ISN
ETH Zurich

INTERNATIONAL RELATIONS AND SECURITY NETWORK

DEFENSE INDUSTRIES AND DEPENDENCY: CURRENT AND FUTURE TRENDS IN THE GLOBAL DEFENSE SECTOR

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

INTERNATIONAL RELATIONS AND SECURITY NETWORK

DEFENSE INDUSTRIES AND DEPENDENCY: CURRENT AND FUTURE TRENDS IN THE GLOBAL DEFENSE SECTOR

Dr. Stephanie Neuman
Columbia University

TABLE OF CONTENTS

INTRODUCTION

In the social sciences, an indicator is a variable that conveys reliable information about the condition or structure of the larger system of which it is a part. In this paper, I propose the global defense industrial sector as an accurate indicator of the stratification of power in the international system.[1] To that end, this paper describes the post-Cold war restructuring of the world's military industrial sector. It portrays the dominant role played by the US in this sector and outlines the ways in which US policymakers use this comparative advantage to influence foreign affairs. Curiously, the defense industrial sector as a policy tool has received relatively little academic scrutiny. Instead, scholars have focused on the use of military force and arms embargos, evaluating their success or failure as instruments of policy. This paper takes a broader view. It argues that the global military industrial sector not only reflects the international order but also provides the US with the ability to encourage and reward compliance,[2] as well as to threaten sanctions or punish non-cooperation.[3] As such, it is a powerful (if undervalued) diplomatic tool in the United States' political arsenal.

Part one of this paper describes trends that have restructured the global military industrial sector: the contraction of defense industries, the role of US military transformation, the rising costs of weapons, commercialization and privatization within the defense sector, and the skewed arms export market. Part two outlines the dominant position of the US and the relative dependency of other arms producers. Part three speculates on the emerging defense industrial system and analyzes the options and strategies that are available to the world's less advanced defense industries. Part four discusses the political implications of the current global military industrial structure, while part five summarizes the article's primary arguments.

* *Paper delivered at the Conference on Israel's Strategic Agenda (4–6 July 2005), BESA Center, Bar Ilan University. A shorter version appears in ORBIS 50:3 (Summer 2006).*

CONTRACTION AND GLOBALIZATION OF DEFENSE INDUSTRIES

The end of the Cold War precipitated major changes in the defense-industrial base worldwide. As the perceived conventional military threat diminished, defense budgets were reduced, and major weapons programs slowed down in the main arms-producing countries. In some less developed countries, military industrial production was drastically cut, and some production lines were closed down entirely. Since the mid-1990s, through a process of mergers and acquisitions and rationalization, the world's defense industrial sector has become increasingly concentrated, particularly in the US.[4]

These changes have been accompanied by rapid globalization of the military industrial sector worldwide and the emergence of transnational defense companies, especially at the subcontractor level in Europe and the US. There is some question, however, as to the actual character and extent of what is frequently referred to as "globalization."[5] According to some analysts, globalization of the defense industrial sector in both the US and Europe has been uneven. The Stockholm International Peace Research Institute (SIPRI) contends that the military industrial sector in the US has opted for certain kinds of global and transnational initiatives while avoiding others. Whereas the US is eager to exploit foreign sources of technology, it simultaneously seeks to protect itself from becoming too dependent upon foreign suppliers. In fact, studies conducted by the US Department of Defense found that US dependency upon foreign sources is limited, and that what is imported has a negligible impact on the readiness of the military and the US defense industrial base. Only about 4 percent (US$ 7 billion) of total Pentagon procurement (US$ 171 billion) during FY02 was for overseas contracts, and, of that US$ 7 billion, less than 1 percent was for military hardware.[6] It is, SIPRI contends, a policy of moving both towards and away from defense industrial globalization.

The term globalization as applied to Europe's military industries is equally problematic, since intra-European collaboration has been far more extensive than transatlantic collaboration.[7] But even within the boundaries of Europe, transnational collaboration has not been vigorous. As the European Union (EU) Representative for the Common Foreign and Security Policy (CFSP) and the head of the European Defense Agency (EDA) Javier Solana observed, "There is enormous fragmentation in both supply and demand, and almost no international cooperation between [EU] member states." He added that less than 5 percent of Europe's research and development budget is spent collaboratively. As an example, Solana cited the 23 separate national programs for armored fighting vehicles (AFV) currently running or about to start, with almost no cooperation between EU members.[8] Less is known about the participation of defense industries in less developed countries, suggesting that, with few exceptions, they are only marginally involved in the globalization process.

What has indisputably been globalized is the industry's perception of future markets and the desire for sales. As armies continue to downsize and domestic demand for defense goods shrinks, arms producers worldwide are looking abroad for customers to create economies of scale for their products. Some analysts believe that, with the possible exception of the US, in the coming years defense industries may consider their own military to be a less important customer than foreign markets. According to other analysts, this is already the case in France and Israel. In both countries, export earnings are far higher than domestic sales in the defense sector. In France, the military complains that the requirements of foreign customers – ather than the needs of the French armed forces – drive French arms production. In Israel, the military has become a secondary customer for almost all defense companies, whose exports now account for almost 80 percent of revenues (the reverse of the US market).[10]

TRANSFORMATION

Another factor contributing to the defense industrial restructuring is the "transformation" of US military doctrine.[11] In response to perceived new security threats and technological innovations, this new doctrine is designed to enable the US military to better address small, complex, non-traditional contingencies. It aims to expand communication among military units, and to achieve greater real-time target acquisition, longer-range force projection, increased mobility, and improved weapon accuracy and lethality. Based on the concept of network-centric warfare (NCW), operations are designed to provide an integrated picture of the battlefield, available in detail to all levels of command and control, down to the individual soldier.[12] The goal is to achieve rapid and effective interaction between systems that "collect, process, fuse and communicate information" and those that deliver military force.[13] This integration of complex systems into a network of other complex systems – the so-called "systems of systems" concept – therefore depends on a host of sophisticated sensors, computers and telecommunication technologies, as well as technical support and other specialized services designed to improve military capabilities.

These innovations in technology and doctrine have generated a sizable demand from both the civil and military sectors. As the line between traditional military and internal security functions has blurred, demand for many of the same systems has arisen from both the armed forces and the Department for Homeland Security, creating a large market for these new technologies in the US, one that is having a ripple effect around the world.[14]

Economic pressures combined with a new, more complex threat environment have led other governments to downsize and modernize their armed forces and their military industries. In East Asia, for example, Japan, South Korea, Singapore, Taiwan and (to a lesser extent) China have opted to integrate advanced computers, communications equipment and sensors with precision-guided weapons in an effort to "transform" their militaries.[15] The defense industries in East Asia are also consolidating, privatizing and internationalizing in order to increase their technological self-reliance, satisfy their militaries' needs, and compete in the world market. But, despite their efforts to become less dependent on Western suppliers and increase their share of the world's arms trade, East Asian defense industries still find themselves reliant on Western technology.[16]

RISING COSTS

Cost growth in successive generations of weapons is inevitable. Over time, as new threats arise, new, more sophisticated weapons are developed to improve military capabilities. During the Cold War, the average unit production cost (UPC) of weapons grew between 5 and 10 percent annually. According to one study which analyzed some 30 classes of weapons, this rate of increase has remained stable, with the unit production cost of military weapons continuing to rise an average of 5 to 10 percent per year in the post-Cold War period as well.[17] However, compared to the price of mature systems, such as rifles and machine guns, which increase more slowly, the rate of growth for new technologies is much faster.[18] This is due not only to rising manufacturing costs but to the military's requirement for more extensive research, development, testing and evaluation (RDT&E). Also contributing to the rising costs are the more complicated operating and maintenance procedures of the new weapons, as well as the requisite need for more highly trained personnel and more intricate spare parts.[19] Despite the use of less expensive off-the-shelf commercial components instead of those designed specifically for the military (see discussion below), the cost of new weapons and military technologies "seem[s] to be rising inexorably."[20] Today, as the price of sophisticated weapons has escalated and defense budgets have fallen, few countries can afford the many new technologies associated with network-centric warfare.

The economics of military transformation, then, is a major dilemma for defense planners, who recognize that, in the twenty-first century, the number of weapon systems in inventory is no longer a reliable indicator of military power or effectiveness. Today, an electronic network of sensors and communications systems is estimated to multiply the utility of individual weapon systems ten-fold, by providing broader coverage of the battlefield, allowing a more efficient allocation of forces, enhancing the timing of their operations and reducing fratricide.[21] However, the cost of building and maintaining such a network is substantial, and the number of countries that can afford it is extremely limited.[22]

COMMERCIALIZATION AND PRIVATIZATION[23]

These changes in the defense sector have occurred as the pace of scientific innovation in the civilian economy has increased, especially in the areas of electronics, software, and information and communications technologies. Major advances in fields such as nano-technology, robotics, computer simulation, and stealth technology have also taken place. In the past, there were dramatic differences between technologies used in commercial and military systems, but, as suggested above, that is changing. As a result, military organizations in most major arms producing countries are now turning to the commercial sector – both at home and abroad – for dual-use technologies and new breakthrough scientific discoveries.[24]

Doing so is also a response to post-Cold War political pressures to economize by cutting military spending. Jacques Gansler, then US Under Secretary of Defense for Acquisition, Technology and Logistics, made this point at a conference promoting the Department of Defense's Dual Use Science and Technology (S&T) program.[25] He emphasized that the US military needs to take advantage of the efficiencies, innovation, reduced cycle time and lower cost of technologies that come from the commercial world in order to create economies of scale that can have important cost-cutting benefits for the military. Gansler insisted that the S&T program he had initiated was not about using commercial items for defense, but was about using the underlying technologies to meet both defense and commercial needs.[26] Other governments, such as that of the UK, have introduced similar incentives to encourage cooperation between the military and the private sector. The UK Ministry of Defense (MoD) takes the position that, "while the defense industry may continue to lead in some selective military applications ... most future technological innovations will originate in the commercial sector."[27]

New entities are now also being created to satisfy the military's demand for outsourcing to private commercial firms those goods and services formerly produced within the defense sector. In the US, many traditional defense contractors have, through acquisitions or partnerships, gained a foothold in this market, although large numbers of other private firms are actively participating as well.[28] The services offered by private companies range widely: from providing repair services, training and logistical management to feeding soldiers in war zones; from administrative support for defense departments and ministries to the supply, integration, maintenance, or operation of military systems.

Two factors are driving the US military's growing reliance on private companies, particularly for services. First is the Pentagon's belief that it is less expensive to use civilian rather than uniformed personnel. Second is the armed forces' lack of sufficient human resources. Downsizing, which began in the 1990s, has produced a military that often does not have enough uniformed manpower to carry out all its assigned missions, much less enough personnel trained to operate and maintain leading-edge commercially designed technology.[29] Private companies now are needed to provide a multitude of skills to fill these gaps. A study by the Center for Public Integrity found that half of the US defense budget now goes to private contractors – US$ 208 billion of the US$ 416 billion budget for 2005, a number that does not include supplementary spending for the war in Iraq. Over half of this US$ 208 billion was awarded for services, instead of for weaponry or materiel.[30]

The integration of private companies into Europe's military sector is proceeding slowly but unevenly. In the UK, for example, the role of private contractors as service providers to the military is expanding. By 2003, the MoD had reportedly signed 47 private firms to contracts with a combined value of more than 2.5 billion pounds (US$ 4 billion). Germany, however, has lagged behind in outsourcing military functions, although it too is now following the US and UK example by trying to rely more heavily on the private sector.[31]

Among less developed countries, the trend is even slower and less consistent. In India, for example, despite the government's good intentions, the private sector contributes annually only about 7 percent to India's total defense research and production.[32] In Russia, all but one of the major arms-producing companies (Irkut) are government owned.[33] For Israel – where 67 percent of the defense industry is in government hands – privatization decisions have proven to be especially difficult. Most private-sector executives, along with the Israeli MoD, agree that the best way to slim down Israel's bloated military industrial base is to

privatize and allow Israeli defense firms to compete in the open market. According to MoD Director-General Amos Yaron, Israel's defense budget (US$ 8.3 billion) cannot sustain the 45,000 or so workers currently employed by Israeli government-owned defense companies. Yet despite the economic pressure to do so, the Israeli government has been slow to privatize, citing security concerns. Even so, privately-owned companies account for one-third of the Israeli defense industry base, and a process of mergers and acquisitions is now underway.[34] Although the processes of commercialization and privatization are proceeding more slowly in some countries than in others, it is a trend that is gathering momentum. According to analyst P. W. Singer, total revenue worldwide just for private firms providing services "intricately linked to warfare" was about US$ 100 billion in 2003 and growing rapidly.[35]

As new commercial firms enter the defense sector, they are precipitating major changes in it and raising hard questions about the future: What is a defense industry? How are defense industries and military technology to be defined?[36] What differentiates them from their commercial counterparts? How can governments guarantee their own sources of military equipment and services during times of crisis? How will governments control the proliferation of commercial technologies that have military applications?[37] These are questions that have important implications not only for defense industrial production and procurement, but also for arms control regimes, and for military effectiveness and readiness in the future. To date, governments have provided few answers to these questions.

ARMS EXPORTS

Since the end of the Cold War, falling defense budgets have created a significantly smaller global arms market. The total value of arms deliveries worldwide declined by 28 percent between the periods 1997–2000 and 2001–2004 (Table 1). The US, accounting for over 40 percent of the world's military exports, dominates the global arms trade. The second and third largest suppliers during 2001–2004 (Russia and the United Kingdom respectively) each accounted for only 13 percent of total world deliveries of military equipment and services

Arms Deliveries to the World, 1997–2004: Leading Suppliers Compared (in millions of constant 2004 US dollars)

Supplier	Arms Deliveries Value 1997–2000	% of World Deliveries 1997–2000	Arms Deliveries Value 2001–2004	% of World Deliveries 2001–2004
China	3,651	2.01%	3,053	2.33%
France	24,969	13.78%	11,626	8.86%
Germany	7,255	4.00%	4,914	3.74%
Italy	1,874	1.03%	1,387	1.06%
Russia	14,807	8.17%	17,625	13.43%
United Kingdom	26,295	14.51%	17,149	13.07%
United States	76,202	42.04%	53,967	41.13%
All Other European	15,989	8.82%	11,096	8.46%
All Other Countries	10,205	5.63%	10,400	7.93%
Total	**181,247**	100.00%	**131,217**	100.00%

Supplier	Arms Deliveries Value 1997–2004	% of World Deliveries 1997–2004	% Change from 1997–2000 to 2001–2004
China	6,704	2.15%	-16.38%
France	36,595	11.71%	-53.44%
Germany	12,169	3.89%	-32.27%
Italy	3,261	1.04%	-25.99%
Russia	32,432	10.38%	19.03%
United Kingdom	43,444	13.90%	-34.78%
United States	130,169	41.66%	-29.18%
All Other European	27,085	8.67%	-30.60%
All Other Countries	20,605	6.59%	1.91 %
Total	**312,464**	100.00%	**-27.60%**

Table 1

(All foreign data are rounded to the nearest $100 million. Source: US Government)

Source: Richard F. Grimmett, Conventional Arms Transfers to Developing Nations, 1997–2004, (Washington, DC: Congressional Research Service Report for Congress, 29 August 2005), 80, Table 9A. Compiled 31 August 2005. See http://fpc.state.gov/documents/organization/52179.pdf.

According to Grimmett, all amounts given include "the values of all categories of weapons and ammunition, military spare parts, military construction, excess defense articles, military assistance and training programs, and all associated services." See 80.

THE DOMINANCE OF THE UNITED STATES

Collectively, the trends outlined in part one of this paper underscore the dominance of the US in the global defense sector, and present governments everywhere with serious economic, military and political dilemmas. The defense spending of the US in 2003 was over six times that of its nearest competitor, Russia, and it dwarfs that of the rest of the world (Table 2). The scope of the US defense industry, compared to that of any other nation, is overwhelming. It produces a vast array of defense systems, and is the world leader in advanced systems-integration skills and leading-edge technologies.[38] According to the latest data, the United States in 1996 accounted for about 50 percent of the world's production of arms (Table 3). In 2002, US military R&D spending was more than four times that of the entire European Union.[39] Since then, the gap has grown even larger.[40] In 2005, a French government report found that "spending on military hardware in the EU is equal to only one-third of the Pentagon's equipment budget, and research spending Europe-wide totals only a fifth of US outlays."[41]

States with Defense Expenditures in Excess of USD 10 million as percent of US Defense Expenditures, 2003 (current USD)

Country	Total Defense Expenditures (in millions of USD)	Percentage of U.S. Expenditures
Australia	11,758	2.90%
Canada	10,118	2.50%
China	55,948	13.82%
France	45,695	11.28%
Germany	35,145	8.68%
India	15,508	3.83%
Israel	10,325	2.55%
Italy	27,751	6.85%
Japan	42,835	10.58%
Korea, South	14,632	3.61%
Russia	65,200	16.10%
Saudi Arabia	18,747	4.63%
Turkey	11,649	2.88%
United Kingdom	42,782	10.57%
United States	**404,920**	**100.00%**

Table 2
Source: The Military Balance 2004–2005 (London: International Institute for Strategic Studies, 2004), 353–57, Table 38. Compiled 6 June 2005.

Moreover, as the largest exporter of military equipment and services in the world, the US is paradoxically the least dependent on foreign exports. Because the United States' domestic procurement budget is so large, the dollar value of its defense-related exports amounts to only about 20 percent of the arms the Pentagon buys.[42] Likewise, the dollar value of US arms imports is less than 5 percent of the dollar value of its exports, by far the lowest percentage of any arms producer (Table 3). Given this comparative economic and technological advantage over any other major power or combination of powers, the dominant position of the US in the world's military industrial sector presents significant dependency problems for the rest of the world. This is particularly true for smaller states whose options, relative to those of the US, are far more limited.

The 35 Largest Arms-Producing Countries Ranked by Share of World Total Arms Production,[1] Arms Exports as Share of Production, and Arms Imports as Percent of Arms Exports[2]			
Country	Arms Production as Share of 1996 World Total[3]	Arms Exports as Share of 1996 Production	Arms Imports as % of 1999 Arms Exports
USA*	46–49%	Medium	4.8
United Kingdom*	10%	Very High	50.0
France*	9–10%	High	27.6
Japan	4–5%	Low	15000.0
Germany*	4%	Medium	68.4
Russia	3–4%	Very High	15.6
Italy*	2%	Medium	184.2
Canada*	2%	High	181.8
South Korea	2%	Low	1100.0
Israel	2%	Very High	400.0
Australia*	.5–1.5%	-	200.0
China[5]	1.1–2.3%	-	210.9
India	.5–1.5%	-	7000.0
The Netherlands*	.5–1.5%	-	553.57
South Africa	.5–1.5%	-	166.6
Spain*	.5–1.5%	-	1071.43
Sweden*	.5–1.5%	-	34.07
Switzerland*	.5–1.5%	-	2200.0
Taiwan	.5–1.5%	-	13000.0
Turkey	.5–1.5%	-	4571.0
Austria*	.1–1.5%	-	100.0
Belgium*	.1–1.5%	-	1166.67
Denmark*	.1–1.5%	-	2900.0
Finland*	.1–1.5%	-	800.0
Greece*	.1–1.5%	-	2111.12
Norway*	.1–1.5%	-	2400.0
Portugal*	.1–1.5%	-	-[6]
Czech Republic	.1–1.5%	-	275.0
Poland	.1–1.5%	-	133.3
North Korea	.1–1.5%	-	21.4
Pakistan	.1–1.5%	-	10000.0
Singapore	.1–1.5%	-	4750.0
Egypt	.1–1.5%	-	-[7]
Iran	.1–1.5%	-	1500.0
Brazil	.1–1.5%	-	900.0

Table 3

1 *Source: Derived from SIPRI Yearbook 1999, Table 10.7 (1996 data), 408–9.*

2 *Source: Derived from World Military Expenditures and Arms Transfers, 1999–2000, Table II (1999 data), 103–53. Compiled 10 June 2005.*

3 *Total world arms production in 1996 is estimated by the SIPRI Yearbook to be about USD200 billion, with a possible range of US$ 195 billion–205 billion.*

4 *Because exact data on the dollar value of national arms production are unavailable, SIPRI estimates are reported as percent ranges; therefore this column does not add up to 100 percent.*

5 *Because reliable data on the Chinese arms industry is not available, the figure included here reflects SIPRI's rough estimate of China's share of world arms production. See SIPRI Yearbook 1999, 409.*

6 *Portugal imported arms (at a value of US$ 60 million), but did not export arms.*

7 *Egypt imported arms (worth US$ 700 million) but did not export arms.*

** Developed industrial countries.*

- Information unavailable (not provided by SIPRI).

ECONOMIC, POLITICAL AND MILITARY DEPENDENCY

These trends suggest that there are few ways in which smaller producers can avoid increasing economic, military and political dependence upon the US. The escalating costs of defense technologies alone present military planners everywhere with the dilemma of choosing between greater military effectiveness and necessary budgetary constraint. As the price of weapons continues to rise faster than tight defense budgets, governments are less able to afford new military systems. Those governments unwilling to equip their forces with second-rate weapons and risk defeat at the hands of a better-armed enemy are choosing to downsize their militaries, buy the most advanced weapon systems they can afford (in fewer numbers), and are foregoing some classes of weapons altogether. [43]

EUROPE

The dilemma is no less acute in the industrialized countries of Europe. The UK government, for example, has made it clear that it cannot realistically pursue the wholesale transformation of its forces. Instead it has adopted a policy of Network Enabled Capability (NEC),[44] which selectively and incrementally transforms the capabilities of its military in those areas "most likely to improve the effectiveness of British armed forces in a context of coalition warfare."[45] [Emphasis added.] France is pursuing a similar policy.

The dark side of this decision is greater military and industrial dependency. As some analysts warn, foregoing one or more classes of weapons means the military can no longer initiate a full range of military operations except as part of an alliance or coalition.[46] Defense industrial autonomy becomes equally elusive. Maintaining an industry that designs and produces only small numbers of weapons for a downsized military will yield products that are prohibitive in cost. The UK government, for one, has acknowledged that the design, development, and production of network-centric technologies "will inevitably be led by the US."[47]

The numbers tell the story. Most arms-producing nations are already importing more military technology than they are exporting. In 1999, even the larger European producers such as the United Kingdom, France, Germany and Russia imported between three and 14 times more defense items than the US as a percentage of their exports (Table 3). This trend gives every indication of continuing and escalating. In the future, the arms-producing countries in Europe will look to the US to provide the technologies and weapons that they do not make. Moreover, economic considerations will mean that small and medium-sized arms producers will become increasingly dependent on export sales of their own products to those countries that can afford to buy them. In a contracted market, the prospects for exports are not great. Inevitably, for these governments, given the current international structure, the large US defense market will be the most attractive target. The problem will be finding a niche for their products within it.

For European arms producers, then, entrance into the US military market for sales and collaborative programs is critical not only for the economic viability of their defense industries but also to maintain the technological sophistication of their armed forces. But it entails a "Hobson's choice," namely accepting US controls over technology transfer. Unwilling to lose control over the destination and use of its exported technologies, services and technical data, the US requires that even close allies agree to retransfer/end-user restrictions, and expects conformity to key US export controls.[48] From the perspective of non-US governments, the cost of entry to the US market is increased dependence for them and greater political leverage for the US. In their view, these measures provide the US with the ability to dictate the pace and direction of their technological development and the stability of their domestic military industries.[49]

LESS DEVELOPED COUNTRIES[50]

Statistical information on arms production for most countries is often not available, and what is available is generally unreliable. The majority of countries provide no information about their defense industries. Those that do use differing definitions of "arms production," and therefore include different data in published documents. This is particularly true for most less developed countries. Researchers at SIPRI conclude that "any presentation of national, regional and global arms production therefore has to resort to estimates."[51] In fact, information on China's defense industries is so unreliable that SIPRI has chosen to exclude it from its arms production tables altogether.

But even SIPRI's rough estimates of comparative arms production capabilities depict in sharp relief the extent of concentration in the global arms production system. Dependency on foreign inputs is even greater in less developed countries than in Western Europe (Table 3), and the range of technical capabilities varies more widely, with few countries approaching the production level of West European defense industries and only in some categories of military technology. Jurgen Brauer points out that in discussing arms production in less developed countries there are at least three levels of manufacturing capability: the construction of military platforms; the manufacture of the weapons to be mounted on the platform; and the production of the necessary modules and sub-components.[52] Some less developed countries have only acquired the ability to assemble or disassemble military systems, but are not able to design and produce their own.[53] Others are accomplished at producing platforms – such as armored vehicles, aircraft or naval vessels – but remain dependent upon imports for their weapons, sub-units and electronic components. A few of these countries are proficient in producing some portion of the advanced weapons and components, but must import the rest. South Korea, India and Israel, for example, have developed extensive arms production capabilities in a number of areas. None, however, are completely self-reliant, and their defense sectors remain heavily dependent upon imports.

In 1999 (the latest date for which arms import/export information is available),[54] all three countries – South Korea, Israel and India[55] – imported many times more defense items than they exported. The same is true for all other less developed arms-producing states, with the exception of North Korea.[56] Together, the 17 major arms producers in less developed countries (including Russia) accounted for anywhere from 13 to 25 percent of global defense production (Table 3). In contrast, the United States alone accounted for approximately 46–49 percent. Moreover, the US imported defense goods worth only a small amount (4.8 percent) of the value of its arms exports. Its closest Western competitors were the UK and France, each with defense-related imports amounting to 9–10 percent of arms exports (Table 3).

Table 3, then, suggests that a new global defense industrial order is emerging. The various tiers or levels of industrial capability previously associated with a defense production hierarchy are now becoming more fluid and less distinct as even major producers begin to forego earlier industrial competencies out of economic necessity.[57]

Faced with shrinking defense budgets, downsized militaries and declining demand, the long-term viability of many national defense industries is now in doubt. The technological and resource demands of new, sophisticated weapon systems have escalated beyond the production capabilities of most countries, and most have grown increasingly dependent upon defense exports and imports for their survival, regardless of their earlier position in the international production hierarchy. Richard Bitzinger observes: "As the economic and technological barriers to domestic arms production rise, the second-tier producers find themselves increasingly at a crossroads when it comes to the future of their indigenous defense industries."[58] The same is true for other arms producers at lesser stages of capability.

As Table 3 illustrates, with the exception of the US, none of the arms-producing nations – including France, Germany, Italy and the United Kingdom – have been able to reduce their reliance on foreign imports, especially in the areas of "weapons design, engineering and development assistance, critical components and subsystems, machine tools and production know-how." Even these more advanced industrial economies suffer from insufficient defense R&D, and an inadequate scientific and technical infrastructure "to pursue breakthroughs and applied research in many critical technologies."

As the pace of technological innovation continues to increase and the gap between the US and other countries widens, the ability of even the more advanced producers to keep up is diminishing.

The contracted defense export market exacerbates the problem. Arms producers with relatively small domestic militaries have found it too costly to manufacture advanced weapon systems just for domestic consumption. Without the cost reducing economies of scale that come with exports, buying foreign systems off the shelf is not only more economical for governments but more appealing to their armed forces.[60] But without the challenge of producing cutting-edge armaments domestically, the capabilities of non-US defense industries will gradually level-off. This is already happening.[61] Kirkpatrick maintains that the disparity in R&D and production capabilities between the US and other arms producers in the near future will be reflected in a "widening gap between the qualities and capabilities of weapons systems produced in the US and those produced in other nations."[62] If so, the dependencies of these countries on US military resources are bound to increase.

What, then, does the emerging globalized defense sector look like? The evidence presented here points to an interconnected and complex global system dominated by the United States. Its shape probably resembles less the hierarchical pyramid described in traditional analyses than a giant spider's web, or what Bitzinger calls a "hub and spoke system," with spokes reaching out from the center to connect defense industries all over the world. It is a complex system in which the distinctions between the various tiers of arms production capability are eroding as the world's major defense industries formally subordinate themselves to the US "through subcontracting relations, joint venture partnerships, and foreign equity ownership."[63]

OPTIONS AND STRATEGIES

The current unipolar structure of the global defense industrial system is likely to last for several decades.[64] What options are left for countries with smaller industrial and military capabilities relative to the US? What strategies will they adopt in order to maneuver in the post-Cold War world?

Predictions are always hazardous when dealing with a system in rapid transition. But logic suggests that the alternatives available to governments and industries for the foreseeable future are limited. Listed below are various strategies being pursued by governments and industries today in an effort to cope with existing trends in the changing global defense sector.

Option One: Dropping Out and Scaling Back

Economic and political pressures are forcing some states to abandon some (if not all) of their military industries. Brazil, Argentina and Indonesia, for example, have dramatically cut back their defense production and are instead opting to buy foreign military equipment off the shelf. Brazil, after canceling its ambitious "Program X" fighter project in early 2005, is now negotiating with US companies to purchase used aircraft to use as an interim fighter.[65] Similarly, by the mid-1990s Argentina had canceled all of its defense production programs and sold its state-owned aerospace company to a US firm.[66] In Indonesia, the government-owned aircraft industry (IPTN, or Industri Pesawat Terbang Nusantara) – which in its heyday produced turboprop tactical military transports, commuter aircraft, helicopters and components for European and US aircraft companies – had virtually ceased aircraft production by the late 1990s.[67]

The Israeli case is particularly interesting. Israel's military industries were established in a difficult political environment in the 1970s and 1980s in an effort to achieve self-sufficiency in arms production. But, the end of the Cold War and Israel's economic downturn in the early 1990s delivered a major blow to Israel's defense industries. Strapped for funds, the Israeli Defense Forces (IDF) opted to buy US equipment paid for by the US Foreign Military Financing (FMF) program. But buying off the US shelf has increased Israel's dependence on the US to finance the purchase of new air and naval platforms, and has undercut domestic arms production. Currently, 20 percent of Israel's FMF funding from the US is spent on equipment from Israeli suppliers.[68] However, each purchase is subject to US approval. Since 1999, the IDF has diverted an ever-increasing amount of its local spending – including spending on low-tech products like footwear, uniforms and rations – to equipment made in the US because it can be paid for using US funding. Industry executives warn that the Israeli industrial base will be dangerously compromised if the government continues to circumvent local providers because of its need to buy US products with US aid.[69]

Although dropping out and scaling back are options of last resort for most arms-producing countries, and to date few have willingly chosen this alternative, it may become necessary for many others in the future. Germany's defense industry, for example, in the face of deep cuts in military spending and a 17 percent reduction in its armed forces, is struggling to sustain its technological edge. Defense expenditure as a percentage of GDP is expected to drop below 1 percent, the lowest in NATO. As one German industrial official gloomily predicted, "If there is no change, companies will slowly either get out of defense, as Siemens did, or out of Germany."[70] Sweden's defense spending cuts in 2005 and the shrinking of its armed forces are having an equally negative effect on the Swedish defense industry. One analyst predicted that, "It may be difficult for Sweden's military to prevent the abandonment of certain key capabilities during this round of cutbacks."[71]

Option Two: A Common Market

The idea of constructing a consolidated market for military equipment through cooperation in defense spending and procurement has been advanced by the Europeans. It is conceived as a common defense market large and powerful enough to compete with that of the United States. To date, attempts to create a unified market and end costly industrial duplication have foundered on concerns about national sovereignty, the security of supply, and the conflicting strategic interests of Europe's small and large countries.[72] It is, nevertheless, a goal to which many of Europe's governments still aspire.

In November 2005, after a year's deliberation, the European Union's 16-month-old European Defense Agency (EDA) completed a new code of conduct. The goal is to create a single, competitive defense market among the 25 EU countries by transforming

the procurement of military equipment into a more transparent process by curbing the use of Article 296 of the EU constitution. Article 296 allows governments to invoke national security interests to shield defense procurements from foreign bidders; European governments have used it regularly since the inception of the Treaty of Rome (the precursor to the EU constitution) in 1957. As a result, redundant defense products are manufactured throughout Europe, and "a significant proportion of their defense procurement takes place outside EU internal market rules."[73]

The effectiveness of the new code of conduct in creating a unified defense market, however, remains to be seen. Because it is voluntary and non-binding, and cannot punish members for the non-observance of its rules, the EU cannot, in practice, prevent a government from invoking Article 296. Moreover, certain items – such as nuclear weapons and propulsion systems, cryptographic equipment, and chemical, bacteriological and radiological goods – are exempted completely. For those EU countries that look to the US defense market for sales and profit, a common defense market that excludes the US is very costly. As François Lureau, chief executive of the Délégation Générale pour l'Armament (DGA) observed, the new code of conduct "does not intend to close the European defense market. It is open to non-European companies. As you know, 50 percent of that market is in the hands of US companies. Today, France is buying three to four times more armaments from the US than the other way around."[74] As of this writing, the code's goal of creating a common defense market remains a long-term hope rather than a foreseeable reality.

Option Three: Preserving "Core Competencies"

An increasing number of governments and industries are pursuing a third option – namely, a "core competency strategy." Facing the prospect of long-term stagnant domestic growth, arms-producing countries are seeking a niche position in the global defense market by promoting their main comparative strengths – be they manufacturing skills, cheap labor, investment monies or extended defense markets – as a means of retaining some of their production capabilities and increasing their exports abroad.[74] For many, this means serving as suppliers of specialized items to the US military or as sub-suppliers to US industry-led projects through collaborative arrangements, joint ventures, and foreign direct investment. As an official of the Swedish Defense Materiel Administration (FMV) concluded, "We all want to develop European capabilities, but you cannot neglect the main technology drivers in the field of defense – the US armed forces and US industry. FMV is not in favor of building a 'fortress Europe.'"[75]

Option Four: The "American Option" Subcontracting, Joint Venture Partnerships, Acquisitions and Buy-Outs

Given the challenges outlined above, most foreign defense companies and their conglomerates have been actively pursuing what is referred to as the "American option."[76] Almost all of Europe's leading defense firms are seeking US military and civil business. They are buying US companies, establishing subsidiaries in the US, or teaming with US firms to enter new markets and fortify core strengths. European Aeronautic Defense and Space (EADS), for example, is the largest defense company in Europe, but because of cuts in Europe's military forces and budgets, it is trying aggressively to enter the larger, more lucrative, US defense market.[77] Last year EADS formed an American subsidiary to improve its business opportunities in the US, and it may have found a partner in the Northrop Grumman Corporation to strengthen its bid to supply aerial refueling planes to the Pentagon.[78] Similarly, the Anglo-Italian helicopter maker AugustaWestland established new headquarters in Virginia as part of its contract to build a fleet of presidential helicopters. A new Eurocopter assembly and manufacturing plant recently opened in Mississippi. Thales Communication (TCI), a four-year-old US subsidiary of Thales, a French-based electronics company, makes military communications equipment at its plant in Maryland, including radios for US troops in Iraq and Afghanistan.[79] The German company Heckler & Koch announced in 2003 that it was building a $20 million plant in Columbus, GA so that its SMB light-weight assault rifle could have a better chance of winning the bid to replace the US Army's current rifle, the M16.[80] Following its acquisition of the US company United Defense, BAE Systems (UK) is now the sixth-largest supplier to the US Department of Defense and has about 25,000 US employees on its payroll.[81] Similarly, Smiths Group, plc of London acquired five defense-related companies in the US. These US subsidiaries now contribute 57 percent of the firm's earnings.[82]

Non-European defense firms are also actively engaged in the US military sector. Brazil's Embraer, teamed with Lockheed Martin, won a contract to provide the US Army with its ERJ-145 jet surveillance plane. It will be assembled in a plant Embraer

constructed in Jacksonville, Florida. Major Israeli firms such as Israel Aircraft Industries (IAI), Elbit Systems, and Electro-Optics Industries (El-Op) have purchased controlling stakes in US firms and formed new subsidiaries. These, then, are a few examples of how an increasing number of states are seeking a profitable niche for their "core competencies" in the world's largest defense market.[85]

Washington Technology, a business intelligence publication, reports that the traffic in mergers, acquisitions, and buy-outs in the defense sector continues to grow – in both directions – as US companies search for investment opportunities abroad. In 2005, the volume of international or cross-border transactions in which the buyers, sellers, or both are non-US entities is expected to exceed the record levels of 2004. The total announced international transactions in the aerospace, defense and government sectors numbered 72 in 2003 and 87 in 2004. As of August 2005, there had been 51 such transactions. Of these, US companies have been involved in 24, 12 times as buyers and 12 times as sellers. For the most part, US buyers are targeting small companies with strong niche capabilities. 70 percent of these US acquisitions were in Europe. By June 2005, however, the aggregate value of US businesses sold to non-US buyers was roughly 10 times the value of foreign companies bought by US domestic companies. As the *Washington Technology* report concludes, "There is nothing surprising about this. The United States is the largest aerospace and defense market in the world ... [which compels] foreign companies to seek larger participation in the US defense market."[86]

Europe, too, has seen a surge in cross-border acquisitions and partnerships, not only of the transatlantic variety but intra-European as well. In some countries, the extent of foreign ownership has grown so large that their military industries can no longer be considered domestic entities. In fact, most of Sweden's military industry is now foreign-owned, largely by US, German and British companies.

Although this wave of joint ventures, mergers, acquisitions and buy-outs is considered by defense firms to be a strategy for survival, the question of national security has become a sensitive issue for many governments. A report by Amicus, a British union of skilled workers and engineers, points out the potential dangers for the UK defense industrial base if the trend continues. Many of Britain's larger companies, such as BAE-Systems, Rolls-Royce and Smiths Industries, now employ as many workers within the US as they do in the UK. The report warns that the British Ministry of Defense will be increasingly reliant on military systems designed and built outside the UK, and in the future will be unable to buy necessary military equipment within the UK.[87] Germany, facing a similar threat, responded by passing a law in 2003 requiring government approval of any foreign company buying a 25 percent or larger share in a German defense company. According to the government, the law is meant is to "protect the industry from foreign predation." In practice, however, industry analysts believe the law is unlikely to be used to block buy-outs that would result in greater European consolidation, but "will be used to counter attempts by US companies to buy their way into Germany."[88]

Option Five: Loyal Ally

Establishing a close political and military relationship with the United States is a fifth and closely related industrial policy option. US friends and allies have come to hope and expect that political cooperation will be rewarded with economic and technological benefits, particularly in the military sector.

Italian defense companies, for example, argue that Italy has supported the US in Afghanistan and has had more troops in Iraq than any other country, except Britain and the US. As Finnmeccanica's chief executive Pier Francesco Guarguaglini asserted: "As allies we collaborate, but we must also be considered allies when it comes to accessing the US market." The Italian government has aggressively supported these claims, calling for greater technology transfers from the US.[89]

Britain, too, is lobbying to have the US waive licensing requirements on military technology transfers to the UK. Frustrated by the reluctance of the US Congress to do so, Britain's Defense Committee Chairman Bruce Georges said, "It seems to me truly absurd for a country like the United Kingdom, which has proved itself to be by far and away the most loyal ally to the United States, to be in the position of almost groveling to the United States and saying, 'Please will you give us the [technical] information we require?'"[90]

Countries choosing this option raise difficult issues for the US. To pursue its foreign policy agenda, the US solicits the cooperation of allies and friends. But there is a growing gap between what foreign

governments hope to receive in return for their loyalty and the willingness of the US to share its industrial "crown jewels." To date, the urgency of its allies' economic needs has given the US the luxury of political leverage without the need to decide the issue.

The five policy options described above are, of course, not mutually exclusive. Different combinations are often pursued simultaneously depending on the players involved and their objectives. Governments may declare that they will follow a certain strategy but, in practice, there is often variety in the options they choose. Even France, a vocal advocate of creating a competing European defense market as a means of avoiding dependence on the US, is now also in favor of more defense industrial collaboration with the US. A recent French government study calls for increased trans-Atlantic partnerships, and urges French government officials to "overcome the past to work more closely with the US."[91]

The radical concentration of the world's military industrial sector in the United States mimics the structure of the larger geopolitical system, and allows the US a powerful role within it. However, there is actually nothing new about US technological leadership and the strength of its military industrial sector. Since the end of World War II, the US defense sector has been the largest and most powerful in the world. It served then, as now, as a magnet for the products of smaller arms producers and as a source of technology and training for many countries in the world. During the Cold War, however, US influence was constrained by the bipolar structure of the geopolitical system. Within the Western alliance, major collaborative programs that helped European arms industries recover from WWII were successfully completed during this period.[92] The so-called "two-way street" policy of arms cooperation between Europe and the US was introduced later in order to reduce duplication in defense research and development. Its stated goals were not very different from those of today: greater standardization and interoperability, the improved military posture of the NATO Alliance and savings in defense spending. Over time, however, differences arose over the purpose and extent of technology transfers. From the European perspective, access to US technologies and markets was seen in terms of the economic benefits that would accrue to Europe's national defense industries. The US, on the other hand, was focused on its conflict with the Soviet Union and insisted upon strict technology transfer restrictions to control the diffusion of US weapons and components to its enemies. These policies became (and remain today) a major issue in US-Allied relations.[93]

By the late 1980s, however, as the threat from the Soviet Union diminished, and the old Cold War alignments began to dissolve, new opportunities emerged for the US to reinforce its old foreign policy strategies. Foreign governments struggling with heightened levels of economic and strategic insecurity – even governments once hostile to the US – were now more receptive (and vulnerable) to US initiatives. The US now could wield its military and industrial comparative advantage more freely as an instrument of persuasion. The sheer size and sophistication of the US military sector provided US policymakers with a wide variety of policy options from which to choose. Gradually, a broad, overlapping range of incentives, rewards and sanctions evolved, which the US government used to discourage uncooperative behavior, encourage cooperation, promote stability and pursue its own interests in the post-Cold War world.

INCENTIVES AND REWARDS

The array of incentives and rewards the US has to offer for cooperation is quite broad. It includes the promise of military credits, offset arrangements, technology transfers, loans, economic aid, joint ventures and a variety of other forms of military assistance. Other possible incentives involve removing penalties, whether they are arms embargoes, technology transfer restrictions, onerous export regulations or high transaction costs. As Haass and O'Sullivan argue, the end of the Cold War has brought with it new opportunities for the US to use incentives to persuade governments to change one or more aspects of their behavior. In their view, the offer to facilitate entry into the global economic arena now ranks as one of the most potent incentives in today's global market. [94]

As early as 1987, the idea of creating a category of "major non-NATO allies" (MNNA) emerged in US government circles. Conceived as an incentive and reward for cooperation, MNNA status afforded non-NATO countries many of the collaborative and technology-transfer advantages provided to full NATO members.[95] Today, as an added inducement, MNNA partners in the US-led "war on terrorism" also receive up to $3 million a year in anti-terrorism assistance.[96] Pakistan, for example, was given MNNA status in recognition of its cooperation in the war against the Taliban and al-Qaida in Afghanistan and its close intelligence collaboration with the US in the global war on terror. According to B. Raman, no Pakistani leader other than President Pervez Musharraf has given a foreign power such free rein to operate on its territory. [97]

The US Department of State has also inaugurated special procedures to expedite military exports to US partners in Afghanistan (2001) and Iraq (2003). Export license applications for the countries involved are given priority, with the goal of processing them within 48 hours.[98] In addition, the Bush administration has made it clear that the US$ 87 billion in reconstruction work for Iraq would go only to those countries with troops in Iraq.[99]

It is, of course, often difficult to separate carrots from sticks. The desire to avoid prospective penalties is also frequently the incentive for policy change, moderation or compromise. The controversy between the EU and the US over EU subsidies for the Airbus A350 passenger aircraft project is one example.[100] To encourage the EU to end direct subsidies to Airbus for "new-start aircraft," the US shaped a policy strategy that included both incentives and disincentives. According to Richard Aboulafia, an US aerospace analyst, the "carrot" is continued access to the US defense market at a time when European companies increasingly "tie their growth to US revenues." The stick, he added, is the potential for the World Trade Organization to rule in favor of the US or issue findings that worsen US trade relations with Europe and prompt the US to adopt protectionist policies. Other defense analysts agree. "I think it is very risky to be seeking launch aid when you are trying to land billions of dollars of tanker business with the (US) air force," Paul Nisbet, a senior analyst with JSA Research observed. "The two don't mix very well."[101]

By October 2005, the EU was sending strong signals that it was eager to defuse the dispute with the US. European governments were reported to be delaying any formal pledges of aid to build the Airbus A350, and Peter Mandelson, the European trade commissioner, reiterated the desire of the European Union to avoid litigation. But perhaps the strongest sign of policy flux was the statement by the chief executive of Airbus that direct aid for the A350 could be jettisoned in favor of the kinds of aid the US government provides to Boeing.[102] Despite these overtures, the dispute has remained before the WTO, with no decision expected before spring or summer of 2006. Nevertheless, the incentive of US military spending, and the prospect of losing access to the US market, has clearly influenced EU policymakers on this issue.

THREATS AND SANCTIONS

Just as the defense sector is used by US policymakers as a carrot, so too is it used as a stick. A host of embargoes, restrictions, denials and penalties are invoked to encourage other states to comply on various issues. In 2005, military exports to China were a key irritant in US-Israeli and US-European relations, and represented a litmus test of US influence.

Israel and China

Israel, which receives about $3 billion dollars annually in US foreign aid and actively collaborates in US defense industrial projects, has followed a strategy of close political and military alliance with the United States. But US-Israeli differences over Israeli exports of arms to China have often soured that relationship. The reported secret Israeli sales of sophisticated military technology to China (in this case for the Harpy drone) elicited a strong response and severe sanctions from the US.[103] These included halting US-Israeli collaborative programs, including the Joint Strike Fighter; ending Israel's role in the upgrades to the Joint Direct Attack Munitions initiative; banning Israeli contributions to the US Army's Future Combat Systems; freezing exchanges of information on the development of an attack drone; and stopping the sale of US night-vision equipment to Israel.[104] Moreover, according to Israeli defense industry officials, US suppliers of materials and components to Israel experienced significant delays in what were once routine US State Department license approvals: "The standard review process that used to take no longer than two months is now dragging out to eight months or more ..."[105] The head of the Defense Security Cooperation Agency, which manages the Pentagon's foreign sales, declared that the US government would not consider any new military sales to Israel until the dispute over Israel's sales to China was resolved.[106]

Given Israel's economic and political dependency on the United States, these measures took a heavy toll. In an effort to placate Washington and end the costly dispute, Israel initiated several policy changes and agreed to others. It prohibited Israeli defense firms from visiting, discussing, or in any way generating new business with China without written permission from the defense ministry. The prohibition extends not only to military sales but also to dual-use items that could be used by the Chinese military.[107] This initiative was followed by a public apology by the Israeli Foreign Minister for having "damaged US interests," and then by the resignation of the Director-General of the Israeli Ministry of Defense "under US pressure." Israel also agreed to restructure its agencies that are involved in regulating military exports, and it is rumored that the Israeli government also acceded to a US demand to report not just Israeli defense exports to China but to other countries as well.[108] Israeli Minister of Defense Shaul Mofaz declared, "Israel will maintain its independence with regard to defense exports." But, as one senior Israeli defense source observed, "If the US, which provides Israel with US$ 2 billion in annual military aid, demands that we will not sell anything to China – then we won't. If the Americans decide we should not be selling arms to other countries as well, Israel will have no choice but to comply."[109] A similar disagreement arose in 1998. The US strongly objected to Israel's decision to supply the Chinese Air Force with the Phalcon airborne radar system. Although Israel asserted that the Phalcon (as well as the Harpy) did not contain US components, it still bowed to US pressure by canceling the contract sale in late 2001 and paying restitution to China. To help redress the financial loss, the US consented in 2004 to the sale of three Phalcon systems to India.[110]

Europe and China

Exports to China have disrupted US-European relations as well. In early 2005, the European Union considered lifting its 16-year-old arms embargo against China, which was imposed in 1989 because of the Chinese government's violent suppression of the Tiananmen Square protests. The US responded to the EU by requesting that the arms embargo not be lifted, and issuing a series of forewarnings to underline the importance of its request. On 17 March 2005, a Senate resolution declared that lifting the embargo "would potentially adversely affect transatlantic defense cooperation, including future transfers of United States military technology, services, and equipment to European Union countries." Some days later, addressing a 21 March conference on transatlantic defense cooperation, a senior US official also warned, "If the EU does lift its arms embargo against China, it is going to have a significant negative impact on transatlantic defense cooperation."[111]

The incentives to sell arms (as well as other equipment) to China are very high for European firms. China Southern Airlines, for example, recently ordered five of Airbus' A380s (EADS and BAE Systems jointly own Airbus). According to defense analysts, additional Chinese orders are crucial to the plane's commercial success. But it is China's on-going efforts to modernize its military (and its huge civilian market) that most strongly beckon Europe (and Israel as well). By 2040, China's annual demand for military hardware is likely to reach US$ 295 billion in current dollars, a compound annual growth rate of 2.63 percent a year over today's base of US$ 120 billion, according to an 8 September 2005 report. The US will remain the largest defense market in the world (US$ 101 trillion in 2040, accounting for 36 percent of global demand), but China will feature the fastest growing rate of defense spending of any nation. [112]

In spite of the great incentive to export military technology to China, however, the consequences of antagonizing the US may outweigh those benefits. According to defense analyst Loren Thompson, most of the European defense companies that do business with the Pentagon stand to lose more business from the US than they would gain from selling to China. BAE Systems, Britain's largest military contractor, sells more than $5 billion worth of goods a year to the US military. "America is where we're looking for growth," a company spokesman said. "If that becomes mutually exclusive with doing business in China, then we will go with the US."[113] In April, the European Parliament voted 431 to 85, with 31 abstentions, in favor of a resolution urging the European Union not to end the arms embargo against China. To date the European Union has postponed the decision.[114] But the issue sets in sharp relief the problem of dependency for Europe, and highlights the power of the defense sector as a policy tool for the US.

SUMMARY AND CONCLUSION

What, then, does the future hold for the global defense industrial system and its members? Carlos Escudé, an Argentinean scholar writing in the mid-1990s, argued that the structure of the international system is a major determinant of a state's foreign policy. Using the Argentine government's decision to abandon the development and production of the Condor II missile as a case study, Escudé held that there are three types of "functionally differentiated" states in the international system: states that command; states that obey (the majority of the interstate community); and rebel states (a small number of Third World regimes that challenge the right of Great Powers to dominate). States, in his view, can only challenge dominant powers by sacrificing the interests of their citizens. Most states, therefore, have little choice but to accept the existing hierarchy of the international system if they want to develop or foster their own political and economic systems.[115] Argentina's decision to deactivate and destroy the Condor II – despite intense domestic opposition – was, in Escudé's view, largely a response to US pressure.[116] Although a state can resist (if it can tolerate the price of doing so), in the present world order the costs are so high that most states will not risk bearing them.

The evidence presented in this essay lends support to Escudé's argument. It suggests that the current unipolar structure of the international system, as reflected in the global defense industrial order, imposes major constraints on the domestic military production capabilities and policy choices of most states. Arms-producing countries, particularly former first-, second- or third-tier producers, have become increasingly dependent upon the US for sales, technological innovation and the advanced technologies needed to modernize their own militaries and defense industries. This growing dependency has granted the US considerable direct and indirect political leverage. From the perspective of non-US governments, the price of entering the US market is increased US influence over the direction of their technological development, the stability of their defense industries, and the autonomy of their foreign policy decisions.

What is emerging, then, is a new, complex, interwoven global military industrial order that is dominated by the United States. The former international hierarchy of production capabilities that evolved during the Cold War is rapidly disintegrating, as the world's major defense industries subordinate themselves to the US defense sector through various forms of subcontracting, collaborative ventures, foreign equity ownership and increased procurement of US-made military technology.

This is not to say that the United States has complete control over the global military industrial system, or is able to shape and reshape the national industries within in it. Clearly the impact of the US is variable, both in intensity and in content, depending upon the policy issues at stake and the degree of US interest involved. Furthermore, profound effects on the world's defense industries may occur as the unintended consequence of US domestic decisions. The size and sophistication of the US economy and its military industrial capabilities make this inevitable. By the same token, however, the US defense sector provides US policymakers with an unambiguously potent foreign policy tool with which to penalize offensive behavior, encourage cooperation, promote stability and pursue US interests in the post-Cold War world. Given the prevailing structure of the global military industrial sector, most arms-producing countries have few options other than to accede to US preferences.

ENDNOTES

[1] The terms "defense industrial sector" and "military industrial sector" are used synonymously throughout this paper.

[2] Encouragement often takes the form of promises or threats, e.g. "If you join the war on terror, we will provide you with access to US technology," or the reverse: "If you harbor terrorists, we will deny you access to US technology." However, threats and promises may not be explicitly stated. Instead, they may consist of subtle signals to the target state of which outside observers may be unaware. In those cases, we are forced to assume that some form of warning or notification process took place prior to the visible outcome (e.g. the denial of military equipment).

[3] A threat may not necessarily entail a tangible reward for compliance. When a target state complies, the reward may be simply not carrying out the threat. For example, if Saddam Hussein had withdrawn from Kuwait in 1990 in response to US threats, then the US would not have invaded in early 1991 and the Iraqi Army would not have been defeated. Similarly, a punishment may not involve a tangible or verbalized threat. Simply not doing what the target state has come to expect (or fear) can be a penalty, without the need to convey an overt threat. For example, the licensing of US military exports to Israel has routinely been expedited in the past. By suddenly reverting to normal US licensing practices for Israeli exports, the US has delivered a punishment that presumably will be rescinded when Israel complies with US demands to halt sensitive exports to China.

[4] In the last decade, the number of independent prime contractors in the US defense sector fell from 20 to four. See David L. I. Kirkpatrick, "Trends in the Costs of Weapon Systems and the Consequences," *Defense and Peace Economics* 15:3 (June 2004): 271.

[5] *Globalization* is defined in various ways by different authors and organizations. As defined by the International Monetary Fund (IMF), economic globalization "refers to the increasing integration of economies around the world, particularly through trade and financial flows. The term sometimes also refers to the movement of people (labor) and knowledge (technology) across international borders." International Monetary Fund Staff, "Globalization: Threat or Opportunity?" 12 April 2000 (corrected January 2002), at http://www.imf.org/external/np/exr/ib/2000/041200.htm#II. Other definitions focus on the broader cultural, political and environmental dimensions of globalization. In this paper, *globalization* refers to the increasing integration of the defense sector through trade, financial flows and the movement of knowledge and technology across international borders.

[6] US Department of Defense, Office of the Deputy Under Secretary of Defense for Industrial Policy, *Study on Impact of Foreign Sourcing of Systems* (Washington, DC: Department of Defense, Jan. 2004), 33–35.

[7] Elizabeth Sköns, Sibylle Bauer, and Eamon Surry, "Arms Production," SIPRI *Yearbook* 2004 (Oxford: Oxford University Press, 2004), 405–10.

[8] James Murphy, "EU Calls for Closer Co-ordination of Defense Projects," *Jane's Defence Weekly*, 1 June 2005.

[9] Keith Hayward, "'I Have Seen the Future and it Works': The US Defense Industry Transformation–Lessons for the UK Defense Industrial Base," *Defence and Peace Economics* 16:2 (April 2005): 127.

[10] Pierre Tran, "Fewer Rafales? France Plans to Trim Order, Put Money into Plane's Export Appeal," *Defense News*, 23 January 2006; Sharon Sadeh, "Israel's Defense Industry in the 21st Century: Challenges and Opportunities," *Strategic Assessment* 7:3 (Dec. 2004), at http://www.tau.ac.il/jcss/sa/v7n3p5Sad.html; Aharon Kleiman, "Adapting to a Shrinking Market," in *The Politics and Economics of Defence Industries*, eds. Efraim Inbar and Benzion Zilberfarb, BESA Studies in International Security (London: Frank Cass, 1998), 112.

[11] As used in the literature, the term *military transformation* has various meanings, often leaving it unclear whether "transformation" is the cause or result of changing military doctrine. The different usages of the term include: transforming the military to face a fundamentally new security environment; downsizing and streamlining the organizational infrastructure of the military to reduce costs and increase efficiency; and integrating new information technologies into military systems to increase the effectiveness, efficiency and flexibility of the armed forces. For a more detailed discussion of military transformation, see Carl Conetta, "9/11 and the Meanings of Military Transformation," *Project on Defense Alternatives* (6 February 2003), at http://www.comw.org/pda/0302conetta.html.

[12] Nancy J. Wesensten, Gregory Belenky, and Thomas J. Balkin, "Cognitive Readiness in Network-Centric Operations," *Parameters* (Spring 2005): 94.

[13] Lawrence Freedman, *The Revolution in Strategic Affairs*, Adelphi Paper 318, International Institute for Strategic Studies (Oxford: Oxford University Press, 1998), 110.

[14] For example, a number of traditional defense companies – including the United States' Northrop Grumman; Europe's EADs; Sweden's Saab; Israel's Elta, Elbit, IMI (Israel Military Industries), and Rafael Armament Development Authority – are offering missile protection suites for use by military as well as civilian airlines. See David Mulholland, "Homeland Defence Market Grows," *Jane's Defence Weekly*, 25 August 2004, at http://www.janes.com.

[15] Michael Richardson, "Imbalances of Power," *International Herald Tribune*, 7 January 2000.
[16] Susan Willett, "East Asia's Changing Defence Industry," *Survival* 39:3 (Autumn 1997): 107–34.
[17] David Kirkpatrick, "Trends in the Cost of Weapon Systems, and the Consequences," a paper presented at the conference "Budgets and Expenditure Choices in the Post-Cold War," sponsored by the George C. Marshall European Center for Security Studies and NATO Economics Directorate, 15–18 September 2003, 6; cited in "Controlling Costs in Tactical Aircraft Programs: CDI Congressional Testimony on the FA-22." Prepared Testimony of Christopher Hellmann, for the House Government Reform Committee, Subcommittee on National Security, Emerging Threats and International Relations, Hearing on "Controlling Costs in Tactical Aircraft Programs, 11 April 2003; available at http://www.cdi.org/friendly version/print version.cfm? DocumentID=1285. See also Kirkpatrick, "Trends in the Costs of Weapon Systems" (2004), 267.
[18] For example, some studies indicate that "the UPC has increased by about three orders of magnitude between the general purpose 'dumb' bomb and the stand-off air-to-ground guided missile." See Kirkpatrick, "Trends in the Costs of Weapon Systems" (2004), 263.
[19] Ibid., 263. See also Flamm, who argues that the massive increases in R&D costs required to design leading-edge military equipment were the chief rationale for the consolidation and reduction in the number of arms producers in the US. See Kenneth Flamm, "US Defense Industry in the Post-Cold War: Economic Pressures and Security Dilemmas," in *The Place of the Defense Industry in National Systems of Innovation*, ed. Judith Reppy, Occasional Paper No. 25 (Ithaca, NY: Peace Studies Program, Cornell University, April 2000), at http:/www.ciaonet.org.mizuna.cc.Columbia.Edu:2048/wps/rej03/flk01.html.
[20] D. Dvir and A. Tishler, "The Changing Role of the Defense Industry in Israel's Industrial and Technological Development," *Defense Analysis* 16:1 (2000): 33.
[21] Kirkpatrick, "Trends in the Costs of Weapon Systems" (2004), 268.
[22] Willett also argues that states that are able to deploy even limited new technologies that improve their ability to detect, target and destroy hostile aircraft, ships and armored vehicles have a major advantage over enemies lacking similar capabilities. Cited in Richardson, "Imbalances of Power."
[23] Definitions of *commercialization and privatization* abound in the literature, but there is little consensus as to their meaning. Some analysts distinguish between the two, using the term *commercialization* to refer to situations in which the government continues to be responsible for providing a good or service, but contracts with a private firm for its management, production or delivery. These analysts define *privatization*, on the other hand, as situations in which the government no longer retains control and responsibility over the delivery of certain goods or services and transfers the functions formerly performed by the government to the private sector. Thus privatization is the process of transferring a public function, entity or enterprise to private control and ownership. The government simply stops providing a good or service, and allows the private sector to provide it to those who want it. But because there is no accepted agreement as to their meaning, most analysts do not distinguish between the two concepts, using *privatization* and *commercialization* as synonyms for each other. Given the confused state of the literature and the data presented in it, I have followed suit. In this paper, the terms *privatization* and *commercialization* refer simply to the commercial sector's participation in activities formerly performed by the governmental defense sector.
[24] According to SIPRI, the overwhelming share of defense industrial production (in dollar-value terms) takes place in China, Europe, Russia and the US. See Sköns, et al., SIPRI *Yearbook* 2004, 389.
[25] The Dual Use S&T Program provides incentives to encourage commercial contractors to cooperate with the military and integrate their requirements into a commercial product. Each project is funded jointly by the Pentagon (25 percent), the individual branch of the military involved (25 percent), and the commercial participants, who invest 50 percent of the total cost of the projects in which they are involved. See US Department of Defense Press Release, "Defense Science and Technology Seminar on Emerging Technologies, Dual-Use Technology" (Arlington, VA, 10 March 2000).
[26] Ibid.
[27] Hayward, "'I Have Seen the Future and it Works,'"138.
[28] IBM and Boeing, for example, have formed a partnership to take advantage of the $200 billion market for ways to connect the US military's vast array of weapons, satellites and sensors in the air, at sea and on the ground. The partnership has already won a US$ 300 million contract to develop military satellite communication technologies. See Gopal Ratnam, "IBM Positions Itself for Defense Work," *Defense News*, 6 December 2004.
[29] Andrew Chuter, "UK MoD Turns Increasingly to Partnerships," *Defense News*, 12 April 2004.
[30] William Matthews, "Pentagon Spends Less on Goods Than Services," *Defense News*, 4 October 2004.
[31] David Mulholland, "Briefing – German Industry – Feeling the Squeeze," Jane's *Defence Weekly*, 30 March 2005.
[32] "Indian Defence and Security – Industry-Forces and Future Trends," *Jane's Special Report* (July 2000), posted 14 July 2000.
[33] Elizabeth Sköns and Eamon Surry, "Arms Production," *SIPRI Yearbook 2005* (Oxford: Oxford

University Press, 2005), 401–33. See also Barbara Opall-Rome, "Israeli Moves Pit Private Against State-Owned Firms," *Defense News*, 3 January 2005.

[34] See Sadeh, "Israel's Defense Industry in the 21st Century."

[35] Gopal Ratnam, "Warfare Goes Private: Government Outsourcing Creates Growing Military Industry Sector for Service Firms," *Defense News*, 21 July 2003.

[36] For a discussion of different approaches to defining a defense industry, see Flamm, "US Defense Industry in the Post-Cold War."

[37] Bjorn Hagelin, "Science-and-Technology-Based Military Innovation: The United States and Europe," *SIPRI Yearbook 2004* (Oxford: Oxford University Press, 2004), 286–289, 300–304.

[38] See Flamm, "US Defense Industry in the Post-Cold War."

[39] See Table 11A.2, "Expenditures on military equipment and military R&D in Western Europe and the USA, 1991–2002," in *SIPRI Yearbook 2003* (Oxford: Oxford University Press, 2003), 405.

[40] A French MoD report on this growing disparity complained that it was "tantamount to technological disarmament for Europe, with already perceptible consequences." See J. A. C. Lewis, "France: Europe Faces R&D Crisis," Jane's *Defence Weekly*, 23 April 2003.

[41] The report also disclosed that France and Britain accounted for almost half of all spending on military equipment in Europe over the past three years, and more than two-thirds of all EU defense research budgets. See Peter Spiegel, "French to Warn EU it Lags US on Defence," Financial Times, 6 June 2005. According to another source, the twenty-five EU countries' collective defense budget totals about $180 billion per year, in contrast to the $445.6 billion in defense and supplemental spending in the US in 2005. See Brooks Tigner, "EU Threatens to Build Own Defense Market," *Defense News*, 24 January 2005.

[42] See Flamm, "US Defense Industry in the Post-Cold War."

[43] Kirkpatrick, "Trends in the Costs of Weapon Systems" (2004), 270.

[44] In a briefing on Network Enabled Capability (NEC), the UK Defense Procurement Minister remarked: "... Thinking in Capability Management terms should keep NEC-related projects firmly focused on improving operational capability rather than simply buying the latest attractive-looking technology. Experimentation will also play an important role in helping to determine our capability needs." See Minister's (DP) Speech: "Network Enabled Capability," Intellect Defense Briefing Group Christmas Lunch (15 December 2003), at http://www.ams.mod.uk/ams/content/docs/afnec/minspeec.htm. See also United Kingdom, Ministry of Defence, *Network Enabled Capability*, JSP 777 Edn 1, at http://www.mod.uk/linked_files/issues/nec/nec_jsp777.pdf. For still further information, see Andrew Chuter, "UK White Paper Will Describe Policy, Not Cuts," *Defense News*, 1 December 2003.

[45] Andrew D. James, "European Military Capabilities, the Defense Industry and the Future Shape of Armaments Co-operation," *Defense and Security Analysis* 21:1 (March 2005): 8.

[46] Kirkpatrick, "Trends in the Costs of Weapon Systems" (2004), 270; James, "European Military Capabilities," 16.

[47] James, "European Military Capabilities," 11.

[48] For a good summary of US arms control restrictions, see Sköns, et al., SIPRI Yearbook 2004, 411–412. The US is urging its allies to tighten their export control policies and bring them into closer conformity with those of the US. In 2000, the US introduced export reforms to its NATO allies in an effort to promote and better regulate cross-border defense-industrial cooperation. Among the reforms were new licensing procedures for all NATO countries and companies seeking transatlantic industry-to-industry consultations and partnerships, as well as third-party technology transfer procedures. Export reforms have been and continue to be a major irritant in US-Allied relations. See Bryan Bender and Darren Lake, "Washington Struggles to Sell Export Reforms," *Jane's Defence Weekly,* 11 October 2000.

[49] Hayward, "'I Have Seen the Future and it Works,'" p. 140.

[50] In this paper, I include all countries in Africa, Asia (minus Australia, New Zealand and Japan), Eastern Europe, the former Soviet Union, the Middle East and Latin America in the category of "less developed" or "developing countries."

[51] Elizabeth Sköns and Reinhilde Weidacher, "Arms Production," *SIPRI Yearbook 1999* (Oxford: Oxford University Press, 1999), 407.

[52] Jurgen Brauer, "The Arms Industry in Developing Nations," paper presented at the conference on "Military Expenditures in Developing and Emerging Nations," Middlesex University, London (13 March 1998), 4.

[53] Brauer gives the example of Indonesia, which bought naval vessels from the former East Germany, stripped them down to the hull, and imported new weaponry and guidance systems to be mounted onto them. See Brauer, ibid., 4.

[54] Table 3 includes arms importer/exporters, as well as importers that export a few defense items (Japan, South Korea, India, Taiwan, Turkey, Pakistan, Egypt, Iran and Brazil).

[55] Although India strives for self-sufficiency and expresses its intention to reduce its reliance upon foreign military technology, the current level of dependency on imports is 70 percent. See *Jane's Special Report*, 14 July 2000.

[56] Prior to 1994, North Korea's arms imports exceeded its arms exports. Since then, because of the country's deteriorating economic circumstances, North Korea's arms exports are greater than its imports. In 1999, it imported military systems worth US$ 30 million and exported defense products worth US$ 140 million. See *World Military Expenditures and Arms Transfers 1999–2000*, Table 11.

[57] Various analysts have created frameworks depicting the hierarchal stages of defense production capabilities. There is, however, little agreement among them as to the number of stages, or the countries that have reached them. Keith Krause, for example, divides the world's arms producers into a pyramid of five tiers. In his model, the first-tier is composed of "innovators" such as the (now former) Soviet Union and the US, who produce and export the entire range of advanced weapon systems. Second-tier producers, such as Britain and France, possess a limited capacity to innovate, but have the ability to adapt and modernize weapons. These countries are active exporters because of the relatively small size of their national defense markets. Third-tier states (e.g., Turkey, India, Brazil and China) have mastered the scientific and engineering skills needed to reproduce advanced weapons, largely through licensed and co-production arrangements. The fourth-tier consists of countries that are able to buy and utilize advanced weapons. The fifth-tier is composed of those states that either cannot buy or cannot use advanced arms effectively. See Keith Krause, "Arms Imports, Arms Production, and the Quest for Security in the Third World," in *The Insecurity Dilemma*, ed. Brian L. Job, (Boulder and London: Lynne Rienner, 1992), 121–42. Richard Bitzinger constructs a similar model, but with three rather than five tiers of industrial capability. First-tier arms-producing states are the US, the UK, France, Germany and Italy. The second-tier is composed of a diverse group of industrialized countries possessing limited but sophisticated defense industries, such as Australia, Japan and Sweden. It also includes a number of less developed countries with modest military-industrial programs such as Brazil, Iran, Singapore, South Africa, South Korea, Taiwan and Turkey. China and India, with large overall military industries but without independent R&D or the industrial capability to produce sophisticated conventional weapons, are also included. Third-tier states have very limited and generally low-tech production capacities. See Richard Bitzinger, "Problems and Prospects Facing Second-Tier Arms-Producing States in the Post-Cold War Era: A Comparative Assessment," Council on Foreign Relations Study Group on the Arms Trade and the Transnationalization of the Defense Industry: Economic Versus Security Drivers (November 2000), 1. See also, Andrew Ross' four-tier model in Andrew Ross, "Full Circle: Conventional Proliferation, the International Arms Trade and Third World Exports," in *The Dilemma of Third World Defense Industries*, eds. Kwang il Baek, Ronald D. McLaurin, and Chung-in Moon (Boulder, CO: Westview, 1989), 22–27.

[58] Bitzinger, "Problems and Prospects," 1. Russia is an analytical problem for Bitzinger, because of the current disarray within the Russian defense sector. He observes: "Russia, of course, is a special case falling outside the purview of this paper. The former Soviet Union clearly qualified as a "first-tier" arms producer, and Russia inherited most of the USSR's sizable military-industrial complex. At the same time, the breakup of the Union and the ensuing economic chaos gripping Russia has devastated the defense industry, genuinely threatening its existence. How Russia deals with the crisis in its arms industry and whether it will succeed is certainly worth studying, but not in the context of addressing the dilemma of the second-tier producers" (note 4). Later in the paper, however, Bitzinger appears to include Russia among the second-tier states: "In Russia, for example, military R&D has largely come to a standstill, given the country's ongoing economic crisis, and most defense establishments are largely selling off their existing core capabilities; this provides them with little to trade in the future. Increasingly, therefore, the only choices for most second-tier arms producers could be globalization or marginalization" (5).

[59] Ibid., 2.

[60] The armed forces in most (if not all) countries prefer to purchase the most advanced systems they can operate and afford. South Korea's military, for example, argues that, given its vulnerable security situation, it requires the most sophisticated weapons systems that incorporate the latest technology. Foreign purchases, in its view, are more reliable, sophisticated and readily available than their own locally procured systems. See "China and Northeast Asia – Defense Production and R&D, Korea, South," *Jane's Sentinel Security Assessment*, 19 April 2005. The Israeli armed forces have always preferred to buy "off-the-shelf" and have objected to the costly investment in programs funded by the defense budget, which inevitably were outmoded by the time they arrived from production. The cancellation of the Lavi plane in 1987 is a case in point.

[61] Bitzinger, "Problems and Prospects," 3.

[62] Kirkpatrick, "Trends in the Costs of Weapon Systems" (2004), 272.

[63] Bitzinger, "Problems and Prospects," 7. At the center of the "hub and spoke system" in Bitzinger's model are five "first-tier" arms producers: US, UK, France, Germany and Italy (see note 57, above). This paper argues that recent trends indicate that a more concentrated defense industrial system has evolved, in which only one "first-tier" producer (the United States) dominates the center.

[64] A recent CIA study observed that historically, in periods of major technological change, there was parallel transformation of global defense markets and industries. A few suppliers (one to three) became the world's leading suppliers of advanced military and technological capabilities for a significant period of time (several decades). See John Battilega, et al., *Transformation in Global Defense Markets and Industries: Implications for the Future of Warfare* (Washington, DC: National Intelligence Council, 2000), at http://www.cia.gov/nic/pubs/researc_supported_by_nic/battilega/index.htm. Richard Betts, contemplating the anomaly of US primacy in the face of world exasperation with it, argues that, "Despite the much bruited alienation of world opinion, foreign governments have so far continued to

acquiesce in American policy to a greater degree than can be accounted for by American coercion." See Richard Betts, "The Political Support System for American Primacy," *International Affairs* 81:1 (2005): 1–14.

[65] Brazil so far has refused to sign a non-extradition treaty with the United States, and therefore may be denied access to US defense items. See Christopher P. Cavas, "Lack of National Strategy Plagues Brazil's Industry," *Defense News*, 25 April 2005.

[66] Bitzinger, "Problems and Prospects," note 21.

[67] "Southeast Asia: Defense Production and R&D," *Jane's Sentinel Security Assessment*, 5 April 2005.

[68] Israel is permitted to exchange dollars for shekels. See Robin Hughes and Ilan Ostfeld, "Israeli Defense Industry: In the Lion's Den," *Jane's Defence Weekly*, 26 February 2003.

[69] Ibid.

[70] David Mulholland, "German Industry: Export Drive," *Jane's Defence Weekly*, 29 October 2003.

[71] Joris Janssen Lok, "Swedish Defense Industry Warms to Exports as Domestic Markets Cool," *International Defence Review*, 1 May 2005.

[72] See Burkard Schmitt, "Armaments Cooperation in Europe," Institute of Security Studies (Jan. 2005), 6–10, at http://www.iss-eu.org/esdp/07-bsarms.pdf.

[73] "The Code of Conduct on Defense Procurement of the EU Member States Participating in the European Defense Agency," 21 November 2005, at http://ww.eda.eu.int; see also Brooks Tigner, "EU Tears Down Protectionist Walls, but New Rules Only Help European Companies," *Defense News*, 21 November 2005.

[74] The President of Sweden's Saab frankly stated: "I do not really think that all of Sweden's military capabilities can be maintained. It would be wrong to assume that [all types of equipment] that up to now have been produced in Sweden will continue to be required by our military. Specific Swedish niches must be identified, and we should focus our activities in these areas." See Lok, "Swedish Defense Industry Warms to Exports."

[75] Ibid.

[76] According to a 1998 US General Accounting Office report, no one knows the full extent of foreign subcontractor activities in the United States because of inadequate data collection. See US General Accounting Office, Report to the Chairman, Subcommittee on Military Procurement, Committee on National Security, House of Representatives. "Defense Trade: Weaknesses Exist in DOD Foreign Subcontract Data," (November 1998), 1–2.

[77] EADS was formed in 2000 from the merger of Germany's Daimler Chrysler Aerospace, France's state-owned Aerospatiale Matra, and Spain's CASA. The French government owns 30.2 percent of the stock, as does Daimler Chrysler. The Spanish interest is less than 6 percent. The remaining one-third of the stock is owned by the general public (though much of this private ownership is allotted to those who work for EADS).

[78] Jonathan Karp and Andy Pastor, "Northrop, EADS to Link up for Bid," *Wall Street Journal*, 8 June 2005.

[79] William Matthews, "Who Wins When Foreign Firms Build Factories? As More Companies Open Facilities on US Soil, Critics and Supporters Face Off," Defense News, 10 January 2005.

[80] William Hawkins, "Preserve American Defense Production," *Defense News*, 22 September 2003.

[81] Press release, "BAE Systems Completes Acquisition of United Defense Industries; Creates Global Land Systems Enterprise," 24 June 2005, at http://www.na.baesystems.com/releasesDetail.cfm?a=322. See also Joshua Kucera, "Mark Ronald – BAE Systems North America Chief Executive Officer," *Jane's Defence Weekly*, 6 July 2005.

[82] Matthew Swibel, "UK: Cutting a Larger Slice of the Sticky US Defense Pie," *CORPWATCH*, 29 April 2005; Jerry Grossman, "Market Watch: International Transactions Fuel Rise in M&A Volume," Washington Technology, 1 August 2005, at http://www.washingtontechnology.com/news/20_15/marketwatch/26698-1.html.

[83] Megan Scully, Christopher Cavas, and Gopal Ratnam, "Brazil Breaks Into US Market," *Defense News*, 9 August 2004; Matthews, 'Who Wins When Foreign Firms Build Factories?"

[84] See Sadeh "Israel's Defense Industry in the 21st Century."

[85] For an additional list of recent foreign acquisitions in the US, see David Mulholland, "European Invaders Snap Up US Companies," Jane's *Defence Weekly,* 3 November 2004.

[86] See Grossman, "Market Watch"; See also Kim Burger, et al., "US Defense Industry," *Jane's Defence Weekly*, 19 June 2002.

[87] "Maintaining a Critical Mass for UK Defence," 19 June 2005, at http://www.amicustheunion.org/.

[88] Mulholland, "German Industry: Export Drive" (2003).

[89] Tom Kington and Gopal Ratnam, "Italy Turns War Support into US Work," *Defense News*, 8 November 2004.

[90] Tony Skinner, "UK Steps Up Arms Accord Pressure on US," Jane's *Defence Weekly*, 23 February 2005.

[91] Tigner, "EU Threatens to Build Own Defense Market."

[92] For example, the US/German Main Battle Tank 70 Program provided Germany with the advanced technology to design and manufacture the Leopard 2 tank. Licensed production in the 1960s and 1970s of US hardware provided the German aircraft industry with the "know-how" for inputs into the Alpha Jet and the Tornado. See Wilfred E. Von Zastrow, "The Two-Way Street: US/European Armaments Cooperation Within NATO," *The National War College*

Strategic Studies Project (Washington, DC, 1985), 18.

[93] US military systems and components may not be sold to third parties without US consent. An industrial partner who co-produces a weapon system containing US technology for its own armed forces, therefore, may not attempt to capitalize on economies of scale by selling some of these weapons to a third party. During the 1970s and 1980s, the debate over this issue was particularly heated. In 1978, a congressional subcommittee concluded: "the term 'two way street' ... [has become] a political device to secure economic benefits for European industries and often has little or nothing to do with enhancing military effectiveness." For a full discussion of the "two-way street" and its controversies, see Zastrow, ibid.; the subcommittee is quoted in Zastrow, 3–4.

[94] Richard N. Haass and Meghan L. O'Sullivan, eds., *Honey and Vinegar: Incentives, Sanctions, and Foreign Policy* (Washington, DC: Brookings Institution Press, 2000), 5, n. 13.

[95] US legislation creates two categories of MNNA status. The first category falls under Title 10 of the US Code, Section 2350A (Nunn Amendment of 1987). The second is under Section 517 of the Foreign Assistance Act of 1961, as amended, Title 22 of the US Code, Section 2321k. Under Title 10, MNNAs are authorized to engage in cooperative research and development projects with the US on defense equipment and munitions. Australia, Egypt, Israel, Japan and the Republic of Korea were given MNNA status in 1987, followed by Jordan (1996), Argentina (1998), New Zealand and Bahrain (2002), Philippines and Thailand (2003), Kuwait (2004), and Pakistan (2005). See "'Major Non-NATO Ally'(MNNA) Status," *Just the Facts*, 2 September 2003, at http://www.ciponline.org/facts/mnna.htm. See also B. Raman, "Pakistan as a Major Non-NATO Ally (MNNA) of US," Observer Research Foundation (2005), at http://www.observerindia.com/analysis/A145.htm.

[96] Joseph Roe, "US Grants Kuwait 'Major non-NATO Ally' Status," *Jane's Defence Weekly*, 7 April 2004.

[97] B. Raman, "Pakistan as a Major Non-NATO Ally (MNNA) of US" See also Matt Schroeder and Rachel Stohl, "Pakistan Policy Sends Dangerous Signal," Center for Defense Information (March 2004), CIAO Working Papers, at http://www.ciaonet.org/wps/str23.

[98] US Department of State, "Department of State to Expedite Export Licenses for Iraq Coalition Partners," Media Note (Washington, D.C., 26 March 2003).

[99] Other allies have been rewarded with different forms of military assistance. Georgia, for example, will receive 15 months of US military training for its armed forces, for which the US has budgeted US$ 60 million. The new training program, according to Jane's, was offered to the Georgian government on the condition that it send an infantry battalion to Iraq to join the US-led coalition there. The battalion left for Iraq on 1 March 2005. See Joshua Kucera, "US Extends Training of Georgian Armed Forces," *Jane's Defence Weekly*, 13 April 2005.

[100] In late May 2005, the US filed suit with the World Trade Organization (WTO), charging that European Union subsidies to Airbus for "new-start" aircraft violate WTO global trade rules. (Airbus has received US$ 15 billion in loans from the governments of Spain, France, Britain and Germany; these loans are risk-free, since they do not have to be repaid unless the new aircraft makes a profit.) The EU has countersued that Boeing receives similar loans. The US, in response, has argued that Boeing's loans are commercial loans that must be repaid, and therefore fall within WTO rules. See Paul Meller and Elizabeth Decker, "Europe Strikes Back in Plane Dispute," *The New York Times*, 1 June 2005.

[101] Michael Sirak, "EU Faces Tough Choice over Aircraft Subsidies," *Jane's Defence Weekly*, 8 June 2005.

[102] "Strategy Seen on Airbus Aid," *The International Herald Tribune*, 6 October 2005; James Kanter, "Airbus Chief Says Subsidy is Negotiable," *The New York Times,* 8 October 2005.

[103] The argument reportedly was over Israel Aircraft Industries' suspected upgrading of Harpy radar-killing drones (sold to China in 1997) with new leading-edge technologies. See Barbara Opall-Rome, "Israel Restricts Firms' Contact with China," *Defense News*, 28 March 2005.

[104] Ze'ev Schiff, "US to Israel: Tighten Arms Export Supervision," *Ha'aretz*, 12 June 2005.

[105] Opall-Rome, "Israel Restricts Firms' Contact with China."

[106] "New Technology Transfers to China on Hold, Pentagon Official Confirms," *Defense Daily*, 16 June 2005.

[107] Opall-Rome, "Israeli Moves Pit Private Against State-Owned Firms."

[108] "Israeli FM Regrets China Arms Sale Could Have Damaged US Interests," *Defense News*, 20 June 2005; Alon Ben-David, "Israel-US Crisis Eases," Jane's *Defence Weekly*, 2 June 2005.

[109] Alon Ben-David, "Israeli Contractors Concerned over US Export Request," *Jane's Defence Weekly*, 22 June 2005.

[110] "Israel, External Affairs," *Jane's Sentinel Security Assessment*, 19 May 2005.

[111] See Mulholland, Briefing – German Industry – Feeling the Squeeze."

[112] Gopal Ratnam, "For Defense Market Success, Go East: Goldman Sachs Sees High Demand in Asia for Next 3 Decades," *Defense News*, 3 October 2005.

[113] Mark Lauder, "Europe Wants China Sales but not Just of Weapons," *The New York Times*, 24 February 2005.

[114] Gopal Ratnam, "For Defense Market Success, Go East."

[115] Carlos Escudé, "An Introduction to Peripheral Realism and its Implications for the Interstate System: Argentina and the Condor II Missile Project," *International Relations Theory and the Third World*, ed. Stephanie G. Neuman (New York: St. Martin's Press, 1998), 55–75.

[116] Ibid., 57.

ABOUT THE AUTHOR

Dr. Stephanie Neuman is Senior Research Scholar and the Director of the Comparative Defense Studies Program at the Arnold A. Saltzman Institute of War and Peace Studies at Columbia University. Dr. Neuman joined Columbia in 1975 and has served as the Director of the Comparative Defense Studies Program since 1981. She currently teaches courses on Third World security at Columbia and has also held teaching appointments at the United States Military Academy at West Point (1993-1994) and at the Graduate Faculty of the New School for Social Research (1972-1983), and was a Senior Fulbright Research Scholar in Sweden (1997).

She is currently the Chair of the Editorial Advisory Board of *International Studies Perspectives*, a journal published by the International Studies Association. In addition to receiving numerous research grants and fellowships, Dr. Neuman has been a Senior Fulbright Scholar and a recipient of the Taraknath Das Award for scholarship.

Her publications include *Warfare and the Third World* co-authored with Robert Harkavy (Palgrave, 2001); *International Relations Theory and the Third World,* ed. (St. Martin's, 1998); "Control of Small Arms: A Response to Michael Klare" in *Issues in Science and Technology*; "Controlling the Arms Trade: Idealistic Dream or Realpolitik?" (coedited) in the *Washington Quarterly;* and *Military Assistance in Recent Wars: the Dominance of the Superpowers* (Praeger, 1986), among others. She is also the author of numerous journal articles on Third World security issues.

Dr. Neuman's other professional activities include work as a consultant for the US Department of State (where she currently sits on the Defense Trade Advisory Group) and the US Agency for International Development. Dr. Neuman is a member of many professional organizations, sits on several editorial boards, and on the Board of Directors of the Institute for Advanced Strategic and Political Studies in Israel.

Neuman's teaching interests are international relations, comparative foreign policy, third world security studies, and international arms trade and defense production. Dr. Neuman received a BA (1953) from Connecticut College, and a MA (1966) and a PhD (1971) from New York University. She is now engaged in research on US security assistance and regional conflict.