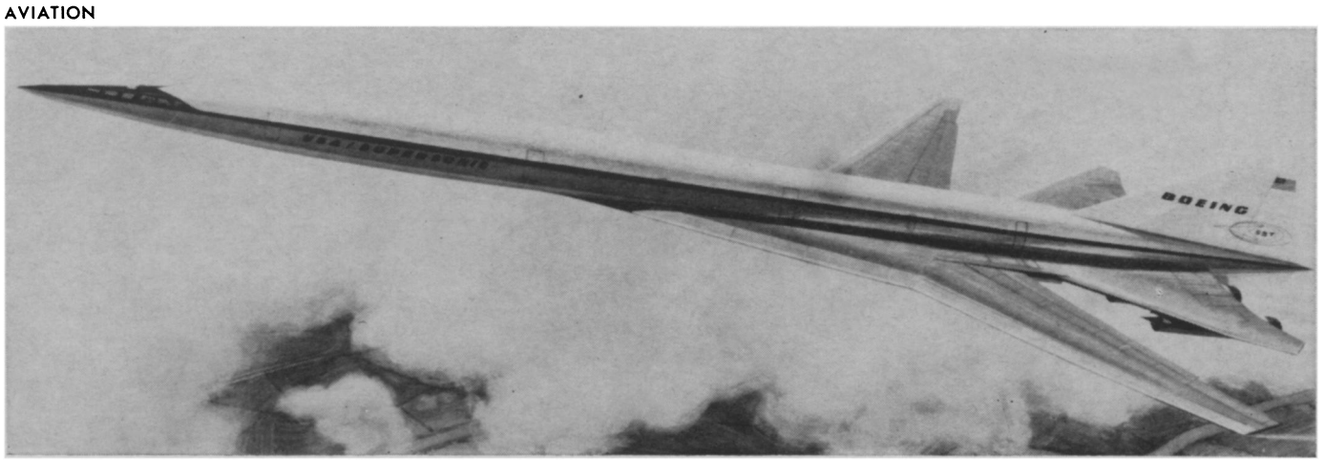

SST Is 'Go'--But Wait!

Technological and economic factors combined to give Boeing, GE, the inside track on aviation's future.

The U.S. supersonic transport, which will carry more people faster than any other plane ever built, will also carry some of the frontiers of technology. Advances in metallurgy, aerodynamics and safety are inevitable as the demanding SST becomes a reality, but in some cases, like the engines, they must play second fiddle to economies available from use of established methods.

Conservatism was welcomed by SST advisors, concerned about carrying passengers faster than sound.

The battle among competing technologies has ended, after two and a half years and a cost of $386 million, but because of another battle the victors don't know what they've won.

The prize ought to be worth something on the fat side of $40 billion, but getting to it is so expensive that the U.S. may not want to pursue both it and the Viet Cong with equal vigor.

Signaling the end of the battle, Gen. William F. McKee, head of the Federal Aviation Agency, armed with advice and recommendations from 31 U.S. and foreign airlines, as well as from 235 government and aviation industry consultants, announced that the Boeing Co. and General Electric Co. had won out over Lockheed Aircraft Corp. and Pratt and Whitney to build the airframe and engines, respectively.

What he did not say was that the long-awaited plane, part of whose sales depend on how soon it catches up with the Anglo-French Concorde, is finally to begin construction. Instead, a series of little month-to-month contracts will be let until Vietnam bills permit the project to get underway, since the government is paying from 75 to 90 percent of the SST development costs.

Why did the winners win? Both teams had huge research and engineering departments working on SST. Both had confidence in their designs.

Experience is vital in aircraft design. Lockheed, builder of numerous high-speed jets including the SR-71 and YF-12A, far outclassed its rival in supersonic experience. Boeing, however, had what the airlines wanted: passenger jet background. Lockheed built its last jetliner, an Electra, in 1962. Boeing has sold some 1,400 jets to the airlines, and is still building them faster than it can get engines for them.

The biggest deciding factor, of course, was the airframe design, upon which all those consultants based their opinions. The two approaches differed radically from each other and from current airliner practice. Boeing's variable-sweep design allows slower takeoffs and landings than Lockheed's double-delta fixed-wing would have, and since a delta shape requires more power during takeoffs, the swing-wing also means less noise around airports.

Boeing's SST, called the 2707, will weigh 675,000 pounds, more than twice as much as even the heaviest intercontinental 707 jets. And it has more growth potential than any plane ever built. Boeing estimates that it could reach a huge 800,000 pounds, equal to 32 of the famous old DC 3's.

Though final design proposals had to be in by Sept. 6, Boeing kept right on refining its design long after. Since the President's advisory committee on the SST met as late as Dec. 20, less than two weeks before the decision, said a Boeing official, "presumably they were aware of the changes."

The changes included adopting a wider fuselage that had previously been proposed as an alternate, as well as several improvements to increase lift. The unswept angle of the wing was changed from a 30-degree sweep-back to a more straight-out 20 degrees to aid in landings and takeoffs. When late wind tunnel tests indicated that the plane's pitch control was inadequate, the area of the elevator control surfaces was increased to compensate. A strain gauge was even added to the nose wheel to tell the flight engineer when unbalanced fuel tanks are affecting the plane's center of gravity.

Boeing and GE were not picked together as a team. In fact, most of Boeing's present jetliners are sold with Pratt and Whitney engines. Money, however, made a big difference. GE's SST engines will sell for about a million dollars each, versus $1.4 million estimated for Pratt and Whitney. In addition, GE pursued tried-and-true technology, while their unfortunate competitor went out on a limb—and, at least partly as a result, fell off. GE's straightforward design was essentially a conventional jet with an afterburner to reignite exhaust gases for extra push. Pratt and Whitney used a radical technique called duct burning, in which a fan would blow air into ducts around the engine, where it would be mixed with fuel and ignited.

Even the losers may win, in the long run, however. Sonic boom problems may require that a second, slower plane be built for overland flights. If so, Lockheed and Pratt and Whitney may well have a shot at it.