

Not so superior anymore; R&D is a strategic asset; Twenty-three years of litigation; Intangible but valuable by-product; Better buying power 2.0

OBJECTS IN MIRROR ...

Cuts in research and development have so badly eroded the US lead in military technology that it's razor thin in some areas and gone in many others, according to the Pentagon's top technology chief. Competitors are catching up fast and unless action is taken—and quickly—the lost edge will pose a profound strategic problem for the nation.

"Technological superiority is not assured," said Frank Kendall, the Pentagon's acquisition, technology, and logistics chief. "I'm very concerned about ... where we're going to end up," he said during a January panel discussion sponsored by the Center for New American Security in Washington, D.C.

Kendall said the US has gotten complacent since its technology led to overwhelming victory during the Cold War and the first Gulf War, and this "led to an assumption over the next 25 years that technological superiority would be a fact of life," but it isn't, he said.

Other countries are increasing their R&D investments "while we're decreasing ours," and consequently, "we do have reason to be concerned," he reported.

The US is only "several years ahead" of China and Russia in fifth generation fighter technology, as evidenced by their progress with stealth fighters of their own, he noted. Competitors have achieved parity in ballistic and cruise missiles, Kendall warned—"they're doing quite well compared to us"—and electronic warfare "is a close race right now." The US still clings to a lead in submarine technology, but "our space systems are vulnerable." There are more areas of concern, but these are classified, Kendall said.

Despite the need to keep ahead of the Joneses, R&D spending is taking big hits in the defense budget. That's because sequester-mandated spending levels must be reached so fast they can't be achieved simply by cutting manpower or force structure. R&D spending is down in the recently enacted 2014 defense budget, and the request in Fiscal 2015 "is much worse," Kendall said.

In January, China confirmed it had tested a hypersonic glide vehicle—an accomplishment that seems to put it easily on par or beyond the US in an area that Air Force Chief of Staff Gen. Mark A. Welsh III has identified as critical to USAF's future success. The revelation led several members of the House Armed Services Committee to issue a statement that "the Chinese and other competitor nations are [reaching] military parity with the United States; in some cases, as in this one, they appear to be leaping ahead of us."

The congressmen—including outgoing HASC Chairman Howard P. "Buck" McKeon (R-Calif.)—said the US deficiency in R&D is inviting trouble. The Asia-Pacific region is "a powder keg," they said, and allowing other "nations that do not share our respect for free and open avenues of commerce to gain a strategic advantage over the United States and her allies only brings us closer to lighting the fuse."

Kendall explained that although the Pentagon tends to view R&D as a variable cost, it's not. Usually R&D is funded relative to force structure, but it has nothing to do with the size of the force.

"It doesn't matter how many tanks you buy; if you want a new tank every 20 years, you have to do the R&D, ... period," Kendall said. "So it's not a variable cost, but we have a tendency to treat it like [one]—and cut it more."

A third consideration is the simple math of time, he said.

"Time is not a recoverable asset," Kendall explained. "And R&D really buys you time. We are in something of a race for technological superiority over time, and if you give that up, you do not get it back." He said that while he can buy back readiness or force structure—if the funds are appropriated—"I have no way to buy back time, ... and that timeline is relatively long." He said it takes about two years to set a requirement and create a budget for it, then two to four years of risk reduction, "then we have five to six years of development, ... into production, and then we have a few years of building up numbers to be of significance."

Just a week later, Kendall told attendees at an American Institute of Aeronautics and Astronautics conference that failing to create new systems to replace worn-out or obsolescent ones will create a "hollow force," just as surely as failing to provide spare parts or ammunition.

Wesley G. Bush, CEO of Northrop Grumman, told the CNAS gathering that the whole US technological "ecosystem"—beginning with grade-school education in science, technology, education, and mathematics up to the aerospace industry writ large—is at grave risk because of the budget cuts.

"This innovation ecosystem needs everyone—not just scientists but those who build, sell, and service products," he said. However, graduates in STEM are "recruited around the globe" and might not contribute to US advancement.

"There's no guarantee that those whom we educate will contribute to America's innovation, especially if they observe declining R&D budgets here and rising budgets elsewhere," Bush said. Other countries are patterning their innovation ecosystems on that of the US and are succeeding well with the model, he added.

"We need to think about R&D as a strategic asset for our nation, not a cost. If you think about it as a cost, you think about cutting it. ... I think we're making a profound mistake by cutting R&D." Bush said that while there "absolutely" are ways to make the defense budget more efficient, "I think we have taken these cuts far beyond what can be recovered from efficiencies." He also suggested that budget-cutting alone will not solve the nation's economic and fiscal woes.

"We have to invest in R&D to drive long-term growth," he said. Gutting it "reduces our future growth potential."

LEGACY OF THE A-12

After an exhausting 23-year legal battle, the Navy and its contractors on the A-12 attack airplane—canceled by then-Defense Secretary Dick Cheney on the eve of the first Gulf War in 1991—finally settled their claims and counterclaims in January. The contractors will pay the Navy \$400 million worth of goods and services, and the Navy pays nothing in return, except giving up the fight to get more.

The litigation—in which each side won rounds in a series of five trials and three appeals that at one point reached the Supreme Court—has provided one valuable by-product, even if it never yielded a working combat aircraft. That by-product was an object lesson in how not to structure major Pentagon contracts—the lesson that you can't invent technology at a fixed



KC-46 and F-35 aircraft are benefitting from the A-12 mess.

price. That wisdom, won at a cost of billions, is now enshrined in Pentagon acquisition rules.

The A-12 was conceived in the 1980s, when the Navy wanted a stealth combat jet of its own. The Air Force had already fielded the top-secret F-117 and was working on the B-2 bomber. It was the heyday of the so-called “Reagan Buildup,” when a huge amount of money was being thrown at defense to turn around the “hollow force” that resulted from the post-Vietnam drawdown.

In a joint arrangement, the Navy would develop the A-12 as a replacement for the A-6 Intruder carrier-based medium bomber, while the Air Force would buy the resulting airplane as a replacement for its F-111 interdiction bomber.

Pentagon acquisition officials at the time were big on fixed-price contracts, believing that companies should be held accountable to accurately predict the cost of developing new technology. Even if the estimates were off, Pentagon leaders believed their vendors could “get well” financially with big production contracts later, even if they lost their shirts in development.

Northrop and Grumman, then separate companies, opted not to bid on the A-12 because they believed the fixed-price contract was unworkable. There were sure to be overages, especially since the Navy continued to add features and requirements, and as stealth technology, then still in its operational infancy, evolved. General Dynamics and McDonnell Douglas were more optimistic, and they won the contract to build what came to be known unofficially as the “Dorito” for its triangular, flying-wing shape.

The project went downhill fast, however, and both the Navy and the contractor team each started keeping two sets of books: one that documented how the program was really doing and another they used in discussions with each other. The contractors told the Navy the A-12 was on time and schedule; the Navy pretended to believe it. It was the contract that was to blame: If the companies admitted problems, they could be on the hook for billions in overruns. The Navy, meanwhile, feared that if it acknowledged the problems, it would in effect accept a change in the contract to cost-plus, and the service would be liable for the mounting overages.

The Navy told the fiction of the A-12’s success to Cheney, who in turn repeated it to Congress in his “Major Aircraft Review.” By mid-1990, however, the real story began to leak to the press: The jet was at least two years behind schedule, one-third overweight, and billions over budget. Cheney ordered

an inspector general investigation and, shortly after receiving it, canceled the A-12 himself.

The lawsuits began almost at once. The contractors argued the A-12 had been canceled for the convenience of the government and wanted cancellation fees. The Navy argued that the contractors had failed to deliver anything but a half-built mock-up for the \$1.2 billion in progress payments. The service wanted the money back.

The legal battle went on more than two decades. General Dynamics sold its aircraft business to Lockheed in 1993, but kept its standing in the lawsuit, believing it to be a moneymaker. Boeing inherited its share of the lawsuit in 1997, when it bought McDonnell Douglas.

The sting of the A-12 fiasco has left a lasting soreness at the Defense Department. Pentagon ATL chief Kendall last fall released a second comprehensive review of how the Pentagon buys things. Called “Better Buying Power 2.0,” it clarifies guidance offered by his predecessor, Ashton B. Carter, who had championed a return to fixed price contracting.

“There was a lot of overreaction” to Carter’s message to the acquisition troops that fixed price was back in vogue, Kendall said at an industry conference last year. “People started thinking that was what they should use all the time—and use it for everything,” he said. Now, however, the latest acquisition rules—the “5000 series” of regulations—explain that fixed price should only be used in certain circumstances. The idea is that fixed price works best when the item to be bought is well-understood, and the government is prepared to restrain itself from making changes that disrupt the production plan and add time and cost. It should not be used when developing a radically new technology, when it simply isn’t known what obstacles may be encountered and how to work through them.

The F-35 and the KC-46 tanker, two of USAF’s top three acquisition priorities, are benefitting from the new wisdom. The F-35 is now at a point where the scope of the hardware and software, though still in the works, are reasonably in hand, and Lockheed Martin has offered to sell the jets to the Pentagon for a fixed price over several production lots. The KC-46 is being developed at a fixed price only because the work is clearly spelled out and understood by both parties and because the government has pledged not to change its requirements. The Secretary of the Air Force alone is authorized to alter them.

The Air Force has so far not stated how it will buy its third priority—the classified Long-Range Strike Bomber—but the service leaders describe the program using buzzwords and catchphrases, such as “integration, not invention” and “cost as an independent variable.” ■