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Arsenal's End? American Power and the Global Defense Industry

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Cover Image

A F-35 Lightning II taxis down the flightline after its first flight at Eglin Air Force Base, April 23, 2009.

(SENIOR AIRMAN JULIANNE SHOWALTER/U.S. Air Force)

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About the Author

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INTRODUCTION

In December 1940, one year before the surprise attack on Pearl Harbor, President Franklin D. Roosevelt delivered a somber radio address to the American people. “This is not a fireside chat on war,” the President began, “it is a talk on national security.” The President argued that the United States still had the opportunity to deter the Axis powers, but only by producing vast amounts of materiel for itself and its allies. “We must have more ships, more guns, more planes – more of everything... *We must be the great arsenal of democracy.*”¹

Today, debates over American defense acquisition are rarely cast in terms of “national security.” Instead, they tend to focus more narrowly on the causes of the cost overruns and delays that are associated with the procurement of nearly every major weapons platform. But that discussion about procurement efficiency, whatever its merits, overlooks some of the deeper changes that are shaping the structure of America’s defense-industrial base – changes that could have a significant impact on the nation’s ability to prosecute major conflicts in the future.

From the time of Roosevelt’s “arsenal of democracy” speech until the 1970s, the United States was close to being self-sufficient in the development and production of its major weapons systems. These systems were financed, designed, and built

by the Pentagon and its contractors, and they were fielded by the U.S. armed forces. To the extent the American defense industry was “global,” it was global only in terms of export markets for the hardware it produced.

Today, the Pentagon faces a vastly different reality in the defense-industrial space – one that it has actively helped to create. Increasingly, the United States is weaving a complex web of global interdependence – what might be called a “hub strategy” – when it comes to weapons acquisition. The paradigmatic case of this approach is the F-35 Lightning II Joint Strike Fighter, which is being financed and built in collaboration with eight partner nations (and will likely be sold to many others), but nearly every “American” platform now has substantial foreign content.²

Why did the United States decide to engage in international collaboration on the F-35? Why didn’t it just produce the plane domestically and then export a slightly different version? Or more broadly, why and how has globalization come to the American defense industry and what are its consequences for U.S. national security? These are the primary questions addressed in this paper.

It must be emphasized that these issues are not just of consequence for those who specialize in defense procurement. The changes that this paper describes point to a major strategic shift in American national security policy. Rather than preserving the United States as the great “arsenal of democracy,” the Pentagon has instead been transforming the nation into the center or hub of a vast international network of defense expertise and activity.³

Some analysts and policymakers have reacted to this trend by urging, or in the case of Congress, even commanding the Pentagon to “Buy American” in a futile and costly attempt to maintain a “defense-industrial base” that is prepared for total war. Protectionism may still have some place in today’s increasingly globalized defense economy, but such broad-brush

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provisions fail to redress the vulnerabilities associated with the Pentagon's weapons acquisition strategy. The end of the American arsenal, and its evolution toward a hub, poses significant national security challenges that must be addressed, particularly as Washington confronts rising economic and military powers such as China. Confronting these challenges in a responsible way dictates a pragmatic analysis of what (if any) capabilities the United States must maintain and how it can do so most efficiently in light of expected cuts to defense expenditures in the future.

Unfortunately, analyzing the consequences of defense-industrial globalization for U.S. national security is a daunting task. The Defense Department has hardly been forthcoming with data regarding this phenomenon; indeed, the website of the Pentagon's "Office of International Cooperation" contains no data whatsoever, not even a list of the cooperative programs that the office is currently overseeing.⁴ If Americans are to have the kind of serious discussion about the relationship between security policy and defense acquisition that President Roosevelt urged in 1940, then facts are its necessary foundation, and the Pentagon would do well to make such facts at its disposal publicly available and easily accessible.

WHY COLLABORATE GLOBALLY?

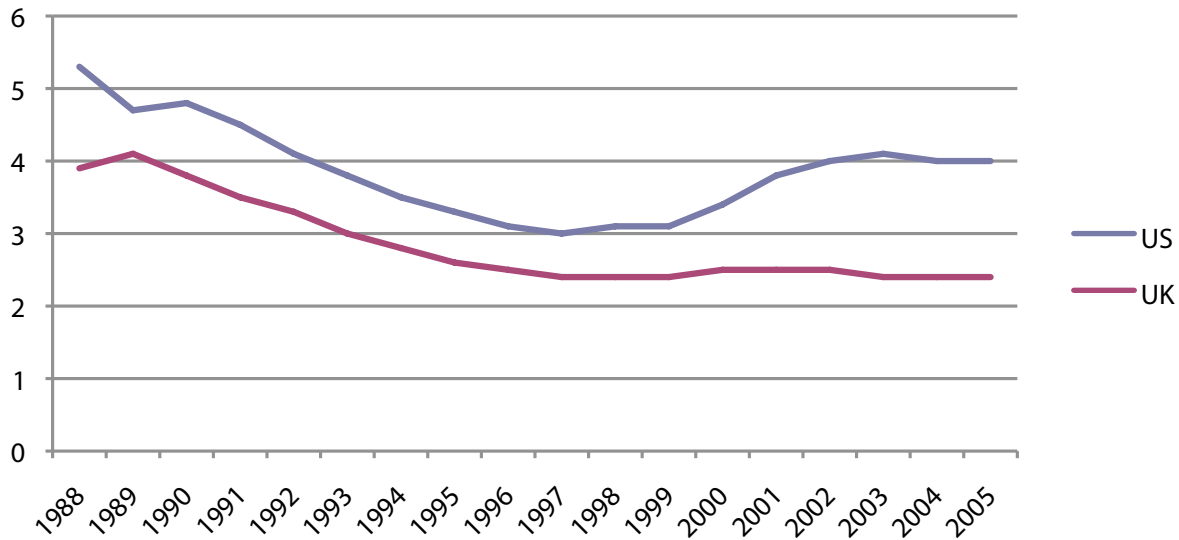
In October 2001, the team of Lockheed Martin, Northrop Grumman, and BAE Systems was chosen to develop what was then called the Joint Strike Fighter (or JSF, since badged the F-35 Lightning II). The industrial organization of the F-35 program, which could run up to 40 years, is unique in the annals of American military history. According to a recent report by the Congressional Research Service:

The F-35 program is the Department of Defense's (DOD's) largest weapon procurement program in terms of total estimated acquisition cost. Current DOD plans call for acquiring a total of 2,456 JSFs for the Air Force, Marine Corps, and Navy at an estimated total acquisition cost (as of December 31, 2007) of about 246 billion dollars in constant (i.e., inflation adjusted) FY2009 dollars. Hundreds of additional F-35s are expected to be purchased by several U.S. allies.⁵

The plane was also unique in that it was "designed to cost," coming in at an "affordable" 35 million dollars per unit. Not surprisingly, that ambition has crashed into the reality of cost overruns.⁶

Rather than fund, design, and build the plane domestically – and then export a variant at some future date – the United States brought in "partner countries" from the very beginning to assist in the financing and development of the program. For example, the United Kingdom was invited to become a "Level 1" partner and provided a hefty financial contribution of 2 billion dollars (about 10 percent of the development costs) for the F-35, while having two of its contractors (BAE on the airframe and RollsRoyce on the engine) play a significant role in program development, ensuring early acquisition by the Royal Air Force and Royal Navy (which sought the F-35 as a Harrier replacement). Other partner nations include Canada, Italy, Norway,

Figure 1: U.S. and UK Defense Spending as a Share of GDP, 1988-2005



Source: SIPRI Military Expenditures Database

Denmark, the Netherlands, Turkey, and Australia, and Israel and Singapore have signaled their strong interest in acquiring the platform. All told, the partner nations have provided nearly 20 percent of the development costs of the program.

While each partner nation has made a financial contribution toward developing the F-35, their domestic defense industries have been more than repaid in terms of the work they have received. According to a report prepared for the Pentagon, for example, the United Kingdom – which had initially planned to buy something on the order of 140 F-35s (it now looks more like 70) – could generate revenues for its firms of 43 billion dollars based on its initial investments of 2 billion dollars, giving it a startling return of over 2,000 percent.⁷ And therein lies part of the genius of the F-35 program design.

At the time when the F-35 program was first proposed during the early 1990s, the end of the Cold War had abruptly arrived and defense spending in the United States and Western Europe was being drastically reduced (see Figure 1). Faced with an aging fleet of fighter aircraft, each U.S. military

service was studying potential replacements. The Clinton Administration, however, was unprepared to fund three new airplanes and instead decided to produce a “Joint Strike Fighter” that would meet everyone’s needs, albeit in different versions. Thus, the Navy would receive a carrier version of this aircraft, the Marines (and Royal Navy) a vertical take-off and landing version, and the Air Force a conventional fighter. In short, the JSF was designed to be an “affordable,” all-around fighter that could meet myriad needs in the context of a harsh budgetary but more benign security, climate.

If JSF was to be affordable, however, it would need to have a long production run. Only then could the heavy up-front costs of research and development be amortized. Moreover, the JSF program was supposed to keep these initial costs to a minimum as it was supposed to rely primarily on “proven” technologies. While the United States would purchase the vast majority of the aircraft, foreign sales could play a crucial role in bringing down the unit cost. Initially, this suggested that an export variant of the plane should be built.

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But the allies of the United States had no interest in buying an American plane “off-the-shelf.” As in the United States, weapons procurement decisions overseas reflect a political calculation that incorporates both economic and security variables. Politicians worry about national security, but they are also concerned about jobs, high technology, and the other economic benefits that they – and their voters – associate with defense spending. American planners and defense executives, therefore, recognized that they could only “lock-in” foreign markets if they made potential buyers industrial partners in the endeavor.⁸

Foreign participation also promised other benefits to the F-35 program. To the extent that foreign suppliers had distinctive expertise (and at lower cost than U.S. firms) the program could meet its objectives of being both cutting-edge and affordable. Competition among suppliers would also bolster innovation. And the military would benefit from the added interoperability of working with a common platform.

What resulted from this strategic decision was perhaps the most complex industrial program in modern history. Today, the Pentagon and Lockheed Martin must coordinate the decisions of eight nations and over 1,000 suppliers, each of which has its own defense budget cycle (and budgetary politics), capital requirements, intellectual property and export control regimes, and so forth. Ensuring that all these players are on the same page is a formidable challenge, as illustrated by the program’s cost overruns and delays. The total acquisition cost of the F-35 program is now estimated by the Congressional Research Service to have risen about 100 billion dollars with procurement delayed by at least one year. On a unit cost basis, the price of each plane has risen by nearly 40 percent.⁹ What percentage of these overruns is related to the complexity of foreign collaboration and how much is due to the influences of the U.S. political economy (e.g. the congressional decision to “second-source” the F-35’s engine over the Pentagon’s objections) is unclear, and indeed the data to make this sort of determination is not easily available.

THE INTERNATIONAL ORGANIZATION OF DEFENSE PRODUCTION

Building weapons collaboratively – like any other cross-border, high-technology venture – presents a unique set of problems that must be managed. The governance of such an enterprise is daunting, in that the alignment of everyone’s interests may not be perfect. Indeed, international joint ventures have very high rates of failure.

Why is that the case? In particular, it is because of the inability of project leaders to control “opportunistic” behavior by suppliers. In other words, suppliers may act in their own short-term interest, reducing the likelihood of program success (this is the infamous “Prisoner’s Dilemma” of game theory). The failure to deliver parts on time and within a specified budget, or the inability to meet military specifications, could all create logjams in aircraft

development and production. Furthermore, the prime contractor – and the U.S. government – must be vigilant about the possibility of foreign governments and firms attempting to “poach” sensitive American technology, such as low observables (“stealth”) in the case of F-35. While the U.S. government’s export control regime aims to curb the leakage of military secrets, its ability to do so in the context of a highly interdependent multinational program involving engineers from many firms and countries may be open to question.

Within the domestic context, problems of opportunism can certainly undermine the success of a collective project undertaken by two or more firms. But actors who work on a purely domestic stage have several outlets for resolving their disputes. First, they share a common legal environment, and therefore contracts and law enforcement provide tools for adjudicating differences between partners. Second, a prime contractor can always decide to buy a supplier and vertically integrate if necessary, as Boeing has recently done in order to shore up its 787 Dreamliner production.¹⁰ While there are also methods under international law for dispute resolution, these are likely to prove less effective and more costly, given, for example, different property rights regimes and legal systems. Furthermore, to the extent that weapons technology may involve industrial secrets, firms are unlikely to bring their disputes into a foreign court. Finally, foreign countries may not allow a military prime contractor from the United States to purchase a local defense firm for strategic reasons, limiting the possibility of vertical integration. Indeed, the United States government has previously blocked selected foreign acquisitions of American companies owing to national security concerns.

As already noted, the history of international joint ventures in high technology is not a particularly happy one in either the defense or the commercial sectors. In defense, the Europeans have long struggled with controlling costs and delays in

programs like the Eurofighter and A400 transport aircraft, while Boeing has faced difficulties managing its far-flung supply chain network in the case of the Dreamliner. These problems are not surprising; they are precisely what the literature on macroeconomics would predict.

The question, then, is why the Pentagon would allow itself to collaborate in weapons acquisition and thus render the nation’s security hostage to foreign companies and governments? This paper argues that, in addition to any military advantages that might be gained from this policy (e.g. owing to inter-operability or access to useful technologies), it is because the United States has decisive advantages in the defense procurement “space” that give it tremendous power over foreign behaviors and outcomes. This is what makes it possible for the United States to make the decisive shift from “arsenal” to “hub” without putting the nation at an unacceptable level of risk.

Specifically, the United States now has one great advantage over virtually all other nations, namely the colossal size of its defense procurement budget, which has rebounded sharply from its post-Cold War lows since the terrorist attacks of September 11, 2001 (it had fallen by some 40 percent in real terms between 1990-2000, and now the Obama Administration is planning a new round of cuts between 2010-2014). The U.S. defense procurement budget (not including logistics or supplemental funding for the wars in Afghanistan and Iraq) of 140 billion dollars is equal to the amount that almost every other country on earth put together spends on weaponry (to put this in perspective, the combined total defense budgets of China and Russia equal about 230 billion dollars; see Table 1). The consequences of this market power must not be neglected.

In short, this means that the United States can pose the following choice to a potentially opportunistic foreign supplier: “You can either be a supplier to a

Table 1: US and Global Defense Spending

Country	2007 Spending	Global Rank
United States	660.0	1
China	144.5	2
Russia	85.3	3
United Kingdom	65.8	4
France	63.1	5
Germany	43.8	6
Japan	42.7	7
Italy	39.3	8
Saudi Arabia	36.9	9
South Korea	27.6	10
Israel	12.1	17
Taiwan	10.0	20
Iran	7.7	23
North Korea	6.6	28
Pakistan	4.7	33
Venezuela	2.9	49

Source: Travis Sharp, Center for Arms Control and Non-Proliferation, 2009.

locally produced weapon (say, in Western Europe) and provide 100 (or 200, or even 300) sub-systems, or you can supply an American weapons acquisition program and provide 1,000 (or 2,000, or even 3,000) sub-systems.” The scale difference is so significant that it has the effect of “concentrating the mind” and promoting good behavior on the part of foreign contractors. Furthermore, the jobs thus produced in their factories also reflect well on national politicians, who would close down an armaments project of this scale at their electoral peril.

It is therefore American market power in defense acquisition that makes successful international

collaboration in armaments possible, just as American market power in the commercial domain during most of the postwar era gave Washington the most influential voice in deliberations over such issues as global trade, finance, and regulation (e.g. with respect to climate change). This is not to diminish the great challenges presented by the F-35 program: defense executives are still facing an engineering project of enormous complexity. But it does mean that opportunistic behavior by foreign suppliers, which would be the “normal” or reflexive concern of most students of industrial organization (and which is very much in evidence on this program, as with Italy’s recent demand for more workshare), is unlikely to emerge as the most pressing problem for program managers so long as the United States maintains its commitment to acquiring this (and other) platforms.

THE HUB OF DEMOCRACY?

While the Pentagon’s transformation of the United States from defense-industrial arsenal to hub reflects a pragmatic recognition of the changing economic and security environment since 1989, including the globalization of high technology, policy analysts must still confront what it means for America to lose the capacity to acquire defense systems autonomously. To be sure, some might argue that America no longer faces an existential threat like the Soviet Union, and thus, the kinds of fears that existed during the Cold War simply have no place in the contemporary context, where America’s battles are mainly with small, highly mobile groups. In fact, at the strong urging of Secretary of Defense Robert Gates, the U.S. defense budget increasingly supports “special,” “low-intensity” and “counter-insurgency” operations.

Still, it is hardly far-fetched to imagine that other great powers might arise which will challenge the United States across entire regions where it has ongoing security interests. This means that the Pentagon might well wish to “buy an option” that

will allow it to access needed capabilities in the event of a major conflict. Not surprisingly, these capabilities will be increasingly found in the science, technology, and management of complex systems, or systems engineering – for America’s hub strategy is essentially grounded in its ability to conceptualize and integrate complex military systems whose inputs are globally sourced.

Unfortunately, the ability to engineer large-scale, high-technology projects is a dying art in the United States, as many of the nation’s best young people tend to avoid “old” manufacturing industries – including the aerospace sector – opting instead for what seem to be more exciting (and potentially much more lucrative) prospects in start-up ventures and “cutting-edge” firms that appear to be at the technological frontier.¹¹ Indeed, as the United States seeks to maintain its system integration capabilities, it will need to look outside the defense-industrial sector – and even well beyond those industries like aerospace and ship-building that were closely tied to it – and focus on the capabilities found in biotechnology, information and communications technology, and other sectors which must weave together complex sets of technologies in order to meet consumer needs.

Still, there is a potentially serious vulnerability in the current American acquisition strategy: its dependence upon relatively large defense procurement budgets in order to succeed. After all, it is only in this way that foreign suppliers will remain bound to the U.S. market for military hardware. If, under any credible scenario, some foreign power or powers emerge as large markets for defense goods and services or should American defense spending fall significantly, then the United States would face a difficult and likely costly situation, as these military challengers would also require a global supply chain (after all, even the Chinese are likely to require foreign inputs and technology as they seek to modernize their stock of weapons). Under such a scenario, foreign suppliers to a defense project could

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essentially bid one country’s program against that of another, much as petty dictators did during the Cold War in the interest of higher “foreign aid” budgets.

Should U.S. defense spending fall precipitously, these foreign suppliers would probably become less reliable as they seek other markets for their products, meaning that the Pentagon needs to think through its fallback position if its global defense industrial strategy begins to unravel. This could include a variety of policies, such as stockpiling, maintaining a reserve corps of retired defense-industrial experts who serve as consultants on current projects, and perhaps even the ongoing maintenance or subsidization of system integration teams in the United States. Again, it would be extremely helpful if the Pentagon would make available more data about defense globalization and the industrial organization of supply chains, so that serious analysis and scenario planning can be done. The lack of publicly available information hampers sound, evidence-based research on the challenges that the United States faces as it tries to maintain a global defense industrial network.

The American defense procurement budget, therefore, is now at the hub of a global defense-industrial network. That fact seems little

appreciated in Washington; ironically, it is better understood overseas, where many foreign suppliers have thrown in their lot – for now at least – with the Pentagon. Ensuring that Americans understand what is really at stake in defense spending debates will become increasingly vital as future budget reductions begin to reduce the Pentagon's share of government spending.

While it is unlikely that America's hub strategy will be threatened anytime soon, defense planners must also engage in scenario building of potential long-run threats. This means that the time has come to think seriously about how to maintain and improve U.S. systems integration capabilities in light of globalization on the one hand and diminishing resources on the other. If history is any guide, the procurement account will bear most of the burden of any future defense-related budget cuts, which means skilled workers will continue to exit the defense industry. Further, should foreign nations doubt America's long-run commitment to F-35, among other collaborative projects, it will only be a matter of time before the hub strategy falls on its axle. If that occurs, some future President could end up demanding – as Franklin Roosevelt did – “more ships, more guns, more planes” – only to find that America has lost much of its capacity to provide them.

ENDNOTES

- ¹ U.S. Department of State, "Radio address delivered by President Roosevelt from Washington, December 29, 1940," <http://www.mtholyoke.edu/acad/intrel/WorldWar2/arsenal.htm>, emphasis added.
- ² See Jacques Gansler, "Trade War" (29 March 2009), www.foreignpolicy.com.
- ³ For a succinct discussion of this strategy, see William Schneider, Jr., "Testimony to the House Armed Services Committee: National Security Industrial Program: Implications of Globalization and Foreign Ownership for the Defense Industrial Base" (16 April 2008), http://www.fas.org/programs/ssp/asmp/issueareas/us_arms_export_reform1/Schneider_Testimony041608.pdf.
- ⁴ See U.S. Department of Defense, "International Cooperation" (last updated 2 February 2010), <http://www.acq.osd.mil/ic/>.
- ⁵ Ronald O'Rourke, *F-35 Joint Strike Fighter Program: Background and Issues for Congress* (October 2009): 1, http://assets.opencrs.com/rpts/RL30563_20090916.pdf.
- ⁶ I thank Jacques Gansler of the University of Maryland (and former Undersecretary of Defense for Acquisition and Technology) for highlighting this point.
- ⁷ Office of the Deputy Under Secretary of Defense (Industrial Policy), "JSF Industrial Participation: A Study of Country Approaches and Financial Impacts of Foreign Suppliers" (June 2003), http://www.acq.osd.mil/ip/docs/jsf_international_industrial_participation_study.pdf.
- ⁸ For more details see Ethan B. Kapstein, "Capturing Fortress Europe: International Collaboration and the Joint Strike Fighter," *Survival* 46:3 (Autumn 2004): 137-159, http://www.ethankapstein.com/articles/capturing_fortress.pdf.
- ⁹ O'Rourke, *F-35 Joint Strike Fighter*, 13-14. Please note, an earlier version of this report contained a typographical error. It has been corrected to read: "The total acquisition cost of the F-35 program is now estimated by the Congressional Research Service to have risen about 100 billion dollars with procurement delayed by at least one year. On a unit cost basis, the price of each plane has risen by nearly 40 percent."
- ¹⁰ Christopher Drew, "Boeing Buys Plant That Makes Crucial Part of Dreamliner," *New York Times* (7 July 2009), <http://www.nytimes.com/2009/07/08/business/08boeing.html>.
- ¹¹ This is a point frequently emphasized by former UnderSecretary of Defense for Acquisition and Technology Paul Kaminski. See Earl Lane, "At AAAS Briefing, US Defense Expert Urges More Nimble Military Acquisition System," AAAS [American Academy for the Advancement of Science] News Release (27 January 2009), <http://www.aaas.org/news/releases/2009/0127kaminski.shtml>.

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