

SUSTAINING THE U.S DEFENSE INDUSTRIAL BASE AS A STRATEGIC ASSET

By Barry D. Watts

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Overview

As the Department of Defense (DoD) struggles to adjust its plans, programs and operations to what is expected to be a protracted period of shrinking budgets, the challenge of preserving the truly vital portions of the nation's defense industrial base (DIB) is of increasing concern. Since the early 1940s the United States has relied primarily on commercial, for-profit firms to design, develop and produce the advanced weaponry and supporting systems on which America's military relies. While the U.S. defense industrial base weathered a major drawdown following the Cold War's end, another round of industry downsizing may find the United States no longer able to produce certain essential military systems and capabilities. The time for the Defense Department to take a long-term, strategic approach to managing the U.S. defense industrial base is now, while the Pentagon still has the opportunity to preserve its core elements. The alternative is to risk losing them to recurring bouts of short-term, across-the-board budget cutting.

What might a strategic approach to managing the U.S. DIB look like? First, the guiding principle should be determining what design and production capabilities to retain in the long term rather than focusing on what programs to pare down or eliminate in the short term. Second, the United States' strategic decision to "*rebalance toward the Asia-Pacific region*" (while continuing to counter violent extremists in the Middle East),¹ argues that in those military competitions most critical to U.S. national security, the American military will need to sustain competitive advantage relative to even the most formidable potential adversary.² Finally, sustaining advantage in the critical military competitions will depend on ensuring that both essential design and production capabilities in the defense industrial base are preserved.

Toward this end, the business literature's conception of core competencies provides a useful framework for identifying both the military competitions in which the U.S. military should retain enduring advantage as well as the industrial "crown jewels" that underwrite U.S. advantage in these competitions. Here the crucial insight from the business literature is that a legitimate list of the core competencies of a corporation must be short: certainly less than ten and probably closer to five or six. For any firm, a list even as short as 15 or 20 putative "core competencies" risks too many of the things that the

¹ Department of Defense (DoD), "Sustaining U.S. Global Leadership: Priorities for 21st Century Defense," January 2012, p. 2 (italics in the original).

² Michael Porter analyzed the concept of sustainable competitive advantage in detail in his influential 1985 *Competitive Advantage: Creating and Sustaining Superior Performance*. Basically he argued that a business firm has competitive advantage if it can produce at lower costs than its competitors, or if it can deliver more perceived value than competitors can, or if it can achieve a mixture of both lower costs and greater perceived value. Core competencies can be understood as the sources of competitive advantage.

corporation does being considered a “top” priority, even though good strategies cannot have dozens of “top” priorities. The same is true for the core competencies of the American military and of the U.S. defense industrial base.

This paper proposes a short list of the military competitions most likely to dominate military relationships between the United States and prospective adversaries over the next decade or two. These six areas of competition—precision strike, nuclear capabilities, power projection, access to the global commons, integrated combined-arms campaigns, the cryptologic enterprise, and realistic training—can be thought of as the core competencies of the U.S. military establishment. They are the areas in which the U.S. military will need to sustain competitive advantage, not only today but for the foreseeable future.

Given the current state of technology and Service preferences, DoD’s core competencies can then be used to identify the relevant core competencies in the defense industrial base. These are the areas that underwrite sustainable competitive advantage in the vital military competitions. The DIB’s core competencies, in turn, point to indigenous design, engineering and manufacturing capabilities that the Defense Department will need to accord sufficient priority to ensure their long-term preservation

Not every element in the prime contracting firms and the associated supply chains underlying the DIB’s core competencies will demand special attention and preferential investment. For example, if three or four firms are maintaining design teams for nuclear submarines based on existing programs, then special attention or targeted funding would not be necessary. But if the requisite design capability only exists in a single firm, then preserving that capability would be a priority in any coherent strategy for sustaining the U.S. defense industrial base.

Drilling down into defense supply chains to identify unique, fragile, or niche capabilities requires detailed data—almost certainly including propriety and classified information about individual firms and their defense programs that is not publicly available. Indeed, only in recent years has the Defense Department begun to map the sectors and tiers of the U.S. DIB to this degree of detail.³ Consequently, an in depth, comprehensive strategy for preserving the U.S. defense industrial base is beyond the scope of this paper. But drawing on the concept of core competencies, it can argue that such a strategy is not only possible, but increasingly urgent.

An Overview of the U.S. Defense Industrial Base

What is the structure of the U.S. defense industrial base in the early 21st century? What companies are most likely to contain essential, one-of-a-kind, defense-unique capabilities that the Defense Department will need to preserve in the long term? The firms that immediately come to mind are leading prime contractors for major weapons and military systems such as Boeing, General Dynamics, Lockheed Martin, Northrop Grumman, and

³ Office of the Deputy Assistant Secretary of Defense for Manufacturing and Industrial Base Policy (MIBP), “Annual Industrial Capabilities Report to Congress,” August 2012, pp. 9-12.

Raytheon. In Fiscal Year (FY) 2012, the Defense Department obligated \$85.4 billion to these five defense contractors out of the total of \$356.7 billion obligated to all contractors.⁴

The first point to be made about the leading defense contractors is that they possess design, engineering, and production capabilities for advanced systems whose only customers are the U.S. military services (or those of close American allies). There is no commercial market for a B-2A bomber, a Joint Direct Attack Munition (JDAM), a protected military communications satellite, or a Trident II submarine-launched ballistic missile (SLBM). In FY 2012 there were many firms that received DoD funds for a wide range of commercial goods and services. Examples include Kraft Foods, the Kuwait Petroleum Corporation, United Parcel Service, the Triwest Healthcare Alliance Corporation, and the Veritas Capital Fund II. By and large these and similar firms do not contain critical elements of the DIB that warrant preservation in order to ensure DoD's competitive advantage in the core military competitions.

The other point is that these top-tier firms depend on complex, multi-tier supply chains that include industry partners and myriad lower-tier contractors for everything from major components to raw materials. Consider the main components of the F-35 Joint Strike Fighter (JSF): Lockheed Martin is responsible for the forward fuselage and wings, Northrop Grumman the center fuselage, and BAE Systems the aft fuselage. The plane's F135 turbojet engine is supplied by Pratt and Whitney, which is a subsidiary of United Technologies; the JSF's AN/APG-81 active electronically scanned array (AESA) radar is built by Northrop Grumman; and its composite wing skins are produced by Alliant Techsystems. Yet these observations about the main upper-tier contractors involved in the F-35 program provide no more than a glimpse of the true complexity and variation of the U.S. defense industrial base today. As the Office of the Secretary of Defense (OSD) acknowledges:

[S]ome defense-unique parts of the base develop brand-new, emerging technologies, while others manufacture and update very mature products; some products and services incorporated into the defense supply chain are widely available in commercial markets, while others are uniquely useful to the military; some niches have significant backlogs of work and reservoirs of capital earned in a recent production surge, while others currently operate at or below their minimum sustaining rate and are financially fragile. In some parts of the defense industry, all of the intellectual capital resides in a few key companies that interact directly with the Department and rely on build-to-print subcontractors, while in other areas the key design capability and production skills are diffused through the extensive layers of the supply chain.⁵

It is misleading, therefore, to view the U.S. DIB as a single, monolithic entity. Companies in any of its sectors and tiers, regardless of size, may provide unique products that enable the production of critical systems and subsystems used by the U.S. military; and neither

⁴ "Fiscal Year 2012," Federal Procurement Data System—Next Generation, worksheet "DoD (9700)," available at <https://www.fpds.gov/fpdsng/cms/index.php/reports/62-top-100-contractors-report>, accessed May 11, 2013.

⁵ MIBP, "Annual Industrial Capabilities Report to Congress," p. 9.

the supplier nor the military customer may be aware of their dependence on commercial elements.⁶ It is this complexity and variability that led the Defense Department's Office of Manufacturing and Industrial Base Policy (MIBP) to undertake an analytic effort to map and assess the U.S. defense industrial base "sector-by-sector, tier-by-tier."⁷ As a result of this effort, the MIBP office has concluded that the U.S. DIB is not only complex, but is also serviced by a diverse array of companies that span the globe.⁸

Tightening Fiscal Constraints

Within a few years of the Cold War's end, the Defense Department's annual budget authority fell to \$250-260 billion in then-year or current dollars. Taking inflation into account, this comes to around \$400 billion in constant Fiscal Year (FY) 2014 dollars. Beginning in FY 1999, DoD budgets again began to grow, but modestly. Following al-Qaeda's September 11, 2001 (9/11), attacks on the World Trade Center and the Pentagon, growth in the Defense Department's base budget accelerated. Ignoring the \$1.43 trillion in supplemental funding for the wars in Afghanistan and Iraq through FY 2013, DoD's base budget authority (in current dollars) grew from \$287.4 billion in FY 2001 to \$527.9 billion in FY 2010, an increase of over 80 percent, or roughly 50 percent in constant FY 2014 dollars.⁹

In FY 2010, however, DoD's baseline budget began leveling off, and it is now entering what is expected to be a protracted period of decline. Supplemental funding for overseas contingency operations is declining as well. The last U.S. combat troops left Iraq in 2011, and the Obama administration hopes to transition full responsibility for Afghanistan's security to the Afghans by December 2014.¹⁰ Including a cut of \$37 billion due to the sequestration that went into effect on March 1, 2013, it appears that the Pentagon's base budget, in current dollars, will fall to \$495.4 billion in FY 2013, a reduction of 6.2 percent since FY 2010.¹¹ In constant FY 2014 dollars, DoD's estimated baseline FY 2013 budget is some 11 percent lower than it was in FY 2010.¹²

These reductions over the last few years are already affecting the U.S. military's readiness, operations and acquisition plans. In addition to training and maintenance cutbacks and curtailed deployments, Pentagon spokesmen have reported the disruption of

⁶ MIBP, "Annual Industrial Capabilities Report to Congress," p. 1.

⁷ MIBP, "Annual Industrial Capabilities Report to Congress," p. 2.

⁸ MIBP, "Annual Industrial Capabilities Report to Congress," p. 1. As of January 2013, the Aerospace Industries Association had 152 full-member and 230 associate-member companies.

⁹ OUSD/Comptroller, "National Defense Budget Estimates for FY 2014," May 2013, pp. 38-41, 146-147. Note, however, that if the Office of Management and Budget's (OMB's) GDP (Chained) Price Index deflators are used to convert current dollars to FY 2014 constant dollars instead of DoD deflators, the growth in DoD's 051 base budget authority from FY 2001 to FY 2010 is less, around 50 percent. Using OMB's deflators, DoD's 051 budget authority grew, in constant FY 2014 dollars, from \$377.6 billion in FY 2001 to \$566.4 billion in FY 2010.

¹⁰ Office of Management and Budget (OMB), *Fiscal Year 2014 Budget of the U.S. Government* (Washington, DC: U.S. Government Printing Office, 2013), p. 70.

¹¹ OUSD/Comptroller, "National Defense Budget Estimates for FY 2014," pp. 147-148.

¹² Using OMB's GDP (Chained) Price Index deflators, DoD's 051 budget authority in constant FY 2014 dollars declined from \$566.4 billion in FY 2010 to \$504.7 billion in FY 2013.

as many as 2,500 DoD investment programs.¹³ These disruptions lend further urgency to developing a coherent, long-term strategy for preserving vital elements of the U.S. defense industrial base.¹⁴

Growing Security Challenges

At the same time as the United States and its allies are reducing their defense budgets, the international security environment is growing more turbulent and posing new security challenges. “For decades, the United States has sought to prevent hostile powers from dominating critical regions, such as western Europe, the western Pacific, and the Persian Gulf, while preserving unfettered access to the global commons (the seas, space, and now cyberspace).”¹⁵ While the military threat to Europe has declined dramatically since the Cold War ended and the chances of “a surprise, disarming nuclear attack” on the United States has become “exceedingly remote,”¹⁶ China and Iran are working to shift their respective regional military balances in their favor by constraining U.S. power projection and influence. Among other initiatives, China is pursuing anti-access/area-denial (A2/AD) capabilities in the western Pacific and Iran, with fewer resources, is developing less sophisticated A2/AD capabilities the Persian Gulf.¹⁷

Perhaps most troubling is the ongoing modernization of the People’s Liberation Army (PLA). Going at least back to the 1991 Persian Gulf War, the U.S. military has enjoyed a near monopoly in the employment of precision-guided munitions. Since the mid-1990s, however, the PLA has begun incorporating precision-guidance into its ballistic and cruise missiles, including the development of an intermediate-range ballistic missile with sufficient accuracy to target U.S. aircraft carriers and fixed bases at distances hundreds of kilometers out into the Pacific from China’s coast. While not yet mature, these developments have profound implications for the U.S. military’s traditional approach to projecting military power from forward bases and naval strike groups in the Asia-Pacific.

The PLA is also aggressively pursuing antisatellite, jamming and cyber capabilities to disrupt or destroy the battle networks and communications systems on which U.S. military’s reconnaissance-strike capabilities are critically dependent. The threat also extends to U.S. economic well-being. Consider that U.S. satellite systems, which are increasingly vulnerable to the PLA’s antisatellite capabilities, are also essential to global commerce and the U.S. economy. Moreover, China’s growing cyber capabilities are not

¹³ OUSD/Comptroller, “Fiscal Year 2014 Budget Request and FY 2013 Update,” April 2013, Slides 5, 6, 14.

¹⁴ The sequestration budget cuts have also affected combat readiness. For example, in April 2013 the Air Force began grounding roughly one-third of its older active-duty combat aircraft because of budget cuts. Steve Vogel, “Budget Cuts Clip Fighter Squadron’s Wings,” *The Washington Post*, May 28, 2013, pp. A1, A12.

¹⁵ Andrew F. Krepinevich, Jr., “Strategy in a Time of Austerity,” *Foreign Affairs*, November-December 2012, p. 60.

¹⁶ The White House, “Fact Sheet: Nuclear Weapons Employment Strategy of the United States,” June 19, 2013, available at <http://www.whitehouse.gov/the-press-office/2013/06/19/fact-sheet-nuclear-weapons-employment-strategy-united-states>, accessed July 2, 2013.

¹⁷ Anti-access (A2) capabilities seek to slow the deployment of friendly forces into a theater or force them to operate from farther distances than they would prefer; area-denial (AD) capabilities seek to impede friendly operations within areas in which an adversary cannot or will not prevent access. Air-Sea Battle Office, “Service Collaboration to Address Anti-Access & Area-Denial Challenges,” May 2013, p. 2.

only enabling the theft of U.S. intellectual property and military secrets but could provide the PLA with the means to impose severe damage on the U.S. infrastructure, to include everything from U.S. power grids and fossil-fuel pipelines to the country's financial systems and e-commerce.

Similar developments, albeit on a far more modest level, are occurring in Iran. In the Middle East, Iranian goals appear to include transforming the Persian Gulf into a “no-go-zone” for the U.S. Navy. Toward this end the Iranians are investing in anti-ship cruise and ballistic missiles, sophisticated anti-ship mines, submarines, and large numbers of small boats capable of conducting “swarm attacks” on U.S. warships. While Iran's A2/AD capabilities are likely to remain far more modest than the PLA's, in the confined geography of the Persian Gulf they could pose increasing constraints on U.S. freedom of action, eroding the confidence of local U.S. allies regarding Washington's reliability. Looking ahead, U.S. defense planners cannot discount the prospect that Iran would transfer precision munitions, to include guided mortars and rockets to proxies such as Hezbollah, enabling them to present more lethal threats to U.S. expeditionary forces and to Israel. Efforts to deal with these threats would be further complicated if Iran acquires a nuclear capability. These developments are particularly worrisome in the context of broader trends in the Middle East. In the wake of the “Arab Spring” instability has grown in the region, especially due to the on-going Syrian civil war and renewed political unrest in Egypt that led the army to remove the country's first elected president.

Nor can the prospect of nuclear proliferation be discounted. Western sanctions have not succeeded in persuading either the Iranians or the North Koreans to abandon their nuclear programs. Even a covert Iranian nuclear capability could trigger a proliferation cascade by countries such as Saudi Arabia and Turkey.

In sum, military developments in China, Iran, North Korea and elsewhere are coalescing to present a far more challenging security environment than the United States has faced during the nearly quarter century since the Berlin Wall came down. Coupled with shrinking defense budgets, these developments will confront the U.S. leaders with hard choices regarding defense strategy, force posture and the nation's defense industrial base. These choices need to be guided by well-crafted strategies, rather than benign neglect.

Core Competencies

The seminal article on the core competencies of corporations, written by C. K. Prahalad and Gary Hamel, appeared in a 1990 issue of the *Harvard Business Review*.¹⁸ Their central idea was that corporate strategists should shift their primary attention from managing price/performance to sustaining their firm's long-term competitive advantage. They argued that enduring competitive advantage can be achieved by focusing on the

¹⁸ C. K. Prahalad and Gary Hamel, “The Core Competence of the Corporation,” *Harvard Business Review*, May-June 1990, pp. 79-90. The inspiration for this article came from comparing the relatively greater success of Japan's NEC Corporation relative to America's GTE Corporation during the 1980s. Their argument was that NEC had emerged as the world leader in semiconductors and as a first-tier player in telecommunications and computers largely because NEC had conceived of itself in terms of “core competencies” whereas GTE had not (*Ibid.*, p. 79).

core competencies that are essential to empowering “individual businesses to adapt quickly to changing opportunities.”¹⁹

What are core competencies? Prahalad and Hamel identified three primary features. Core competencies: (1) provide “potential access to a wide variety of markets” (or critical military competitions in DoD parlance); (2) “should make a significant contribution to the perceived . . . benefits of the end product” (or, in a military context, to combat capabilities and outcomes); and (3) “should be difficult for competitors to imitate.”²⁰ More precisely defined, core competencies are “a complex combination of technology, manufacturing base, skilled manpower, training, organizational adaptivity, doctrine, and experience” that enables an organization to accomplish something of strategic importance at a world-class level.²¹ They result from “operational experience and technological know-how developed over many years by specific individuals and organizations in specific circumstances,” which is why they are difficult for competitors to match, counter or outflank.²²

One of the clearest examples of a U.S. military core competency that was developed over a period of decades is its capability for timely, global precision strike and battle damage assessment operations against both fixed and mobile targets employing non-nuclear munitions. Since the introduction of laser-guided bombs (LGBs) in 1968, the American military has fielded a wide range of precision-guided munitions (PGMs), wide-area reconnaissance and surveillance systems, precision location and timing capabilities, and battle networks to facilitate reconnaissance-strike operations over distances that today can span multiple time zones. These developments include: electro-optical, infrared and synthetic aperture radar sensors; electro-optical reconnaissance satellites; the constellation of Global Positioning System (GPS) satellites; short-range PGMs such as the Joint Direct Attack Munition (JDAM) that utilize GPS-aided inertial guidance; long-range PGMs such as the Tactical Tomahawk and the Joint Air-to-Surface Standoff Missile (JASSM); long-range strike platforms such as the stealthy B-2; the MQ-9 Reaper unmanned aerial vehicle (UAV) for loitering surveillance and strike; and networked command-and-control facilities.

One need look no further than to the ability of MQ-9 Reaper operators located in Nevada to find and strike individual terrorist leaders in the Middle East in real time to recognize that the U.S. military’s long-term investments in reconnaissance-strike architectures have opened up new ways of conducting missions—in this case global man-hunting of individual terrorists with UAVs. Further, the U.S. military’s growing skill in conducting precision strikes has provided it with significant competitive advantages at the tactical and operational levels of war. Indeed, one reason current Russian military doctrine has

¹⁹ Prahalad and Hamel, “The Core Competence of the Corporation,” p. 81.

²⁰ Prahalad and Hamel, “The Core Competence of the Corporation,” p. 83.

²¹ W. Cockell, J. J. Martin, and G. Weaver, “Core Competencies and other Business Concepts for Use in DoD Strategic Planning,” Science Applications International Corporation, February 7, 1992, p. 1. This report was done for the Directors of Net Assessment, Office of the Secretary of Defense, and the Defense Nuclear Agency.

²² Cockell, Martin, and Weaver, “Core Competencies and other Business Concepts for Use in DoD Strategic Planning,” pp. i, 7.

placed such emphasis on using a few theater nuclear weapons to “de-escalate” any conventional conflict threatening Russia’s territorial integrity or sovereignty is precisely because the Russians cannot match the conventional precision-strike capabilities of the United States.²³ To date no other country, including China, has yet come close to fielding precision-strike capabilities comparable to those of the United States. Thus, U.S. capabilities in this area satisfy all three of the criteria Prahalad and Hamel used to characterize the concept of a core competency: applicability across a broad range of combat situations, greater value than the alternatives, and not easily imitated by opponents.

As noted in the introduction, Prahalad and Hamel also offered a critical caveat about core competencies that bears directly on the present task of identifying those portions of the U.S. defense industrial base that require preservation because they support the core competencies of the U.S. military:

Few companies are likely to build world leadership in more than five or six fundamental competencies. A company that compiles a list of 20 to 30 capabilities has probably not produced a list of core competencies.²⁴

Again, the most direct way to apply this caution to enduring areas of military competitions is to express it in terms of strategic focus. A strategy with as many as 20 or 30 top priorities cannot be an effective strategy precisely because strategy is fundamentally about choice; a strategy with 20 or 30 top priorities is no strategy at all. Resources are always limited; thus good strategy is about deciding what to do—and what *not* do to. Similarly, the number of core mission areas or competencies to which the U.S. military can give top priority probably cannot exceed single digits without becoming a “laundry list” of “wants” rather than a realistic set of strategic priorities that have a reasonable chance of being achieved—especially in an era of progressively constrained resources.

Critical Areas of Long-Term Military Competition

Limiting the list of truly vital U.S. military competitions to less than ten cannot help but be controversial. A list this short will necessarily leave out many mission areas and capabilities that are both desirable and that individual U.S. military Services and war-fighting communities hold near and dear. Crafting such a list is difficult both analytically and bureaucratically. With respect to the latter it is worth recalling why the strategy review Andrew W. Marshall’s Office of Net Assessment (ONA) initiated in February 2001 for defense secretary Donald H. Rumsfeld came to an abrupt halt within weeks. The

²³ Dima Adamsky, “Russian Regional Nuclear Developments,” Long Term Strategy Group (LTSG), September 2010, pp. 13-26. Mark Schneider, “The Nuclear Forces and Doctrine of the Russian Federation,” National Institute Press, publication No. 0003, 2006, pp. 22-27. Fredrik Westerlund and Roger Roffey, “Weapons of Mass Destruction” in Carolina Vendil Pallin, ed., *Russian Military Capability in a Ten-Year Perspective—2011* (Stockholm: Swedish Defence Research Agency, August 2012), FOI-R—3474-SE, pp. 135-148. Matthew Rojansky, “Russia and Strategic Stability,” in Elbridge A. Colby and Michael Gerson, eds., *Strategic Stability: Contending Interpretations* (Carlisle, PA: Strategic Studies Institute, February 2013), pp. 295-342.

²⁴ Prahalad and Hamel, “The Core Competence of the Corporation,” p. 83.

U.S. defense strategy suggested in the early drafts of the review recommended that top priority be given to maintaining significant margins of advantage across a small portfolio of competitions deemed critical to the United States' military position. As the early drafts did not include a list of these critical competitions, reviewers outside ONA began asking for one. But when ONA offered a candidate portfolio, the absence of heavy ground forces from the list led the U.S. Army to object strenuously.²⁵ The other Services quickly followed suit, arguing that *all* their missions merited being included in the list of top priorities, along with their associated supporting capabilities. As a result, the 2001 strategy review failed to produce a small, manageable portfolio of DoD's top strategic priorities.

With this unhappy history in mind, and with an appreciation of the challenges inherent in identifying genuine core competencies, the following capabilities and missions are suggested as core competencies in which the U.S. military should strive to maintain sizeable margins of advantage even in a period of fiscal austerity.

- Global non-nuclear precision strike;
- Flexible, effective nuclear forces;
- Projecting and sustaining forces sufficient to conduct combined-arms campaigns at the operational level of war;
- Access to and freedom of action in the global commons, especially on the world's oceans, in orbital space and across the electromagnetic spectrum²⁶ (of which cyber is a part);
- The cryptologic enterprise; and
- Realistic combat training.

These proposed core competencies are a mixture of mission areas and capabilities. This mixture should not be surprising. DoD's core competencies should "cut across" multiple missions, military Services, and operational commands.²⁷ Consider, for example, Honda's historical core competences, which exhibit a similar mixture. In the 1980s Honda excelled in engines and power trains, but these competencies were combined with a capability to bring new products to market faster than rivals within product lines such as motorcycles (time-based competition). Over time, these competencies helped Honda to move from motorcycles to automobiles. They also cut across multiple product lines and enabled Honda to sustain competitive advantage over rival firms. Like Honda's core competencies, those suggested for DoD are broad. Each of them potentially involves a

²⁵ Marshall's view remains that ultimate responsibility for choosing such a portfolio should lie with the military, ideally with the Joint Staff.

²⁶ Admiral Jonathan W. Greenert, "Imminent Domain," *Proceedings*, December 2012; Chief of Naval Operations Strategic Study Group XXXI, "EM [Electromagnetic] Maneuver Warfare," January 2013.

²⁷ Cockell, Martin, and Weaver, "Core Competencies and other Business Concepts for Use in DoD Strategic Planning," p. 3.

wide range of weapon systems, capabilities, skill sets, and organizations that enable the U.S. military to do things of strategic significance at a world-class level, and they depend on the U.S. industrial base.

There are also interdependencies among DoD's core competencies just as there are with Honda's. The ability of U.S. forces to conduct extended-range precision strike in non-permissive environments depends to no small degree on the use of orbital space and the electromagnetic spectrum. Sustaining significant margins of competitive advantage in these two domains, in turn, provides much of the wherewithal for sustained power-projection campaigns into areas of the globe defended by enemy A2/AD capabilities. If Chinese military strategists such as Peng Guangqian and Yao Youzhi are right, then the key to all of these areas of military competition will be winning the information confrontation between opposing battle networks: modern warfare under "informationized" conditions, they argue, is increasingly about using information attack and counter-attack, both kinetic and non-kinetic, to disrupt or paralyze the enemy's information systems and networks while protecting one's own.²⁸ Suffice it to say that U.S. cryptologic capabilities will play a vital role in America's ability to prevail in information confrontations. Next, the greater the advantages U.S. forces have in non-nuclear precision strike, access to the global commons, and combined-arms power projection, the greater will be the incentives of nations such as Russia and Iran to turn to nuclear weapons to offset conventional inferiority. Hence the inclusion of offensive nuclear forces and capabilities as a competition in which the United States needs to be as good or better than any competitor. Finally, for the time being at least, realistic combat training remains as critical an area of U.S. competitive advantage as it has been since the founding of the Navy's Topgun Fighter Weapons School, the Air Force's Red Flag exercises and the Army's National Training Center.

It is possible that new areas of vital military competition will emerge over time, or that areas now deemed critical will grow less so. Robotic systems able to find and attack targets without human oversight constitute one such possibility. Its emergence is supported by unmanned aerial vehicle (UAV) experience since Kosovo in 1999 and the progress firms such as Google are making in developing cars that can navigate congested roads and highways by themselves.²⁹ It may be tempting to dismiss lethal robotic systems as an enabler rather than a prospective core competency. On the other hand, during the interwar years 1918-1939 most armies and navies saw the airplane as a mere enabler of more traditional forms of military power, but it quickly proved to be much more in Battle of Britain against the Luftwaffe and the Battle of the Atlantic against German U-boats. The airplane eventually changed war's conduct as much as *Blitzkrieg* did during the

²⁸ Peng Guangqian and Yao Youzhi, eds., *The Science of Military Strategy* (Beijing: Military Science Publishing House, 2005), pp. 339-340, 345. They argue that that local wars under high-tech, "informationalized" conditions constitute a "brand new form of war"—indeed, a "new stage in the development of the history of war" (ibid., p. 394). See also Yuan Wenxian (ed.), *Lectures on Joint Campaign Information Operations* (Beijing: PLA National Defense University Press, 2009), translation Foreign Systems Research Center, Science Applications International Corporation, FOUO, pp. 106-107.

²⁹ "Special Report: Cars," *The Economist*, April 20, 2013, pp. 12-14; "The Car That Parks Itself," *The Economist*, June 29, 2013, pp. 71-72.

1940s or precision strike has done since the early 1990s. Directed-energy weapons are another possibility: they could change the relationship between offense and defense. Currently, however, neither robotics nor directed-energy weapons have yet matured to the point where they provide a dominant source of competitive advantage.

What about areas of military competition that have not been included in the list of core competencies? Consider, for example, counterinsurgency capabilities, ballistic missile defenses, and amphibious operations. They all reflect important military capabilities. But none of them have quite the breadth across key mission areas or reflect as much enduring military value going forward as the six DoD core competencies. The reluctance over the past two years to get involved in the Syrian civil war suggests that there is little appetite in the United States for committing U.S. lives and treasure to another “war of choice” in the Middle East. True, there is even less enthusiasm for nuclear war, but deterrence of nuclear use and preventing proliferation have been high U.S. priorities for over 60 years, and will likely remain so given the existential threat these weapons pose to the United States. In the case of ballistic missile defense, the military effectiveness achieved so far has been limited at best. Through FY 2012, the Defense Department has invested over \$180 billion in theater and national ballistic missile defenses, but has only 30 ground-based interceptors of questionable effectiveness deployed to date. The same can be said regarding the prospective effectiveness of sea-based theater missile defenses. As for amphibious warfare, the U.S. Marine Corps’ capabilities have proven valuable in disaster relief situations, but the last time the Corps mounted a major amphibious assault was at Inchon in 1950.

Further Rationale for Nuclear Forces as a Core Competency

Starting with the 1991 Persian Gulf War, precision strike has been so consistent and important a source of competitive advantage for the U.S. military that its inclusion in the list of critical military competitions hardly needs further justification. Much the same can be said of power projection, access to the global commons, and the American military’s post-Vietnam investment in what has been called “the revolution in training affairs.” It is the inclusion of nuclear forces that may raise the most questions given current U.S. policy to begin taking concrete steps toward a world without nuclear weapons.³⁰ Might nuclear forces be an area of competition that is of waning importance?

The overriding reason for including U.S. nuclear forces and capabilities lies not in American views and policies about their usefulness but in those of the governments of other countries. Both the 2001 and 2010 nuclear posture reviews advocated reducing the role of nuclear weapons in American security strategy.³¹ Yet most other nuclear powers—as well as states seeking to acquire a nuclear capability—continue to see nuclear weapons as vital to their security. The governments of Russia and possibly Iran are cases in point. As Stephen Blank summarized the situation in 2011:

³⁰ “Remarks by President Barack Obama,” Hradcany Square, Prague, Czech Republic, April 5, 2009.

³¹ DoD, “Nuclear Posture Review Report,” April 2010, pp. vii-ix.

. . . much U.S. writing about the inutility or “senselessness” of nuclear weapons is misplaced, unfounded, and based on a failure to take into account the evidence of other governments’ thinking and policies. Russia is by no means the only government whose programs must be seriously considered. Those who argue that nuclear weapons are only good for deterring nuclear attacks might profit by more serious study of Russia, Pakistan, China, and Israel, to cite only a few examples.³²

The incentives that the governments of other nuclear states and aspirants have to retain or seek to acquire nuclear weapons vary widely from one country to the next. In many capitals nuclear weapons are seen as a source of political prestige and influence. In the case of Russia’s leaders, nuclear arms are even perceived to confer great power status. But nuclear weapons can also contribute to regional hegemony (China and Iran), compensate for conventional inferiority (Russia, Pakistan, etc.), provide insurance against regime change or a repetition of past defeats or catastrophes (France and Israel), and extort aid and protection as North Korea has done. The United States has also sought to curb nuclear proliferation by extending its “nuclear umbrella” to allies such as Japan and South Korea. Nuclear arsenals, therefore, serve many purposes besides deterring direct nuclear attacks. For all these reasons it is very likely that nuclear weapons will continue to exist for decades to come. And so long as they do, the United States will need to sustain a “safe, secure, and effective nuclear arsenal” to deter potential adversaries, and reassure U.S. allies and partners of American security commitments to them.³³ Thus, there are compelling reasons for retaining flexible, effective nuclear capabilities as a U.S. core competency.

Core Competencies in the U.S. DIB

What are the core competencies in the U.S. defense industrial base that underwrite the six DoD core competencies listed above? One approach to answering this question would be to begin listing the main weapon systems and supporting capabilities that underwrite each of the critical military competitions. In the case of non-nuclear precision strike, for example, a first-cut list might include the following:

Global Precision Strike:

1. Precision weapons, powered and unpowered
2. Targeting sensors
3. Precision guidance
4. Intelligence, surveillance and reconnaissance (ISR), including satellites and UAVs
5. Automated target search and target processing capabilities
6. Protected satellite communications
7. Global timing and navigation (e.g., the GPS constellation or its successor)

³² Stephen J. Blank, “Russia and Nuclear Weapons,” in Stephen J. Blank, ed., *Russian Nuclear Weapons: Past, Present, and Future* (Carlisle, PA: Strategic Studies Institute, November 2011), p. 347.

³³ DoD, “Nuclear Posture Review Report,” April 2010, p. i (also pp. iii, v, vii, 1-2).

8. Submarines armed with non-nuclear land-attack missiles
9. Stealthy long-range air vehicles, manned and unmanned

The immediate problem, of course, is that similar lists of “core competencies” for the other five military competitions would, when added to the items detailed under precision strike, produce far too many “top priorities” to be useful in formulating a strategy for preserving the truly important elements of the defense industrial base. Again, as Prahalad and Hamel note, even as few as 20 or 30 top priorities are too many.

The next difficulty is that even military-unique systems often have critical elements in their supply chains that, for one reason or another, do not warrant special intervention or preferential funding to preserve them. Today virtually every major U.S. weapon system contains microprocessors and software, but both are widely available commercially. True, much of the software used in defense systems is either DoD unique or specially tailored by defense contractors to military requirements. But the primes and upper-tier firms all employ large numbers of software engineers. So software is widely available in the defense industrial base and probably does not require special attention or priority funding from an industrial base perspective. This is precisely the reason that OSD’s Manufacturing and Industrial Base Policy office has initiated an effort to map the U.S. defense industrial base sector-by-sector and tier-by-tier. To screen for elements of the DIB that do merit intervention—or may require priority or preferential funding in the long term—MIBP developed the following template:

Characteristics of an Industrially Critical and Fragile Niche³⁴

Defense unique	No alternatives available at reasonable cost, schedule, and performance
Relevant to many platforms	Certain future demand
Uses highly skilled labor	Socio-political reliability limits non-U.S. sources
Design-intensive activity	High reconstitution cost
Suppliers’ finances weak	Long lead item
Few firms in niche	Production near minimum sustaining rate
Variation in output imposes high costs	Suppliers’ earnings depend on few program elements

Source: DASD(MIBP)

A further complication stems from the dynamic nature of DoD’s industrial base. Initial screening decisions using MIBP’s or a similar template are unlikely to be permanent. For instance, if key suppliers choose to exit the defense business, or if new firms enter, then judgments about which DIB elements are truly critical will have to be revisited.

³⁴ MIBP, “Annual Industrial Capabilities Report to Congress,” p. 10.

Finally, the nine systems and capabilities listed above under conventional precision strike do not take into account DoD's need to preserve competitive design teams, especially for major weapon systems. In the case of advanced combat air vehicles, whether manned or unmanned, the number of firms retaining the requisite design capacity are now down to, at most, three: Boeing, Lockheed Martin, and Northrop Grumman. In the case of nuclear submarines, DoD appears to be down to a single source for design: General Dynamics Electric Boat. Given the collapse of the Future Imagery Architecture program in 2007, the same may be true of military electro-optical reconnaissance satellites for the National Reconnaissance Organization (NRO).³⁵ In some of these areas, DoD may be hard pressed to leverage competition between design teams to control costs and stimulate innovation in new starts for major weapon systems.

Note, too, that innovative designs often depend crucially on the lead designers. Kelly Johnson's role in designing the U-2 and the Mach 3 SR-71 is an obvious example, as is Ben R. Rich's role in the F-117.³⁶ In the case of the B-2, the key figures were electrical engineer John F. Cashen and aeronautical engineers Irving T. Waaland and John Patierno. A more recent example of the importance of these sorts of individual designers is the development of the RQ-1 Predator UAV under Abe Karem. It was Karem's relentless focus on cost and reliability that was critical in making Predator a success.³⁷ With shrinking DoD budgets and far fewer new starts than there were in the 1950s, 1960s or even the 1970s, maintaining competitive design teams is likely to be especially difficult—as well as increasingly crucial—for the Defense Department.

Given these observations, what can be suggested about the likely core competencies of the U.S. defense industrial base now and in the years ahead? In light of the six core military competencies identified above, a defensible, if tentative, list would probably contain the following areas:

- Precision weapons, including missiles for both strike and defense;
- Low-signature platforms such as stealthy air vehicles, both manned and unmanned, and nuclear submarines;
- Global ISR (reconnaissance satellites, GPS, UAVs, etc.);
- Integrated battle networks that marry ISR with robust command, control and communications (C3);

³⁵ Philip Taubman, "Failure To Launch; Death of a Spy Satellite Program," *The New York Times*, November 11, 2007, available at

http://www.nytimes.com/2007/11/11/washington/11satellite.html?_r=3&pagewanted=1&oref=slogin&, accessed June 4, 2013. Northrop Grumman built the sensor for the Space Based Infrared System (SBIRS) developed to replace the Defense Satellite Program (DSP) missile-warning satellites. Northrop Grumman is also the prime contractor for the James Webb Space Telescope.

³⁶ Ben R. Rich and Leo Janos, *Skunk Works: A Personal Memoir of My Years at Lockheed* (New York: Little, Brown and Company, 1994).

³⁷ "The Dronefather," *The Economist's Technology Quarterly*, December 1, 2012, pp. 23-24.

- The skills, procedures, tools and organizations for dominating the electromagnetic spectrum (including network attack, network defense and cryptologic skills); and
- Large-scale system and network-architecture integration.³⁸

These tentative DIB core competencies, like the six military core competencies, are quite broad, yet they are derived from them. However, to pursue any of them down to the point of identifying the essential, fragile or one-of-a-kind elements in the underlying supply chains would require the kind of detailed industry data MIBP has been collecting in its sector-by-sector, tier-by-tier (S2/T2) analysis and data collection program. Only with such a map of the industrial base could one zero in on the specific elements within these core competencies requiring special attention or preferential funding if they are to be preserved. Doing so is clearly beyond what can be done in an unclassified, non-proprietary paper such as this one. Nevertheless, this provisional attempt to highlight the core competencies of the U.S. defense industry illustrates a larger point: *it is possible to develop a DIB strategy that proceeds from focusing first on what to keep in the long term rather than defaulting to a series of unrelated or arbitrary cuts in the short term to meet next year's budget constraints.*

The likelihood of declining Pentagon budgets and the growing security challenges facing the United States—especially in the Asia-Pacific region—underscore the urgency of developing a coherent strategy for preserving the “crown jewels” of America’s defense industrial base. Given the magnitude of existing and prospective reductions in U.S. defense budgets, and the United States’ structural economic problems, it is all but certain that hard choices about the country’s shrinking defense industrial base will have to be made. The Defense Department will not likely be able to sustain every desired mission area and capability—nor should it try. Doing so would not only be an act of self-delusion, but risk losing elements of the industrial base that are core enablers of long-term U.S. military effectiveness. The last time the U.S. defense industrial base faced a comparable period of downsizing was in the 1990s after the Cold War ended. But the industrial base on which the U.S. military depends is considerably thinner today than it was 1992. Just as there are fewer primes due to the industry consolidations of the 1990s, in many cases there are fewer suppliers in the lower tiers of the industrial base. Hence the growing urgency for the Defense Department to craft and implement a coherent industrial-base strategy that places priority on deciding what to protect and preserve over the long term rather than what to trim or eliminate in the short term.

³⁸ It is tempting to add the United States’ nuclear infrastructure to this list. But whether it is more an underfunded anachronism rather than a core competency of the DIB is certainly open to question given the refusal to develop any new weapons since the Cold War ended.

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CSBA

Center for Strategic and Budgetary Assessments

1667 K Street, NW, Suite 900

Washington, DC 20006

Tel. 202-331-7990 • Fax 202-331-8019

www.csbaonline.org