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Reforming a Defense Industry Rife with Socialism, Industrial Policy, and Excessive Regulation

by Ivan Eland

Executive Summary

The U.S. defense industry is hardly a bastion of free-market competition. Even Secretary of Defense Donald Rumsfeld has compared the way the Department of Defense does business, including the way the Pentagon buys weapons, to Soviet central planning. The industry has a socialist component: government laboratories, shipyards, depots, and arsenals that, in many cases, compete with private companies. Even the part of the industry that is in private hands is subjected to DoD's industrial policy and excessive regulation. Congress, to win votes in states and districts that are home to such industrial concerns, keeps unneeded government and private facilities open through phony "competitions," creating much excess capacity in an industry that was insufficiently downsized after the Cold War.

The result is weapons that have ballooning costs, are years behind schedule, and contain technology that is out-of-date when the systems are finally fielded. Costs per unit accelerate because of the military's excessive emphasis on performance and frequent changes in design, the dwindling numbers of units purchased, and contractors' deliberate initial underestimation of costs.

DoD has no incentive to reform the system when the president and Congress continue to reward such inefficient practices by slathering the department with ever-increasing budgets, long after the demise of the Soviet Union as a superpower rival. (Its national defense budget gives the United States overkill in the fight against the destitute nations that sponsor and harbor terrorists.) In fact, if the Pentagon's budget were reduced, it would be under increased pressure to make the process of weapons buying more efficient.

Although DoD officials have talked a great deal about using commercial practices in military procurement, only limited progress has been made. The Pentagon should not only use commercial practices; it should eliminate excessively detailed military specifications and buy commercial products and even commercial components for weapons—thus reducing barriers to entering the defense industry and increasing competition. In all its purchases, DoD, like the commercial sector, should focus on getting the best value for each dollar spent instead of focusing excessively on performance. Also, Congress should allow the Pentagon to buy weapons systems from friendly nations and thus open the U.S. defense market to greater competition.

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Efficiency is not the main goal of the weapons acquisition system.

Politics Drives the Defense Industry

Although much post–Cold War "consolidation" has taken place in the defense industry, actual industrial production capacity has decreased much less than would have been expected in an era in which the United States has no superpower rival. (Even with a further decrease in industrial capacity, the United States—as the most dominant military power in world history—would have bone-crushing superiority in the battle against the pauper states that harbor or sponsor terrorists.) Many companies that acquired or merged with other companies merely changed the nameplates on the factories instead of reducing or eliminating capacity.[1]

For example, although the number of companies building ships has declined, the same six major private shipyards that produced vessels during the Cold War remain open today. Most of those shipyards are operating well below capacity—leading to approximately 50 percent excess capacity in the shipbuilding sector. To make matters worse, the Navy still retains four publicly owned shipyards that compete with private shipyards for maintenance, repair, and overhaul business. Similarly, the Army uses a government depot to perform maintenance, overhaul, and upgrades to tanks instead of relying on General Dynamics' tank-building plant. The Air Force also uses public facilities that do the same for aircraft and engines.

According to Jacques Gansler, under secretary of defense for acquisition during the Clinton administration, during the post–Cold War period the U.S. defense sector was the only major part of the world's economy to become more socialist. He argued that political support in Congress and the military services allowed government depots, arsenals, laboratories, and research and development (R&D) centers to shrink even less during the military drawdown than did the private portion of the defense industry.[2]

The inefficient retention of excess capacity (both public and private) relative to the existing demand for weapons is rooted in a larger problem: politics plays a much larger role in the defense industry than it does in the market for commercial products. That is, efficiency is not the main goal of the weapons acquisition system. Politics plays such a central role in the industry because the government—that is, the Department of Defense—is the sole U.S. buyer of defense articles; in contrast, many private buyers exist for commercial products. Also, Congress micromanages DoD and the defense industry more than it intrudes into the commercial market.

Many of the factors that cause Congress to be reluctant to close unneeded military bases also operate in the defense industry. Defense facilities and factories have developed supporting constituencies—the companies that own them (if they are privately owned), the labor forces that work in them, and the communities that benefit economically from their presence. The senators and representatives from the states and districts that are home to such facilities and factories usually obtain seats on the committees that oversee or provide funding for DoD (the House and Senate Armed Services Committees and the Defense Appropriations Subcommittees) to look out for their interests back home rather than to act in the national interest. Experts on Congress usually look on those panels as "constituency committees"—a euphemism for committees that "bring home the bacon." With the drastic reduction in traditional international threats during the post–Cold War period, even less pressure exists to build weapons efficiently and retain a modicum of competition. Lobbying by defense contractors for business has replaced even constrained competition.

In the commercial sector manufacturers buy parts and components from vendors that offer the best value for the money. Defense contracting does not work that way. To make the political constituencies supporting a specific weapons system stronger, prime contractors try to spread subcontracts

to as many states and congressional districts as possible. For example, attempts were made by senior officials in the administrations of Reagan, George H. W. Bush (including Secretary of Defense Dick Cheney), and Clinton to kill the troubled V-22 Osprey tiltrotor aircraft. The plane has crashed several times and is 10 years behind schedule, exorbitantly expensive, and $15 billion over its original cost estimate. Nonetheless, the aircraft has survived with congressional support because it is built in more than 40 states.

Finally, research shows that the president's people in DoD channel defense contracts away from states that would be likely to vote for the president's opponent to states that would be likely to vote for the president or are being contested.[3]

Pentagon Bureaucracy Promotes Socialism and Industrial Policy

Even Secretary of Defense Donald Rumsfeld has compared the way the Pentagon does business to Soviet central planning:

> The topic today is an adversary that poses a serious threat to the security of the United States.
>
> This adversary is one of the world's last bastions of central planning. It governs by dictating five-year plans. From a single capital, it attempts to impose its command across time zones, continents, oceans, and beyond.
>
> With brutal consistency, it stifles free thought and crushes new ideas. Each day, in countless ways both visible and unseen, it disrupts the defense of the United States and places the lives of our men and women in uniform at risk. Perhaps this adversary sounds like the former Soviet Union. . . .
>
> This adversary is closer to home. It is the Pentagon bureaucracy.[4]

In the wake of the attacks on the World Trade Center and the Pentagon, that adversary at home impedes the fight against terrorists abroad. It is now even more critical to reform the way DoD buys weapons.

The defense bureaucracies—that is, the military services and the Office of the Secretary of Defense—are willing collaborators with Congress and the defense companies in condoning cost inflation, retaining excess industrial capacity (both public and private), and imposing industrial policy (government interference to achieve outcomes that are different from those deriving from the operation of a free market). The military knows that, to get contracts, companies bid lower than they expect a weapons system to cost and anticipate that their profits will increase as DoD requires design changes. The companies also know that cost increases and overruns will not cause the termination of politically protected weapons programs. So original cost estimates for weapons tend to be only 40–70 percent of final costs, according to British and American studies.[5]

The military invokes several justifications for spending taxpayers' money on excess production capacity. First, the military maintains that excess capacity is needed to "surge" production in the event of an industrial mobilization in time of national emergency. Yet until another major hegemonic power rises, most national emergencies will probably be similar to the war against terrorism. The conventional military equipment used to fight those kinds of low-level conflicts could easily be drawn from the existing supply and would not require large surge production to build or replenish. Now that the Cold War is over, the huge defense industrial base designed to support a sustained conflict in Europe against a rival superpower is no longer needed. Most defense analysts do not foresee a major conventional threat arising for at least 15 years (and many do not expect one for 20 to 30 years).

Nonetheless, if hedging against such a distant threat is still a wise idea, the government could reduce costs to the taxpayer by allow-

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ing the closure and mothballing of private production facilities instead of keeping them active. Even if the government decided that mothballing facilities was unacceptable and that excess active facilities needed to be retained for surge production, existing industrial capacity would still be greater than that needed for surge capability. For example, the Navy wants to retain two active shipyards capable of producing submarines—the Newport News shipbuilding facility in Virginia and the Electric Boat facility in Connecticut—in case surge production is needed. But each shipyard can produce four submarines per year simultaneously—enough to build up the fleet to 132 submarines (assuming that a submarine's average lifespan is 33 years). During the Reagan administration, at the height of the Cold War, the submarine force was only about 100 vessels (as opposed to the 55 that the United States has now). So one of the two facilities could produce all the submarines that the Navy would probably ever need to meet surge requirements even in the event of a confrontation with a future superpower.

Second, the military services use "competition" as an excuse to retain excess capacity. Despite the existence of more than one supplier (in most instances), most defense contracts are not "competitive" in the commercial sense of the term. Some contracts are awarded without competition, and others are let as administrative exceptions to procedures for open competition. Even where true competition exists originally, price hikes due to changes in the military's original specifications and requirements (which are numerous and costly) are negotiated on sole-source terms.[6]

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Retaining Excess Industrial Capacity Is Expensive

True competition means more than just retaining two or more producers. It requires sufficient demand for at least two suppliers to produce articles efficiently. In many cases, the quantity of defense articles demanded does not meet this standard. For example, the Navy has two facilities producing DDG-51 destroyers and two facilities producing submarines, but no competition exists for the production of either type of ship. At procurement rates of only three DDG-51s per year, the Navy discovered that it could not run a viable long-term competition between Northrup Grumman's Ingalls facility in Mississippi and General Dynamics' Bath Iron Works production line in Maine, so it allocated production between the two private producers. Members of Congress kept demanding "competition" in submarine production, but the Navy astutely realized that Congress really wanted both fully capable submarine producers to have work. So the Navy decided to let Newport News and Electric Boat form a "team"—an absurd and costly arrangement by which one producer builds one part of each boat, the other producer builds the other part, and they alternate integrating the parts to assemble the submarine.

Even when true competition exists, the losing company is "taken care of" by DoD so it remains in business. DoD conducted a competition between Boeing and Lockheed Martin to determine which company would develop and produce the tri-service Joint Strike Fighter in what is the most costly weapons program ever. But DoD feared that the loser of the competition would have to exit the military aircraft business. So DoD officials made it clear that the loser would be given enough maintenance and repair work and foreign military sales to remain in that sector. Keeping excess capacity in the military aircraft sector ultimately costs taxpayers money because they must absorb much of the overhead needed to keep a second producer in business.

In DoD and congressional circles, so-called competition has become an end in itself. Genuine competition is a means to lower costs, enhance quality, and spur innovation. But in the defense industry, "competition" usually means having two or more producers making the same defense article, regardless of whether the quantities purchased by the U.S. military are so low that they could be produced more

efficiently by only one firm. (For example, although General Electric and Pratt and Whitney both produce aircraft engines, the Pentagon buys enough of them to support only one company efficiently.)[7] If both producers know that, regardless of which one wins the design competition, they will both probably get to participate in some of the production run (during which big profits are earned), they have less incentive to develop a cutting-edge design and innovative manufacturing technologies to improve quality and hold costs down. Such pseudocompetition has few of the advantages of genuine competition; it also has many disadvantages that are not present when real market forces are present.

The main disadvantage is cost. Industrial policy in the name of national security is very expensive to the taxpayer. The government frequently is forced to pay the overhead needed to keep excess defense industrial capacity open. The military bureaucracies are spending taxpayers' money to keep production facilities open across the country to retain grass-roots political support for a larger military by providing jobs. They are also keeping the facilities open to pressure Congress to use them to build more weapons.

In contrast, winner-take-all competitions are most efficient when small quantities of a defense article are demanded by the military. In the post–Cold War world, for major weapons, that situation is the norm; the war against low-tech terrorism and the destitute countries that sponsor it will not require a ramping up of production of conventional weapons (such as tanks, ships, submarines, and aircraft). In a legitimate winner-take-all competition, the company that wins produces all the finished articles at its factory or factories. The loser gets nothing and will probably close or mothball its unneeded capacity. Thus, as a result, the government pays the overhead on only one facility. Also, if two factories are producing small quantities that could be handled by one, they cannot get economies of scale when buying inputs of equipment, material, and labor. Furthermore, when a company produces a high-tech defense item, it experiences a learning curve—that is, as more articles are produced, the company learns how to produce them more efficiently and at a lower unit cost. If two companies are producing items that one firm could handle, their combined learning curve is less steep than that for a single, combined production run. Finally, if the government wants to keep a second producer alive, costs of transferring technology from one company to the other are likely to arise. Thus, if two firms produce the item, costs are likely to be higher than if one does.

Winner-Take-All Competitions Should Be Conducted

Considerations of overhead, economies of scale, and learning curves all point to conducting winner-take-all competitions for major weapons systems. The bad news is that winner-take-all competitions may prevent future competition by knocking one of the competitors out of the market permanently (as the government feared would happen with the JSF program). The good news is that not much will be lost by going to winner-take-all awards because the current industrial policy provides scant real competition on major weapons and that situation is unlikely to improve.

In arguing against winner-take-all competitions, the government maintains that keeping two firms designing and producing a defense article will result in more innovation. But, as noted earlier, such industrial policy attenuates innovation because the companies believe that they will get a piece of the production pie even if they are not innovative in the design of weapons. The same disincentives apply for cost reduction. In addition, the companies know that the results of any R&D they do will likely be given to the other firm at no cost.[8] Furthermore, without winner-take-all contracts, firms will innovate less because they know they will not be allowed to maximize their profits by winning the whole purchase.[9] Research by Leitzel and Riardon and Sappington suggests that if the winner-take-all contract for development and production is truly competitive, keeping around

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more than one producer is unlikely to improve weapons purchasing in the future.[10]

Even if after a winner-take-all competition only one major defense firm (a monopolist) were producing a particular defense article, the government would remain in a uniquely powerful position as the sole buyer (a monopsonist) of defense equipment and regulator of the defense market. (Although the Navy was overruled by DoD, it made such an argument in 1999 when it advocated allowing General Dynamics to buy Newport News shipyard and thereby gain control of four of the six private shipyards.)[11] The government has the option of channeling its resources into production of weapons other than the one built by the monopolist. Rarely is only one weapon suitable for a combat mission. The ability to shift funds from one weapons system to the next gives the government leverage over the monopolist producer of any one weapon.

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In addition, a study by Columbia University economist Jagdish Bhagwati showed that even a monopolistic firm is restrained in its pricing behavior by large firms in other sectors (in this case, other defense subsectors) that have the potential to enter its market.[12] Similarly, William Baumol and others noted that company performance was determined by the threat of a competitor's entry into an industry rather than by the number of firms already in it.[13] The findings of those studies have been confirmed in the defense industry; the huge companies that remain in the defense industry do not act like monopolists.[14] Therefore, the Pentagon should not be afraid of replacing its industrial policy with winner-take-all competitions at the prime contractor level.

The results of those studies lead to the conclusion that antitrust laws are unneeded—particularly in an industry with a powerful monopsonist government buyer. In addition, DoD has been very capricious in its antitrust reviews for industry consolidation. For example, the Pentagon encouraged and even subsidized mergers and acquisitions in the industry until it abruptly, and seemingly arbitrarily, blocked a merger between Lockheed Martin and Northrup Grumman in 1998.[15] Going further, the government buyer itself may be guilty of anti-competitive actions. For example, the bureaucracies of the military services often believe that it is simpler to avoid competition by working with known companies than to incur the costs of searching for additional suppliers.[16]

Since the end of World War II, as a result of mergers and exits from the industry, the defense sector has been consolidating into a small number of large firms.[17] If the Pentagon continues to buy expensive, high-end weapons, it can afford to buy them only in small quantities. Such quantities would probably support efficiently only one or two prime contractors for each major weapons system. That is, if the Pentagon were to let normal market processes run their course, only one or two firms would be left in each major defense subsector. (In some high-technology defense industries, decreasing costs and the resulting economies of scale would lead to monopolies.)[18] The remaining firms would be specialists in integrating parts and subcomponents into defense-unique systems and would probably conduct a large portion of their business with DoD. For example, no demand for large submarines exists in the commercial sector. So the lone remaining prime contractor that won any winner-take-all competition would have little or no commercial business.

Given the small quantities of defense-unique weapons, such as submarines, ships, tanks, and military aircraft, currently demanded and the existing barriers to entering the U.S. defense industry, ongoing genuine competition between two or more producers is not possible in most cases. But ways do exist to introduce more true competition into the defense industry.

Open the U.S. Defense Industry to Foreign Competition

Traditionally, the national security rationale has been used to close the U.S. defense sector to foreign competition. In a war, the argument goes, the United States would not

want to depend on foreign sources for its weaponry. Also, national security considerations have been used to severely limit direct investment in the U.S. defense sector by even NATO allies. Only a few token cooperative weapons development programs have been undertaken with Western European nations.[19]

The stated worry is that at some time in the future friendly nations might turn hostile and would, during a conflict, withhold from the United States military spare parts, training, and replacements for weapons lost in battle. For example, the United States was a major supplier of arms to Iran until the Iranian revolution turned an ally into a foe. If the United States had been purchasing large quantities of weapons from Iran, it might have found supplies cut off.

The National Security Rationale Is No Justification for Protectionism

With the end of the Cold War, the national security rationale for limiting foreign imports and investment needs to be reexamined and the walls around the domestic defense market lowered. The demise of the potent Soviet threat and the lack of a credible replacement for the next 15 to 30 years have reduced the dangers of purchasing weapons produced by companies from friendly foreign nations. (A war against destitute rogue states that sponsor terrorist attacks does not change that fact.) In the inevitable march to a "globalized" economy, U.S. prime contractors already purchase a growing proportion of critical parts and technologies for weapons from foreign subcontractors. Subcontractors are exempt from the "Buy American" Act, which requires weapons to be built in the United States. That restriction should be lifted on prime contractors because increased competition from foreign sources would reduce the costs and increase the quality of defense articles.

Since the collapse of the worldwide communist threat, the stakes are no longer as high, and the United States has become much more secure against conventional threats. In addition, given the reduced threat of conventional attack by nations, even if a friendly state became hostile abruptly (the worst case), the United States could afford the time to readjust and buy from another friendly seller. No newly hostile nation could now pose the dire threat to U.S. survival that the Soviet Union did. The U.S. government is usually given plenty of advance warning of adverse political changes in friendly nations. As insurance against a friendly nation's disagreeing with U.S. military action and withholding components or spare parts, a stockpile of critical items could be maintained. Of course, if foreign suppliers withheld such items, they could develop a reputation for unreliability and lose substantial amounts of long-term business from the U.S. government and other governments.

The universe of firms from friendly countries that are given access to the U.S. defense market should not be limited to those from NATO nations. For example, arms imports from nations such as Israel, South Africa, South Korea, Japan, Sweden, Switzerland, Singapore, Australia, and Brazil should not be ruled out.[20] Other nations that import weapons (for example, Germany and Saudi Arabia)[21] regularly diversify their sources so that they are not overly dependent on any one exporting firm or nation; the United States should do the same. (The U.S. defense industry already buys weapons components from many foreign sources.) Even if a friendly nation were to become hostile or withhold supplies, that would affect only the supplies of limited types of weapons. Moreover, the list of potential selling countries could be limited to friendly countries that are likely to be stable. After all, in most cases, only wealthy democracies have the high-technology base needed to develop the advanced weapons that the United States would be interested in buying. Most of those countries are also highly stable. It goes without saying that DoD would not even consider buying obsolete and inferior weapons from nations such as Iran, Iraq, Afghanistan, Sudan, and other pauper rogue states.

Of course, U.S. defense firms have an

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interest in DoD's restricting foreign competition in the huge U.S. defense market. By keeping the barriers to foreign suppliers high, DoD is really defending the domestic defense industry, not the nation's security. DoD would rather deal with familiar domestic companies than foreign ones, and U.S. companies would like to continue to have the world's largest defense market to themselves. Yet U.S. companies would be very competitive against foreign competition both at home and abroad. Because the U.S. defense budget is so huge relative to the defense budgets of other countries (the U.S. defense budget alone accounts for about a third of worldwide military expenditures), U.S. defense companies have grown large compared with their foreign competitors.

Benefits of and Caveats to Allowing More Foreign Investment

The influx of competition from foreign suppliers could provide genuine competition at the prime contractor level—something that is sorely lacking in the Pentagon's current industrial policy of artificially propping up more than one U.S. prime contractor in closed and limited subsectors of the U.S. defense market. A single U.S. megacompany in a defense subsector could compete with large companies from other nations. The U.S. government would get better and more innovative weapons systems for lower prices; weapons from the United States and friendly nations would be more compatible for operations on the battlefield; and U.S. defense companies would become stronger and more efficient.

Even if other friendly nations were to refuse to reciprocate by lowering the barriers to entry to their own defense markets, it would still be in the interest of the United States to open its defense market to foreign competition. As they do from unilateral free trade in other goods, U.S. consumers (in this case, U.S. taxpayers) would benefit from cheaper and better weapons regardless of what other friendly nations did with their defense markets. In fact, if other friendly nations failed to open their defense markets to U.S. companies, it would be their own loss. Different nations specialize in different weapons and produce them more efficiently than other countries, rendering self-sufficiency for all weapons costly. (Any nation should produce the weapons that it can build most cost-effectively and buy the rest from friendly nations that can build them more efficiently.) And self-sufficiency in the defense sector is more costly than in other industrial sectors because R&D costs for complex, sophisticated weapons are high and production runs are short.[22]

Congress and DoD should open the U.S. defense industry to foreign investment, but some caution should be exercised. Because the U.S. budget for military R&D is of the same magnitude as the entire defense budgets of the countries with the next largest military expenditures, U.S. weapons tend to be more sophisticated than their foreign counterparts. Thus foreign investment in U.S. defense companies might result in the transfer of cutting-edge military technology abroad.

Nevertheless, more foreign investment by firms of friendly nations in the upper tiers of the U.S. defense industry should be allowed by DoD. (It is already allowed at the subcontractor level.) But the U.S. government might monitor such investment so that foreign firms could not acquire U.S. defense prime contractors with leading-edge technology. Alternatively, and preferably, the U.S. government could approve foreign investment in a U.S. prime contractor with cutting-edge technology as long as the U.S.-based subsidiary would be required to erect firewalls in the management structure that could prevent the foreign parent company from acquiring advanced technologies. This result might be obtained by requiring the U.S. subsidiary to operate autonomously from its foreign parent firm. Foreign direct investment would not cause a problem in time of national emergency because weapons production would remain on U.S. soil.

To free the defense market among friendly nations, foreign investment rules, weapons acquisition processes, technology transfer

protection, industrial security, intellectual property rights, and export controls must be made more compatible. In addition to lowering barriers to entry for foreign firms, DoD should extend the same access to the defense market to U.S. nondefense companies.

Reduce Barriers to Entry So Nondefense Firms Can Compete in the Defense Sector

The defense industry has had lower profit margins than the commercial sector but has also experienced less risk—that is, government industrial policy and politics have ensured that contracts are given to faltering firms and excess production capacity is kept open. A couple of examples illustrate the point. First, during the 1970s the government bailed out the sinking Lockheed Corporation. Second, the Navy chose the F-18E/F to be the successor to the F-18C/D. Despite the name, which would seem to indicate that the aircraft is an incremental improvement on the F-18 series, the E/F version is significantly different from the C/D aircraft. Yet bureaucratically, a new designation other than F-18 would have meant that a competition would have been required between manufacturers of military aircraft. In 1991 McDonnell Douglas, the maker of the F-18C/D, was in dire financial straits. DoD, with the help of Congress, designated the aircraft the F-18E/F so that McDonnell Douglas could get the contract without competition.[23] In other words, the existence of the F-18E/F program—little more than corporate welfare—indicates that the Pentagon is afraid to allow struggling firms to fail.

The U.S. Government Has Created a Protected Industry

DoD officials and members of Congress routinely complain that the average rates of return are lower for the defense industry than for the market as a whole. But they forget to mention that the risks are lower because of the protected nature of the industry. (For example, not only is the industry shielded from foreign competition, its R&D is almost completely subsidized by the government.) They also forget to note that they are responsible for that sheltered environment. Firms in the commercial market have higher risks and therefore higher profitability.

Pete Aldridge, President George W. Bush's under secretary of defense for acquisition, wants to lower the risk for defense contractors even further. He recently sent a memo to DoD's acquisition offices announcing that private financing of future defense R&D programs would end. He argued that requiring defense contractors to risk losing their investment in R&D could be harmful to the industry.[24] But government funding for R&D is a subsidy that most commercial firms do not enjoy.

Another way of reducing risk to the industry has been proposed by Philip Coyle, former director of DoD's Weapons Testing and Evaluation Office. He advocates making defense R&D contracts more profitable by increasing the amounts paid by the government at completion. He argues that doing so would lure to the industry and retain more technology specialists and would attenuate political pressure to rush weapons programs into the more profitable production phase.[25]

Adm. Mike Boorda proposed a better approach when he was chief of naval operations. He advocated an approach that was the opposite of Aldridge's—that is, requiring the defense industry to fund a greater percentage of R&D contracts. Under that approach, defense companies could make more money on production contracts, but they would need to put more of their own funds into R&D.

Boorda's proposal, however, would create an even bigger incentive than already exists for suppliers to rush weapons into production. Defense contractors already make most of their money in the production stage; congressional districts get most of the jobs in that phase; and the military services want to field systems as fast as they can so that Congress or the Office of the Secretary of Defense cannot terminate them. So if defense

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contractors were required to fund more of their own R&D (and to accept risk levels approaching those of the commercial sector) but could make more profit in production (and reap rates of return approaching those of the commercial sector), the customer (DoD) would need to make sure that it tested weapons thoroughly before they were allowed to go into production. In other words, DoD should pay attention to the quality of weapons it receives for the money rather than worry about whether the industry is making excessive profits, which are hard to define anyway. Over the past decade, however, the services have cut testing personnel by 30 percent and testing installations by 32 percent.[26] Such cuts have to be reversed, and more emphasis should be placed on ensuring that taxpayers get their money's worth when weapons are purchased.

Also, defense contractors have benefited from the lower risk associated with the high barriers to entry that have kept nondefense firms from competing for defense business. Those regulatory barriers have been erected by DoD and Congress to protect the defense industry. Unlike a commercial business, which wants to buy the best equipment for the money it has, the Pentagon just wants to purchase the best equipment. DoD is spending other people's money (that is, taxpayer dollars) so cost is less important than performance. In fact, many defense contracts allow a percentage of profit based on costs incurred—thereby giving a contractor perverse incentives to increase costs and lower efficiency.

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Major barriers to entry for many commercial firms are the Pentagon's very demanding and unique noncommercial specifications for weapons. Although controlling cost is now a requirement in weapons development, even Gansler admits that not enough has been done to restrain costs. The commercial sector remains much more conscious of costs than the defense sector, which is still focused on the performance of weapons. According to Coyle, combat personnel are unrealistic in their expectations for performance.[27] They want the highest-technology weapons without regard to cost. That view is understandable, but some balance must be achieved between performance and cost, especially when recent wars have demonstrated that the United States already has bone-crushing dominance over any potential foe. U.S. forces are already more dominant relative to other world militaries than was the Roman Empire at its height, the British Empire at its zenith, or Nazi Germany in 1940.

Also, the Pentagon has constructed a labyrinth of bureaucratic processes to regulate and oversee defense contractors (that government oversight is much more intrusive than that over any other U.S. industry).[28] In the 1980s "procurement reform" was sought through increased regulation of the defense industry.[29] For example, under the current system, numerous teams of government auditors descend on defense contractors to attempt to prevent or deter their defrauding the government. Yet much more public money is squandered on the inefficiencies and expenses of complying with the audits than is lost through the small amount of fraud in the system. In other words, the cure costs more and has more ill effects than the original problem. The marginal cost of achieving zero fraud and waste is exorbitant. Furthermore, excessive regulation in the defense industry causes programs to be inefficient and sometimes fail, spurring demands for even more regulation.[30]

Few commercial firms want to incur either the actual or the opportunity costs of navigating the exacting, highly bureaucratic, regulated, and inefficient defense market. According to Rumsfeld, "Our processes and regulations have become so burdensome that many businesses have simply chosen not to do business with us."[31]

Instead of being able to sell their commercial products to the military services or to modify them slightly for military use, nondefense firms are asked to develop unique items for the military at a much higher cost. Many commercial firms conclude that the small sales volume is not worth the added costs and aggravation of complying with more

intensive government regulations. Even firms that do decide to undertake defense work are often forced to conduct defense and commercial business in separate facilities. For example, Motorola maintains an obsolete plant to comply with unique DoD requirements; that plant is kept separate from the company's leading-edge commercial electronics installation. Boeing also keeps commercial aircraft facilities separate from plants that produce military aircraft so that DoD's burdensome regulations and specifications will not hurt its commercial product lines. In contrast, the government of Japan has encouraged its defense sector to buy commercial products and has encouraged Japanese companies that build aircraft and jet engines to build both advanced military fighters and major components of civilian transport aircraft on the same machinery in the same plants.[32] If the United States did that, the price of defense goods would decrease and the quality would increase.

During the Clinton administration, DoD launched an acquisition reform process intended to streamline the way defense articles are purchased in order to make it similar to the way commercial businesses buy items. That laudable goal was only partially met and is still being pursued by Rumsfeld, but that is nowhere near enough. Also, the Pentagon has allowed prime contractors more flexibility in choosing subcontractors, but the primes still have an incentive to distribute the subcontracts around the country to ensure that Congress continues to fund the weapons programs.

Instead of tinkering with a flawed system, DoD must radically transform the way it buys weapons. Despite a U.S. defense budget that dwarfs that of any other country, if such transformation does not occur, the United States may fall behind other nations in certain weapons technologies. Other countries may use rapidly advancing commercial technology to leapfrog outdated U.S. military-specific technology. Transformation of weapons acquisition will also lower costs to the taxpayers.

DoD Must Buy Commercial Components for Weapons

There will probably always be a few large defense firms that are heavily or totally dependent on DoD as a customer. Military weapons systems, such as tanks and aircraft carriers, made by prime contractors may not have counterparts in the commercial sector, but more than likely they have parts and components that do. At the component level, the technology of both the product and the manufacturing process for defense and commercial applications is most similar. Instead of generating excessive specifications for military-unique items, the Pentagon should allow prime contractors to use commercial off-the-shelf items in building weapons unless an overriding need for a special military item arises. Such cases should arise only rarely because, in many cases, commercial technology compares well with military requirements, and those requirements need to become more realistic. Although in the short term the military might correctly assume that such a policy will not produce weapons of optimum performance, in the long term it will result in more advanced weapons.

The U.S. military gets its technological edge from the brute force of applying large amounts of government R&D funds to the task rather than from spending money efficiently. As noted earlier, the U.S. budget for military-unique R&D has roughly the magnitude of the entire defense budget of each of the nations that are runners-up in military expenditures (such as Russia, China, and Japan). But the technology developed by fierce competition in the commercial marketplace is rapidly outrunning the technology developed by sluggish defense bureaucracies that defend socialist practices (publicly owned facilities) and industrial policy. For example, the U.S. Airborne Warning and Control System aircraft is the most technologically advanced military airborne early-warning system in the world, but its technology is now primitive by commercial standards. Future adversaries might obtain the more advanced technology readily available

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worldwide in the commercial sector, use it in weapons, and leapfrog U.S. military-unique technology in important areas. In other words, in some respects, potential adversaries' lack of access to military-unique technology might be an advantage rather than a disadvantage.

The military must either buy commercial technologies or face the obsolescence of its hardware. For example, commercial semiconductors now meet the environmental standards of the military and are more reliable, much more advanced technologically, and cheaper than military semiconductors. Yet excessive military specifications and procurement regulations have led many of the top commercial semiconductor firms to refuse business from DoD, which means that the military pays exorbitant prices for obsolete, specially designed circuits.[33] Even now, more than half of DoD's budget for R&D, production, and upgrades goes to the defense electronics industry. Electronics is the defense industry subsector in which buying commercial components is most feasible and most urgent.

Some progress, however, has been made by the military services. The Navy had to make adjustments to the designs for new submarines to incorporate commercial computers and software because commercial computing equipment had vastly outstripped that developed in the military world. The Navy was forced to make that change because computers are the heart of a submarine's combat system. Similarly, the Navy and Marine Corps, instead of attempting to purchase, operate, and maintain their own hardware and software for the services' intranet, saved funds and obtained new technology by outsourcing the intranet's operation. If the military does not do the same with other commercial technologies, it may fall behind the military of an adversary that has the foresight to do so.

Right now, for the most part, the military acquisition system commissions private defense contractors (many of whom are wards of the state) to do military-unique R&D and then build hardware containing the technology to exacting military requirements and specifications for performance. According to Coyle, military personnel in the field want the most capable weapons possible and so exhibit a "lack of realism." That divorce from reality, says Coyle, leads to excessive requirements for weapons systems.[34] The U.S. military should have capable weapons systems, but it already has crushing dominance compared with any other military on the planet and needs to pay more attention to escalating costs and the excessive time required to build complex weapons.

Frequently, requirements and specifications for weapons are modified during development to reflect government-mandated design changes containing new military-unique technologies. The weapon that finally rolls off the production line rarely looks like the one originally planned. All of those changes cause schedule slippages. It is not uncommon for it to take 15 to 20 years to get a weapons system from the initial stages of R&D to production. As weapons systems have become more complex, the time required to develop, produce, and field them has grown. (Of course, all of the design changes drive up costs, resulting in fewer funds to start new programs or produce existing weapons in large quantities. That, in turn, reduces the number of firms that can remain viable in the industry.)[35]

Yet during the long period needed to acquire weapons, commercial technology will have likely galloped ahead—making the weapon obsolete, or nearly so, compared with the state-of-the-art technology of the private sector. According to Rumsfeld: "It takes twice as long today as it did in 1975 to produce a new weapons system—at a time when new generations of technology are churned out every 18 months. That virtually guarantees that weapons systems are at least a generation old the day they are deployed."[36] (In the early 1990s the average time from a U.S. weapon's start to production was 16.5 years, compared with a 6- to 18-month cycle of obsolescence in the commercial information technology sector.)[37] Vernon Clark, chief

of naval operations, admitted as much when he argued that the pace of change in the world had left the weapons acquisition process behind and that something needed to be done about it.[38]

"Spiral Acquisition" Is Only a Partial Solution

Of course, the problem of obsolescent technology could be ameliorated by incrementally improving existing weapons every so often rather than waiting a long time for quantum leaps in capability offered by a new development program. In a significant reform of the current acquisition process (at least in theory), Aldridge has instituted regulations requiring such a "spiral" or "evolutionary" acquisition approach. That approach aims at achieving more modest improvements in a shorter period of time and then incorporating feedback from military users in the field when upgrading the weapon. The concept is not new, but making it mandatory is. Unless program managers can show that the technology exists up front for the entire program or that a critical need exists for all technology to be incorporated at once, they must use the evolutionary approach.

The advantages of spiral development are twofold: (a) less risk to the government because fewer funds are invested before a weapon is tested and fielded and (b) quicker incremental technology insertion for the benefit of the users (so that the technology is not outdated by the time it gets to the field). Evolutionary acquisition also results in fewer gaps in production—that is, it smoothes the weapons acquisition process by incrementally introducing technology rather than seeking quantum improvements in successive generations of weapons at long intervals. Fewer gaps reduce costs and approximate the efficient and timely way in which commercial items are produced.[39]

In general, commercial products and upgrades can be fielded in 18 months or less.[40] Spiral development is a government attempt to match that pace. Weapons developed in the traditional way (such as the F-22 fighter) have seen quality increase, but costs soar and production delays multiply. In contrast, in the commercial sector, with each new generation of products, quality usually goes up, costs normally come down, and the time needed to field the item usually decreases. The new process has promise: the Air Force's new remotely piloted vehicle program took only five years from its start to the fielding of the system. The JSF is using the same approach.

There is underground resistance from the defense acquisition bureaucracy, and that resistance is likely to continue. The bureaucracy prizes high-performance technology and may not want to forgo it even to get weapons with proven technology more quickly.[41] According to Katherine Schinasi of the U.S. General Accounting Office, Congress's investigative watchdog, "We find [program managers] are not willing to accept evolutionary acquisition, because they know they are not going to get another project for 20 years, so everything has to be in it now."[42] They fear they may never get the money for future improvements to the project and believe it is easier to get funding for all technology when the weapon is new.

Evolutionary weapons acquisition is a positive development (if the defense acquisition bureaucracy does not succeed in undermining it). The problems of high costs and outdated technology, however, will not be solved until the defense sector not only adopts commercial practices but also buys components and parts commercially. Sometimes commercial components will need to be modified for military purposes, but that is better than designing military-unique items. At the very least, defense components should be designed so that they can be built using flexible manufacturing equipment on commercial assembly lines. Using more dual-use commercial items in defense would reduce the need to keep redundant defense-unique facilities open for surge production in case of a national emergency and lessen the pressure for arms sales overseas to keep the U.S. defense industry "healthy." In addition, part of DoD's (really, taxpayers') overhead would be absorbed by commercial contracts.

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Now we can produce defense and commercial items on the same assembly line during peacetime.

Defense Acquisition: Back to the Future

Before World War II and the Cold War, in which the United States developed "global responsibilities," the United States had no permanent arms industry. When the nation went to war, civilian industries were converted to weapons production and then reconverted after the various conflicts ended.[43] With modern technology, the United States may now be able to move at least partially back to that way of doing things. Now, instead of converting entire factories after a war starts, we can produce defense and commercial items on the same assembly line during peacetime.

Common production lines for defense and commercial items have been made possible by several technological developments: the growing similarity of defense and commercial technologies; the development of reliable, durable, and advanced commercial components; and the advent of flexible manufacturing techniques. The lists of critical military-related technologies issued by the Departments of Defense and Commerce have 80 percent of the technologies in common, and commercial technologies (for example, supercomputers, special materials, and advanced electronics and communications) now meet and exceed DoD's requirements for ruggedness on the battlefield. Modern, flexible production lines can change robotic tools quickly and manufacture small quantities of items (typical defense production runs are small) as efficiently as longer runs do on older assembly lines. U.S. allies (for example, Japan) have had more success than DoD in using commercial practices and facilities in defense production.[44]

In the short term, the U.S. military may have to relax some of its requirements so as to allow the adaptation of commercial technology for use in weapons, but in the long term, that policy will solve the problem of outdated technology. (A gap already exists between many defense technologies and their cutting-edge commercial counterparts, and that gap is getting wider.) If the prime contractors bought commercial components—or versions modified for military use and built on commercial assembly lines—from commercial subcontractors, the time required to develop weapons would be dramatically reduced, and potential adversaries would have less of an opportunity to leapfrog U.S. technology. Moreover, competition at the subcontractor level would increase greatly, thereby dramatically lowering the costs and improving the quality of weapons.

Buying Commercial: Theory and Practice

According to George Krikorian of *National Defense*, defense items are 30 to 50 percent more expensive than comparable commercial goods.[45] According to the Defense Science Board, for high-technology items, the disparity was even greater—a 200 to 500 percent markup for defense goods.[46] (That gap occurs because the commercial sector invests much more than does the defense industry in technology to improve the production process; the defense industry invests in technology to enhance the performance of the product.) For example, the National Security Agency had STU-III encrypted phones developed using commercial practices, components, and facilities in order to get them delivered fast (in one-fifth of the time that would have been required for a defense-unique purchase). As a result, NSA built the phones for 10 percent of what a defense-unique item would have cost.[47]

Reducing the exacting military-unique requirements imposed by DoD would allow many of the excessive regulations and burdensome reporting and auditing requirements to be eliminated. The price of the same or similar items in the commercial sector would give DoD a good idea of whether it was being overcharged. Also, economies of scale, achievable by building items for both defense and commercial uses on the same flexible production lines, would reduce the costs of production. Thus, commercial firms would be less leery of doing business with the Pentagon. In other words, buying commercial components for weapons would better allow the introduction of commercial practices.

During the Clinton administration, the Pentagon pursued the daunting goal of adopting commercial practices for acquiring weapons. Rumsfeld is continuing that initiative. But that effort has been constrained by the absence of a major initiative to buy commercial components for weapons.[48] In theory, the Pentagon encourages the use of commercial specifications whenever possible, and Aldridge has endorsed the idea of using more commercial technologies in weapons systems. According to Coyle, however, even many items that the military terms "off-the-shelf" really have no commercial use.[49] In reality, the military bureaucracies have little incentive to accept commercial components when they are permitted to have parts and components custom built. Achieving lower costs by "designing to cost" (designing a product using cost as a major constraint) is more important to the commercial sector than it is to the defense sector.

Unless Pentagon officials at the highest levels demand the purchase of commercial components, the military services will continue to insist on unique specifications—and waste billions of dollars in the process. Consider the Army's wasteful approach to producing tank components. The next-generation tank will probably have composite armor and a ceramic engine, making it much lighter than the current 70-ton M-1 model. Commercial producers of such materials wanted to produce defense and commercial items at the same facilities because the military would need only small quantities of them (compared with the commercial sector). But the Army refused to design the tank armor and engine so that they could be produced on a flexible commercial assembly line.[50] Thus, tremendous economies of scale were forgone—and with them, significant cost savings.

According to the Defense Science Board, the executive branch could scrap 60 to 75 percent of the barriers between the defense and commercial sectors. In the remaining cases, legislation would be needed.[51] In short, the executive branch could do much to introduce true market forces into the defense industry—if only it would.

Conclusion

America's defense industry wastes billions of taxpayer dollars and fails to provide cost-effective weapons in a timely manner. As Gansler put it:

> America designs and builds the best weapons in the world. These weapons, however, cost far too much (especially in the small quantities likely to be bought in the future), take too long to develop and produce, and are often unreliable and prohibitively expensive to operate and support.[52]

The reason those problems persist is that the defense industrial sector is a mixture of socialism, industrial policy, and excessive regulation. According to defense economists Todd Sandler and Keith Hartley, the defense industry is characterized by "non-competitive cost-based contracts, state-funded research and development, a protected market, guaranteed profits, and a culture of dependency rather than a culture of enterprise."[53]

Government-owned depots, shipyards, and laboratories should be closed and the business given to the private sector. Even then the Pentagon's post–Cold War demand for small quantities of expensive weapons would probably support efficiently only one or two large private prime contractors in each defense subsector—mainly to integrate components into finished weapons systems. Yet because of politics and DoD industrial policy, excess capacity is also maintained in the private sector at great cost to the taxpayer. The Pentagon uses "competition" or "future competition" as an excuse to allocate production among contractors to keep excess facilities open.

The Pentagon should not be afraid to conduct winner-take-all competitions to weed out the uncompetitive deadwood in the industry. Economic studies by Baumol and others suggest that company performance is determined by the threat of a competitor's entry into an

The military bureaucracies have little incentive to accept commercial components when they are permitted to have parts and components custom built.

industry rather than by the number of firms already in it. Another study by Bhagwati showed that even if a monopoly existed in a market, the threat of other large firms from outside the market entering would hold prices down. (In this case, large firms from other defense subsectors would provide the potential competition.) Furthermore, in the defense business, any monopoly in a subsector would be offset by the enormous market and regulatory power of the sole buyer—DoD. Because some weapons (for example, tanks and aircraft carriers) have no commercial counterparts and are needed only in small quantities, DoD may be forced to accept the reality of a limited number of large prime contractors remaining in each industry subsector—not necessarily a bad outcome.

If the Pentagon wanted to increase competition at the level of the prime contractor, it could open the U.S. defense market to firms from friendly nations. Given the demise of the Cold War threat of a mass surprise attack with conventional, including high-tech, weapons (the terrorist threat is strictly low tech, and only modest conventional forces are needed to combat the destitute nations that sponsor and harbor terrorists), the United States can buy some of its weapons from friendly countries without undermining its security.

Competition at the subcontractor level could be increased substantially if the prime contractors were to buy commercial components, or modified versions thereof, instead of mainly military-unique items. Buying commercial products would require the military to move away from rigorous specifications for weapons that only military-unique items can fulfill. If the military could buy mostly commercial parts and components for its weapons, most of the defense industry could be deregulated. Thus, the goal of DoD's adopting commercial practices would be easier to attain.

None of those policy prescriptions would make the defense industry as efficient as the commercial sector, but each would move it in that direction. The result should be better and cheaper weapons that take less time to field and reduced overhead (which is expensive) accruing to the taxpayer—in short, a more efficient defense industry.

Yet DoD has no incentive to reform the system when the president and Congress continue to reward inefficient practices by showering the department with ever-increasing budgets, even after the massive threat from a rival superpower has evaporated and been replaced by only a low-tech terrorist threat (DoD is only one of the many federal, state, and local agencies countering terrorism). In fact, if the Pentagon's budget were reduced, it would be under increased pressure to make the process of weapons buying more efficient. Both of those results would be a welcome relief to the already overburdened taxpayer.

The Pentagon should not be afraid to conduct winner-take-all competitions to weed out the uncompetitive deadwood in the industry.

Notes

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