



**The Air Force plans to make do with its present bomber fleet for almost 40 more years.**

# The Bomber Ro



***A Joint Direct Attack Munition is readied for a 15-hour, one-way ride to Serbia aboard a B-2 bomber. “Shacks” on as many as 16 targets by each stealth bomber are not uncommon in Operation Allied Force. Stellar as the B-2/JDAM combination has proven, though, USAF doesn’t plan to seek more bombers for at least the next decade-and-a-half.***

# oadmap

By John A. Tirpak, Senior Editor

**T**HE Air Force’s new Bomber Roadmap, released in March, features a detailed set of plans to upgrade the existing bomber fleet with new precision weapons, more reliable components, and new communications gear that will considerably improve its combat power and reliability. The document includes a rationale for the role of the bomber in overall national strategy, as well as in the Air Force’s new expeditionary structure.

What the roadmap doesn’t feature, however, is a definitive new-build bomber program, a fact that’s frustrating to members of Congress and others who had hoped to see a new and greater budgetary emphasis on this mission area. In fact, it was the lack of even a *budget placeholder* for a new bomber that led Congress last year to require USAF to update the Bomber Roadmap, last overhauled in 1992.

The Air Force said it will continue to fly its current bomber fleet of B-1, B-2, and B-52 bombers well into the 2030s—beyond the B-52’s 80th birthday. This is possible, USAF said, because the life expectancy of all three airplanes is believed to be well-understood. The service maintains that, barring a surge in losses due to accidents or war and with regular upgrades, it will be able to keep the fleet operationally relevant and affordable until 2037. Only at that time will the fleet fall below required levels and a new system need to enter service. Working backward from 2037, USAF judges it will need to start work on this new system in 2013.

Congress mandated the roadmap update last year, only weeks after completion of a highly classified study by the independent Panel to Review Long Range Airpower. The panel stated—among numerous recommendations—that funds intended to hold open some parts of the B-2 production line would be far more usefully spent on upgrades to the existing bomber fleet. This was especially true, said the panel, with respect to improvements that would increase bomber sortie rates.

In an unclassified summary of its findings, the panel reported that increasing the sortie rate for bombers by a factor of two “doubles the capability to deliver bombs on target.” It added, “From an investment perspective, increasing the efficiency of the bomber force is more cost effective than procurement of additional aircraft.”

The panel also noted the lack of any replacement bomber program on the Air Force’s books and suggested that the service “move out smartly” on such an effort, given the increasing value of high-payload, long-range bombers at a time when forward-basing options for shorter-range, low-payload aircraft are narrowing.

“Current plans do not adequately address the long-term future of the bomber force,” the panel asserted, and it advocated that USAF buy either “a variant of the B-2, incorporating upgrades suggested in this report and those that will emerge in the future, or [pursue] development

of more advanced technologies that might lead to a better solution for the next generation aircraft.” The panel noted, “Today, there is not yet adequate basis for such a choice. A continuing program to demonstrate advanced technologies in support of long range airpower should be given high priority.”

Clearly, USAF took many panel suggestions to heart in crafting the new roadmap. It emphasizes new weapons, which, as a result of their accuracy, produce “a tenfold increase in bomber lethality.” Taking another cue from the panel, the Air Force asserted that bomber funding will focus on connectivity with air- and spaceborne sensors and command-and-control systems, for greater situational awareness. This will not only improve the ability of the bombers to return from battle intact but enable them to rapidly shift targets on the fly, to keep pace of a fast-changing battlefield. Finally, USAF will implement the panel’s suggestion to invest in improvements that will increase bomber sortie rates.

On the subject of a new bomber, though, the Air Force was unmoved.

The service remains “committed to bomber modernization,” stated the roadmap, and has in the past decade spent \$3.6 billion for “new combat capabilities and reliability and maintainability upgrades.” Even so, it noted the bomber program is “budget constrained” and that a new airplane is not affordable in the

foreseeable future. In fact, beginning in Fiscal 2001, the service actually will reduce the amount it spends on bombers.

In the roadmap, USAF acknowledges that its bomber spending plan will be about \$100 million a year short of what it considers necessary to keep its current fleet sound. Over \$900 million of “needed” improvements have not been budgeted, and a further \$1.36 billion worth of “desired” and “candidate” upgrades have also been put off. The latter category includes, for example, digital engine controls for the B-2; USAF projects that, without them, it will have to ground the B-2 fleet starting in 2009.

As much as the Air Force would like to buy a new bomber, other items have a higher priority right now, senior service officials said.

“We need to upgrade all our systems every 20 to 30 years,” said F. Whitten Peters, acting Secretary of the Air Force, at the unveiling of the roadmap. Under USAF’s time-phased modernization, bombers last received a major influx of new-build money in the 1980s, when it procured the B-1B and developed the B-2. In the 1990s, priority shifted to airlift, primarily the new C-17 transport. In the 2000s, most of the effort will go to upgrading the fighters, which are in dire need of replacement, he noted.

Much of the bomber fleet is relatively new, Peters said, meaning USAF can safely defer a new big airplane for now. He emphasized that the service’s priority for bombers is not to buy new ones but to better equip them with new munitions and connectivity enhancements that will give the fleet the ability to carry out its mission until a compelling new aircraft requirement emerges.

Neither the threat posed by enemy air defenses nor any new laboratory discovery demands an acquisition program just now, Peters added. “We feel ... there is no compelling technology out there that we need to capture.”

The acting Secretary went on to say that, despite the success of the B-2 program, much is still being learned about stealth, especially from the F-22 and Joint Strike Fighter programs. The service hopes to better understand and sharply reduce the cost of maintaining the low observable features of the B-2 “before we rush off to build the next low observable airplane,” he stated.

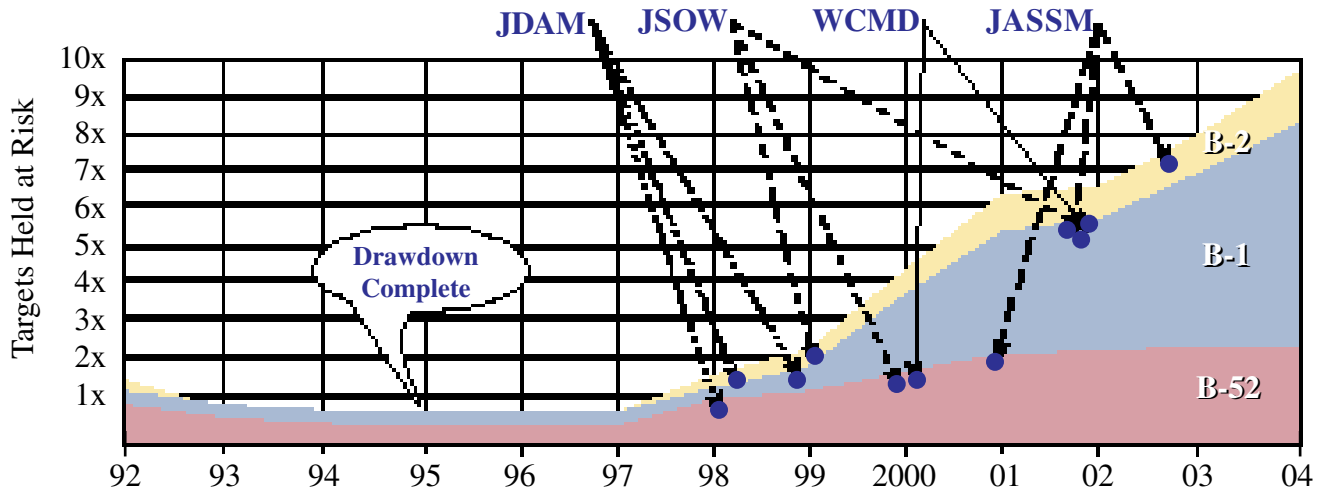
USAF photo by SSgt. Jim Howard



**With standoff weapons like this Conventional Air Launched Cruise Missile and the Joint Air to Surface Standoff Missile, the B-52’s utility can stretch far into the next century, USAF believes.**

## Bomber Effectiveness

(Relative to 1992)



USAF says precision weapons will make the 2004 bomber fleet 10 times as effective as the 1992 fleet.

Moreover, the Future Strike Aircraft program is under way to keep abreast of newly emerging technologies that could be applied to an advanced strike system. Dubbed the Future Strike Aircraft program, it calls for working with industry to identify emerging or expected technologies that could form the basis of a replacement system 10 to 15 years hence.

The FSA program will look at alternatives such as Uninhabited Combat Aerial Vehicles, hypersonic missiles, and other technologies. There is no assumption at this point that the next system to do the long-range, quick-response, precision power-projection mission must be another big airplane. In fact, contractors working on it have been warned away from making any hard assumptions at the outset of the project.

However, the FSA program has been allocated less than \$1 million in funding and is not geared toward becoming a full-blown acquisition program. It will simply inform Air Force leadership about the state of the art in aerospace technology and catalogue those technologies that could be tapped to fill a requirement, should one be stated.

The roadmap calls for a force of 190 bombers, which it maintains is enough to meet Air Force responsibilities as spelled out in the National Defense Strategy. The strategy sees bombers as the first weapon called on to make strikes against an enemy beyond the reach of forward deployed forces and as doing much of the work

of halting an invasion of the territory of a US ally.

The level of 190 aircraft would be achieved by Fiscal 2004. The fleet would comprise 21 B-2s, 93 B-1s, and 76 B-52s. Of the 190 airplanes, 130 would be available for combat at any time and the others would variously be in depot maintenance, test, or training. To reach 130, the Air Force will restore some non-combat coded B-52s to the fighting force. These so-called attrition reserve airplanes currently are off the books, with their regular funding diverted to pay for weapons upgrades.

By taking some airplanes off the books, USAF was able to save funds which it then applied to the Conventional Mission Upgrade Program for the B-1 and B-52. As that program winds down, the sidelined bombers can be brought back into the active force, officials said.

Since the end of the Cold War, the bomber fleet has transitioned from emphasis on nuclear warfare to concentration on conventional conflict. The B-1 has been turned into a purely conventional system. The B-2s and B-52s retain their power to engage in nuclear missions, but bombers no longer sit alert for nuclear war.

The roadmap describes bombers as being “a cornerstone of America’s airpower and force projection,” posing “a strong and highly visible deterrent force just over the horizon from the enemy.” If deterrence fails, bombers can launch from the continental US and “strike time-critical targets and

Due to their range and stealth, bombers are especially effective against command-and-control centers, weapons of mass destruction, and advancing enemy armored columns. Forward deployed, they offer sustained heavy firepower without the need for vast armadas of fighters in a strike package. At the same time, they can integrate with these packages and boost their effectiveness. Increasing their sortie rates will be the equivalent of buying more bombers, USAF said.

Bombers are likely the first weapon to be called on in a shooting war, since they could arrive first, “particularly in regions where the United States does not routinely maintain forces or have basing rights.” Acting to halt an enemy invasion, and then conduct “continuous, parallel attacks” on the enemy, they create “the conditions for follow-on forces to access the [battle area].”

The weapon of choice for attacks on enemy strategic targets, bombers can also destroy enemy airpower close to its source, as well as suppress enemy air defenses and destroy ground forces and naval forces.

In the Aerospace Expeditionary Force concept, bombers are especially important, given the potential limitations on overseas basing. They also offer regional commanders in chief the element of surprise when launched from CONUS, the Air Force said.

In nuclear operations, bombers serve as a means of permitting gradual



**Often described as a bomber-sized fighter, the B-1B's speed allows it to work well with expeditionary forces. Its fast-and-low attack profile, however, will cause it to wear out well before its B-52 and B-2 stablemates.**

escalation and de-escalation of a crisis and as an essential part of the nuclear war plan.

In the future, as standoff weapons increase the range from which bombers can launch their munitions, bombers will acquire a kind of self-Suppression of Enemy Air Defenses capability, said the roadmap. Also, new, inexpensive munitions like the “[Joint Direct Attack Munition] and [Sensor Fuzed Weapon] greatly enhance the cost-benefit ratio” of bombers compared to smaller airplanes, USAF said. Bombers will be able to hit more targets in a single pass, reducing the required number of sorties and allowing a force commander to “accelerate the pace of the campaign and to maximize the offensive potential of available aerospace force assets.”

The Panel to Review Long Range Airpower, in an unclassified report, said the advent of precision munitions has fundamentally altered the role of bombers, vastly increasing the speed at which an air campaign can be conducted. It called for more work on the concept of operations for bombers, asserting that current war plans do not fully exploit their capabilities.

The Air Force Chief of Staff, Gen. Michael E. Ryan, argued that bombers are indeed getting the operational attention they deserve. “The CINCs recognize their capability and ask for as many as we can give them” Ryan said. However, he prefers not to think of bombers as a stand-alone

but an element of the larger force. “It’s integrated into everything we do,” Ryan said.

Bombers have gone from virtually a segregated force during the Cold War into one that fits well into the mix of combat and surveillance aircraft, said the Chief of Staff. Depending on the target, “we’ll use the platform that makes the most sense,” Ryan added.

Donald B. Rice, a former Air Force Secretary, was a member of the panel. He said that, in several key areas, he was disappointed with the Air Force’s new Bomber Roadmap. Though he found it to be thorough and reasonably comprehensive, he felt the roadmap fell short, especially on the B-2 and a follow-on.

Rice asserted that the panel was very clear that the B-2 needs improvements in both the maintainability of its low observable materials and the overall degree of stealth in the airplane. The time lines for improvements to both aspects of the B-2 as quoted in the roadmap were “pushed way out ... from where they should be,” Rice said.

By rapidly improving the B-2’s stealth and its maintainability, Rice argued, the Air Force can get a quick handle on how to proceed with a successor airplane, which Rice feels is necessary in the near term, not the long term.

“If you believe bombers last 50 years, and you want to maintain a force of, say 200, ... that means you need to be building about four

a year, doesn’t it?” Rice noted. To his thinking, a new bomber—most likely a variant on the B-2—should be under way by 2006 at the latest. When it comes to replacement capability, the roadmap puts off the choice too long, he said. The panel “had more concern about this than [the roadmap] shows.”

“By the time we get to 2005–06, we will only have built 21 B-2s over a 20-year period,” Rice said. “That’s not fast enough [to maintain the force].” Even if it cost \$6 billion to \$7 billion to reconstitute the B-2 line, it would still be a substantial savings over an all-new bomber program, he added.

The long range of bombers is an exceedingly useful capability and will be more so in the future, Rice said. “The panel looked at the availability of bases and felt more convinced that bombers are becoming more important, not less,” he added. The panel “believes long range airpower is enormously important, and it’s hard to see that reflected in the Air Force’s resource allocations.”

Rice has an interesting view of the proper balance of bombers and fighters. He strongly supports the F-22 as a critical program and argues that USAF should build not only the air superiority version but also a ground-attack version. However, given a choice between the Joint Strike Fighter and more bombers, he said, he would have to argue against the shorter-range aircraft and go for bombers.

Those are the funds he would reconsider in finding resources to pay for a more aggressive bomber program, Rice said, given the disproportionate value of bombers vs. fighters in the strike role.

Rice also said he’s very worried about USAF’s plan to maintain the B-52 beyond 80 years. There simply isn’t enough good evidence, he added, to bank on the airplane lasting that long, especially when threats are always improving. The B-1s, Rice feels, will wear out long before USAF estimates, due to their fighter-like, high-speed, low-level missions, which put enormous stresses on the airplane.

“Five to 10 years from now, we’re going to have to make a choice among these alternatives [about how to replenish the bomber force],” Rice asserted. If the Air Force doesn’t prepare now to have answers to the questions,

“there will be few options. ... I would prefer that we have many.”

Rep. Duncan Hunter (R-Calif.) was instrumental in bringing about the panel study. He also is impatient and dissatisfied with the roadmap, as it did not, in his opinion, adequately address the importance of bombers in the event that forward deployed forces are hit by weapons of mass destruction.

Hunter vigorously advanced that view in an exchange with Lt. Gen. Gregory S. Martin, the principal deputy assistant secretary of the Air Force for acquisition, at a House Armed Services Committee hearing held March 22. He asked that the roadmap be reviewed with an eye toward the role bombers would play in Korea if forward airfields were to be hit by chemical attack.

Martin responded that such a scenario would indeed cause the value of the bombers to go up but that such calculations had been taken into account in setting a level of 130 combat-coded bombers. Hunter countered that if US crews were killed by chemical attack in Korea, “it may be very difficult, politically, to continue [tactical air] operations on the peninsula.”

Martin also defended the Pentagon’s strategy of *swinging* bombers from one Major Theater War to another as a prudent way to prepare against a scenario considered unlikely.

He made the analogy that to buy

## How Long Will the Bombers Last?

The B-1 flies low-level, high-speed missions which take a physical toll on the airplane. Based on continued rough usage, and gauging the rate at which B-1s have been lost in peacetime training, USAF expects the B-1 fleet to dip below a minimum-required level of 89 aircraft in 2018. The overall fleet will wear out in 2038.

No B-2s have been lost in accidents, so the Air Force guesses that its attrition rate will mirror that of the B-52, with one crash every 10 years. Based on that, as well as a design life of about 40,000 hours and a fairly benign flight profile, the B-2 fleet will likely drop below the minimum of 19 needed by 2027.

Most robust of the three bombers is the B-52, built at a time when little was known about aircraft life expectancy. To be safe, the B-52s were built to take twice the expected punishment. Now serving as a high-flying bomb truck, the B-52’s main limiting structure is the upper wing surface, which will give out sometime after 32,500 hours. Expected mishaps and fatigue will bring the B-52 fleet below the 62 required in about 2044. First built of the three, the B-52 will outlast its newer stablemates by up to 26 years, by Air Force reckoning.

The Air Force noted that the predictions for all three bombers will be affected by actual wartime usage, changes in tactics, unexpected technical problems, or changes in the threat.

more bombers to cover a second MTW would be like “Washington, D.C., buying snow removal equipment at the rate they buy it in Buffalo, N.Y.” The swing strategy works with bombers—but not other kinds of systems—because of their speed and range, Martin told Hunter.

The general noted that the panel had suggested some improvements that would further reduce the observability of the B-2. However, he said such improvements would cost \$120 million–\$180 million rather than \$50 million, as the panel suggested.

Gen. John Michael Loh, the retired former head of Air Combat Command, reported that he would have liked to have seen in the roadmap “a stronger strategy underpinning ... for

the unique contributions of bombers,” emphasizing their “long range, precision payload, and independence of foreign bases or parties.”

Loh said that, as ACC commander, he spent “a lot of time convincing our overseas commanders [of the value of bombers in their war plans].” This message needs to be reinforced with more joint doctrine and promotion of the bomber, he said.

A series of detailed five-year plans—looking 25 years into the future—to improve the survivability, lethality, and cost of operating the bomber fleet would benefit the Air Force’s planning process, Loh said. The roadmap took a much shorter-term view than what he feels is necessary to stay ahead of requirements.

Loh sees a need for a “B-X” technologies line item in the Air Force budget—a placeholder for a future bomber—and he would fund it at roughly equal levels with the individual B-1, B-2, and B-52 upgrade lines—about \$100 million a year. The money would further underscore “our need to claim core competence in bomber technology forever,” he added. To set a date of 2037 for the next in-service bomber-like capability “is all but asking the [Defense Department] and industry to forget bomber technologies and innovative ways to project power [from the US],” Loh maintained.

Such a B-X line would be comparable to Navy line items that develop technologies for certain types of ships even if the ships are not being procured at the time, Loh pointed out. “I don’t think we should wait until 2020 to start thinking about bombers again.”

USAF photo by SSgt. Randy Mallard



Today, B-1Bs carry dumb bombs like these Mk 82s. Soon, all bombers will have capability for precision weapons and USAF will be able to merge mass and precision in the same platforms.

Asked why he thinks the Air Force has not pursued a new bomber, he said, "I think the Air Force believes ... if they put together a robust bomber roadmap that would showcase bombers now, that it would ... be perceived by Congress as a sign that we'd prefer bombers today [and draw away funding for the F-22 or C-17], which have a higher priority today."

Loh also felt the Air Force paid insufficient attention to the nuclear role of bombers in the roadmap, having become perhaps too enamored of the fleet's huge conventional capabilities.

"It seems to me ... the bomber has the most promise for keeping all our options open, wherever we go in nuclear policy," he asserted. He also noted that the B-2 is now the only penetrating nuclear bomber, the

B-1 having been withdrawn from the nuclear mission. A small handful of penetrating nuclear bombers is not enough, and the Air Force needs to "think nuclear" in future editions of the roadmap, Loh said.

Loh collaborated with Boeing on putting together a list of new and potential technologies that would be applicable to the bomber mission, but he said the long deferral of a new system will leave industry "not too interested" in doing such research. Without interim funding, USAF may not have a competent contractor at hand when it finally gets around to ordering replacement bombers, Loh said.

Maj. Gen. Bruce A. Carlson, director of operational requirements on the Air Staff, said he is aware of the panel's suggestion to aggressively improve the B-2's stealthiness but

that USAF feels it can safely wait to do so.

"The B-2 has a pretty good signature," Carlson said. "For the way we employ the bomber, it's adequate." Given the stealth work being done on the F-22 and JSF, he said, there is confidence in the Air Force that stealth materials will soon get easier to apply and maintain.

"A little bit down the road, we'll be able to get [stealth improvements] for less [than if an effort were launched now and focused solely on the B-2]," he asserted.

As for a new bomber's absence from the budget, he said USAF is "pursuing technologies that fulfill the mission area that are not necessarily a bomber [such as UCAVs, cruise missiles, and hypersonics]."

In the meantime, noted Carlson, "We already have three manned bombers. We don't see a threat that demands more. If, 15 years from now, something better, ... a more effective way comes along to do [the mission], we'll do it. We are preparing the necessary [technological] foundation to do that."

The reality, he added, is that "the budget won't tolerate doing everything at once." Fighters have priority.

Carlson said the recent Nuclear Posture Review stated the Air Force's strong, unwavering support of bombers in the nuclear role. However, since the end of the Cold War, he stated, "the target set has come down dramatically." A big increase in bombers isn't necessary to cover the threat. The bomber inventory meets the requirements of our strategic planners, he said. Moreover, since the conventional mission is more demanding, in practical terms, than the nuclear mission, "if you have enough to do the conventional, then you have more than enough to do the nuclear," Carlson asserted.

USAF is well aware that, into the 2030s, "all the bombers fall off the chart in a five-to-eight-year period," Carlson said. "We are posturing ourselves as well as we can [to have a replacement in hand] well before we come to that point. We feel the [roadmap] is a prudent approach to the mission. It's more risky than it would be if we had an extra \$2.5 billion a year to spend. We would have a different strategy if that were the case. But we feel this is the most prudent course we can take." ■

ANG photo by MSgt. Kevin L. Bishop



## B-2s Make Combat Debut in Allied Force

The B-2 stealth bomber saw combat for the first time on the night of March 24. Two of the long-range aircraft struck a series of targets in Yugoslavia in the opening hours of Operation Allied Force. Making a round-trip, 30-hour flight from—and back to—Whiteman AFB, Mo., the B-2s used a combined 32 Joint Direct Attack Munitions to strike a "variety of soft and hard targets," such as command-and-control sites, airfields, and barracks, an Air Force spokesman said.

The B-2s have since been "part of the mix" in almost every night of the air action in the Balkans, Maj. Gen. Charles F. Wald, vice director for strategic plans and policy on the Joint Staff, told reporters at the Pentagon. Service officials report that the B-2's ability to strike targets with near precision in all weather has made it a valuable part of the NATO striking force. The JDAM uses a Global Positioning System satellite location device which doesn't require clear weather or the pilot's intervention to score a precise hit.

In an April 20 Pentagon briefing, Maj. Gen. Bruce A. Carlson, director of operational requirements for the Air Staff, said the B-2s are "doing superbly" in combat operations. "The B-2 continues to improve in its maintainability," he reported. "In fact, two of them landed the other day at Whiteman in a driving rain, and they had flown 30 hours. And the [low observables] maintenance was essentially routine. In other words, there were no major LO write-ups ... that would have kept it from flying immediately thereafter. So we think we're turning the corner on low observable maintenance on the B-2, and I think it has great potential in the future."