ASD-EUROSPACE

facts & figures 2022

The European space industry in 2021

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About Eurospace

Eurospace - a non-profit organisation founded in 1961 - fosters the development of space activities in Europe and promotes a better understanding of space industry stakes and challenges. Its members are the main space industry manufacturers and launch service providers.

Eurospace members encompass the whole span of the space industrial chain, are present in 13 European countries and represent more than 90% of the European space industry activity from both a turnover and employment point of view.

Since 2004, Eurospace is the Space Group of ASD (AeroSpace and Defence Industries Association of Europe) where it represents and defines the space viewpoint of the association. This new aggregated structure allows industry to address transversal stakes and challenges between aeronautics, defence and space industrial activities.

Since its creation, ESA (European Space Agency) has maintained formal links with Eurospace. The association provides an effective entry point for the industrial sector and is the preferred medium to discuss industry-wide topics. A frame contract between ESA and Eurospace was signed in 1987, which allows the association to perform advisory work for the Agency. In 2001 a Memorandum of Understanding (MoU) that officially recognised Eurospace as the representative body of the European space industry was signed. The MoU covered all aspects related to new programmes, competitiveness, research & technology, and administration. In 2012 the ESA Eurospace MoU was renewed.

Eurospace plays a key role in the European Space Technology Strategy process, officially presenting the whole European space manufacturing industry views on technology evolution and harmonisation.

Eurospace has established and maintained a comprehensive network of contacts with the relevant national ministries as well as with the main national space agencies in Europe. As policy evolution required, Eurospace extended its reach to new institutions, such as the EDA (European Defense Agency) or Defence agencies for security and defence matters.

Over the past 15 years, the European Union has developed a strong interest in space, from the research and development point of view (with dedicated space budgets being included in the 6th and 7th and 8th Framework Programmes for example), but also as a user and promoter of space infrastructures (as with the Galileo programme or the Copernicus infrastructure). Indeed, space services and applications are now recognised as efficient tools for policy implementation, environmental studies, situation assessments, etc. to support the European Commission and a number of EU Bodies and Agencies.

Eurospace mandate covers the relevant EU bodies, including Commission Directorate Generals, the Council, the Parliament etc. and Eurospace eventually established a dedicated office in Brussels in 2001.

Eurospace is a recognised interlocutor to the European Union, and an active participant to EU led industry consultations on space, providing data, analysis and assessments on space industry related issues to relevant DGs as required.

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Foreword

by Pierre Lionnet : Research & Managing Director

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The 26th edition of the annual facts and figures survey is, like the 25th edition, prepared in a difficult economic context for the European space sector. The war in Ukraine, with the disruption of economic activity in Ukraine and the geopolitical consequences such as the EU/Russia trade bans have put the European space sector in a difficult, and highly unexpected, situation.

This situation is not helping the sector to overcome the consequence of the Covid-19 crisis, that had already impacted industry sales by 1B€ in 2020. While the revenue level of the industry in 2021 is back to pre-Covid levels, at 8,6B€ (consolidated) the European industry is navigating under difficult conditions.

The Ukraine crisis has revealed the numerous dependencies that the European space industry has on Russian and Ukrainian space systems, from the VEGA launcher upper stage motorisation to the numerous low and medium electric propulsion systems usually procured from Russia to enhance the competitiveness of European commercial satellites. On top of that, Arianespace has been banned from operations in Baikonur, and Russian personnel has left the European launch site in Guyana, while Russian authorities stopped the export of more Soyuz launchers for operations in Kourou. Finally, the European space industry is losing access to two of its important Russian customers: Gazprom and RSCC. We thus anticipate a further contraction of the commercial space business of the European industry as a consequence of the crisis.

Furthermore, the crisis is having global economic impacts, and is accelerating the inflationary pressure on all western economies, with its immediate effects on the rising costs of energy and food supplies. The Euro zone is already registering inflation levels above 8% in 2022, and some EU countries have local inflation rates at two digits. The overall rise of price levels adds to the difficulty of increasing prices on very specific supplies, such as rare gases (Xenon and Krypton) or rare metals and metal alloys (Titanium and Steel), whose demand is notoriously tense, and whose supply relied significantly on Russian and/or Ukrainian producers.

The European industry is thus facing a potential profit squeeze, with rising production costs, rising workforce costs, and rising supply chain costs with cascading effects. The situation will be worsened by decreasing market opportunities, due to the receding demand in the commercial geostationary segment (a historically strong revenue segment for European players, for both satellite and launcher segments) and the lost business opportunities with Russian customers in the medium term.

Despite the difficulties, the European space sector is still showing a positive dynamic, with a few very encouraging trends:

- Employment growth is confirmed in 2021, with close the 53000 full-time equivalents registered in the sector, a 6% growth over 2020, mostly driven by the expansion of new and emerging players in Europe (the so-called “New Space”) that have thrived in recent years and have created more than 5000 employees in the sector in just 5 years. This new demand for space qualified jobs creates a competitive tension on the workforce market, and large historic players have reported difficulties in filling up open positions. There are close to 1000 yet unfilled job opportunities in the European space industry today.
- Space systems sales are improving in all institutional market segments, with marked growth in satellite applications (supported by the regular opportunities provided by the EU flagship programmes), as well as in science and exploration segments (one of the 'rising stars' of the ESA programmes), and, to a lesser extent, in the launcher development segment, where technical difficulties have caused programme delays (but the successful maiden launch of VEGA-C on July 13th 2022 is showing that Europe is on good tracks).

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- Europe is still very strong on the space systems export markets. Eurospace monitored the value of space systems export/import in the past decade, and found that space systems exports represented 21B$ in the satellite segment, and 7B$ in the launcher segment, generating a net surplus to the European trade balance worth more than 1,6B$ every year in the past decade. This positive impact would be much higher if Europe was not the first destination for US satellite exports and for Russian launcher exports (worth a combined total 12B$ of space systems import in the past decade). Space systems imports not only reduce the positive impact of our exports on the trade balance, but they also diminish the local business opportunities of European space systems suppliers. If European customers, in particular on the institutional segment, applied an unfailing European preference, the European space industry would register more than one billion of additional revenues every year, and would support more than 6000 additional jobs.

Let me conclude by recalling that with its 53000 workers and 8.6B€ worth of sales, the European industry has delivered 80 satellites (worth 32 tons at launch in 2021) and 7 launch systems in 2021 (launching 28 tons to orbit in 2021), putting it in the 4th position in the ranking of space powers worldwide. According to Eurospace assessments, in 2021 China and the USA occupy the first place, with the USA achieving a record in commercial launch activity thanks to the ongoing deployment of the Starlink constellation supporting a never seen before rate of launch, and with the Chinese institutional programmes reaching to a World record of more than 180 tons launched to orbit in a single year.

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Overview

A specialised strategic sector

The European space manufacturing industry is a strategic sector, essential for the implementation of many public policies, and supporting all economic sectors. It is embedded in the wider European AeroSpace and Defence industrial complex.

The space manufacturing industry is an infrastructure supplier. The sector operates at the higher end of the space value chain, and supplies service providers and public institutions, spacecraft and launchers to meet their requirements.

The space industry designs, develops and manufactures spacecraft and launchers, along with the associated ground systems for satellite control and operations. The space manufacturing industry is organised vertically with large and medium system integrators (capable of delivering a complete launcher or spacecraft to the launch pad) providing business to a wide range of equipment and service suppliers (capable of delivering integration ready subsystem, equipment and components, or providing specialised services and tools supporting system design, integration and test). The industry is highly specialised and capital intensive. The sector is also rather concentrated; despite being distributed across all ESA member states.

Four large industrial groups (Airbus, Thales, Safran and Leonardo) are directly responsible for more than half of the total space industry employment via dedicated Business Units (BUs) and/or Joint Ventures (JVs). In 2021, the largest dedicated space business units and industrial capabilities are located mainly in Airbus Defence & Space, Thales Alenia Space and ArianeGroup. Smaller, but sizeable space players such as GMV, RUAG and OHB provide additional employment and capabilities to the European space industry.

SMEs represent only a small fraction (less than 10%) of the total space industry manufacturing employment. Notwithstanding, small space units are very common in the space sector, but they are often part of, or owned by, a larger company. These units often face the same issues as SMEs in the sector but cannot benefit from the dedicated support measures proposed by public institutions.

Industry is distributed across all Europe, with the main industrial sites located in France, Germany, Italy, and, to a lesser extent, United Kingdom, Spain and Belgium.

In 2021, the European space industry successfully delivered 89 spacecraft to the launch pad of which 50 large satellites and 39 pico and nano satellites). It also delivered 6 launchers for operations in Kourou.

In 2021, the European space industry posted sales worth 8620 Million € and employed a total of 52822 workers (FTE: Full Time Equivalents).

Main industry facts

Key figures employment (FTE) and sales (M€)	2019	2020	2021	Var.
Direct industry employment (FTE)	49018	50317	52822	5,0%
Other personnel working on site (FTE)	2356	2402	2422	0,8%
Total space industry employment (FTE)	51374	52720	55244	4,8%
Final sales (M€ current e.c.)	8803	7720	8620	11,6%

Definitions
Direct industry employment: personnel employed directly by the company (permanent staff, measured in FTE).
Other personnel working on site: personnel directly supporting company activities supplied by a third party (interim workers, engineering, etc. measured in FTE).

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Final sales: sector sales to final customers (equal to consolidated sales).

Markets and customers

The European space industry has access to quite large, yet fragmented domestic markets, its core markets. It also exports its systems outside Europe. In both markets space systems are sold to a variety of customers, mostly public entities such as space agencies in Europe and worldwide, but also private customers such as satellite or launch service operators.

Final sales by main customer segment (M€)

(M€)	2019	2020	2021	Var.
Final sales (M€)	8803	7720	8620	11,6%
European public customers	5554	4900	5539	13,0%
European private customers	1619	1297	1367	5,4%
Other/unkown European customers	115	99	117	17,4%
Public customers RoW	696	457	458	0,2%
Private customers RoW	768	941	1084	15,2%
Other/Unknown customers RoW	50	25	54	114,3%

The first business area of the space manufacturing sector lies in the design, development and manufacturing of satellites for operational applications, such as telecommunications systems and parts, Earth observation systems and parts, and position/navigation/timing (PNT) systems and parts.

The second area of business is launchers. Launcher activities include operational launch systems sales (mainly to Arianespace) and development and consolidation activities, mostly in support of the Ariane and Vega systems, but also for the development of brand new systems (e.g. micro-launchers).

Scientific activities include a wide variety of systems and leading edge technologies, with science systems and parts and human spaceflight (and related activities, such as crew and cargo systems for the ISS etc.) representing together the core of revenues in this area.

Ground systems and activities cover an array of diverse industrial activities, including engineering and consultancy services (provided to the manufacturing sector and in support to space agencies), the development and production of professional ground stations, and the industrial hardware required for the development, production and test activities (EGSE/MGSE).

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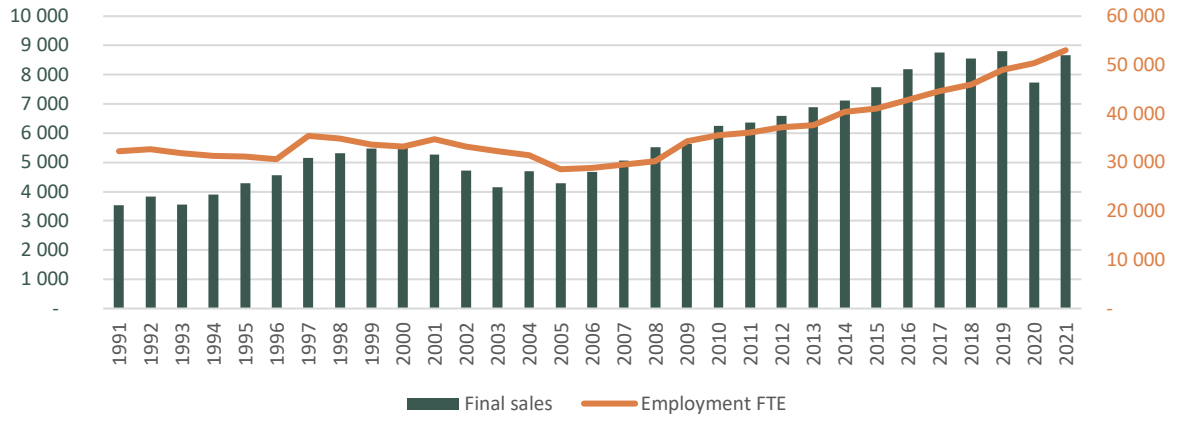
Final sales by main product segment (M€)

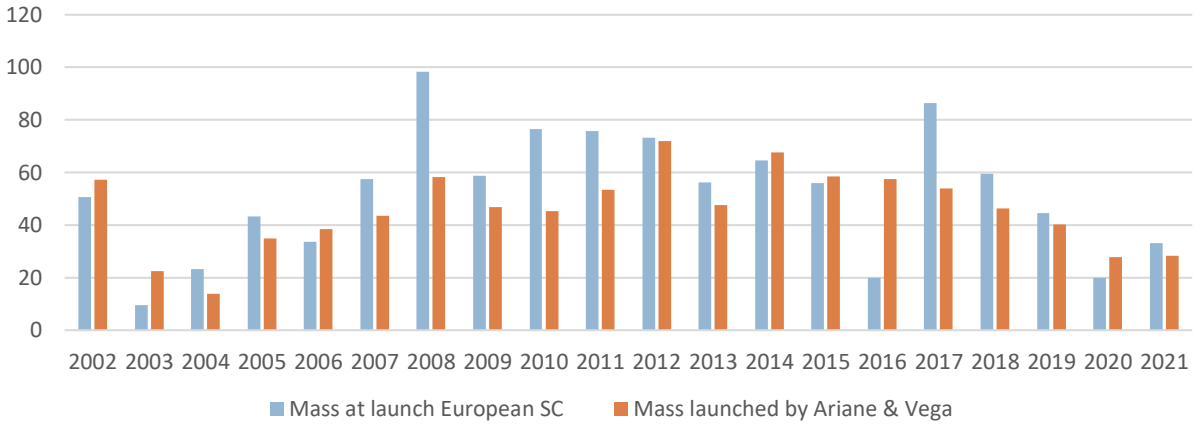
(M€)	2019	2020	2021	Var.
Final sales (M€)	8803	7720	8620	11,6%
Launcher systems	1714	1316	1338	1,7%
Satellite applications systems	4225	3525	3959	12,3%
Scientific systems	998	1129	1341	18,7%
Ground systems and services	1705	1567	1806	15,3%
Other & Unknown	161	183	175	-4,5%

European space industry sales and employment (M€, left & FTE, right)



European space industry sales exhibit contrasted evolutions over time, mostly influenced by the evolution of sales to commercial customers. Industry employment figures follow the variation of sales, with a similar pattern.

Output of the European space industry at date of launch (mass at launch - tons)



The output of the space industrial sector can be summarised every year with the measure of the mass of European spacecraft delivered for launch, and the measure of the mass launched by European-built launchers (Ariane and VEGA).

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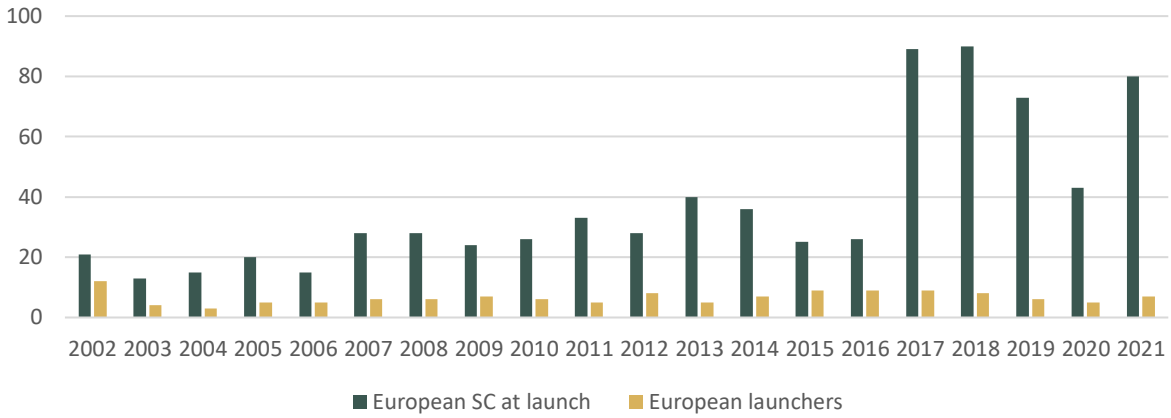
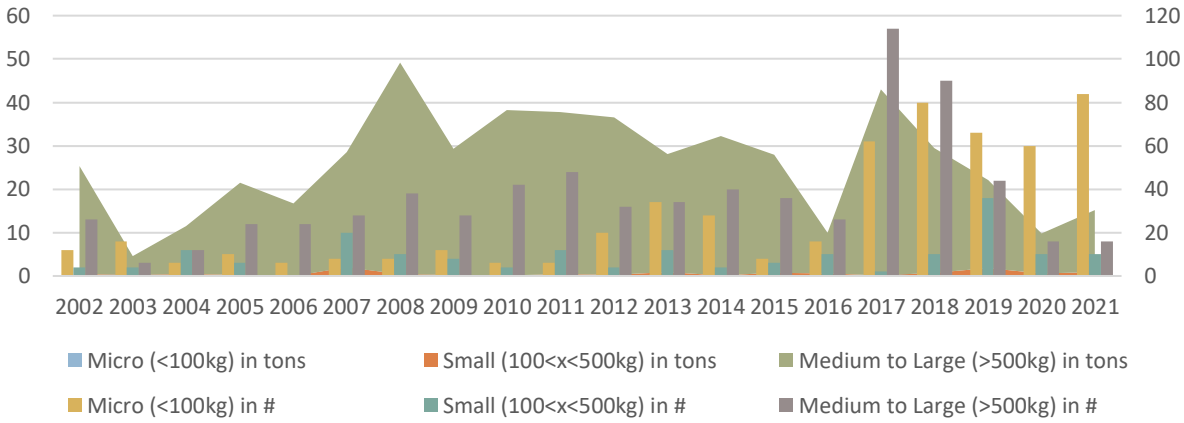
Output of the European space industry at date of launch (units: spacecraft and launchers)



The output of the Space industry can also be measured every year with the number of spacecraft delivered for launch and the number of European launchers operated the same year. We note a peak of spacecraft delivered for launch in 2017, 2018 & 2019 due to the large numbers of very small satellites produced (many were produced within university labs, some by emerging European players specialising in very small satellite production). See the next chart for details. Disregarding such exceptional events, the European space industry has delivered a growing number of spacecraft over the years, from an average of 10-11 spacecraft/year in the 1990s up to 20 and more in the years 2000 and up to 30 in the years 2010. Regarding launcher deliveries the situation is quite different with peak years having more than 10 launchers/year corresponding to the years between 1996 and 2002 when Ariane 5 and Ariane 4 were operational at the same time. After the Ariane 4 phase out (in 2002) the situation stabilised with less launchers produced.

Spacecraft Output - details by satellite mass class (left #, right tons)



In this chart we present the evolution of the spacecraft delivered for launch produced in Europe. The chart presents in bars the number of spacecraft delivered to launch, split between three classes of spacecraft: the Micro class (all less than 120kg at launch), the Small class (spacecraft between 120 and 500 kg at launch), and the Medium to Large class (all above 500kg). The chart presents: in bars the number of spacecraft delivered to launch within each mass class (left axis), and in areas the cumulated mass at launch by class (right axis, in tons).

The chart exhibits the contrasted evolution of spacecraft market segments, with a particularly noticeable increase of deliveries in the Micro class in recent years and the seemingly cyclic evolution of deliveries in the Medium to

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Large class, with the visible impact of the Iridium NEXT deliveries in recent years. The mass distribution over time is mostly correlated with the evolution of deliveries of the largest spacecraft. The Micro class has no visible impact on the mass distribution.

Main indicators

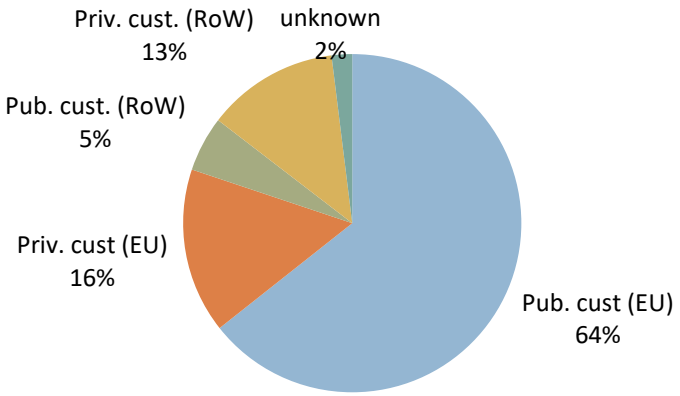
The European space industry designs, develops and manufactures spacecraft, launchers and the related ground segment for a variety of customers. Current market segmentations support the identification of the customer nature (public/governmental customers vs. private/commercial customers), and the identification of the customer's geographical location (customers located in Europe and customers outside Europe). Note that here the term 'Europe' covers all countries being ESA and/or EU members.

The core business of the European space industry is with European public customers (more than half of sales). As a whole, European customers (public and private) represent 81% of total sales.

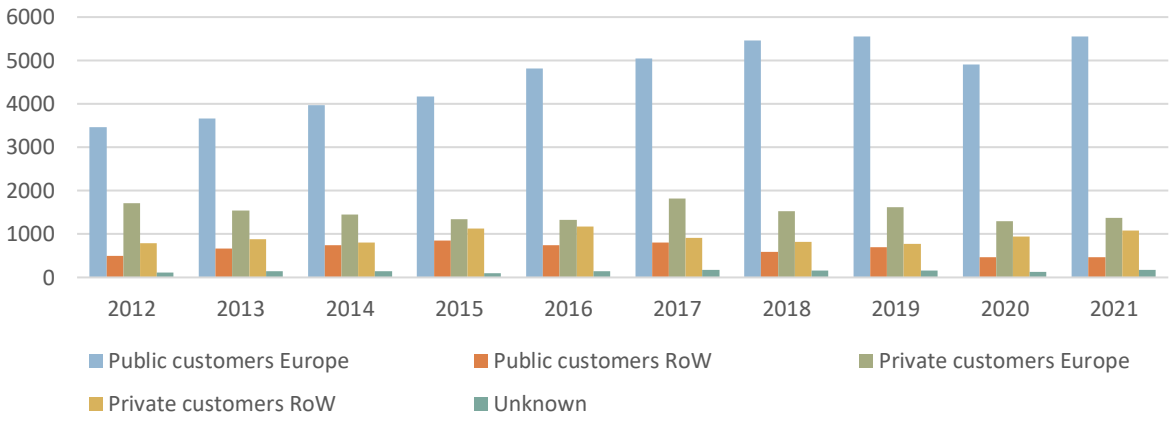
Sales by macro market segment (M€)

M€	EU customers	RoW customers	Total
Public customers	5539	458	5997
Private customers	1367	1084	2452
Other / unknown	117	54	171
Total	7023	1597	8620

Distribution of sales by main market segment (%)



Distribution of sales by main market segment (M)



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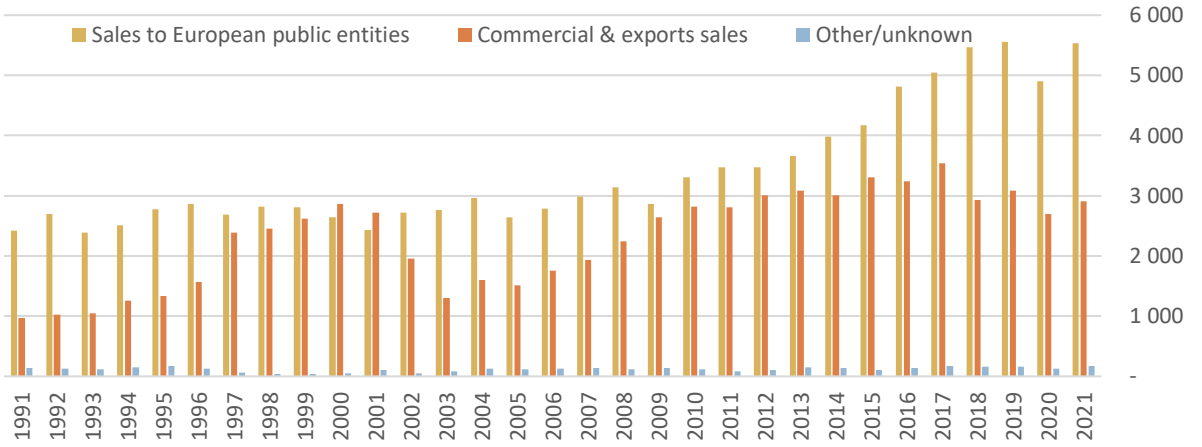
Long series indicators

IMPORTANT NOTE: Long series are built by aggregating data established over a long period of time using three different methodologies and data collection tools. Over time, new customers or product categories were introduced to increase the level of detail of the survey. In particular, the separate identification of ground systems (TTC stations, ground control stations etc.) was introduced in 2009. Before, the value of relevant ground systems was associated to the relevant application (telecoms, observation etc.). To avoid statistical disruption in long series by system, the value of ground systems is distributed proportionally in the satellite applications series. This is why the data points in the graphs have higher values than in the associated tables. In customer/market segment aggregate series, there is no statistical disruption.

European space industry sales are split amongst two main markets segments, according to the customer: an institutional domestic market, with a civil and a military component, where customers are European public entities, and a market for commercial and export customers.

Sales by main market segment - European public entities vs Commercial and exports (M€)



Commercial and export sales include the sales to: Privately owned satellite operators worldwide (e.g. Eutelsat, Intelsat), public satellite operators outside Europe (e.g. Arabsat, RSCC, Chinasat), privately owned launch services operators worldwide (e.g. Arianespace), public space agencies outside Europe (e.g. NASA, KARI), military institutions outside Europe, space manufacturing companies outside Europe.

European space industry sales can also be split according to the civil or military nature of the system. This specific analysis is required to assess correctly the value of the defence/military component of European space industry's business. Indeed, due to innovative procurement schemes (such as PPPs) and due to the complex nature of space programmes, there are situations where military systems are procured by civil entities. For example, the French military observation system Essaim was procured by CNES (a civil agency), similarly the military communications system Skynet 5 was owned and managed by Airbus (through a PPP scheme). Contrary to other space powers (the USA, Russia, China), Europe has modest investment in military space activities. As a result, military space systems sales represent only a small fraction of European space industry revenues.

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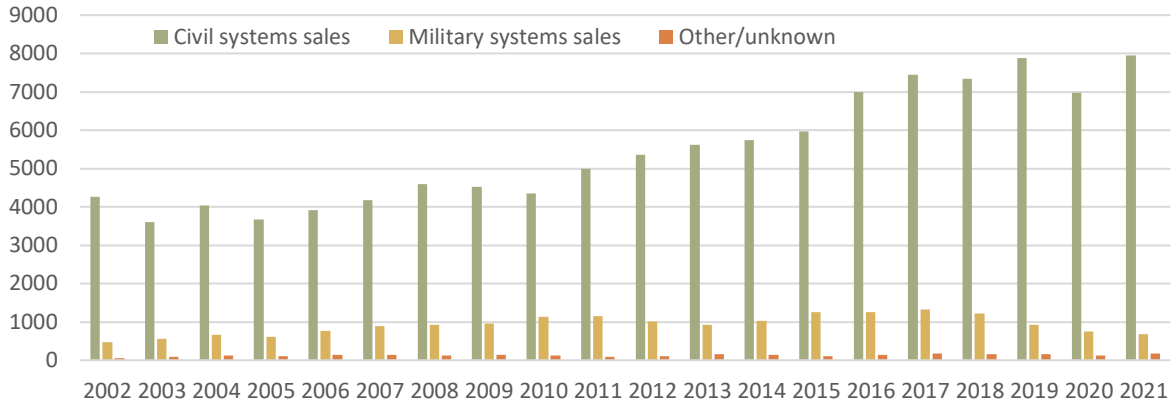
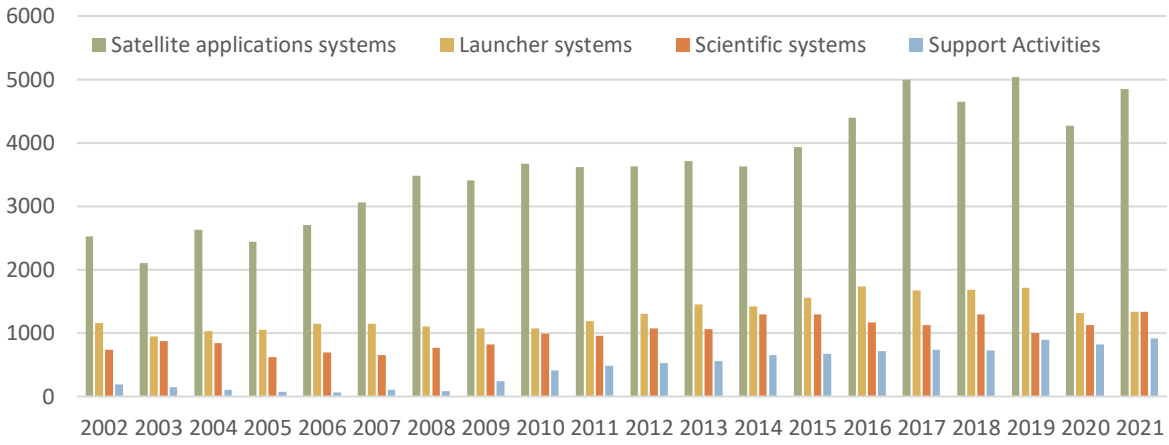
Sales by main market segment - Civil vs. Military systems sales (M€)



Military systems are defined as systems procured by a military entity (such as the French DGA) and systems designed for a military mission (such as the Skynet system for military communications or the Helios system for military observation). All other systems are identified as civil.

The European space industry is involved with four main lines of products, with different characteristics and customers: satellite applications systems (including the related ground segment), launcher systems, scientific systems (including human space infrastructure) and ground support activities. Satellite applications systems sales contribute the most to European space industry revenue. Their evolution is marked by a rather high variability over time.

Sales by main market segment - type of system (M€)



Satellite applications include all sales related to the development and production of systems for future and actual missions in telecommunications, Earth observation and navigation/positioning. Most of the revenues are drawn from the production of operational systems, while a smaller share is associated to technology and system development activities. In the specific frame of long series, satellite applications also include the value of ground systems (control centres, ground antennas etc.). These figures do not include the revenues drawn from satellite operations.
Launcher systems include all sales relevant to the design, development and production of launcher systems. European launcher systems include the large Ariane 5 system, in operations since 1996, and the smaller VEGA system, in operations since 2012. A small fraction of these revenues are associated to the exports of launcher equipment (e.g. thrusters, fairings) used on non-European launchers. These figures do not include the revenues drawn from launch operations.

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Scientific systems sales include all sales relevant to the design, development and production of scientific spacecraft systems. These spacecraft address missions such as: human spaceflight, planetary exploration, Earth science, astronomy, etc. Almost all of these revenues are associated to government programmes.
Support activities include all activities required to support the design, development and production of space systems. This category includes a share of hardware and a share of services sales. Hardware sales are associated to the production of electric and mechanical ground segment equipment (EGSE & MGSE) i.e. dedicated equipment required for the test and integration activities of equipment, subsystems and complete systems. Services sales are associated to the delivery of engineering, test and other specialised services to the space manufacturing industry and space systems customers. These services sometimes include also ground control centre operations, in particular for space agencies.

Sector Demographics

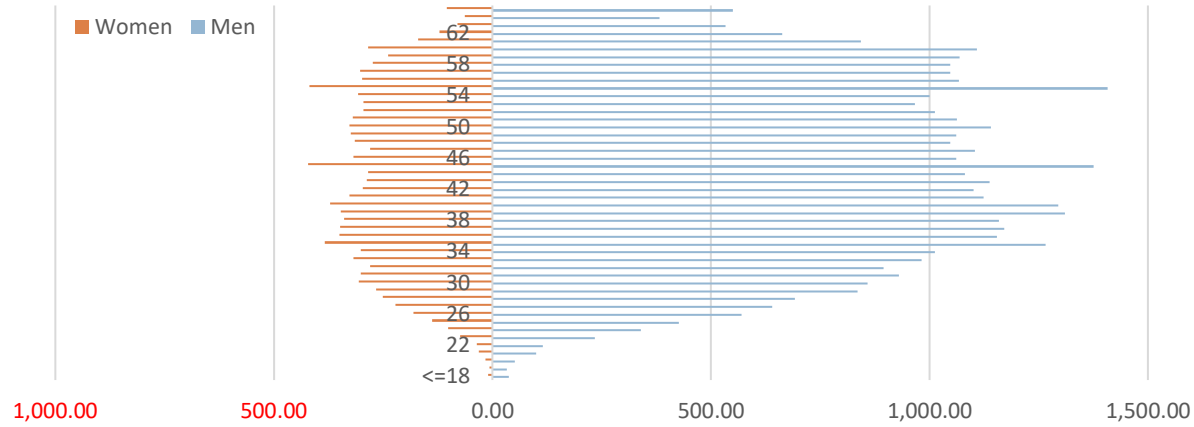
Industry employment - age and gender distribution

The European space industry is quite specific in terms of age and qualification structures. The industry maintains a rather stable age structure. The employment distribution by age exhibits a larger proportion of employees in the 49-58 age range, with an average age of employees around 44, with a slight difference between women and men. About a fifth of space industry employees are women.

Space industry employees age and gender characteristics

Total employment	52822
Average age (women)	43,77
Average age (men)	44,43
Average (all)	44,28
Women in % of total	22,78%
Men in % of total	77,22%

Space industry employees age pyramid



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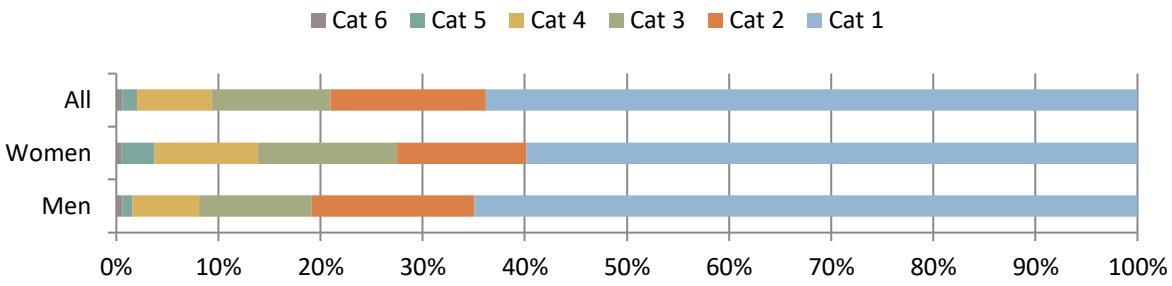
Industry employment - Qualification structure

Due to the engineering complexity of space programmes, the space sector attracts a larger than average share of highly skilled workers. The majority of space industry workers have a scientific and/or engineering background and hold high level degrees (PhD, master). The qualification structure of women is quite similar to that of men - women in the space industry are not limited to clerical and low level positions.

Space industry employees' qualification and gender characteristics (Table)

Qualification profile	All	Men	Women
1. University (4-5 years and up)	54%	55%	51%
2. University (up to 3 years)	13%	14%	11%
3. Higher Vocational School	10%	9%	12%
4. Vocational School	6%	6%	9%
5. General School Only	1%	1%	3%
6. Apprenticeship	0%	1%	0%
Not available	15%	15%	16%

Space industry employees' qualification and gender characteristics (Graph)



NOTE: detailed age distribution and qualification structure is not available for all companies in the model. The data compiled here is based on 68% of total employment.

Industry employment - distribution by country

The European space industry is distributed across all Europe, resulting in an important fragmentation, particularly in the smallest contributors to ESA. Yet, the 6 major ESA member states (France, Germany, Italy, United Kingdom, Spain and Belgium) provide about 90 % of European space industry employment. In principle, personnel are allocated to the country of activity. This is particularly relevant to companies who provide engineering and other specialised services to space agencies and industry throughout Europe (e.g. Serco, Vega, RHEA, HE Space).

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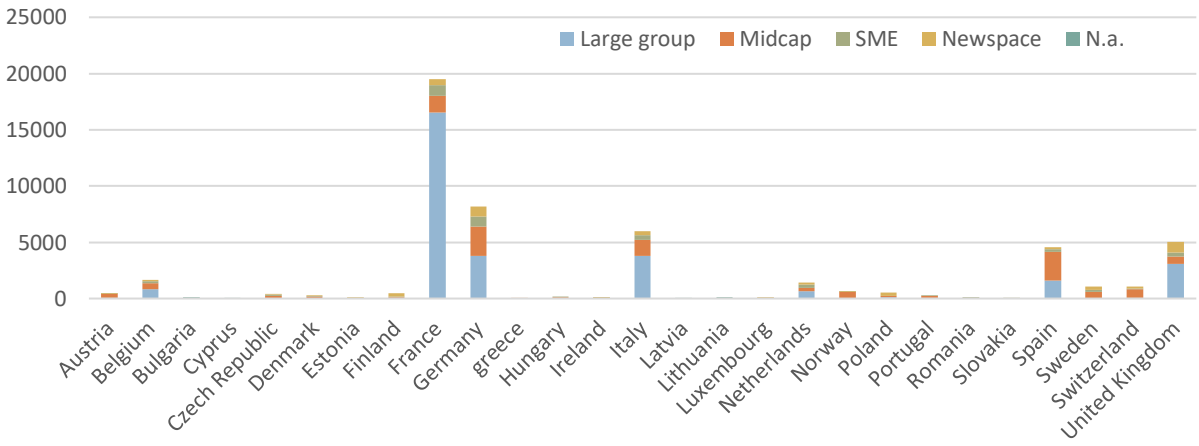
Industry employment distribution by country (FTE)

Country	2019	2020	2021	Level of confidence
Austria	451	456	483	62%
Belgium	1606	1606	1606	51%
Bulgaria	76	102	117	0%
Cyprus	25	25	25	0%
Czech Republic	292	324	331	2%
Denmark	257	285	281	12%
Estonia	39	51	59	34%
Finland	227	280	501	60%
France	17938	17737	18309	78%
Germany	9577	10238	10246	62%
Greece	na	6	34	100%
Hungary	130	130	130	0%
Ireland	64	66	66	0%
Italy	5384	5411	5928	75%
Latvia	41	41	41	0%
Lithuania	99	99	109	0%
Luxembourg	36	41	66	64%
Netherlands	1240	1272	1380	8%
Norway	555	592	602	4%
Poland	397	495	509	70%
Portugal	239	254	287	55%
Romania	41	83	107	77%
Slovakia	31	31	72	29%
Spain	3815	4293	4563	75%
Sweden	996	985	1052	48%
Switzerland	917	911	1028	76%
United Kingdom	4545	4503	4890	71%
Europe	49018	50317	52822	68%

Note that the level of confidence is the ratio between actual data collected by questionnaire and the total employment (including the estimates) by country.
Please read our "Release Notes" to better understand national evolutions: perimeter changes (i.e. the inclusion of a new company in the economic model) may affect significantly national employment figures.

Employment distribution by country: and company category (FTE)



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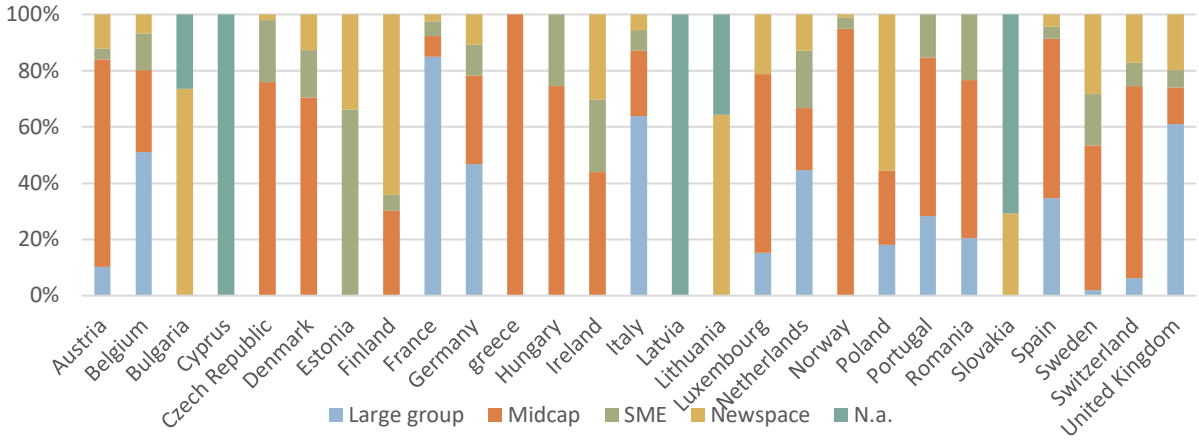
Employment distribution by country: and company category (%)



Large Groups are companies having more than 10000 employees worldwide, the category applies to all subsidiaries and controlled entities.
Midcaps are independent companies having more than 250 and less than 10000 employees worldwide.
SMEs are companies having less than 250 employees and less than 50M€ in annual sales (according to EU definition)

Industry employment - distribution by company

The space industrial sector is embedded in the larger aerospace and defence industrial landscape. Approximately half of the companies in the survey have corporate ties with the main industrial conglomerates, such as Airbus, Thales, Safran and Leonardo. As a result, the vast majority of space industry employees are working in large aerospace and defence groups. These groups may also create dedicated joint-ventures to undertake specific industrial tasks (e.g. Europropulsion, Cryospace, UMS, and more recently ArianeGroup...). The large groups contribute 60% of total employment, with well established industrial structures, supported by huge conglomerates active on a diverse range of market segments: aerospace, defense and security, data systems and telecommunications.

With a view to securing the supply of critical equipment, large groups tend to extend their control in the space supply chain with the absorption of suppliers (and competitors). Thus the space sector counts a large number of small space units (subsidiaries of large groups), but a rather limited number of independent SMEs. SMEs in the supply chain contribute about 8% of the total workforce, but interestingly, they can span the whole range of industrial capabilities, from component and equipment suppliers up to complete turnkey solution providers.

Between the SMEs and the large groups sits the category of midcaps, companies whose total size exceeds the SME criteria, while still being of rather limited size (Eurospace sets the midcap limit at 10000 employees). Midcaps provide an important share of the European industry space employment (24%) and are particularly well represented in a few European countries, such as Spain, Switzerland, Norway, Denmark and Austria. With companies such as OHB, RUAG, GMV, Avio, APCO, Kongsberg D&A, Sitael, TTTech, Terma, etc.

The Eurospace survey also acknowledges the growing number of new entrants in the sector, supported by a large number of company creations thanks to the rise of private equity investment for space companies. This sector, usually labelled the 'newspace' created thousands of new work opportunities for space professionals in Europe, and is responsible for the growth of space employment figures in Europe. One key feature of these 'newspace' players (that are often small enough to be categorised as SMEs, although we identify them separately) is that they do not contribute (yet) to the creation of a measurable revenue, lacking a sizeable customer base.

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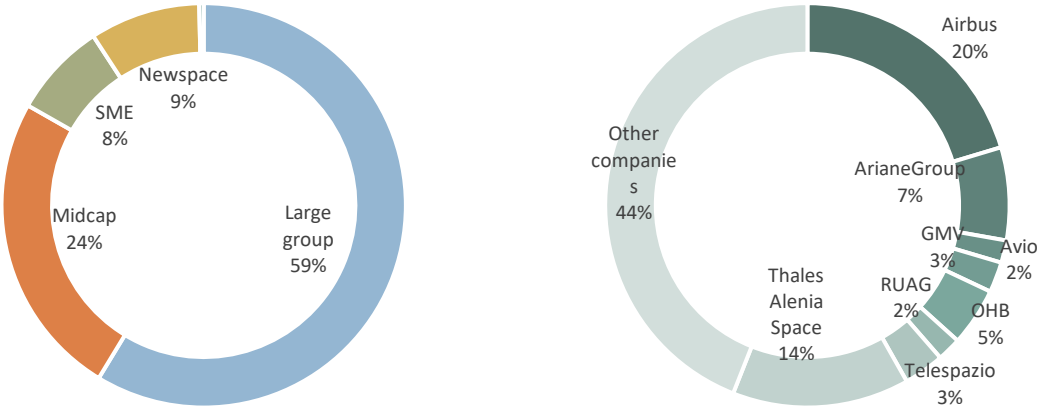
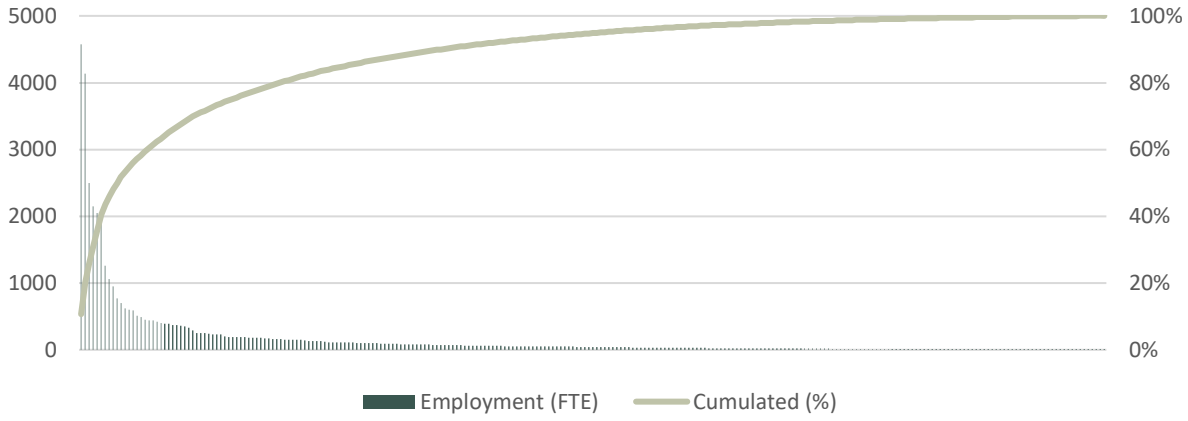
Employment distribution by company category (left) and corporate affiliation (right)



Note: for the sake of representation we grouped corporate entities on the basis of their membership in Eurospace. We present in the chart only the corporate entities whose space employment (susbisdiaries included) exceeds 1000 FTE.

Employment distribution by space unit - concentration in the space sector



The graph above demonstrates the high level of concentration in the space industry in Europe, where only a few space units concentrate most of the employment whilst the majority of space units have very low employment figures (the smaller ones having less than 10 employees).

Final Sales by Market Segment

Overview: European sales vs. Export

The sales of the European space industry are located mainly in Europe (77% of final sales). Exports represent a smaller, but significant share (23%).

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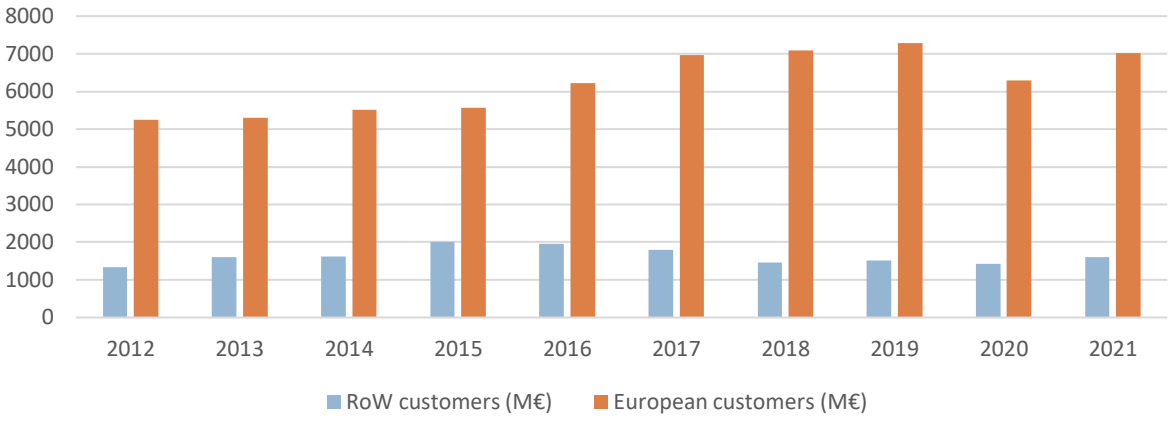
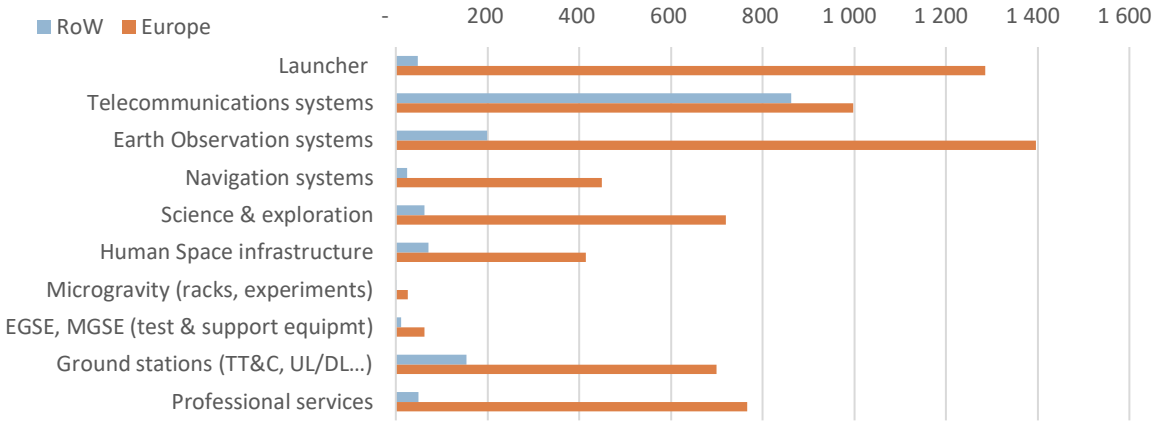
European sales vs. Exports (M€)



Sales by system - European customers vs. Exports in 2021 (M€)



European sales involve a variety of customers, including of course the main space agencies in Europe (ESA procurement alone representing more than one third of industry revenues). Consequently, European sales concern a broad range of systems, from scientific spacecraft to satellite applications and launcher systems. Differently, customers outside Europe are almost exclusively commercial satellite operators, and their focus is on the procurement of telecommunications satellite systems. The exports of European telecommunications systems sales are even more important than the value of domestic sales for similar systems.

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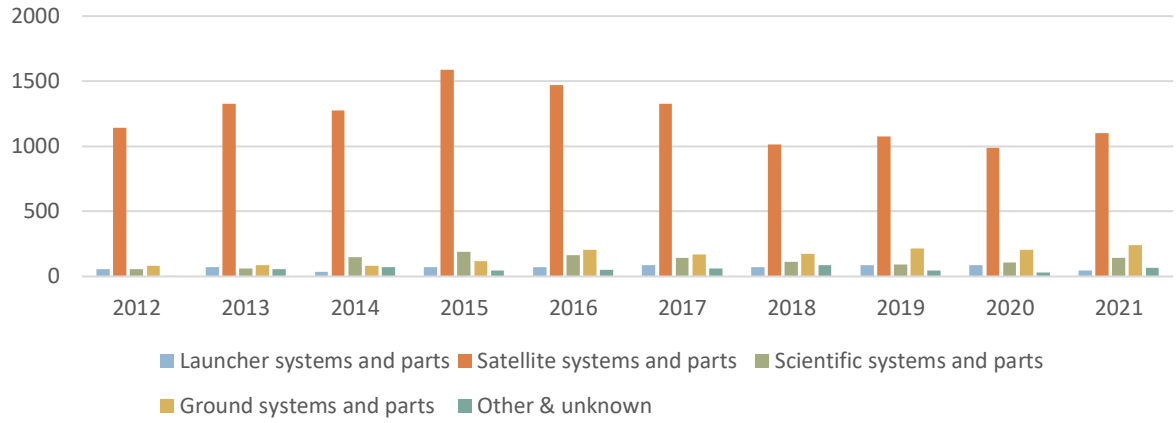
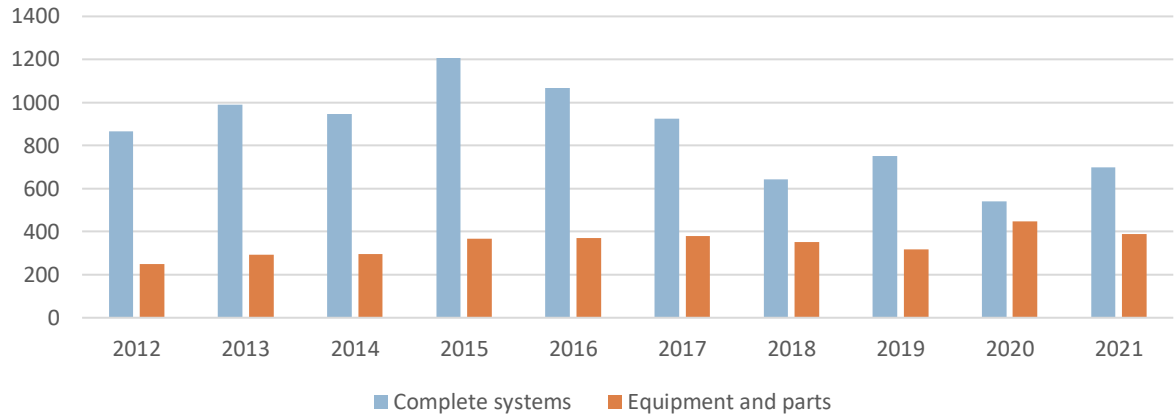
Export sales by system segment (M€)



Satellite systems and parts (mostly telecommunications) are the main segment for exports. Launcher systems are not prone to exports due to strict limitations on international trade in launcher technology. Exports for scientific systems are usually associated to bilateral intergovernmental agreements, but in recent years they have regained opportunities for export. Ground segment exports are often associated to satellite export contracts, but not systematically.

Export sales, spacecraft systems - complete systems vs equipment and parts (M€)



The majority of Europeans space systems are exported as complete systems directly to the launch pad. Notwithstanding the European industry has developed a market for space equipment and parts that are exported for further integration onto spacecraft produced outside Europe. These deliveries range from complete payloads for telecommunications (for Russian customers e.g.) to dedicated components and specialised equipment (such as amplifiers e.g.).

Focus: the space systems European trade balance 2012-2021

Eurospace analysed the situation of European space systems exports and imports in the past decade. This analysis was built upon the detailed data collected over the years by the f&f survey, and was complemented, for international comparisons, with the data compiled in the Launch Events Analysis Tool, a detailed compendium of annual launch events.

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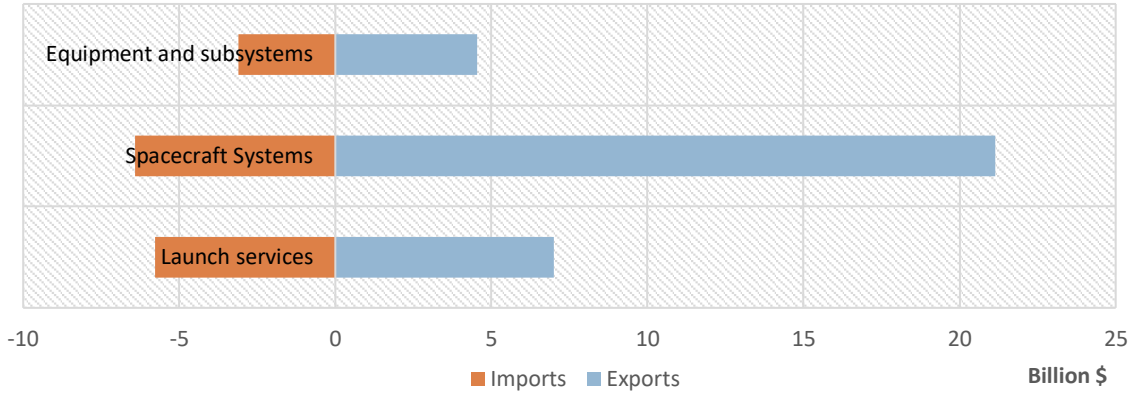
European space exports represented 23,1B$ in the past decade. The space manufacturing sector is a net positive contributor to the European trade balance, with an average net surplus of 1,6b$/year to the European trade balance. This contribution is split as follows:

- Complete satellite systems: 1,5B$/year
- Launch services: 130M$/year
- Equipment and subsystems: 150M$/year

There is a potential for improving even more the space systems trade surplus by reducing imports. Indeed the European customers are the largest importers of space systems and launch services worldwide, worth 15,3B$ in the past decade.

European space systems trade balance 2002-2021 (Billion $)



Methodological aspects

We consider that a spacecraft is an export when the spacecraft supplier and the spacecraft customer are from two different countries, except in Europe for which only trade outside European borders is considered an export. Therefore all spacecraft trades within Europe are considered domestic.

Spacecraft and launch services value estimates in $ are produced using a proprietary parametric price model. The model produces the full value of the spacecraft, and of its launch service, at the date of launch

Satellite exports

We estimate satellite value based on satellite mass, mission and supplier. The point is to define reasonable value estimates for each exported spacecraft, considering that 90% of the spacecraft involved are commercial, the value being usually rather well documented.

Note that satellites are not 'physically' exported. In practical terms satellites are moved from the place of production to the place of launch, this may entail cross-border movements, but they are not labelled as exports. For example, when the European-built Cluster satellites are transported to Baikonur for launch by Soyuz they are not considered exports in this analysis. Despite the fact that the systems actually cross borders, we label them as 'domestic' (i.e. build in Europe for a European customer). Similarly, when NASA procures a Progress flight from Baikonur to fulfill its obligations towards cargo resupply of the ISS, we label this as a Russian export (i.e. built in Russia for a US customer), despite the fact that the spacecraft is built in Russia and launched from a Russian state-controlled launch site. Thus, spacecraft exports are appreciated from the point of view of transfer of ownership and control of the spacecraft, as well as from the point of view of currency intake.

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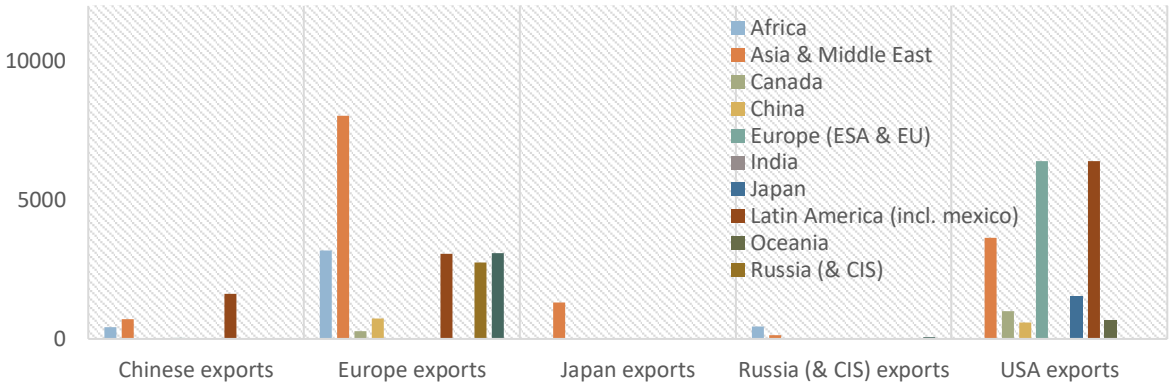
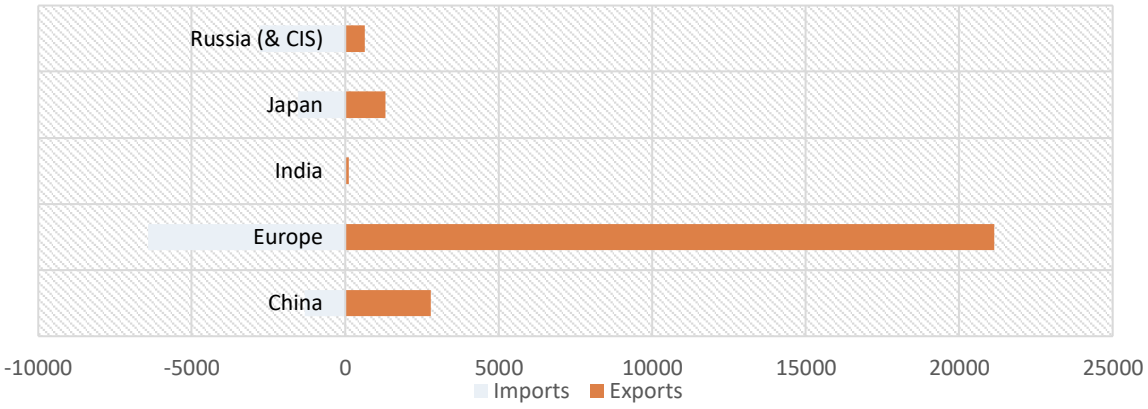
Satellite exports by importer region – 2002-2021 (M$)



Satellite exports are historically a market segment addressed almost exclusively by US and European companies. Russian exports are the very specific case of serving NASA demand for ISS crew and cargo deliveries since the Space Shuttle was phased out, while China started developing satellite trade as a tool for geopolitical expansion and economic diplomacy in the past decade.

The commercial performance on exports of the European industry is particularly good, achieving actual levels of exports comparable to that of the US industry in the past decade: the European spacecraft industry is a net contributor to the European trade balance, it contributed in average >1,5B$/year of trade surplus (including complete systems and exports of equipment).

The global satellite trade balance 2002-2021 (M$)



Launcher exports

We consider that a launch service is an export when the launcher used and the launch service customer are from two different countries, with a few notable cases and exceptions:

- European countries: only the launch services by Arianespace sold outside Europe are considered an export, all launch services procured by European countries (ESA+EU) are considered domestic.
- Russian launchers: All launches performed by Russian launchers for non-Russian customers are counted as Russian exports, even when the operator is not Russian (i.e. Starsem, Eurockot, Sea Launch, and Soyuz at CSG are all labelled Russian)
- RocketLab operates from New Zealand, but the company is registered in the USA. US customers of RocketLab are thus considered 'domestic' (the launchers are produced in the USA)

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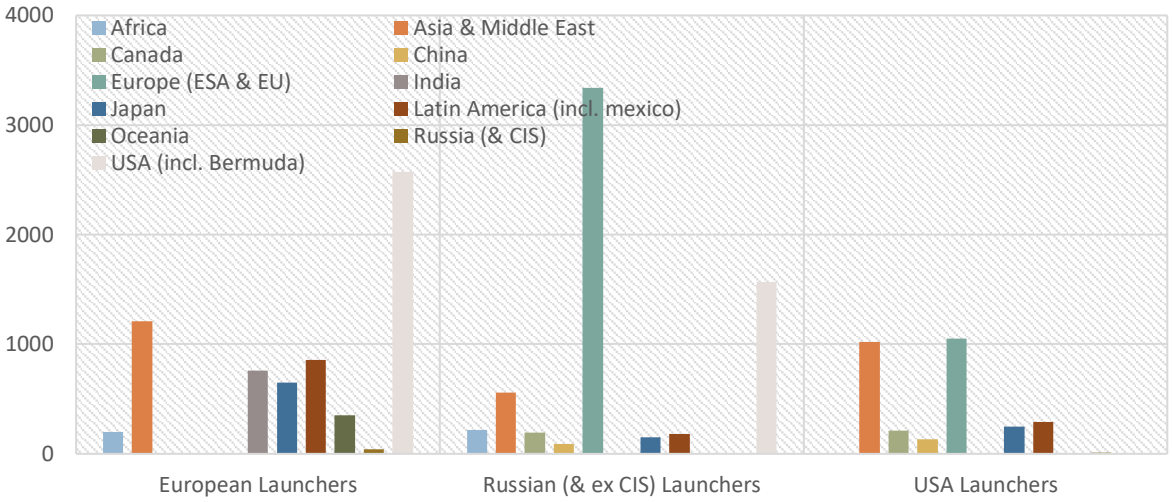
The rationale for these choices is that eventually most of the price paid for the service will benefit the launcher supplier country.

We estimate launch service value based on launcher version, mission/orbit and customer - the point is to create meaningful comparable figures, not precise valuation.

Note that launch services are not 'physically' exported of course.

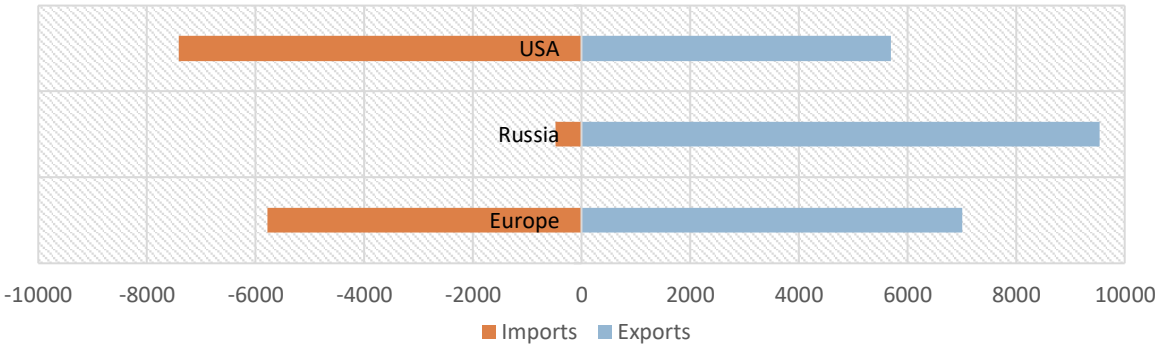
Launch exports by importer region M$ – 2011-2020



Europe (with Arianespace) has pioneered the launch services exports market 4 decades ago. European launchers have led the export market almost permanently in the past 3 decades, only challenged by Russia (with Proton) and (more recently) the USA (with Falcon). The growing competitive pressure and technical evolutions have driven launch prices down, which has had an impact on market values.

In total, European launch exports have contributed 1,**5B$ of net trade surplus in three decades**. If European customers had more consistently used European launchers, the net surplus could have been higher by 60 to 70%, although we note that the recourse to non-European launchers by European institutional programmes has improved in time.

Launch services trade balance comparison – USA, Russia & Europe (M$)



Both Russia and Europe exhibit positive launcher trade balance in the past decade, but Russia, with its highly consistent recourse to Russia launchers for all its domestic needs has no Launcher imports, in contrast with European customers that are still making rather significant recourse to US and Russian launchers for its

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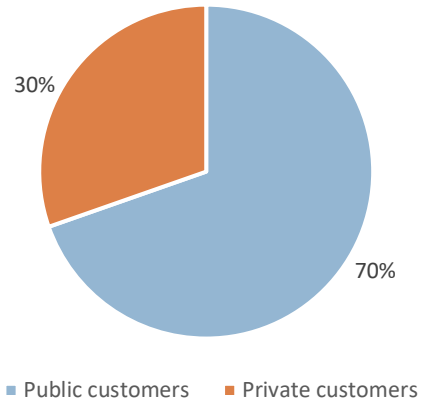
programmes. Launch services export contribute an average 600M$ a year to the Russian trade balance, and about 300M$ a year to the European one.

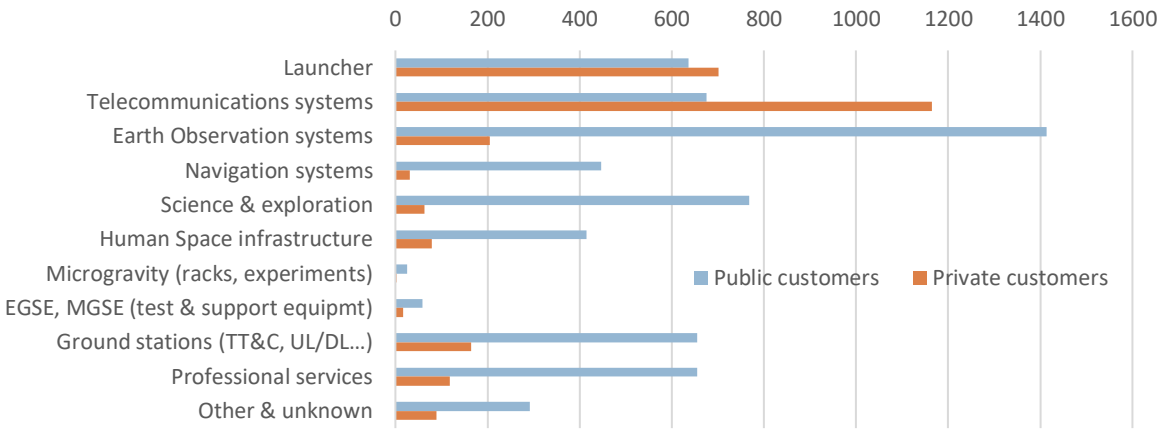
Overview - Public vs. Private customers

The sales of the European space industry are mostly associated to public customers (i.e. state-controlled/owned entities). They represent 72% of final industry sales. Private customers represent a significant, though lesser, share of European space industry sales, worth 28% of final industry sales.

Sales to Public vs. Private customers (%) in 2021



Sales by system segment - Public vs. Private customers (M€) in 2021



Historically public entities have been the sole customers for space systems in Europe (and worldwide). Today, public/governmental programmes are still the largest contributors to space industry activity worldwide, and Europe is no exception to this rule. Public customers (i.e. government controlled entities) are mostly composed of space agencies in Europe and abroad, as well as public satellite operators (such as Eumetsat in Europe, or Arabsat, Chinasat, RSCC worldwide). The gradual privatisation of a few specific areas of space activity has favoured the development of private customers for space systems. The first in line was Arianespace, the European private launch services operator. This development was accelerated at the turn of the millennium with the privatisation of all main telecommunications satellite operators (Eutelsat, Inmarsat, Intelsat).

As a consequence of the structure and nature of commercial markets in space, European space industry sales to private customers are concentrated upon two main product lines: large geostationary telecommunications

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satellite and operational launch systems for operations at Kourou. Since the late nineties, two secondary commercial markets have emerged; the market for low Earth orbit mobile communications satellites (in constellations) and the market for commercial Earth observations systems. We now see an emerging commercial/export market in the areas of Science and (more importantly) in the segment of human spaceflight.

Customer details

Focus: European public/institutional customers

European public institutions, including ESA, national agencies, Eumetsat, and later the military and the EC, are the core historic customers of the European space industry. Today they represent 65% of space industry sales.

Space agencies have been established in Europe progressively from the sixties to nowadays. They have progressively acquired an extended technical competence that allows them to manage the complexity of space programmes, a unique competence that is put to the service of other institutions. Space agencies (ESA and CNES in particular) not only manage and procure programmes serving their own purpose, but also provide technical management and procurement services to other entities. The most notable cases involve complete programme delegation, where full budgets are delegated to the space agency for implementation on behalf of a third party. This is the case of the Copernicus satellites, managed and procured by ESA on behalf of the European Commission. This is also the case of the Galileo programme, where ESA ensures all procurement on behalf of the Commission. Similarly, ESA has consistently developed and procured the European meteorological satellites on behalf of Eumetsat.

Thus, it is no surprise that ESA is now the single most important customer of the European space industry, worth 3,6 B€ of revenues. In this total, the European Commission programmes delegated to ESA represent an estimated 637 M€ worth of revenues for the sector. Furthermore, programmes delegated by Eumetsat represented 134 M€ of revenues for industry.

After ESA, national space agencies in Europe represent the most sizeable share of revenues from European institutional programmes, worth 1047 M€. These are the revenues generated by national space programmes. Most of these are associated to the activities of CNES (France), DLR (Germany) and ASI (Italy). It must be noted however that these three civil space agencies also occasionally manage programmes on behalf of the military. This was the case of Essaim (CNES/DGA), Satcom BW (DLR/Bundeswehr), Sicral (ASI/Forze Armate Italiane). In 2021 the estimated value of military systems procured by civil space agencies in Europe was 49M€.

With regard to the sales to military institutions in Europe, they represent revenues worth 611 M€. Since not all military systems are procured directly by military entities, the total value of military systems sales is higher than the value of sales to military customers in Europe, worth 599 M€. This total includes the procurement of civil space agencies, worth 57 M€, the PPP approaches (e.g. Airbus/Skynet) worth 38 M€, and exports worth 78 M€ and a further 23 M€ worth of military systems whose customer could not be identified in the survey. In total, the sales of military systems represent 677 M€ in 2021..

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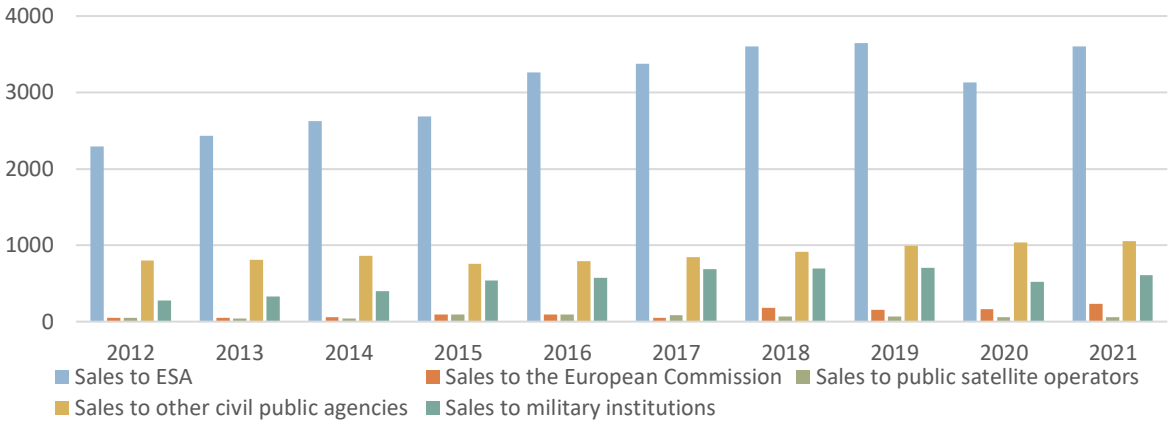
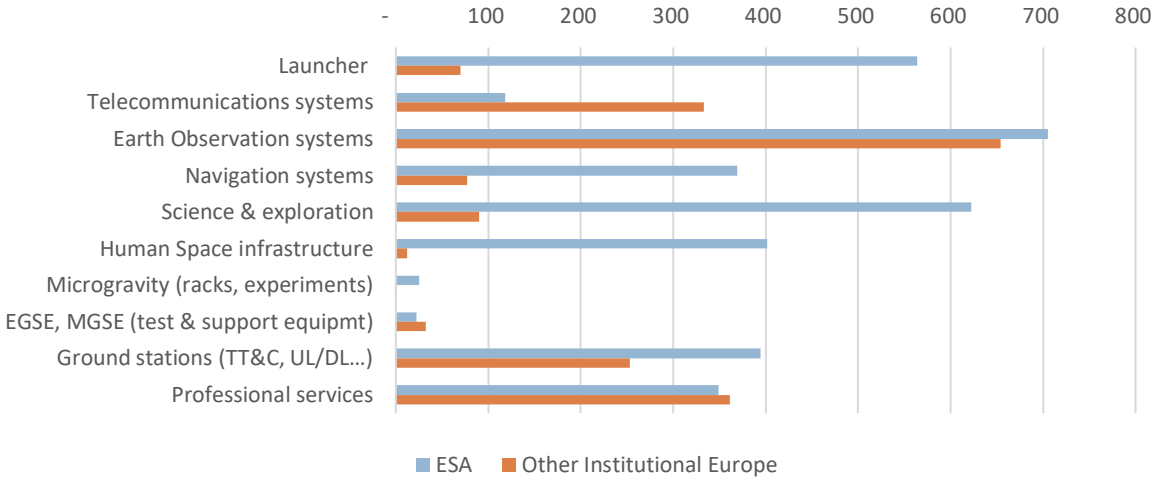
Focus: Sales to European institutional customers by procuring entity (M€)



NOTE: In these two graphs all sales to ESA include also the programmes with budget delegation from the EU (GMES/Copernicus and Galileo/EGNOS) and from Eumetsat. The two EU programmes represent 637 M€ worth of industry sales to ESA. Eumetsat delegated procurement represents 134 M€ worth of industry sales. An estimate of the yearly impact of EU programmes on space industry revenues is provided further down. Sales to the EC include revenues from grants (H2020 e.g.) and from direct procurements managed by the GSA.

Sales to European institutional customers by system (M€) in 2021



It is interesting to note that ESA and other institutional customers in Europe are not procuring the same types of systems. For Earth observation systems, the most important area of activity for institutional programmes, we note that ESA, supported by the Copernicus and Meteosat delegated budget generates revenues comparable than those of all national agencies. This clearly shows that Earth observation is still considered as a strategic activity for some member states (France, Germany and Italy mostly) that invest more on national programmes than what they provide to ESA. For telecommunications, we note an even more striking situation with industry revenues from ESA programmes being lower than those of national programmes. On the contrary some branches of activity are almost completely organised in the ESA frame, this is the case of launch system development, human spaceflight (and ISS activities), and science.

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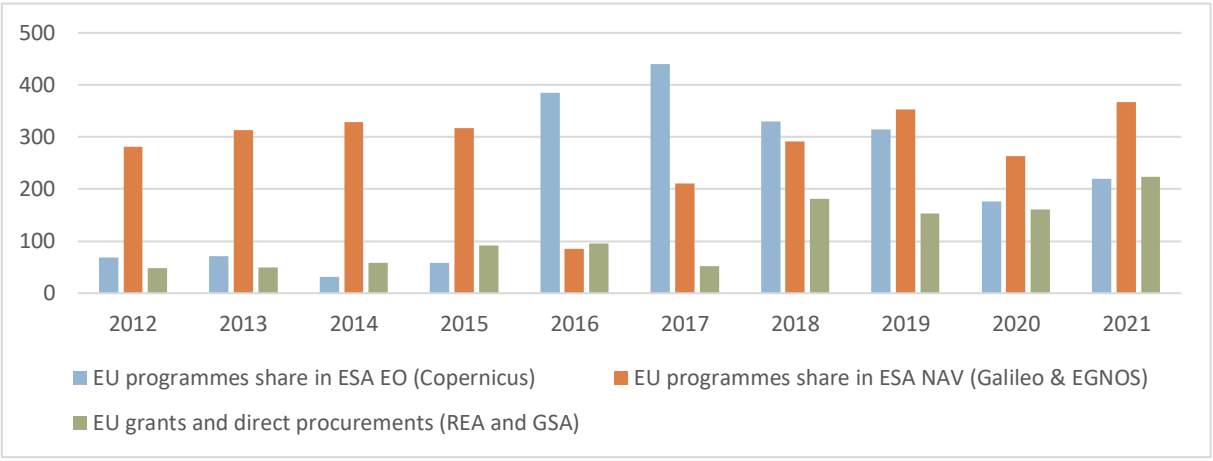
EU programmes contribution to industry Sales (estimate - M€)



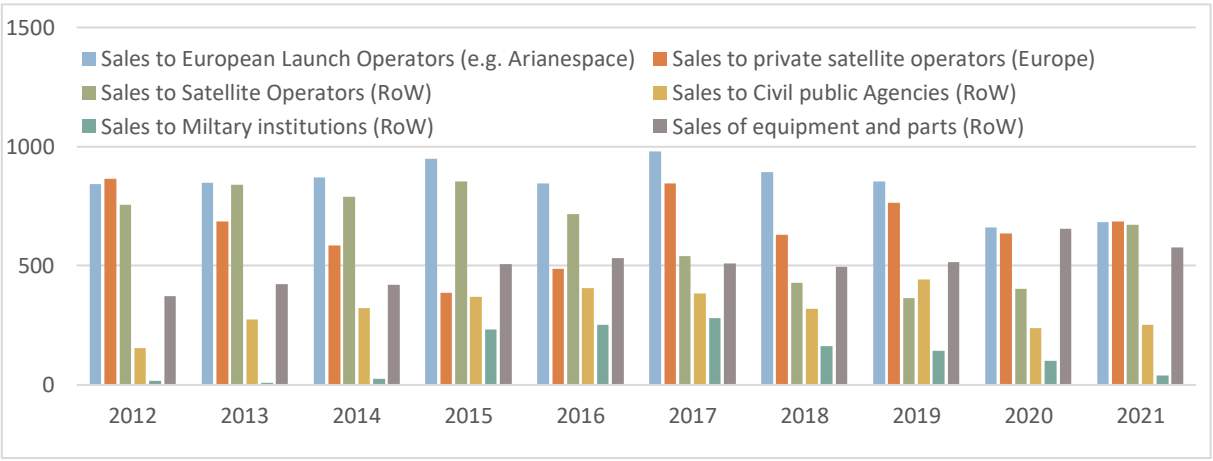
Note: the chart above estimates the annual contribution of EU programmes to space industry sales (inclusive of Galileo, EGNOS, Copernicus, and Research grants). European Union programmes contribution to industry sales is increasing regularly since 2009.

The commercial market (private customers and exports)

With the establishment of Arianespace, and later the advent of commercial satellite operators, the European space industry has added new customers on top of its core business with European institutional customers. These customers are commonly referred to as 'the commercial market', although not all of them are private entities.

The 'commercial market' is the market composed of private entities (e.g. satellite operators, Arianespace), and public entities located outside Europe. In other terms we define the commercial market as all sales to private entities, plus all exports (sales to customers outside Europe).

Sales on the commercial market by customer (M€)



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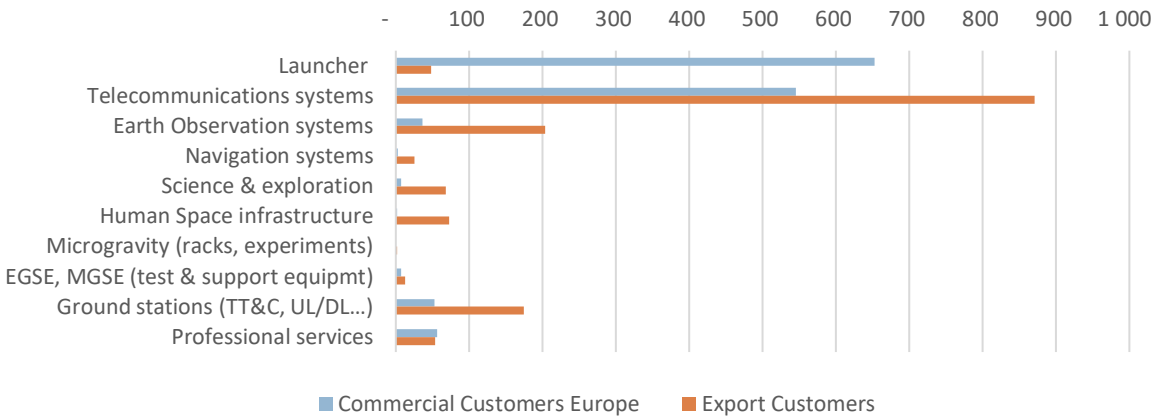
Sales on the commercial market by system (M€) in 2021



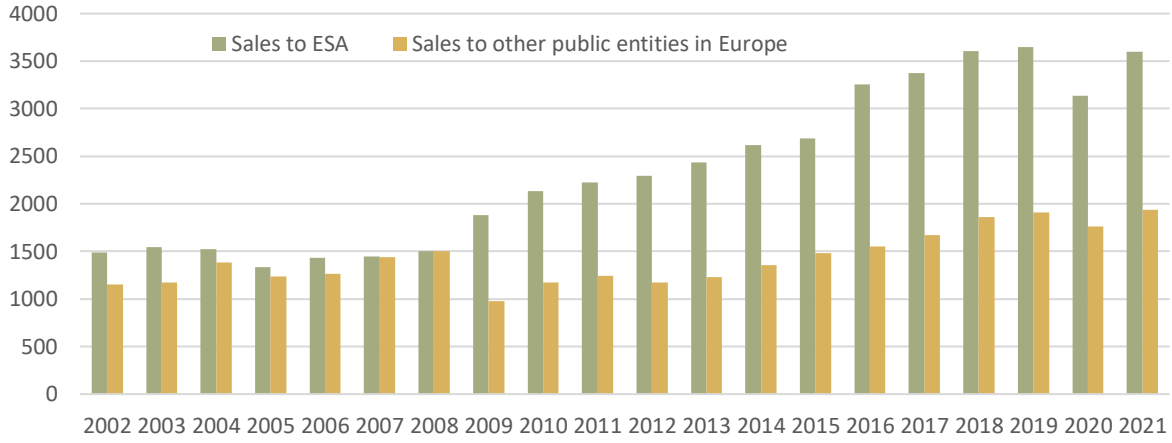
Differently than the European institutional market, where sales are distributed among a wide variety of different systems, in the commercial market the sales are concentrated on two main types of systems: launchers (24%) and telecommunications systems (48%).

In telecommunications systems the importance of exports is particularly worth noting. They represent alone 48% of the European space industry sales on the commercial market, and 56% of total exports. The future of the commercial satellite communications business is very uncertain today. The broadcast business that was at the core of satellite operators markets, based on GEO infrastructure, is now in a transition phase towards new business models (such as broadband offering, in GEO, LEO and MEO...).

In all other product segments the commercial market is far from being similarly mature/sizeable, and European industry sales are altogether still limited.

Overview: Historic series - customer segment

Historic series: Institutional Europe (M€)



Note: two EC programmes (Galileo and Copernicus/GMES) are managed by ESA on behalf of the EC. The sales associated to these programmes are thus **included in the ESA values**. The contribution of the EC to ESA probably explains most of the growth of sales to ESA observed after 2008. The series 'sales to other entities in Europe' is mostly relevant to the revenues generated by national programmes (civil and military).

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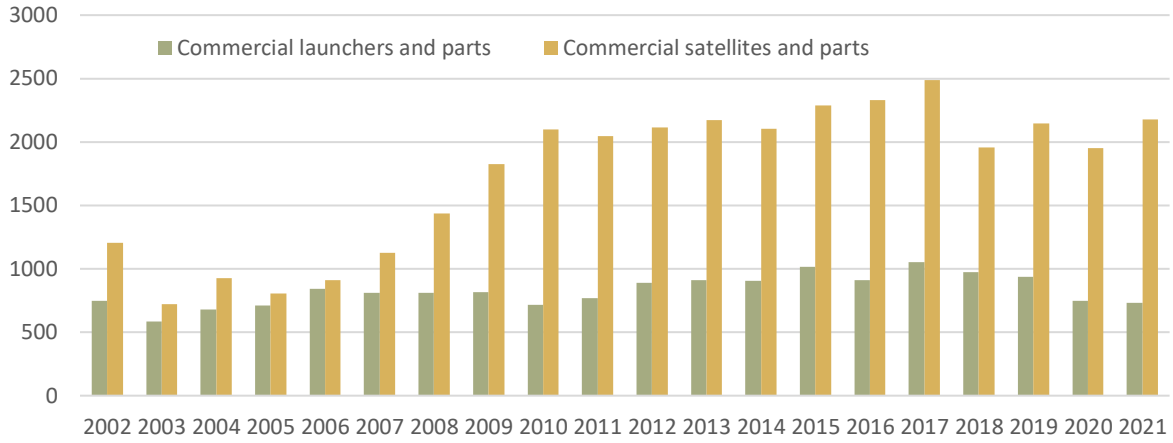
Historic series: Commercial market & export (M€)



Note: for historic series the value of exports alone is unknown. Eurospace started measuring exports separately only with the 2009 methodological update.

Final Sales by Product Segment

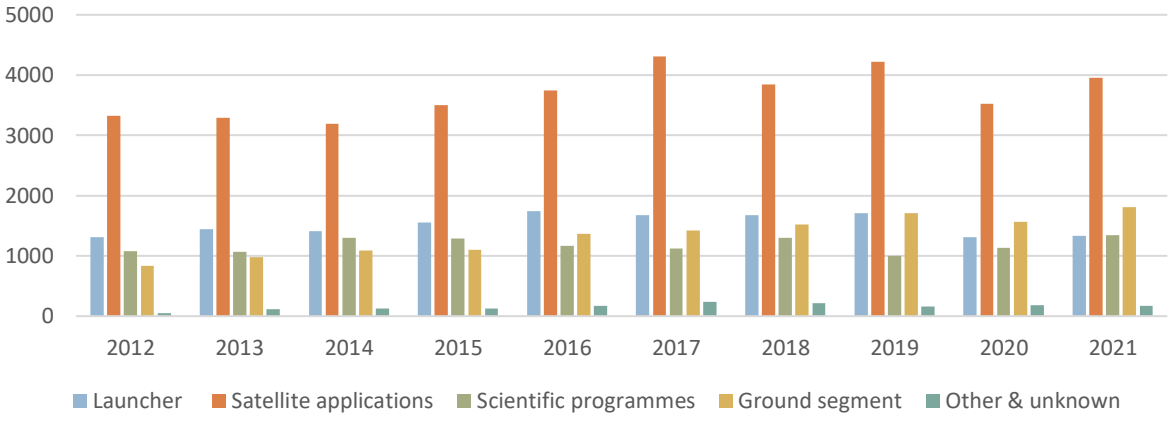
Overview: sales by main product segment

The Eurospace survey identifies 4 main product segments in European space industry sales, each lending itself to further categorisation: Launcher systems, Satellite applications, Scientific systems, and Ground systems/services.

Sales by macro product segment

M€	2017	2018	2019	2020	2021
Launcher systems	1671	1679	1714	1316	81
Satellite applications systems	4307	3847	4225	3525	3877
Scientific programmes	1122	1297	998	1129	1289
Ground systems and services	1418	1522	1705	1567	485
Other & unknown	240	215	161	183	220

Sales by macro product segment - recent evolution - (M€)



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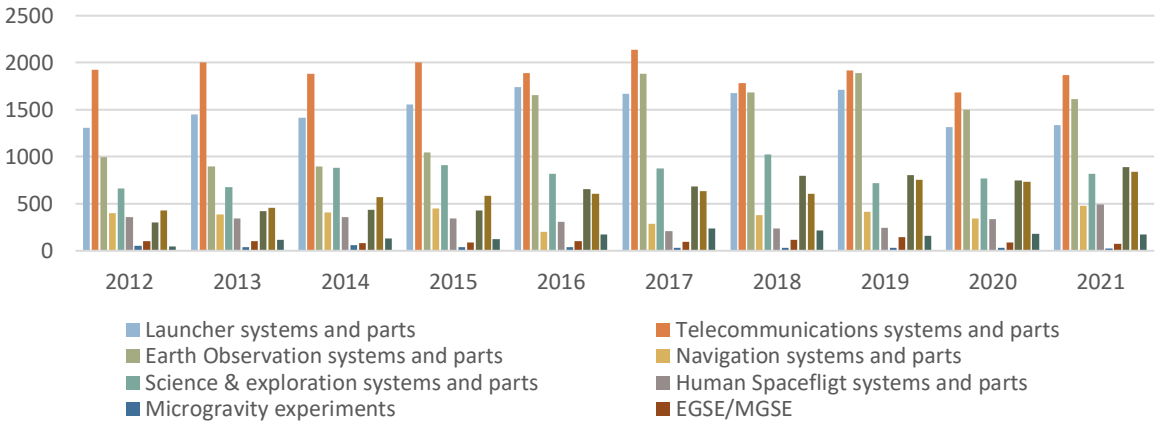
Sales by product segments, details (M€)



- *Launcher systems: The category only encompasses space launchers, all missile activity is excluded from the perimeter of the survey. Launcher systems are further split between operational launcher systems and parts (sold to launcher integrators and to launch services operators) and launcher development activities (funded by space agencies, so far).*
- *Satellite applications: this category considers satellite systems, i.e. autonomous systems destined to be operated in Earth orbit to perform an operational mission. Satellite systems category thus includes all systems (and parts) for telecommunications, Earth observation (including meteorology), and navigation/localisation/positioning.*
- *Scientific systems: this category encompasses all spacecraft with a scientific purpose. This includes all scientific satellites (i.e. for astronomy or Earth science purposes) as well as all human related structural components (cargo spacecraft, habitable modules etc.) and microgravity equipment (racks and modules for operations in the space station, or in artificial microgravity environment such as drop towers/parabolic flights).*
- *Ground systems/services: this category considers hardware and services closely associated to space systems development, production and operations. The category includes: professional ground stations (uplink/downlink stations) and ground control centres (for telemetry, tracking, and command - TT&C), Electric and mechanical ground support equipment (EGSE/MGSE - specialised equipment used to test and integrate space systems), services (only professional services, including test and engineering services associated to development and manufacturing), and ground control centre and operations services associated to spacecraft or launcher operations.*

Sales by macro segment and by customer (M€)

M€	Launcher syst	Satellite apps	Scientific progs	Ground & services	Other / Unknown	Total
Sales to ESA (incl. Copernicus & Galileo)	564	1193	1049	765	31	**3602**
Sales to other European institutions (public)	70	1064	102	647	53	**1937**
Sales to Public institutions RoW	3	312	32	81	31	**458**
Other/unknown European customers	4	17	38	37	22	**117**
Sales to European private operators	1	584	8	88	5	**685**
Sales to Arianespace	652	1	2	28	0	**682**
Sales Private satellite operators RoW	1	386	28	82	6	**504**
Sales of equipment and parts RoW	43	388	75	52	23	**581**
Other/unknown RoW customers	1	15	8	26	5	**54**
Total	**1338**	**3959**	**1341**	**1806**	**175**	**8620**

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Looking at the matrix of sales (the distribution by macro segment and by customer/procuring entity) we note that all product segments are not associated to the same customer categories.

ESA procurement addresses all product segments in the sector, but maintains a marked focus on scientific programmes (worth 29% of total sales to ESA, and 78% of total sales in scientific systems). This is consistent with the historic mandate of European cooperation in space established in the 60s with ESRO (European Space Research Organisation).

Launcher sales are very much focused on two main customers, ESA (42% of launcher sales) and Arianespace (49% of launcher sales). This is consistent with the organisation of launcher development and procurement activities in Europe where Arianespace is procuring operational launcher systems while ESA is financing launcher development and consolidation activities.

Satellite applications sales (sales of systems and equipment for telecommunications, Earth observation and navigation) are more evenly distributed across a variety of customers in Europe and outside Europe. Of course satellite operators worldwide (public and private) are the core customers for this segment of products worth 28% of total satellite applications sales. The exports of equipment and parts (complete payloads, specialised equipment etc.) represent a sizeable amount (10% of total satellite applications sales).

On the ground systems & services segment, the core business is located with European institutional customers (78% of total ground system/services sales). Within this segment, sales are mostly associated to ground control centre hardware and services, as well as engineering services provided in support of technical space agency activities.

Focus: Military systems and military customers

In Europe, differently than in the USA, Russia or even China, military applications of space are rather under-developed. Strategic considerations have not been a major driver of space systems development in the early years of European space programmes, and today European space military programmes are still organised at national level rather than at European level.

Military space programmes in Europe have almost exclusively developed in the areas of telecommunications (with the Syracuse, Skynet, Sicral, Satcom BW systems…) as well as in the area of remote sensing and electronic intelligence (Helios, Cosmo-Skymed-Pleiades, Essaim…).

The technical and financial management of military space programmes in Europe has been associated to a wide variety of solutions, from the direct procurement of military systems by defence procurement agencies (such as the French DGA) to budget delegation to national space agencies (such as the DGA/CNES agreement or the Bundeswehr/DLR scheme) as well as a variety of public-private partnerships (such as the Skynet/Paradigm scheme with the UK Ministry of Defence). As a result, the economic assessment of military systems sales cannot be limited to the assessment of industry sales to military entities.

The Eurospace methodology identifies all sales to military entities, but also the sales of military systems under procurement by civil public and private entities.

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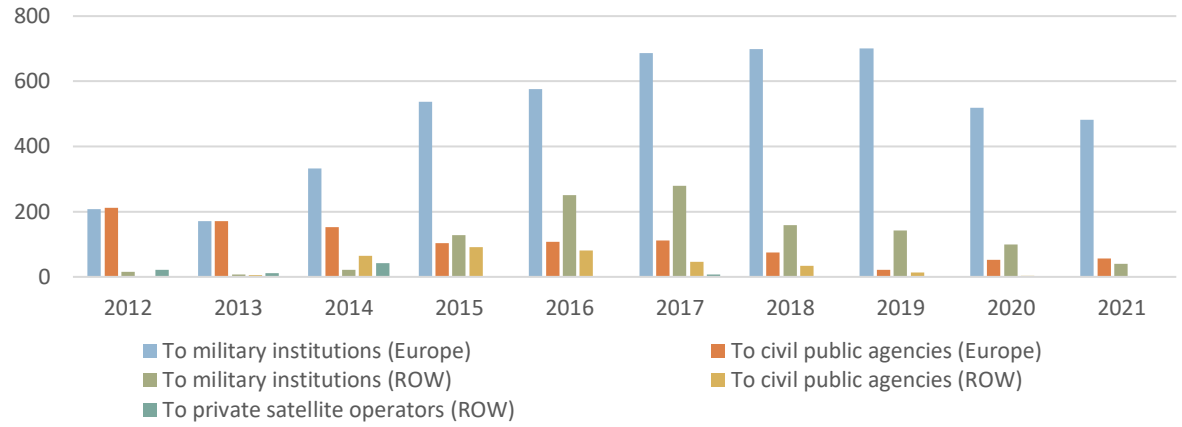
Focus on Military systems: military systems sales by customer segment (M€)



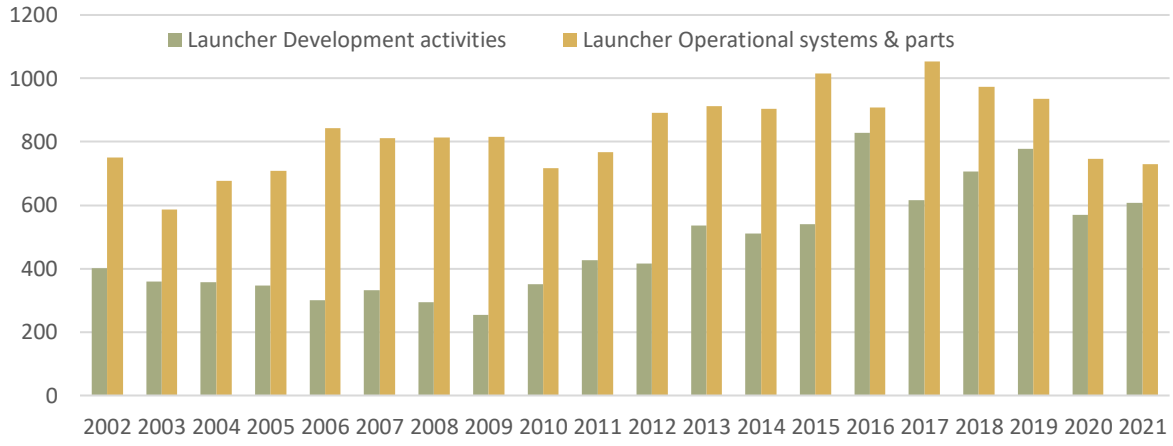
With regard to the sales to military institutions in Europe, they represent revenues worth 611 M€. Since not all military systems are procured directly by military entities, the total value of military systems sales is higher than the value of sales to military customers in Europe, worth 599 M€. This total includes the procurement of civil space agencies, worth 57 M€, the PPP approaches (e.g. Airbus/Skynet) worth 38 M€, and exports worth 78 M€ and a further 23 M€ worth of military systems whose customer could not be identified in the survey. In total, the sales of military systems represent 677 M€ in 2021.

Due to their strategic nature, defence markets are still very much organised nationally worldwide. With military space systems this situation is reflected in the sales figures for European military space systems, where exports are a growing fraction of military systems sales.

Launcher systems sales

Launcher system sales include sales of operational launch systems to Arianespace procurement, the exports of launcher equipment and parts, and all launcher development and consolidation activities funded mainly by ESA.
The European space industry currently manufactures two different launchers, the Ariane 5 system (heavy launcher), and the VEGA system (small/medium class launcher). Both are operated by Arianespace from the European spaceport in French Guyana, alongside the Russian Soyuz launcher. The Soyuz is produced in Russia and is not associated to any significant revenues for the European space manufacturing industry.

Long series: Launcher systems sales (M€)



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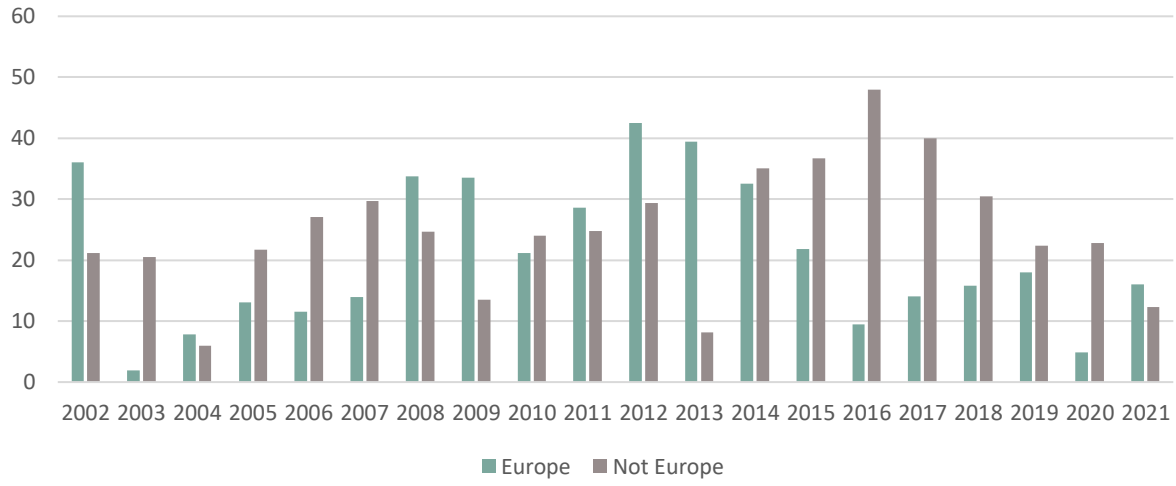
Launcher programmes include two different and complementary market segments.

A market for operational launcher systems: the space industry produces and integrates the Ariane and VEGA launch systems for Arianespace. This is strictly a domestic market, although Arianespace services are sold to customers worldwide. The level of business in this segment is driven mostly by Arianespace demand for launch system, itself being strongly linked to the global demand for launch services and by the competitiveness of Arianespace. Industry also exports launcher parts (e.g. fairings, nozzles) that are integrated to non-European launchers (e.g. Atlas in the USA, H2 in Japan).

A market for launch system development activities: development programmes are funded almost exclusively through ESA, they aim at preparing the future (e.g. FLPP) or at consolidating and improving existing technology (e.g. ARTA, VERTA). The level of business associated to this market is driven by policy decisions. In 2014 European Ministers at the ESA Council decided to embark on the development of a new launcher system: Ariane 6. The impact of the Ariane 6 development programme on industry revenues is quite visible since 2016.

With the exception of launcher parts for exports (only 4% of launcher sales), the whole launcher system market is domestic, on both its operational and development market segments. Notwithstanding the customer base of Arianespace business is markedly international, since over past years most of Arianespace launched mass was by non-European customers.

Long series: Total mass (tons) launched by Ariane and Vega launchers by customer region



Note that in the graph above only the satellites launched with the Ariane 4, Ariane 5 and Vega systems are taken into account. Arianespace also operates Soyuz launchers, whose activity is not considered here.

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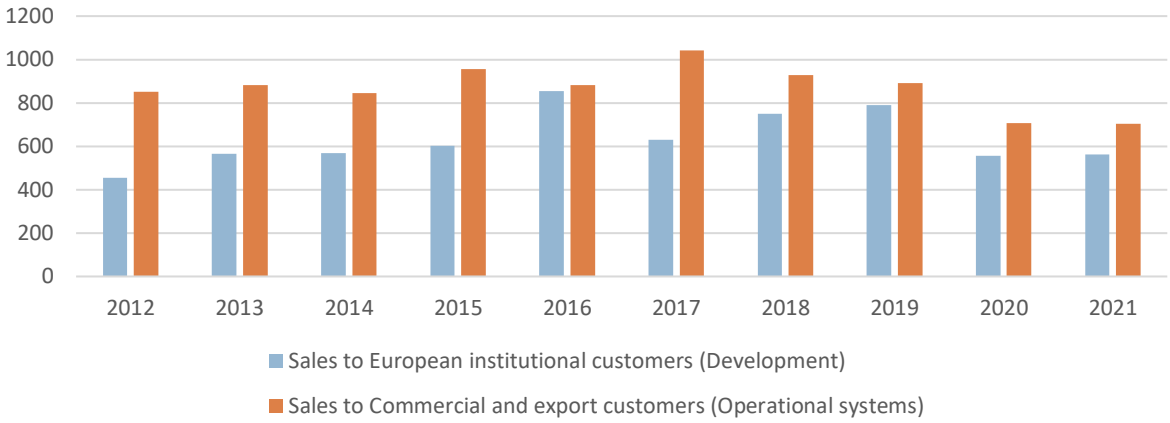
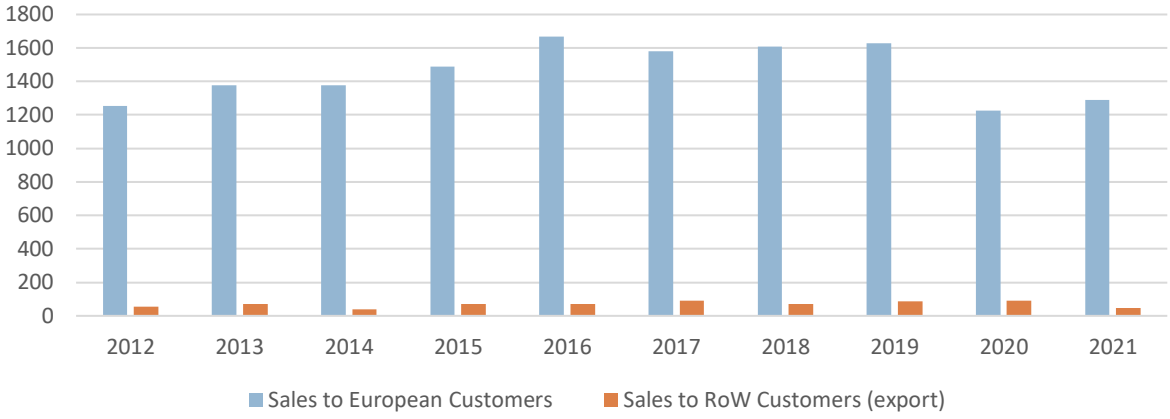
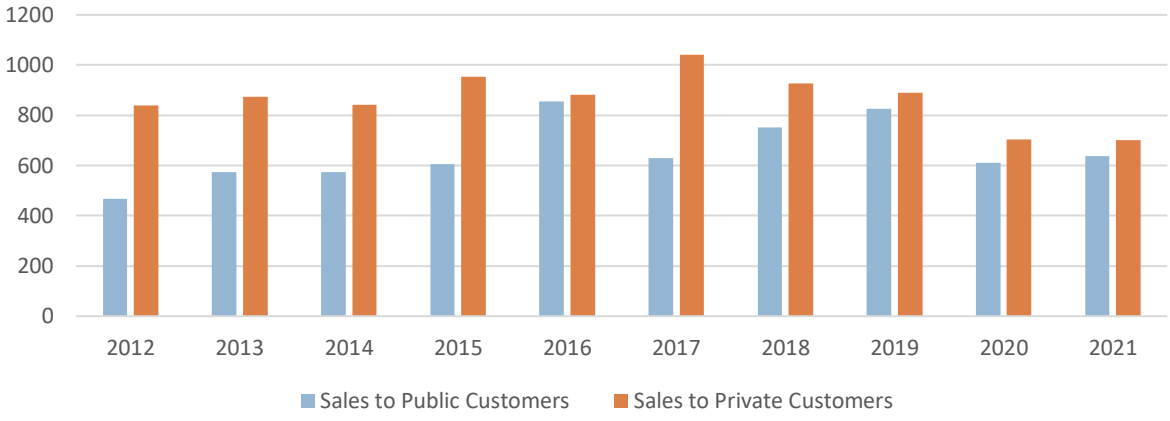
Launcher segment details, commercial vs. institutional customers sales (M€)



Launcher segment details: European vs Export customers (M€)



Launcher segment details: Private vs. public customers sales (M€)



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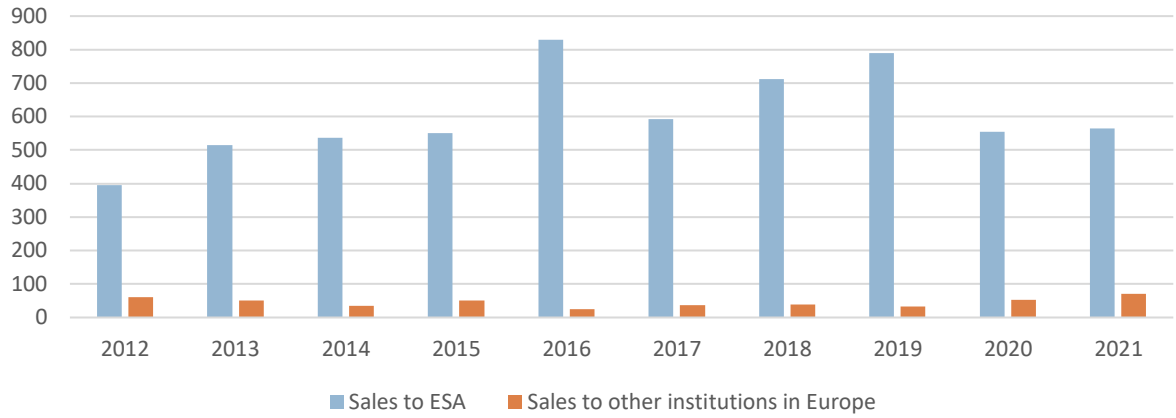
Launcher segment details: Sales to public entities in Europe (M€)



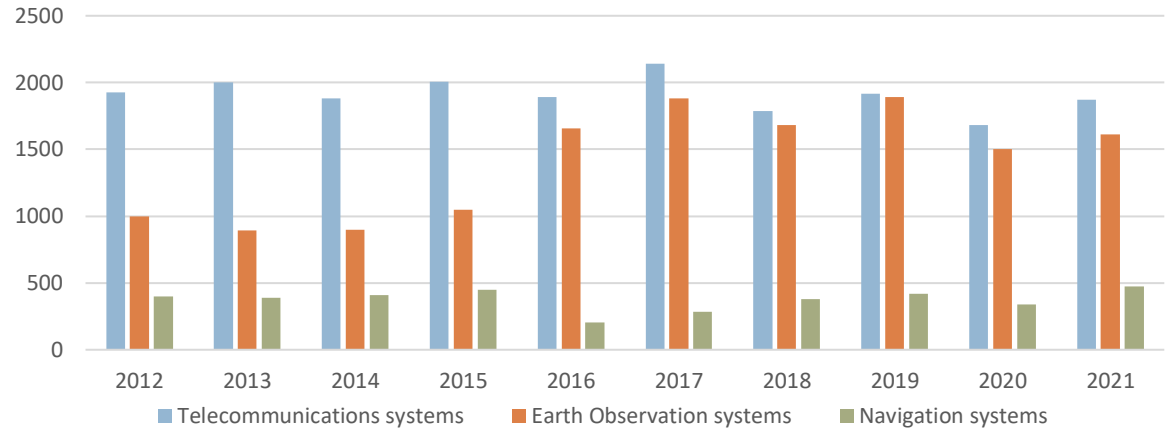
For launcher development programmes ESA manages the largest budget in Europe. National and EU programmes are comparatively very small.

Satellite applications sales

Satellite applications: this category considers satellite systems, i.e. autonomous systems destined to be operated in Earth orbit to perform an operational mission. Satellite systems category thus includes all systems (and parts) for telecommunications, Earth observation (including meteorology), and navigation/localisation/positioning.

Satellite applications, as a whole, represent the most important source of revenues for the European space industry, worth 46% of final sales. They are also the main export segment with 69% of exports.

Satellite applications details: distribution by application - decadal evolution (M€)



The evolution over time of sales among the three segments of satellite applications is very different. Telecommunications systems sales exhibit a high variability with an evolution that may be driven by a cycle. Fluctuations in telecommunications systems sales are mostly linked to fluctuations in the commercial/global market for geostationary telecommunications systems. In Earth observation, the evolution is marked by rather stable sales over time. In navigation the situation is that of an emerging market segment, with no significant sales until the mid-nineties, and from there on a growth associated to the gradual commitment of European public institutions to the development and deployment of the European EGNOS, and Galileo systems.

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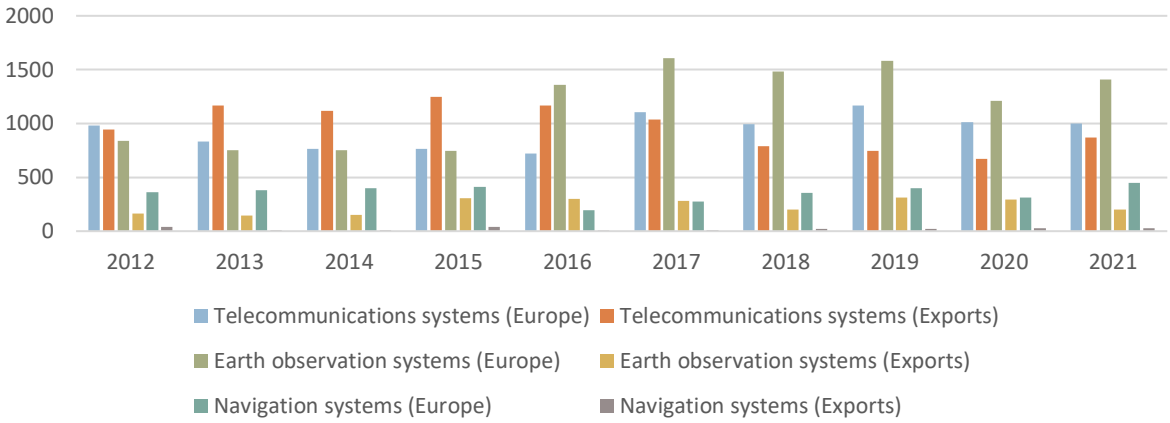
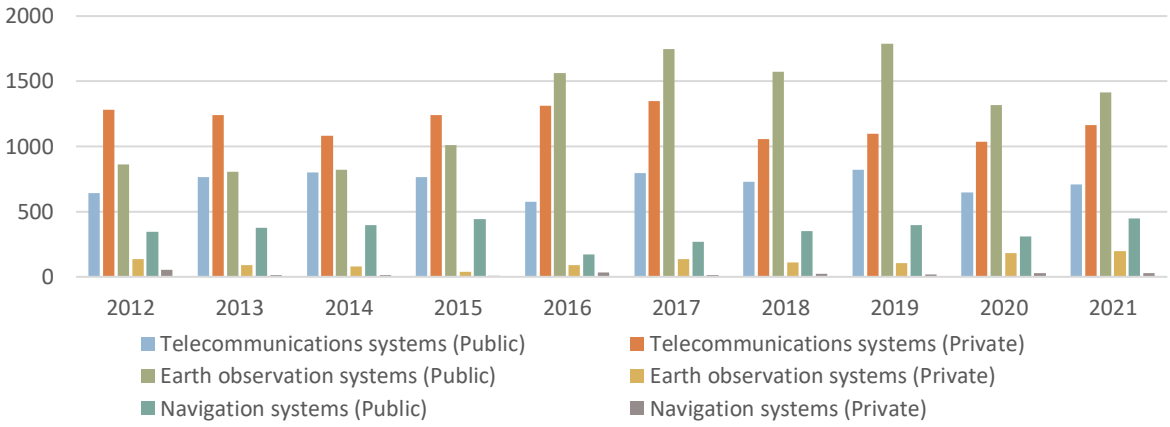
The sales of satellite applications systems are composed at 89% of complete systems sold to final customers such as space agencies (in Europe and abroad) and satellite operators. A small percentage of satellite applications sales (11%) is associated to the export of satellite parts and equipment, ranging from complete payloads for telecommunications system, to smaller parts and equipment such as amplifiers, TWTs, gyros, etc. These parts and equipment are sold for integration in satellite systems produced by non-European space companies (mainly in the USA and Russia). These not so marginal exports highlight the excellence of some specific European products.

Satellite applications sales: European sales vs. exports (M€)



Satellite applications represent the major segment of exports for the European space industry. These exports are not evenly distributed among the three sub-segments. In fact, most of satellite applications systems exports are associated to telecommunications systems (79% of all satellite applications exports). For the other two sub-segments export markets have yet to develop significantly, although European Earth observation systems are facing a growing non domestic demand from emerging operators and aspiring space countries.

Satellite applications sales: Private vs. Public customers (M€)



The satellite applications market segment is composed at 65% by the demand expressed by public customers, mostly public agencies such as ESA (mostly acting on behalf of the EU in this segment), national space agencies and public satellite operators such as Arabsat. Private entities are found on the demand side mostly in telecommunications systems, where they represent the core demand (i.e. Eutelsat, Inmarsat, SES etc.).

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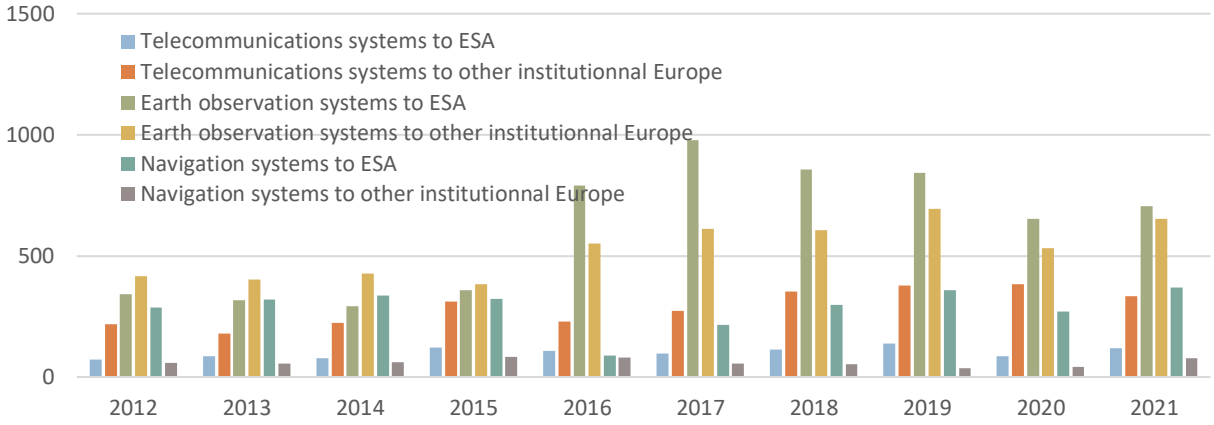
European institutional/public customers are core players in the satellite applications market, their demand is worth 57% of the total satellite applications sales, and worth 88% of the demand expressed by public customers worldwide in this market segment.

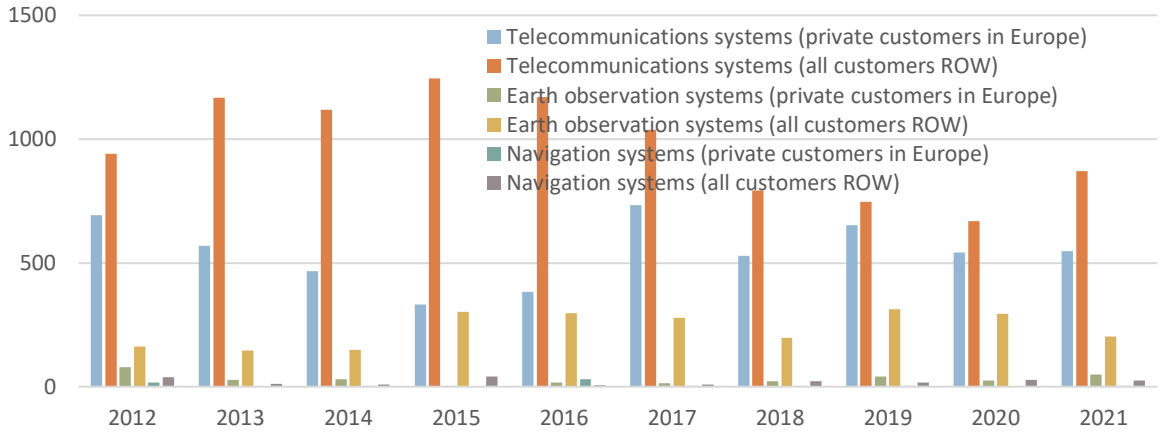
Satellite applications sales: focus on the European institutional market (M€)



Note: two EC programmes (Galileo and Copernicus/GMES) are managed by ESA on behalf of the EC. The sales associated to these programmes are thus included in the value of sales to ESA. It is estimated that GMES activities represented almost half of Earth observation sales to ESA and Galileo about 90% of the navigation-related sales to ESA.

Within the specific sub-segment of European institutional customers a few peculiarities can be highlighted with regard to the split between sales to ESA and sales to other institutional entities (mostly national space agencies). In two sub segments the activities performed under ESA procurement generate more business that those performed mainly in a national environment. This is the case for navigation and Earth observation. On the contrary, in telecommunications, the majority of sales occur outside the ESA procurement scheme (with national funding). Such a situation suggests that in telecommunications and Earth observation ESA member states rather promote activities on a national scheme, supporting the development of their own industry.

Satellite applications sales: focus on the commercial and export market (M€)



The commercial and exports market for European satellite applications systems is mostly associated to the sales to telecommunications satellite operators to the point that sales to telecommunications satellite operators represent 28% of total sales of satellite applications, and are worth as much as 63% of sales in the total commercial

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and export market segment. The smaller value of sales of Earth observation and navigation systems on the commercial and exports markets is due to the lower commercial maturity of these market segments, compared to telecommunications.

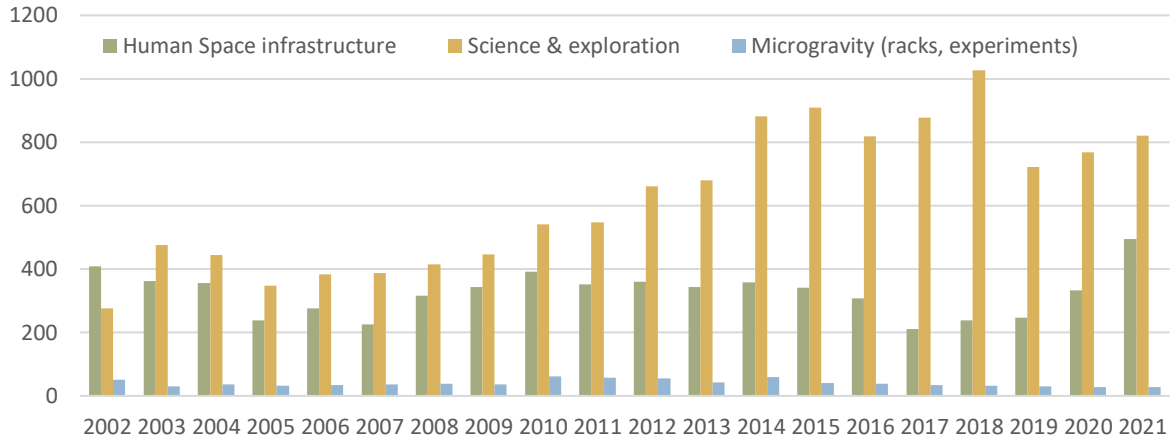
Satellite applications: sales matrix (M€) in 2021

M€	Private customers Europe	Public customers Europe	Private customers RoW	Public customers RoW	Total
Telecommunications systems	546	407	586	258	**1797**
Earth Observation systems	34	1342	150	53	**1579**
Navigation systems	2	441	26	0	**469**
Total	**582**	**2190**	**762**	**311**	**3845**

Scientific programmes sales

Scientific programmes cover activities exclusively related to governmental programmes. With the development of exploration missions and the interest of not missing the appropriate launch windows for such remote targets as Mars (Mars Express, Exomars) or Jupiter (Juice), a growth trend in exploration and science has been observed after a long decade of extreme stability of scientific programme revenues of the European industry.

Long series: scientific programmes (M€)



Scientific programmes are a broad market segment that includes three very different sub-segments.
Science and exploration: this category embraces all industry sales associated to the design, development and production of automated spacecraft systems in the frame of scientific programmes promoted by governmental organisations. These may cover a diversity of missions in the scientific domain, such as astronomy, oceanography, atmosphere science, magnetosphere studies, planetary exploration, etc.
ISS and human spaceflight programmes: this segment covers all activities relevant to the European involvement in the European space station (cargo spacecraft, modules, habitats, specialised gear, etc.) with the exception of the experiments carried on board.
Microgravity: this segment covers all sales related to the design, development and operations of experiments and tests performed in microgravity, mostly aboard the space station, but also on Earth based microgravity infrastructures (Zero-G flights, drop towers).

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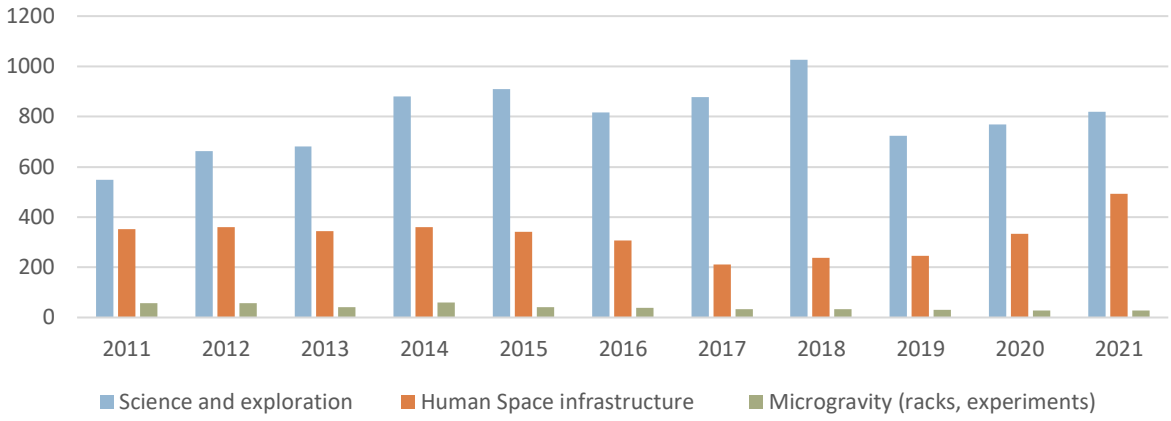
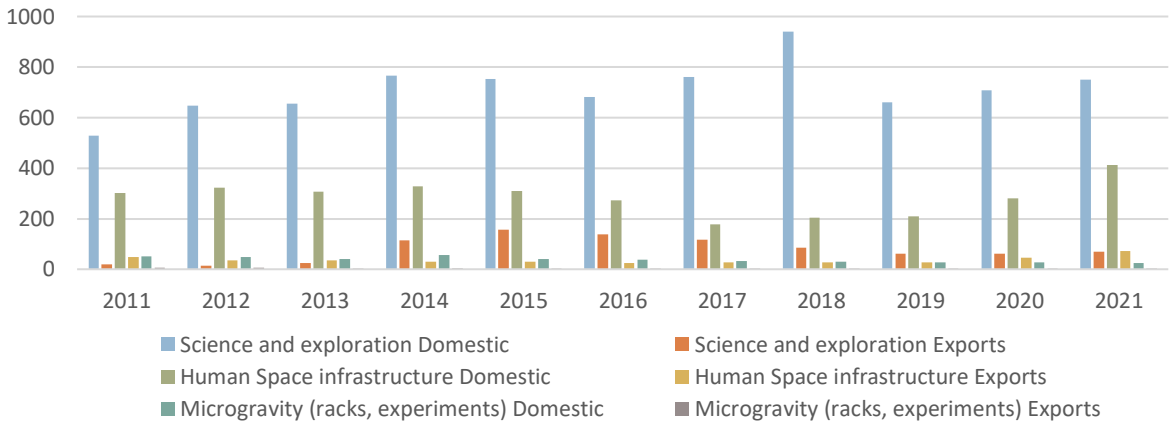
Scientific programmes sales by product segment (M€)



Science and exploration systems represent alone 61% of the sales of scientific programmes. The human space infrastructure related systems sales are worth 37% of scientific programmes while microgravity products (racks and experiments) are the smallest share of sales in this segment, only worth 2% of scientific programmes sales.

Scientific programmes sales: Domestic vs. Export (M€)



Due to the governmental nature of scientific programmes in space there are only limited opportunities for exports in this specific segment. As a result exports represent a mere 11% of all scientific programmes sales, and are mostly associated to activities performed in a multilateral framework (such as the ISS, or scientific programmes in collaboration with India, the USA or Russia). For human spaceflight the situation has changed in 2014 with the delivery of European contributions to the US Cygnus cargo module. The European involvement in this programme may further generate growth opportunities for exports in this market segment.

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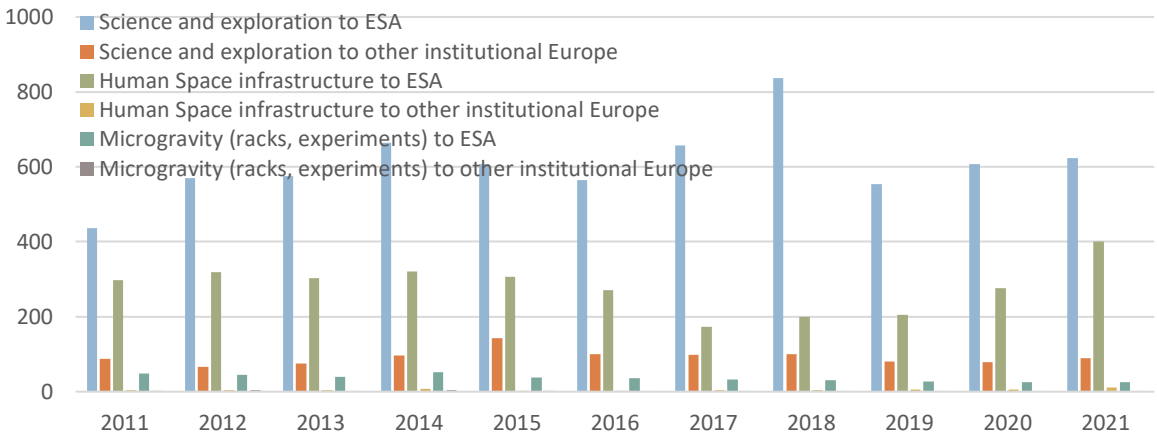
Scientific programmes sales, focus on European institutional customers (M€)



In Europe, the majority of scientific programmes (differently than satellite applications) are promoted and funded in the frame of ESA (78% of all scientific programmes sales). This is completely in line with the original vision of the founding fathers of European space programmes willing to promote scientific research in space at European level.

Scientific programmes, sales matrix (M€) in 2021

M€	Private customers Europe	Public customers Europe	Private customers RoW	Public customers RoW	Total
Science & exploration	2	694	34	25	755
Human Space infrastructure	0	403	68	1	472
Microgravity (racks, experiments)	0	26	1	0	27
Scientific programmes	2	1123	103	26	1254

Ground segment activities

This product category was introduced with the methodological change of 2009, there are no long series associated. The category was created to measure precisely the ground segment business directly associated to the design, development, manufacturing and operations of space systems. Since the measure was introduced, this market segment has represented an average of 21% of space industry sales, confirming the relevance of the measure and the importance of ground segment activities in the overall space system approach.

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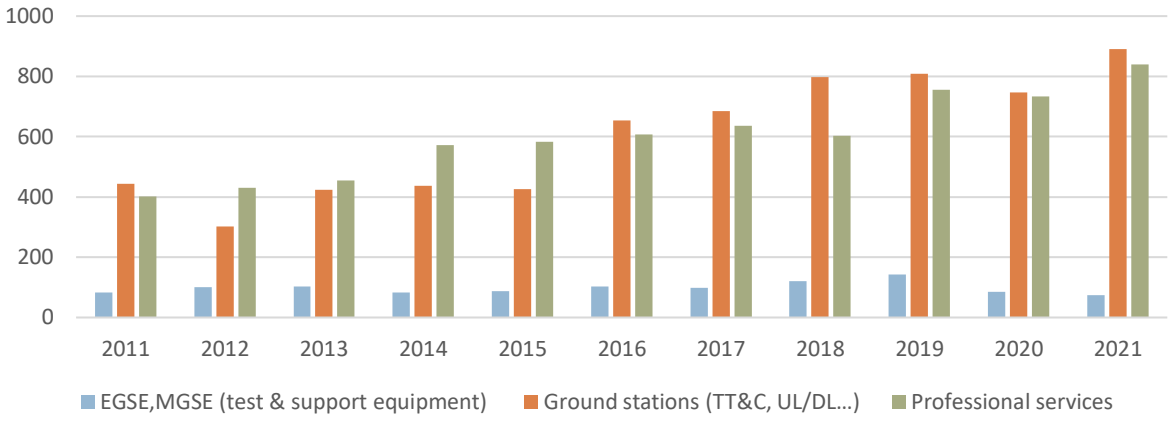
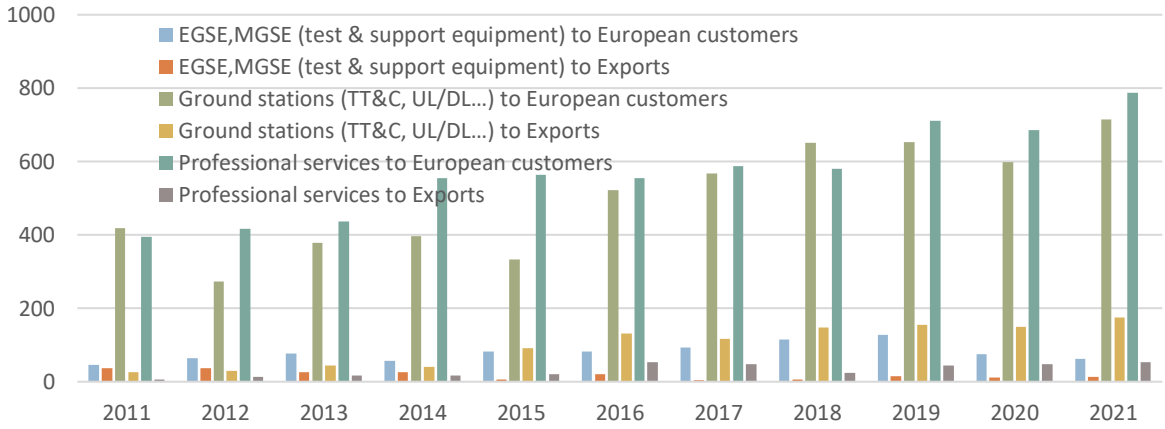
Ground segment sales by product segment (M€)



Ground segment activities include three categories.

- *First the manufacturing of EGSE/MGSE (electric/mechanical ground support equipment): the professional equipment used to perform calibration, integration and test activities on spacecraft systems, subsystems and instruments (worth 4 % of ground segment sales). Only specialised equipment designed and procured to support space programmes is included in this category. Generic manufacturing equipment is not included in the Eurospace survey.*
- *The sale of ground stations and ground control centres, i.e. the ground infrastructure required to operate space systems (launchers during launch, and spacecraft during operational lifetime) is worth 49% of ground segment activities sales. Ground segment services are not counted in this category.*
- *The last, but not least, category of sales in the ground segment is associated to services exclusively. In this category are bundled two different types of services. The services provided to the manufacturing industry in support of design, development, test and integration activities, and the services provided to space agencies for the technical and financial management of their programmes, including, sometimes, ground control centre operations. This category represents 47% of the total ground segment activities sales. In this category the vast majority of sales are related to public customers in Europe (mostly ESA).*

Ground segment sales - Europe vs Exports (M€)



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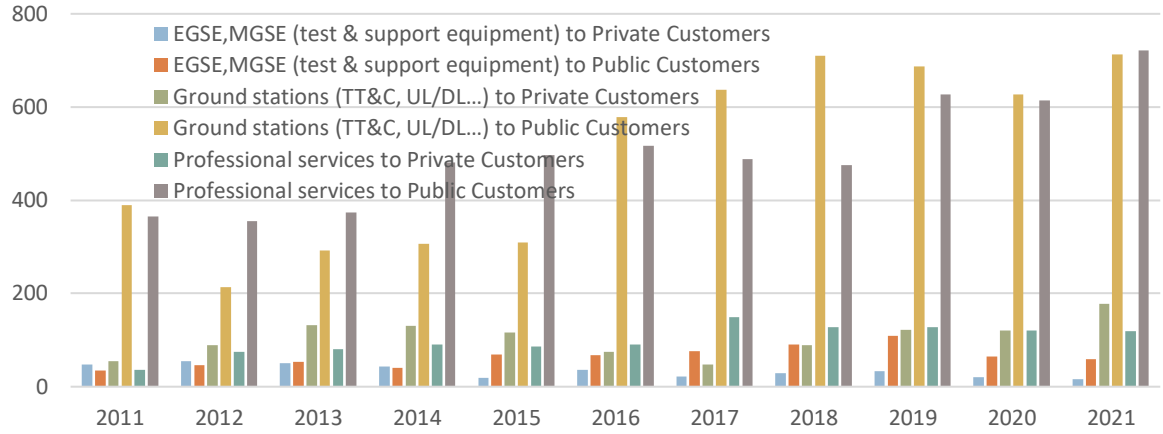
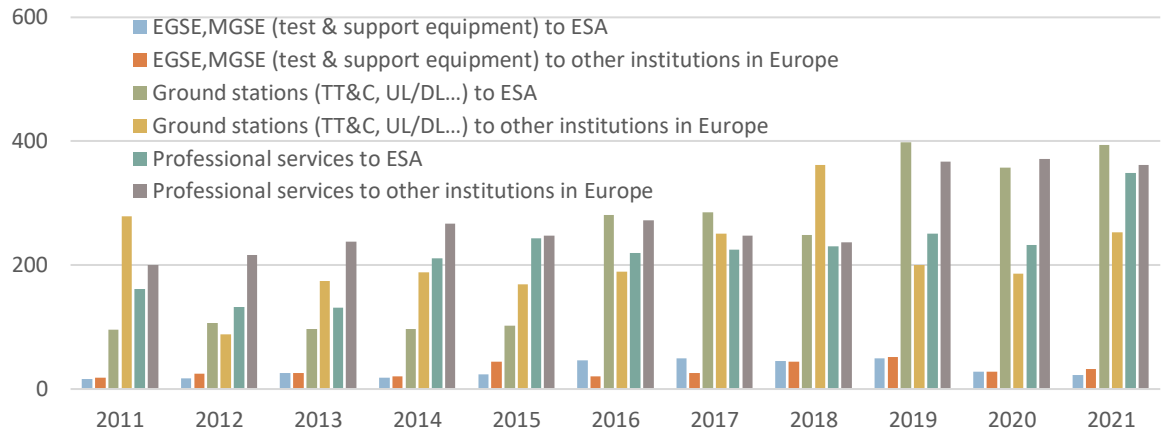
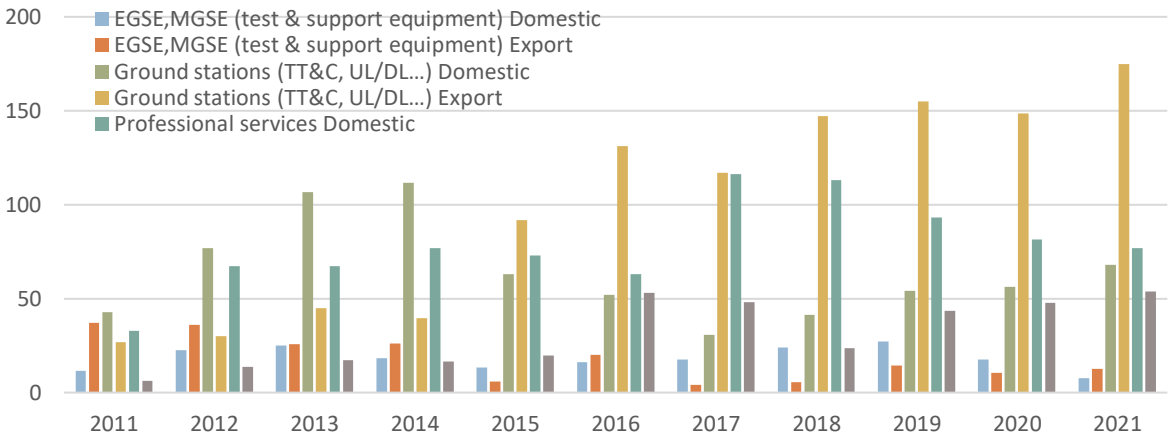
Ground segment sales - Private vs Public customers (M€)



Ground segment sales - Focus on European institutional customers (M€)



Ground segment sales - Focus on Commercial and Exports customers (M€)



Sales in the ground segment category are mostly located in Europe, with exports representing 13% of the total. Sales are mostly relevant to public customers, with ESA at the forefront with 765 M€, i.e. 42% of the total ground segment sales of the European space industry.

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Ground segment: sales matrix (M€) in 2021

M€	Private customers Europe	Public customers Europe	Private customers RoW	Public customers RoW	Total
EGSE, MGSE (test & support equipmt)	0	6	5	0	11
Ground stations (TT&C, UL/DL…)	14	278	34	27	353
Professional services	7	87	5	5	104
Total	21	371	44	32	468

Output of the European space industry in 2021

European spacecraft launched in 2021

The European space industry was involved in the production of 15 large spacecraft delivered for launch in 2021. In addition to these, 65 small satellites (i.e. less than 100kg) were produced in Europe, including very small satellites (less than 10kg) often developed in universities and laboratories.

Table: European-built spacecraft delivered for launch in 2021 (customer and mass at launch/kg)

Market Segment	*Customer*	*Number of spacecraft*	*Total Mass (kg)*
Institutional Europe	CNRS	1	0,5
	DGA	4	5190
	DLR	1	5
	ESA	2	6
	Europe Universities	13	48
	EUSPA	2	1466
	Fossa Systems	2	0,4
	Royal Netherlands Air Force	1	10
Institutional Europe Total		**26**	**6725,9**
Commercial & exports	Aerospacelab	1	20
	Airbus DS	2	1842
	Amateur	2	0,4
	Astrocast SA	11	52
	D-Orbit	2	300
	Endurosat	1	12
	Eutelsat	1	3461
	GP Advanced Projects	2	0,6
	Hiber Global	2	8
	ICEYE Oy	7	595
	In-Space Missions Ltd	2	15,9
	Inmarsat	1	5470
	Kleos Space	4	32
	Lacuna	1	4
	Libre Space	2	0,2
	MarInt	1	4
	OHB	1	50
	Open Cosmos	1	4
	OQ Technology	1	12
	SatRevolution	2	8
	SES Global	1	6411
	Spacequest	1	10
	Turksat	2	8000
	UnseenLabs	1	10

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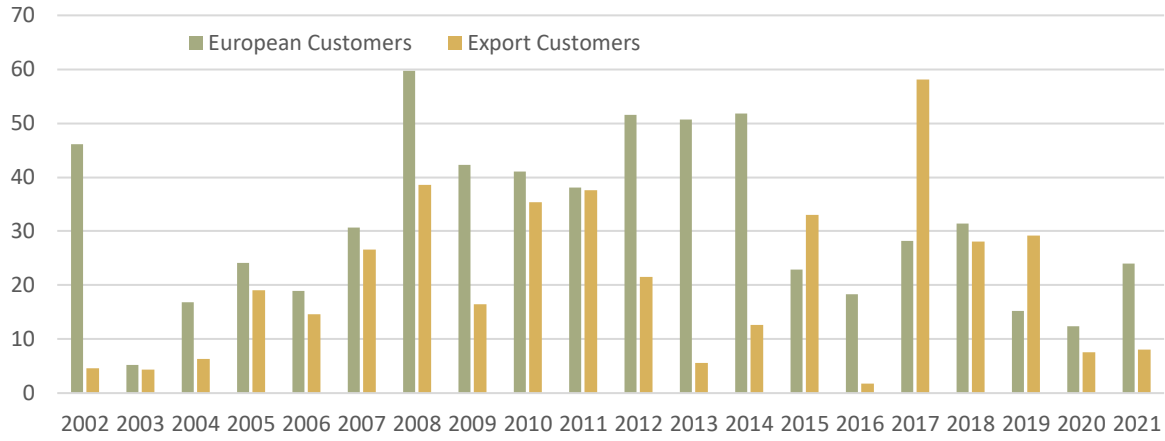
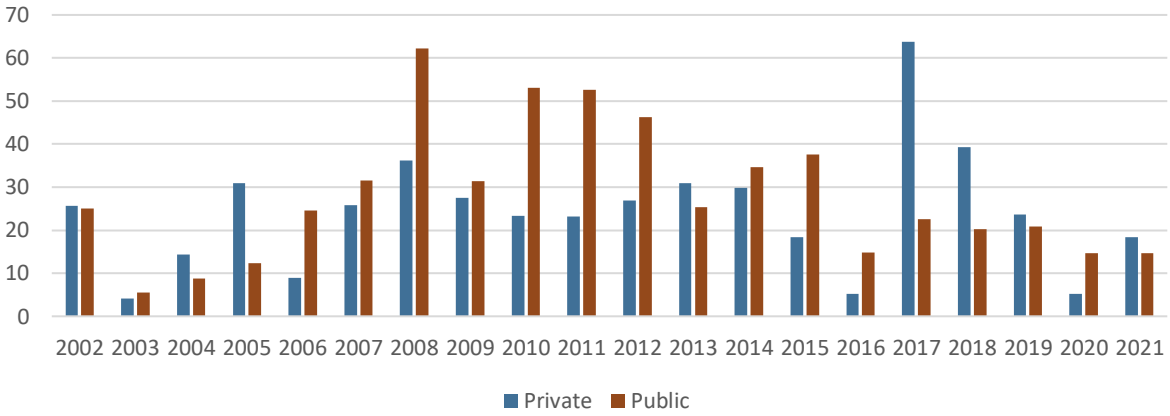
Market Segment	*Customer*	*Number of spacecraft*	*Total Mass (kg)*
	US armed forces	1	4
	USA Universities	1	0,25
Commercial & exports Total		**54**	**26326,3**
Grand Total		**80**	**33052,2**

Long series: European-built spacecraft by customer segment - European vs Exports (mass at launch/tons)



Historically, European spacecraft were sold exclusively to institutions (and all of them in Europe) with ESA, National agencies and Eumetsat being the main customers. The first commercial customers for European spacecraft were also European, but they were soon expanded with export customers. The comparison over time of the evolution of the mass of European spacecraft against the customer exhibits two interesting trends. First the European industry has largely increased its production (measured in mass), second the share of European customers usually exceeds that of Exports. The mass impact of human spaceflight programmes (ATV, Columbus) on the series was significant since these programmes required very heavy spacecraft (e.g. ATV: 20 tons, ISS Node 15 tons). This is slightly compensated by the trend in geostationary communications satellites whose mass routinely exceeds 5 tons.

Long series: European-built spacecraft by customer segment - Public vs private customers (mass at launch/tons)



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In the nineties, annual deliveries of European spacecraft for launch were mostly associated to public customers (space agencies and public satellite operators). In the past decade, where we have seen a growing share of deliveries to private customers. This market segment, worth 20 to 40 tons of spacecraft deliveries per year, is mostly composed of large geostationary telecommunications satellites.

Ariane and VEGA launches in 2021

Spacecraft launched by Ariane and Vega in 2021

Market Segment	*Customer*	*Launcher*	*Orbit*	*Payload*	*Mass (kg)*
institutional Europe	DGA	Ariane 5	GEO	Syracuse 4A	3852
		Vega	LEO	CERES 1	446
				CERES 2	446
				CERES 3	446
	ESA	Vega	LEO	RADCUBE	4
				Sunstorm	2
	Europe Universities	Vega	LEO	LEDSAT	1
institutional Europe Total					**5197**
Commercial & exports	Airbus DS	Vega	LEO	Pleiades Neo 3	920
				Pleiades Neo 4	922
	Aurora Insight	Vega	LEO	AII-Bravo	10
	Embratel Star One	Ariane 5	GEO	Star One D2	6190
	Eutelsat	Ariane 5	GEO	Eutelsat Quantum	3461
		Vega	LEO	ELO Alpha	10
	NASA	Ariane 5	Escape	JWST	6161
	Norwegian Space Agency	Vega	LEO	NorSat-3	15
	SES Global	Ariane 5	GEO	SES-17	6411
	Spire	Vega	LEO	Lemur-2-Amanda-Svante	4
				Lemur-2-SpecialK	4
	UnseenLabs	Vega	LEO	BRO-4	10
Commercial & exports Total					**24118**
Total launched mass					**29315**

In 2021 the European launcher industry delivered 4 Ariane-5 systems and 3 Vega system for launch by Arianespace. The launchers were used to loft 4 geostationary satellites and 15 low Earth orbit spacecraft.

In 2021 the launchers built by the European industry were booked to launch a total of 29,3 tons in orbit.

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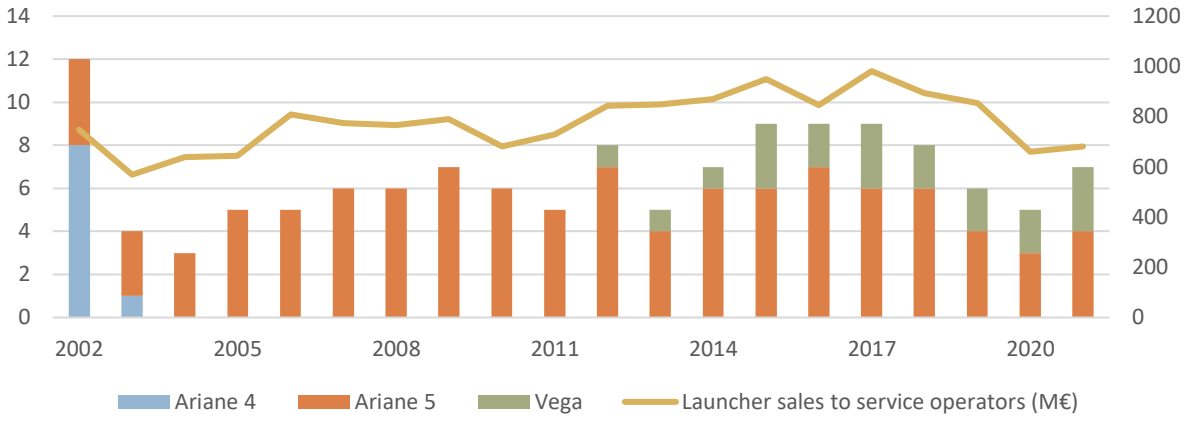
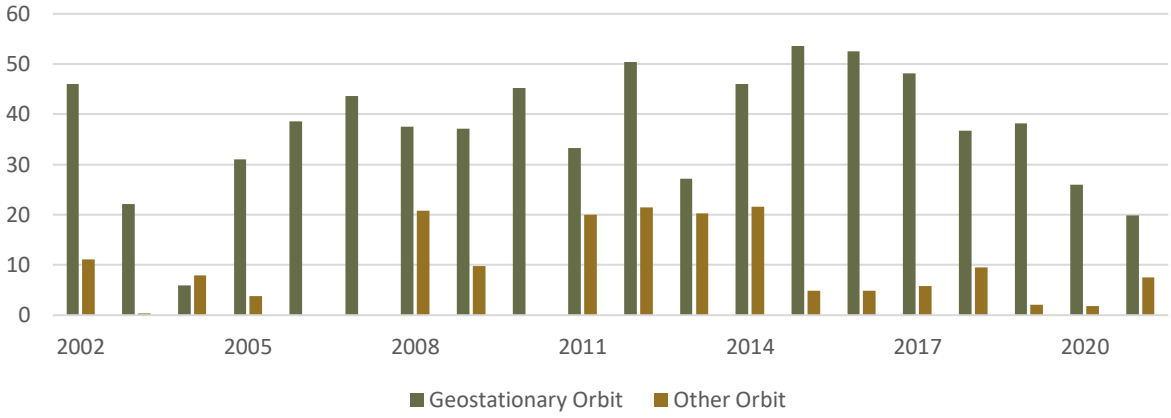
Ariane and Vega launches (left) vs. Industry revenues (right, M€)



The value of industry launcher sales to Arianespace is closely correlated to the number of launchers delivered to Arianespace in the same year. It shall be noted however that not all systems delivered are launched in the year of delivery, thus the series are not perfectly aligned. In addition to the revenue from systems sales, industry also performs specific services for Arianespace on location at the spaceport in French Guyana, to support launcher/payload integration aspects and launcher readiness for launch. This factor is being corrected in most recent data series.

Mass launched by Ariane and Vega by orbit (tons)



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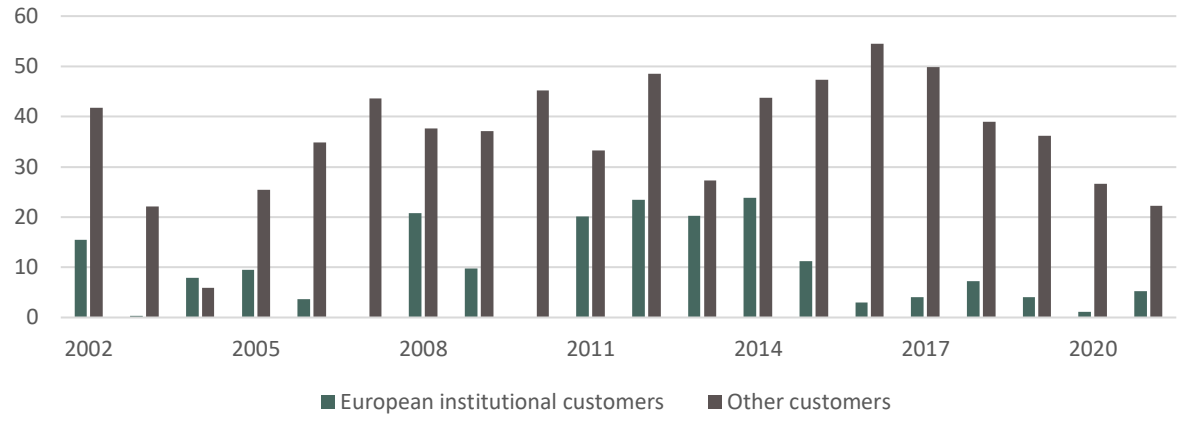
Mass launched by Ariane and Vega by customer (tons)



The Ariane system has been used mainly to deliver spacecraft in geostationary orbit, although it has also served low Earth orbit on specific occasions (e.g. ATV launches). The Ariane launch system is the preferred choice of commercial customers, and this is reflected by the high share of commercial launches in Ariane's launch history. European institutional customers (ESA, Eumetsat and national agencies in Europe) are not the primary customers of the Ariane system, but it is interesting to note that they have been the only ones using Ariane to reach other orbits that the geostationary orbit.

Methodology

Introduction to the survey

Every year Eurospace, the association of the European space manufacturing industry, issues the annual update of its facts & figures statistical series.

Since its inception, the statistical collection aims at measuring the value of the market for space systems design, development and production in Europe (i.e. the space industry manufacturing activity). Space systems are defined in detail (see “products definitions”) in order to ensure an appropriate data collection and to avoid misinterpretation of the data sets.

This statistical effort is supported by two main driving principles:

1) The focus on manufacturing activities (with the exclusion of all services related to the exploitation of space systems: launch services and satellite operations). Service activities associated to the manufacturing process of space systems (such as engineering and test services, consultancies etc.) are included in the perimeter of the survey. A share of ground systems operations is included also, when they are performed for Space agencies in Europe.

2) The effort to measure the value of the end-market, with the elimination of all inter-sectoral business that could be counted twice or more.

Perimeter of the survey

The Eurospace facts & figures survey focuses on measuring the economic value of industrial activities associated to the design, development and manufacturing of space systems (also called the upstream sector) in Europe.

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It does not consider non-space products (such as missiles or consumer-end terminals such as GPS receivers, Satellite TV receivers and dishes, etc.) nor the provision of services based on the exploitation of space assets. This means that the revenues and employment of such companies as Eutelsat, Paradigm, Inmarsat, Arianespace, SES Global, and other operators are not included in the perimeter of the survey.

Data Collection

The data collection is supported by companies with space activities operating in Europe (not limited to Eurospace membership). Companies answer a questionnaire providing detailed information on their sales and employment relevant to space systems design, development and manufacturing. All information released to Eurospace is protected by a confidentiality agreement. The quality of the survey is only as good as the data provided by participating companies.

Most companies in the space manufacturing sector have participated at least once to Eurospace survey in the past. The main players (companies with more than 100 space employees) usually support the survey on a very regular basis, while smaller players may only support the survey sporadically. When a reply is missing from a company, it is supplemented by an estimate based on a previous reply received from that company, and/or publicly available information on the company.

The space manufacturing sector in Europe is at the same time very fragmented and very concentrated. The 30 largest space units in Europe make for almost 80% of total employment of the sector. The remaining smaller players representing barely 20% of employment. It is also interesting to note that all smaller players work almost exclusively as subcontractors to the largest players.

From a statistical point of view, this means that an efficient data collection shall focus on collecting at least the main replies (the large players, and particularly the prime contractors) that will provide a good assessment of final sales. Collecting additional replies from increasingly smaller players, adds a layer of detail to the survey and improves marginally the measurement of employment; but does not affect the overall value of final sales and has a limited economic impact.

Consolidation Model

In the Space sector, as with many other industrial sectors, the delivery of a complex system involves the participation of a large number of companies at various stages of the development and production processes. This translates into a complex contractual chain, where one prime contractor signs with the customer and then distributes the work among itself and many subcontractors.

The need for consolidation

When considering the revenues generated within the whole supply chain by the production of one space system, with the mechanism of subcontracts the cumulated value of all contracts exceeds the value of the system itself. This is due to the fact that without consolidation, some subcontracts are counted twice.

Within a given perimeter, the consolidation of sales can be done in two ways: either by measuring the consolidated sales at company level (total sales minus the value of subcontracts), either by measuring the final sales at company level (total sales minus inter-sector sales, relevant to subcontracted work). Within a given perimeter the value of consolidated sales and final sales are identical.

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Methodological update in 2010

Initially, the Eurospace survey was based on a methodology focusing on measuring the consolidated sales (i.e. the value of sales, minus the value of purchases within the sector). In 2010 Eurospace implemented a new methodology based on the accurate measure of final sales, including the identification of sales to other companies in the sector (not provided before). This methodological update was required because there were growing uncertainties with the data consolidation activities, due to missing, inaccurate or incomplete returns, particularly with regard to the measure of purchases within the appropriate perimeter.

All efforts have been made to preserve full data consistency throughout historic series, and the objective was achieved at the expense of corrections applied to previous years' data sets. These corrections have been rather minor.

Definitions

Space systems and related products considered in the survey

Eurospace survey is product oriented, i.e. it measures sales of well identified products: space systems. Space systems are organised in three different categories: launcher systems and parts, spacecraft systems and parts, ground systems and parts. Each product/system category is split in relevant subcategories.

Launcher systems

The category only considers space launchers, all missile activity is excluded from the perimeter of the survey. Launcher systems are further split between operational launcher systems and parts (sold to launcher integrators and to launch services operators) and launcher development activities (funded by space agencies, so far).

Spacecraft/satellite systems

The category includes all items destined to leave the Earth atmosphere and operate in space, either to deliver operational services in Earth orbit (satellite applications systems), either in to perform scientific mission in Earth orbit and beyond (scientific systems).

Satellite applications include: telecommunications systems, Earth observation systems (including meteorology) and navigation systems (e.g. Galileo)

Scientific systems include: generic R&DT, science and exploration programmes (such as Gaia, Venus Express, Exomars...), human and robotic infrastructure programmes (such as ISS contributions, rovers, landers, etc.), and microgravity equipment (racks and experiment modules to perform microgravity experiments aboard the ISS and other microgravity environments).

Ground Segment (and related services)

Ground segment activities include three categories of activities.

The manufacturing of EGSE/MGSE (electric/mechanical ground support equipment): the professional equipment used to perform calibration, integration and test activities on space systems, subsystems and instruments. Only specialised equipment designed and procured to support space programmes is included in this category. Generic manufacturing equipment is not included in the Eurospace survey.

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The sales of ground stations and ground control centres, i.e. the ground infrastructure required to operate space systems (launchers during launch, and spacecraft during operational lifetime) Ground segment services are not counted in this category.

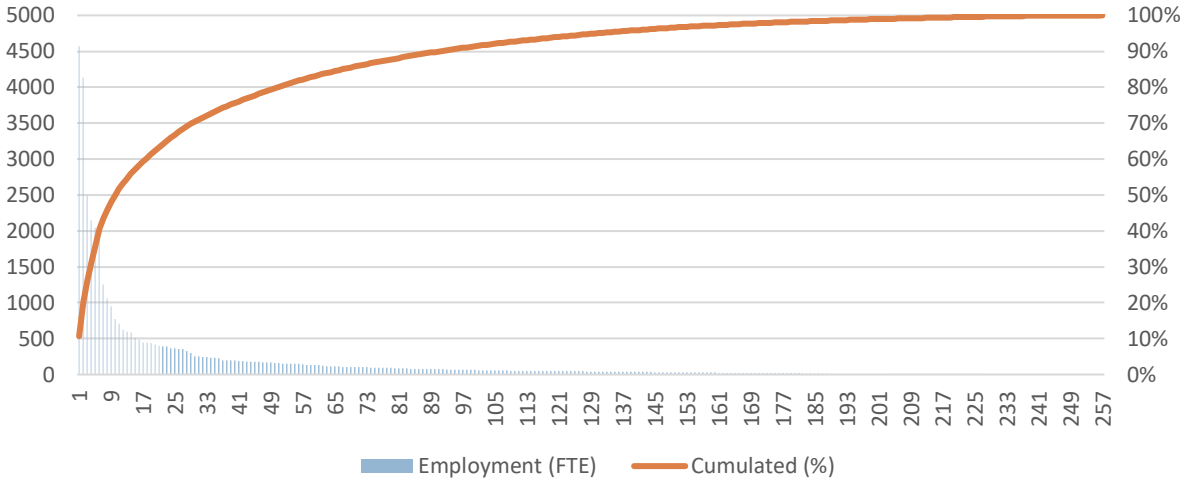
The sales of ground services. In this category are bundled two different types of services. The services provided to the manufacturing industry in support of design, development, test and integration activities, and the services provided to space agencies for the technical and financial management of their programmes, including, sometimes, ground control centre operations.

Sector concentration: employment in space units, employment by unit and cumulated %

The European space sector is at the same time very concentrated and highly fragmented. As a result, it is composed of a small number of rather large space units (notably at Airbus Defence and Space, Thales Alenia Space and SNECMA) and a quite extensive number of very small space units.

Are worth noting:

- The 10 largest space units in Europe contribute to more than half of total employment.
- The 20 largest space units in Europe are worth two thirds of total employment.
- The 30 largest space units gather three quarters of the total employment.
- All smaller space units have employment of less than 250.
- The average space unit size is 116 employees.



Note: Each bar represents the employment in one space unit (e.g.TAS-Italy, EREMS, Airbus D&S UK)

Survey information

Eurospace economic model

The Eurospace facts & figures economic model included 396 Space Units/Companies in 2022.

We provide hereafter the full list of companies included in the Eurospace economic model, with details on the status of information used for the year 2021. The regular contribution of major space players in Europe ensures the accuracy of Eurospace facts & figures economic assessment of European space manufacturing activity.

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For all other companies, proxy data was used in the model. Proxy data is elaborated using information provided in previous years (when available) and/or information available from public sources, mainly the European Space Directory and company websites.

2021 Survey statistics: questionnaire return rate in % of units, sales, and employment

The survey rate of return, measured in number of units was 35%. But thanks to the good support of large players, the 171 questionnaires returned represent 85% of final sales data compiled and 68% of space employment.

Survey representativeness

Survey statistics	Nb of units	Final sales M€	Space empl.
All units in the model	488	8620	52822
Units updated	171	7346	35894
Proxies	317	1274	16928
Survey representativeness	**35%**	**85%**	**68%**

Companies having supported the survey in 2022

The table below lists the complete set of companies included in the Eurospace f&f economic model this year. The data update status is marked "Actual" for all companies having provided a reply to the questionnaire (including the entities consolidated in each reply), or for companies having published relevant information on their space sales and employment values. For all others we use proxies to fill the information gap. Proxies are usually based on previously collected information on the companies.

Country	*Entity Name*	*Update status*
Austria	Aerospace & Advanced Composites GmbH	Actual
	Andritz	Proxy
	Enpulsion	Proxy
	FACC	Actual
	MAGNA STEYR Fahrzeugtechnik AG & Co KG	Proxy
	Nanosat MO Framework	Actual
	Plansee	Proxy
	RUAG Space GmbH	Actual
	Siemens AG Austria	Proxy
	Space-Lock	Actual
	TTTech Computertechnik AG	Actual
Belgium	AerospaceLab	Actual
	AMOS	Proxy
	Antwerp Space	Proxy
	Arcsec	Actual
	Britte	Proxy
	Cegelec SA	Proxy
	Centre Spatial de Liège - ULg	Proxy
	CubeSat Pointing	Actual
	e-Xstream engineering	Proxy
	Euro Heat Pipes	Proxy

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Country	*Entity Name*	*Update status*
	GMV Innovating Solutions S.R.L.	Actual
	IMEC	Proxy
	JAQAR Space Engineering	Actual
	Lambda-X	Proxy
	NUMECA International	Proxy
	OIP N.V.	Actual
	Onestagetospace	Actual
	Open Engineering	Proxy
	QinetiQ Space	Proxy
	Redu Operations Services	Actual
	RHEA System S.A.	Proxy
	SABCA	Actual
	Sabca Limburg NV	Actual
	Serco	Proxy
	Sonaca	Proxy
	Space Applications Services	Proxy
	SPACEBEL SA	Proxy
	Techspace Aero	Proxy
	Telespazio Belgium	Actual
	Trasys	Proxy
	V2i	Proxy
	Veoware	Actual
	Vitrociset Belgium S.p.r.l.	Proxy
	Thales Alenia Space BE	Actual
Bulgaria	Agromo	Actual
	Endurosat	Actual
	IMIBAS	Actual
	Institute of Oceanology	Actual
	Mozaika Ltd	Actual
	National Institute of Meteoroloty	Actual
	Nikola Vaptsarov Naval Academy	Actual
	RSICS	Actual
	Sfera Technologies	Actual
	Space Research and Technology Institute	Actual
	Space Sling Technologies	Actual
	The Stephan Angeloff Institute of Microbiology.	Actual
Cyprus	Cyprus University of Technology	Actual
	Emtech Space	Actual
	Geofem Ltd.	Actual
	The Cyprus Institute	Actual
	University of Cyprus	Actual
Czech Republic	5M S.r.o	Actual

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Country	*Entity Name*	*Update status*
	5M s.r.o.	Proxy
	BBT Materials Processing	Actual
	BBT-Materials Processing	Proxy
	BD Sensors	Actual
	Chipinvest	Actual
	CSRC Ltd	Actual
	Czech Space Alliance	Proxy
	Dartsat	Actual
	esc Aerospace	Actual
	ESC Aerospace s.r.o.	Proxy
	Frentech Aerospace s.r.o.	Proxy
	Iguassu Aerospace	Actual
	Iguassu Software Systems AS	Proxy
	LK engineering	Actual
	OHB Czechspace s.r.o.	Proxy
	SAB Aerospace	Proxy
	SkyFox Labs	Actual
	Sobriety	Actual
	Suborbitality	Actual
Denmark	Copenhagen Suborbitals	Actual
	Damec Research	Proxy
	Danish Aerospace Company (DAC)	Proxy
	Rovsing	Proxy
	Satlab A/S	Actual
	Space Composite Structures Denmark	Actual
	Space Inventor	Actual
	Sternula	Actual
	TERMA AS	Proxy
	TICRA	Proxy
Estonia	CrystalSpace	Actual
	Cubehub	Actual
	Enterprise Estonia	Proxy
	Golbriak Space	Actual
	Radius Space	Actual
	Spaceit	Actual
Finland	Aurora Propulsion Technologies	Actual
	DA-Design Oy	Proxy
	Elektrobit Microwave Oy	Proxy
	Huld	Proxy
	Iceye	Actual
	Kuva Space	Actual
	Mililab	Proxy

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Country	*Entity Name*	*Update status*
	Modulight, inc.	Proxy
	Patria Aviation Oy, Systems	Proxy
	Space Systems Finland	Proxy
	VTT	Proxy
France	3D Plus	Proxy
	4Skies	Actual
	Absolut Systems	Proxy
	AD industries	Proxy
	Air Liquide advanced Technologies	Actual
	Air Liquide Spatial Guyane	Actual
	Airbus Defence & Space SAS	Actual
	Akka Technologies	Proxy
	ALTER TECHNOLOGY TÜV NORD FRANCE	Proxy
	ALTRAN TECHNOLOGIES	Proxy
	Anyfields	Actual
	Anywaves	Proxy
	ArianeGroup SAS	Actual
	ASB	Actual
	Astreos	Actual
	ATMOSTAT	Proxy
	ATOS	Proxy
	Avantis Group	Proxy
	Avio Guyane	Actual
	Bertin Technologies	Proxy
	Cailabs	Actual
	Callisto	Actual
	Capgemini Technology Services	Proxy
	Cedrat technologies	Proxy
	Cilas	Actual
	CNIM Air Space	Proxy
	COMAT	Proxy
	CS GROUP	Actual
	DAM Group (Dactem)	Proxy
	DARK	Actual
	DASSAULT Aviation	Proxy
	E-Space	Actual
	ECA AEROSPACE	Proxy
	EES - CLEMESSY	Actual
	EREMS	Actual
	Eurocryospace	Actual
	Europropulsion	Actual
	Exotrail	Actual

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Country	*Entity Name*	*Update status*
	Gama	Actual
	Global Smart rescue	Actual
	GMV Innovating Solutions SARL	Actual
	GTD Sistemas de Informacion	Proxy
	HE Space	Proxy
	Hemeria	Proxy
	Hybrid Propulsion for Space	Actual
	Hydrogen Aerospace	Actual
	Intespace	Proxy
	ISP System	Proxy
	iXblue	Proxy
	Latecoere	Proxy
	Leanspace	Actual
	Loft Orbital Technologies SAS	Actual
	Lunar Logistics Services	Actual
	LYNRED	Actual
	Magellium	Proxy
	MaiaSpace	Actual
	MAP	Proxy
	Mecano ID	Actual
	Mersen Boostec	Proxy
	Microchip (ATMEL)	Actual
	Microtec	Proxy
	Miratlas	Actual
	MotorSat	Actual
	MT Aerospace Guyane SAS, Kourou	Actual
	NanoRaven	Actual
	NanoXplore	Actual
	Opus aerospace	Actual
	Orius Technologies	Actual
	OSE	Actual
	PLUG IN	Proxy
	Promethee	Actual
	Prometheus Space Industries	Actual
	Pyroalliance	Actual
	Radiall	Proxy
	RAKON	Proxy
	Regulus	Actual
	Rovial SAS	Actual
	SA Techlam	Proxy
	Safran Aircraft Engine	Actual
	SAFRAN DATA SYSTEMS	Actual

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Country	*Entity Name*	*Update status*
	Safran Electronics & Defence (Sagem)	Proxy
	Safran Reosc	Actual
	Saft	Actual
	SAP Micro	Proxy
	Scalian	Proxy
	Selha	Proxy
	Serco	Proxy
	SEREME	Actual
	SESO	Proxy
	Sirius Space Services	Actual
	Sodern	Actual
	Soditech	Proxy
	Soterem	Proxy
	SpaceAble	Actual
	SpaceDreams	Actual
	Spacemedex	Actual
	Spark Orbital	Actual
	Spartan Space	Actual
	STEEL Electronique	Proxy
	Stellar	Actual
	STMicroelectronics	Actual
	Symetrie	Actual
	Syrlinks	Actual
	Systronic	Proxy
	TE	Proxy
	Technip	Proxy
	Telespazio France SAS	Actual
	Telespazio French Guyana	Actual
	Telespazio SpA	Actual
	THALES AIRBORNE SYSTEMS	Proxy
	Thales Alenia Space France SAS	Actual
	THALES Communications & Security SAS	Proxy
	Thales Services SAS	Proxy
	Thales Training & Simulation	Actual
	Timelink	Proxy
	TRAD Tests et Radiations	Proxy
	U-Space	Actual
	UMS	Actual
	Unseenlabs	Actual
	Venture Orbital Systems	Actual
	Vitrociset SpA	Proxy
	Xinetis	Actual

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Country	*Entity Name*	*Update status*
	Thales TED	Proxy
	W.L.Gore & Associates	Actual
Germany	Advanced Space Technologies (AST)	Actual
	Airbus Defence & Space GmbH	Actual
	Airbus Defence and Space GmbH	Actual
	Airbus DS Geo GmbH	Actual
	Anite Systems	Proxy
	APCON Aerospace & Defence	Proxy
	ArianeGroup GmbH	Actual
	Arquimea Deutschland	Proxy
	ASP GmbH	Proxy
	Astro- und Feinwerktechnik Adlershof GmbH	Proxy
	AZUR SPACE Solar Power GmbH	Actual
	Bake in Space	Actual
	Berlin Space Technologies	Actual
	Black Engine Aerospace	Actual
	Celestial Space Technologies GmbH	Actual
	CGI Deutschland B.V. & Co. KG	Proxy
	CS Gmbh	Actual
	DcubeD	Actual
	Deorbit It	Actual
	DSI Aerospace Technologie GmbH	Proxy
	E.I.S. Electronics GmbH	Proxy
	Elmspace	Actual
	ESC Aerospace GmbH	Proxy
	ETS	Actual
	Eurocryospace	Proxy
	Exolaunch	Proxy
	Future Space Infrastructure	Actual
	GAF AG	Actual
	GAF AG (Telespaziogroup)	Proxy
	German Orbital Systems GmbH	Actual
	GMV GmbH	Actual
	GTD GmbH	Actual
	HE Space Operations GmbH	Proxy
	Hisatec GmbH	Actual
	Hoch Technologie Systeme (HTS) GmbH	Proxy
	HPS GmbH	Proxy
	IABG mbH	Proxy
	iBoss GmbH	Actual
	Inradios.com	Proxy
	Invent GmbH	Proxy

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Country	*Entity Name*	*Update status*
	IQ Spacecom (IQ Wireless)	Actual
	Isar Aerospace	Proxy
	Jena Optronik	Proxy
	JOHANN MAIER GMBH	Proxy
	Kampf Telescope Optics	Actual
	KLEO Connect (was eightlyLEO)	Proxy
	Large Space Structures (LSS)	Proxy
	Levity Space Systems	Actual
	Made in Space	Proxy
	Morpheus Space	Actual
	MT Aerospace AG	Proxy
	MT Aerospace Grundstücks GmbH & Co. KG, Germany	Actual
	Mynaric	Actual
	navXperience GmbH	Actual
	Neutron Star Systems UG	Actual
	OHB System AG	Actual
	OHB Teledata	Proxy
	Okapi:Orbit	Actual
	Omnidea RTG	Actual
	Omnidea-RTG GmbH	Actual
	Orbit recycling	Actual
	Orbit20	Actual
	Ororatech	Actual
	Planetary Transport Systems (PTS)	Actual
	Polaris Raumflugzeuge Gmbh	Actual
	RHEA System GmbH	Actual
	RMT GmbH	Actual
	Rocket Factory Augsburg (RFA)	Actual
	Rockwell Collins Deutschland	Proxy
	Rohde & Schwarz INRADIOS GmbH	Actual
	SAT4M2M UG	Actual
	Serco	Proxy
	Smart Small Satellite Systems GmbH	Actual
	Space IC	Actual
	Space Origami	Actual
	Space Products and Innovation UG	Actual
	Space structures GmbH	Actual
	SpaceOpal GmbH	Actual
	Spacetech GmbH (STI)	Proxy
	Spin	Actual
	STT-SystemTechnik	Proxy
	Telespazio GmbH	Actual

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Country	*Entity Name*	*Update status*
	Telespazio Vega Deutschland GmbH	Actual
	Tesat-Spacecom GmbH & Co.KG	Proxy
	THALES	Proxy
	The Exploration Company	Actual
	ThingsOnAir GmbH	Actual
	TIWARI Scientific Instruments GmbH	Actual
	UMS	Actual
	VH&S	Proxy
	VisionSpace technologies	Actual
	Vyoma	Actual
	W.L.Gore & Associates GmbH	Proxy
Greece	Adamant Composites	Actual
	Althom Engineering	Actual
	EMTech	Actual
	FEAC Engineering	Actual
	Geosystems Hellas	Actual
	Heron Engineering	Actual
	Inasco	Actual
	ISI Hellas	Actual
	IST	Actual
	OHB Hellas	Actual
	Thales Hellas	Actual
Hungary	BHE (Bonn Hungary Electronics)	Proxy
	C3S Electronics Development LLC	Proxy
	HSO	Proxy
Ireland	Captec	Proxy
	Farran Technology Ltd	Proxy
	InnaLabs	Proxy
	Nammo Ireland	Proxy
	NUMA Engineering Services Ltd	Proxy
Italy	Advanced Computer Systems ACS SpA	Proxy
	Aiko	Actual
	Airworks	Proxy
	ALMA SISTEMI SRL	Proxy
	ALTA S.P.A	Proxy
	ALTEC SpA	Actual
	ALTER TECHNOLOGY TÜV NORD	Proxy
	Antech Space Srl	Actual
	Arca Dynamics	Actual
	Argotec	Proxy
	Avio SpA	Actual
	Aviosonic Space Tech	Actual

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Country	*Entity Name*	*Update status*
	Aviospace	Proxy
	CESI	Proxy
	D-Orbit	Actual
	Dataspazio Spa	Proxy
	DEIMOS Italy	Actual
	Design Manufacturing SPA	Proxy
	E-Geos S.p.A.	Actual
	HE Space	Proxy
	IMT Srl	Actual
		Proxy
	Ingeniars	Actual
	IngeniArs S.r.l.	Actual
	Intecs S.p.A.	Proxy
	IRCA div. RICA	Proxy
	Kayser Italia Srl	Actual
	LEAF Space	Proxy
	Leonardo SpA	Proxy
	MEC - MICROWAVE ELECTRONICS FOR COMMUNICATIONS	Actual
	Microspace	Actual
	Microspace Srl	Actual
	Microtecnica	Proxy
	NPC Spacemind	Actual
	Officina Stellare	Actual
	OHB Italia SPA	Proxy
	Picosats Srl	Actual
	Progetti Speciali Italiani Srl	Proxy
	SAB Aerospace	Proxy
	Serco	Proxy
	Sidereus Space Dynamics	Actual
	Sistemi Software Integrati S.p.A.	Proxy
	SITAEL S.p.A.	Actual
	Space Engineering S.p.A.	Proxy
	Space Factory Srl	Actual
	Spacemind - NPC New Production Concept	Actual
	Stellar Project	Actual
	T4i	Actual
	TECNOMARE S.p.A	Proxy
	Telespazio Group	Actual
	TESEO S.p.A.	Actual
	Thales Alenia Space Italia S.p.A.	Actual
	Tyvak International	Actual
	Vitrociset SpA	Proxy

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Country	*Entity Name*	*Update status*
	Yetitmoves	Actual
	W.L.Gore & Associates	Actual
Latvia	Baltic Satellite Services Ltd	Actual
	Eventech	Actual
	Foundation Institute for Environment	Actual
	Institute of Electronics and Computer Science	Actual
	MIKC	Actual
	RD Alfa Mikroelektronik	Actual
	Riga Technical University	Actual
	Ventspils University College.	Actual
	Wood Chemistry Institute.	Actual
Lithuania	adpos	Actual
	Kaunas University of Technology	Actual
	Lidaris UAB	Actual
	Nano Avionica UAB	Actual
	NanoAvionics EU	Proxy
	Space Union	Actual
	State Research Institute Center for Physical Science and Technology.	Actual
	The National Centre for Remote Sensing and Geoinformatics.	Actual
	University of Klaipeda	Actual
	Up & Above	Actual
Luxembourg	CisLunar Industries	Actual
	CTI Systems S.A.	Proxy
	Euro-Composites S.A.	Actual
	GRADEL S.A.	Proxy
	HITEC Luxembourg S.A.	Proxy
	LUXSPACE Sarl	Proxy
	Maana	Actual
	Space Cargo Unlimited	Actual
	Thales Alenia Space LU	Actual
	The Lunar Grid	Actual
Netherlands	AAC Hyperion	Actual
	ACM Coatings GmbH	Actual
	Airborne Aerospace BV	Proxy
	Airbus Defence and Space Nederland BV	Proxy
	APP	Proxy
	ATG-Europe	Proxy
	Bradford Engineering BV	Proxy
	Celestia-STS	Proxy
	cosine measurement systems B.V.	Actual
	Eye On Orbit	Actual

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Country	*Entity Name*	*Update status*
	GMV Innovating Solutions B.V	Actual
	GTM Aerospace	Proxy
	HE Space	Proxy
	Hyperion Technologies (AAC Clyde)	Actual
	Innovative Data Services	Actual
	Innovative Space Logistics	Actual
	ISIS - Innovative Solutions In Space	Proxy
	J-CDS B.V	Actual
	Lens Research & Development	Actual
	MOLTEK	Actual
	NLR	Proxy
	Origin	Proxy
	Revolv	Actual
	Serco	Proxy
	SpaceBorn United	Actual
	T-Minus	Actual
	T-Minus Engineering	Actual
	TNO	Proxy
Norway	Andoya SpacePort	Actual
	Eidsvoll Electronics AS	Proxy
	Integrated Detector Electronics	Actual
	Kongsberg Defence & Aerospace AS	Proxy
	Kongsberg Norspace	Actual
	Kongsberg Satellite Services AS	Proxy
	Kongsberg Spacetec	Actual
	Marintek	Proxy
	NAMISAT	Actual
	Nammo Raufoss	Proxy
	Presens AS	Proxy
	Prototech AS	Proxy
	Ripple Aerospace	Actual
Poland	AGH - University of Sciences and Technol	Actual
	Astri Polska Sp. z o.o.	Proxy
	Astronika SP. Z O.O.	Actual
	ATOS Polska S.A.	Actual
	Creotech	Actual
	Ewa Slominska "Obsee"	Actual
	GDYNIA MARITIME UNIVERSITY	Actual
	GMV Innovating Solutions Sp.z o.o.	Actual
	HE Space	Proxy
	Hertz Systems Ltd Sp Z00	Actual
	HTP NOWE TECHNOLOGIE SPÓ321;KA Z	Actual

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Country	*Entity Name*	*Update status*
	Hyper-sat	Actual
	Institute of Aviation	Proxy
	INSTITUTE OF GEODESY AND CARTOGRAPH	Actual
	ITTI SP. Z O.O.	Actual
	KP Labs	Actual
	Lodz University Of Technology	Actual
	Near Space Technologies Sp. Z.o.o.	Actual
	PIAP Space	Actual
	POLAND SPACE SECTOR (GAP FILER)	Proxy
	SatRevolution	Actual
	Scanway	Actual
	SENER Poland	Actual
	Thales Alenia Space PL	Actual
	Thorium Space Technology	Actual
Portugal	Active Space Technologies S.A.	Proxy
	Critical Software, S.A.	Proxy
	DEIMOS Portugal	Actual
	Edisoft - Empresa de Serviços e Desenvolvimento de Software, S.A	Actual
	FHP	Proxy
	GMVIS Skysoft S.A.	Actual
	Omnidea Lda	Actual
	W.L.Gore & Associates	Actual
Romania	ARCA Space	Proxy
	CS Romania	Actual
	DEIMOS Romania	Actual
	GMV Innovating Solutions Sp.z o.o.	Actual
	Rartel S.A.	Actual
Slovakia	Algoritmy SRO	Actual
	Borospace	Actual
	CTRL SRO	Actual
	Go Space Tech SRO	Actual
	Institute of Experimental Physics, Slovak Academy of Science.	Actual
	Needronix	Actual
	Needtronix.	Actual
	Orbisys	Actual
	Orbisys SRO	Actual
	Pavol Jozef Sararik University.	Actual
	Slovak University of Technology IMSAS	Actual
	Spacemanic	Actual
Spain	ACORDE TECHNOLOGIES	Proxy
	AIRBUS DEFENCE & SPACE SAU	Actual

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	Alen Space	Actual
	ALTER TECHNOLOGY TÜV NORD	Actual
		Proxy
	Arkadia Space	Actual
	ARQUIMEA INGENIERIA S.L.	Proxy
	AVS	Proxy
	Balamis	Actual
	Celestia Aerospace	Actual
	Celestia Aerospace	Actual
	CELIS	Actual
	Computadoras, Redes e Ingeniaría SAU	Actual
	DEIMOS Space	Actual
	DHV Technology	Actual
	emxys	Actual
	EOS-X Spaceship	Actual
	FentISS	Actual
	Fossa Systems	Actual
	Fossa Systems SL	Actual
	GMV Aerospace and Defence S.A.U.	Actual
	GMV Soluciones Gloables Internet S.A.U.	Actual
	Green Moon Project	Actual
	GTD SISTEMAS DE INFORMACION SAU	Actual
	HE Space	Proxy
	Ibérica del Espacio, S.A.	Proxy
	ienai Space	Actual
	Indra Sistemas	Proxy
	INSA	Proxy
	Karten Space	Actual
	Kreios Space	Actual
	LIDAX	Proxy
	Pangea Aerospace	Actual
	PLD-Space	Actual
	Radian Systems	Actual
	Satlantis Microsats	Actual
	SENER Aeroespacial, S.A.	Actual
	Serco	Proxy
	Solar MEMS Technologies	Actual
	TECNALIA	Proxy
	Telespazio Iberica S.L.	Actual
	Test in Space	Actual
	Thales Alenia Space España	Actual
	Theia Space	Actual

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Country	*Entity Name*	*Update status*
	TTI Norte	Proxy
	UARX	Actual
	Waptel	Actual
	Zero 2 Infinity	Actual
Sweden	12G Flight Systems	Actual
	AAC Clyde Space	Actual
	AAC Omnisys	Actual
	ACR	Proxy
	Arctic Space Technologies	Actual
	CAES Gaisler	Actual
	ECAPS	Proxy
	GKN Aerospace	Proxy
	Gomspace	Proxy
	IR Nova	Actual
	Jirotex	Proxy
	Nanospace	Actual
		Proxy
	OHB Sweden AB	Actual
		Proxy
	Porkchop AB	Actual
	ReOrbit	Actual
	RUAG Space AB	Actual
	Space Travel Alliance	Actual
	Spaceport Sweden	Actual
	Spectrogon	Proxy
	Swedish Space Corporation	Proxy
Switzerland	ALMATECH SA	Proxy
	APCO Technologies	Actual
	Astrocast	Actual
		Proxy
	Clearspace	Actual
	Clemessy	Proxy
	Clemessy Switzerland AG	Actual
	CSEM	Proxy
	ELCA	Proxy
	ETH (PnP Software)	Proxy
	Helbling Technik AG	Proxy
	Leica Microsystems	Proxy
	Observatoire de Neuchâtel	Proxy
	Orbitare	Actual
	Orolia Switzerland SA	Proxy
	RST Radar Systemtechnik AG	Proxy

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Country	*Entity Name*	*Update status*
	RUAG Schweiz AG, RUAG Space	Actual
	Solenix	Actual
		Proxy
	Syderal	Proxy
	Thales Alenia Space CH	Actual
	TSS Innovationsprojekte GmbH	Proxy
	Vibro-Meter SA	Proxy
United Kingdom	3rd Rock Aerospace	Actual
	4Links Limited	Proxy
	AAC Clyde Space	Actual
	ABSL Power Solutions	Actual
	AEA Technology	Proxy
	Airbus Defence & Space Ltd.	Actual
	Alba Orbital	Actual
	ALTER Technology TÜV Nord UK	Proxy
	Anchor Orbital	Actual
	Archangel Lightworks	Actual
	Arqit	Proxy
	Arralis Technologies	Actual
	Asteroid Mining Corporation	Actual
	Astroscale UK	Actual
	Astrotanks	Actual
	AvalonSpace	Actual
	AVS	Proxy
	Axon Cable	Proxy
	B2Space	Actual
	BHR Group	Proxy
	Black Arrow	Actual
	Blue Asteroids	Actual
	Bristol Spaceplanes	Actual
	CGI IT UK Ltd	Proxy
	Citadel Space Systems	Actual
	Clutch Space Systems	Actual
	COM DEV Europe Ltd	Proxy
	Commercial Space Technologies	Actual
	D-Orbit	Actual
	DEIMOS UK	Actual
	e2v	Proxy
	Effective Space Solutions (Astroscale)	Actual
	ERA Technology	Proxy
	ESR Technology	Proxy
	ESYS	Proxy

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Country	*Entity Name*	*Update status*
	Exodus Orbitals	Actual
	F&W Insights	Actual
	GKM Aerospace	Proxy
	GMV NSL Limited	Actual
	Goonhilly Earth Station	Actual
	HE Space	Proxy
	Horizon Technologies	Actual
	In-Space Missions	Proxy
	Isotropic Systems Ltd	Actual
	KISPE	Actual
	Lift me off	Actual
	Living Optics	Actual
	Lumi Space	Actual
	Magdrive	Actual
	Mars Space	Actual
	Massterra Space	Actual
	Masterra Space	Actual
	MT-Sat UK	Proxy
	Nammo (Polyflex)	Proxy
	Nammo Westcott (Nammo UK)	Proxy
	NanoAvionics EU	Proxy
	OhmSpace	Actual
	Open Cosmos	Proxy
	OrbAstro	Actual
	Orbex	Actual
	Orbit Boy	Actual
	Orbit:Linx	Actual
	Orbital Access	Actual
	Orbital Astronautics	Actual
	Orbital Optics	Actual
	Orbital Wave	Actual
	Oxford Space Systems	Actual
	QinetiQ	Proxy
	Quadsat	Actual
	Radian Aerospace	Actual
	RAL	Proxy
	Raptor Space Services	Actual
	Reaction Engines	Actual
	RHEATECH Limited	Actual
	SatRevolution	Actual
	SaxaVord Spaceport	Actual
	SCISYS UK Ltd	Proxy

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	SELEX Galileo LTD	Proxy
	Serco	Proxy
	SIRA Technology	Proxy
	Skyrora	Proxy
	Smallspark Space Systems	Actual
	Sofant Technologies	Actual
	Space Entertainment Enterprise	Actual
	Space Forge	Actual
	Space Forms	Actual
	Space Hub Sutherland	Actual
	Space power	Actual
	Space Talos	Actual
	SpaceBit	Actual
	SpaceLS	Actual
	Spire Global UK	Actual
	SPUR Electron Ltd	Proxy
	SRT Marine	Actual
	Starchaser	Actual
	SteamJet Space	Actual
	StratoBooster Ltd	Actual
	Surrey Satellite Technology Ltd	Actual
	Telespazio Vega UK Ltd	Actual
	Terahertz	Proxy
	Thales Alenia Space UK	Actual
	Tranquility Aerospace	Actual
	UKVL Sutherland	Actual
	XCAM	Actual
	W.L.Gore & Associates	Actual

The survey is only as good as the data available to populate the economic model. Companies support to the data collection is thus essential.

We wish to express our thanks to all companies that have supported the survey this year.

Survey release notes

Release notes

Long series information

Long series are built by compiling data collected with three different methodologies.

From 1991 to 1995 only a few types of customers and products were considered. After 1996 the customer and products lists were expanded in order to provide additional details. The following categories were introduced:

- For customers:

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    - The European Commission (in 1996): EC programmes can be managed directly by the EC (a small fraction of EC space budgets: Framework Programmes for space research) or delegated to ESA for implementation (the lumpy GMES/Copernicus, and Galileo programmes).
    - Eumetsat (in 2002): as with the EC, Eumetsat delegates all space system procurement (the Meteosat programmes) to ESA, whereas it procures only ground segment activities directly from industry.
    - Civil multilateral programmes (from 2002 to 2008, now discontinued - before, and after the data is included in National civil programmes).
    - Private satellite operators, other commercial satellites and parts, Arianespace, and other launcher sales—before the data was bundled into one single category: commercial and exports.
- For products:
    - Navigation systems (in 1996) - before the data was included in telecommunications.
    - Launcher development and Operational launcher systems (in 1996) - before all launcher activities were bundled together.

About ground systems and services:

- Before 2009, all sales of professional ground stations (TT&C and data stations, control centres) and related services (such as ground segment operations) were included in the associated product category (telecoms, science, Earth observation, etc.).

A major methodological update was performed in 2010 (i.e. applicable to 2009 data) that entailed some changes in the data series, and in particular:

- Military system sales are now counted separately from military customers sales.
- All ground segment activities are clearly separated from the rest, this includes the sales of professional stations and control centre operations, as well as services to industry and agencies.

In all long series spanning across more than one methodological framework, the data is harmonised to ensure continuity.

Perimeter changes

Tracking: When a new company is included or removed from the economic model we call this a perimeter change. Perimeter changes have an impact on figures since they may introduce a discontinuity with previous years. The details (and orders of magnitude) of these changes are provided below.

2021 / Creation of new country entries: Greece, Latvia, Lithuania, Romania, Slovakia - the data has been retroactively corrected to avoid data discontinuities.

2020 / Germany: inclusion of Airbus GEO in perimeter, impact on FTE Approx +100

2020 / Europe: 35 new proxies added to the model, with retroactive impact, to include emerging start-ups with known employment information. No statistical discontinuity, proxies were inserted in previous years, consistent with company history.

2019 / Europe: Six new countries added to the model (gap filler data based on ESA PECS involvement), impact on FTE +300.

2019 / Netherlands: Two new companies (proxies) added to the model, impact on FTE about +70

2019 / Germany: Six new companies (proxies) added to the model, impact on FTE about +300

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2019 / UK: Three new companies (proxies) added to the model. FTE impact about +100.

2019 / France: The publication by CNES in April 2020 of a catalogue of French space companies revealed information previously unknown to Eurospace. The model was enriched with 27 more entities, and old proxies could be updated with fresher data. The positive impact on employment was in the order of 1000 FTE.

2017 / Spain: GTD is a spanish company providing services in Kourou at launch sites it has been added to the model this year, Eurospace collected data about this company which exists since 1987, the total impact on employement is below 100.

2017 / Netherland: the measurement of employment in the Dutch Space sector has been improved in 2017 with the fine identification of FTE count within a major Dutch company (that could only provide headcount previously). This has a negative impact in Dutch employment in the order of 180.

2017 / Netherlands: ATG-EUROPE was added to the model, with a proxy which added about 200 FTE to employement perimetre in the Netherlands area

2017 / Belgium: a deacrease in the space employement was noticed in Belgium, due to a variation of 205 employement at SABCA- from 340 to 315 in 2017

2016 / Italy & France : in 2016 Regulus personnel (working at Kourou) part of the AVIO consolidated reply was re-allocated to France (not Italy) resulting in a change of 100 FTE lost in Italy and added to France.

2016 / Poland : in 2016, 28 Polish companies have been added to the model. Impact on employment is in the order of +100 FTE. Final sales have been sligthly impacted.

2015 / Sweden: in 2015, three more Swedish companies have been added, Jirotex, NanoSpace and ECAPS. Impact on employment is in the order of +30FTE. Final sales have been sligthly impacted.

2015 / Netherlands: An additional company, ISIS Innovative Solutions in Space, has been integrated to the survey perimeter with negligible variation to final sales. Changes are in the order of +50FTE for employment.

2015 / France: As Thales Alenia Space's employees located in Belgium and Spain have been included in TAS France's response, a redistribution of employment data has been done for these countries since 2010. The impact is in the order of -400 FTE for France and +150 FTE for Belgium and Spain every year.

2015 / Belgium: Three new companies have been added to the model : V2i, LambdaX and Numeca with a very slight impact on both final sales and employment (+20FTE)

2015 / Other countries: Eurospace has also gathered data about a new entity in Czech Republic, BBT Materials Processing with also a weak effect on final sales and employment.

> For information related to previous year's changes please refer to previous editions of Eurospace facts and figures.

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- Survey tools, programming and debugging (all editions since 19th):
  - Jean-Charles Treuet
- Additional programming and data verification/consolidation activities (23rd edition):
  - Paul Brunet
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  - Nesrine Mezghrani
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The survey would not be possible without the kind cooperation of participating companies (see list inside).

To all contributors: Thank you for your support!

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