

Space, Security and Defence

Strengthening the transatlantic relationship



Foreword



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Space, security and defence are three key strategic segments of the European industrial landscape. Europe's tradition of innovation and excellence in these sectors is recognised around the world. For decades, American companies have actively participated in Europe's success in these sectors and engaged extensively as partners, customers, suppliers and manufacturers.

Despite recent heightened tensions between the EU and the US and growing competition from other global economies, the case for transatlantic cooperation in space, security and defence continues to be as strong as ever. This presents a unique opportunity for transatlantic partners to build on past achievements and to strengthen their relationship. Transatlantic leadership in these sectors remains critical to achieving global prosperity, economic growth and collective security.

The American Chamber of Commerce to the European Union (AmCham EU) is and continues to be a constructive partner to EU institutions and national governments in their pursuit to strengthen the security and defence of Europe. American companies make significant contributions to the European Defence Technological and Industrial Base (EDTIB) and the EU's security and space markets through the creation of high-skilled jobs, the development of cutting-edge technologies and the production of high-end capabilities. Our member companies in aerospace and defence have been active in Europe for more than 100 years and employ more than 50,000 people across the EU. This is why AmCham EU is committed to supporting the continued development and growth of the space, security and defence sectors in Europe.

A lot has changed since the release of the 2017 edition of this brochure. We are not only witnessing an increase in the activities of the EU in the areas of defence, but also simultaneously seeing a growing need for a transatlantic approach towards vital security segments, such as aviation transport and cybersecurity. Moreover, as companies and governments around the world shift their attention towards the stars, AmCham EU has decided for the first time to include a section on the space industry and how EU regulation could further strengthen joint EU-US space exploration.

Now in its third edition, AmCham EU's brochure, 'Space, Security and Defence: Strengthening the transatlantic relationship', demonstrates how closer transatlantic cooperation will support a stronger and more competitive space, security and defence industry on both sides of the Atlantic.

Table of contents

List of abbreviations	2
Executive summary	3
Space	4
Market outlook	5
Recent developments	6
Impact on the transatlantic relationship	8
Recommendations for the transatlantic relationship	10
References	11
Security	12
Market outlook	13
Aviation security	14
Recent developments	14
Impact on the transatlantic relationship	15
Recommendations for the transatlantic relationship	16
Cybersecurity	16
Recent developments	16
Impact on the transatlantic relationship	17
Recommendations for the transatlantic relationship	18
References	19
Defence	20
Market outlook	21
Recent developments	24
Impact on the transatlantic relationship	25
Recommendations for the transatlantic relationship	28
References	32

List of abbreviations

ACAS	Air Cargo Advance Screening
ACC3	Air cargo or mail carrier operating into the Union from a third-country airport
AI	Artificial intelligence
CARD	Coordinated Annual Review on Defence
CBP	Customs and Border Protection
Competence Centre	European Cybersecurity Industrial, Technology and Research Competence Centre and Network
DARPA	Defence Advanced Research Projects Agency
DTIB	Defence Technological and Industrial Base
EAR	Export Administration Regulations
EDA	European Defence Agency
EDAP	European Defence Action Plan
EDF	European Defence Fund
EDIDP	European Defence Industrial Development Programme
EDTIB	European Defence Technological and Industrial Base
EGNOS	European Geostationary Navigation Overlay Service
ENISA	EU Agency for Network and Information Security
ESA	European Space Agency
ESTIB	European Space Technological and Industrial Base
EUSP	European Union Space Programme
EUSPA	EU Agency for the Space Programme
FCT	Foreign Comparative Testing
GDP	Gross domestic product
GNSS	Global Navigation Satellite Systems
GPS	Global Positioning System
IoT	Internet of Things
IPR	Intellectual property rights
ITAR	International Traffic in Arms Regulations
MFF	Multiannual Financial Framework
MRA	Mutual recognition agreement
NASA	National Aeronautics and Space Administration
NATO	North-Atlantic Treaty Organization
NIS	Network and Information Security
PADR	Preparatory Action on Defence Research
PESCO	Permanent Structured Cooperation
PLACI	Pre-Loading Advance Cargo Information
R&D	Research and Development
R&T	Research and Technology
SMEs	Small and medium-sized enterprises
SSAs	Special Security Agreements
TADIC	Transatlantic Defence Technological and Industrial Cooperation
TASIC	Transatlantic Space Technological and Industrial Cooperation
TSCG	Transportation Security Cooperation Group

Executive summary

'Space, Security and Defence: Strengthening the transatlantic relationship' examines the state of play of these key strategic sectors in the EU. This includes recent developments in EU regulation and potential opportunities to strengthen the transatlantic relationship. On both sides of the Atlantic, policy-makers are introducing new regulations to support the growth of these sectors, but greater transatlantic cooperation and interoperability is possible.

To ensure new regulatory developments benefit and further strengthen EU-US ties, the following recommendations should be considered. Additional recommendations can be found after each subsection.

Space	Security	Defence
<p>Foster the openness of space markets as essential prerequisites for a sustainable and mutually-reinforced Transatlantic Space Technological and Industrial Cooperation (TASIC);</p> <p>Support free and open data-sharing policy frameworks that enable the full development of civil, commercial and scientific space applications; and</p> <p>Ensure reciprocity in granting public funding for transatlantic space cooperation that ensures both sides benefit from the best available technologies at competitive costs.</p>	<p>Aviation security Develop a Pre-Loading Advance Cargo Information (PLACI) programme in the EU, to analyse the risk of cargo before it is transported, in close collaboration with the US, mirroring the Air Cargo Advance Screening (ACAS) programme; and</p> <p>Harmonise testing methodologies for screening equipment, including through the recognition of certification schemes on both sides of the Atlantic.</p> <p>Cybersecurity Adopt an inclusive, market-driven and risk-based approach to cybersecurity solutions, taking into account different risk profiles of products, services and processes, and ensuring that any future EU certification scheme remains voluntary, aligned with international standards and developed in close cooperation with industry; and</p> <p>Provide legal clarity for participants in EU-funded programmes and facilitate access to research and development (R&D) consortia by offering access to funds when third-country entities demonstrate the implementation of sufficient measures to guarantee the protection of 'essential security interest'.</p>	<p>Remove impediments to Transatlantic Defence Technological and Industrial Cooperation (TADIC) to improve the delivery of high-end interoperable military capabilities, create high-skilled jobs and increase investments on both sides of the Atlantic;</p> <p>Foster reciprocity as a vital component of transatlantic defence cooperation to ensure a mutually beneficial economic relationship; and</p> <p>Promote closer transatlantic coordination in capability standardisation and certification as well as greater cooperation in research and technology (R&T) and R&D activities to support interoperability and reduce costs.</p>

Space

Space exploration represents a relatively new market with immense growth potential and a means of addressing many of today's most urgent challenges. With the help of industry, innovations such as satellites, launch and ground systems can ensure space technology and services are at the forefront of addressing these issues. This includes tackling climate change, supporting the drive for technological innovation and providing socio-economic benefits to the entire globe.

Market outlook

The importance of Europe's space sector is growing. In 2017, it generated €8.76 billion in annual turnover, an increase of 6.2% from the previous year, and directly employed 42,664 workers across Europe.¹ Today, 6 to 7% of gross domestic product (GDP) in Western countries, worth roughly €800 billion, is already dependent on satellite radio navigation.²

In 2017, Europe's space sector generated €8.76 billion in annual turnover and directly employed 42,664 workers across Europe.

More than half of the space industry's revenue in Europe is comprised of institutional programmes that are funded by European authorities or governmental organisations. The European Space Agency (ESA), the main space procurement and development agency in Europe, is the industry's largest customer with 40% of total sales.³ The commercial segment represents 41% of the European space market. In 2017, this amounted to €3.5 billion in sales, including €2 billion from commercial satellites, €989 million from operational launch systems and €252 million from ground systems and services.⁴

Did you know?

A EU-US joint venture is revolutionising the space economy

OneWeb, a US communications network company, and Airbus set up OneWeb Satellites, a joint venture to manufacture large amounts of low-cost, ultra-high performing satellites. The aim is to deploy and operate constellations of up to 900 low-earth orbit satellites that will provide high-speed internet to the entire globe. Manufacturing takes place in both Toulouse, France and Florida, US, demonstrating a truly transatlantic partnership. Through commoditisation and mass production, this joint venture is able to achieve satellite production rates of one per day at 10% of the traditional cost and is well on its way to revolutionising the space economy.⁵



Satellites orbiting earth provide vital services such as earth observation or high-speed internet.

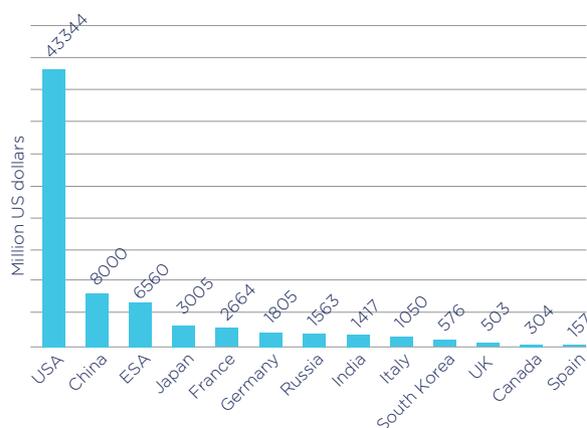
The commercialisation of the space industry has given rise to the concept of ‘new space’, in which companies no longer only operate as contractors to national governments, but are increasingly pursuing their own commercial interests. One notable example of this is SpaceX, a privately-owned company operating spacecraft and launch systems. In 2018, the company launched 21 rockets into space, of which 14 were carrying commercial loads and by 2023 they plan to offer the first private passenger flights around the moon.⁶

When looking at the global picture of the space sector, there is a significant difference compared the situation in Europe. Globally, in 2017, annual turnover was \$383.51 billion of which 80.1%, \$307 billion, were from commercial sales.⁷ This growth is projected to reach between \$1.1 and \$2.7 trillion by 2040.⁸

The US continues to lead the way with the world’s largest annual budget for space activities of more than \$43 billion. Many other countries are increasing their investments in this strategic sector. For example, China’s budget has nearly doubled between 2016 and 2017, from \$4.32 to \$8 billion. EU Member States currently represent most of the mid- to lower-end of the spectrum, with France leading the European space efforts with an annual budget of \$2.66 billion.⁹

However, looking at European-wide national investment does not provide the full picture. Indeed, the involvement of the ESA also needs to be taken into account. In 2017, the ESA budget totalled \$6.56 billion, which places the agency as the third largest funder of space activities in the world, just behind the US and China.¹⁰ Although EU Member States fall behind the US in their national space budgets, when you consider the total contributions of the ESA, the EU as a whole can be seen as a primary contributor to the global development of space activities.

▶ Annual space expenditure in USD (\$) in 2017



Adapted from: The Space Report 2018, found in Space Policies, Issues and Trends in 2017-2018¹¹

The value of the global space sector is projected to reach between \$1.1 and \$2.7 trillion by 2040.

Recent developments

Space has become increasingly strategic for the EU and the US, with growing importance in areas such as data-related services and enhanced connectivity provided by satellites. While the US has responded to this with large-scale investments in space launch systems¹², landing platforms and the creation of the United States Space Command¹³, the EU is still establishing its European Union Space Programme (EUSP).¹⁴

EU-US cooperation has always been a core pillar of global space efforts. In 2015, EU and US authorities signed a cooperation arrangement on Copernicus earth observation data. It aimed to pursue full, free and open data policies for government satellites by enabling US agencies, such as the National Aeronautics and

Space Administration (NASA), National Oceanic and Atmospheric Administration and the US Geological Survey, to share and receive data from their European counterparts.¹⁵ This arrangement was a critical step towards enhancing data access and interoperability across the Atlantic.

Building on the European Commission's 2016 Space Strategy, the EUSP aims to reinforce Europe's autonomous access to space as well as to adapt to technological change and disruptive business practices.¹⁶ The EUSP will provide a framework for achieving the EU's space ambitions and establish a governance structure that clarifies the roles and relations between the European Commission, the ESA and Member States. The priority of space is apparent, as the European Commission has earmarked a €16 billion budget in the EUSP to be invested in the European space industry. The Commission will consolidate all EU space-related activities and partners into a coherent organisational structure which brings together defence industry and space under one overarching heading. The proposed budget represents a significant increase in funding compared to the

€12.6 billion allocated to space under the 2014-2020 EU multiannual financial framework (MFF).¹⁷

The EUSP will also further enhance the role of the former European Global Navigation Satellite Systems (GNSS) Agency, to be renamed the EU Agency for the Space Programme (EUSPA), which will be assigned key responsibilities in the execution of the EUSP. The Commission will act as programme manager, setting priorities and operational direction. The ESA will remain responsible for the implementation of the EUSP. The EUSPA will support the commercialisation of space data and play an increased role in security accreditation.

The overarching objective will be to ensure that the EU remains a global leader in space through targeted investments in the commercialisation of Galileo, European Geostationary Navigation Overlay Service (EGNOS) and Copernicus, which are the world's most advanced satellite positioning and earth-observation systems.

► Investments by the EUSP in the EU's satellite positioning and earth observation systems

	Galileo and EGNOS	Copernicus	Government satellite communication and space situational awareness
Role	Global satellite navigation	Free and open earth observation	Secure satellite communications and space hazards monitor
Budget (proposed)	€9.7bn	€5.8bn	€0.5bn
Objective	<ul style="list-style-type: none"> • Ensure continuity in the operation of high-quality satellite navigation services; • Invest in ground infrastructures and satellites (eg, autonomous vehicles); and • Commercialise data created by the systems. 	<ul style="list-style-type: none"> • Provide environmental monitoring; • Improve borders and maritime security; • Increase the range of satellites for new observation capacities; and • Enhance the uptake and dissemination of space data. 	<ul style="list-style-type: none"> • Develop secure satellite communications by pooling Member States capabilities; and • Increase autonomy to ensure own protection against space hazards (eg, debris).

Adapted from: European Parliamentary Research Service, 2019¹⁸

Impact on the transatlantic relationship

Datasharing between key earth observation programmes, such as the EU's Copernicus and US's Global Positioning System (GPS), have strengthened transatlantic ties and enabled critical scientific discoveries and innovative applications. Cooperation frameworks, such as the EU-US Copernicus arrangement enable both sides to take full advantage of earth observation satellites for civil and scientific applications as well as for the management of natural disasters. In fact, Copernicus data, complemented with US satellite imagery, was critical in identifying geographical areas requiring emergency assistance during hurricanes Harvey, Irma and Maria in 2017.¹⁹

Consumers can also benefit from EU-US cooperation in this area. For instance, satellite navigation devices can use both Galileo and GPS for a more precise location positioning and even determine vertical geolocations (eg, identifying which floor a user is on).²⁰

Transatlantic cooperation is the bedrock for the development of innovation in the space sector. Recent programmes, such as the EUSP, have great potential to strengthen the EU-US relationship. Unfortunately, the participation of third countries in these initiatives could end up being restrictive and unclear, as the EUSP could exclude important US partners if they are found by the European Commission to be infringing 'essential security interests'. This approach could risk drastically misrepresenting the global nature of the space sector and the value of transatlantic cooperation. While sensitive security activities in this area should be protected, scientific and technological contributors from like-minded third countries should not be excluded as these can significantly enhance EU space initiatives.

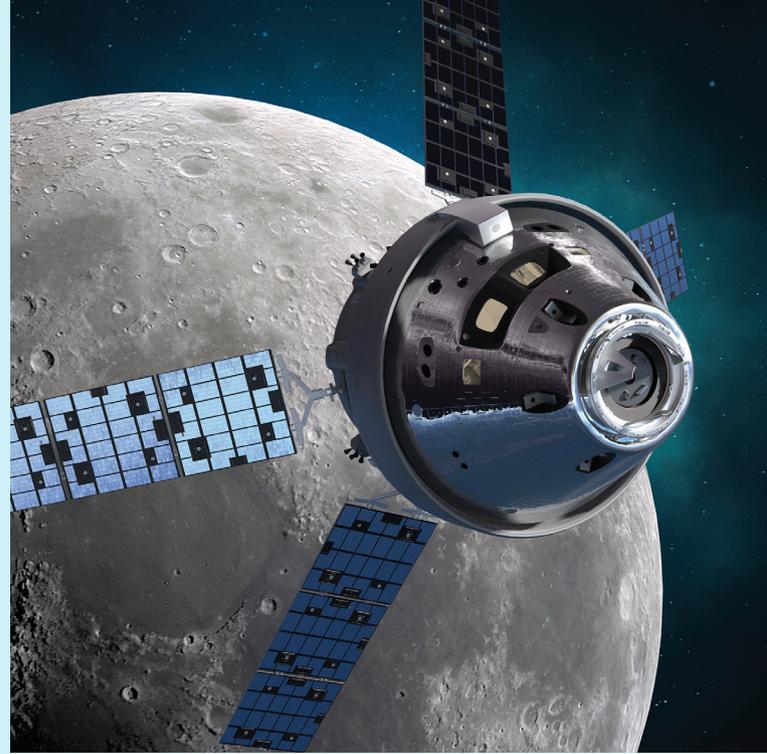
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The space industry is truly international with supply chains spanning multiple continents. If US partners were to be excluded from participation in EU programmes, it would negatively impact industrial and scientific relationships. By not being able to take advantage of the expertise located in either the EU or the US, future space projects could be significantly limited by increased costs, unnecessary duplications and missing technological know-how. In contrast, projects such as the Orion space capsule, currently being developed by NASA, demonstrate what is achievable through closer transatlantic cooperation.

Did you know?

EU-US cooperation is driving deep-space exploration

For the first time in a generation, NASA is building a new spacecraft to send humans into space. The Orion spacecraft is designed to address new challenges and meet the evolving requirements for deep-space exploration.²¹ Orion has two main modules, with the command module being built by Lockheed Martin²² and the service module being provided by the ESA, who has contracted Airbus Defence and Space for the build.²³ Thanks to unparalleled transatlantic cooperation, Orion will be the first human spacecraft designed for long-duration missions, ushering in a new era of EU-US led space exploration.



The Orion spacecraft will combine both EU and US expertise in space exploration.

Recommendations for the transatlantic relationship

The rise of protectionism on both sides of the Atlantic puts at risk the development of the European space sector. Therefore, policy-makers need to defend a level playing field that ensures industry operates within similar regulatory environments in both the EU and the US. This will foster industrial excellence and encourage open competition in the sector. As other international players also increasingly engage in space activities, it is beneficial to both the EU and the US to further develop transatlantic and public-private partnerships. For stronger transatlantic cooperation, policy-makers should:

- Foster the openness of space markets as essential prerequisites for a sustainable and mutually-reinforced TASIC;
- Support free and open data-sharing policy frameworks that enable the full development of civil, commercial and scientific space applications;
- Ensure reciprocity in granting public funding to US businesses in Europe and EU businesses in the US for efficient and sustainable transatlantic space cooperation;
- Consider the contributions made to the European Space Technological and Industrial Base (ESTIB) by third-country entities when assessing participation in EU funding programmes; and
- Rely on a case-by-case approach to review 'essential security interests' in the EUSP, recognising its dual nature (civilian and security/defence) to ensure the EU benefits from the best available technologies at competitive costs.

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Security

The security sector is complex and multifaceted. It brings together a diverse range of dimensions, including:

- **Aviation security;**
- Border security;
- Counter-terror intelligence;
- Crisis management/civil protection;
- Critical infrastructure protection;
- **Cybersecurity;**
- Maritime security;
- Physical security protection; and
- Protective clothing.²⁴

While the global security sector was valued at \$84.5 billion in 2018²⁵, these numbers should be used with caution, as the sector remains difficult to quantify due to a lack of comprehensive statistical definitions, clarity of security-related product headings and absent data industry could provide.²⁶

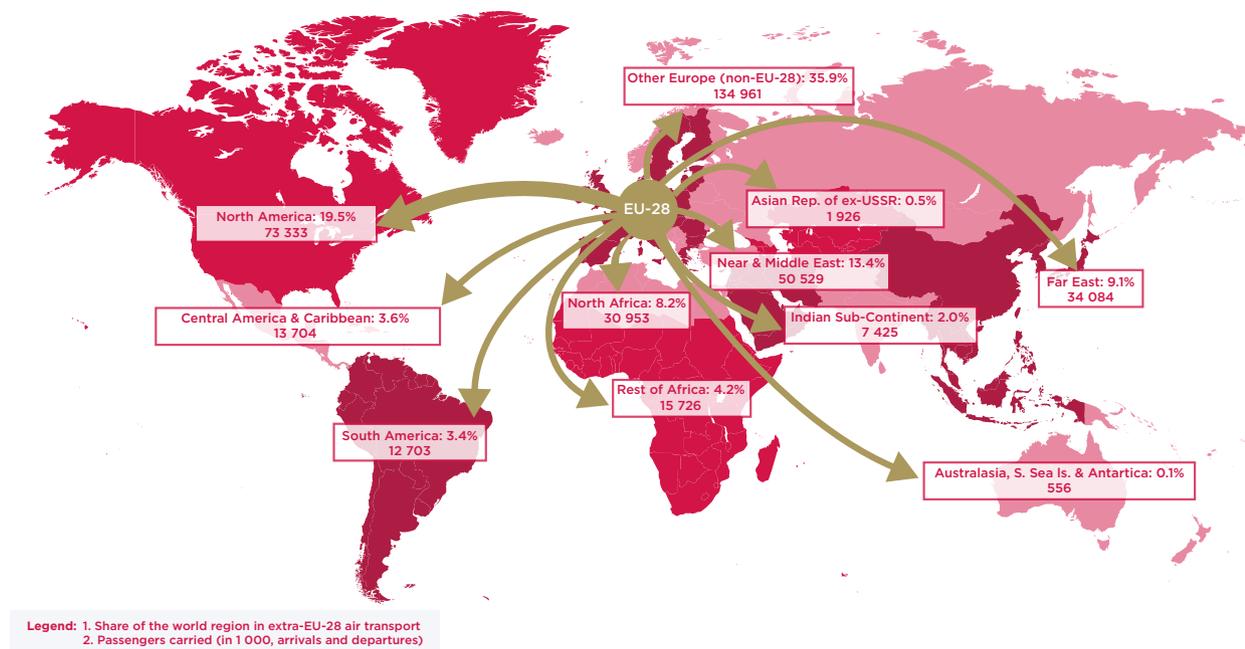
With the sector being so diverse and its value challenging to assess in its entirety, this brochure will focus specifically on two critical segments: aviation security and cybersecurity. Both have grown significantly over the last few years and demonstrate strategic importance for the transatlantic relationship in terms of their technological and economic value.

Market outlook

Aviation security refers to the protection of individuals and goods being carried by civil aircraft from unlawful interference.²⁷ This includes airport and aircraft security, as well as the screening of cargo and mail.²⁸ While there is no detailed information on the market value of the aviation security segment in Europe, the number of passengers and volume of cargo are direct indicators of the sector's growing economic value. In 2017, the number of passengers travelling by air in the EU increased by 7.3% compared to the previous year, totalling more than one billion people.²⁹ In a similar way, both intra-EU and international air freight and mail transport have increased significantly, with 13 million tonnes in 2017 leaving Europe.³⁰

In 2017, the total number of passengers travelling by air in the EU was more than one billion people, a 7.3% increase compared to the previous year.

► Number of passengers travelling out of the EU in 2017



Source: Eurostat, 2017³¹

When it comes to cybersecurity, the economic impact of cyber-crime has increased five-fold in recent years.³² In 2016, Europe faced up to 4,000 daily ransomware attacks and 80% of companies were victim of at least one cybersecurity incident.³³ Cybersecurity is defined as the activity and means ‘to protect network and information systems, the users of such systems, and other persons affected by cyber threats’.³⁴ While the rise of cyber incidents is troubling, this has also led to a significant growth in the industry. From 2013 to 2018, the global market value of the sector rapidly increased from \$66 billion to \$100 billion.³⁵ The same trend is also visible within Europe, where the European cybersecurity market is predicted to grow at an annual rate of 11.3% and could amount to \$47 billion by 2023.³⁶

From 2013 to 2018, the global market value of the cybersecurity sector increased from \$66 billion to \$100 billion.

Aviation security

Recent developments

The transatlantic aviation relationship is one of the strongest in the world, with millions of passengers and tons of cargo moving across the Atlantic every year. In order to cope with such magnitude, reduce regulatory barriers and ensure smooth processes, the EU and the US have established several platforms to promote the exchange of strategies and best practices.

Since 2006, the EU and the US have held comprehensive discussions on key aviation security issues in the Transportation Security Cooperation Group (TSCG).

Within the TSCG, policy-makers address concerns, find common solutions on technical matters and ensure the mutual recognition of air cargo security regimes.³⁷ Furthermore, additional stakeholder sessions bring together industry and regulators from both sides of the Atlantic to discuss challenges faced by companies.

In 2012, the EU and the US signed the mutual recognition agreement (MRA) on air cargo security. This initiative streamlines transatlantic cargo operations by improving the speed and efficiency of security measures. Under the MRA, both EU and US authorities recognise each other’s aviation security regimes and ensure their alignment. This reduces duplications of security procedures during transit and facilitates the efficient flow of air cargo.³⁸

The EU has also independently introduced several additional measures to strengthen aviation security, such as meeting obligations under the ‘air cargo or mail carrier operating into the Union from a third-country airport’ (ACC3) regime.³⁹ In line with these efforts, the EU has introduced a risk-based cargo and mail screening process and established various other capacity-building and training programmes. These initiatives are crucial to ensuring the continued security for air cargo operators, consumers and other actors.

EU-US cooperation in the field of air cargo security has been highly beneficial to the safe and efficient flow of goods. Both have introduced regulations for Pre-Loading Advance Cargo Information (PLACI) regimes. These regimes, relying on specific data sets and intelligence provided by industry and national authorities, analyse the risk before cargo is loaded on an inbound aircraft. The US has been successfully piloting its ACAS programme for over seven years, with its regulatory introduction in 2018.⁴⁰ The private sector has proactively contributed to this process and views the collaborative approach used during the ACAS pilot positively.⁴¹

Did you know?

The US PLACI regime improves transatlantic aviation security

In response to new and ongoing security challenges major aviation hubs around the world are installing PLACI regimes. These regimes allow authorities to perform targeted risk assessments on air cargo prior to an aircraft's departure. The ACAS programme has been hugely successful in allowing the US Customs and Border Protection (CBP) to prevent high-risk cargo from being loaded onto flights heading to the US. Considering its success, the US Department of Security amended the CBP regulations to turn ACAS into a mandatory programme.⁴² The programme is highly regarded in the EU.



Aircraft being loaded with cargo and prepared for take-off.

Impact on the transatlantic relationship

The ongoing exchange on aviation security through platforms such as the MRA demonstrates the willingness from both the EU and the US to share information and identify areas of cooperation. These efforts have brought greater security to both sides, with no major incidents since 2010.⁴³

The long-term renewal of the MRA in February 2019 provides certainty and stability to aviation stakeholders and offers the opportunity for the US to continue the programme indefinitely. These developments are positive for governments and industry as they encourage investments in emerging security initiatives and the integration of best practices.

Although the MRA and its extension secures certain core business operations, there are still certain exemptions that hinder transatlantic cargo operations. These exemptions require air carriers transporting cargo from certain third-country airports via the EU to the US to apply for additional security measures at EU airports. This is despite the cargo having been secured at a third-country airport of origin in line with the EU aviation security regime. This duplication of security measures leads to additional costs and unnecessary inefficiencies, therefore limiting the true potential of closer transatlantic ties in this area.

Recommendations for the transatlantic relationship

Aviation security has made great progress in ensuring safer conditions for passengers and cargo on both sides of the Atlantic. However, there are still areas where improvement is needed. For stronger transatlantic cooperation, policy-makers should:

- Develop a PLACI programme in the EU in close collaboration with the US, mirroring the ACAS;
- Lead efforts to promote PLACI regimes at international level;
- Support the development of innovative security equipment through joint R&D;
- Harmonise testing methodologies for screening equipment, including through the recognition of certification schemes on both sides of the Atlantic; and
- Continue the exchange of information on air cargo security through the MRA with the aim of reducing or eliminating any exemptions from the agreement.

Cybersecurity

Recent developments

The EU has a strong reputation for its high-quality research institutions. Amongst other reasons, this is why many international companies decide to locate their research and innovation centres for cybersecurity in Europe. To strengthen its attractiveness and competitiveness in this area even further, the EU has introduced several new instruments and structures, such as the Horizon Europe and Digital Europe programmes. With a proposed budget of €9.2 billion, Digital Europe will support the EU's digital transformation and boost investments in key strategic areas, such as supercomputing, artificial intelligence (AI) and cybersecurity.⁴⁴

In addition, the Cybersecurity Act, which entered into force in June 2019, has the objective to enhance the EU's cyber resilience. It strengthens the role of the EU Agency for Network and Information Security (ENISA), by granting it a permanent mandate and creating the first European cybersecurity certification framework. Its goal is to ensure a common approach to cybersecurity certification in the Single Market and to improve the cyber resilience of digital products and services.⁴⁵

This legislation builds on previous regulatory developments, such as the 2016 directive on security of network and information systems (NIS Directive). This introduced common European requirements for cyber risk management, incident reporting and audit requirements applicable to essential service operators and digital service providers.⁴⁶

With a proposed budget of €9.2 billion, Digital Europe will support the EU's digital transformation and boost investments in cybersecurity.

Impact on the transatlantic relationship

The Digital Europe programme and other EU funding instruments could enhance transatlantic and global cooperation on emerging technology securities, such as cybersecurity, and help Europe become a leader in these areas. However, the exclusion of third-country participants could hamper the success of these instruments and lower the attractiveness of the EU market for foreign investment.

Joint research programmes are instrumental to R&D in Europe, such as under Horizon 2020, the EU's framework programme for research and innovation from 2014 to 2020. They benefit from collaboration with key transatlantic players that make considerable contributions to the European cyber ecosystem. Unfortunately, recent developments show a trend towards restricting third-country industry participation, including those already well established in the EU, from contributing to these programmes in the future. A restrictive understanding of third-country entities could have severe repercussions for many companies, including small and medium-sized enterprises (SMEs).

More recently, the European Commission proposed to establish a European Cybersecurity Industrial, Technology and Research Competence Centre and Network (Competence Centre) to enhance its industrial and technological capacities. The Competence Centre will support the pooling of EU and national resources and expertise, as well as have responsibility for the coordination of cybersecurity funds foreseen in the next MFF.⁴⁷

Failing to bring in multinational partners will limit vast segments of the cybersecurity community and EU industries (eg, automotive, aviation and financial services) that are critically dependent on existing third-country information security technologies.

The Internet of Things (IoT) is rapidly expanding, connecting humans with technology and improving the efficiency of industrial operations. However, there is a strong risk that EU cybersecurity certifications that are not based on international standards and existing best practices could have a negative impact on the EU cybersecurity market, creating barriers to entry or raising costs for global businesses. Considering that the EU and the US face similar challenges with regard to the cybersecurity of products and devices, there should be a strong mutual interest in sharing best practices and developing common standards.

Recommendations for the transatlantic relationship

The cybersecurity landscape relies heavily on global collaboration and cross-border investment. In the EU, most cybersecurity research and products have been developed through international collaboration and foreign investment. Recent developments need to recognise the global nature of the sector and allow the EU to benefit from competitive and excellence-driven R&D consortia. For stronger transatlantic cooperation, policy-makers should:

- Adopt an inclusive, market-driven and risk-based approach to cybersecurity solutions, taking into account different risk profiles of products, services and processes, and ensuring that any future EU certification scheme remains voluntary, aligned with international standards and developed in close cooperation with industry;
- Provide legal clarity for participants in EU-funded programmes and facilitate access to R&D consortia by offering access to funds when third-country entities demonstrate the implementation of sufficient measures to guarantee the protection of 'essential security interest';
- Ensure that entities with highly relevant expertise remain part of the EU's cyber ecosystem through the Competence Centre and are not excluded from participation to R&D consortia;
- Reduce market fragmentation in Europe through a harmonised implementation of the NIS Directive;
- Support a successful transition of ENISA towards a permanent EU cybersecurity agency and enhance cooperation with industry and international partners, including standardisation organisations; and
- Invest resources to raise public awareness of the need for cybersecurity across the value chain, including vendors, service providers, industry, employees and consumers.

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Defence

The defence sector ensures the security of citizens and provides an innovative ecosystem that is responsible for many of today's cutting-edge technologies. Covering air, naval, land and electronics, the sector brings together a limited number of large companies that rely on extensive supply chains involving many SMEs. The sector caters specifically to national governments to fulfil their defence capability requirements and is bound by strict export controls, prohibiting the sale or transfer of data, products and services to unauthorised entities. Given its unique regulatory considerations and characteristics, the defence sector is truly like no other.

Market outlook

In 2016, the European defence industry reached an overall turnover of €96.5 billion, a slight decrease from €101 billion in 2015, and employed 445,000 people across Europe, representing nearly one-fourth of the entire global defence industry workforce.⁴⁸

In 2017, Member States spent approximately €217 billion on defence, marking another consecutive year of growth

in national budgets.⁴⁹ In comparison, the overall US defence budget in 2017 was \$606 billion and increased to \$686 billion in 2019.⁵⁰

In 2017, Member States spent approximately €217 billion on defence.



Investment in defence R&D is critical for the industry to remain at the forefront of technological developments (example: NP2000 propellers).

Did you know? EU companies have access to US defence R&D funding

Every year, the US Defence Advanced Research Projects Agency (DARPA) awards contracts to European companies to develop and promote emerging technologies. In 2018, BAE Systems received \$9.2 million for the Radio Frequency Machine Learning System programme⁵¹, and in 2019, Airbus Defence and Space received \$2.9 million to demonstrate the military utility of global low earth orbit satellite constellations.⁵² Many European companies benefit from the US Foreign Comparative Testing (FCT) programme that supports the fielding of world-class technologies, enhancing military capabilities and strengthening industry ties with crucial allies.⁵³ The FCT programme has provided \$1.2 billion worth of funding for R&D projects around the world, with a majority going to 17 Member States. These initial investments have led to \$7.2 billion of direct US procurement in France, Germany, Norway, Sweden and the UK.⁵⁴

Four Member States account for 71.3% of total defence expenditure in the EU.⁵⁵ Taking a closer look at national defence expenditure in the EU, the United Kingdom tops the list having spent €47 billion (23.7% of the EU total) in 2016.⁵⁶ France comes in second with nearly €40.7 billion (20.4%); Germany third with €32.7 billion (16.4%); and Italy fourth with €21.5 billion (10.8%).⁵⁷

As members of the North-Atlantic Treaty Organization (NATO), most EU Member States are also bound by specific obligations with regards to defence expenditure. At the 2014 NATO Wales Summit, NATO members reaffirmed their commitment to increase their annual defence spending to 2% of national GDP.⁶⁰ They also agreed that spending on new equipment, including R&D, should reach 20% of annual defence expenditure.⁶¹

Expenditure in defence R&D in the EU are also highly concentrated with only eight Member States accounting for 95% of the total in 2016, with the majority spent by the United Kingdom (€3 billion), Germany (€1.2 billion) and France (€1.2 billion).⁵⁸ Persistently low R&T investments in these critical segments remains a challenge. In contrast, the US Department of Defence earmarked \$74 billion for research, development, testing and evaluation in 2017.⁵⁹

► Graph 1: Defence expenditure as a share of GDP (%) (based on 2015 prices and exchange rates)



Notes: Figures for 2019 are estimates.

* Defence expenditure does not include pensions.

** These Allies have national laws and political agreements which call for 2% of GDP to be spent on defence annually, consequently estimates are expected to change accordingly. For the past years, Allies' defence spending was based on the then available GDP data and Allies may, therefore, have met the 2% guideline when using those figures (In 2018, Lithuania met 2% using November 2018 OECD figures).

Source: NATO, 2019⁶²

► Graph 2: Equipment expenditure as a share of defence expenditure (%) (based on 2015 prices and exchange rates)



Note: Figures for 2019 are estimates.

* Defence expenditure does not include pensions.

Source: NATO, 2019⁶³

The joint EU-NATO declaration signed in 2016 reconfirmed these targets and emphasised the need for a stronger defence industry and greater industrial cooperation within Europe and across the Atlantic.⁶⁴

In 2014, only three NATO members spent more than 2% of their GDP on defence (the US, Greece and the UK). In 2019, seven NATO members have now met this target and two more are very close (see graph 1). EU Member States in particular have made considerable commitments over the last few years. Positive developments are also noticeable in the area of equipment spending, with the share of defence expenditure growing. In 2014, seven NATO members were spending more than 20% of their total defence expenditures on new equipment (including related R&D). In 2019, the number has grown to 16 countries, including 13 EU Member States (see graph 2).

Overall, there is a clear upward trend in defence expenditure amongst NATO members and in particular those from Europe. Overall NATO defence spending amounts to over \$1 trillion in 2019, compared to \$970 billion in 2018.⁶⁵ Continuing to increase defence expenditure, in particular budgets for new equipment (including related R&D), will enable the EU to promote innovation and remain a highly attractive market for the global defence industry.

Defence expenditure amongst NATO members has increased to over \$1 trillion in 2019, compared to \$970 billion in 2018.

Recent developments

Since the introduction of the Global Strategy for the EU's Foreign and Security Policy in 2016⁶⁶, there have been many new initiatives that intend to facilitate European defence cooperation, strengthen the European Defence Technological and Industrial Base (EDTIB) and promote the EU's strategic autonomy. These ambitions are further underlined by the European Defence Action Plan (EDAP), which proposed to set up a European Defence Fund (EDF), foster investments in SMEs and strengthen the Single Market for defence.⁶⁷

The Preparatory Action on Defence Research (PADR) also commits EU funding to defence research, bringing together academics, researchers and industry from across the EU to work on joint projects.⁶⁸ The Ocean 2020 project for example, launched in 2017 under PADR, brought together 40 participants from 15 Member States.⁶⁹ While PADR pilots defence research, the European Defence Industrial Development Programme (EDIDP) is paving the way for joint defence capability development. The EDIDP will co-finance projects that aim to support the competitiveness and innovation capacity of the EU's defence industry and has an operating budget of €500 million.⁷⁰ As of 2021, both defence research and capability development initiatives will be united under the EDF. The fund will aim to coordinate, supplement and amplify national investments by Member States in defence research, the development of prototypes and the acquisition of defence equipment and technologies.⁷¹ The European Commission has proposed an initial EDF budget of €13 billion.⁷²

While such investments and initiatives focus on strengthening the EDTIB, the Permanent Structured Cooperation on security and defence (PESCO) and the Coordinated Annual Review on Defence (CARD) look

to deepen European defence cooperation amongst Member States. PESCO, introduced in 2017, gives Members States a platform to cooperate in the areas of defence investment, capability development and operational readiness.⁷³ While CARD fosters capability development by addressing shortfalls, deepening defence cooperation and ensuring an optimal and coherent use of national defence budgets.⁷⁴

The EU has made significant progress over the last few years to strengthen defence cooperation between Member States and industry partners. Notably, the promotion of joint capability development projects has brought export controls back on the policy agenda. National governments have resumed discussions on forms of closer cooperation and alignment in this area. The current review of the UN Arms Trade Treaty further underlines how these changes in the EU-US defence landscape affect national prerogatives on export licensing.⁷⁵

The EU has established a framework for closer cooperation. Enabling the direct funding of the sector is a critical next step in ensuring the continued competitiveness and innovation of the EDTIB. If all of these efforts are implemented correctly, in line with the EU's wider defence commitments (including towards NATO), these developments are an opportunity for increased EU-US cooperation and a stronger transatlantic relationship.

The Ocean 2020 project launched in 2017 under PADR has brought together 40 participants from 15 Member States.



EU-US cooperation is key as demonstrated by the T-X advanced trainer fighter powered by the F404 and the F414 engine in the Gripen fighter jets.

Did you know?

EU-US industry partnerships are leading the way in transatlantic cooperation

EU-US industry partnerships are the cornerstone of TADIC. This is demonstrated by Boeing's partnerships with Saab on the T-X advanced trainer fighter⁷⁶ and with Leonardo on the MH-139 helicopters.⁷⁷ Both programmes are valued at approximately \$12 billion and have potential for further global expansion. The transatlantic partnership between Saab and GE Aviation has also been key to the success of the Gripen fighter jet. GE Aviation provided the F404 and upgraded F414 jet engines, which were key contributions to the development of a competitive platform that has seen Gripen flown in six countries around the world.⁷⁸ Such transatlantic ventures enable companies to bring together the best available technologies, facilitate market access and provide unparalleled capability solutions.

Impact on the transatlantic relationship

Increased defence spending

European defence budgets are expected to rise in the coming years, with many countries moving towards the NATO target of 2% of GDP for defence spending and 20% for new equipment. This positive development will ease tensions within NATO, as members will be seen to be proportionally contributing towards the alliance's common security. This will also positively benefit the EU, as it will promote new opportunities and investments in the European defence industry.

EU defence initiatives

The key to the success of EU initiatives such as PESCO and EDF will be the integration of the best available technologies from within the EU and its allies. This will support a stronger EDTIB and increase collaboration between the EU and the US. EU defence initiatives allow EU and US companies to benefit from each other's unique and unparalleled expertise and for Member States to achieve the best strategic value in defence capabilities at competitive costs.

The challenge will be ensuring these developments do not enforce a strict and limited understanding of strategic autonomy that could exclude like-minded allies and their European subsidiaries. Such limitations would weaken the effectiveness of these programmes and the competitiveness of the EDTIB. They also risk widening the technological and operational gap between the EU and the US.

The European Defence Fund

The fund's framework as agreed by EU policy-makers, will allow the participation of third-country entities as long as they are established in the EU and fulfil strict security criteria.⁷⁹ These criteria and conditions are often common practice within the global defence industry.

For example, in the US, third-country entities are asked to sign proxy agreements or Special Security Agreements (SSAs) in order to ensure that foreign firms do not undermine US security and export controls.⁸⁰ In nearly all bilateral defence dealings involving third-country entities, similar conditions are often reflected. The EDF seeks to implement similar conditions, which therefore do not present entirely new obligations or hurdles for industry.

However, while the global nature of the defence sector has been recognised in the EDF, there remain aspects that could have significant impacts on the transatlantic relationship. These include:

- A too restrictive implementation that could make it unattractive for EDF beneficiaries to make use of third-country held assets or to cooperate with foreign entities such as American companies with significant presence in Europe;

- Restrictions on intellectual property rights (IPR) that make it difficult for third-country entities to effectively collaborate in an EDF action and pose significant hurdles for European companies wanting to use their non-EU assets; and
- Requirements in the EDF for Member States to demonstrate intent to procure a final product or use technology funded by the programme, which could distort competition in the EU by excluding companies that were not a part of the EDF action from later competitions.

Strategic autonomy in the EU

Many of the EU's defence initiatives are created under the guiding principle of European strategic autonomy. First coined in the EU Global Strategy in 2016, the concept of strategic autonomy remains poorly defined, leaving space for different interpretations of its scope. Some understand it as the EU having absolute autonomy across all three strategic defence dimensions (political, operational and industrial), while others believe that the term should cover political and/or operational autonomy and only within the context of the EU's international cooperative frameworks.⁸¹ The EU's strategic autonomy does not necessarily preclude strong transatlantic ties, as they can be mutually reinforcing.⁸² However, the long-term impact on the transatlantic relationship will be determined by how strategic autonomy is implemented and understood by the EU and national policy-makers.

The EU's strategic autonomy does not preclude strong transatlantic ties.

Did you know?

The world's most successful 5th generation fighter jet is truly global

The F-35 Lightning II is a global aircraft programme with an initial involvement of nine partner countries: Australia, Canada, Denmark, Italy, the Netherlands, Norway, Turkey, the UK and the US. All F-35 components are produced by suppliers from the partner countries, with a manufacturing site in the US and a European final assembly and check-out facility in Italy.⁸³ Having EU Member States involved in the F-35 programme will bring significant economic benefits to Europe. Italy for example, is expected to gain \$15.8 billion from the production phase⁸⁴ and in the UK, the programme will support more than 20,000 jobs.⁸⁵ In addition, Pratt & Whitney, a United Technologies Corporation company, has signed maintenance, repair, overhaul and upgrade contracts with EU entities for the F135 engine, which powers the F-35.⁸⁶ It ensures that Europe continues to benefit even after the production phase.



The F-35 and the F135 engine that powers it bring significant economic benefits to the programme's partner countries.

Export controls

Defence manufacturers rely on exports to remain profitable and operational. National export controls and how they interact have significant business impacts. The importance of exports for the EU's defence market is significant as almost 27% of the total global arms exports originated from the EU between 2013 and 2017.⁸⁷ The promotion of collaborative and joint defence development programmes in the EU has also led to debates as to whether adjustments to existing export controls are

necessary. These discussions need to be coordinated at the EU level, as unilateral Member State decisions can lead to significant regulatory uncertainties for industry. Moreover, increasingly complex conditions and diverging controls can harm the competitiveness of the EU and disrupt global value chains, further fragmenting the international regulatory space for transatlantic defence entities.

Recommendations for the transatlantic relationship

Recent EU defence initiatives have contributed significantly to maintaining the safety and security of European citizens. It is now the successful implementation of these initiatives that will have an impact on the transatlantic relationship and whether like-minded third-country entities, including American companies with significant presence in Europe, can continue to contribute to the EDTIB. It is important that these initiatives and their implementation recognise the global nature of the sector in order to strengthen TADIC. For stronger transatlantic cooperation, policy-makers should:

Establish strong and innovative Defence Technological and Industrial Bases (DTIBs)

A robust EDTIB, to which many US entities are legitimate contributors, is crucial for a prosperous TADIC and sustainable transatlantic growth. To achieve this, policy-makers should:

- Secure strong DTIBs based on cross-border supply chains on both sides of the Atlantic, which are key for maintaining global technological leadership and providing armed forces with the best equipment; and
- Support international commitments to global security efforts and cross-border industrial innovation.

Remove impediments to TADIC

Addressing impediments to TADIC, such as the lack of reciprocity and open defence markets, will improve the delivery of high-end interoperable military capabilities and create high-skilled jobs, foster investments and promote cutting-edge technologies. To achieve this, policy-makers should:

- Clarify overlaps between different international defence frameworks;
- Define strategic autonomy as capability-, technology- and security-driven;
- Rely on the best available technology to reduce costs, advance interoperability and strengthen industrial ties;

- Invest in and develop new industrial opportunities for future capabilities that promote interoperability;
- Endorse a tailored study, conducted by a team of experts from both sides of the Atlantic, to showcase the economics of EU-US cooperation in security and defence and the remaining impediments to further collaboration; and
- Ensure greater alignment between the European Defence Agency (EDA) and the US Department of Defence to allow US input to the EDA's military-technological programmes.

Ensure reciprocity and open defence markets

Reciprocity when it comes to access and equal market opportunity is a vital component of the transatlantic defence relationship and enables both the EU and the US to benefit from closer economic ties. To achieve this, policy-makers should:

- Reciprocate economic opportunities throughout all stages of the development and acquisition of new defence products, including the sustainment, withdrawal and disposal phases;
- Implement the EU's 2009/81/EC Security and Defence Procurement Directive and the Reciprocal Defence Procurement and Acquisition Policy Memoranda of Understanding with the US to take full advantage of more open defence markets;
- Promote an inclusive approach for defence-related R&D funding and procurement as the foundation for transatlantic reciprocity; and
- Improve cooperation within Europe and with the US in order to improve economies of scale and remove unnecessary duplications.

Promote closer collaboration on research, standardisation, certification and the development of emerging technologies

Transatlantic coordination in R&T and R&D is necessary to ensure the harmonisation of standards and certifications. This supports interoperability among military forces and reduces cost for governments and businesses. To achieve this, policy-makers should:

- Align standards to improve interoperability and enhance the operational effectiveness of militaries. Interoperability enables forces, units and/or systems to share common doctrine, procedures and communication links and reduces capability duplications. This allows for the pooling of resources and produces critical industry synergies;
- Ensure essential industrial partners from like-minded third countries can participate in and access funding from R&T and R&D projects as well as procurement programmes, as long as they do not contravene security and defence interests;
- Facilitate collaboration between researchers, innovators and standardisation authorities through joint research actions;
- Enforce existing standards and promote the harmonisation of standardisation where possible; and
- Establish a flexible and case-by-case approach to IP restrictions in R&D funding programmes to ensure the best available technologies can be used when this does not infringe the security and defence interest of the issuing authority.

Enforce coherent and coordinated export control regimes

All business segments benefit from open markets and clear rules, therefore the defence industry would benefit from clearer export control policies. To achieve this, policy-makers should:

- Align export controls between EU Member States and with the US through consistent regulatory exchanges and joint actions;

- Address export controls at the beginning of joint R&T and R&D projects through agreements that clearly define the conditions applicable throughout the duration of the project; and
- Support regulatory exchanges for EU and US companies in the joint development of new capabilities and their capacity to sell in each other's markets and export to third countries.

Did you know? US export controls for defence items are being reformed

The US government is reforming its primary export control regime, the International Traffic in Arms Regulations (ITAR). The changes will make it easier for European companies to jointly develop defence and dual-use items with US companies, sell to US companies and export European-made items containing US origin content to countries not subject to sanctions or arms embargoes.⁸⁸ As part of this exercise, many items are being reviewed and moved from the US Munitions List under ITAR, to the Commerce Control List under the Export Administration Regulations (EAR). This is important because defence items controlled by the EAR are not subject to US regulatory requirements if they do not contain more than 25% US-origin content and are not exported to embargoed destinations. This is a key change because a European capability containing less than 25% US content listed under the EAR would not fall under US export control regimes.⁸⁹



The CH-47 Chinook is in use in 19 countries around the world, including Italy, the Netherlands, Spain and the UK.⁹⁰

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