National Aero-Space Plane

This is an artist's concept of the X-30. It would be able to take off, climb into an orbit around Earth (flying eight times faster than today's aircraft), then return for a runway landing.

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