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UNDERSTANDING US FOREIGN MILITARY SALES GLOBALLY SINCE 2008: AN ANALYSIS OF A NEW DATASET

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This paper introduces a new and unique dataset of all United States Foreign Military Sales (FMS) programme notifications from 2008 to September 2025. The dataset covers purchasing countries, specific equipment involved (and quantities when available), financial values, contractors associated with each notification, and associated equipment and services bundled with the main equipment sold.

We introduce the main instruments used by the US to transfer military equipment abroad and provide an overview of both the equipment and financial volumes related to each instrument, showing that the FMS programme is the main instrument for transfers of military equipment. We then analyse the trends in number and values of total FMS notifications since 2008, at the regional as well as country level. We break down military sales notifications by region, focusing on Europe, the Near East and South Asia, East Asia and the Pacific, the Americas and Africa. We then study in detail the types of equipment sold by region and over time. We then focus on high-value items, and detail the additional services and equipment included in sales of select weapon systems. We conclude by reflecting on the main attributes of the Bruegel FMS dataset and suggesting avenues for further research that could benefit from this data.

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1 Introduction

The United States is the global leader in exports of military equipment, with sales increasing substantially in recent years. Russia's war in Ukraine has meant that European demand for US weapons has increased. On Ukraine specifically, US President Donald Trump appears to have shifted to supplying weapons increasingly via the US Foreign Military Sales programme, rather than as donations. Meanwhile, Russia has focused its own war economy on reliably supplying its own troops, rather than on exports, though Russian arms exports continue. France and China are also significant major exporters of military equipment (SIPRI, 2024), but lag the US by large margins. The US has a highly diversified export market in terms of both geographies to which weapons are delivered and types of equipment exported.

The worsening global security situation, with ongoing military conflicts in Europe, the Near East and Asia, and with hybrid attacks becoming more systematic, has implications for the military needs of countries and is thus likely to have an effect on their recourse to the US industrial base. The risk of further conflict escalation or of new conflicts can also translate into more arms purchases from the US.

Overseas military sales have always been subject to intricate foreign policy considerations in the US[1]. The ability of the US administration or US suppliers to interrupt the supply chain or stop the flawless functioning of military equipment constitutes a security risk for importing countries. They must weigh this carefully against the benefits of access to the world's most sophisticated military industrial base.

Arms transfers have become a major focus of academic research. A main line of this research explores the drivers of, and domestic regulations governing, international arms transfers (Stavrianakis, 2023b; Soubrier, 2023). Scholars seek to establish whether democracy, conflict and humanitarian law affect military transfers. This literature has also examined implementation gaps in arms export controls (Erickson, 2023) and the impacts of these gaps on conflict zones (Stavrianakis, 2017, 2023a). In particular, Erickson (2023) argued that the flexibility of US law and policy on arms export controls fails to ensure that exported arms do not reach conflict zones.

Another strand of this literature has traced the evolution of international norms on arms transfer (Garcia, 2014), including the development of the Arms Trade Treaty (Bolton and James 2014; Bolton *et al*, 2014). While research on the drivers, regulatory gaps and normative shifts in arms transfers has been expanding, progress in these areas has been constrained by the scarcity and secrecy of data. Coicaud and Tahri (2014) singled out limited data available from the US as a particularly significant gap that makes it hard to understand arms flows and undermines the design of security policies.

Against this backdrop, this paper introduces and analyses a new and unique dataset (Bruegel, 2025; hereafter the Bruegel FMS dataset) of all Foreign Military Sales (FMS) notifications since 2008. FMS is a

[1] See, for example, Madeleine K. Albright, 'The Right Balance Will Secure NATO's Future', *Financial Times*, 7 December 1998, https://www.jstor.org/stable/resrep06989.8.

programme that accounts for most of the US military equipment transferred abroad[2]. Our database covers the purchasing country, the specific equipment involved (and quantities when available), financial values, contractors associated with each notification, and associated equipment sold. The dataset complements international arms transfer databases such as SIPRI (2024; Stockholm International Peace Research Institute) as it includes financial values, additional equipment, quantities and contractors for each of the purchases. It also offers expanded time coverage and greater granularity compared to other FMS notification databases, such as the Forum on the Arms Trade[3]. Our dataset can also be used in conjunction with other data to analyse delivery times, delays or price trends.

Overseas military sales are an important source of demand for the US defence industry. Table 1 shows that during 2008-25, the value of US FMS notifications was roughly equivalent to one third of the US's own spending on military equipment. FMS is thus strategically important for the US but it is also clear that the bulk of US military production actually goes to the US armed forces. Table 1 also shows the geographical distribution of US FMS notifications over time[4]. Before Russia's illegal annexation of Crimea, most FMS notifications related to sales to countries in the Near East and South Asia – the overall value of FMS notifications is highest for this region over the period analysed. Since 2014 however, sales to Europe have increased substantially, especially between 2022 and 2025, and Europe is now the main US customer via the FMS programme. East Asia and the Pacific remain significant partners and the third region for US FMS notifications overall. The values of notifications for both the Americas and Africa are relatively low.

Table 1: Total value of FMS notifications and US own spending on military equipment*, $ billions, 2024 prices

Region	2008-2013	2014-2021	2022-2025	Overall
Europe	32	185	190	407
Near East and South Asia	261	264	96	621
East Asia and Pacific	92	152	84	328
Americas	16	20	9	45
Africa	4	19	4	27
All regions	405	640	383	1428
US equipment spending	1518	1945	1042	4504

Source: Bruegel (2025) and NATO. Note: * = total US administration spending on military equipment, including imports. Regional groupings are as per the US Department of Defense.

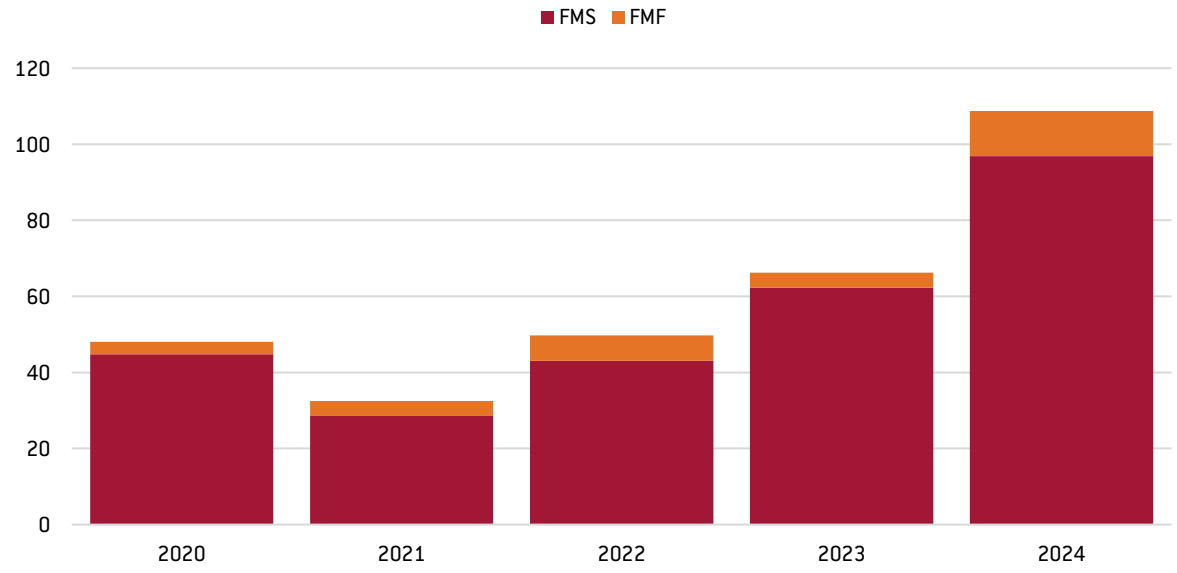
[2] See US Defense Security Cooperation Agency, 'Defense Trade and Arms Transfers, Foreign Military Sales', undated, https://www.dsca.mil/Programs/Defense-Trade-and-Arms-Transfers/Foreign-Military-Sales.
[3] Forum on the Arms Trade, 'Major Arms Sales (via FMS) Notification Tracker', undated, https://www.forumarmstrade.org/major-arms-sales-notifications-tracker.html.
[4] In this paper, we use the geographical categorisation used by the US Department of Defense (https://samm.dsca.mil/table/table-c4t2all), with the exception of Canada which we classify as 'Americas'.

The remainder of this paper is structured as followed. First, we provide an overview of US military equipment exporting tools and FMS more specifically. Second, we explain how our FMS dataset was created, and we conduct a robustness check for the validity of the data. We then analyse the development of total FMS notifications since 2008, both in value and number terms. In the fifth section, we look more closely at the regional composition of military sales, focusing on key regions including Europe, the Near East and South Asia, East Asia and the Pacific. In section six, we study the specific equipment exported, including quantities. We finally conclude with policy considerations.

2 How the US exports military equipment

US exports of military equipment are governed by a set of national security and foreign policy-oriented laws and regulations, including the Foreign Assistance Act (FAA)[5] and the Arms Export Control Act (AECA)[6]. These regulations provide the legal framework for the US administration's arms export programmes including Foreign Military Sales (FMS), Foreign Military Financing (FMF) and Direct Commercial Sales (DCS). The FMS instrument covers most of the US military equipment transferred abroad, in both financial value and strategic importance of the equipment. Values of exports via FMS have increased. Figure 1 shows the value of transferred defence equipment via FMS and FMF, showing that FMS accounts for the bulk of exports.

Figure 1: Total value of transferred defence articles, FMS and FMF, $ billions

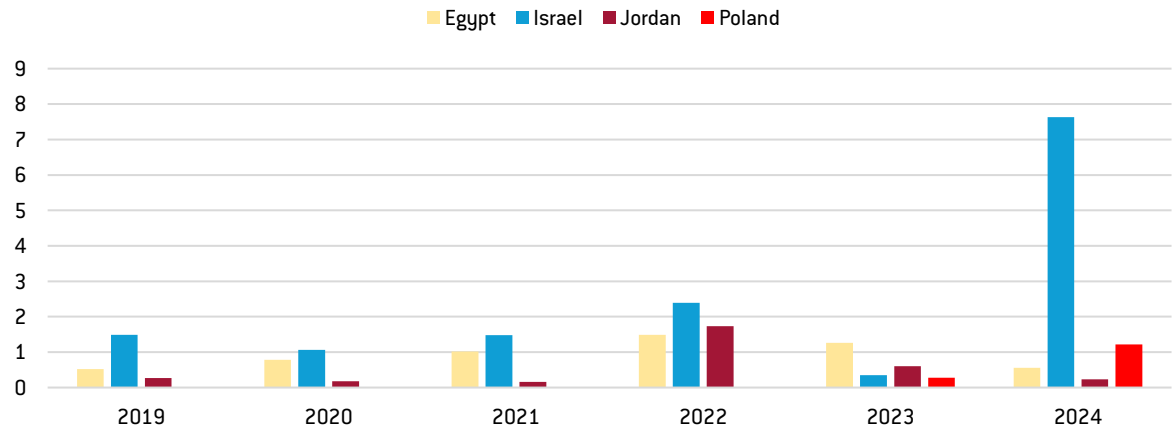


Source: Bruegel based on US State Department. Note: while the US Department of Defense sometimes refers to this data as 'transferred value', it is likely that they actually refer to 'implemented' value, that is the authorised value of FMS agreements for which the foreign government has signed the contract and paid the initial deposit; see DSCA (2019).

[5] 22 U.S. Code § 2304 - Human Rights and Security Assistance (1979), https://www.law.cornell.edu/uscode/text/22/2304.
[6] 22 U.S. Code § 2778 - Control of Arms Exports and Imports (1973), https://www.law.cornell.edu/uscode/text/22/2778.

The FMF is a secondary instrument that finances procurement by of foreign countries of US military equipment. Financing can be provided through grants or loans and can be used in conjunction with the FMS process. While the instrument has been used recently by countries such as Poland, the scope of the FMF has mainly remained non-European. Israel, for example, saw a steep increase in FMF in 2024 in relation to its war in Gaza (Figure 2).

Figure 2: Transferred military equipment or financing via the FMF instrument, selected countries, $ billions

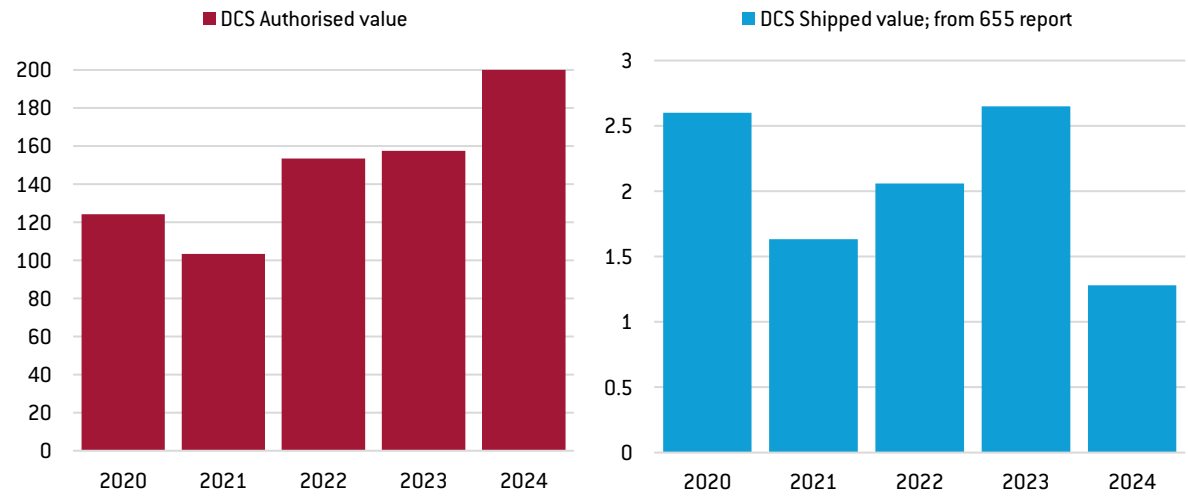


Source: Bruegel based on DSCA (2019, 2020, 2021, 2022, 2023, 2024).

The DCS is the second main US military export programme. Via DCS, foreign governments purchase military equipment directly from US companies, which in turn obtain specific export licenses from the US administration. These licenses are often valid for up to four years and do not need to lead to concluded sales. Comparing FMS and DCS is thus not straightforward and caveats apply. The authorised values of exports under DCS grown remarkably, in relative and absolute terms, reaching more than $200 billion in 2024. The reported data on shipped values under DCS shows however significantly lower amounts, of between $1.25 billion and $2.5 billion annually[7]. Beyond the overall financial amounts, the DCS instrument often involves equipment that, while important, remains less significant than the major equipment purchased via FMS. Examples of equipment authorised for transfer through DCS in recent years include F-35 aircraft engines, F-35 components, Patriot missiles and National Advanced Surface to Air Missile Systems (NASAMS). Figure 3 shows the reported DCS authorised and shipped values, with the latter substantially less than the former.

[7] According to GAO (2010), authorised values cover licenses for services delivered to US forces abroad, but the State Department does not collect data on shipped services, which leads to a large mismatch between authorised and shipped values.

Figure 3: DCS total authorised value (left panel) and DCS shipped values (right panel), $ billions



Source: Bruegel based on US Department of Defense and US Section 655 reports (https://www.state.gov/section-655-annual-military-assistance).

Playing a rather smaller role, Excess of Defense Articles (EDA) is the US instrument for transfer of excess equipment to foreign countries or international organisations, either at reduced prices or as donations, with the purchaser paying shipment and other related costs. The importance of this instrument is limited in terms of financial size and transfer of significant equipment[8].

Finally, there are exceptions to the standard military export processes that might fall outside the instruments detailed above. Specific military programmes, such as the F-35, allow participating countries to procure the aircraft outside the FMS programme. In addition, the emergence of a military conflict requiring rapid US intervention, such as Russia's invasion of Ukraine, can trigger the establishment of specific military assistance instruments, such as the Ukraine Security Assistance Initiative (USAI)[9], which also fall outside the regularly used export instruments.

3 FMS notifications: a new dataset

We focus on FMS as the main US export programme for transfers of major military equipment to foreign governments. The FMS programme consists of government-to-government agreements, with the US administration playing an intermediary role between the foreign government and US contractors. Under this instrument, the foreign government depends on the US administration to negotiate the contract conditions with US defence companies. The FMS instrument is typically used for exports of the most advanced military equipment, including fighter aircraft, autonomous equipment and

[8] See Defense Security Cooperation Agency for a detailed list of the equipment transferred via the EDA; https://www.dsca.mil/Portals/157/Publications/EDA%20Database/EDA%20Database%20-%201993%20to%202023.pdf?ver=jJVsyIy0GEV6zpRxIyItbg%3d%3d.
[9] DSCA, 'Appendix 8 - Ukraine Security Assistance Initiative', https://samm.dsca.mil/program/USAI#USAI.1.

advanced missile systems[10]. Examples of equipment transferred via FMS in recent years include F-35 aircraft, M1A2 Abrams main battle tanks, Patriot systems and missiles, Blackhawk helicopters and the AEGIS Combat System.

Our dataset and empirical analysis focus on FMS notifications by the US administration to the US Congress[11]. To understand the importance of these notifications, it is necessary to understand the basic structure of the process by which foreign governments buy military equipment from the US. After an initial expression of interest by a foreign government to the US administration, the US administration must notify Congress of its intention to sell. Once Congress approves (or does not reject), the US administration can sign the procurement contract with a US contractor and the Letter of Offer and Acceptance (LOA) with the foreign government (see CRS, 2023, for further details). Thus, while a notification does not automatically lead to a sale, it is a legal requirement before the final FMS agreement between the US and the foreign government and should be a good proxy indicator of the final sale. Finally, it is important to note that even approved and signed FMS LOAs can be overturned or postponed by the US administration at any time. This happened, for example, with the delivery of F-16s to Egypt in 2013[12]. It is also possible that a notified sale is ultimately not concluded[13], ie the LOA is not signed.

Our dataset (Bruegel, 2025) is based on a compilation of all 1179 FMS notifications[14] published by the US Department of Defense between 2008 and September 2025. It includes detailed information on the purchasing countries, main equipment items in the purchase and supplementary equipment, quantities when available in the notification, contractors involved and their respective locations, and the overall sales prices. We also provide the data in 2024 prices using the US PPI index. We collected data from the publicly available US Department of Defense website, and include sale timings, geographical and political regions, and a classification of the military domain (land, air, naval or other) to which each sale corresponds.

FMS notifications are often rather large purchases, with bundles of complementary military equipment included in each sale. The annex provides an example of a notification. We used an advanced large

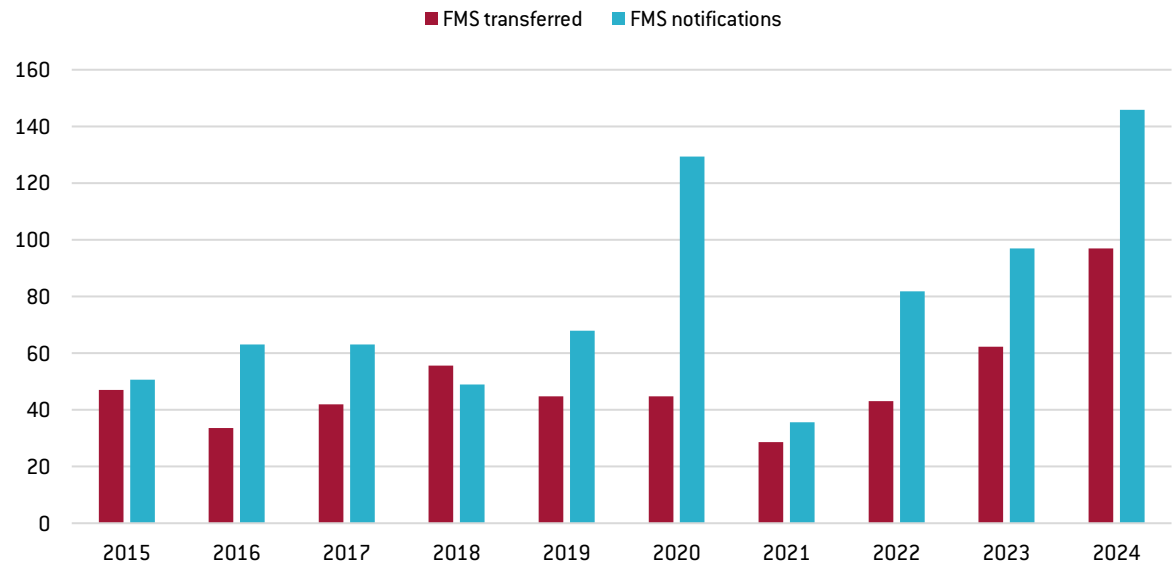
[10] See the DoD Security Assistance Management Manual (https://samm.dsca.mil/) for specific information on geographical restrictions and equipment recommended to be transferred via the FMS.
[11] US rules set notification to the US Congress requirements for FMS sales above certain thresholds. For NATO countries and main allies, the thresholds applied to major defence equipment and any defence articles or service is $25 million and $100 million, respectively.
[12] *Al Jazeera*, 'US delays F-16 fighter jet delivery to Egypt', 25 July 2013, https://www.aljazeera.com/news/2013/7/25/us-delays-f-16-fighter-jet-delivery-to-egypt. Another example, though not within the FMS, was the exclusion of Turkey from the F-35 programme in 2019.
[13] This is the case for Finland's FMS notification in 2020 for the acquisition of F-18s, which has not yet been decided. Another example is for Denmark in 2025, over the acquisition of the Patriot air defence system.
[14] Official reporting from the US administration exists for both FMS and the DCS sales. The latter is sketchier and while statistics by country and year can be obtained via Department of State 655 Reports, it is not possible to disaggregate this by year as data relates to multi-year frameworks and does not match the numbers provided by the Department of State in yearly summary reports. See for instance US Department of State fact sheet of 24 January 2025, 'Fiscal Year 2024 U.S. Arms Transfers and Defense Trade', https://www.state.gov/fiscal-year-2024-u-s-arms-transfers-and-defense-trade.

language model (GPT-4o mini[15]) to read the documentation and classify the various weapons sold into categories, such as 'air-to-air missiles' and 'air-to-ground precision-guided munitions', in line with the taxonomy in the Kiel Procurement Tracker (2025), which we make available in our dataset. This classification task was doubled-checked for 10 percent of all notifications[16]. The full detailed list of all items included in the notification, combined with the respective quantity, is also available.

4 Analysing FMS notifications since 2008

As a robustness check of magnitudes of the data, and of the extent to which notifications translate into later implemented sales for which the LOA has been signed, we compare the yearly value of the FMS notifications with the values of implemented sales since 2015[17]. Figure 4 shows that our FMS notifications database captures the overall magnitude and later trends in actual FMS sales, even though values of actual weapons transferred tend to be somewhat less than values notified. FMS notifications thus typically translate into implemented sales and are therefore a good proxy of US transfers of main military equipment abroad.

Figure 4: FMS notifications and FMS value of implemented sales, current $ billions

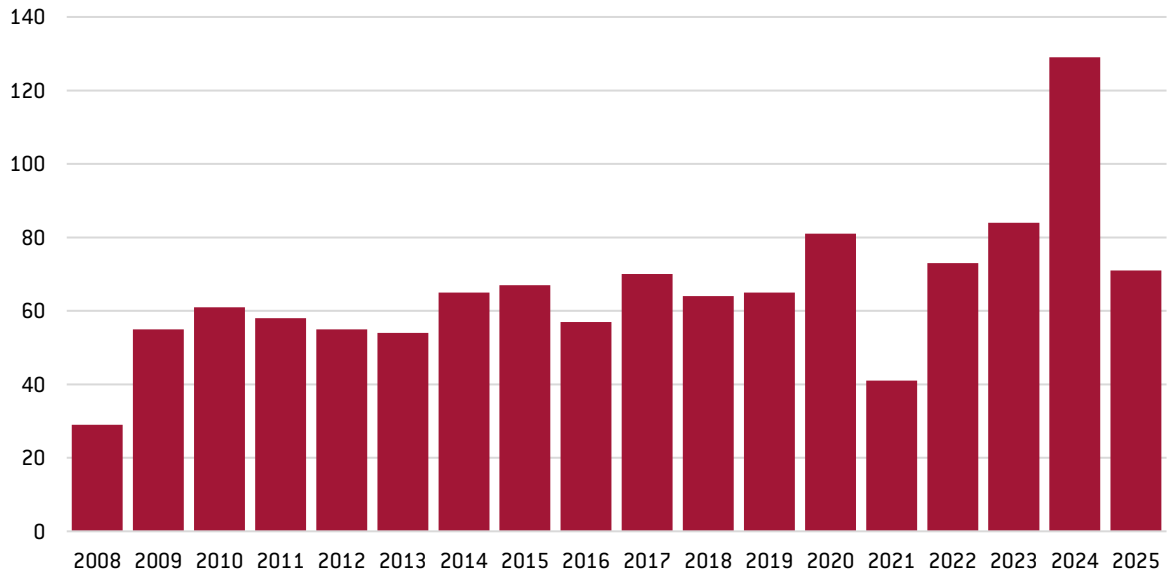


Source: Bruegel (2025).

[15] See OpenAI press release of 18 July 2024, 'GPT-4o mini: advancing cost-efficient intelligence', https://openai.com/index/gpt-4o-mini-advancing-cost-efficient-intelligence/.
[16] In checking the data, we found no errors for the dataset's main variables (country, financial amounts, main equipment). We found errors related to secondary variables in less than 2.5 percent of the checked entries. This included additional equipment or quantities (eg a specific service included in the notification was not added), the military domain (non-specified or wrongly classified when the item could serve different domains and these are not stated in the notification), and specific-item type (eg wrong categorisation chosen).
[17] US Department of Defense reporting started showing this variable in 2015.

Figure 5 shows the numbers of FMS notifications provided by the US government to Congress per year. The number was particularly high in 2024, and the overall number of notifications has increased in the last two decades.

Figure 5: Number of FMS notifications per year



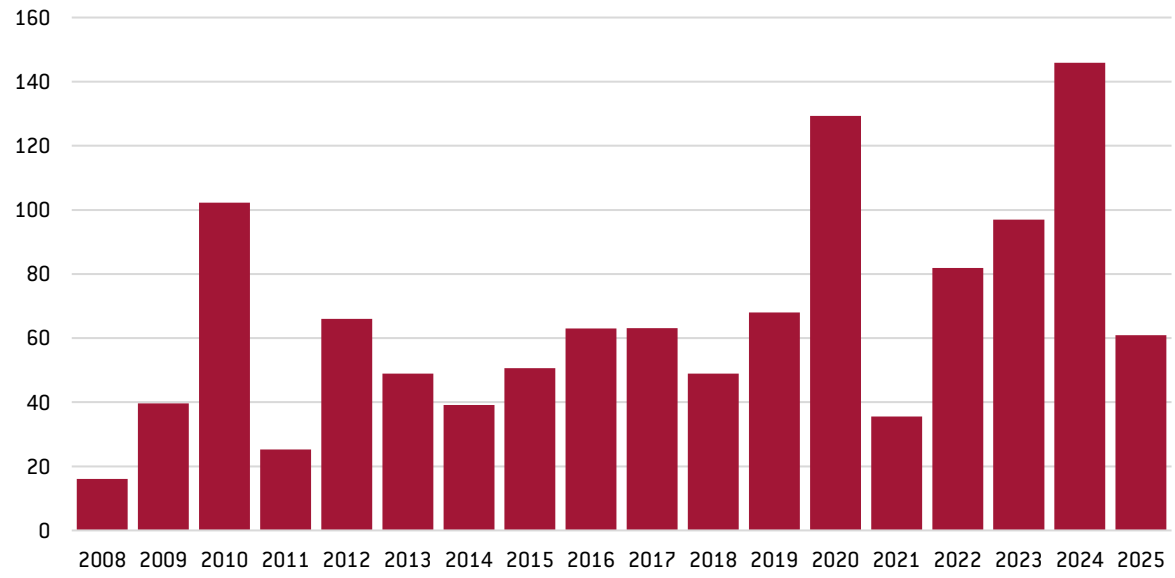
Source: Bruegel (2025). Note: 2025 data covers January-15 September.

4.1 Values of FMS notifications stable in real terms, but 2024 unusually high

Figure 6 captures the development over time of FMS notifications in our dataset in real values using 2024 prices. Except for 2010 (when the value was unusually high because of a significant US arms deals with Saudi Arabia[18]), FMS notifications remained rather stable until 2019. In real monetary values, 2020 then marked a record high: $160 billion compared to an average of $80 billion per year previously (since 2008). The highest number of notifications was then recorded in 2024: 129 versus an average of 65/year.

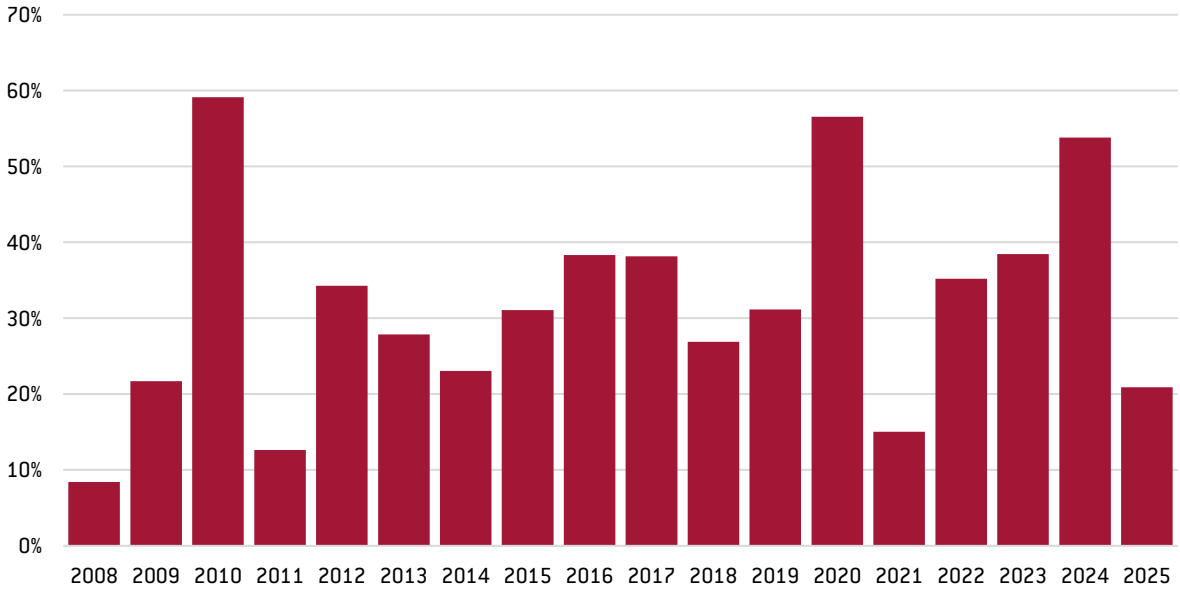
[18] This includes the purchase of F-15 aircraft, different attack and transport helicopters, including AH-64D Apaches and UH-60M Blackhawks, and related equipment, adding up to $77 billion in 2024 prices.

Figure 6: Values of FMS notifications, $ billions, constant 2024 prices



Source: Bruegel (2025). Note: using the US PPI deflator to take account of US inflation. 2025 includes FMS notifications up to 15 September.

Figure 7: Value of FMS notifications as a share of US spending on military equipment



Source: Bruegel (2025) and NATO. Note: 2025 includes FMS notifications up to 15 September.

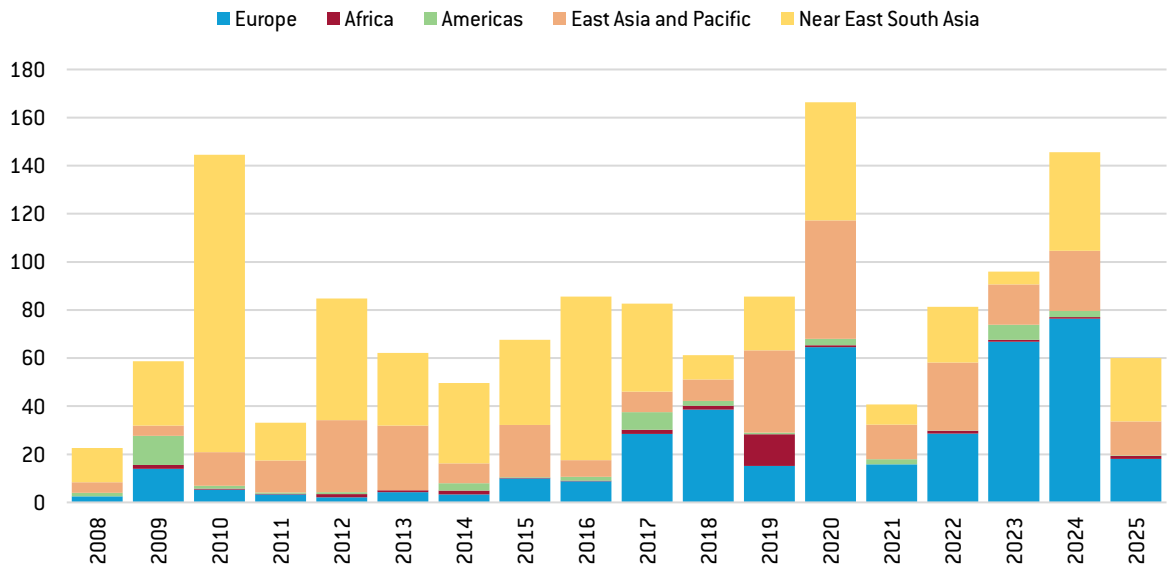
Figure 7 compares the total value of FMS notifications to US spending on military equipment. FMS notifications from 2022 to 2024 were equivalent to 43 percent of US spending on military equipment, up from 34.8 percent from 2019 to 2021. This indicates that military exports via FMS are becoming relatively more important to the US military equipment sector. Since US spending on defence and the share of this spending allocated to equipment have remained stable, changes to FMS notifications

largely explain the variance shown in Figure 7. Indeed, Figure 7 shows a similar trend to the total value of FMS notifications displayed in Figure 6.

4.2 Geographical distribution of the sales

Until 2017, only a small part of FMS notifications related to Europe, reflecting the very limited European spending on defence equipment (Wolff *et al*, 2024). Since 2017, however, Europe has taken up a larger share of FMS sales (Figure 8). The FMS notifications per European country first increased sharply in 2020 because of Finland's and Switzerland's major notifications of F-35s and F-18s. In 2024, this number further increased and marked also a record high in FMS notifications for European customers, reaching $76 billion, four times the European average since 2008. Meanwhile, in both absolute numbers and shares, FMS notifications for countries in the Near East and South Asia have fallen markedly, while those for East Asia and the Pacific region have remained relatively stable.

Figure 8: Value of FMS notifications by destination region, $ billions, 2024 prices



Source: Bruegel (2025).

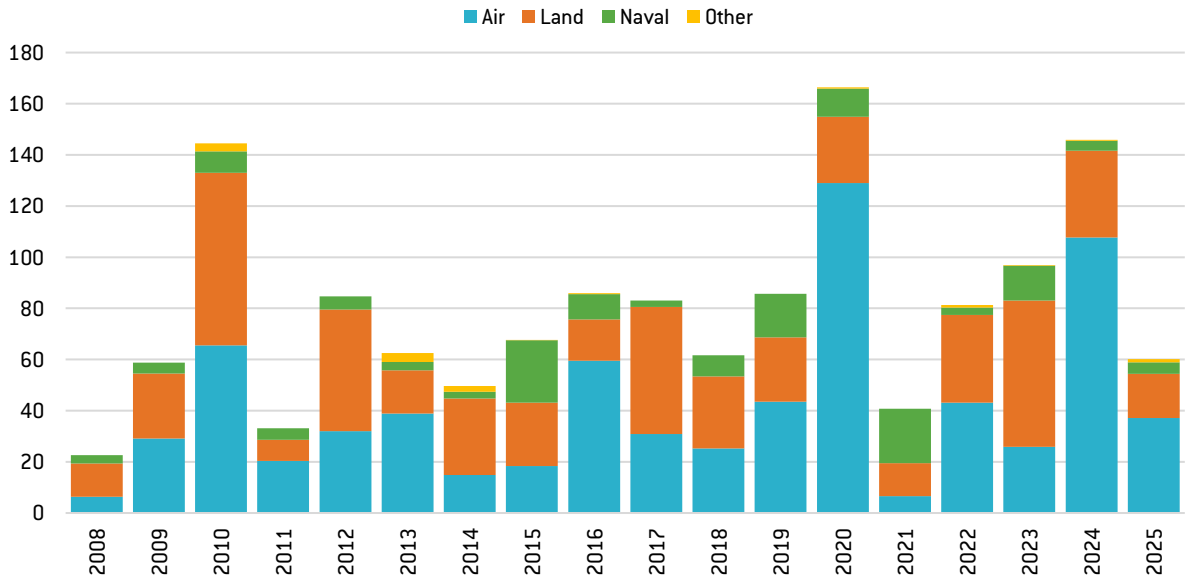
4.3 Air, land and sea forces sales are balanced

The balance of military exports has been relatively stable between land and air forces, with sales notifications related to land forces being slightly higher, and naval forces having a rather smaller role (Figure 9)[19]. Air combat programmes, such as the F-35 and F-18, are also quantitatively very important, with those sales often involving high financial values supported by high values related to equipment and services, including engines, training and weapons associated with the main aircraft. For naval forces, while quantitatively smaller, equipment such as the integrated AEGIS system, used

[19] While development programmes such as AUKUS are not directly covered by the FMS programme, specific components or training can be exported under this instrument.

for example by Spain, Norway and Japan, is a strategic enabler for which US components are crucial. Ships or submarines, however are often built by the national producers, outside the US, as in Spain and Japan, or alternatively by other allied producers, as for Norway.

Figure 9: Value of FMS notifications by military branch, $ billions, 2024 prices



Source: Bruegel (2025).

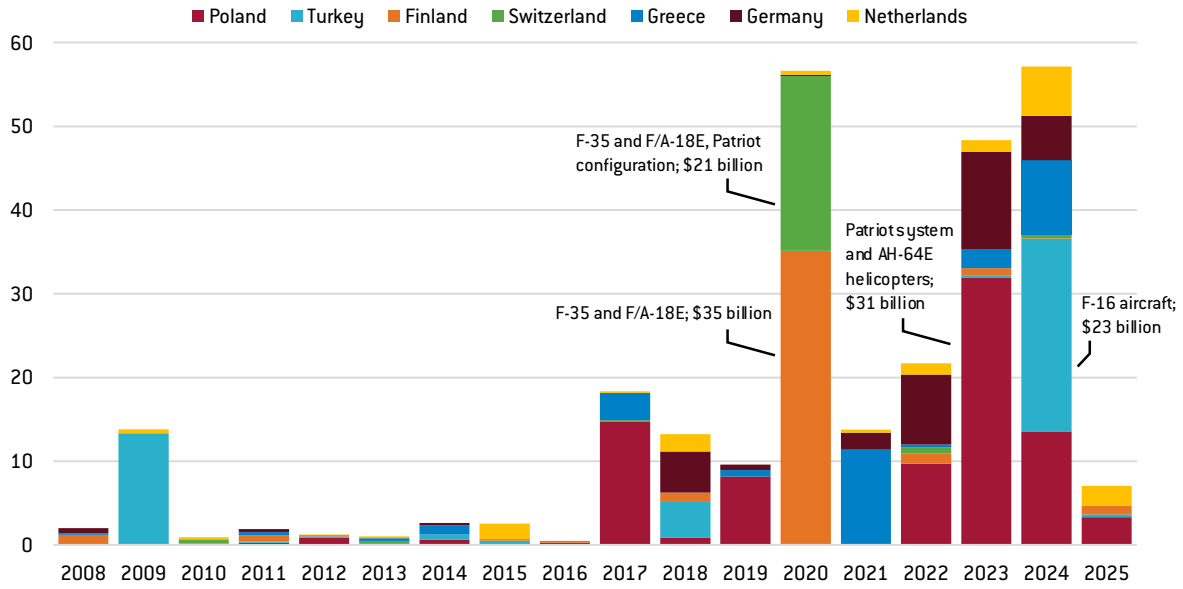
5 Understanding US FMS by region

5.1 Europe

After a decade of very low levels of notifications, dating from the financial crisis, FMS notifications related to Europe have increased considerably. Since 2020, Europe has become the main US customer via FMS. Most of these purchases involve air defence systems and fighter aircraft such as the F-35 and F-16. In addition to the European participants in the F-35 programme (UK, Italy, the Netherlands, Denmark and Norway), Germany, Belgium, Greece, Romania, Switzerland, Finland and Poland have also joined the group of countries using the F-35. Most expect the first deliveries in the coming years.

Poland has become the main European customer, accounting for almost a fourth of the total value of the notifications since 2022. Notifications related to Poland include aircraft, air defence systems and main battle tanks. Other European countries have purchased major amounts of additional weapons bundled with their purchases of fighter aircraft and air defence systems, including air-to-air missiles, surface-to-air missiles and other artillery systems (see section 6 for more details).

Figure 10: Value of FMS notifications, selected European countries, $ billions, 2024 prices



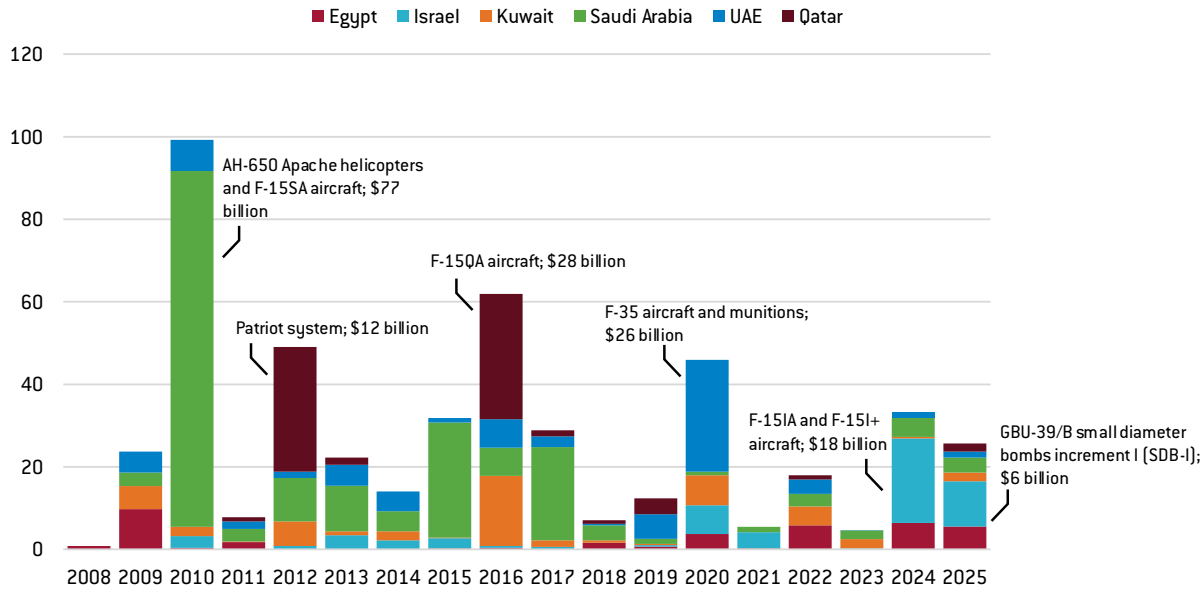
Source: Bruegel (2025).

5.2 Near East and South Asia

US FMS notifications related to the Near East and South Asia are rather unstable over time, but show a significant annual average of $34 billion between 2008 and 2025, and $624 billion for the whole period. Saudi Arabia is the US's main partner in the region, accounting for almost a third of the total value of all notifications, notably with sales in 2010 of equipment including Apache Helicopters and F-15s.

The UAE and Qatar are also significant partners of the US, with about $70 billion in notifications each. For the UAE, the signature of the Abraham Accords in September 2020 was followed by FMS notifications for purchases of F-35s and munitions. This notification is an example of possible risks in terms of predictability of the actual sales. The F-35 notification in 2020 led to a finalised LOA (Embassy of the UAE, 2021), but the deal was suspended by the UAE in 2021, with a series of technical and security considerations given as reasons for the suspension. In 2024 and 2025, with the ongoing war in Gaza, FMS notifications related to Israel stand out, with a value of $32 billion, including the sale of F-15s in 2024 and high volumes of bombs in 2025.

Figure 11: FMS notifications, selected countries in the Near East and South Asia, $ billions, 2024 prices

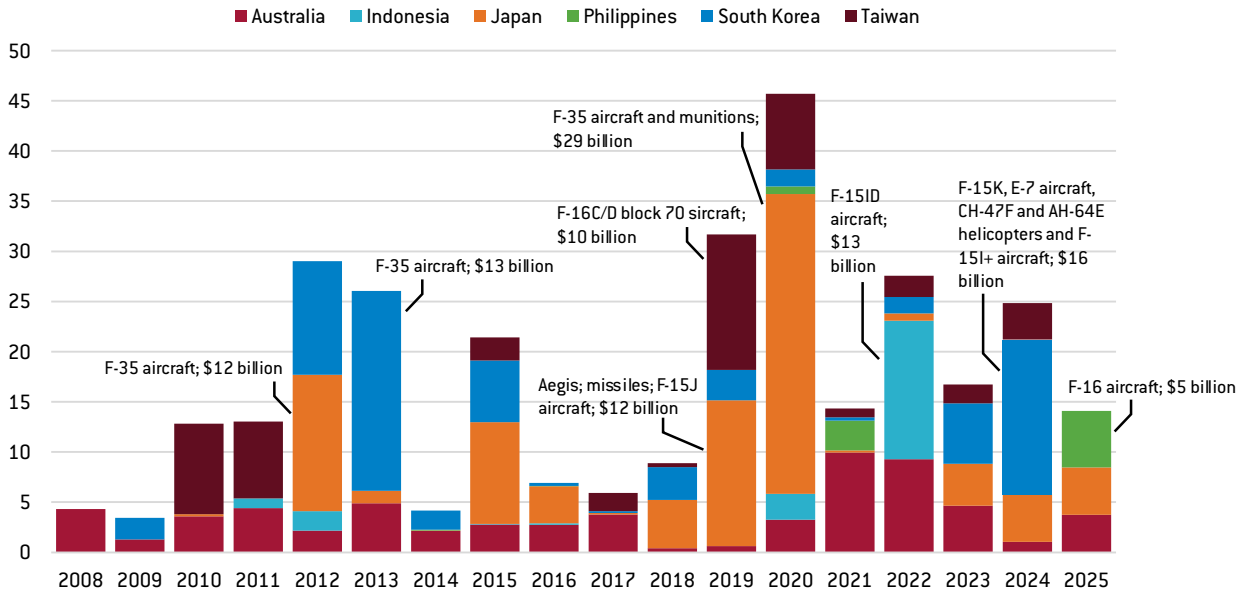


Source: Bruegel (2025).

5.3 East Asia and the Pacific

East Asia and the Pacific is the third ranking region in terms of military imports from the US. The current US administration is substantially modifying the US security strategy, putting more emphasis on defence related to the continental and overseas US, while aiming to push partners in Asia in particular to take a larger role in defence. Security officials argue that the focus for US security needs to be put on Asia (see for example Colby, 2021). The US administration's encouragement of Taiwan and nations such as the Philippines to increase their military capabilities makes the analysis of this region particularly interesting. Consequently, we would expect US FMS notifications related to the region to increase, while deployment of US troops to the region could fall.

Figure 12: Value of FMS notifications, selected East Asia and Pacific countries, $ billions, 2024 prices



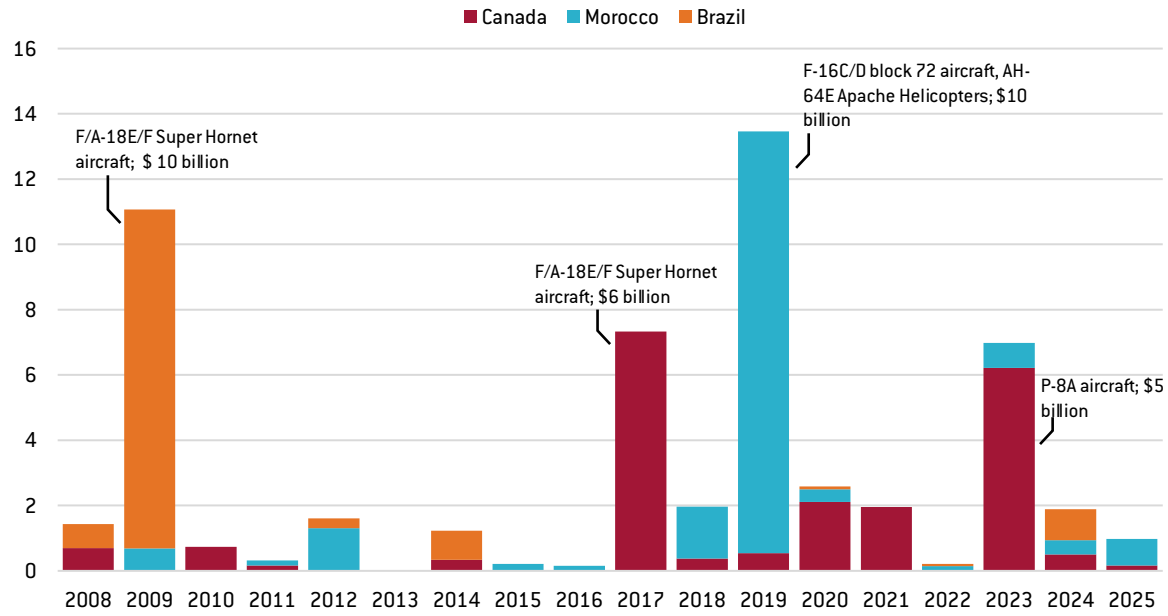
Source: Bruegel (2025).

Figure 12 confirms some shifts in FMS but so far no massive change. Overall FMS notifications relating to the region have not yet increased. The Philippines has, however, become a major client. Japan has been consistently among the main US customers in the Asia-Pacific, accounting to almost a third of the value of notifications. South Korea and Australia were the second and third largest customers, but sales to South Korea seem to have declined in 2025. In terms of equipment, sales of fighter aircraft, including the F-35, F-16 and F-15 continue to represent the highest financial values. Other sales do however cover significant equipment such as the AEGIS combat system, key for naval combat, to Australia, South Korea and Japan. Finally, FMS notifications related to India remain small compared to the regional partners.

5.4 Americas and Africa

Finally, the American and African regions account for the lowest shares of FMS notifications. Canada has often been the main partner, while Brazil or Morocco account for other significant purchases. A notification of 2019 related to the sale of aircraft and attack helicopters to Morocco was later followed by the establishment of diplomatic relations between Morocco and Israel after the Abraham Accords. Canada's possible acquisition of F-35s in the coming years would also represent major spending for the US industrial base, but such a purchase would be made outside the FMS programme as Canada is part of the F-35 programme.

Figure 13: Value of FMS notifications, selected countries in the Americas and Africa, $ billions, 2024 prices



Source: Bruegel (2025).

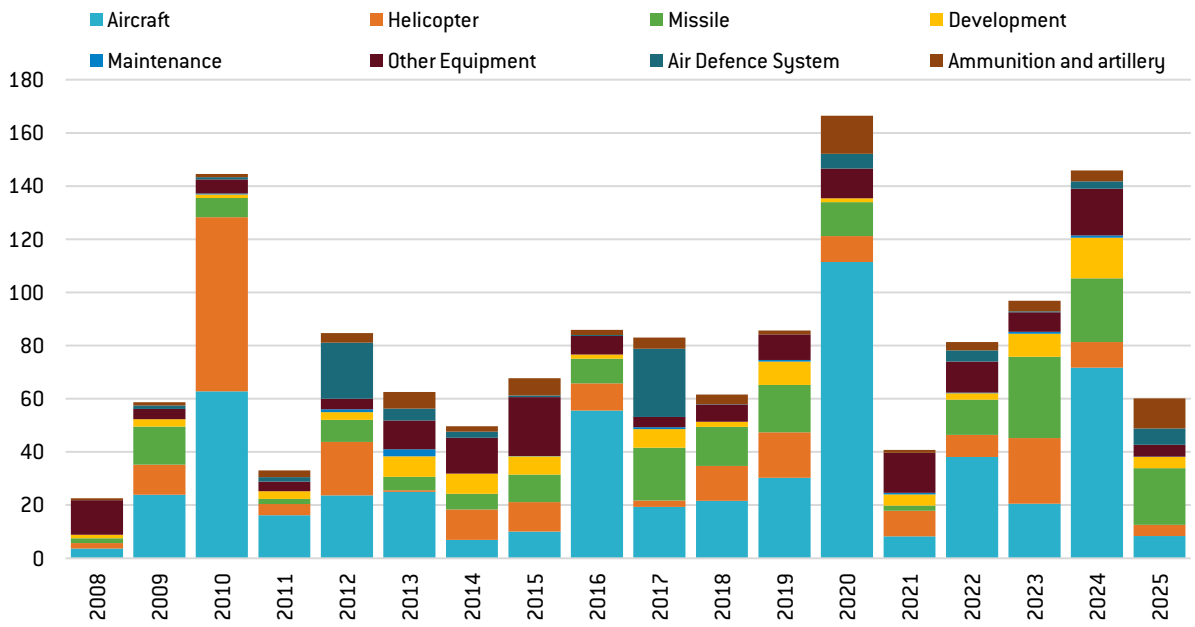
6 Details of specific system sales

Our FMS dataset offers detailed information on the equipment being sold under each notification. This includes the main equipment specified in each notification, and the various additional items that are also part of the sale. This section explores how types of equipment and the highest-value products have varied across regions and over time. Finally, it details how notifications include additional items that are often employed as part of the operation of the main equipment.

6.1 Type of equipment by region

Figure 14 shows FMS notifications by the general equipment type covered, over the full span of the dataset (2008-2025). Aircraft, helicopters and air defence systems are the highest-value types of equipment sold under FMS. We grouped the remaining general item types into broader categories to represent them here. For instance, 'missiles' includes missiles employed in all domains and various platforms. 'Development', which became a major category in 2024, encompasses upgrading of several types of equipment.

Figure 14: Value of FMS notifications by type, $ billions, 2024 prices

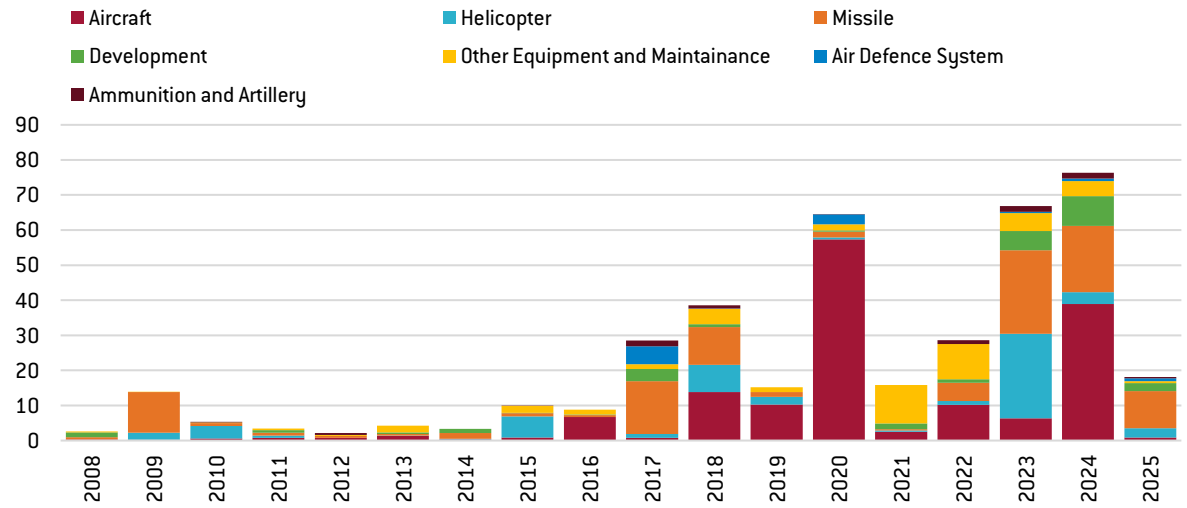


Source: Bruegel (2025). Note: other equipment includes armoured vehicles, drones, infantry, tanks, naval and other types of equipment.

Figure 15 shows that prior to 2017, there were no major sales of air defence systems or artillery to European countries. Instead, the low levels of FMS notifications were split between missiles and the development of current equipment. Figure 15 shows a marked change in 2017, with the sale of Patriot air defence systems to Romania and Poland. There has also been an increase in the value of notifications for aircraft, which in 2020 accounted for $57.22 billion, mostly related to notified sales of F-35s and F/A-18E/F Super Hornet aircraft to Switzerland and Finland[20]. Notably, 'development' became the largest category by value in 2024, with most of the spending on development going to the modernisation of existing aircraft, such as a mid-life upgrade of Polish F-16s in 2024.

[20] In the Finnish case, the F-18 notification has not been concluded.

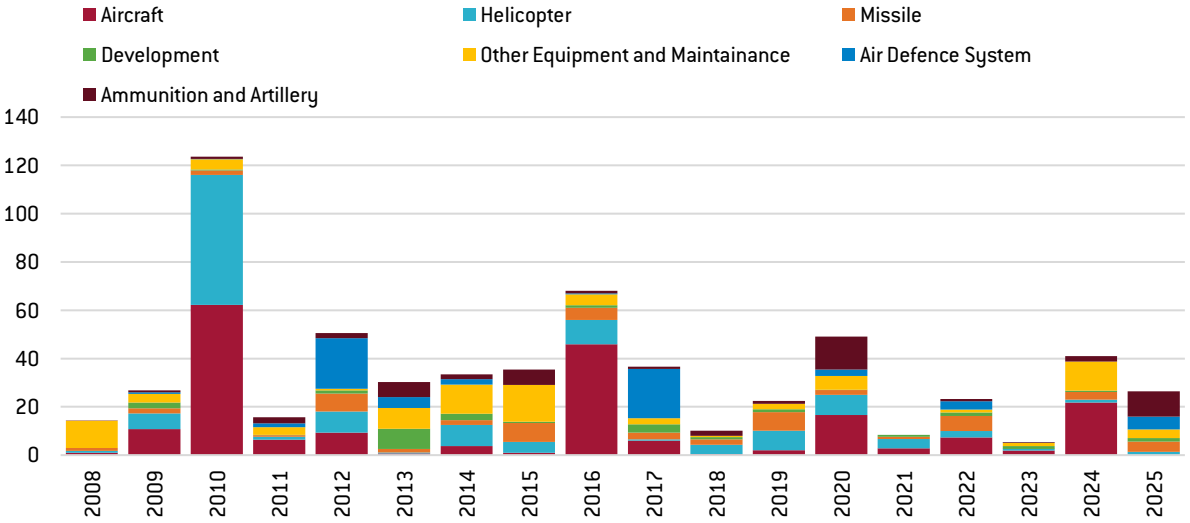
Figure 15: Value of FMS notifications related to Europe by type, $ billions, 2024 prices



Source: Bruegel (2025).

Figure 16 displays how the 2010 peak in the value of notifications related to the Near East and South Asia was mainly due to sales of helicopters and aircraft. This included the purchase of 84 F-15SA aircraft and 36 Apache helicopters by Saudi Arabia. In other years, the distribution of notifications is more balanced and includes other categories, such as air defence systems. Qatar purchased air defence systems worth $21 billion in 2012, and Saudi Arabia purchased systems worth $20 billion in 2017. These purchases account for most of the acquisitions of air defence systems over the covered period.

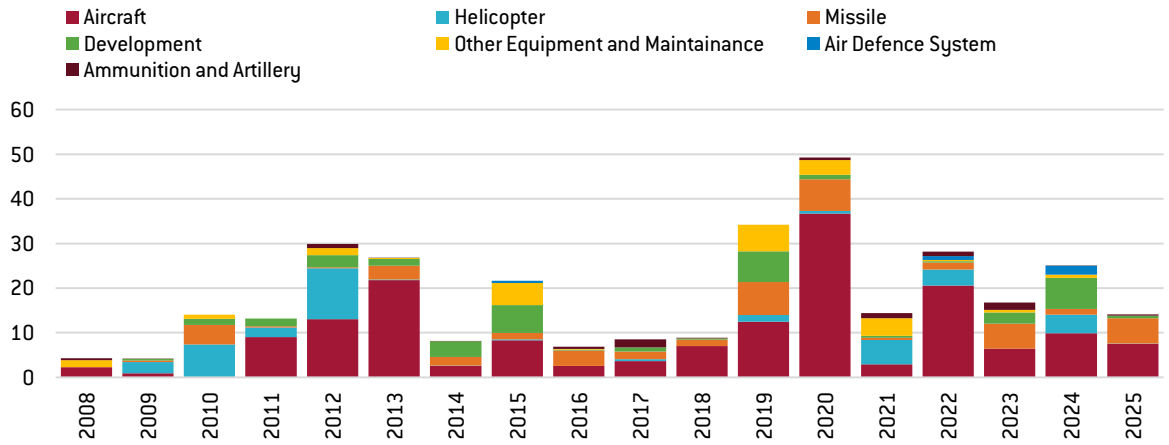
Figure 16: Value of FMS notifications related to the Near East and South Asia by type, $ billions, 2024 prices



Source: Bruegel (2025).

Among notifications of sales to East Asia and the Pacific, aircraft also stand out as the main type of equipment by value. Figure 17 shows the composition of notifications related to this region by the type of main equipment. Japan's acquisition of F-35 aircraft in 2020 accounted for most notifications of aircraft sales, with additional contributions from purchases by South Korea and Indonesia of fighter aircraft.

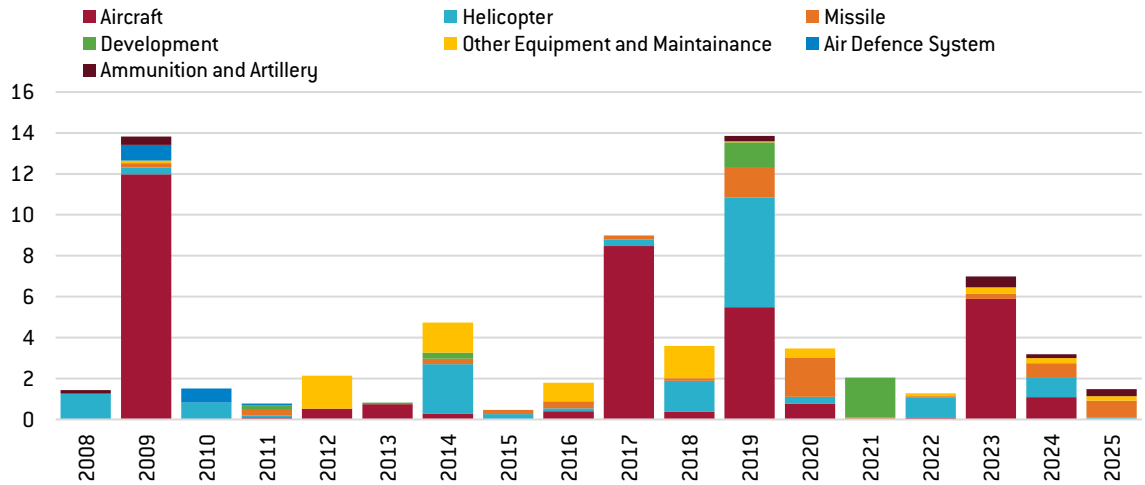
Figure 17: Value of FMS notifications related to East Asia and Pacific by type, $ billions, 2024 prices



Source: Bruegel (2025).

A few large purchases of aircraft and helicopters account for most of the total value of notifications related to Africa and the Americas. Of the $12 billion worth of aircraft notifications to the region in 2009, $10 billion related to the sale of 36 Super Hornet aircraft to Brazil. In the following years, higher notification values resulted from major acquisitions, including Canada's $7 billion purchase of 18 Super Hornet aircraft in 2017, and Morocco's $5 billion acquisition of 36 Apache attack helicopters.

Figure 18: Value of FMS notifications related to Africa and the Americas by type, $ billions, 2024 prices



Source: Bruegel (2025).

6.2 Geographical distribution of sales of high-value equipment

Our dataset also contains the specific equipment that has been proposed for sale in each notification. This detailed level of data allows us to capture how the composition of high-value equipment has changed over time. In this subsection, we aggregate the notification value in millions of dollars and 2024 prices at the level of the specific item type, so that we have the total notification value of each item type. This allows us to identify the ten highest-value item types sold to each region. We plot these in word clouds (Figures 19-22), to illustrate changes in the high-value types of equipment sold across regions and over time. In Figures A2–A5 in the annexes, we provide the same analysis based on name of the main equipment from the notification, instead of the item type.

Figure 19: High-value type of equipment by region (2008-2025)

Source: Bruegel. Note: the largest item in the figure is the type of equipment with the highest notification value sold to that region, and the colour refers to the military domain to which each item type corresponds.

Over the entire period of our dataset, aircraft sales have dominated high-value FMS notifications. Figure 19 shows that aircraft are the highest value item types sold to all four regions. In our dataset, F-35s, F-16s and F-15s were most frequently sold to Europe, followed by East Asia. Various F-15 models are the high-value items mostly sold to the Near East and South Asia, while the Americas and Africa have focused on P-8A aircraft.

Figure 20: High-value type of equipment by region (2008-2013)

Source: Bruegel. Note: the largest item in the figure is the type of equipment with the highest notification value sold to that region, and the colour refers to the military domain to which each item type corresponds.

Figure 20 shows the preponderance of aircraft and helicopter sales across all four regions from 2008 to 2013. Our dataset indicates that F-16s were frequently sold to Europe, while the Near East and South Asia favoured the purchase of F-15s in this period. In both regions, FMS notifications for high-value equipment were dominated by aircraft and helicopters used to conduct operations in different domains. There were also notable sales of air defence systems and missiles to equip these systems in all regions.

Figure 21: High-value type of equipment by region (2014-2021)

Source: Bruegel. Note: the largest item in the figure is the type of equipment with the highest notification value sold to that region, and the colour refers to the military domain to which each item type corresponds.

Figure 21 shows the period from the Russian annexation of Crimea in 2014 to 2021. European countries including Poland and Romania purchased the Patriot air defence system. Nevertheless, aircraft remained the financially most important equipment sold to Europe (Figure 21). The United Kingdom, Germany, and Norway mainly purchased the P-8A model, which accounted for most aircraft sales to the region. Countries in East Asia still prioritised helicopters and aircraft, predominantly purchasing F-35s and F-15s. Figure 21 indicates that sales of high-value equipment to the Americas and Africa were more varied in their domains during this period than in the previous period. This included the proposed sale of 182 Abrams tanks for land operations to Morocco in 2018, and Canada's 2021 purchase of the naval AEGIS combat system.

Figure 22: High-value type of equipment by region (2022-2025)

Source: Bruegel. Note: the largest item in the figure is the type of equipment with the highest notification value sold to that region, and the colour refers to the military domain to which each item type corresponds.

Figure 22 suggests that since Russia's full invasion of Ukraine in 2022, European countries have prioritised fighter aircraft. Indeed, our dataset shows that this was driven by the acquisition of F-16s and F-35s, with notified sales to Germany, Czechia, Greece, Romania and Poland. Aircraft and helicopters are followed in importance by air defence systems and the equipment installed in them. Notably, tanks and their ammunition entered the top ten high-value items in Europe for the first time during this period, because of the proposed sale of 54 Abrams tanks to Romania. In East Asia, purchases of high-value equipment remained consistently focused on aircraft, with a secondary role for missiles. Figure 21 shows no equipment for naval operations among the highest-value equipment. Unlike the previous period, countries seemed to return to focus on readiness for land and air operations.

6.3 Additional equipment

In addition to main equipment purchases, FMS notifications also list various other items included in sales. These can be complementary products, such as weapons to mount on aircraft and spare parts, or the provision of services, such as technical and logistical assistance. Occasionally, the additional equipment in a notification may be unconnected to the main equipment, corresponding instead to another system. The FMS dataset records the name of this additional equipment and its quantity, when reported in the notification.

Table 2: F-35 fighter aircraft, FMS notifications, 2017-2025

Country	$ billions	Quantity	Additional equipment (quantity)	Years
Belgium	8.23	34	F-135 engines (38), logistics and programme support, other (20)	2018
Poland	8.19	32	F-135 engines (33), logistics and programme support, other (18)	2019
Singapore	3.54	12	F-135 engines (13), logistics and programme support, other (18)	2020
Switzerland	8.47	40	F-135 engines (66), missiles (96), bombs (36), other (18)	2020
Finland	16.08	64	F-135 engines (66), missiles (482), bombs (808), other (581)	2020
UAE	13.38	50	F-135 engines (54), logistics and programme support, other (18)	2020
Germany	8.35	35	F-135 engines (37), missiles (285), bombs (806), other (351)	2022
Czechia	5.62	24	F-135 engines (25), missiles (148), bombs (88), other (39)	2023
Greece	8.6	40	F-135 engines (42), logistics and programme support, other (22)	2024

Source: Bruegel. Note: main associated contractors for F-35 fighter aircraft: Lockheed Martin, Pratt & Whitney, Boeing, Raytheon.

Table 2 summarises notification-level data for the sales of F-35s. All sales include missiles to equip the aircraft and at least one spare Pratt and Whitney F-135 engine. Some involve a large amount of additional equipment, such as the sales of F-35s to Finland, which included 482 missiles and 808 bombs, among multiple other items. Likewise, the purchase of F-35s by Switzerland in 2020 included 96 Sidewinder AIM-9X Block Missiles and 36 bombs. The sales of F-35s also include services, such as software development, and logistical and technical support from both the contractor and the US administration.

Table 3: FMS notifications for Patriot air defence systems (2017-2025)

Country	$ billions	Quantity	Additional equipment (quantity)	Years
Romania	5.45	8	Launch stations (29), missiles (224), power plants (8), other (37)	2017, 2025
Poland	13.82	4	Launch stations (16), missiles (219), power plants (11), other (53)	2017
Sweden	4.03	4	Launch stations (12), missiles (300), power plants (4), other (29)	2018
Bahrain	3.12	4	Launch stations (9), missiles (96), power plants (3), other (19)	2019
Switzerland	2.83	5	Launch stations (17), missiles (70), power plants (5), other (3)	2020
Spain	2.80	4	Launch stations (24), missiles (52), power plants (4), other (32)	2023

Source: Bruegel. Note: main associated contractors in Patriot air defence systems: Lockheed Martin, Raytheon, Northrop Grumman.

Sales of Patriot air defence systems include a more consistent set of items than sales of F-35s. Table 3 shows that notifications related to Patriot systems contain multiple missiles employed in air defence, and launch stations used to fire those missiles. In most cases, missiles sold with this system are Patriot Advanced Capability-3 (PAC-3) missiles. These notifications also tend to include radar sets and power plants (large self-sufficient electrical generators).

Table 4: FMS notifications for Patriot Advanced Capability missiles (2017-2025)

	$ billions	Quantity	Additional equipment (quantity)	Years
Germany	5.51	650	Fly-to-buy missiles (10), spare and repair parts, round trainers, launch stations, technical assistance, other (28)	2019, 2024
Kuwait	1.18	84	Launch stations (20), round trainers (52), power plants (10), radars (4), control stations, and centrals (6), other (19)	2020, 2023
Netherlands	0.31	34	Round trainers (14), spare parts, repair services, other (4)	2020
South Korea	0.63	64	Test missiles (2), training equipment, spare part, other (5)	2018
Switzerland	0.70	72	Round trainers, spare parts, quality assurance, other (16)	2022
Taiwan	2.39	114	Lauch stations (26), antenna mast groups (5), engagement control stations (5), tactical command station, other (41)	2010
UAE	3.44	452	Spare and repair parts, training, technical support, other (7)	2019

Source: Bruegel. Note: main associated contractors in Patriot Advanced Capabilities Missiles: Lockheed Martin, Raytheon.

While sales of F-35s and air defence systems involve the same bundles of additional equipment, other equipment is less consistent in terms of the additional items supplied. While sales of Patriot missiles often include technical support, training and equipment for training, they are sold with a less-consistent bundle of additional items. Table 4 shows, for example, that the sale to Kuwait included a large bundle of additional items, but its composition was significantly different to the sale of missiles to Taiwan. Sales of Patriot missiles may also be accompanied by additional equipment, such as the sale to the UAE, which included training services and training equipment, but no launch stations or other ancillary military equipment.

7 Conclusions

The US is the world's biggest exporter of military equipment. Considering increasing global geopolitical tensions and conflicts, understanding US transfers of military equipment is of paramount importance. This paper and the Bruegel FMS dataset (Bruegel, 2025) offer a valuable resource for academics and policymakers to analyse the global reach of US military equipment.

We focus on the FMS programme as it is the most significant instrument, both in financial terms and in terms of the strategic value of the equipment transferred. FMS notifications related to Europe have grown considerably since 2020, and Europe has become the main US partner purchasing equipment via the FMS programme. The Near East and South Asia is the second main region for US FMS programme sales, followed by Asia and the Pacific.

In terms of equipment, sales related to military aircraft, helicopters and their respective development and sustainment, account for most of the value of FMS notifications. This includes the associated equipment bundled with the purchases, including advanced software, missiles, bombs and additional services. The breadth of the additional items included in proposed sales underscores the importance of US military transfers for the development and maintenance of military equipment across the globe.

The high level of disaggregation of our dataset means aspects such as equipment prices and market concentration across the main contractors can be analysed. The dataset can also be used in conjunction with other databases to understand the length of the FMS process, delays and final quantities agreed. Researchers could use this dataset to test theories on the drivers of arms transfers, evaluate the effectiveness of US export controls, and examine whether global norms influence arms transfers. Because this data identifies specific equipment, researchers can also trace the flows of weapons to conflict zones around the globe. We leave these aspects for further research.

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Annex

Figure A1: Example of an FMS notification for sale to Finland

Defense Security Cooperation Agency

NEWS RELEASE

On the web: http://www.dsca.mil

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pm-cpa@state.gov

Transmittal No. 20-66

Finland – F-35 Joint Strike Fighter Aircraft with Air-to-Air Missiles and Air-to-Ground Precision Guided Munitions

WASHINGTON, October 9, 2020 - The State Department has made a determination approving a possible Foreign Military Sale to the Government of Finland of F-35 Joint Strike Fighter aircraft with air-to-air missiles and air-to-ground precision guided munitions and related equipment for an estimated cost of $12.5 billion. The Defense Security Cooperation Agency delivered the required certification notifying Congress of this possible sale today.

The Government of Finland has requested to buy sixty-four (64) F-35 Joint Strike Fighter CTOL aircraft; sixty-six (66) Pratt & Whitney F-135 engines (64 installed and 2 spares); five hundred (500) GBU-53/B Small Diameter Bomb II (SDB II) All-Up Round (AUR); twelve (12) GBU-53/B SDB II Guided Test Vehicles (GTV); twelve (12) GBU-53/B SDB II Captive Carry Vehicles (CCV); one hundred fifty (150) Sidewinder AIM-9X Block II+ (Plus) Tactical Missiles; thirty-two (32) Sidewinder AIM-9X Block II+ (Plus) Captive Air Training Missiles (CATMs); thirty (30) AIM-9X Block II+ (Plus) Sidewinder Tactical Guidance Units; eight (8) AIM-9X Block II Sidewinder CATM Guidance Units; one hundred (100) AGM-154C-1 Joint Stand Off Weapon (JSOW-C1) Tactical Missiles; two hundred (200) Joint Air-to-Surface Standoff Missile-Extended Range (JASSM-ER) AGM-158B-2 Missiles; two (2) AGM-158B-2 JASSM-ER Separation Test Vehicles; two (2) AGM-158B-2 JASSM-ER Instrumented Test Vehicles; two (2) AGM-158B-2 JASSM-ER Jettison Test Vehicles; two (2) AGM-158B-2 Inert JASSM w/Intelligent Telemetry Instrumentation Kits; two (2) AGM-158 Dummy Air Training Missiles; one hundred twenty (120) KMU-556 JDAM Guidance Kits for GBU-31; three hundred (300) FMU-139D/B Fuzes; two (2) KMU-556(D-2)/B Trainer JDAM Guidance Kits for GBU-31; thirty (30) KMU-557 JDAM Guidance Kits for GBU-31; one hundred fifty (150) KMU-572 JDAM Guidance Kits for GBU-38/54; one hundred twenty (120) BLU-117, General Purpose Bombs; thirty-two (32) BLU-109, General Purpose Bomb; one hundred fifty (150) BLU-111, General Purpose Bomb; six (6) MK-82, Inert Bomb; one (1) FMU-139D/B (D-1) Inert Fuze. Also included are Electronic Warfare Systems; Command, Control, Communications, Computer and Intelligence/Communications, Navigational, and Identification (C4I/CNI); Autonomic Logistics Global Support System (ALGS); Operational Data Integrated Network (ODIN); Air System Training Devices; Weapons Employment Capability and other Subsystems, Features, and Capabilities; F-35 unique infrared flares; reprogramming center access; F-35 Performance Based Logistics; software development/integration; aircraft ferry and tanker support; Detector Laser DSU-38A/B, Detector Laser DSU-38A(D-2)/B, KMU-572(D-2)/B Trainer (JDAM), 40 inch Wing Release Lanyard; GBU-53/B SDB II Weapon Load Crew Trainers (WLCT); GBU-53/B SDB II Practical Explosive Ordnance Disposal System Trainers (PEST); AGM-154C-1 JSOW Captive Flight Vehicles; AGM-154C-1 JSOW Dummy Air Training Missiles; AGM-154C-1 JSOW mission planning, integration support and testing, munitions storage security and training, weapon operational flight program software development; integration of the Joint Strike Missile; weapons containers; aircraft and munitions support and

test equipment; communications equipment; provisioning, spares and repair parts; weapons repair and return support; personnel training and training equipment; weapon systems software, publications and technical documents; U.S. Government and contractor engineering, technical, and logistics support services; and other related elements of logistical and program support. The total estimated cost is $12.5 billion.

This proposed sale will support the foreign policy and national security of the United States by improving the security of a trusted partner which is an important force for political stability and economic progress in Europe. It is vital to the U.S. national interest to assist Finland in developing and maintaining a strong and ready self-defense capability.

The proposed sale of F-35s and associated missiles and munitions will provide Finland with a credible defense capability to deter aggression in the region and ensure interoperability with U.S. forces. The proposed sale will replace Finland's retiring F/A-18s and enhance its air-to-air and air-to-ground self-defense capability. Finland will have no difficulty absorbing these aircraft into its armed forces.

The proposed sale of this equipment and support will not alter the basic military balance in the region.

The prime contractors will be Lockheed Martin Aeronautics Company, Fort Worth, TX; Pratt & Whitney Military Engines, East Hartford, CT; The Boeing Company, St. Charles, MO; and Raytheon Missiles and Defense, Tucson, AZ. This proposal is being offered in the context of a competition. If the proposal is accepted, it is expected that offset agreements will be required. Any offset agreement will be defined in negotiations between the purchaser and the contractor(s).

Implementation of this proposed sale will require multiple trips to Finland involving U.S. Government and contractor representatives for technical reviews/support, program management and training over the life of the program. U.S. contractor representatives will be required in Finland to conduct Contractor Engineering Technical Services (CETS) and Autonomic Logistics and Global Support (ALGS) for after-aircraft delivery.

There will be no adverse impact on U.S. defense readiness as a result of this proposed sale.

This notice of a potential sale is required by law. The description and dollar value is for the highest estimated quantity and dollar value based on initial requirements. Actual dollar value is expected to be lower depending on final requirements, budget authority, and signed sales agreement(s), if and when concluded.

All questions regarding this proposed Foreign Military Sale should be directed to the State Department's Bureau of Political Military Affairs, Office of Congressional and Public Affairs, pm-cpa@state.gov.

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Annex 2

Table A1: LLM prompts

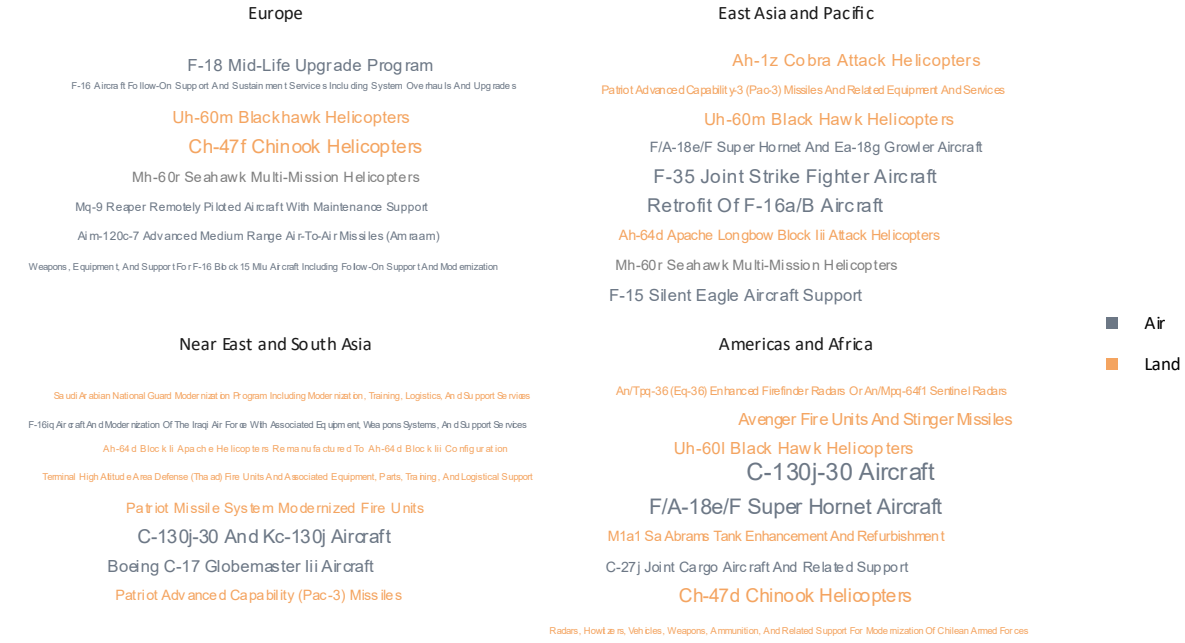
Variable	Prompt
Country	From the following contract, extract only the country involved in the sale. Do not add other information. If the contract is directed to an international organization then extract the international organization.
Financial value	From the following contract, extract only the total financial value of the sale. - Convert to USD billion and extract only the unit (e.g., "USD 3.5 billion" → "3.5"). - If no amount is found, write "Not specified". - Answer with just the value, do not add introductory sentences.
Main equipment	From the following contract, extract ONLY the main product involved in the purchase (e.g., F-35 aircraft). If it refers to a refurbishment, maintenance, modernisation or a similar service applied the main product include this information as well. If missing, write "Not specified". Do not add the quantity of the product. Do not add introductory sentences.
Additional equipment	From the following contract, extract ONLY the additional equipment and various services. Return the additional equipment and services with differnet lines for each equipment in the format: i) <equipment> ii) <equipment> iii) <service> ... Do not add introductory sentences. Do not include the quantities for the equipment. If missing, write "Not specified".
Quantities	From the following contract, extract quantities of equipment and services in the format <equipment>: <quantity>. If missing, write "Not specified". Return only these extracted quantities as specified and with differnet lines for each equipment in the format: i) <equipment>: <quantity> ii) <equipment>: <quantity> iii) <service>: <quantity> ... Do not add introductory sentences.
Military domain	From the following contract, classify the main equipment according to the military domain it serves. Return EXACTLY ONE label from this closed set: {domain_list}. Definitions (service/mission-centric): - Land: Ground forces equipment and systems supporting land operations (tanks, IFVs, howitzers, GBAD batteries, ground radars, soldier comms). Include rotary-wing aircraft primarily used to insert/extract or support ground troops (transport helicopters/utility helicopters/attack helicopters). - Naval: Surface/subsurface vessels and shipborne systems; coastal defense units against maritime targets; naval sensors/weapons/CMS. Integrated naval defence systems. Include helicopters specifically serving the naval forces.

	- Air: Fixed-wing aircraft, UAVs/UCAVs, airborne sensors/pods and air-launched weapons used primarily for air domain missions. (Exclude rotary-wing used mainly for land troop transport/attack—classify those as Land, include those serving the air force (e.g., utility helicopters for the air force)) Tie-break rules: - Air defense: ground-based batteries → Land; airborne sensors/pods → Air; shipborne air defenses → Naval. - Anti-ship missiles: ship/sub-launched → Naval; coastal batteries → Naval; air-launched → Air. - ISR/C4ISR: classify by deployment domain (airborne radar → Air; ship CMS → Naval; land battlefield comms → Land). - Electronic warfare: platform-centric unless helicopter (airborne EW pod → Air; shipboard EW → Naval; ground jammer → Land). - Generic IT/network classify by the platform/domain it supports.
General item type	From the following contract, classify the main equipment according its general item type. Choose EXACTLY ONE of the allowed values: {general_list}. Consider all available values and pick that which better reflects the general item type of the equipment. Return one label from the allowed list in the format <general_item_type>. For instance, for main equipment 'F/A-18E/F Super Hornet Aircraft', return: 'Aircraft'. Or, if main equipment is 'F-16 Block 52 Upgrade Program', then return: 'Development - Aircraft'. ... Do not invent labels, copy the label text exactly as written. Do not leave the response blank, always choose the best fitting label for the main equipment.
Specific item type	From the following contract, classify the main equipment according to its specific type. Choose EXACTLY ONE of the allowed values: {specific_list}. Consider all available values and pick that which better reflects the general item type of the main equipment. Return one label from the allowed list in the format: <specific_item_type>. For instance, for main equipment 'F/A-18E/F Super Hornet Aircraft', return 'Fighter aircraft'. ... Do not invent labels, copy the label text exactly as written after the numeral. Do not leave the response blank, always choose the label that most approaches the main equipment.
Contractor	From the following contract, extract the contractors or companies involved and their respective location in the format '<contractor>: <location>'. Return the information with differnet lines for each contractor in the format: i) <contractor>: <location> ii) <contractor>: <location> ... If no contractor is found just add 'i) No contractor specified' Do not add introductory sentences.

Figure A2: High-value main equipment by region (2008-2025)

Source: Bruegel.

Figure A3: High-value main equipment by region (2008-2013)



Source: Bruegel.

Figure A4: High-value main equipment by region (2014-2021)

Source: Bruegel.

Figure A5: High-value main equipment by region (2022-2025)

Source: Bruegel.

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