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MAPPING THE INTERNATIONAL PRESENCE OF THE WORLD'S LARGEST ARMS COMPANIES

LUCIE BÉRAUD-SUDREAU, ALEXANDRA MARKSTEINER, DIEGO LOPES DA SILVA, NAN TIAN, ALEXANDRA KUIMOVA, PIETER D. WEZEMAN AND SIEMON T. WEZEMAN

SUMMARY

● Arms companies have a presence that reaches far beyond the countries in which they are headquartered. This is the result of the internationalization of the arms industry. This paper uses a new data set to examine the results of this internationalization in terms of the international presence of major arms companies. It presents a mapping comprising 400 foreign entities linked to the world's largest arms companies.

The mapping shows that the international presence of major arms companies continues to be influenced by geopolitical divisions and ties, and generally mirrors the geographical locations of the world's biggest arms import markets. It also reveals that the international presence of major Chinese arms companies and the one Russian company included in the study remains limited.

Appendix A lists the 25 largest arms-producing and military services companies in the world, ranked by their arms sales in 2019.

I. Introduction

This SIPRI Insights Paper aims to map the international presence of the world's largest arms-producing and military services companies (or 'arms companies' for short). It covers the 15 arms companies with the highest arms sales in 2019 (see appendix A for a list of the top 25 arms companies ranked according to their arms sales in 2019).

A simple survey of the geographical locations of the headquarters of these companies suggests that they operate in only a limited number of states. However, this obscures the fact that arms companies often have a presence that reaches far beyond the borders of the countries in which they are headquartered. This is the result of the internationalization of the arms industry.

Following the contraction of military spending in major arms companies' domestic markets in Europe and North America during the early years of the post-cold war period, many companies expanded globally through international interfirm agreements, subcontracting, joint ventures, and mergers and acquisitions.[1] This process of internationalization appears to have gradually slowed in Europe and North America after the early 2000s.[2] Although there were still relatively few major cross-country mergers and acquisitions in Europe and North America in 2010–19, the multiplication of technology transfer agreements during this period has contributed to the internationalization of the arms industry outside these regions.[3]

This paper uses a new data set to examine the results of this process of internationalization in terms of the international presence of major arms companies. It identifies and maps foreign entities owned by the 15 largest arms companies in the world, using relevant research criteria. The data set represents a significant addition to existing research literature in two ways. First, it is a systematic data collection effort, whereas the existing literature

[1] Sköns, E. and Wulf, H., 'The internationalization of the arms industry', *The Annals of the American Academy of Political and Social Science*, vol. 535, no. 1 (Sep. 1994), p. 45.

[2] Bitzinger, R. A., 'Globalization revisited: Internationalizing armaments production', ed. A. T. H. Tan, *The Global Arms Trade: A Handbook* (Routledge: Abingdon, 2010), pp. 208–20.

[3] Kinne, B. J., 'Agreeing to arm: Bilateral weapons agreements and the global arms trade', *Journal of Peace Research*, vol. 53, no. 3 (May 2016), pp. 359–77.

Table 1. Criteria for inclusion as a foreign entity of an arms company in 2019

Criteria	Reasons for inclusion	Reasons for exclusion
Location	The entity is legally registered in a country other than the one in which the ultimate parent company is headquartered.	The entity is legally registered in the same country as the one in which the ultimate parent company is headquartered.
Time period	The entity was operational for 6 months or more in 2019.	The entity was operational for less than 6 months in 2019.
Activities[a]	The entity (*a*) manufactures military goods or provides military services to military customers; or (*b*) manufactures, or provides services for, dual-use goods to military customers.	The entity (*a*) is involved *only* in sales, marketing and outreach activities (i.e. through a representative office); or (*b*) manufactures, or provides services for, dual-use goods but no military customers were identified.
Ownership	Only majority-owned entities were included in the data set, down to 3 levels: Level 1—Ultimate parent company; Level 2—Subsidiary/joint venture; and Level 3—Subsidiary of a subsidiary/subsidiary of a joint venture/joint venture of a subsidiary. At each level, the immediate parent company had to own more than 50% of the entity in the level below.[b]	Holding and investment companies with no direct operational activities were not treated as a company level. Companies owned by such entities are categorized at a higher level than they otherwise would be.

[a] Military goods and services are those specifically designed for military applications. This refers to manufactured military equipment or components thereof; maintenance, repair and overhaul services; training; and research and development. Military customers are defence ministries, armies, navies, air forces, paramilitaries, special forces and agencies tasked with military intelligence, surveillance and reconnaissance.

[b] In the case that information on the exact share of ownership could not be found, the entity was included in the data set.

has seemingly relied on anecdotal evidence to study the internationalization of the arms industry.[4] Second, it includes arms companies from China and Russia, whereas the existing literature has focused primarily on North America and Western Europe.[5]

The next section (section II) explains the research methodology, provides some of the results of the mapping exercise and discusses some of the findings in more detail. Section III explores what may have prompted companies to establish or expand their international presence, both from the supply perspective—company strategies—and the demand perspective—states' arms procurement policies. In the concluding section (section IV), the paper summarizes the key findings and presents avenues for further research.

II. Mapping the foreign entities of the world's largest arms companies

Most data sets on the arms industry, including the SIPRI Arms Industry Database, are structured according to the location of the headquarters of

[4] Only a few authors measured internationalization using indicators and data: Bitzinger, R. A., *The Globalization of Arms Production: Defense Markets in Transition* (Defense Budget Project: Washington, DC, 1993); and Belin, J. et al., 'Defence industrial links between the EU and the US', Armament Industry European Research Group (ARES) Report no. 20, Institute for International and Strategic Affairs (IRIS), Sep. 2017, p. 35.

[5] Brooks is one of the few scholars to include Russia in an analysis of internationalization of the arms industry, but he focused on the Soviet Union period. Brooks, S. G., *Producing Security: Multinational Corporations, Globalization, and the Changing Calculus of Conflict* (Princeton University Press: Princeton, NJ, 2005).

the parent company.[6] The internationalization process of the arms industry means that such data sets no longer fully represent the geographical spread of arms companies' activities. In order to address this issue, SIPRI conducted a mapping exercise to survey the international presence of the 15 largest arms companies (as measured by their arms sales in 2019). 'International presence' refers here to the location of majority-owned foreign entities involved in arms production and military services activities. This mapping provides one way of examining the internationalization of these companies. This approach was selected over other indicators—such as the number of employees abroad, foreign sales, revenue of entities abroad, or the nationality of shareholders—because very few companies disclose information on these indicators in a systematic or comprehensive way.[7]

Methodology and research design

For the purposes of this paper, an arms company's 'international presence' is measured by the number of foreign entities it owns and the number of countries in which those entities are based. 'Entity' encompasses branches, majority-owned subsidiaries and joint ventures, some of which may be military research facilities.

Although a subsidiary is distinct from its parent company, the latter retains limited or full control of the former. A joint venture is also a distinct entity but is established in association with other companies, and thus the parent companies share control of the joint venture. Research facilities can legally take the form of subsidiaries or joint ventures but are categorized separately in the data set in order to identify entities involved in military research and development (R&D) activities. 'Foreign' entity refers to any entity legally registered in a country other than the one in which the ultimate parent company is headquartered.

A number of criteria (based on location, time period of operation, activities and ownership) determined which entities were included in the mapping (see table 1). Based on these criteria, SIPRI's final data set is composed of 400 entities (see table 2). The use of these criteria means that the data set results in a narrower selection of entities than is suggested by looking at other open sources such as company documents and websites. For example, the data set includes only majority-owned entities and therefore excludes numerous minority-owned joint ventures and subsidiaries.[8] The data set also excludes entities involved only in civilian or dual-use activities, for which no military customer was identified.

[6] SIPRI Arms Industry Database, <https://www.sipri.org/databases/armsindustry>.

[7] Fleurant, A. and Tian, N., 'Arms production and military services', *SIPRI Yearbook 2019: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2019), p. 281.

[8] E.g. the Eurofighter GmbH joint venture, which produces the Eurofighter Typhoon combat aircraft, is excluded from the data set because none of the parent companies has a majority share (Airbus: 46%, BAE Systems: 33% and Leonardo: 21%).

Table 2. The international presence of the 15 largest arms companies in the world, as ranked by their arms sales in 2019[a]

Parent company	Rank, 2019	Location of headquarters	No. of foreign entities[b]	No. of countries[c]	No. of regions[d]	Entities involved in manufacturing as a % of total foreign entities[e]
Lockheed Martin Corp.	1	United States	28	19	4	*50*
Boeing	2	United States	56	21	5	*9*
Northrop Grumman Corp.	3	United States	16	9	3	*56*
Raytheon[f]	4	United States	16	7	4	*88*
General Dynamics Corp.	5	United States	25	14	4	*80*
Aviation Industry Corp. of China (AVIC)	6	China	7	6	3	*86*
BAE Systems	7	United Kingdom	38	18	4	*42*
China Electronics Technology Group Corp. (CETC)	8	China	[0]	[0]	[0]	. .
China North Industries Group Corp. (NORINCO)	9	China	[0]	[0]	[0]	. .
L3Harris Technologies	10	United States	33	15	5	*76*
United Technologies Corp.[f]	11	United States	14	8	3	*93*
Leonardo	12	Italy	59	21	5	*58*
Airbus	13	Trans-European[g]	41	24	5	*32*
Thales	14	France	67	24	5	*73*
Almaz-Antey	15	Russia	[0]	[0]	[0]	. .

. . = data not available; [0] = no foreign entity matching the research criteria was found—the estimated number of majority-owned foreign entities is therefore 0; corp. = corporation.

[a] See appendix A in this paper for a ranking of the world's largest arms companies by total arms sales in 2019 and detail on the specific methodology used to compile it.

[b] 'Foreign entities' refers to entities (branches, majority-owned subsidiaries and joint ventures) that are (*a*) legally registered in a country other than the one in which the ultimate parent company is headquartered; and (*b*) involved in the manufacturing of military goods, the provision of military services, or the supply of goods and services to military customers. For further detail see table 1 in this paper.

[c] The number of countries in which the parent company's foreign entities are present.

[d] The number of regions (i.e. Africa, Americas, Asia and Oceania, Europe and the Middle East) in which the parent company's foreign entities are present. For further detail on regional coverage see the SIPRI website.

[e] The percentage of the parent company's foreign entities that are involved in manufacturing activities.

[f] Raytheon and United Technologies Corp. merged in 2020.

[g] 'Trans-European' refers to companies whose ownership and control structures are located in more than one European country. For this study, Airbus is considered to have a headquarters in three European countries: France, Germany and Spain.

Sources: Company reports and stock exchange and investment filings; company websites and social media pages; company employee profiles on LinkedIn; company press statements; public company registrars; and media reports.

Key findings on the international presence of the 15 largest arms companies in the world

The mapping provides an overview of the locations and types of foreign entities owned by the world's largest arms companies. It also sheds light on the activities performed by these foreign entities. In addition, it reveals that the Chinese and Russian companies included in the study do not appear to have as broad an international presence as their North American and West European counterparts. Despite the extensive research efforts undertaken for this paper, only very limited data on companies headquartered in China and Russia was uncovered. For this reason, the focus of this subsection is mainly on companies based in the subregions of North America and Western

Europe; the companies in China and Russia are discussed in more detail in a separate subsection.

Location of entities

The headquarters of the 15 largest arms companies in 2019 are spread across eight countries. Six of these countries (France, Germany, Italy, Spain, the United Kingdom and the United States) are in North America or Western Europe; the other two countries are China and Russia. However, expanding the scope of the analysis to subsidiaries and joint ventures widens the geographical spread significantly. The 15 companies are then present in at least 49 different countries—when including China and Russia as headquarters locations.[9] Seventeen of these countries are in the Global South (including China).[10]

Of the world's five regions (Africa, the Americas, Asia and Oceania, Europe and the Middle East), Europe hosts the highest number of entities (167). This largely derives from the consolidation of the arms industry in Europe in the late 1990s and early 2000s. Although this led to a reduction in the number of major European arms companies overall, it often meant that the resulting companies had a higher number of entities in other countries than they did before the process of consolidation.[11] The rapprochement between European companies occurred in parallel with a transatlantic wave of mergers and acquisitions. As a result, US arms companies, 7 of which appear in the top 15, also have a strong presence in Europe. For example, nearly 79 per cent of United Technologies' foreign entities are located in Europe and more than half of General Dynamics' foreign entities are based there (see figure 1). Lockheed Martin is an outlier to this predominant European focus. Its international presence leans more towards the Middle East (10 out of its 28 foreign entities are located in that region).

BAE Systems is a European (UK-based) company with a strong focus on the USA: 8 of its 38 foreign entities are based there while only 5 are located in Europe. In 2019 the US market accounted for 43 per cent of BAE Systems' total sales.[12] Most of these sales were from USA-based entities held by the company's US arm—BAE Systems Inc.

Of the 15 companies surveyed, Thales has the highest number of foreign entities as well as a wide geographical spread: 67 entities in 24 different countries outside of France. This is consistent with the strategy Thales has

[9] It is possible that China Electronics Technology Group Corporation (CETC), China North Industries Group Corporation (NORINCO) and Almaz-Antey have foreign entities that would meet the criteria for inclusion in the mapping. However, no foreign entities for these companies are included because of a lack of available data.

[10] The 17 countries are Brazil, Cambodia, China, Colombia, Costa Rica, India, Iraq, Jordan, Kazakhstan, Kenya, Malaysia, Mexico, Morocco, Pakistan, South Africa, Thailand and Turkey. 'Global South' here refers to developing countries eligible for official development assistance (ODA). Organisation for Economic Co-operation and Development, Development Co-operation Directorate (DAC), 'DAC list of ODA recipients: Effective for reporting on 2020 flows', 2020.

[11] Meijer, H. L. E., 'Post-cold war trends in the European defence industry: Implications for transatlantic industrial relations', *Journal of Contemporary European Studies,* vol. 18, no. 1 (2010), pp. 63–77; and Béraud-Sudreau, L., 'Integrated markets? Europe's defence industry after 20 years', ed. D. Fiott, *The CSDP in 2020: The EU's Legacy and Ambition in Security and Defence* (European Union Institute for Security Studies: Paris, 2020), pp. 69–72.

[12] BAE Systems, 'Half year results', 30 July 2020, p. 20; and Robertson, D., 'Milestone for BAE as its trade with America outstrips MOD business', *The Times*, 10 Aug. 2007.

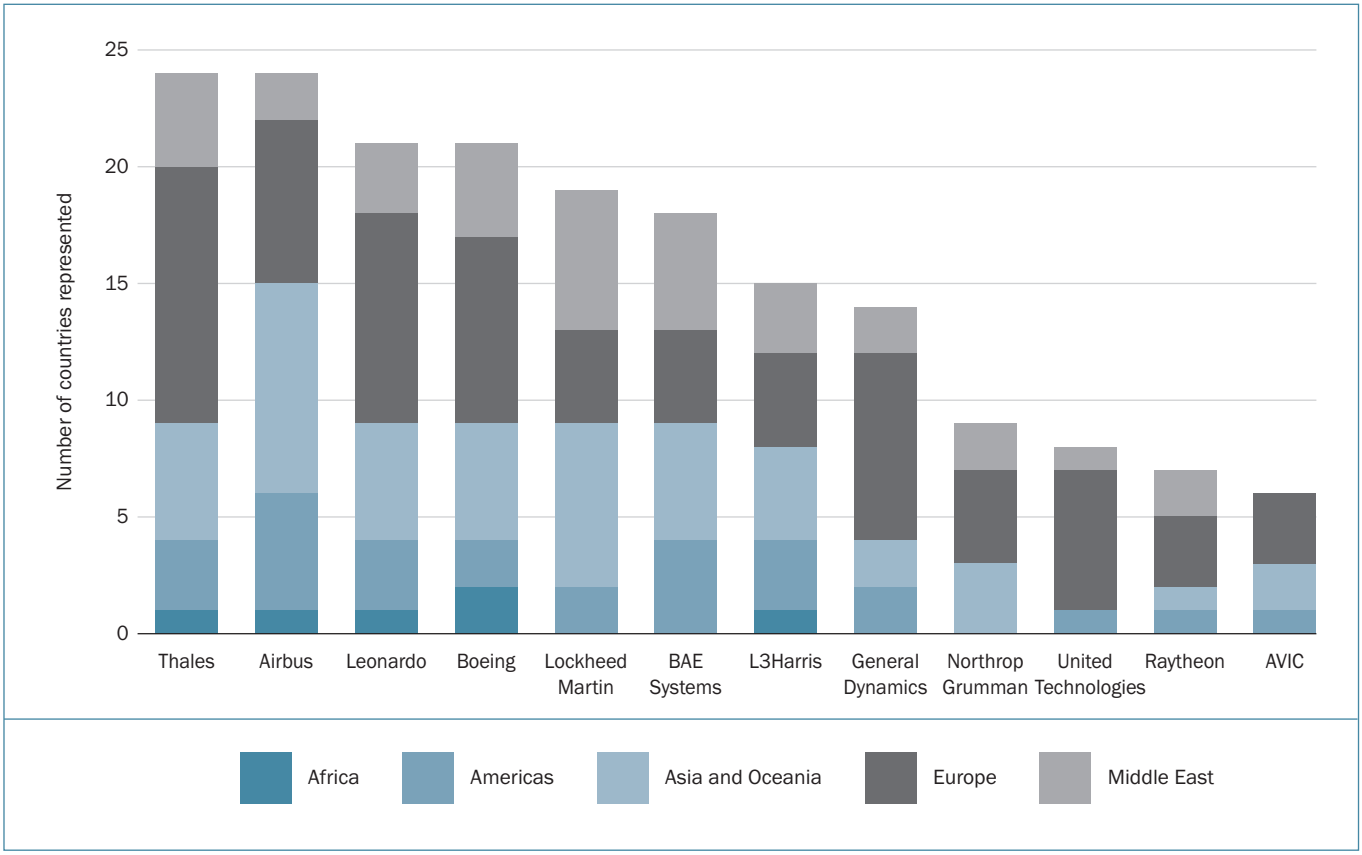

Figure 1. International presence of the largest arms companies in the world, by number of countries and regions in which their foreign entities are located, 2019

AVIC = Aviation Industry Corporation of China.

implemented since the early 2000s, which the company labels as 'multi-domestic'.[13] While Thales is present in all five regions, most of its activities are in the subregions of Western Europe and North America.

Airbus, which is categorized by SIPRI as trans-European, is considered to have a headquarters in three European countries—France, Germany and Spain. It is present in 24 other countries and has 41 foreign entities. It has 13 foreign entities in Europe and the same number in the Americas, which together make up about 63 per cent of its international presence.

The mapping of the locations of foreign entities highlights that, overall, the international presence of the world's largest arms companies mirrors the ties and divisions that exist at the geopolitical level, where alliances play a major role. Five out of the seven US companies surveyed have a presence in both Australia and Canada: Boeing, General Dynamics, L3Harris Technologies, Lockheed Martin and Raytheon. Northrop Grumman is present in Australia but not Canada, while the reverse is true for United Technologies. US firms are also present in Israel (Boeing, Lockheed Martin and United Technologies), Japan (Boeing, Lockheed Martin and Northrop Grumman), South Korea (Boeing, Lockheed Martin and L3Harris Technologies) and Taiwan (Lockheed Martin).

[13] Thales Group, 'History', [n.d.], see the periods 1998–2000 and 2001–2004 in particular.

This geopolitical alignment is also visible when analysing the data in terms of host countries. Turkey, which is a member of the North Atlantic Treaty Organization, hosts foreign entities from a number of arms companies headquartered in North America and Western Europe—namely BAE Systems, L3Harris Technologies, Leonardo, Lockheed Martin and Thales. Saudi Arabia, which is a long-standing security partner of the UK and the USA, hosts several entities from arms companies headquartered in these countries (see section III). Notably, none of the North American or West European arms companies has a foreign entity involved in military manufacturing, military R&D or military services in China or Russia. This reflects the lack of military–technology cooperation between Chinese and Russian arms companies on the one hand and North American and West European companies on the other.

Arms companies are also more likely to establish foreign entities in countries with a high demand for military goods and services than in countries with a smaller defence market. Brazil, for instance, is the main arms importer in South America and hosts nearly 77 per cent of the relevant foreign entities in the subregion.[14] Similarly, three of the world's top five arms importers in the period 2015–19 (Saudi Arabia, India and Australia) were among the countries hosting the highest number of foreign entities outside of those in North America and Western Europe.[15]

Types of entity

The mapping covers subsidiaries, joint ventures, and subsidiaries or joint ventures of subsidiaries or joint ventures (see table 1). It also specifically categorizes research facilities.

Joint ventures are particularly noteworthy since they link companies with different owners together. Of the foreign entities of the 15 largest arms companies covered by the mapping, 59 are joint ventures or derivatives thereof (e.g. joint ventures of subsidiaries).

A joint venture can take the form of a partnership between a foreign and a local company. The establishment of a joint venture is often negotiated as part of an arms deal to transfer technologies from a supplier to a recipient country. For example, Airbus's joint venture in Kazakhstan, Eurocopter Kazakhstan Engineering, was set up as part of a deal finalized in 2012 to sell EC145 helicopters to Kazakhstan.[16] Similarly, in 2017 General Dynamics set up a joint venture with Romanian company Uzina Mecanică Bucureşti in the framework of a contract for Piranha-5 infantry fighting vehicles.[17]

A joint venture can also link together major arms companies (i.e. ultimate parent companies) headquartered in different countries. These linkages have

[14] Lopes da Silva, D., 'Brazil: Reassessing Brazil's arms industry', eds K. Hartley and J. Belin, *The Economics of the Global Defence Industry* (Routledge: Abingdon, 2020), pp. 482–505; and Franko, P. M. and Herz, M., 'Defense industrialization in Latin America', *Comparative Strategy*, vol. 37, no. 4 (2018), pp. 331–45.

[15] Wezeman, P. D. et al., 'Trends in international arms transfers, 2019', SIPRI Fact Sheet, Mar. 2020, p. 6.

[16] Eurocopter, 'Kazakhstan buys 45 EC145s and signs production JV with Eurocopter', Heli-Hub, 28 Oct. 2010; and Airbus, 'The Kazakhstan Government to acquire 20 multi-role Eurocopter EC725 helicopters', 10 May 2012.

[17] Romania Insider, 'Contract with US firm to relaunch Romanian military equipment factory', 13 Oct. 2017.

established a network between the world's largest arms firms. For instance, Thales has foreign entities located in Italy and Leonardo has foreign entities located in France based on various joint ventures between the two companies. BAE Systems and L3Harris Technologies are partnered through a UK-based joint venture for training and simulation services—FAST Training Services Ltd.[18] Thales and Raytheon have formed a joint venture, Thales Raytheon Systems, that has entities in both France and the USA.[19]

Research facilities are significant because they support a company's ability to maintain an edge over its competitors in the design of new and more advanced military products. The establishment of research facilities abroad indicates that a company trusts the recipient country's workforce and technical capabilities to contribute to its innovation capacities. The mapping uncovered 22 research facilities that met the relevant criteria. Of the 15 companies surveyed, 3 have set up research facilities on foreign soil: Boeing (14), Thales (6) and Airbus (2). Some of these companies have set up research facilities both in emerging arms-producing countries (e.g. Brazil and India) and in more industrialized countries that have the objective of developing their local arms industry (e.g. Singapore).

Types of activity

The mapping provides an overview of the types of activity performed by the foreign entities of the 15 arms companies covered by the study. These activities include the manufacture of military equipment or components thereof; maintenance, repair and overhaul services; training; and military R&D. Of these activities, military manufacturing and military R&D are of perhaps particular importance because they can lead to the rapid diffusion of military technologies in the countries in which the activities take place.

The mapping shows variations between arms companies in terms of the share of manufacturing undertaken by their foreign entities (see table 2). This suggests that companies may have different objectives in mind when establishing their foreign entities. These objectives are likely to be determined by the companies' strategies and product requirements. A company that retains its manufacturing capabilities in its home country and mainly provides services (such as maintenance, repair and overhaul services) abroad probably aims to prioritize the development of the expertise and knowledge base of its domestic market. Conversely, a company that choses to set up manufacturing entities abroad probably aims to make use of technology transfers and leverage the infrastructure and skills available in customer countries.

The type of sector in which an arms company operates seems to have an influence on whether it opts for one or other of these two options. For example, Boeing and Airbus, which both operate in the aerospace sector, appear to have a widespread international presence, but very few of their foreign entities are involved in manufacturing. In total, Boeing has 56 entities spanning 21 countries; however, only 9 per cent of those entities are involved in military manufacturing activities (see table 2). The others

[18] See e.g. L3Harris Technologies, 'L-3 to provide integrated platform management system for UK Type 26 Global Combat Ship', 15 Dec. 2015; and BAE Systems, *Maritime*, 2012, p. 20.

[19] Thales Raytheon Systems, LinkedIn company page, [n.d.]; and Thales Group, 'Address book', see locations in the USA.

provide local maintenance, repair and overhaul services or perform some research activities. The core of Boeing's military manufacturing activities thus takes place in the USA. Similarly, the majority of Airbus's military manufacturing takes place in the countries in which it is headquartered (France, Germany and Spain). Around 32 per cent of its foreign entities are involved in military manufacturing activities. These findings for Airbus and Boeing may be partly explained by the fact that many of their foreign entities provide maintenance and repair services for both military and civilian customers. Civilian products accounted for 86 per cent of Airbus's total sales in 2019 and 56 per cent of Boeing's.

The findings for Airbus and Boeing differ noticeably from those for Lockheed Martin, which also operates in the aerospace sector but focuses predominantly on the development of military products (89 per cent of its total sales). Half of Lockheed Martin's foreign entities are involved in military manufacturing.[20] However, this is still a fairly low percentage compared with some arms companies that operate in other sectors.

General Dynamics, which is active in the naval shipbuilding, electronics, armoured vehicles and ammunition sectors, has far more significant manufacturing capabilities abroad than the companies in the aerospace sector covered by the mapping. About 80 per cent of its foreign entities are involved in military manufacturing activities. This is mainly due to business units in Europe and Canada, involved in the manufacturing of armoured vehicles.

From a geographical standpoint, the mapping indicates that military manufacturing activities are mostly concentrated in countries in North America and Western Europe, with the largest military manufacturing hub outside those subregions being Australia. Together, these countries (including Australia) account for around 80 per cent of the 15 largest arms companies' foreign entities involved in manufacturing. This seems to suggest that arms companies prefer to set up production lines in states that have more advanced manufacturing capabilities. Despite the willingness of many countries in the Global South to develop their own arms–industrial base, the world's largest arms companies still appear to be reluctant to establish local manufacturing entities in some of those countries because of their industrial limitations.

Military manufacturing activities are mostly concentrated in countries in North America and Western Europe

The international presence of the largest Chinese and Russian arms companies

The Chinese and Russian arms companies among the 15 included in the study have only a limited international presence. There is still little available open source data for arms companies headquartered in China or Russia.[21]

[20] Although Lockheed Martin manufactures different categories of products, it can be considered as predominantly an aerospace company. According to the company's 2019 Annual Report, its aeronautics segment accounted for 40% of its sales in 2019. Lockheed Martin, *2019 Annual Report* (Lockheed Martin: Bethesda, MD, 2020), p. 3.

[21] The discussion on the international presence of Chinese and Russian companies is less comprehensive due to a lack of data. The subsection is based on extensive background research conducted by the authors. In all cases—AVIC, CETC, NORINCO and Almaz-Antey—it is likely that the companies provide local maintenance or training services for some customers abroad. However, it was not possible to independently verify those activities systematically or to ascertain

Table 3. Foreign entities of Aviation Industry Corporation of China (AVIC), 2019

Name of foreign entity[a]	Country location	Relevant product or service	Ownership share (%)	Year of establishment/ acquisition
Align Aerospace	United States	Aircraft components	*100*	2015
AVIC CAPDI Construction Project Management Co. Ltd	Pakistan	Construction and maintenance of a combat aircraft production line	*100*	. .
AVIC CAPDI Construction Project Management Co. Ltd	Cambodia	Hangar maintenance	*100*	. .
AIM Altitude Ltd	United Kingdom	Aircraft components	*100*	2016
Aritex	Spain	Aircraft components	*95*	2016
Cirrus Aircraft	United States	Training aircraft; and maintenance, repair, overhaul and upgrade	*100*	2011
Deltamarin Group[b]	Finland	Design; engineering; shipbuilding; and maintenance, repair, overhaul and upgrade	*80*	2012

. . = data not available; CAPDI = China Aviation Planning and Design Institute.

[a] Entities listed are subsidiaries or subsidiaries of subsidiaries.

[b] AVIC's ownership of Deltamarin Group ended in Jan. 2020.

Sources: Company reports and stock exchange and investment filings; company websites and social media pages; company employee profiles on LinkedIn; company press statements; public company registrars; and media reports.

This subsection discusses the key findings of the mapping as they relate to the three Chinese companies in the top 15—Aviation Industry Corporation of China (AVIC), China North Industries Group Corporation (NORINCO) and China Electronics Technology Group Corporation (CETC)—and the one Russian company included—Almaz-Antey.

China: AVIC, NORINCO and CETC

AVIC is the only one of the three Chinese arms companies in the top 15 for which foreign entities that met the research criteria were uncovered. It is present in at least six different countries (see table 3). Four are Western industrialized countries—Finland, Spain, the UK and the USA—and two are in the Global South—Cambodia and Pakistan.

China has a long-standing military cooperation with Pakistan and Cambodia, and one of AVIC's subsidiaries, AVIC CAPDI (China Aviation Planning and Design Institute), is present in both countries.[22] In the Western industrialized countries, AVIC's foreign entities are mainly active in the civilian realm, but do also produce some items that have military applications (e.g. certain aircraft components sold to military customers) or undertake some limited activities (e.g. repair, overhaul and upgrade) for military customers. AVIC's investments in Western companies do not appear to correspond to an attempt to develop an international presence per se as they remain fairly limited in scope. For example, AVIC's largest single investment in the USA is worth around US$200 million and its acquisitions there have 'minimal military implications'.[23] Thus although AVIC has

whether related legal entities were established abroad. See e.g. Woncha-um, P., 'Thailand plans joint arms factory with China', Reuters, 16 Nov. 2017.

[22] AVIC CAPDI Construction Project Management (Beijing) Co. Ltd, [Hangar at Phnom Penh Air Force Base, Cambodia], 2016 (in Chinese); and AVIC CAPDI Construction Project Management (Beijing) Co. Ltd, [Pakistan JF-17 aircraft line construction project], 2016 (in Chinese).

[23] Ohlandt, C. J. R. et al., *Chinese Investment in US Aviation* (Rand Corporation: Santa Monica, CA, 2017), pp. 58, 76.

some foreign entities, its presence remains in China for the most part. Its acquisition of companies in the USA and Western Europe with dual-use capabilities is probably a response to the Chinese Government's broader industrial strategy of gaining access to technologies from abroad.[24]

Although the research conducted for the mapping revealed some foreign entities among NORINCO's majority-owned subsidiaries and joint ventures, all appeared to be involved in civilian activities and therefore none met the criteria to be included in the final mapping. The availability of information about the civilian activities of NORINCO's foreign entities and the absence of information about any military activities could be interpreted as an indication that NORINCO has not established legally registered entities involved in military activities abroad.

Unlike with AVIC and NORINCO, no data on CETC's foreign entities could be found. This total absence of available information prevents any interpretation of the result. The only finding that can be made is that the company is generally lacking in terms of transparency.[25]

Russia: Almaz-Antey

All of Almaz-Antey's first-level subsidiaries are located in Russia.[26] One of its subsidiaries—the Interstate Joint Stock Corporation Vimpel, which is involved in the missile and space sectors—reportedly owns entities in Belarus, according to secondary sources.[27] However, it is unclear whether these entities are still active.

Almaz-Antey has nonetheless stated its interest in strengthening its position on international markets by creating representative offices and repair centres for military equipment supplied abroad, in particular in Algeria, Egypt and Kazakhstan.[28] The company is also reportedly assessing 'issues pertaining to setting up regional service centers in the countries that are members in the Commonwealth of Independent States (CIS)'.[29] However, it remains unclear whether these regional partnerships have been (or will be) realized, and what legal status they have (or will have). In early 2020 (and therefore outside of the scope of the data set described in this paper), Almaz-Antey notably signed a memorandum of understanding with Indian company Bharat Dynamics Ltd to form a joint venture that will produce and service air defence missile systems.[30]

Looking beyond Almaz-Antey at Russian companies outside the top 15 (and therefore outside the scope of the data set), Russia reportedly owns arms-manufacturing and military services entities in India, Kazakhstan

[24] Nouwens, M. and Legarda, H., 'China's pursuit of advanced dual-use technologies', International Institute for Strategic Studies (IISS) Research Papers, 18 Dec. 2018.

[25] This general lack of transparency is illustrated by the fact that the company's website no longer appears to be accessible (as of Nov. 2020).

[26] Almaz-Antey, [History], [n.d.] (in Russian).

[27] Centre for Military and Political Studies, [Open Joint Stock Company 'Interstate Joint Stock Corporation Vimpel'], [n.d.] (in Russian).

[28] Almaz-Antey, 'Military-technical cooperation', [n.d.]; and Andreev, F., [The service trajectory], *Rossiyskaya Gazeta*, 31 Aug. 2020 (in Russian).

[29] International Industry Technology Guides, 'Leading brand for air defence', *Russian Aviation and Military Guide*, no. 08(15), Aug. 2017, p. 29.

[30] Peri, D., '14 MoUs for military spares and support signed with Russian firms', *The Hindu*, 16 Feb. 2020.

and Vietnam—three of the largest importers of Russian major arms.[31] This type of international presence is primarily in the form of joint ventures, such as those between Hindustan Aeronautics Ltd of India and several Russian firms.[32] In 2016 the company Russian Helicopters signed an agreement with AVIC for the establishment of a maintenance and repair centre in China. However, no information was uncovered as to whether the agreement led to actual infrastructure or a joint entity.[33]

Although these companies and entities are beyond the scope of the data set, the developments noted above provide useful background to help to gain a better understanding of the international presence of Russian companies in general terms. Unlike many of the largest Western arms companies whose international presence includes numerous majority-owned foreign entities involved in military manufacturing, the Russian examples suggest that the international presence of Russian companies is mainly based on ad hoc agreements, often for maintenance services.

Limits on Chinese and Russian companies' international presence

The above analysis of the available information on the largest Chinese and Russian arms companies highlights some differences and some general similarities in their approaches to internationalization. For example, AVIC's international presence shows that it provides in-country services to existing customers (Cambodia and Pakistan) and perhaps has an intention to acquire Western technology. Almaz-Antey may be pursuing only the first of these two strategies and possibly just at a minority-level of corporate ownership, which is not captured by SIPRI's data set. In contrast to the often broad international presence of most major Western arms companies, the findings for AVIC and Almaz-Antey seem to show that the international presence of the largest Chinese and Russian companies is very limited. Indeed, almost all of each state's arms–industrial base is known to be located within its state territory.

The findings for AVIC and Almaz-Antey seem to show that the international presence of the largest Chinese and Russian companies is very limited

With the understanding that the data is limited and that some Chinese or Russian foreign entities might be missing from the data set, the findings for the Chinese and Russian companies covered by the mapping can be explained in three ways.

First, in both states the arms industry is almost entirely state-owned. This implies that company strategies align with and are limited by government policies. Both China and Russia place a very strong focus on the domestic development of weapons, which in turn may discourage their respective arms companies from developing a larger international presence.[34]

[31] Rostec, [Rostec opened a helicopter engine repair centre in Vietnam], 22 Apr. 2019 (in Russian); Rostec, [Technodinamika opened a representative office of the Aviation Service Centre in India], 12 July 2016 (in Russian); and Peyrouse, S., 'Armament strategies and development of the Kazakhstani military–industrial complex: Stakes and prospects', Central Asia Program (CAP) Papers no. 185 (May 2017).

[32] Hindustan Aeronautics Limited, 'Joint ventures companies', [n.d.].

[33] Rostec, [At the forefront of the digital economy: Yearly Report 2016], 2016 (in Russian), p. 192.

[34] Cheung, T. M., *Fortifying China: The Struggle to Build a Modern Defense Economy* (Cornell University Press: Ithaca, NY, 2009); and International Institute for Strategic Studies (IISS), 'Defence budgets, defence industry and the State Defence Order', *Russia's Military Modernisation: An Assessment* (Routledge: Abingdon, 2020).

Second, while both China and Russia are among the world's largest arms exporters—which seems to have led to some maintenance and services activities abroad—it could be that a lack of experience with regard to technology transfers inhibits other forms of cooperation with their customers. However, this possible explanation is perhaps more relevant to China than to Russia. Russia has, for example, previously transferred technology for Su-27 combat aircraft to China and for Su-30 combat aircraft to India.[35] But these transfers did not lead to the establishment of foreign entities as defined in this paper.

Third, limits on international presence also come from abroad. Chinese ambitions to acquire dual-use and emerging technologies from North America and Europe may be frustrated by Western states' increasing wariness over the fast pace of China's technological development.[36] Some states have restrictions on direct foreign investment and others are looking to tighten regulation in this area. The European Union (EU), for instance, has recently strengthened its foreign investment screening mechanism, specifically 'with regard to foreign direct investments likely to affect security or public order'.[37] Measures such as these may prove to be a barrier to the further development of China's industrial strategy and AVIC's international presence.

The opportunities for Russian arms companies to form partnerships abroad have been affected by Russia's annexation of Crimea in 2014. The USA, for example, has imposed a range of sanctions against Almaz-Antey and a number of its subsidiaries since 2014.[38] These sanctions aim to freeze Almaz-Antey's foreign assets and hinder its economic activities outside Russia. Russia was developing arms supply relations with some EU member states before 2014. However, in that year the EU imposed sanctions that prohibit nationals of EU states (or their territories) from any involvement in the supply of (*a*) arms or military-related services to Russia, or (*b*) dual-use goods for military use or military end-users in Russia.[39] These sanctions also specifically target Almaz-Antey.[40]

[35] Federation of American Scientists, 'J-11 [Su-27 FLANKER]', 29 Mar. 2000; Roblin, S., 'Aircraft theft: Why China's J-11 fighter looks like Russia's Su-27 "Flanker"', *National Interest*, 19 Dec. 2019; Zarzecki, T. W., 'Arming China or arming India: Future Russian dilemmas', *Comparative Strategy*, vol. 18, no. 3 (1999), p.263; and Raghuvanshi, V., 'An Indian facility that makes Su-30MKI jets may shut down, toppling 400 local suppliers', *Defense News*, 15 Aug. 2019. China later breached the licensing production agreement to develop its own variant of the aircraft.

[36] Johnson, K. and Gramer, R., 'The great decoupling', *Foreign Policy*, 14 May 2020.

[37] Regulation 2019/452 of the European Parliament and of the Council of 19 Mar. 2019 establishing a framework for the screening of foreign direct investments into the Union, *Official Journal of the European Union*, L79, 21 Mar. 2019.

[38] US Department of the Treasury, 'Announcement of treasury sanctions on entities within the financial services and energy sectors of Russia, against arms or related materiel entities, and those undermining Ukraine's sovereignty', 16 July 2014; US Department of State, Bureau of International Security and Nonproliferation, 'Section 231 of the Countering America's Adversaries Through Sanctions Act [CAATSA] of 2017', 2017; and US Department of State, Bureau of International Security and Nonproliferation, 'CAATSA Section 231(e) list regarding the defense sector of the Government of the Russian Federation', 2017.

[39] Council Regulation (EU) 833/2014 of 31 July 2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine, *Official Journal of the European Union*, L229, 31 July 2014.

[40] Council Decision 2014/659/CFSP of 8 Sep. 2014 amending Decision 2014/512/CFSP concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine, *Official Journal of the European Union*, L271, 12 Sep. 2014.

Following the implementation of the sanctions in 2014, Russia introduced an import substitution policy to limit its dependency on foreign suppliers. This policy further strengthened the domestic focus of its arms procurement policy and has influenced Almaz-Antey's strategy in recent years.[41]

The EU and US sanctions not only make it impossible for Russian arms companies to operate legally in the EU and the USA, but also pose major obstacles to the development of an international presence elsewhere. This is of relevance, in particular, when a potential partner is based in a country that is attempting to develop arms supply relations with both Russia and the USA.[42]

III. Understanding the international presence of the world's largest arms companies

This section takes the key findings of the mapping as a starting point and explores what may have prompted arms companies to establish or expand their international presence. It looks at this issue both from the supply perspective—company strategies—and the demand perspective—states' arms procurement policies. As explained in the previous section, arms companies in China and Russia appear to have only a very limited international presence and their strategies in this area are largely determined by government policy. For these reasons, the focus of this section is on the largest arms companies in the subregions of North America and Western Europe.

The supply perspective: Company strategies

An arms company's strategic goals are likely to have an important influence on its international presence. Typically, these goals include a perceived need to achieve global competitiveness and gain access to foreign markets. Some arms companies also align their strategies with their respective government's ambitions to develop collaborative weapon programmes.

Global competitiveness

As military spending declined in Western countries after the end of the cold war, the market became increasingly competitive (a smaller market for the same number of suppliers). In response, many arms companies forged new partnerships through mergers, acquisitions and joint ventures. Larger companies are more capable of withstanding cuts by governments to military spending because they can leverage economies of scale and productivity gains.[43] Furthermore, by entering into joint ventures, companies pool the risks associated with the development of new weapon programmes. Risk-sharing is of increasing importance to arms companies as in many cases

[41] TASS, [Putin urged to produce everything necessary for defence in Russia], 14 May 2014 (in Russian); and Interfax, [Almaz-Antey uses the profit from export contracts for import substitution and promising R&D: CEO], 18 Dec. 2019 (in Russian).

[42] Wezeman S. T. et al., 'Developments among the suppliers of major arms, 2015–19', *SIPRI Yearbook 2020: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2020), pp. 279–81.

[43] McKinsey and Company, *The Future of European Defence: Tackling the Productivity Challenge* (McKinsey and Company: [London], May 2013), pp. 24–25.

the costs of producing any single major weapon system have reached a point where they have become difficult for one company to bear alone. Although governments largely fund the development of new weapon systems, companies can be affected by rising costs because they often need to pay a significant proportion of the outlay for R&D themselves. Larger companies can also diversify their portfolios to include different weapon systems, which makes them less dependent on the success (or failure) of one single programme.[44]

By growing larger, arms companies became more competitive on the global market. BAE Systems' growth since its establishment in 1999 is an illustration of this phenomenon. BAE Systems has widened its international presence through the acquisition of foreign companies or the formation of new production units abroad.[45] It has made various acquisitions to expand its US operations, including for example the purchase of IAP Research LLC in 2017—a company specialized in electromagnetic railguns.[46]

An expansion in a company's international presence can also result from a strategy based on domestic consolidation to improve competitiveness. Lockheed Martin's acquisition of Sikorsky Aircraft in 2015 is a notable recent example of this phenomenon.[47] With this acquisition, Lockheed Martin inherited some of Sikorsky's foreign entities. Of the 28 foreign entities identified in the mapping for Lockheed Martin, at least 3 were added in 2015. One of these three is PZL in Poland, which employs around 20 per cent of Lockheed Martin's non-US staff. Similarly, the merger between Harris Corporation and L3 Technologies in 2019 (to form L3Harris Technologies) appears to have been motivated by a strategy to improve competitiveness through domestic consolidation, but as a result the new company inherited a larger international presence.[48]

North American and West European arms companies' search for new markets led them to acquire companies in states with smaller arms–industrial bases

Companies also strive to become more competitive by acquiring companies providing emerging technologies relevant for military applications. Arms companies have now expanded into sectors such as communication, cyber-security and information technology (IT). Moreover, some companies in these sectors have begun to supply military customers and have thus entered the arms industry themselves.[49] In its 2019 annual report, Lockheed Martin stated that it 'make[s] investments in companies (both within the US and in other countries) that [it] believe[s] are developing disruptive technologies applicable to [its] core businesses'.[50] Although, generally speaking, this process can often be achieved through domestic consolidation, it can

[44] Devore, M. R., 'Arms production in the global village: Options for adapting to defense–industrial globalization', *Security Studies*, vol. 22, no. 3 (2013), pp. 537–38.

[45] Robertson (note 12).

[46] BAE Systems, 'IAP Research brings pioneering expertise for electromagnetic railgun', 23 Feb. 2017.

[47] Lockheed Martin, 'Lockheed Martin completes acquisition of Sikorsky Aircraft', Press release, 6 Nov. 2015.

[48] L3Harris Technologies, '2019 Transition Report', 2020, p. 6.

[49] Perlo-Freeman, S. and Sköns, E., 'Arms production', *SIPRI Yearbook 2008: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2008), p. 266; and Jackson, S. T., 'Key developments in the main arms-producing countries, 2011–12', *SIPRI Yearbook 2013: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2013). p. 214–15.

[50] Lockheed Martin (note 20), p. 17.

sometimes lead to an expansion in a company's international presence. For example, in 2018—before the above-mentioned merger—L3 Technologies acquired one cybersecurity entity based in Australia, which expanded its presence in the country.[51]

Access to foreign markets

North American and West European arms companies' search for new markets has led them to acquire or partner with companies in states with smaller arms–industrial bases. During the 1990s many of these states—including for example Australia, South Africa and South Korea—were seeking injections of capital into their arms industries and new arms-producing partners.[52] These states often made investment in the development of their domestic arms industries a precondition of their arms import deals with exporting companies. A commitment by a foreign arms company to establish in-country offices and manufacturing sites usually made the associated arms deal more attractive to the recipient state. In addition, once a contract had been won, if the recipient state had bought a large number of systems manufactured by a single company, an in-country maintenance repair and operations presence facilitated logistics for both sides.

A commitment by a foreign company to establish in-country manufacturing sites makes the associated arms deal more attractive to the recipient state

The outcome of this strategy is reflected in the mapping results. The cases of Leonardo, Lockheed Martin and Raytheon can be used to illustrate this point. In the 2000s and early 2010s Leonardo identified that countries aiming to develop arms-production capabilities, such as Brazil and Turkey for instance, would be among its key markets in the coming years.[53] As a result, the company expanded its international presence in the Global South. In Turkey it owns Leonardo Turkey Havacılık Savunma ve Güvenlik Sistemleri AŞ, a company that produces military communications equipment.[54] Leonardo has also been active in military communications-related activities in Brazil since 2002, through Leonardo do Brasil Ltd and Telespazio Brasil SA. As part of its efforts to increase its presence in South America, in early 2020 it announced plans to build a regional support centre in Brazil.[55]

Developments in Lockheed Martin's international presence have also been largely driven by the search for foreign markets. This can be illustrated by the expansion of Lockheed Martin's international presence in Saudi Arabia in recent years. Since the 1980s, Saudi Arabia has bought several batches of UH-60 helicopters from Sikorsky (now Lockheed Martin) production lines in the USA. However, in 2017 Saudi Arabia launched a major initiative to build up its own arms industry (see below). As a result, Lockheed Martin

[51] Johnson, M., '5-eyes giant L3 snaps-up locals Azimuth and Linchpin for $313m', IT News, 7 Sep. 2018

[52] Sköns, E. and Weidacher, R., 'Arms production', *SIPRI Yearbook 2000: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2000), pp. 300, 312; and Dunne, P. J. and Surry, E., 'Arms production', *SIPRI Yearbook 2006: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2006), p. 411.

[53] Finmeccanica, '2012 Separate Financial Statements', 31 Dec. 2012.

[54] Leonardo Turkey, 'Profile', [n.d.].

[55] Leonardo, 'New helicopter support centre in Brazil to enhance service capabilities in South America', 14 Feb. 2020.

agreed to establish a joint venture with Saudi Arabian Military Industries (SAMI) to produce the UH-60 helicopters locally.[56]

Raytheon has also expanded its international presence in the Middle East over the past few years. It has established two foreign entities in Saudi Arabia and one in the United Arab Emirates (UAE) in recent years.[57] Its international presence will probably continue to widen in the coming years. The company's strategy includes accessing new foreign markets, adapting existing offerings and technologies for its current markets and developing industrial partnerships.[58]

Collaborative weapon programmes

As noted above, the development and production costs associated with major weapon programmes are rising. In response, governments have increasingly sought to share the costs of producing arms, and companies have adjusted their strategies to fulfil this objective. This has occasionally led to the joint production of weapon systems by two or more companies headquartered in different countries—which, in turn, has expanded the international presence of some arms companies.

Collaborative weapon programmes have been fairly commonplace in Europe since at least the 1960s. Notable historical examples include the Jaguar combat aircraft, which was a collaboration between France and the UK, and the Panavia Tornado combat aircraft, which was a collaboration between Germany, Italy and the UK.[59] Such collaborations are now also present in other regions.

A recent example of this type of collaboration is the F-35 combat aircraft programme developed by the US Department of Defense (DOD) as an international project with foreign states to share research and production costs.[60] Lockheed Martin leads the programme in which companies in seven countries outside the USA are also formal partners. Other companies in the top 15 are also involved, such as Northrop Grumman (headquartered in the USA), BAE Systems (headquartered in the UK) and Leonardo (headquartered in Italy). In addition, companies in several other countries serve as subcontractors.[61] Lockheed Martin owns three foreign entities—located in Italy, Japan and Turkey—tied to the F-35 programme.[62]

[56] Lockheed Martin, 'Lockheed Martin in Saudi Arabia', [n.d.], accessed 30 Oct. 2020; and Kane, F., 'Lockheed Martin, KSA joint venture to create jobs', *Arab News*, 26 Feb. 2018.

[57] The entities in Saudi Arabia are Raytheon Atheeb Systems Ltd (established between 2012 and 2015) and ZHR Marine LLC (established in 2016 and dissolved in 2020). *Arab News*, 'Pannesma, Raytheon ink deal to form JV', 12 July 2012; Raytheon, 'Raytheon and Pannesma name board members for joint venture operation in the Kingdom of Saudi Arabia', Press release, 16 July 2014; ST Engineering, 'ST Engineering's marine arm in the US forms JV business', Press release, 30 Aug. 2016; and Leow, A., 'ST Engineering dissolves inactive Saudi Arabia naval joint venture', 23 Sep. 2020. The entity in the United Arab Emirates is Raytheon Emirates (established in 2017). Raytheon, 'Raytheon forms new subsidiary in the United Arab Emirates', Press release, 7 Dec. 2017.

[58] US Securities and Exchange Commission, 'Raytheon Company: Form 10-K', 2019, p. 15.

[59] See e.g. Matthews, R., *European Armaments Collaboration: Policy, Problems and Prospects* (Routledge: Abingdon, 1992).

[60] Gertler, J., *F-35 Joint Strike Fighter (JSF) Program*, Congressional Research Service (CRS) Report for Congress RL30563 (US Congress, CRS: Washington, DC, updated 27 May 2020), p. 30.

[61] Lockheed Martin, 'Global participation: The Centerpiece of 21st century global security', F35.com, [n.d.].

[62] Gertler (note 60), p. 30; and Reuters, 'US to work with Turkey on F-35 parts until 2022, state media citing Pentagon says', 1 July 2020.

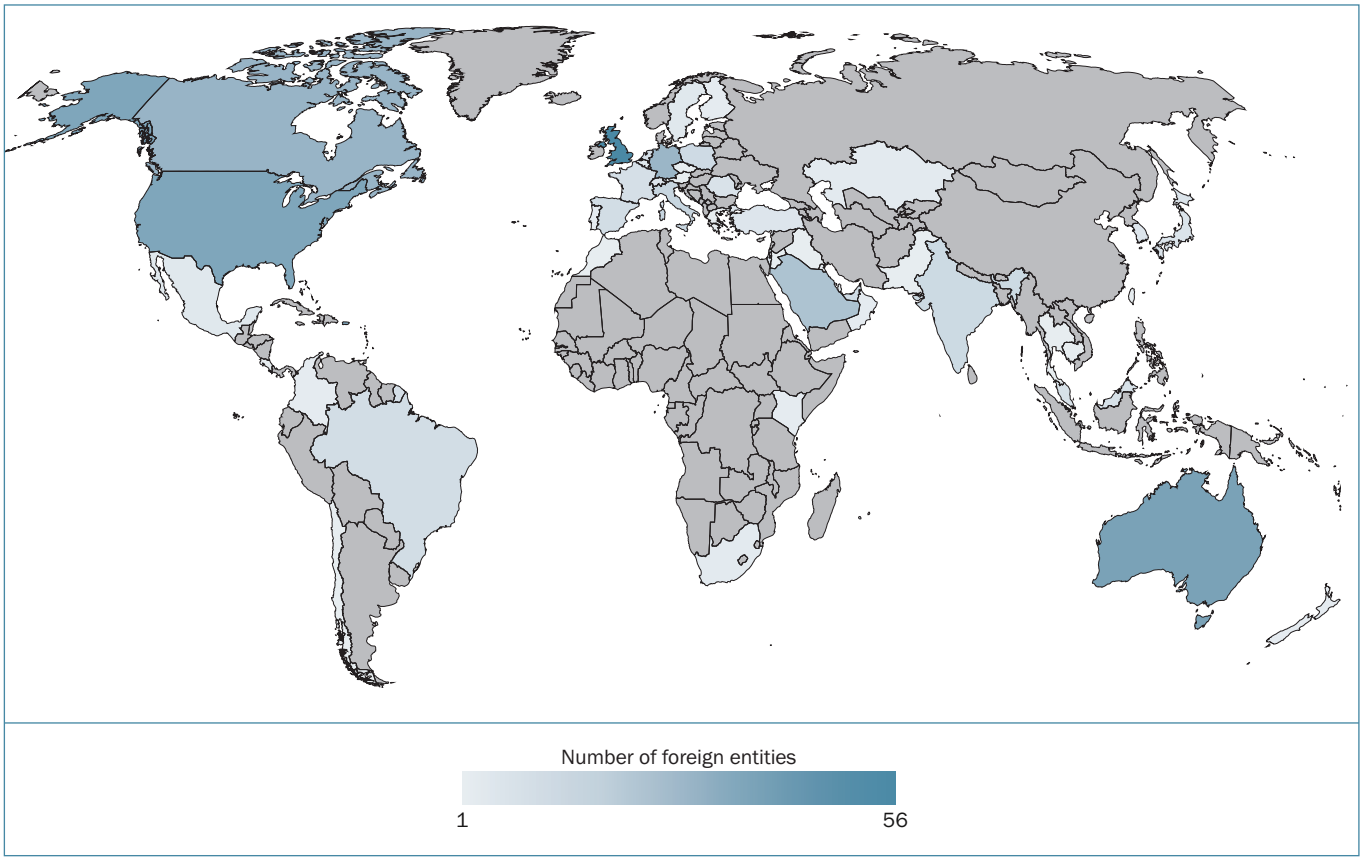

Figure 2. Countries hosting foreign entities of the 15 largest arms companies in the world, 2019

Note: The boundaries used in this map do not imply any endorsement or acceptance by SIPRI.

The A400M transport aircraft is another notable example of a current major multinational weapon programme. The aircraft was developed and is being produced by Airbus, which is itself a trans-European company. One of the foreign entities tied to the programme is a joint venture between Airbus and Thales that operates a training centre in the UK.

Collaborative weapon programmes are more government-led than they are company-led. Because state armed forces are the primary customers of arms companies, these companies depend heavily on government policies to drive their strategies for pursuing collaborations and developing their international presence.

The demand perspective: Customer requirements

The arms procurement and arms industry policies of arms companies' foreign customers—primarily states looking to equip their armed forces—also have an influence on company strategies. Such policies have an important impact on the geographical spread of the world's largest arms companies, with some countries hosting more entities than others (see figure 2). Overall, the UK hosts the most entities—about 14 per cent of the total for the 15 largest arms companies, followed by Australia (9.5 per cent), the USA (9.0 per cent), Canada (7.5 per cent), Germany (7.3 per cent), Saudi Arabia (6.0 per cent), Italy (3.8 per cent) and India (3.3 per cent).

This subsection examines how the policies of five of these host countries influence the international presence of some of the world's largest arms companies. They were selected because they are among the countries with the highest number of foreign entities in the region in which they are located. The five countries discussed are the USA (Americas), Australia and India (Asia and Oceania), the UK (Europe) and Saudi Arabia (the Middle East). Although Australia and the UK are located in different regions, they have similar arms procurement policies and are therefore analysed jointly below.

The United States

The mapping of the international presence of the 15 largest arms companies indicates that the USA hosts 36 foreign entities. All non-US companies identified as having foreign entities have a presence in the USA. Of the 36 entities, 30 are involved in manufacturing activities. The fact that almost all the 15 companies have a presence in the USA can be explained by the US DOD's procurement regulations. The 1933 Buy American Act (as amended) requires US federal agencies to select domestic products, including major arms, over foreign products in certain circumstances.[63] Between 2007 and 2017 around 5.5 per cent of US DOD purchases per year were imported, and the majority of those foreign purchases were for 'low-tech' goods and services.[64]

Thus, to access the large US market for military products, foreign firms have had to establish US subsidiaries.[65] However, the US DOD places strict restrictions even on the USA-based entities of foreign companies. It cannot contract a programme related to national security with companies 'controlled' by foreign governments or where the execution of the contract requires access to classified information.[66] The US legislation demands strict firewalls between foreign-owned US arms companies and their parent company: this means that foreign and US entities need to be split into independent businesses and the US entities must have a separate board composed of US citizens.[67] As a result, arms companies outside the USA seeking to gain access to the US market need to ensure that their US operations remain distinct rather than 'consolidated' with the foreign-based parent company.[68]

[63] Manuel, K. M., *The Buy American Act—Preferences for 'Domestic' Supplies: In Brief*, Congressional Research Service (CRS) Report for Congress R43140 (US Congress, CRS: Washington, DC, 26 Apr. 2016).

[64] The data is based on information published by the Defense Pricing and Contracting section of the US Department of Defense (DOD). USDOD, Defense Pricing and Contracting, 'DoD Purchases from foreign entities, (FY 2004–FY 2019)', [n.d.]. See also Fiott, D., 'The poison pill: EU defence on US terms', European Union Institute for Strategic Studies, 14 June 2019.

[65] Belin et al. (note 4), p. 37.

[66] Gourley, A. W. H., McCarthey J. E. (Jr) and Cliffe, R. A., 'Federal restrictions on participation by foreign investors in defense and other government contracts', eds J. E. Marans et al., *Manual of Foreign Investment in the US*, 3rd edn (Thomson West: Eagan, MI, 2004), pp. 4–5.

[67] Maye, D. L., 'Autarky or interdependence: US vs European security and defense industries in a globalized market', *Journal of Strategic Security*, vol. 10, no. 2 (June 2017), pp. 33–47.

[68] Perlo-Freeman, S., 'Arms production', *SIPRI Yearbook 2009: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2009), p. 276.

Australia and the United Kingdom

The mapping reveals that the UK hosts 56 of the foreign entities covered by the mapping, which is equivalent to around a third of the foreign entities based in Europe. Australia hosts 38 of the foreign entities that met the research criteria, and accounts for around 42 per cent of the foreign entities located in Asia and Oceania.

In both countries, the privatization of the arms industry in the 1980s and 1990s involved an open policy for foreign investments in the sector, in large part for economic reasons. In Australia, the result was that, by the end of the 2000s, four of its five largest arms companies were foreign-owned.[69] The UK also has a long-standing policy of openness to foreign companies in its arms procurement market and to foreign ownership of parts of its arms industry.[70] It introduced competition with the objective of lowering the costs of Ministry of Defence (MOD) procurement.[71] The MOD shifted away from a preferential domestic procurement policy in the 1980s, and more competition was introduced in the 1990s as the MOD invited bids from foreign suppliers.[72] Thus, in both Australia and the UK, the liberalization of ownership and their open market policies encouraged foreign firms to acquire local entities.

India

The mapping identified 13 foreign entities in India, 2 of which are involved in manufacturing activities. Airbus, BAE Systems, Boeing, General Dynamics, L3Harris Technologies, Leonardo, Lockheed Martin and Thales all have foreign entities in India.

India hosts a relatively low number of foreign entities considering that it has been among the world's largest arms importers for decades and has a policy of domestic arms–industrial development. This could be explained by its rules on foreign investment in its domestic arms industry, which have evolved over time. As India developed its arms procurement policy, it introduced offset requirements to leverage foreign technologies in support of its arms industry.[73] However, between 2006 and 2014 the offset rules capped foreign direct investment in Indian arms companies at 26 per cent; this rose to 49 per cent after 2014.[74] In September 2020 the cap was revised

[69] Markowski, S. et al., 'Defence industry in Australia', eds Hartley and Belin (note 14), p. 465; and Dunk, G., 'Defence industry policy 2016: Well-intentioned but conflicted', *Security Challenges*, vol. 2, no. 1 (2016), pp. 139–50.

[70] Braddon, D. and Bradley, J., 'What lies beneath? Who owns British defence contractors and does it matter?', Working paper no. 0507, Bristol Business School, University of the West of England, July 2005.

[71] Smith, A. and Giry, B., 'Defence capability in the UK since 2010: Explaining change in procurement practices', *British Politics,* vol. 15, no. 4 (Dec. 2020), pp. 433–55; and Hartley, K., 'The economics of the UK defence industrial strategy', *Security Challenges*, vol. 3, no. 2 (June 2007), pp. 19–30.

[72] Hartley, K., 'Defence procurement in the UK', *Defence and Peace Economics,* vol. 9, no. 1-2 (1998), p. 48.

[73] Kundu, O., 'Risks in defence procurement: India in the 21st century', *Defence and Peace Economics* (July 2019), p. 4. In this context, offset requirements refer to compensatory trade agreements that require a supplier to direct some benefits, usually local employment opportunities or technology, to the purchaser as a condition of the sale.

[74] Behera, L. K., *Defence Offsets: International Best Practices and Lessons for India*, Institute for Defence Studies and Analyses (IDSA) Monograph Series, no. 45 (IDSA: New Delhi, June 2015), p. 49.

again, to 74 per cent.[75] This higher threshold may raise the interest of major arms companies in partnering with India's domestic firms or setting up local subsidiaries.

Saudi Arabia

The mapping indicates that Saudi Arabia hosts 24 foreign entities that met the research criteria. Airbus, BAE Systems, Boeing, General Dynamics, L3Harris Technologies, Leonardo, Lockheed Martin, Northrop Grumman, Raytheon and Thales all have entities located in Saudi Arabia. However, of those companies, only BAE Systems, L3Harris Technologies, Lockheed Martin and Raytheon have manufacturing entities there. The other companies only have entities that undertake maintenance and repair activities—except for Boeing, which has also set up two research facilities.

The presence of several major arms companies in Saudi Arabia is partly explained by the fact that it has long been one of the world's largest arms importers, which led foreign arms companies to establish in-country repair services for the products they supplied. The existence of joint ventures—such as Lockheed Martin's above-mentioned partnership with a local company to manufacture helicopters—and research facilities also reflects the development of Saudi Arabia's offset policy. This policy, which originally was not focused on the defence sector, started with the creation of the Saudi Economic Offset Committee in 1983.[76] Part of the offset strategy was to encourage the creation of joint ventures in the country with the aim of strengthening local technological advancement and workforce skills.[77] The policy promoting local arms-manufacturing firms developed over time.[78] In 2017 Saudi Arabia launched its Vision 2030 plan, which includes a target for 50 per cent of its arms procurement spending to be 'localized'.[79] Major foreign arms companies, including some of the 15 covered by the mapping, have since responded by proposing new joint ventures and localized arms production.[80]

The presence of several major arms companies in Saudi Arabia is partly explained by the fact that it is one of the world's largest arms importers

IV. Conclusions

By mapping the foreign entities of the world's 15 largest arms companies, this paper contributes to a better understanding of the international presence of the arms industry. Of the 15 parent companies included in the mapping, data was uncovered for 12, which together have a total of 400 entities involved in military production and services that met the research criteria.

[75] Indian Government, Ministry of Commerce and Industry, 'Review of foreign direct investment (FDI) policy in defence sector', Press note no. 4 (2020 Series), 17 Sep. 2020.

[76] Al-Ghrair, A. M. and Hooper, N., 'Saudi Arabia and offsets', ed. S. Martin, *The Economics of Offsets: Defence Procurement and Countertrade* (Routledge: Abingdon, 1996), pp. 222–28.

[77] Matthews, R., 'Saudi Arabia: Defense offsets and development', eds J. Brauer and P. Dunne, *Arming the South: The Economics of Military Expenditure, Arms Production and Arms Trade in Developing Countries* (Palgrave: Basingstoke, 2002), p. 213.

[78] Ramady, M. A., *The Saudi Arabian Economy: Policies, Achievements, and Challenges*, 2nd edn (Springer Science and Business Media: Dordrecht, 2010), p. 196.

[79] Saudi Arabian Public Investment Fund, 'Saudi Arabian Military Industries', Press release, 17 May 2017.

[80] Khan, S., 'New defence partnerships emerge as Riyadh pushes industrialisation goals', *Arab Weekly*, 20 July 2019.

Overall, European companies are present in the most geographically diverse set of countries. For example, Thales and Airbus each have foreign entities in 24 countries, while Leonardo has a presence in 21. Among the US arms companies, Boeing is the only one that is at a similar level, with 21 foreign entities. At the regional level, Europe hosts the largest number of foreign entities (167), followed by the Americas (84). This is the result of the wave of transatlantic mergers and acquisitions that occurred in the 1990s and 2000s. The UK hosts the highest number of entities (56), which is mainly a result of its policy of openness to foreign investment with regard to arms procurement. Outside the arms industry hubs of North America and Western Europe, the countries that host the highest numbers of foreign entities are Australia (38), Saudi Arabia (24), India (13), Singapore (11), the UAE (11) and Brazil (10). These countries are among the world's largest arms importers and most aim to develop their local arms industries—two factors that encourage major arms companies to establish foreign entities and expand their presence. The mapping also uncovered the fact that 17 countries in the Global South are now (at least partly) integrated in the global armament production system.

The international presence of the world's largest arms companies continues to be influenced by geopolitical divisions and ties

The mapping shows that the international presence of the world's largest arms companies continues to be influenced by geopolitical divisions and ties, and generally mirrors the geographical locations of the world's biggest arms import markets. This is true not only for North American and West European arms companies, but also for the one Chinese company for which data was uncovered: AVIC, China's largest arms company, has entities in Cambodia and Pakistan, which are long-term military cooperation partners of China.

However, the mapping appears to suggest that the international presence of major Chinese arms companies and the one Russian company included in the study remains very limited. Although AVIC has made some foreign acquisitions and Almaz-Antey has issued statements of intent to establish maintenance and service centres abroad, both would face certain constraints should they attempt to pursue these objectives further. Other governments, specifically Western governments, limit foreign investments coming from Chinese companies and have sanctioned Russian entities since 2014. This highlights the limits on international economic integration between Russia and China on the one hand and the West on the other.

The key company strategies for international presence (global competitiveness, access to foreign markets, and collaborative weapon programmes) discussed in this paper are relevant not only to the very largest companies in North America and Western Europe covered by the mapping, but also to many arms companies outside the top 15. Furthermore, the development of arms–industrial policies in a growing number of countries that could be considered as emerging arms producers will probably continue to encourage foreign arms companies to set up local branches and manufacturing entities in order to gain access to, or expand their international presence in, these markets.[81]

[81] Kurç, Ç. and Neuman, S.G., 'Defence industries in the 21st century: A comparative analysis', *Defence Studies*, vol. 17, no. 3 (2017), pp. 219–27; and Kurç, Ç. and Bitzinger, R. A., 'Defense industries in the 21st century: A comparative analysis—The second e-workshop', *Comparative Strategy*, vol. 37, no. 4 (2018), pp. 255–59.

Future research could build on the findings of this mapping in various ways. One area for further exploration could be a comparison between North American and West European arms companies on the one hand and their counterparts in other regions (such as Japanese and South Korean companies in Asia and Oceania) on the other, to gain more insight on why companies decide whether or not to establish an international presence. The data on joint ventures also raises questions on the existence and structure of an international network of arms companies, as well as on the consequences of international presence for interdependence in arms production. Additionally, the research could be complemented with an analysis of other indicators of international presence (e.g. the number of employees based outside of the company's country of headquarters, foreign ownership or sales by foreign entities) for a broader understanding of the international arms-production system.

Appendix A. The 25 largest arms-producing and military services companies in the world, 2019

Arms sales by the world's 25 largest arms-producing and military services companies (or 'arms companies' for short) totalled US$361 billion in 2019 (see table 1.A).[1] This represents an 8.5 per cent increase over the arms sales of the top 25 arms companies in 2018. The total in 2019 was 15 per cent higher than for the top 25 in 2015.[2]

For each year in 2015–19, the United States was home to the highest number of companies listed.[3] Twelve US companies appear in the top 25 for 2019, accounting for 61 per cent of the combined arms sales of the 25 largest arms companies. Four Chinese arms companies, three of which were in the top 10, accounted for 16 per cent of the total in 2019. The combined revenue of these four Chinese companies grew by 4.8 per cent in 2019 and by 8.2 per cent between 2015 and 2019.

This is the first time that SIPRI has included data for Chinese companies in a ranking of the world's largest arms companies.[4] The four companies included are Aviation Industry Corporation of China (AVIC; ranked 6th), China Electronics Technology Group Corporation (CETC; ranked 8th), China North Industries Group Corporation (NORINCO; ranked 9th) and China South Industries Group Corporation (CSGC; ranked 24th). Other Chinese companies might have been among the top 25 arms companies in 2019 but there was insufficient data to include them in the ranking.

The six West European companies in the ranking (two based in the United Kingdom, two in France, one in Italy and one trans-European company) together accounted for 18 per cent of the total arms sales of the top 25 in 2019. The two Russian companies accounted for 3.9 per cent, and the one company based in the United Arab Emirates (UAE) accounted for 1.3 per cent.

Nineteen of the top 25 had higher arms sales in 2019 than in 2018. The largest percentage increase—105 per cent—was recorded by French producer Dassault Aviation Group. Its exports of Rafale combat aircraft rose substantially in 2019, on top of its ongoing deliveries to France. Lockheed Martin, the world's largest arms company in 2019, reported the biggest absolute increase—its arms sales in 2019 were $5.1 billion higher than in 2018, equivalent to an increase of 11 per cent in real terms. The two Russian companies recorded the largest percentage decreases among the top 25 for 2019. Almaz-Antey's arms sales fell by 3.7 per cent, while United Shipbuilding's decreased by 5.7 per cent.

With few exceptions, the 25 companies in the ranking for 2019 were also included in most or all years in the period 2015–18. Two companies

[1] The full data set for the SIPRI top 25 is available on the SIPRI website.

[2] The composition of the annual list of the 25 largest arms companies changed between 2018 and 2019 and between 2015 and 2019. The percentage change is based on the total arms sales of the top 25 companies as they were in each year. Changes are in real terms, accounting for inflation. The comparison presented here starts from 2015 as this is the first year for which SIPRI has sufficient data to include some Chinese companies.

[3] The countries mentioned in this appendix refer to the locations in which the ownership and control structures of the companies are located (i.e. the locations of the companies' headquarters).

[4] The methodology for including Chinese companies in SIPRI's arms industry data sets was published in Tian, N. and Su, F., 'Estimating the arms sales of Chinese companies', SIPRI Insights on Peace and Security, no. 2020/2, Jan. 2020.

Table 1.A. The SIPRI top 25 arms-producing and military services companies in the world, 2019

Figures for arms sales and total sales are in millions of US dollars.

Rank[a]		Company[b]	Country[c]	Arms sales, 2019 (US$ m.)	Arms sales, 2018 (constant 2019 US$ m.)[d]	Change in arms sales, 2018–19 (%)	Total sales, 2019 (US$ m.)	Arms sales as a % of total sales, 2019
2019	2018							
1	1	Lockheed Martin Corp.	United States	53 230	48 119	*11*	59 812	*89*
2	2	Boeing	United States	33 580	32 704	*2.7*	76 559	*44*
3	3	Northrop Grumman Corp.	United States	29 220	26 666	*9.6*	33 841	*86*
4	4	Raytheon[e]	United States	25 320	23 866	*6.1*	29 176	*87*
5	6	General Dynamics Corp.	United States	24 500	22 400	*9.4*	39 350	*62*
6	5	Aviation Industry Corp. of China (AVIC)[f]	China	22 470	21 841	*2.9*	66 846	*34*
7	7	BAE Systems	United Kingdom	22 240	20 672	*7.6*	23 378	*95*
8	9	China Electronics Technology Group Corp. (CETC)	China	15 090	13 581	*11*	32 951	*46*
9	8	China North Industries Group Corp. (NORINCO)	China	14 540	14 580	*–0.3*	65 929	*22*
10	–	L3Harris Technologies[g]	United States	13 920	13 460	*3.4*	18 074	*77*
11	14	United Technologies Corp.[e]	United States	13 100	9 479	*38*	77 046	*17*
12	11	Leonardo	Italy	11 110	9 383	*18*	15 432	*72*
13	10	Airbus	Trans-European[h]	11 050	11 197	*–1.3*	78 905	*14*
14	13	Thales	France	9 470	9 087	*4.2*	20 601	*46*
15	12	Almaz-Antey	Russia	9 420	9 784	*–3.7*	9 657	*98*
16	16	Huntington Ingalls Industries	United States	7 740	7 331	*5.6*	8 899	*87*
17	38	Dassault Aviation Group	France	5 760	2 812	*105*	8 219	*70*
18	18	Honeywell International	United States	5 330	5 529	*–3.6*	36 709	*15*
19	19	Leidos	United States	5 330	5 091	*4.7*	11 094	*48*
20	22	Booz Allen Hamilton	United States	5 140	4 765	*7.9*	7 464	*69*
21	28	General Electric	United States	4 760	3 716	*28*	95 200	*5.0*
22	–	EDGE[f]	UAE	4 750	..	..	5 000	*95*
23	23	Rolls-Royce	United Kingdom	4 710	4 561	*3.3*	19 732	*24*
24	25	China South Industries Group Corp. (CSGC)	China	4 610	4 125	*12*	29 065	*16*
25	21	United Shipbuilding Corp.[f]	Russia	4 500	4 770	*–5.7*	5 416	*83*

.. = data not available; Corp. = Corporation; UAE = United Arab Emirates.

[a] Companies are ranked according to the value of their arms sales at the end of what SIPRI considers to be their financial year. A dash (–) indicates that the company was not ranked in 2018. Company names and structures are listed as they were at the end of their financial year. Rankings for 2018 are based on updated figures on arms sales in the SIPRI Arms Industry Database for the years 2015–19. They may differ from those published in any earlier SIPRI publication owing to continual revision of data, most often because of changes reported by the company itself and sometimes because of improved estimations.

[b] Holding and investment companies with no direct operational activities are not treated as arms companies, and companies owned by them are listed and ranked as if they were parent companies.

[c] Country refers to the country in which the ownership and control structures of the company are located, i.e. the location of the company's headquarters.

[d] To allow comparison with arms sales in 2019, figures for arms sales in 2018 are given in constant 2019 US dollars.

[e] Raytheon and United Technologies Corp. merged in 2020.

[f] The arms sales figure for this company is an estimate with a high degree of uncertainty.

[g] L3Harris Technologies is the result of a merger between Harris Corp. and L3 Technologies. Its arms sales figure for 2018 is 'pro forma', i.e. it is the combined 2018 arms sales of Harris Corp and L3 Technologies.

[h] Trans-European refers to companies whose ownership and control structures are located in more than one European country.

Source: SIPRI Arms Industry Database, Dec. 2020.

Box 1.A. Definitions, sources and methods

Sales of arms and military services (or 'arms sales' for short) are defined as sales of military goods, services and research and development to military customers domestically and abroad.
Unless otherwise specified, all changes are expressed in real terms. Comparisons (e.g. between 2018 and 2019 or 2015 and 2019) are based on the sets of companies listed in the respective year (i.e. the comparison is between different sets of companies).
The data for all years is revised annually based on new information. Therefore, data in this paper replaces all data for all years in previous SIPRI publications on arms companies.
The comparison presented here starts from 2015 as this is the first year for which SIPRI has sufficient data to include some Chinese companies. This means that the data set presented in this paper differs from the previous data set produced for the SIPRI Top 100 ranking of arms-producing and military services companies, which does not include Chinese companies. This data set remains available on the SIPRI website for archiving purposes.
See the SIPRI website for further detail on definitions, sources and methods.

listed in 2018 dropped out of the top 25 in 2019—United Aircraft (Russia) and Naval Group (France). Dassault Aviation Group (ranked 17th) and General Electric (ranked 21st) entered the list in 2019 for the first time since Chinese companies were included in the data set. Other new entrants were the result of mergers in 2019. L3Harris Technologies (ranked 10th) was formed from a merger between two US companies (Harris Corporation and L3 Technologies) that were both in the top 25 in 2018. EDGE (ranked 22nd) is the first Middle Eastern arms company to be included in the top 25. It was formed in 2019 from the merger of more than 25 companies based in the UAE, each of which was far below the threshold for inclusion in the ranking in previous years. The rise of EDGE to be among the world's top 25 arms companies is due to the UAE's investments in its arms–industrial sector over the past 10–15 years.[5] The UAE's arms industry has benefited from offsets and technology transfers, allowing it to progressively increase its local production of major arms and components.[6]

[5] Barany, Z., 'Indigenous defense industries in the Gulf', Center for Strategic and International Studies, 24 Apr. 2020.

[6] Slijper, F., *Under the Radar: The United Arab Emirates, Arms Transfers and Regional Conflict* (PAX: Utrecht, Sep. 2017); and Saab, B. Y., *The Gulf rising: Defense Industrialization in Saudi Arabia and the UAE* (Atlantic Council of the United States, Brent Scowcroft Center on International Security: Washington, DC, May 2014).

Abbreviations

AVIC	Aviation Industry Corporation of China
AVIC CAPDI	AVIC China Aviation Planning and Design Institute
CETC	China Electronics Technology Group Corporation
CIS	Commonwealth of Independent States
CSGC	China South Industries Group Corporation
DOD	Department of Defense
EU	European Union
MOD	Ministry of Defence
NORINCO	China North Industries Group Corporation
R&D	Research and development
SAMI	Saudi Arabian Military Industries
UAE	United Arab Emirates

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STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE
Signalistgatan 9
SE-169 72 Solna, Sweden
Telephone: +46 8 655 97 00
Email: sipri@sipri.org
Internet: www.sipri.org

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MAPPING THE INTERNATIONAL PRESENCE OF THE WORLD'S LARGEST ARMS COMPANIES

LUCIE BÉRAUD-SUDREAU, ALEXANDRA MARKSTEINER, DIEGO LOPES DA SILVA, NAN TIAN, ALEXANDRA KUIMOVA, PIETER D. WEZEMAN AND SIEMON T. WEZEMAN

CONTENTS

ABOUT THE AUTHORS

Lucie Béraud-Sudreau (France) is Director of SIPRI's Arms and Military Expenditure Programme.

Alexandra Marksteiner (Austria/Germany) is a Research Assistant with the programme.

Diego Lopes da Silva (Brazil) is a Researcher with the programme.

Nan Tian (South Africa) is a Senior Researcher with the programme.

Alexandra Kuimova (Russia) is a Researcher with the programme.

Pieter D. Wezeman (Netherlands/Sweden) is a Senior Researcher with the programme.

Siemon T. Wezeman (Netherlands) is a Senior Researcher with the programme.

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