No other military aircraft has endured such assault from the politicians and the news media. The B-1B isn't perfect—but it is very good, and quite capable of performing its mission, reports one who has recently flown the aircraft.

Through Flaps and Flak

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THE fundamental problem that has always faced the bomber is how to get to the target and then back home. During World War II, the survival of the bomber became a matter of primary concern when losses began to threaten the whole concept of strategic air warfare.

In the early days of our daylight missions over Europe, bombers were meant to defend themselves. Armed with ten .50-caliber machine guns mounted in turrets and in flexible gun positions, B-17s could deliver an impressive amount of lead. But despite wildly exaggerated claims of enemy fighters downed, it soon became clear that bombers on deep penetrations were no match for the Luftwaffe. Some imaginative fellow safely distant from the scene of combat came up with the notion of the B-40. This bird was a B-17 fairly bristling with additional guns and armor, an airborne battleship, and its mission was to add firepower to the formation. The B-40, weighed down by all that armor and ammunition, had a brief and sad combat career, and the few survivors were soon withdrawn. Long-range fighter escort saved daylight bombing in Europe.

In the Pacific, Maj. Gen. Curtis LeMay abandoned high-altitude daylight tactics for his B-29s in favor of low-level night incendiary attacks. He got the results he wanted, and the B-29 losses dropped sharply. Still, what the B-29s did in Japan could scarcely have been called precision bombing; it was more on the order of Air Marshal Arthur "Bomber" Harris's concept for RAF Bomber Command. Whatever one wishes to call it, however, the B-29 strikes helped bring Japan to its knees. The nuclear weapons dropped on Hiroshima and Nagasaki ended the war, although Generals "Hap" Ar-

A B-1B bomber is groomed for a training flight. Despite problems, the B-1B is said to be capable of penetrating Soviet defenses and destroying targets that ICBMs have not already hit. Thus it qualifies as the weapon for deterrence that it was designed to be, according to USAF.

—Photo by MI Seitelman/IDI

nold and LeMay both felt strongly that these weapons were not needed.

The bomb changed everything. In the immediate post-war period, chaotic demobilization stripped the United States of any credible conventional strength, but that didn't matter because, to paraphrase the British Boer War jingle, we had the bomb and they had not. In those days, our nuclear monopoly gave us an overwhelming edge, one that allowed a defenseless procession of cargo airplanes to score the first victory in the Cold War by defeating the Soviet blockade of Berlin.

The bomb, and the airplane to deliver it, may have convinced the Soviets to keep their distance, but it did not deter the US Navy. The Admirals' Revolt of 1949 had, as its underlying cause, a concern for the future of naval aviation, threatened by the Air Force and its nuclear bomber, the B-36. In retrospect, that lumbering six-engine airplane was probably a legitimate target, but it was the only intercontinental bomber in the world, whatever its shortcomings, and the admirals had their sights fixed on the strategic mission itself.

In any case, the unseemly interservice squabble ended with the Air Force, and most particularly its Strategic Air Command, in the Pentagon driver's seat. A series of bomber aircraft followed, invariably at the top of Air Force budget priorities. The B-52, in the early 1950s, finally emerged as the intercontinental successor to the B-36.

Intercontinental missiles then appeared on the scene. At first wildly inaccurate, ICBMs had to defer to bombers for those targets requiring a precise strike, but that disparity gradually faded. ICBMs, descending more directly from the old Coast Artillery than from any branch of the aviation family, became the principal strategic weapon, and they also complicated the rationale for a new penetrating bomber.

Low-Level Penetration

It was that doubt that lay behind the cancellation of the XB-70, a high-flying Mach 3 airplane, although anti-aircraft missile development has made the XB-70 cancellation look good for sounder reasons. Then, in the late 1960s, the Air Force conceived the B-1 as a low-altitude penetrator with Mach 2-plus dash capability.

The B-1A won high marks on its early test flights; the trouble was to come from the political arena. Gov. Jimmy Carter had made a thinly veiled presidential campaign promise to cancel the B-1A, and Sen. John C. Culver, Iowa Democrat, slipped an amendment into an appropriations bill that made cancellation easy.

When President Reagan ordered the B-1 program revived, the airplane underwent significant changes. It looked the same, but its radar profile was new and sharply diminished, and the avionics were thoroughly modernized. To reduce costs, and also because the high-supersonic capability was of questionable value, the B-1 lost some of its speed. The crew escape capsule was dropped in favor of conventional ejection seats, and various other items such as a head-up display and state-of-the-art instrumentation were left out in the interests of economy. The resulting cockpit is simple, if not Spartan, and perfectly adequate for the job. The systems operators do have one luxury: small side windows allowing a view of the outside world. Whether a sideways glance at trees and rocks flashing by at 640 knots is reassuring or terrifying is, of course, a matter of personal opinion. Anyway, the job doesn't encourage much sightseeing.

Because the B-2, or Stealth, had already been chosen as the next-generation penetrator, B-1B production was limited to 100 airplanes.

For a while, fuel leaks provided headline material, but these have been fixed, and the B-1B today doesn't leak any more than other wet-wing airplanes. There was an early concern about inertial coupling, or pitch-up, following the crash of a B-1A on an experimental test flight. A stall inhibitor is being incorporated into the flight control system that will increase the safe angle of attack and effectively remove the inertial coupling hazard. The

—Photo by Frederick Sutter/IDI

modification should be completed early in 1990. The fuel management procedures leading to the accident cannot be repeated in the production airplanes unless the system is deliberately bypassed.

Certain journalists have seized on the high wing loading of the B-1B as a serious deficiency. The wing loading, at maximum gross weight of 477,000 pounds, is admittedly high—244 pounds per square foot—but what of it? A low wing loading makes for a rough ride at low altitude, and low is where this airplane flies. With its wings swept back the full 67.5 degrees, the B-1B is more a projectile than it is a flying machine.

A Pilot's Dream

From a pilot's standpoint, particularly from the standpoint of a bomber pilot used to the truck-driving technique necessary for the B-52, the B-1B is a dream come true. Flight controls, mechanical with hydraulic boost, are responsive and, for a big airplane, remarkably sensitive. There is even a stick instead of a wheel. Unlike in

most airplanes, the copilot's position is the dominant one, a nice touch for the instructor pilot.

Four F101-GE-102 turbofans in the 30,000-pound-thrust class give the B-1B good takeoff performance. At maximum gross weight and on a hot day, the roll might reach 9,000 feet, but that is the extreme. Standard day takeoff distances at gross weights approaching 400,000 pounds will average 6,000 feet or less. In any case, the B-1B has no problem either taking off or landing on any airfield it is likely to use, even though it has neither thrust reversers nor a drag chute, only excellent brakes.

In this bird, refueling is a pleasant experience. The pilots are at the very front end of the 147-foot fuselage, and the refueling receptacle is just forward of the windscreen, scarcely three feet away. The pilots say that compared to the physical labor involved in a B-52 refueling, B-1B refueling is effortless.

A formidable flying machine, the B-1B does its stuff over mountainous terrain, venting fuel, in the photo at right. The author writes that the B-1B, with its range, speed, and other attributes, is "uniquely suited to power projection" and is, in fact, "a very good airplane."

—USAF photo by TSgt. Michael J. Haggerty

It is down on the deck, however, that this airplane shines. As you descend from the refueling altitude of 20,000 feet, the wings sweep back, and the B-1B is ready to roll. At 640 knots and 200 feet, guided by a terrain-following system that now appears free of bugs, the B-1B becomes a very elusive target, especially with a radar return resembling that of an F-16. Anyone who has flown a fighter at 500 knots or better on the deck, especially on a hot day, will remember the less-than-thrilling side effects, like the helmet banging on the canopy. The B-1B crew could write a letter home for all the bounce in their cockpit. At night, and over rough terrain, its speed and terrain-following capability alone should make it immune to fighter intercept. Even on a clear day, an interceptor will have to rely on a perfect solution.

The ECM Question

There are, however, other ways to shoot down a bomber, and this is where the celebrated, or infamous, Eaton ALQ-161 system comes into play. This defensive electronics system continues to be the single most vexing shortcoming in the B-1B's operational capability and the focus of attacks against it. The problem is compounded by ignorance on the subject of electronic countermeasures among the public at large and among those who inform that public.

This business of ECM, however, is an arcane matter, and not just for the public. Most pilots know little about it beyond hoping it will do what it is supposed to do—that is, mislead enemy radar. During World War II, ECM consisted mostly of dumping bundles of shredded tinfoil and muttering a prayer. As the years passed, ECM became more sophisticated, but not always more effective. The top-secret ECM pods hoarded against the day when nuclear war began turned out to be essentially useless when we finally took them to North Vietnam.

Electronic detection and the means to counter it is a never-ending game, and Eaton's goal in conceiving and designing the ALQ-161 was ambitious—to search across the entire spectrum and counter what was found. With 108 black boxes, antennas, and jamming transmitters—and, at 5,000 pounds, weighing almost as much as an average World War II bomb load—the ALQ-161 is complicated beyond the understanding of ordinary mortals. Still, while it may fall short of the ability to jam certain threats, it can listen and locate the entire range of hostile emissions.

On balance, the ALQ-161 is a disappointment, but by no means a failure. The cost to remedy the jamming gaps, according to Eaton Co., will be $520 million. Whether or not the funds will be requested by the Air Force and granted by Congress is still an open question. In all fairness, that money, along with the $600 million

for other fixes, would simply restore the program to its originally estimated cost, but that argument is hard to put across.

Politics and Pelicans

A principal obstacle to further spending on the B-1B is the B-2, the mysterious Stealth bomber. The Stealth was a major reason for President Carter's cancellation of the B-1. The B-1B came into being as an interim bomber, a link between the venerable B-52 and the B-2. From its inception, or at least from its second coming as the B-1B, the airplane has suffered from a curtailed development cycle and a limited production run.

Modifications have been made on an *ad hoc* basis, so there are differences between airplanes. Spare parts have been purchased in a niggardly way. Collision with a fifteen-pound pelican, on a low-level training flight in 1987, set operational readiness back more than a year. While the birdstrike fix is simply one of attaching Kevlar, a tough synthetic fiber, to certain vulnerable areas, it has taken time. All the while, the B-2 lurked down the road as the anointed first-line penetrating bomber and the competitor for funds.

The B-1B is our first-line bomber. Its primary task is to penetrate Soviet defenses and take out the important targets that, for one reason or another, the missiles have not hit. The B-1B's bomb bay has a rotary device designed to launch air-to-surface missiles at some distance from the target. Currently, the operational missile is the AGM-69A short-range attack missile (SRAM-A), now growing a bit old after twenty years. The SRAM II is in the offing and should be a more reliable and accurate weapon.

A nuclear war is difficult to visualize, even in dispassionate military terms. It is at least arguable that air defenses, and everything else for that matter, would be in such a shambles by the time the bombers arrived that penetration would be no problem. In that scenario, the argument over the B-1 ECM becomes academic. It is, in fact, difficult to conjure up a situation where the bombers would arrive ahead of the missiles against an undamaged and fully alerted defense. Nevertheless, it could happen, and so penetration aids must remain a high priority. Even if they serve no other purpose than to introduce another uncertainty into Soviet planning and further strains on the Soviet budget, they are important. Much of the domestic furor over the ECM, however, is a smokescreen.

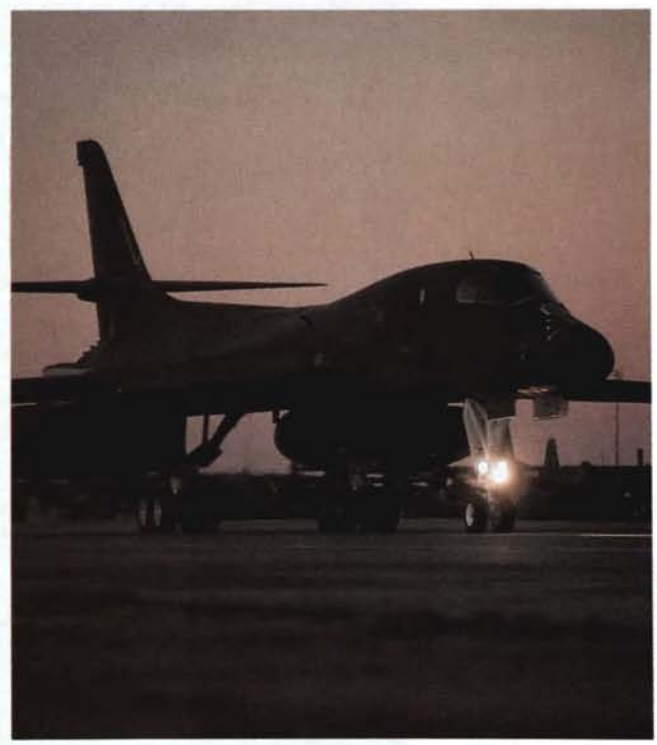
The real fight over the B-1B has its roots in politics. That fight, in turn, contributed heavily to the cost of the airplane. If the B-1B had not been so vehemently opposed, there would doubtless not have been such prolific subcontracting. Well-organized resistance to the B-1 was also responsible for the years of delay in building the bomber, an airplane that should have been in the squadrons more than a decade ago.

It Fits the Bill

Because there are now only ninety-seven of these airplanes, and because they cost $250 million or so apiece, there is a natural reluctance on the part of the Air Force to discuss the B-1B's role in limited conflicts. Strategic planners abhor the thought of losing one of these birds to some guerrilla with a Stinger. Nevertheless, the B-1B, with its range, its speed, and its all-weather low-level capability, is uniquely suited to power projection. Coming over low, fast, and with a deafening roar, it should be a convincing harbinger of worse things to come. The B-1B can drop dumb bombs with fair accuracy, around 150 feet CEP (circular error probable), but that in itself would be a dumb tactic.

A more sensible and realistic employment of this airplane in a conventional role would be with standoff weapons. At this early stage, however, the B-1B people prefer to focus on the strategic nuclear mission.

No other military airplane has ever been the subject of so much controversy and has had to bypass so many roadblocks on its way to production. Now that the B-1B is in the operational inventory, it remains under the microscope, a perennial candidate for investigative journalism, congressional reports, and political darts. There is no reason to believe the attacks will diminish, at least until a new target appears.



—Photo by MI Seitelman/IDI

All that aside, however, the fact is that the B-1B is a very good airplane, one that almost surely can penetrate any nation's defense system and deliver a devastating blow. It probably did cost too much, what with one thing and another, and it came along years late. But if there is general acceptance of the need for a bomber in the nuclear triad, and that appears to be beyond argument, the B-1B fits the bill. ■

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