

## Swept-Wing Wonder: The Boeing B-47

*In Flight Usa*

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***Jet aircraft during the piston era. Convair was one of three companies that responded to the Army's request for a jet-bomber design. Looking pretty much like a piston-engine aircraft, Convair's XB-46 is shown in flight, here. (Photo courtesy U.S. Air Force)***

World War II was at its peak during the summer of 1943. The American aircraft industry was turning out piston-engine bombers, fighters, and other types by the thousands. With production focused on these sorely-needed aircraft, it is an amazing truth that during this time, United States Army Air Forces planners were considering future production of a jet-propelled bomber. Jet propulsion was certainly not "main stream;" the Bell XP-59 (a jet-powered fighter) was still being tested – and its performance was on a par with some piston-engine fighters of the time. In other words, jet-propulsion was in its infancy.

Still, some in the Army were far-sighted enough to see the jet engine's potential, and the service distributed a request to several companies (Boeing among them) to investigate the idea of building a jet bomber around the new General Electric TG-180 jet engine.

Boeing had just begun work on the jet-bomber idea when Army officials at Wright Field came up with a set of specifications for the new aircraft. These consisted of the following:

Like the designs that the two other manufacturers who responded to the Army's request – Convair and North American, Boeing's initial concept looked like a piston-engine aircraft onto which jet engines had been hung. Which is exactly what Boeing's initial concept aircraft – "Model 424" – was. "Model 424" was essentially a scaled-down B-29 with jet engines mounted in pods under the wings. Because the designs being offered by all three companies were so similar (i.e. straight wings and empennage), the National Advisory Committee for Aeronautics ("N.A.C.A." – NASA's forerunner) was able to use one scale-model that featured design elements from all three aircraft for wind-tunnel testing.

A funny thing was happening while all this testing was being conducted. World War II was winding down. As 1944 drew to a close, a far-sighted American general by the name of ("Hap") Arnold dispatched a group of aerodynamicists to Germany, so that they could study German research data on rocketry, radar, and of course, aerodynamics. The group was referred to as "The Scientific Advisory Group," and one of its members was a man by the name of George Schairer. Schairer happened to be Boeing's chief aerodynamicist, who was on assignment at the Pentagon. Prior to his leaving for Germany with the group, Schairer was told about the research that was done by a NACA scientist by the name of Robert Jones. Jones had recently presented a paper to the NACA editorial board. The board had rejected the paper, because he had no wind tunnel to support his ideas about the advantages of using swept wings on high-speed aircraft. As he departed for Germany, the idea of swept wings took root in his mind.

Ironically, one of the Scientific Advisory Group's first stops in Germany was Hermann Goering's Aeronautical Research Institute. Here, Schairer discovered research material – including wind-tunnel data – that had influenced the wing designs of aircraft such as the Messerschmitt Me - 262. Recognizing the impact of swept wings on high-speed flight, Schairer wrote a letter to his employer – Boeing – in which he emphasized the significance of swept wings.

Meanwhile, the results of NACA's wind-tunnel testing of the "composite" scale model suggested that all three designs had potential, and the Army authorized Boeing, Convair, North American, and now Martin- which had recently joined the competition, to continue development of their designs.

During the mid 1940s, there existed only three high-speed wind tunnels in the United States. Two of them were owned by NACA. The third one belonged to Boeing. Naturally, this gave Boeing an advantage over the other companies. Virtually unlimited access to a high-speed wind tunnel enabled Boeing to conduct exhaustive tests, almost at will.

So, after its own wind-tunnel tests on the composite scale model were completed, Boeing determined that the design's drag was high enough to keep it from meeting the Army Air Forces' specifications. The problem seemed to lie with the jet engine pods being located under the wings. In their efforts to remedy this problem, Boeing engineers moved the four jet engines from the wings to the top of the fuselage, behind the cockpit, conveniently located above the main fuel tank.

Although re-locating the engines reduced drag slightly, the main culprits were the aircraft's straight wings. At this point, Boeing hadn't received George Schairer's letter.