Vindicated in war, USAF's long-range systems are taking new and more effective forms.

The Long Reach of the Heavy Bombers

By Adam J. Hebert, Senior Editor

IN MID-2001, the B-1B was in trouble. Years of fiscal stringencies had left the bomber with a $2 billion modernization backlog, poor reliability, rising upgrade costs, and some major combat deficiencies.

Secretary of Defense Donald H. Rumsfeld, reflecting the prevailing view, charged the B-1 "is not contributing to the deterrent or to the warfighting capability to any great extent." Indeed, the purported backbone of the Air Force heavy bomber fleet seemed destined for the scrap heap.

Then, things changed, and, just two years later, the B-1B became one of the star weapon systems in Operation Iraqi Freedom. Just 11 aircraft deployed to the combat theater. However, commanders set up and maintained B-1B "orbits" that kept at least one of the B-1Bs in the air around the clock, ready to engage emerging targets with huge loads of precision weapons.

Mission capable rates soared, and modernization programs were funded and put back on track.

For the Air Force's long-range bombers, the wars in Afghanistan and Iraq provided some of their finest hours. Their performance in many ways validated the service's bomber investment programs. USAF's B-1, B-2, and B-52 bombers were heavily tasked and proved to be highly effective in the two recent wars—and turned in several combat "firsts."

As Air Force planners describe it, the B-1Bs served as "roving linebackers," circling the battlespace and waiting for a call instructing them to unleash deadly satellite guided Joint Direct Attack Munitions. B-1Bs and B-52Hs performed close air support strikes for ground forces, and the venerable B-52H, the last of which was built in 1962, delivered laser guided bombs using newly installed Litening targeting pods. B-2s used new deployable shelters and were "turned" at a forward location to perform additional combat missions.

At least once, B-1B, B-2 and B-52H aircraft all were employed in the same strike package.

No Surprise

"It is no surprise that those aircraft and platforms were used in the way they were," said Maj. Gen. David A. Deptula, Air Combat Command's director of plans and

USAF photo by SSgt. Joanna E. Hensley

At the ready. *A B-1B of the 28th Bomb Wing, Ellsworth AFB, S.D., waits for the next mission. USAF bombers flew only about five percent of the service's strike sorties in Operation Iraqi Freedom, but struck a third of the targets.*

Old Horse, High Tech. *A B-52 with a Litening II targeting pod put laser guided bombs on target close to friendly ground troops. Here, TSgt. Ken Williams, Barksdale AFB, La., and TSgt. Noel Peters, Luke AFB, Ariz., clean a pod's lenses.*

programs. He said that the results of bomber usage over the past two years have confirmed what proponents of long-range strike capabilities had said for a long time: The range, payload, precision capabilities, and flexibility of bombers make them a superb weapon whose uses go well beyond mere "carpet bombing."

Gen. John P. Jumper, the Air Force Chief of Staff, offered one example of the new way of doing business. A combat controller in Afghanistan sent enemy coordinates "up to a B-52 at 39,000 feet, and the B-52 put laser guided munitions down" on a target that was only 1,000 feet in front of friendly forces.

"That's the effect of close air support," Jumper said. "You [didn't] see the airplane or feel the heat from the engines, but the precision was even better than we were able to do in Vietnam."

"This is not a surprise," Deptula said, noting that USAF decided years ago to push for improved bomber defensive systems, data links, and the ability to deliver smart weapons, all with an eye to making long-range systems effective in the future.

In the zero-sum game of defense budgeting, however, long-range strike has clearly suffered at times.

For example, DOD's response to the chronic underfunding of the B-1 fleet was not to fully fund the program but rather was to slash its numbers. USAF announced in 2001 that it would retire one-third of the B-1B fleet—dropping it from 93 to 60 aircraft—consolidate what remained at two bases, and use the savings to eliminate the $2 billion modernization backlog.

Some bomber partisans were up in arms, but the plan has worked, so far as it goes. Within the slimmed-down fleet, 36 B-1B aircraft were kept combat ready, with the other 24 in training status, depot maintenance, or test. That has been sufficient for the wars of recent years. Officials have long maintained that they would prefer a small fleet of effective aircraft to a large fleet of deficient systems.

The B-1B's MC rate—the percentage of aircraft ready to perform their primary mission at any given time—has increased steadily since the decision.

The Institute for Defense Analyses, a federally funded research center, determined back in 1995 that B-1B MC rates are heavily dependent upon sufficient spare parts, equipment, and personnel. Until the retirements began, the Air Force was never able to give the bomber the sustained support it required.

The B-1B MC rate has risen from 61 percent in 2001 to 66 percent in 2002 and 71 percent this year. For the bombers deployed in support of Gulf War II, the rate was even better—79 percent. (The B-2 and B-52 bombers supporting OIF posted MC rates of 85 percent and 77 percent, respectively).

This marks a dramatic turnaround. In the 1990s, B-1B mission capability typically slogged around 60 percent.

When Lines Blur

The line between strategic and tactical systems—never as distinct as it may have appeared—forever has been blurred, and the bombers have proved adept at flying "tactical" missions (while some fighters have proved equally adept at the "strategic mission"). Close air support is no longer the exclusive domain of the A-10 tank-killer aircraft. F-117 fighters carried out numerous strategic strikes in Baghdad and elsewhere. Officials point to this jumbling of operational use as a success in the shift to effects-based operations.

At times, B-1s were able to use moving target indicator radars to perform the functions normally reserved for dedicated intelligence-surveillance-reconnaissance (ISR) aircraft—an airpower first, according to US Central Command.

Each bomber in the Air Force fleet now is capable of delivering JDAMs, which offer targeting flexibility. The JDAM can not only hit fixed targets with near-precision accuracy in all weather conditions but also be quickly programmed to attack a fleeting "emerging target." One strike against Iraq's Republican Guard Medina Division required a B-2 to reprogram its JDAMs, en route to the target, to take advantage of new intelligence coming in from a Global Hawk unmanned aerial vehicle.

Toward the end of major combat, a B-1B orbiting above western Iraq showed the value of the Air Force's heavy bombers in a new way. Intelligence sources on the ground got a tip on the location of former Iraqi dictator Saddam Hussein. The information was beamed to a B-1B circling in the area. Just 12 minutes later, the target lay in ruins, though Saddam may have gotten out shortly before the roof fell in. After dashing to Baghdad and programming in the coordinates, the B-1B had precisely dropped four 2,000-pound JDAMs where Saddam was thought to be.

In addition to deploying 11 B-1Bs, Air Force leaders reported they sent to war four B-2s and 28 B-52s. These 43 aircraft flew a total of 505 sorties between March 20 and April 18, but, as was true in the Afghan war, the bombers' impact was out of all pro-

portion to their numbers. One official noted that a third of all the aim points struck in Iraq were hit by that small bomber force.

Jumper made special note of the bomber impact in the now famous sandstorm that struck Iraq March 25. "You couldn't see your hand in front of your face," he said, and war commentators began to ponder the significance of the "pause" in the war.

"While the commentators were rattling on," said Jumper, USAF's bombers and other aircraft were at work. With the Air Force's ISR systems able to see through the sand, and GPS-guided weapons unhindered by the weather, "B-1s and B-52s were up there pounding the heck out of [the Medina Division]," Jumper said. "I'd like to ask the commander of the Medina Division when he thought the pause was."

"Amazing" Powers

Gen. T. Michael Moseley, who led the allied air war, had another anecdote on the effectiveness of long-range systems. From the United States, a B-2 stealth bomber for the first time delivered 80 500-pound bombs in a single run.

Moseley said the ability to fly from Whiteman AFB, Mo., and drop those 80 weapons against an Iraqi troop concentration was "an amazing capability to bring to the [commander's] quiver."

The success of the bombers in Iraq and Afghanistan has not dramatically changed the Air Force's plans for the aircraft. Because the Air Force has used only a small number of bombers in recent wars, USAF planners still say the existing bomber inventory will be adequate until around 2038. Also helpful is the fact that only one bomber was lost in the two major combat operations. In December 2001, a B-1B, doomed by numerous onboard failures, crashed in the Indian Ocean on its way to Afghanistan.

The Air Force believes an inventory of 60 B-1Bs (36 combat coded); 21 B-2s (16 combat coded); and 76 B-52s (44 combat coded) will suffice.

"About 150 bombers is the right number," said Brig. Gen. Stephen M. Goldfein, USAF's director of operational capability requirements. There has been "no sea change in the number of bombers required," because of recent experience, Goldfein said. The Air Force's inventory plan "includes some reserve," he added, but the preferred number remains stable.

In recent years, lawmakers have often disagreed and pushed for larger numbers of bombers. There have been several unsuccessful attempts to restart B-2 production, with proponents saying the aircraft could be produced much less expensively now that the research and development expenses are already paid.

Citing the lack of any new bomber production, Congress for years has been successful in forcing the Air Force to maintain 18 attrition reserve B-52s that the service considers surplus. A total of 94 B-52Hs remain in service, although only 44 are considered primary mission aircraft.

Congress, led by North Dakota lawmakers, has added funds needed to keep 18 BUFFs at Minot AFB, N.D., configured exactly the same as the rest of the B-52 fleet. Goldfein noted that, despite the service's interest in retiring the 18 aircraft, doing so wouldn't save the Air Force any money. Congress pays the bill, so the savings would be for the taxpayers.

Congress also may force the Air Force to restore some or all of its recently retired B-1Bs. By late summer, three of the four Congressional defense oversight committees had passed legislation mandating that 23 of the 32 deactivated Bones be restored to service.

In the bills, lawmakers offered the $20.3 million needed to bring the B-1s back from the boneyard—but not the much larger amount required to keep the B-1Bs in service. Officials say this unfunded mandate threatens to undo the progress the Air Force has made improving the health of the B-1B fleet.

It would likely cost somewhere between $1.1 billion and $2 billion to keep those aircraft in service through the end of the decade. That funding "has to come from somewhere," Goldfein noted.

The existing arrangement of consolidating the B-1Bs at Ellsworth AFB, S.D., and Dyess AFB, Tex., has enabled the increased mission capable rates through simplified maintenance and parts requirements. Fully funding the smaller fleet's modernization plans brought on a "host of improvements," Goldfein added.

Incremental Upgrades

With no new bomber production on the books, and old debates over restarting B-2 production or pursuing an FB-22 variant of the F/A-22 Raptor seemingly on the back burner, the current emphasis is on incremental upgrades. Numerous programs to improve bomber effectiveness are ongoing.

Situational awareness improvements, the Link 16 data link, laser targeting pods, and computer en-

USAF photo by TSgt. Michael R. Nixon

Global Power. *SrA. Jeremy Pratt, a B-2 crew chief, marshals this B-2 on its way to a combat mission over Iraq from its home base at Whiteman AFB, Mo. The stealth bombers launched from the US and within the theater.*

hancements will continue to make each bomber a more efficient war machine. And upcoming weapons such as the Joint Air-to-Surface Standoff Missile and the Small Diameter Bomb will further broaden the range and number of targets bombers can precisely attack.

ACC officials say that, at this point, almost every improvement serves a dual purpose. Upgrades are expected to both sustain and modernize. Sustainment doesn't just mean keeping the aircraft aloft, either—the aircraft must remain valuable fighting machines. "We're looking at 2040," one B-52 official said. "Unless we can come to the war, they won't need us."

The Air Force is trying to get additional targeting pods on its B-52s, Deptula said. "We're looking at using [Fiscal 2003 and 2004 funds] to get as many targeting pods as we can," by using money set aside for the war on terrorism.

Goldfein said the service is interested in increasing the availability of the B-2's deployable shelters. Because of the sensitive low observable finish on the B-2, the bomber must be maintained in a climate-controlled shelter. Deployable shelters, reportedly set up at the Indian Ocean atoll of Diego Garcia, increased the flexibility of the B-2 for Gulf War II. The Air Force is "looking to expand" their use, Goldfein said.

As Air Force officials tell it, existing bombers will continue to get better and there is no urgent need to field a new system. Recapitalization is "a huge piece" of force structure planning, Deptula said, but USAF has some time to make proper assessments and make wise decisions.

The old way of procurement—planning a new system to replace an old one—"isn't completely gone," Deptula said, "but the fact of the matter is, with respect to the long-range strike platforms formerly known as bombers, their lifetime is viable for many, many years into the future."

The Air Force does not expect to see a dramatic technological breakthrough anytime soon. However Deptula believes that hypersonics research now being done at Air Force Research Laboratory may hold the key to breakthrough strike capabilities in the future.

Transition Period

"We are in a transition period ... when it comes to technologies for long-range strike," he said. Reusable hypersonic propulsion has been difficult to develop, he noted, but it remains worth the effort because the technology offers revolutionary responsiveness, reach, and range. "We're not there yet," Deptula noted.

Improvements to existing systems are expected to bridge the gap until scientists "solve some of these technological challenges that will get us

The Roadmaps Not Taken

The Air Force's most recent servicewide white paper on long-range strike aircraft appeared in November 2001. Air Combat Command last published a bomber roadmap in 1998.

These documents laid out in detail the service's plans for its bombers, including expected modes of operation, modernization plans, and replacement timelines.

In August 2002, ACC officials completed yet another bomber roadmap, but senior Air Force leaders never signed it out for public release. That's probably the way things will be from now on.

The Air Force is "transitioning to more of a capabilities-based approach to force structure planning," explained Maj. Gen. David A. Deptula, ACC's director of plans and programs at Langley AFB, Va. "At Air Combat Command, you won't see any more individual system roadmaps or groups of system roadmaps."

Instead, ACC is putting together a "force structure flight plan" that spans the combat air forces. According to Deptula, it will examine the concept of "integrating the capabilities" of systems across categories. In short, the goal is to defeat the enemy, not wall off specific mission areas for certain systems.

Fighters, bombers, weapons, intelligence-surveillance-reconnaissance platforms, and other assets will all be integrated "into a long-term force structure plan that will identify numbers, types, and capabilities" and will serve as a roadmap for all combat aircraft, not just for long-range bombers or fighters, as in the past.

Deptula said USAF was preparing an integrated position on long-range strike, based on the recommendations of various interested parties throughout the Department of Defense. These recommendations will be evaluated against the national defense strategy to finalize plans for ACC's aircraft programs.

"You will have, at some point, a document that will lay out ... the combat air forces' intent" for investment, Deptula said. Though it is a "roadmap" of sorts, he said, it will not feature organizational stovepipes concerning bombers, fighters, or command and control and ISR platforms.

Deptula sees a disintegration of the traditional ways of achieving desired battlefield effects. Heavy bombers now perform close air support. F-15E Strike Eagles will carry the extended-range Joint Air-to-Surface Standoff Missile. In such an era, it makes sense for the Air Force to think about capabilities fleetwide and not in serial isolation.

ACC's requirements shop, however, will continue to develop specific modernization plans for the individual systems, Deptula said.

Bomber Mission Capable Rates

	FY01	FY02	FY03	OIF
B-1B	60.7%	66.1%	71.4%	79.4%
B-2A	31.6%	42.0%	44.0%	85.0%
B-52H	80.5%	79.2%	73.9%	76.7%

Mission capable rates reflect the percentage of aircraft ready to perform their primary mission at a given time.

to the next step in potential capability," he said.

In Deptula's view, the breakthrough will not come until sometime in the next decade. That timing seems to mesh cleanly with financial realities.

"Our legacy platforms are viable through 2025," said Deptula, "and when we enhance them with all these modifications, they are going to continue to increase in capability." It's a nice fit, he went on, because major funding for future long-range systems probably won't be available "until the 2010-2020 time frame, because we have such a pressing need to recapitalize our fighter force in the next decade."

The Air Force is holding to its November 2001 bomber roadmap, which laid out a notional plan to begin a new long-range strike program sometime around 2012-15. Officials say there is no need to rush into a new strike program, because USAF would spend billions developing a system that may not be significantly better than what is available today.

Features such as stealth, high speed, long loiter time, large payload capacity, and flexibility are well-understood goals for any future strike capability. However, there is great uncertainty. Officials are loath to say a follow-on system will be a "B-3" or even a bomber.

Industry, think tanks, and Air Force officials are all studying what is within the "art of the possible," and USAF wants to keep the broadest possible range of options on the table. These options include traditional bombers, unmanned systems, hypersonic air-space vehicles, conventionally armed ballistic missiles, and even space-based weapons. Current timelines give the Air Force a decade to explore the options.

ACC's Long-Range Global Precision Engagement Study—a look at future strike requirements—noted that the US is pushing for a capability to conduct high-speed strikes against emerging targets anywhere in the world on short notice. However, it has limited options in this area. Conventional ballistic attack missiles, derived from the nation's nuclear ICBM force, "offer increased strike flexibility," but the financial and political cost would be high, the report noted.

USAF photos by SSgt. Cherie A. Thurlby

Retasking En Route. *At least one combat mission over Iraq saw a B-2 crew reprogram its Joint Direct Attack Munitions en route to the target area, taking advantage of real-time intelligence.*

Quick Time. *A weapons load crew readies 2,000-pounders for a B-1B during Gulf War II. One B-1B dropped four 2,000-pound JDAMs on a location suspected to house Saddam Hussein—within 12 minutes of receiving the intel.*

Another area for improvement concerns stealth. The B-2 bomber's low peacetime MC rates stem from the high-maintenance nature of its low observable coatings. The aircraft is also largely relegated to nighttime use in high-threat environments. Yet the B-2 remains the only stealthy strike system largely unhindered by distance or basing concerns.

In the future, the F/A-22 and F-35 fighters will offer around-the-clock stealthy strike capability, noted the study, but the B-2 will continue to be the only stealthy, deep strike penetrator for the foreseeable future. The F/A-22 and F-35 have more limited combat ranges.

The study did not advocate a specific course. However, it did highlight the importance of speed. The advent of hypersonic weapons and platforms would permit "prompt global strike from significant ranges and reduce the risks associated with forward basing," the report noted. Compared to ballistic missiles and cruise missiles, it went on, reusable platforms have high utility "in all lesser threat scenarios, enhancing their cost-effectiveness across the spectrum of conflict." ■