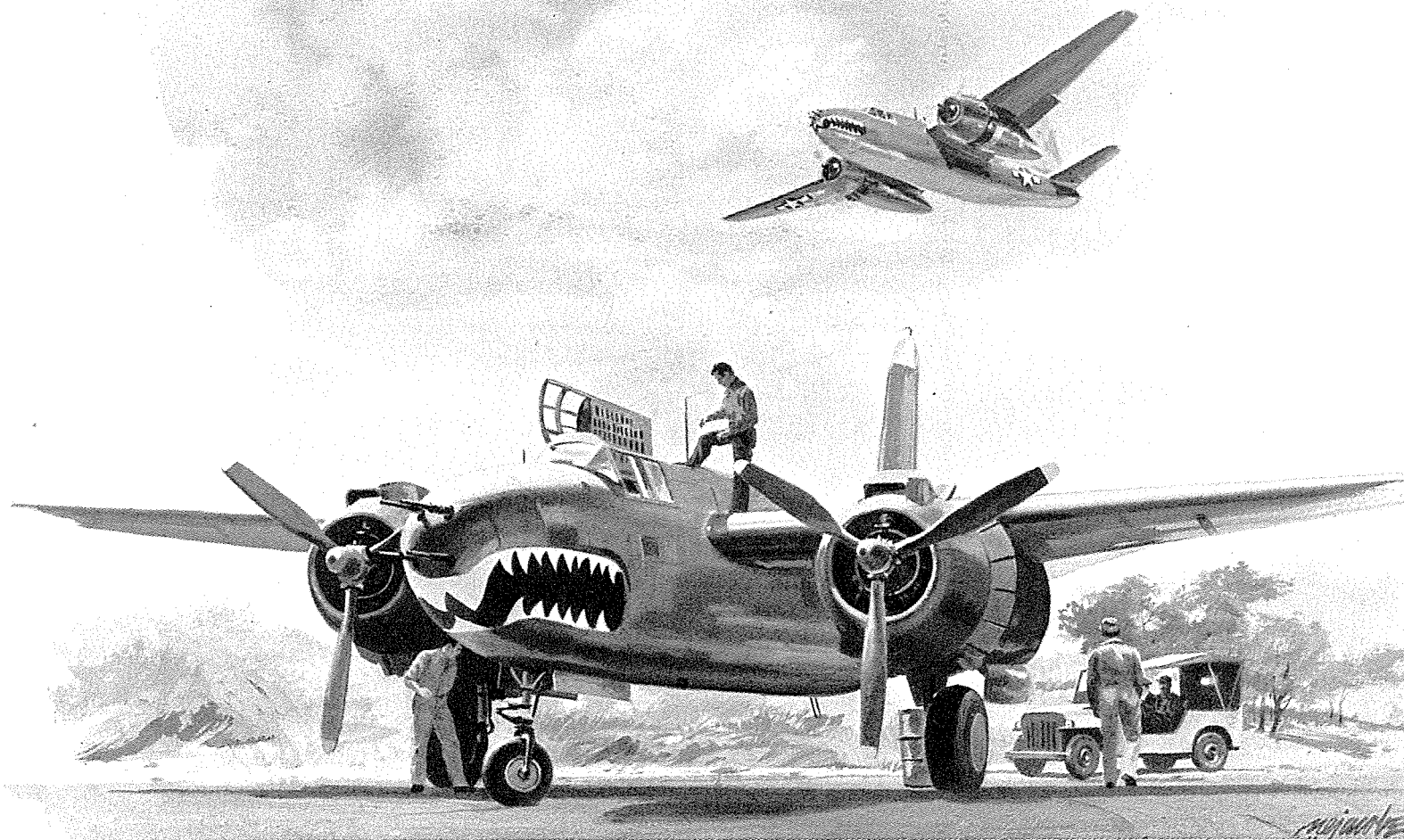




The Douglas DB-7/A-20 Boston/Havoc

by Robert E. Williams

(All photos courtesy of McDonnell Douglas except noted)

By the mid-1930s American business and industry were experiencing a comeback. The worst of the Depression, which started in 1929, was over. Business was picking up and new jobs were being created. Prices and wages were still low, though. A Palm Beach suit at the best men's store in Santa Monica cost \$16.95 and a loaf of bread cost a dime at the neighborhood grocery.

Over in Europe war clouds were gathering. The Spanish Civil War was in progress, providing a testing ground for the perfection of weapons and tactics later used in World War II. And, although American citizens volunteered to fight in Spain as mercenary soldiers and pilots, the United States was adhering to a strict isolationist policy.

Due to a large backlog of orders booked for DC-2s and DC-3s by the world's airlines, the Douglas Aircraft Company was doing much better than average for the industry. The company was also doing a healthy business in military aircraft.

During 1936 the Douglas Santa Monica plant booked orders for 133 B-18 medium bombers, 139 TBD-1 *Devastator* torpedo planes, and 18 C-33 transports (military version of the DC-2), while El Segundo Division sales included 52 BT-1 bombers and 131 A-17 attack aircraft. These were impressive figures for 1936, and with deliveries due the following year, the production lines were humming.

Maintaining full production lines required new orders, which in turn required an active research and development team for developing new aircraft and refining current models. The main factory in Santa Monica was directing its efforts toward designing the DC-4, leaving the military market to the El Segundo group.

The 7B Bomber—Under the leadership of Jack Northrop, general manager and chief engineer, design work was started on a twin-engine multi-mission attack bomber in early 1936. Without firm specifications, but in anticipation of the U.S.

Army Air Corps needs, development progressed through 1936 on company funds.

Called the 7A attack bomber, it was to gross at about 9,500 pounds and carry a crew of three at a top speed of 250 mph. Power was to be provided by two Pratt & Whitney *Wasp Junior* engines of 450 horsepower each.

The 7A was never built.

The USAAC specifications kept changing as a result of intelligence studies of the Spanish and Chinese wars, but were finalized in late 1937. In the fall of that year the Army announced a design competition calling for an aircraft capable of at least a 1,200-mile range, and carrying 1,200 pounds of bombs at over 200 miles per hour.

Around this time Jack Northrop left the company and formed Northrop Aircraft Incorporated in Hawthorne, California. Ed R. Doak became general manager with orders to get the division out of the red. Ed Heinemann was at that time chief engineer.

The 7B was one of the early attempts at a multi-mission aircraft design. A shoulder-wing twin-engine bomber with tricycle landing gear, it featured interchangeable fuselage nose sections for adaptation to various mission requirements. The attack version had two caliber .30 and two caliber .50 guns mounted in the unmanned metal nose section. Four additional caliber .30 machine guns were mounted in two blisters on the sides of the forward fuselage; thus offensive firepower was still available when the greenhouse nose was installed with its bombardier station and bombsight.

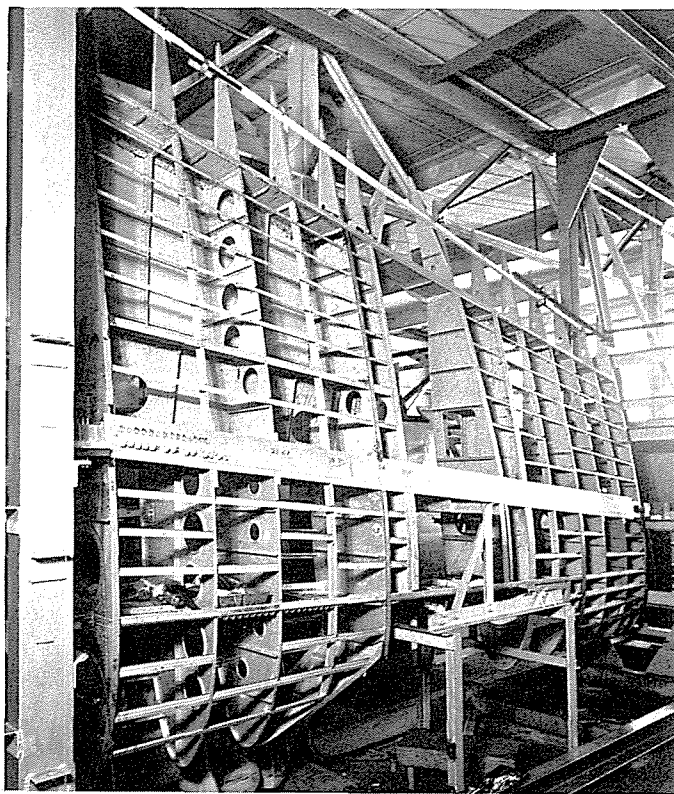
Defensive armament comprised a single, flexible, caliber .30 machine gun in the aft dorsal pop-up birdcage turret, and a similar installation in the belly. Both were operated by the same gunner.

Power for the 7B was increased by the installation of Pratt & Whitney R-1830 engines of 1,100 horsepower each for greater projected performance. Also, internal fuel capacity was increased to 370 U.S. gallons (1,401 liters).

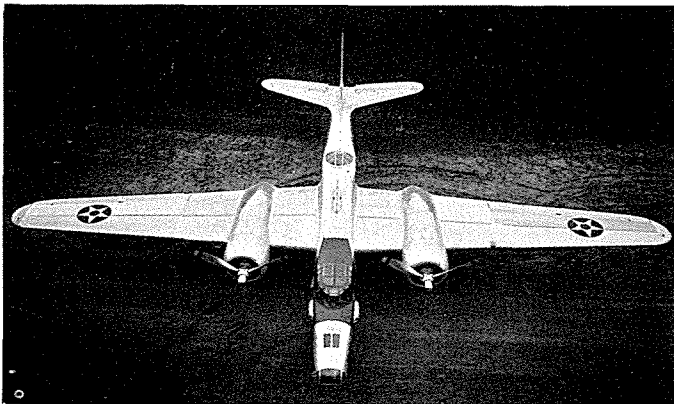
The prototype 7B with these improvements made its first flight on October 26, 1938, piloted by Douglas Senior Vice-President and General Manager Carl Cover. It displayed remarkable speed and maneuverability as well as exceptional handling capabilities.

With war about to erupt in Europe and France's nationalized aviation industry in chaos, the French Purchasing Commission was formed. Armed with unlimited funds and the authority to purchase military aircraft from overseas manufacturers, the commission came to America. While in the United States, members of the commission had to proceed with an air of secrecy due to both the isolationist feelings prevalent in America at that time and the delicate political situation in Europe.

Confidential arrangements had been made, with the approval of President Roosevelt, for members of the commission to examine the Douglas 7B and to observe its flight characteristics. The day before the scheduled demonstration, pilot Johnny Cable put the prototype through its paces, which included shutting down one engine and feathering its propeller to test single-engine performance. After the flight, Ed Heinemann advised him that the single-engine demonstration was not required, and that just a good, simple performance was all he should give them. To this he agreed.



The 7B wing in the assembly jig shows its monospar design. Essentially the same wing was used on the DB-7 and A-20.

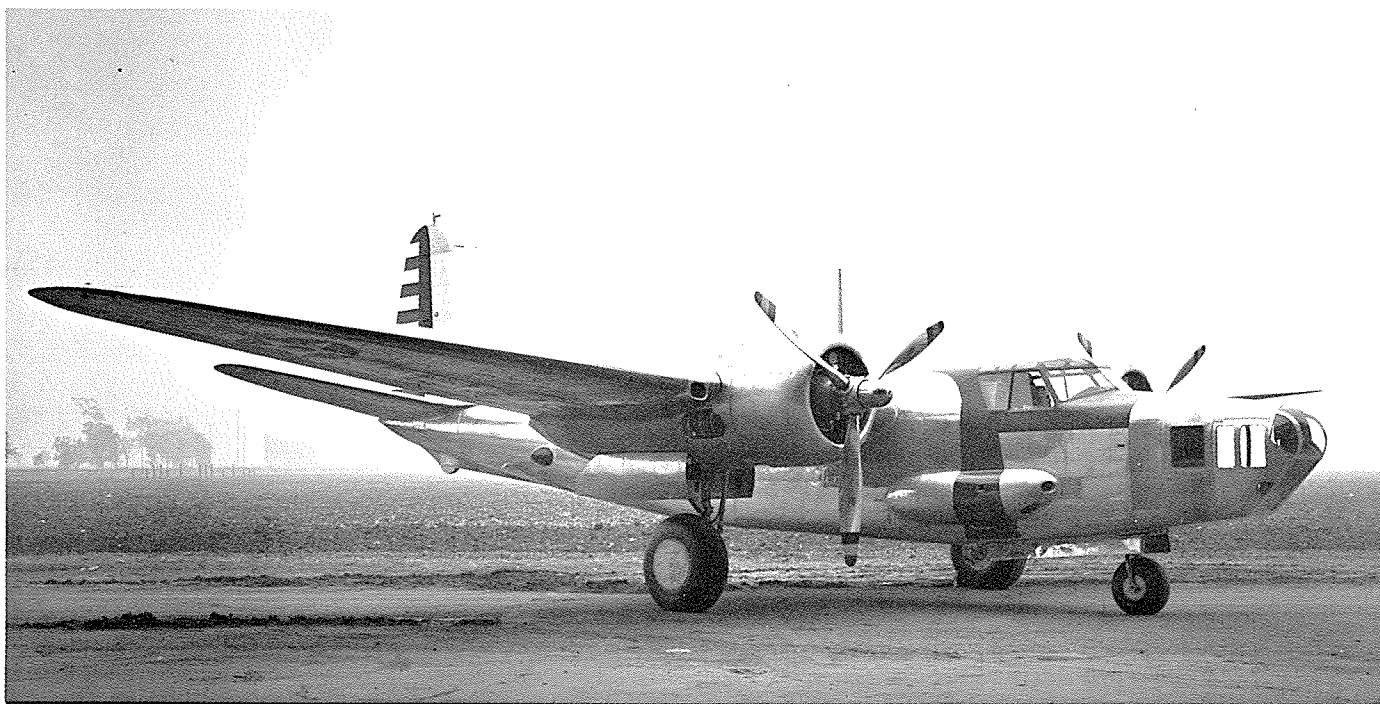


Twelve o'clock high view of the 7B shows its similarity to the A-20. Note the retractable bird-cage dorsal turret.

The group that assembled at Mines Field on the clear morning of January 23, 1939, was to witness an incident far more dramatic than a simple flight demonstration. In addition to the French Purchasing Commission headed by a Colonel Jacquan, Ed Heinemann, Carl Cover, Mike Oliveau, and Donald Douglas were among those in attendance.

Permitted to examine the aircraft closely, Colonel Jacquan's group swarmed over it like kids examining a new car. They crawled in and out, examining it in great detail. Finally, it came time for flight and they were ushered away. With the area cleared, Johnny Cable started the engines, did his preflight check, and taxied out on the runway. He then applied power and the 7B rose gracefully into the sky.

While he was out over the ocean maneuvering for a pass over the field, it was discovered that a member of the commission was missing, and it was feared that he had been left on board.



The completed 7B with its bombardier nose and side gun blisters sits on the ramp at El Segundo prior to first flight.

As the plane was approaching the field for its first pass, Heinemann noted that, contrary to instructions, Cable had feathered the port engine at about 500 feet altitude and 125 miles per hour.

The plane yawed several times and then went into a flat spin. Cable raised the canopy and bailed out, but hit the ground before his chute fully opened. He died instantly. The aircraft crashed on the runway and burst into flames a scant 300 feet from the crowd. However, due to the small amount of fuel carried, the fire was of short duration and minor intensity and was quickly extinguished.

The missing French officer, Captain Chemidlin, was found alive, but badly injured in the rear gunner's station. Rushed to a French hospital in Los Angeles, he eventually recovered.

The news media had a field day with the mishap. Papers across the country picked it up, running banner headlines like: "U.S. SELLING PLANES TO FRANCE." However, the sensationalism soon subsided and, through it all, the French remained interested in the 7B. They were still in dire need of modern attack aircraft, placing an initial order for 100 aircraft on February 13, 1939, despite a degree of opposition expressed by the American public. However, certain design changes were requested by the French to make it more competitive with aircraft of the axis powers.

Chief Engineer Heinemann and Chief Designer Leo Devlin incorporated these changes, along with refinements suggested by Carl Cover, into the 7B design.

When these changes were incorporated, the new aircraft was considerably different from the 7B design. To carry a ton of bombs the fuselage was deepened and narrowed in cross section. The wing, retaining the 7B's geometry, was set lower in the fuselage, giving the design a mid-wing look, and the nacelles were underslung on the wing, extending aft of the trailing edge. This corrected one of the main deficiencies of



Closeup of the 7B with the attack gun nose installed and weapons service panels removed.

the 7B design—poor pilot side vision. (After the first flight of the 7B, Carl Cover reported that all he saw out the side windows was engines.)

The new design was to be powered by two 1,000-hp Pratt & Whitney R-1830-SC3-G air-cooled radial engines with single-speed superchargers.

The changeable nose feature of the 7B was dropped in favor of a fixed, glazed bombardier's station. Four 7.5mm machine guns, two on each side in blisters like those on the 7B, made up offensive armament, with a flexible 7.5mm gun in a dorsal station, and another to fire through a ventral tunnel for defense.

All guns, instruments, bombsights, racks and equipment were to be of French manufacture with metric calibration. Auxiliary controls with limited instrumentation were specified for the rear cockpit.

As conditions in Europe became more critical, Douglas accelerated its efforts to complete engineering of the new

model, designated DB-7 (Douglas Bomber No. 7).

Production of the first DB-7 closely followed release of engineering drawings. By the end of May 1939, all detail drawings were released to the shop and the first fuselage removed from its jig. When its assembly was started a sign which read "DUE OUT 6-1" was placed on the jig as an incentive. Rising to the challenge the shop completed the task seven days early.

Wings came out of jigs, subassemblies came up in double-quick time, and installations piled up one behind the other to make the airplane complete.

The first DB-7 was finished and flown in August 1939, barely six months after authority to proceed was given. In the early morning fog of August 13, DB-7 No. 1 was rolled out onto the ramp of the Douglas hangar at Los Angeles Municipal Airport. Soon it took to the air for its maiden flight with Carl Cover at the controls. After an uneventful 45-minute flight the DB-7 was pronounced "Very Satisfactory." Cover flew it several times the next few days before turning the testing assignment over to Bill Coyle, the Douglas export pilot. Flight Engineer John Wheatly conducted flight tests.

Flight testing proceeded very smoothly. One Douglas test pilot, after a three-hour flight, made these comments:

"Looking over the nose of the plane, we note a runway which is not exactly designed for this modern plane; therefore, every bit of power that can be safely utilized is called for. As the throttles are opened I subconsciously lean forward, not only to feel a part of the ship, but to check the instruments as takeoff is approached. As the 100-mph mark is neared on the airspeed indicator, the ship becomes lighter on

its wheels. The short expanse of runway remaining appears as a fleeting image as propeller controls and throttles are reset to get every bit of available power out of the engines. Immediately after the ship has left the ground and the gear retracting handle reached for, the plane is nosed down to assure more speed. With 3,200 [sic] horsepower in a ship this size there are not many moments, in spite of the high rate of climb, before 180-mph speed is reached.

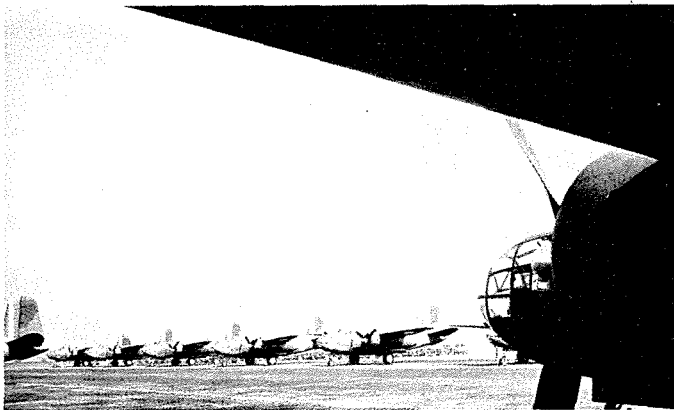
"Even though the ship is designed as an attack bomber, it is nearly as nimble as a modern Pursuit, and the maneuverability for such a high-speed aircraft is remarkable."



DB-7As on the flight line at El Segundo awaiting delivery to the Royal Air Force. Unlike the French DB-7s these were painted in British camouflage colors.

The first DB-7 was completed and flown in August 1939. Fifteen variations were produced before production ceased in 1944.

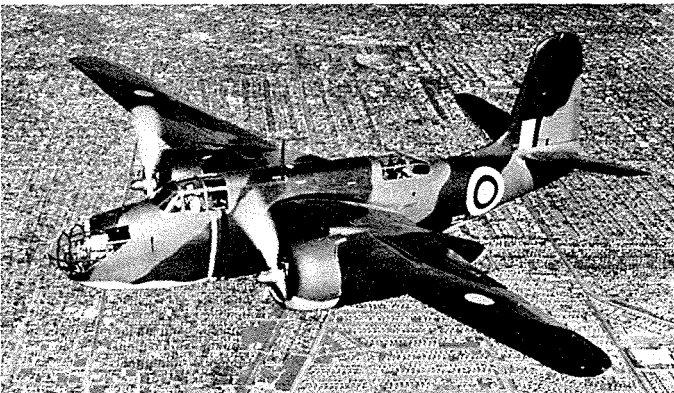




Line of DB-7As for delivery to France. As a quick-fix for engine cooling problems in early production models, holes were cut in the cowlings.



DB-7-131 was the only twin-tail version, produced at the request of the French to improve the field of fire. It was proven impractical by comparison tests with gun cameras, and was later changed back to a single-tail model.



The initial contract for the 100 DB-7 aircraft signed in February 1939 was supplemented by an order for 170 more in October following the outbreak of war.

The first DB-7 was accepted by the French Purchasing Commission in Santa Monica on October 11.

On October 20, 1939, France ordered 100 DB-7As. These were equipped with 1,600-hp Wright R-2600-A5B engines in larger nacelles. Other changes included strengthening the landing gear and attach structure and enlarging the vertical tail surfaces. (When the DB-7A was taken over by the Royal Air Force at the fall of France, a new metal nose was designed by Martin Baker, Limited, to house 12 caliber .303 machine guns and an AI Mark IV radar set for night-fighting duties.)

The 131st DB-7 built for the French was modified with twin fins and rudders, as the French were convinced this would give the gunner a better field of fire. However, when Douglas conducted comparative tests using gun cameras in place of regular guns in both configurations, the idea was proved impractical, as the one blind spot was replaced by two, and this configuration was dropped.

DB-7s became operational with the Armee de l'Air in January of 1940. The first DB-7s were built entirely in El Segundo, whereas the last 170 DB-7s were built in Santa Monica with fuselages produced in El Segundo. These later DB-7s differed from earlier models by having 1,100-hp Pratt & Whitney R-1830-S3C4-G engines with two-speed superchargers. The late production DB-7s had self-sealing tanks and some armorplate for crew protection.

The only model of the DB-7/A-20 series ordered by Britain was the DB-7B, known as *Boston* III. An initial order for 150 on February 20, 1940, was later increased to 300. With revised systems and a plexiglass bombardier's nose lengthened six inches, the DB-7B was powered by 1,600-hp Wright R-2600-A5B radials. They were equipped with British instruments, radio equipment, bomb racks and caliber .303 machine guns. Other changes included self-sealing tanks and

Seen in flight over Los Angeles, circa 1941, is a DB-7B *Boston* II before its delivery to the RAF.

DB-7Bs ready for delivery to the RAF who took over delivery of French DB-7s after the fall of France.





A highly polished A-20A seen in flight over Southern California.

armor for crew protection, and fuel capacity increased from 205 U.S. gallons to 394 gallons. Deliveries of DB-7Bs began in the spring of 1941. A total of 781 DB-7Bs was built, 240 of which were built by Boeing. Four hundred and eighty were ordered as DB-73s by France but were completed as DB-7Bs after the fall of France.

Forty-eight DB-7Cs were ordered by the Netherlands government-in-exile for use in the East Indies. The DB-7Cs and DB-7Bs had similar airframes, and the DB-7Cs were to have interchangeable noses like the 7B, with four 20mm cannon in the metal attack nose. Also specified were automatic life rafts and special racks for torpedo dropping. Only about half of the DB-7Cs (all with glazed noses) were delivered before Java was occupied by the Japanese. The remainder went to the Lend-Lease pool.

A-20 Havoc—The A-20, the USAAF designation for the DB-7, was one of the few fighting planes fully developed before being sold to our armed forces. The United States Army Air Force placed an initial order on June 30, 1939, for 63 A-20s with 1,700-hp Wright R-2600-7 engines. However, due to their cooling difficulties and supercharger problems, only one was equipped with these engines. This aircraft was later modified as the XP-70. All A-20s were later modified; 60 became P-70s and three were converted to F-3s.

The A-20 featured an airframe redesigned for increased strength, a longer nose with 25 percent more plexiglass area and self-sealing tanks with a capacity of 394 U.S. gallons like the DB-7B.

Armament consisted of four forward-firing, caliber .30 machine guns, mounted two each in two side blisters; twin flexible caliber .30 machine guns in a dorsal station; and one

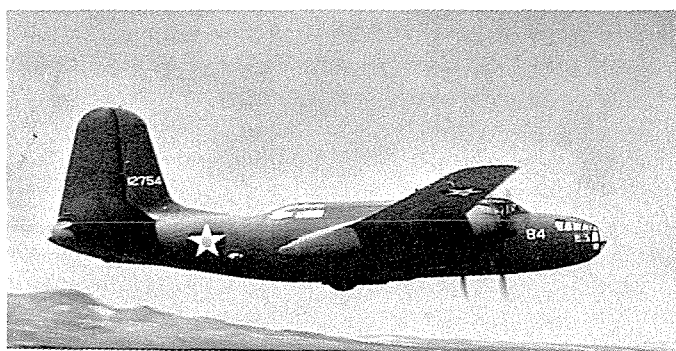
caliber .30 gun firing through a ventral tunnel.

One hundred, forty-three A-20As with 1,600-hp unsupercharged Wright R-2600-11 engines (the only variation from the A-20) were ordered for the USAAF in mid-1939. They were first operated by the 3rd Bombardment Group, stationed at Savannah, Georgia.

One A-20A was modified in July 1941 to test three power-operated, remotely controlled turrets. This, the only XA-20B, was not entirely successful and further development was dropped.

The A-20B was ordered in October 1940 and built at the new Long Beach plant. The 999 aircraft (s/n 41-2671–41-3669) had reshaped, glazed noses, and horizontal instead of vertical bomb racks in modified bomb bays which could be equipped with 200 U.S. gallon auxiliary fuel tanks for ferrying purposes. It carried two forward-firing caliber .50 machine guns, on each side of the forward fuselage. Another caliber

Seen on a low-level bombing run is an A-20B, one of 999 built in the Douglas Long Beach, California plant.





Viewed from 11 o'clock high is an A-20B in U.S. markings.



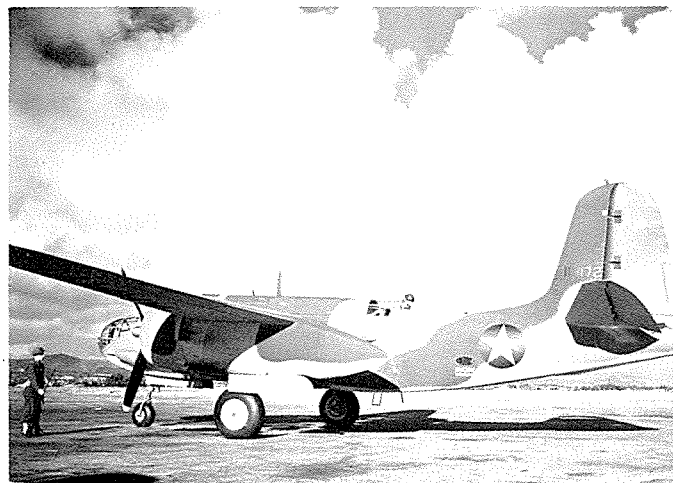
An A-20G-1 produced prior to rear turret installation effectivity. Note edge of camouflage netting which covered the wartime Santa Monica Douglas plant.

.50 flexible gun in the dorsal area and one caliber .30 gun in the ventral tunnel provided defensive armament. However, many A-20Bs were modified in the field by covering the plexiglass noses with metal to house four to six additional forward-firing caliber .50 guns.

In 1941 and 1942, 808 A-20C models were built in the Douglas Santa Monica plant as part of the Lend-Lease program. They were to be delivered to the Royal Air Force and the Soviet Air Force, but after December 7, 1941, many were taken over by the USAAF to establish training groups in the United States. They were similar to the DB-7s built for the RAF but had U.S. caliber .30 guns and increased fuel capacity.

Another 140 A-20Cs (s/n 41-19589-41-19728) were produced by Boeing under Lend-Lease contract.

The A-20D, a projected lightweight aircraft with increased fuel capacity was never produced. And the A-20E designator was applied to 17 A-20As modified to incorporate minor changes.



In 1941 and 1942, 808 A-20Cs were built at the Douglas Santa Monica factory for Lend-Lease to the RAF and Soviet Air Force. But after December 7, 1941, many were taken over by the USAAF.

The XA-20F was a single A-20A modified to test two General Electric remotely controlled turrets similar to those on the A-26.

More A-20Gs were produced than any other version of the A-20 series. A total of 2,850 was built in Santa Monica in several blocks, each with minor changes. The A-20G had a metal nose housing a battery of forward-firing guns. Starting with the 751st aircraft in the series, a Martin turret with twin caliber .50 guns was installed in the dorsal position, and a caliber .50 gun replaced the caliber .30 gun in the ventral tunnel. Features common to all A-20Gs were R-2600-23 engines, the absence of controls in the rear gunner's compartment, the use of carburetor deicing equipment and thicker armorplate.

The A-20H was basically an A-20G powered with 1,700-hp Wright R-2600-29 engines. A total of 412 A-20H models was built, all in Santa Monica.

Although the A-20J had an airframe similar to that of the

A-20G, an entirely new nose of one-piece molded plexiglass distinguished the A-20J. Housing special equipment for accurate bombing, the A-20Js were used as formation leaders to mark the targets on bombing runs. Four hundred and fifty of these were manufactured in the Santa Monica factory.

The last production model of the A-20 series was the A-20K. Similar to the A-20J, but with an A-20H airframe and powerplants, 413 were produced at Santa Monica. Of these, 90 went to the RAF as *Boston* Vs. The last A-20K (s/n 44-825) was delivered on September 20, 1944, signaling the end of production for the series. A total of 7,478 A-20 series aircraft including the 7B and DB-7 by Douglas and Boeing was produced over a five-year period.

Several special-mission modifications made on various production A-20s resulted in some odd designations.

The Royal Air Force *Havoc I* Pandora was a modification that permitted the aircraft to carry a long aerial mine. This explosive device was to be lowered on a 2,000-foot cable and be detonated in the midst of an enemy bomber formation. Operationally it proved disappointing, and the 20 aircraft were changed back to their original configuration.

The RAF *Havoc I* Turbinlite name applied to 21 DB-7 night fighters equipped with 2,700-million candlepower Helmore GEC searchlights in place of nose armament. Using their AI Mark IV radar sets, they located enemy bombers, then illuminated them for the fighters. The Turbinlites became obsolete with the introduction of radar-equipped fighters. (The *Havoc II* Turbinlite designator applied to 39 DB-7A aircraft similarly equipped.)

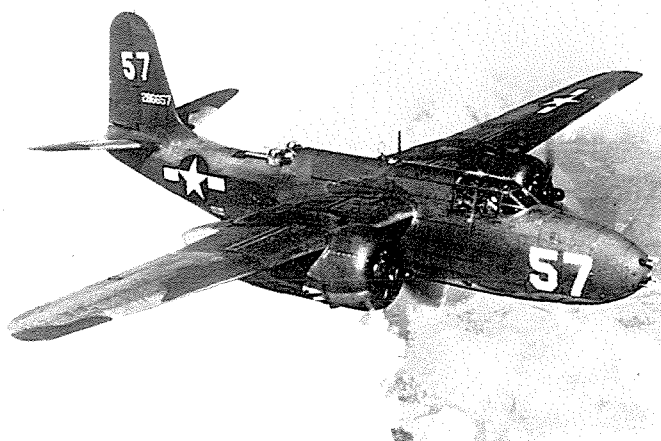
The XF-3, YF-3, and F-3A were modified production A-20s used as photo-reconnaissance aircraft. Cameras replaced guns in the nose, and more cameras plus photo-flash bombs were carried in the bomb bay. Fifty-one A-20s were converted to photo-reconnaissance aircraft, and most were modified A-20Js and A-20Ks.

In October 1940, 1,489 O-53 heavy observation aircraft were ordered. A variation of the A-20, these were to have been produced in the Long Beach plant. However, the "heavy observation" role was discontinued in favor of light-weight artillery-spotting aircraft, and the contract was canceled before a single example was built.

The XP-70, P-70, P-70A-1, P-70A-2, P-70B-1 and P-70B-2 were all night-fighter modifications of various A-20s. Basically, defensive armament was replaced by concentrated forward-firing heavy armament and radar. The P-70B-2 was a night-fighter-trainer version. A total of 329 A-20 aircraft was modified to P-70s, of which 105 were P-70B-2 trainers.

Finally, the BD-1 (BuNo 4251) and BD-2 (BuNos 7035-7042) were modifications of the one XF-3 and eight A-20Bs transferred to the Navy. With armament removed, they were used for target towing and general utility duties.

The DB-7/A-20 in Service—DB-7 deliveries to the French began in late 1939 being shipped to Casablanca disassembled in crates. There they were reassembled, flight tested and turned over to the Armee de l'Aire. Only three Groupes de Bombardement (GB) were fully equipped by the time of the German invasion of France. GBI/19, and II/61 flew 70 missions against troops, panzer concentrations, supply depots and road bridges before being evacuated to North Africa



The A-20G was produced in the greatest numbers (2,850). Starting with the 751st aircraft in the series a Martin turret housing two caliber .50 machine guns replaced the single hand-held gun in the dorsal position.

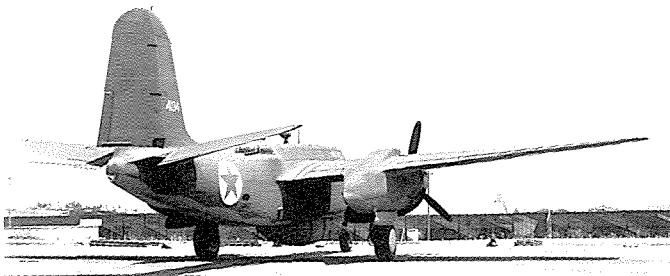
shortly before France surrendered. Regrouping in Morocco and Algeria, the surviving DB-7s were distributed among GBI/32, I/19, and II/61.

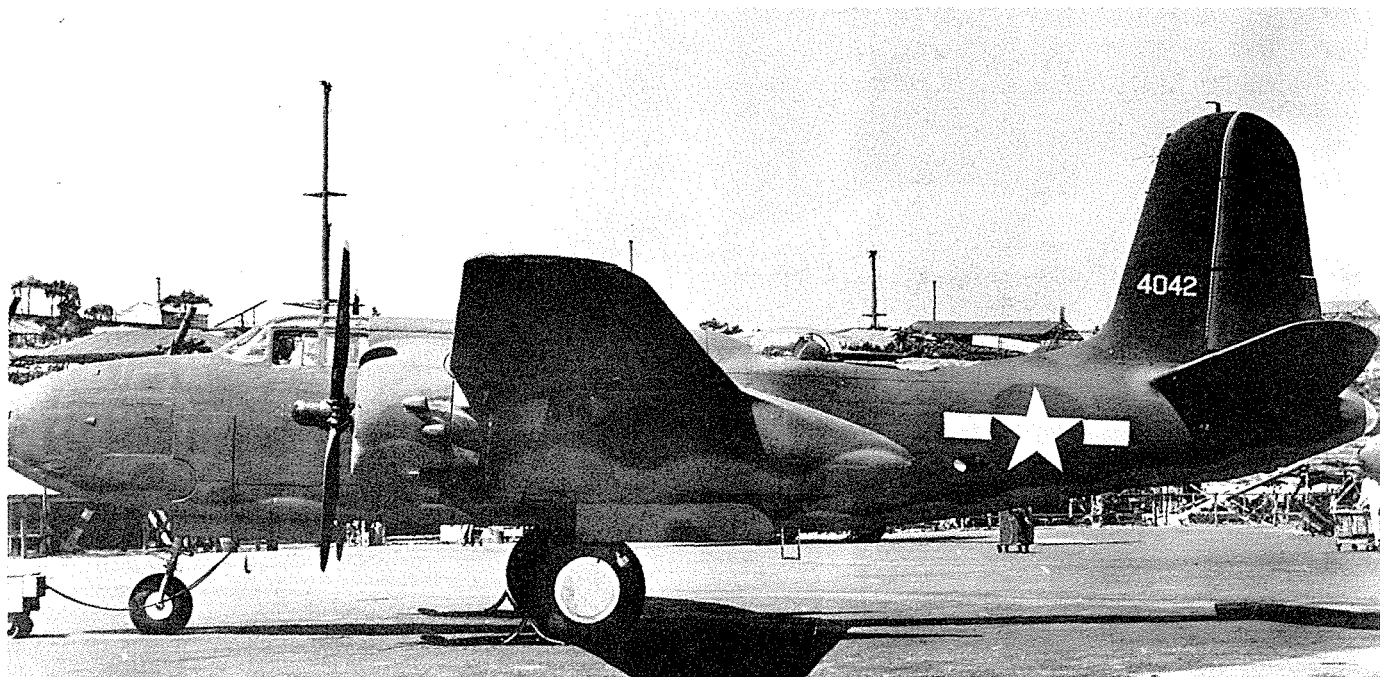
To prevent the uncommitted French from attacking Allied landing forces during November 1942, U.S. Navy carrier-based fighters caught the DB-7s of GBI/32 on the ground and inflicted severe losses to the unit. Shortly after, the French forces joined the Allies, and their DB-7s were used for training and ancillary duties. From October 1944 to April 1945, GBI/34 and I/31 operated a few DB-7s against the German fortifications along the Atlantic coast of France.

Operating as No. 342 Squadron under RAF control, the Free French unit GBI/20 *Lorraine* made a more significant contribution to the Allied war effort. After operating Bristol *Blenheim* IVs in the western desert, the unit was reformed at West Raynham, Norwalk, in April 1943. Equipped successively with *Boston* IIAs and IVs, *Lorraine* was active in bombing operations against various targets in occupied Europe.

Of the 781 *Boston* IIIs assigned British serial numbers in RAF service, 480 had been initially ordered by France. The first of these aircraft to see combat were *Havoc I* Intruders of No. 23 Squadron. During the winter of 1940-41, this unit distinguished itself flying night interdiction missions over France. Later it was assisted in these missions by Canadian Squadrons No. 418 and No. 605 operating the longer-range

A-20K, s/n 44-134, with the Martin power turret for which installation required widening the upper fuselage six inches in the turret area. The tub-like bulge under the bomb bay was a jettisonable 310-gallon fuel tank. Note the Russian insignia.





The metal-nosed A-20H of 1944 with 1,700-hp Wright R-2600-29 engines had a speed of 322 mph.

Boston III Intruders.

"Intruder" hardly seems an appropriate word to describe the thrill and excitement of this weird form of aerial combat, brought to life in the words of a 26-year-old RAF squadron leader as told to Carl Olsson, a well-known (WWII era) British feature writer:

"We have our successes, quite a lot of them, but for certain reasons they do not always figure in the totals of enemy raiders destroyed on any given night.

"For the most part our job is very much hunting for a needle in a haystack. But occasionally we get lots of luck—as I did one night.

"The moon was just setting as I took off and the weather report indicated low clouds over France . . . not a promising night for a hunt."

Later, arriving over an enemy aerodrome: "I began to circle. Almost immediately there was a staccato of flickering from the darkness below, and the next moment tracers began to curve past my windows. I let go some flares as I made for the far end of the 'drome to turn and run up. Four searchlights came up. One waved right across my machine, lighting up everything in my 'office' in a glare as bright as daylight.

"Then I lost it. But I was on the turn now. In the light of my descending flares I saw quivering shadow shapes below, which were hangars and aerodrome buildings. And we were in a straight run up. Putting the nose down I laid a stick of bombs right across them.

"I was miles away by the time I had pulled up out of the dive and got height again, but turning I saw a whole set of leaping fires with the black shapes of the buildings in their midst. And in the very center of it all, bang above the middle of the 'drome, the ground defences were filling the whole empty sky with flak."

Now, about 3 A.M. they had moved on to the next German

aerodrome just as bombers were returning from raids on England. Eight or nine bombers were in a cluster over the field trying frantically to signal for clearance to land.

He continues: "But I had no time to ponder much about it (the snarled-up traffic). This was a jam, an unbelievable jam, but I went in. Picking out one which I glimpsed for a moment, I let him have a burst. I saw my tracers go slap into his motors, and the next second they threw out a shower of sparks. Closing now to point-blank range I let him have another. And suddenly the bomber blew up with an enormous orange flash, and before it dispersed in fragments, I recognised the bomber as an He.111.

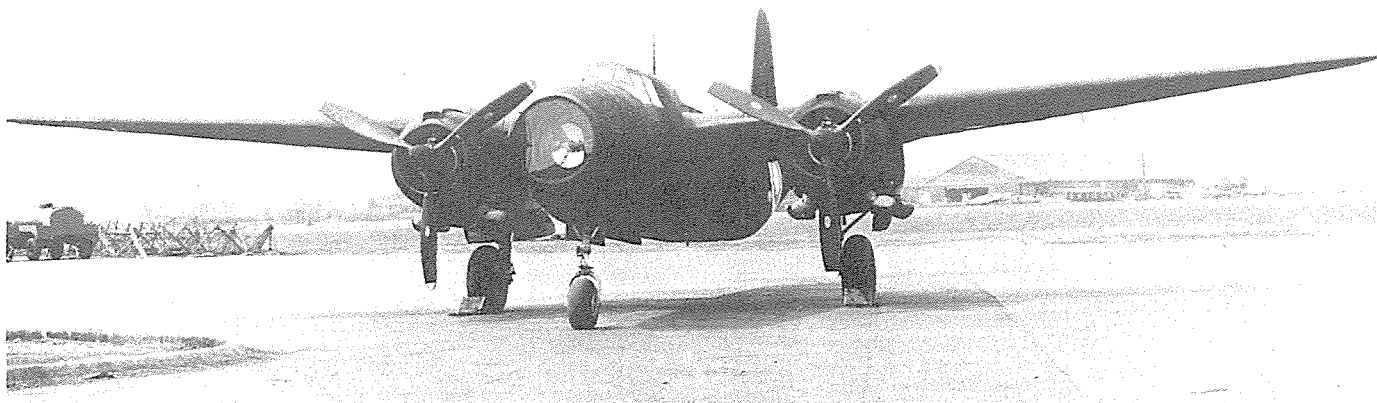
"Turning sharply and coming out of a steep dive I saw the flare path lit up. They must have been desperate to get some bomber down, fighter aloft or not. I kept on with the dive, the lit flare path banking up in front of my nose like nighttime Piccadilly in peacetime.

"A sitter. I dropped 18 bombs nearly along its length and zoomed up again into the clouds. Emerging again in a shallow dive I saw the wreck of the first bomber I hit ablaze at the edge of a wood near the aerodrome. It had already set a lot of trees alight.

"In the glare of the flames I could clearly see vehicles moving and men running. Apart from seeing one of their bombers destroyed at the moment of landing, those bombs on the flare path must have shaken them up a lot.

"So I came down and gave them some more with all the guns we could bring to bear. 'Flak' was coming up now from the ground defences, but bursting far above me and very wide. I cruised around that 'drome once more, but there was no sign of the other bombers, and the ground staff was still pumping up 'flak.' It was quite a party.

"In turning for home with bombs and ammunition nearly gone, I saw the fire started by the destroyed bomber had spread to buildings hidden in the wood. From many miles away it was still visible and still growing. I'll bet it burned as long as most fires in Birmingham that night."



The RAF Havoc I Turbinlite night fighters were equipped with 2,700 million candlepower Helmore/GEC searchlights and AI Mark IV radar sets.
(Author's Collection)



Closeup of a Havoc I Turbinlite nose modification. Twenty Havoc Is (converted French DB-7s) were supplemented by 39 Havoc II Turbinlite models converted from French DB-7As.
(Author's Collection)

The first RAF unit to fly *Bostons* in a light bombing role was No. 88 Squadron, which received its *Boston* IIIs in October 1941. Combat missions began in February 1942 with No. 226 Squadron. Bombing operations with *Boston* IIIs were expanded in 1942 with the addition of No. 107 Squadron, and again in 1943 with No. 342 Free French Squadron. Missions flown included a number of spectacular low-level bombings, like the attack against the Malford Works at Poissy on March 8, 1942, plus many daylight "circus" operations, and smoke-laying sorties off Normandy in support of the D-Day invasion. The *Boston* IIIs, IIIAs and IVs of Squadrons No. 88 and No. 342 saw combat until April 1945, when the squadrons were disbanded.

In the western desert and Mediterranean area, *Bostons* were flown by four squadrons of the RAF and two squadrons of the South African Air Force (SAAF). The SAAF, which began operations in this area before the arrival of the RAF, gained some notoriety for its "Boston Tea Party" raids on enemy airfields in Africa.

Operating out of Tunisia beginning in April 1943, four RAF squadrons flew *Boston* IIIs, IIIAs, and IVs in support of Allied operations in Tunisia, Sicily and Italy. All four squad-

rons operated their *Bostons* until early 1946, when they either disbanded or were re-equipped with *Mosquitos*.

In the Pacific theater, No. 22 Squadron of the Royal Australian Air Force (RAAF) operated 69 DB-7A/A-20 aircraft from early 1942 through October 1944. Also known as *Bostons* to the RAAF, these aircraft were of varied origins. Some were from the USAAF, some were from the Netherlands Marine Luchtvaartdienst, and others were from the French-purchased DB-7s taken over by the British.

In service with No. 22 Squadron the *Boston* IIIs, A-20s and A-20Cs all had their glazed noses covered over, housing a battery of four fixed, forward-firing caliber .50 guns supplementing the normal weapons installations. Included in the field modifications were single caliber .30 guns that fired tracer ammunition. Installed in the tail and set to fire aft by remote control, they were a deterrent to fighter attack from the rear.

Operations began from Port Moresby in November 1942, and the units distinguished themselves during the two years of combat operations. By November 1944, No. 22 Squadron was operating *Bostons* from Morotai in the Halmaher Islands. Scheduled to re-equip with Australian-built *Beaufighter* MK-21s, the squadron suffered its worst loss when 13 of its *Bostons* were destroyed on the ground by enemy aircraft just prior to the changeover.

The Netherlands government-in-exile had ordered 48 DB-7Cs for use in the East Indies. The first 20 of these were in their crates on the docks at Tjilatjap Harbor, Java, when the Japanese invasion of that island began. Only one of the aircraft was assembled in time to help in the desperate defense of Java. The others were captured by the invaders. Though all were damaged, one was repaired and later test-flown at Tachikawa by the Japanese Air Technical Intelligence Group.

After the undelivered Netherlands DB-7Cs were taken over by the USAAF, most of them went to Russia under Lend-Lease while the remainder were delivered to Australia and

assigned to No. 22 Squadron.

Although the Russians received more DB-7/A-20-type aircraft (3,600) than any other nation, little is known of their combat operations.

The last foreign country to receive the A-20 type was Brazil. Brazil's 31 ex-USAAF *Havocs* saw comparatively little service. However, one A-20 is still on display at Quaratingueta Air Base, Sao Paulo.

Nearly a year after the French DB-7s entered combat against the German invaders, the USAAF began operating the A-20A. The 3rd Bombardment Group (Light) at Savannah, Georgia, was the first to receive its aircraft. Deliveries to the 27th Bombardment Group (Light) soon followed.

The 58th Bombardment Squadron at Hickham Field, Hawaii, was equipped with A-20As in 1941. It became the first A-20 unit to see combat, losing two of its aircraft during the Japanese attack on Pearl Harbor, December 7, 1941.

The first USAAF A-20 unit to fly bombing missions in the Pacific was the 89th Bombardment Squadron, 3rd Bombardment Group. It began operations out of Port Moresby in August 1942. It was 1944 before the number of *Havocs* in the southwest Pacific area was made sufficient by the addition of the 312th and 317th Bombardment Groups. Operating out of New Guinea, Leyte, Luzon, and Mindoro were 37 A-20 *Havocs*.

Most bombing operations in the Pacific with A-20s were performed from low level. Not requiring bombardiers for accuracy, most A-20s there were fitted with additional forward-firing machine guns mounted in the faired-over plexiglass noses. These were field modifications and varied considerably in weapons package combinations. The A-20 was an excellent flying gun platform, and its ample nose area could hold a great variety of ordnance limited only by the creative imagination of the American G.I.

The A-20 pilots of Lieutenant General George C. Kenny's Fifth Air Force in the Pacific pioneered the science of skip-bombing. Against Japanese shipping in New Guinea, they came in just low enough to clear the mast, skipped a 500-pound bomb at the water line, zoomed over the doomed ship, and dove on the next. With a degree of luck the enemy was thereby taken out in rows.

By the end of the war all three *Havoc* groups in the Fifth Air Force were equipped with A-20Gs and A-20Hs. Many had their heavy forward-firing armament increased with two clusters of Bazooka-type rocket-launching tubes beneath each wing. These hard-hitting *Havocs* did much to live up to their name during low-level attacks against land and sea targets.

In the European theater, A-20s of the USAAF 47th Bombardment Group had a most significant combat record. Beginning operations at Youks-les-Baines in Algeria on the 13th of December 1942, they fought in the North African campaign before the unit was moved to Malta. Over the next two years the unit flew combat missions with A-20s in Sicily, Italy, Corsica, and France. Returning to Italy in January 1945, the war-weary A-20s were replaced with Douglas A-26 *Invaders*.

Few missions were flown in the European theater by other USAAF units until March 1944, when the 416th Bombardment Group began operations as part of the Ninth Air Force's 97th Combat Bombardment Wing (Light).

Its A-20 *Havocs*, along with those of the 409th and 410th



The 329 P-70s were night-fighter conversions of various A-20 models. Defensive armament was replaced by concentrated forward-firing guns and radar.

began softening up "Festung Europa" (Fortress Europe) in support of the Allied D-Day landings in Normandy. These groups began changing over to A-26s in late 1944, with the 410th being the last to convert to *Invaders*.

The P-70 *Nighthawk*, a night-fighter version of the A-20, had a rather undistinguished career. Used primarily to develop operating procedures and tactics for radar-controlled night interceptions, they were replaced in combat by P-61 night fighters.

The last version of the A-20 to go into service was the F-3 photo reconnaissance model. These aircraft were used by the Second Photographic Mapping Squadron in Alaska in 1942. However, main service did not start until May 1944, when the Ninth Air Force's 155th Photographic Squadron (Night) began operations in the European theater.

The A-20, though not highly publicized by the press for its daily battle prowess, was nonetheless a rugged, honest, dependable machine. Like so many other Douglas-built airplanes, it could be shot to hell and still bring its crew home.

One of the many A-20 stories to come out of WWII was: "An RAF pilot, flying a Douglas *Boston* bomber, was on his way home after plastering a chemical factory in France when a Nazi *Bofors* gun, concealed in a haystack, opened up on him at almost point-blank range. An armor-piercing shell struck the port engine of the *Boston* and split in two. One half of the shell, after wrecking the engine, cracked the main spar on the left wing and left it hanging by its skin. The other half caromed into the pilot's compartment, knocked out the fuel selector valves, shot across the pilot's lap, bounced against the

armor glass, and flew out the window. The pilot managed to keep the plane in the air. Trying to change from one tank to the other, he reached for his selector valves. They came away in his hand.

"With only one engine, and his left wing hanging by its skin, he slid into an emergency landing field on the English coast. The wing was drooping so badly that it almost touched the ground when the *Boston* finally stopped on the field."

One of the many letters received by Douglas from returning combat crews of A-20s and DB-7s stated: "Heaven bless the builders of the *Boston*. Today, our machine, after a successful visit to a French power station working for the Germans, received a direct hit from an antiaircraft artillery shell which exploded in the root of the port wing. The fairing was blown away, the main spar was damaged, and the oil cooler was holed, so the port engine stopped. High-tension cable tore off three feet of the wing and fused on the crankcase. The aircraft flew 199 miles on one engine. My crew joins me in thanking you for such a grand aircraft."

Or, in the words of the British Broadcasting Company: "If the Douglas *Boston* is a fair example of the tools America is sending us, we ought to make a fair job of this war when we get a full set."

On one's chances of survival in the *Boston* an RAF pilot recounted: "Twice I was badly shot up flying *Bostons*, but twice I came back safely.

"The first was on the great marshaling yards at Hazebrouck, France, on April 12, 1942. When we reached the target, more than 100 Focke-Wulf 190s and Messerschmitts were awaiting us about 20,000 feet over the yards. In the small area they were guarding, they outnumbered the *Spitfires* escorting us, and some penetrated the British fighter

screen.

"They dived down to attack from the port beam, and in all made 35 attacks on the *Bostons*. The Germans lost one fighter and we lost one bomber.

"My aircraft was bombed (strafed) 40 times. Explosive bullets ripped past the armor plating around the gunner's cockpit. The starboard engine was holed in eight or nine places but didn't even cough. The port aileron cable was shot away and the tail badly damaged. The starboard outer tank was pierced by bullets, but the self-sealing apparatus worked perfectly. We kept the formation in spite of the damage and reached home safely.

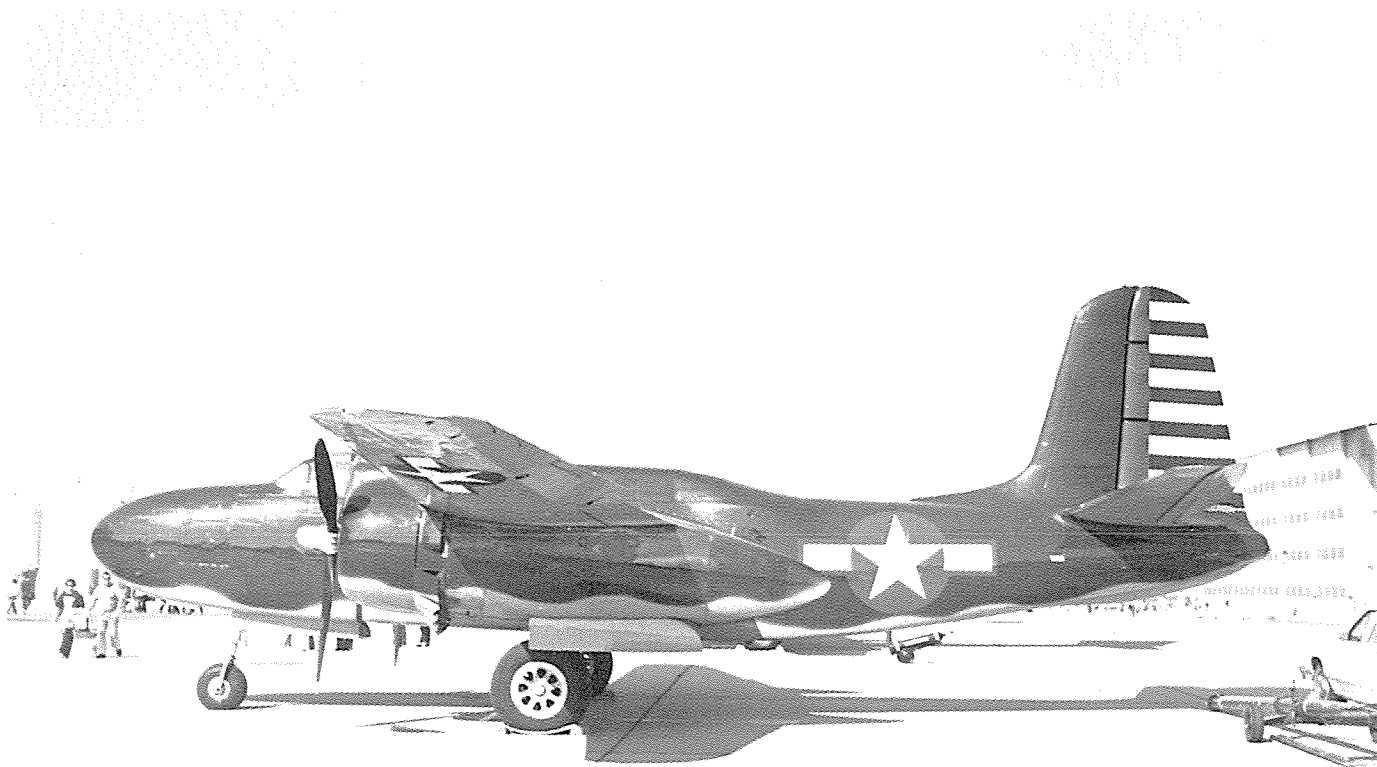
"The morning of April 17, 1942, I was over Calais in another *Boston*. My position in the formation was at the rear. Calais, like all French channel ports, is most strongly defended. A heavy shell from an antiaircraft gun burst under me and holed both engines, both flaps and the rudder controls. With the rudder useless, everything depended on whether the damaged engines would continue to run. If either stopped, we were certain to go in a spin.

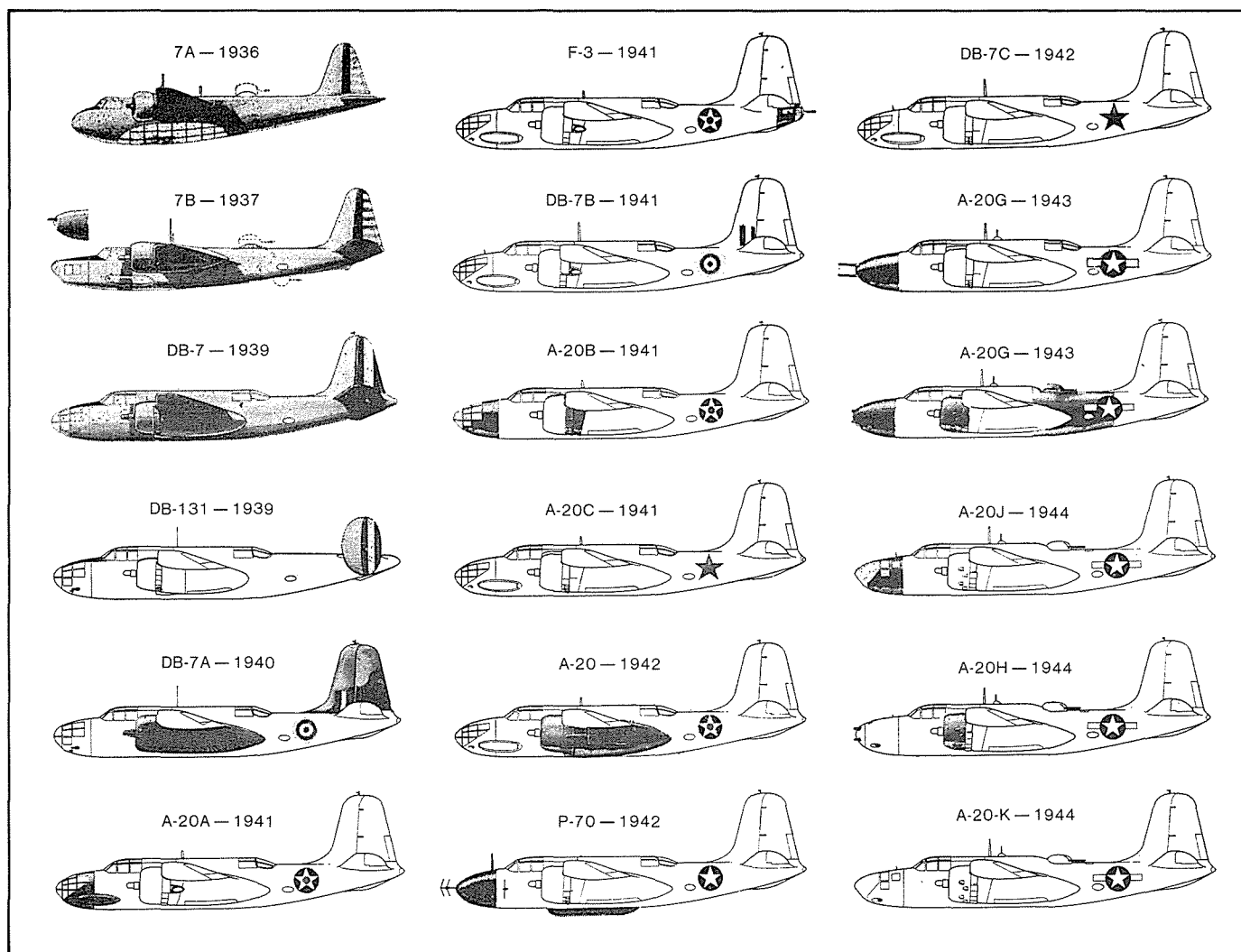
"But we landed safely in England. The gunner told us afterward that a piece of flak the size of an egg had gone through the radio. I remember hearing a peculiar humming and wondering what it was. The armor plating saved the gunner's life."

From its inception as the 7A in 1936 to the final A-20K model of 1944, 18 versions can be identified. One of the early "complex" modern aircraft designs, the A-20 development required three years and 481,662 engineering hours before it was ready for combat. And constant improvement during its production cycle consumed eight times as many more, or 3,521,173 engineering manhours. This would have kept a single engineer, working 48 hours per week, steadily employed from the year 534 A.D. until 1944, or more than 1,400 years!

The only flyable A-20 remaining, worldwide, is this beautifully restored A-20J seen at El Paso, Texas, the property of multimillionaire William F. Farah who flew A-20s in WWII.

(Photo by Harry Gann)





Eighteen models of the same fundamental airplane. The constant improvements made on the airplane from the 7A (top left) to the A-20K (bottom right) took a total of 3,521,173 engineering manhours. In the above draw-

ings the shaded portions represent external changes from model to model. It would require a roomful of prints to show the many interior changes. (Douglas Airview Magazine, January 1945)

In operation right up to the end of the war, the *Havocs* and Lend-Lease *Bostons* became surplus to the USAAF requirements at the close of hostilities. Most were immediately scrapped. However, some surplus *Havocs* gravitated to the civil market and became executive aircraft.

Several representatives of the A-20 series have been preserved in museums. Only one is known to be airworthy. It belongs to William F. Farah. (One, owned by the Confederate Air Force, crashed at an air show in 1988 and was destroyed.)

Farah's aircraft, an A-20J, was built at the Douglas Santa Monica plant in 1943 and accepted by the USAAF in 1944. After the war and a succession of owners, it was discovered in Memphis, Tennessee, and purchased by Farah. There it was dismantled and trucked to El Paso, Texas, where Willie and his mechanics invested seven years in its restoration.

William Farah, a multimillionaire clothing manufacturer, flew A-20s in North Africa and Europe during World War II and developed an affection for the A-20. Today he flies his beautifully restored A-20J in air shows and antique fly-ins, thereby giving the younger generations a glimpse of yesterday's aircraft and possibly the thrill of seeing one of the rare ones in flight.

REFERENCES

- Ed Heinemann Combat Aircraft Designer* by Edward H. Heinemann and Rosario Rausa, Naval Institute Press, Annapolis, Maryland.
United States Military Aircraft Since 1909 by F.G. Swanborough, Putnam, New York.
Skymaster, the Story of Donald Douglas and the Douglas Aircraft Company by Frank Cunningham, Dorrance and Company, Philadelphia.
Flight Plan for Tomorrow, the Douglas Story—a Condensed History by Crosby Maynard, Douglas Aircraft Company, Santa Monica, California.
McDonnell Douglas Aircraft Since 1920 by R.J. Francillon, Putnam, New York.
American Combat Planes by Ray Wagner, Doubleday, Garden City, New York.
A-20 Havoc at War by William N. Hess, Charles Scribner's Sons, New York.
Douglas Airview, February 1939, September 1939, March 1941, December 1941, January 1945.
The Douglas A-20 (7A to Boston III) by Harry Gann, Profile Publications Ltd., Surrey, England.

ABOUT THE AUTHOR

Robert E. (Bob) Williams was born in Indiana after the Wright Brothers' first flight. Growing up in a small midwestern town limited his exposure to aviation to magazines like *Air Trails* and daily comic heroes like Tailspin Tommy and Smiling Jack. Serving in World War II he managed a career move from the 3rd Air Force to the Combat Infantry via the Combat Engineers in just over six months. The war over, he completed his education in Dayton, Ohio, and worked five years in graphic communications at Wright-Patterson AFB followed by 30 years at Douglas Aircraft Company in Long Beach, California. At Douglas he authored a series of aviation history articles called *Yesteryear* published internationally by *Koku Fan* magazine. The DB-7/A-20 article (his second in the *Journal*) was developed from three *Yesteryear* stories.

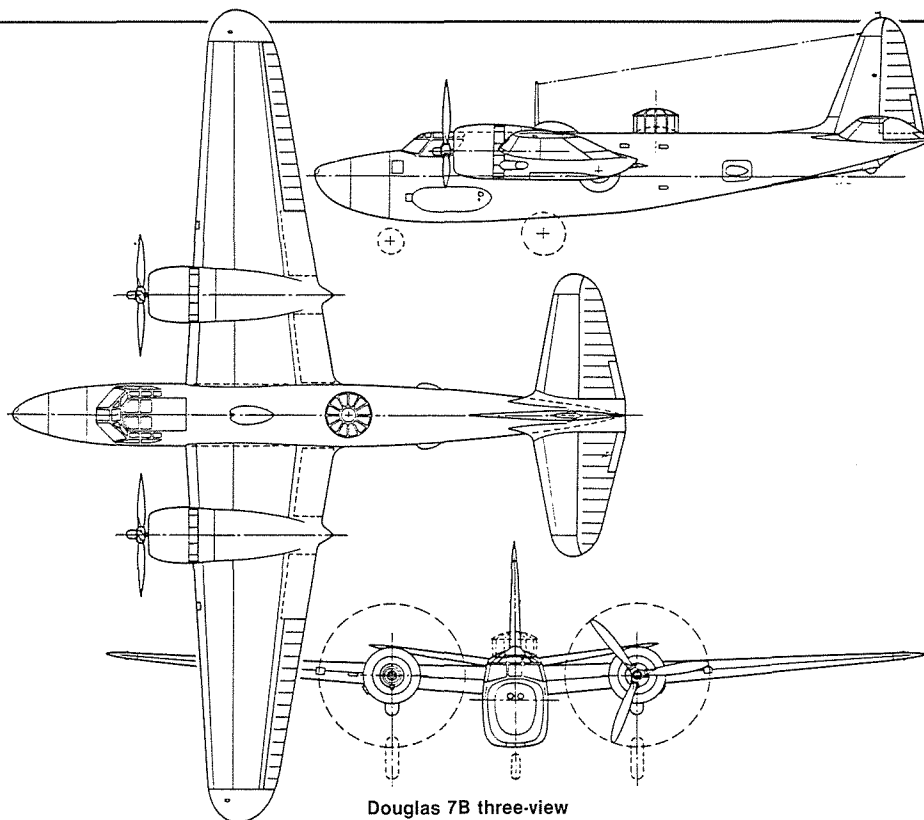
Williams is better known as editor/managing editor of the *AAHS Journal*, a job held since 1977. He is responsible for the graphic design, editorial accuracy, and typographic and printing coordination. We all are responsible for its content!

BOSTON/HAVOC PRODUCTION

7B	1
DB-7	270
DB-7A	100
DB-7B	781
DB-7C	48
A-20	63
A-20A	143
A-20B	999
A-20C	948
A-20D	0
A-20E	(17)*
XA-20F	(1)**
A-20G	2,850
A-20H	412
A-20J	450
A-20K	413
Total	7,478

* A-20Es were modifications of 17 A-20As.

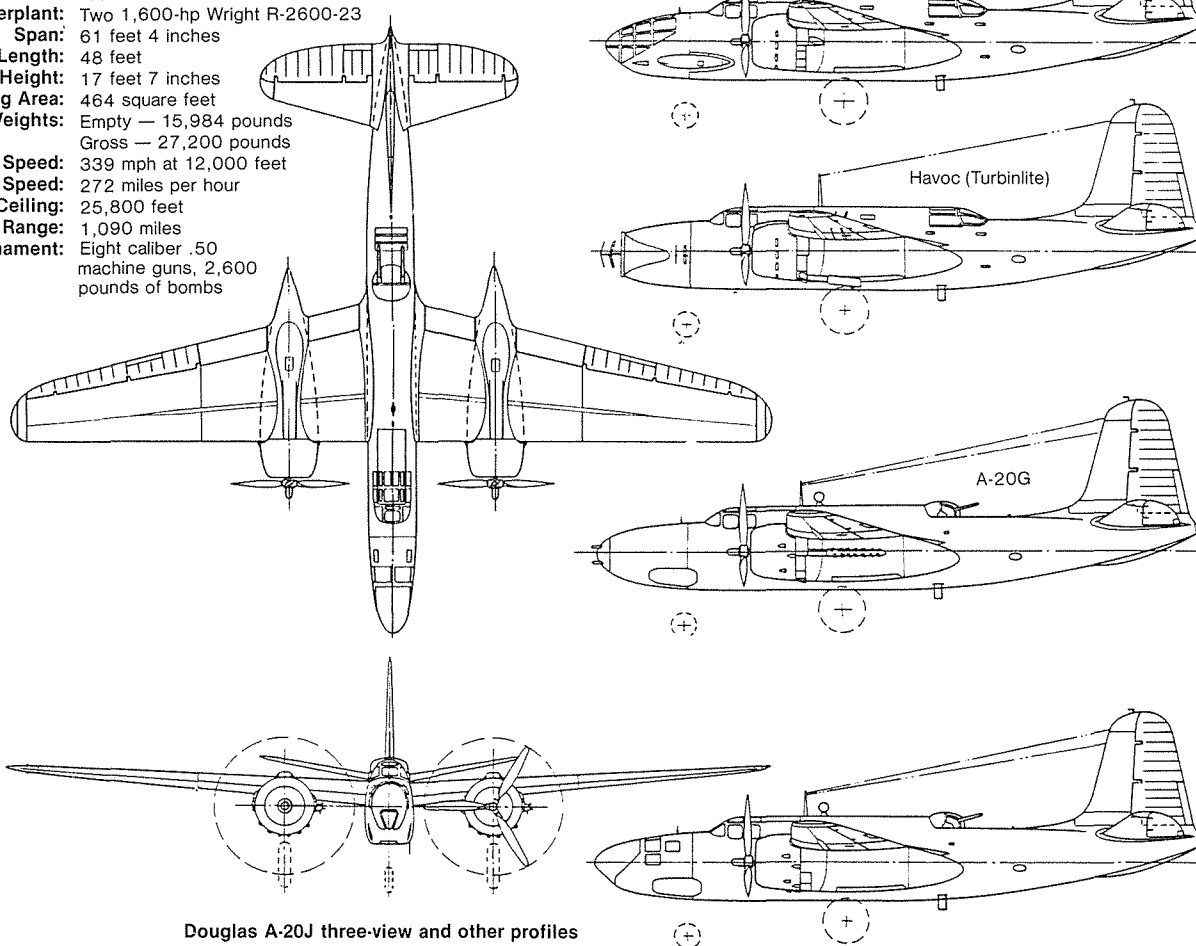
** Modified A-20A.



Douglas 7B three-view

A-20G TECHNICAL DATA

Type: Light bomber
Crew: Three
Powerplant: Two 1,600-hp Wright R-2600-23
Span: 61 feet 4 inches
Length: 48 feet
Height: 17 feet 7 inches
Wing Area: 464 square feet
Weights: Empty — 15,984 pounds
 Gross — 27,200 pounds
Max Speed: 339 mph at 12,000 feet
Cruising Speed: 272 miles per hour
Service Ceiling: 25,800 feet
Range: 1,090 miles
Armament: Eight caliber .50 machine guns, 2,600 pounds of bombs



Douglas A-20J three-view and other profiles