The Bomber Question

The Air Force hasn't been told when to begin work on a new long-range strike aircraft, or even what it should be able to do.

By John A. Tirpak, Executive Editor

The Air Force is hoping there's a new bomber included in the Fiscal 2012 defense budget planned for release next month. If there is, it will be the centerpiece of a new portfolio of long-range strike weapons systems, which will encompass standoff missiles, older bombers, airborne electronic attack (AEA), carrier-based aircraft, and possibly a quick-reaction missile able to hit any global target within an hour.

Deliberations on the long-range strike system have been a subject of fierce controversy within the Pentagon for months. In September, Gen. Norton A. Schwartz, Air Force Chief of Staff, said the "debate is still raging" about the precise mix of systems necessary to carry out the mission in an affordable way. One senior USAF official said in October the subject had become a "third rail … touch and die" subject that couldn't be discussed outside the inner circles of the Pentagon.

At issue were the specific requirements for the new airplane. The traditional process of setting requirements for a bomber—developed by Air Combat Command and ultimately vetted by the Joint Requirements Oversight Council—was discarded.

Rather, Defense Secretary Robert M. Gates personally has final say on the aircraft's capabilities, based largely on inputs from his undersecretary for acquisition, technology, and logistics, Ashton B. Carter, and the head of the Pentagon's Cost Assessment and Program Evaluation shop, Christine H. Fox.

In this extraordinary arrangement, the Air Force in October was not even sure it would get to make a presentation to Gates before he rendered his decision on what capabilities the aircraft would have.

Said Schwartz, "We're not on his calendar, yet."

Although Gates was expected to give a green light to the project—he specifically endorsed the idea of a new bomber when addressing the Air Force Association's Air & Space Conference in 2009—there were no guarantees he

B-1B bombers pass Meteor Crater in Arizona. As a "paid for" asset, B-1s might be part of USAF's bomber force for decades more.

Photo by Ted Carlson

Northrop Grumman illustration

Air Force leaders have not given many details about what characteristics the new bomber should have. In a September 2010 speech, Air Force Secretary Michael B. Donley said the aircraft's design emphasis would be on conventional missions, "where they are most likely to be used," given that USAF bombers have been called on heavily as conventional attack platforms over the last 20 years. The service's goal, he said, is to avoid the experience of previous bomber projects, which either were too far a technological reach or cost too much to build in necessary numbers.

The Air Force, he said, has no intention of pursuing an aircraft with "narrowly focused capabilities, high-risk technologies, and high costs contributing to affordability problems leading to program cancellations or low inventories." Donley later told reporters the airplane will rely heavily on off-the-shelf technologies to hold down cost and risk.

wouldn't shelve the aircraft. He had done exactly that in April 2009, with the previous so-called next generation "2018 bomber" in favor of the now vaguely defined "long-range strike system."

A special commission chartered by Congress to review the recommendations in the Quadrennial Defense Review reported out in July that the Pentagon's planned force of 96 bombers is flatly inadequate. The commission, chaired by former Defense Secretary William J. Perry and former National Security Advisor Stephen J. Hadley, said a force of 184 bombers is more appropriate to credibly deter or, if necessary, fight China or other distant potential adversaries. The bombers should be comfortably able to defeat the latest integrated air defenses with a new generation of stealth technology.

Boeing illustration

A Northrop Grumman concept for a next generation bomber (top) and one from Boeing (above). Contractors don't know where to put scarce R&D dollars without Pentagon guidance.

Range the Planet

In a recent paper for the Center for Strategic and Budgetary Assessments, Mark A. Gunzinger noted the Air Force withdrew the B-1B and B-52 from penetrating attack missions in the 1990s, due to their inability to survive against modern air defense systems.

"Over time," Gunzinger wrote, "the B-2 should be expected to follow the same path as the B-52 and B-1 and lose its ability to penetrate advanced multilayered air defenses." Air Combat Command "has indicated the B-2 may be losing its stealth advantage." That's because in 2018, the B-2 will be 25 years old, and newer stealth technologies will be needed to evade highly advanced surface-to-air missiles and a variety of search and track radars expected to be ubiquitous by then.

Without the B-2 as a penetrator, DOD would lose its only aircraft that can attack targets in an anti-access environment at distances exceeding those of stealth fighters. "This fact has led the Air Force to conclude that it needs to begin developing a new penetrating bomber," Gunzinger reported.

However, he did say the aircraft must have the ability to "range the planet."

Schwartz separately said the machine will not have the hardening necessary to make it survivable against electromagnetic pulse, i.e., suitable for nuclear war. The bomber would have a wiring architecture making such a retrofit or upgrade possible on a later version, however.

In his speech at the 2010 AFA conference, Schwartz said future adversaries are putting up more sophisticated air

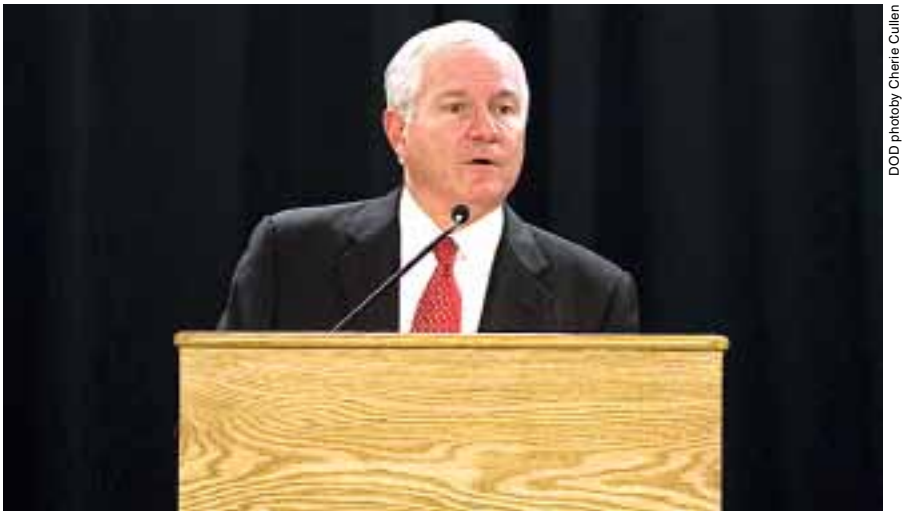
defenses "specifically designed to challenge our ability to project expeditionary power" and "prevent our freedom of action" in the theater of operations. These tougher defenses "can compel friendly forces either to accept higher risks, or be forced to operate, disadvantaged, at greater distances."

However, Schwartz said, due to tight budget constraints, "we cannot just pursue increasingly expensive advanced technologies." The answer is to build a "family of systems" able to overcome area denial measures and preserve USAF's ability to operate anywhere. With the Office of the Secretary of Defense, he said, the Air Force is "carefully developing" this system to ensure "maximum flexibility and longevity" of the portfolio "through a careful balance between simpler and more complex capabilities and platforms, including, we suggest, a penetrating bomber."

The system chosen will have to be versatile and flexible enough to go against the toughest air defenses without being overkill against undefended targets and be adaptable "over time" to meet new threats as they emerge.

The system chosen will use the block upgrade approach, in which an initial version is gradually improved with new capabilities to expand its power and deal with new threats. USAF will seek to balance weapons carriage, penetrating intelligence-surveillance-reconnaissance, and other capabilities, Schwartz said, allowing the service to "renew and extend our traditional Air Force competence: synchronizing diverse capabilities to deter and defeat complex and determined threats."

Schwartz said the Air Force and the Navy will have to function interdependently and rely on each other to accomplish some tasks, including long-range strike.



DOD photoby Cherie Cullen

Defense Secretary Robert Gates scrapped the 2018 bomber, saying the Air Force hadn't adequately defined its mission or requirements. Now he'll decide what the new bomber will be able to do.

Four Optional Mixes

In February, along with its Fiscal 2011 budget proposal, the Defense Department submitted to Congress its first-ever "Aircraft Investment Plan," which was required by statute. The plan did not predict the purchase of any new bombers during the decade 2011 to 2020, but forecast spending between $2 billion and $4 billion a year on science and technology on development of a new bomber by the end of the decade, beginning with $1 billion in Fiscal 2015.

Gunzinger, in the CSBA white paper, offered several options the Defense Department might pursue with the new LRS family of systems. In order to be effective, he said, such a portfolio must have a mixture of capabilities that include a penetrating bomber, supporting aircraft in the form of airborne electronic attack platforms (manned or remotely piloted), the presence of a robust ISR network, stealthy and longer-ranged attack capabilities for aircraft carriers, maintaining a certain number of legacy bombers for standoff missions, new standoff cruise missiles with which to equip them, and a prompt global strike weapon that could hit a fleeting but critical target within an hour of the order to do so.

He also offered four optional mixes of those capabilities that Pentagon decision-makers should consider. Gunzinger's preferred option would prioritize funding a new penetrating bomber supplemented by a new carrier-based remotely piloted aircraft with conventional strike capabilities, a new AEA platform for aircraft carriers, a new standoff cruise missile, and a "limited" number of conventional prompt global strike weapons. Under that option, the B-1 and B-52, which are already "paid for," could continue to serve nicely as standoff platforms or against lightly defended targets into the 2040s.

Before the next generation bomber was canceled, Air Force officials had suggested it would be an aircraft with a combat radius of more than 2,000 miles with a weapons load of about 28,000 pounds. (By comparison, an F-15E strike aircraft has a weapons payload of about 25,000 pounds.) The aircraft also was supposed to be stealthy enough to be capable of surviving—and persisting—in contested airspace against modern air defense systems, be nuclear-capable, and "optionally manned." To

USAF photo by MSgt. Val Gempis

For at least 15 years to come, the B-2 is likely to be USAF's only large-payload, long-range penetration platform. Here, airmen at Andersen AFB, Guam, prepare to load an inert bomb for a B-2 practice mission.

USAF photo

Although the entire B-52 force is 47 years old, with new standoff weapons—possibly hypersonic cruise missiles—the venerable BUFF might have a lease on life into the 2040s.

save money and time, it would rely on proven engine technologies rather than potentially risky new propulsion concepts, and it would be capable of subsonic—rather than supersonic or hypersonic—speeds.

Gunzinger evaluated what might be the "sweet spot" in range, payload, and cost for the new bomber, since Gates announced that affordability would be a principal characteristic of the new aircraft. Boiling it down to the idea that range and payload capability equated to aircraft size and number of engines—and thus unit cost—Gunzinger compared a 40,000-pound payload bomber with a 20,000-pound payload bomber. The larger, four-engine bomber, he deduced, would cost about $44 billion to develop and build 50 aircraft, while a smaller, two-engine aircraft would cost $46 billion to develop and build, but yield a 100-aircraft fleet. Schwartz and Donley have both suggested that a 100-aircraft fleet is about what the Air Force has in mind.

The larger fleet of smaller bombers is the better deal, Gunzinger argued, since it would be more tolerant of combat losses and vastly expand the number of aim points the Air Force could hit in the early hours of a conflict.

"As a comparison, 16 B-2s based in Guam could attack approximately 180 targets in a Western Pacific target area per day with GBU-31s [Joint Direct Attack Munitions], compared to 448 GBU-31s delivered per day by a fleet of 80 new active-inventory penetrating bombers with payloads of 20,000 pounds each," he wrote in the CSBA paper.

The larger bomber would have an advantage, though, in its ability to carry the Massive Ordnance Penetrator, a 30,000-pound bunker-buster able to penetrate deeply buried and hardened targets, which are proliferating.

If the Air Force were able to develop a weapon with the MOP's effects—but in a 5,000-pound munition comparable in size to the GBU-28 penetrator—the advantage would shift back to the two-engine bomber, Gunzinger said.

Lt. Gen. Philip M. Breedlove, USAF's deputy chief of staff for operations, plans, and requirements, said in June the expense of hitting hardened and deeply buried targets far from coastlines is one of the central points on which the LRS debate will turn.

"Our enemy learns well," said Breedlove, who has been tapped to become USAF vice chief of staff.

Roadmap Needed

"The real debate going on," he said, is "how much of our nation's wealth are we willing to put against those targets, which our opponent is making very, very expensive to strike." There is a danger that making certain choices about what the new bomber can and can't do would "telegraph" to opponents what targets the US might "cede" to a dedicated defender. He said it remains a "core requirement" of the Air Force to be able to hit any target, anywhere. The US can't allow an enemy "to feel like he has sanctuary because of policy decisions or equipment decisions that our nation has made."

Darryl W. Davis, president of Boeing's Phantom Works advanced development organization, said that extensive, "in-depth" work has been conducted on new bomber concepts over the last decade by industry, and if the Pentagon opts for an airplane that is similar to the ones discussed up to a year ago—"typically, a [15,000- to] 25,000-pound payload, 2,000 to 2,500 miles of radius"—he could "reach up on the shelf and have a lot of stuff [to offer] that's fairly mature." If the requirements hover where they have been, he added, companies would be able to "get moving pretty quickly." However, no one at the Pentagon "has given us any insight as to whether the requirements are going to deviate from what they've previously been talking about. ... It's just absolutely 'cold mike' on that. No one will talk," Davis said.

The Pentagon will need to set its priorities, and requirements will flow from them. "Some cost more, some cost less," he said. "And the ones that cost less tend to take longer to do the job."

Part of the cost and complexity of the project will depend on when the Pentagon needs to field the new airplane, Davis said. To hit a hypothetical target of having a squadron of new aircraft operational in 2024, "you probably have to start in 2012," he said. Starting later would likely incur a "year-for-year slip."

Concepts for a prompt global strike system have centered on replacing the nuclear warheads of an intercontinental ballistic missile, land- or sea-based, with a conventional warhead. Such a weapon would be able to hit any target on Earth within an hour's time of the go order. Using ICBMs, though, has drawn concern that such a weapon might be mistaken for a nuclear attack, potentially causing miscalculation by other nuclear powers.

Davis said there are ways to approach the problem that do not involve ICBMs. The X-51 and other hypersonic systems now in test could be perfected and launched from air or sea and take just 20 minutes to traverse 2,000 miles.

"Could you scale those up and make them weapons? ... Sure," said Davis. However, with such quick time of flight, attack against a mobile or fleeting target would require nearly "perfect" ISR: "the ability to watch it 24/7, 365 [days a year], through all the weather." If the target moves, there would have to be guaranteed communications and terminal control, because a Mach 7, "20-minute mission ... happens pretty fast."

Air Force officials said there were good reasons why the 2018 bomber was shelved in favor of the portfolio approach to long-range strike. The nation was on the verge of a new arms agreement with Russia, they said, and it made little sense to commit to a design that might

Photo via E-mans av8pix.com

B-52s line the ramp at Barksdale AFB, La. All B-52s now in service were made in the early 1960s, and advanced weapons will give the venerable bomber more nuclear bite.

almost immediately become obsolete. Moreover, whatever system is chosen will have to integrate with airborne electronic attack systems, and USAF had not yet formulated a comprehensive roadmap for AEA.

Timing is not a trivial issue.

Beyond the spur of approaching obsolescence is the fact that the defense industrial base has not had a stealth bomber program to work on for a decade. There is the very real possibility that the skills necessary to design such an aircraft could disappear from disuse.

Asked if such skills could vanish—possibly within a year—if a new bomber program isn't formalized in the 2012 budget, Davis said, "Oh, absolutely. There's no question about it."

Davis said industry has spent heavily on design work in anticipation of the bomber program, only to have the rug pulled out from under it several times in the last decade. That makes it tough to go to corporate leadership and ask for more money to invest in the project.

The point at which bomber skills could evaporate is "not all that far away," Davis said.

"Unless we, industry, decide we're going to spend a lot of our own money to keep these [design teams] together," the skills will dissipate, he asserted. Given the Pentagon's demand for industry to get more efficient, "if you can't see that there's ever going to be a return on those kinds of investments, I'm not sure how far industry is going to go to keep these skills viable for even another year," Davis noted.

A Critical Choice

At the time of the cancellation, Davis said, "engine houses, mission systems houses: … We were all working on it, thinking [funding] was coming." Now, Davis said, he has only about a dozen engineers involved with bomber concepts.

He wonders, "Why should I go work on this thing in any significant depth when I don't know what the requirements are, I don't know if there will be a program?"

As a consolation to industry when Gates last canceled a next generation bomber, in 2009, he agreed to put money in the 2011 budget for continued exploration of stealth and other technologies. However, by mid-October, Congress had not approved the 2011 budget—with about $200 million for bomber technology studies—and the money remained unspent.

A new bomber has been controversial since the 1990s, when Congress decided to cap production of the B-2 at just 21 aircraft, versus earlier production targets of as many as 132 stealth bombers. In 1999, the Air Force published a "Bomber Roadmap," which said it was well-fixed for bombers through 2037—an assertion that stunned many members of Congress at the time—assuming the service got a steady diet of funds to continually enhance its B-1Bs, B-2As, and B-52Hs with regular upgrades and new weapons. By 2006, however, the Pentagon's QDR called for the 2018 bomber, noting the age of the B-52 (all B-52s now in service were made before 1963). Also, the B-1B had been withdrawn from the nuclear role and was now purely a conventional platform.

In the last few years, the Air Force has been retiring its AGM-129 Advanced Cruise Missile, the stealthy weapon meant to give the B-52 more nuclear bite at standoff ranges. The older AGM-86 Air Launched Cruise Missile was retained, but in smaller numbers. The ALCM is cheaper to maintain.

Adversaries will not wait while the US gets its long-range strike act together, and there are penalties for further delay.

"If the next defense budget continues to defer needed long-range strike investments," Gunzinger wrote, "a gap is likely to emerge in which the nation could lose its conventional long-range strike advantage for a decade or more. Consequently, the United States has a critical choice to make: Either accept this loss on the assumption that long-range strike is less relevant in the future, or implement a plan and provide sufficient resources to maintain its long-range strike advantage." ■