



# How will Brexit affect the UK space industry?

---

A research report by the  
Office of Antony Hook MEP

**ANTONY HOOK**  
MEP

# How will Brexit affect the UK space industry?

Research by Jack Winslade and Volha Kozhukh

Published: 24/10/19

Last updated: 24/10/19

## Objective

This report examines the affect that Brexit will have on the UK space industry and the UK's input into European space research. The report also examines to what extent the space industry will be affected by the UK's decision to leave the EU and the opportunities for the UK if Brexit is stopped.

## Contents

<b>Objective</b> .....	1
<b>Key findings:</b> .....	1
<b>Introduction</b> .....	2
<b>1. EU Space Policy</b> .....	3
<b>2. Galileo</b> .....	3
<b>3. Copernicus</b> .....	4
<b>4. Brexit and the UK's input to EU space programmes</b> .....	6
<b>5. No-deal and the impact on the UK space industry</b> .....	8
<b>Appendix 1:</b> .....	12
<b>Appendix 2:</b> .....	13
<b>Appendix 3:</b> .....	14
<b>Appendix 4:</b> .....	15

## Key findings:

- The UK has a highly successful and burgeoning space industry which has thrived and benefited through EU cooperation and funding.
- The UK has made significant investments, including £1.2 billion into the Galileo project, which will be lost after Brexit.

- After Brexit, the UK will lose access to large tranches of funding through programmes such as Horizon 2020.
- Britain's national security will be weakened when the government loses access to satellite technology developed in partnership with the EU, resulting in increased dependence on the US and Russia.
- The UK space industry will be excluded from bidding for the next round of EU contracts due in 2020 that are awarded every seven years. The industry will be left at a severe disadvantage from which it may never recover.

## Introduction

The space industry is an important and developing part of the UK economy. Space technology, data and services is essential in the lives of EU citizens. UK participation in EU space programmes is crucial in tackling new challenges such as climate change, sustainable development, border control, maritime surveillance and security.

The UK has developed a national space policy and is a member of various international space organisations such as the European Space Agency (ESA) and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), amongst others. However, the UK's space policy heavily relies on the EU framework. The space industry is worth around £14 billion to the UK economy employing 40,000 people. Paul Everitt, the chief of the Aerospace, Defence, Security and Space (ADS) industry group told MPs that there has been particularly fast growth in the sector thanks to growth in the market for satellites, which was due to EU projects such as Galileo<sup>1</sup>.

As an EU member state, the UK currently participates in numerous EU Global Navigation Satellite System (GNSS) programmes such as Galileo and Copernicus. The EU fully finances, owns and manages these projects as part of the Union space budget of €12.6 billion allocated to space activities for the 2014-2020 period<sup>2</sup>.

The Galileo project aims to provide EU member states with a high-precision positioning system for both civilian and military use so that European nations do not have to rely on US GPS or Russian Glonass satellites<sup>3</sup>. Copernicus is the EU's Earth Observation system looking at the planet and the environment and is coordinated and managed by the Commission<sup>4</sup>.

---

<sup>1</sup> "UK firms 'excluded' from space contracts by Brexit", *BBC News*, November 21 2017.

<https://www.bbc.co.uk/news/business-42065836>

<sup>2</sup> Cemal Karakas, "EU space programme", Briefing, European Parliamentary Research Service, p.1, May 2019,

[https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/628300/EPRS\\_BRI\(2018\)628300\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/628300/EPRS_BRI(2018)628300_EN.pdf)

<sup>3</sup> "Galileo navigation", *European Space Agency (ESA)*, last modified June 27 2014.

[http://www.esa.int/Applications/Navigation/Galileo/Why\\_Europe\\_needs\\_Galileo](http://www.esa.int/Applications/Navigation/Galileo/Why_Europe_needs_Galileo)

<sup>4</sup> "What is Copernicus?", *Copernicus*.

<https://web.archive.org/web/20181103182626/http://www.copernicus.eu/main/overview>

This report will focus on the two main EU space projects: Galileo and Copernicus and the implications of Brexit for the UK national space policy.

## 1. EU Space Policy

- 1.1. European contracts for space are awarded every seven years as part of the Multiannual Financial Framework (MFF). The next batch of contracts will be awarded in 2020, which includes contracts for satellite construction and research missions. From 2014 to 2020, around €12.6 billion was allocated to space contracts. If the UK does not leave the EU, British space firms can potentially benefit from up to 10% of the available fund and continue to participate in programmes such as Galileo and Copernicus<sup>5</sup>.
- 1.2. EU space policy continues to develop and strengthen. A recently adopted EU regulation establishes the Space Programme for the Union (SPU) as well as the new EU Agency for the Space Programme. With the combined efforts of the European Parliament, the SPU has seen an increased budget for the EU space programmes including €9.7 billion for Galileo and €6 billion for Copernicus. For the period of 2021-2027, the Commission will allocate €16.9 billion for EU space programmes, which the UK would have access to if it was to remain an EU member<sup>6</sup>.
- 1.3. The EU is the largest institutional customer of satellites with more than 30 already in orbit. Some of these launched EU satellites have been designed and constructed in the UK. The SPU plans to launch a further 25 satellites in the next 10-15 years<sup>7</sup>. If the UK was to remain an EU member, it is likely that UK companies would be awarded the contracts to design and build the future planned EU satellites.

## 2. Galileo

- 2.1. According to the European Global Navigation Satellite Systems Agency (EGSA), Galileo is Europe's Global Navigation Satellite



---

<sup>5</sup> Jonathan O'Callaghan, "Here's what each Brexit scenario could mean for the UK space industry", *Forbes*, January 21, 2019. <https://www.forbes.com/sites/jonathanocallaghan/2019/01/21/heres-what-each-brexit-scenario-could-mean-for-the-uk-space-industry/#4b5d98d82908>

<sup>6</sup> "2018/0236(COD): Space programme 2021-2027 and European Union Agency for the Space Programme", *European Parliament*. [https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2018/0236\(COD\)&l=en](https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2018/0236(COD)&l=en)

<sup>7</sup> Cemal Karakas, "EU space programme", Briefing, European Parliamentary Research Service, p.1, May 2019, [https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/628300/EPRS\\_BRI\(2018\)628300\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/628300/EPRS_BRI(2018)628300_EN.pdf)

System (GNSS), provides positioning and timing information for European services and users<sup>8</sup>.

- 2.2. Galileo allows users to know their exact position with greater precision than what is offered by other systems. Products used everyday from car navigation systems to mobile phone navigation benefit from the increased accuracy that Galileo provides.
- 2.3. Critical emergency response-services benefit from Galileo making Europe's roads and railways safer and more efficient.
- 2.4. Galileo has enhanced European innovation, contributing to the creation of many new products and services, and jobs as well as allowing Europe to own a greater share of the €175 billion global GNSS market<sup>9</sup>.
- 2.5. The UK leaving the EU will mean that the UK will lose all access to the all the services provided by Galileo. Brexit has already impacted on UK companies that provide services to Galileo. For example, in 2018 the Spanish company GMV won a €250 million contract to develop a ground control system for Galileo- this was a contract previously awarded and managed by Airbus UK. Another British company, CGI UK which used to supply security systems to Galileo has lost its contract in the wake of Brexit<sup>10</sup>.



### 3. Copernicus

- 3.1. Copernicus is served by a set of dedicated satellites (the Sentinel families) and existing commercial and public satellites. Since the launch of Sentinel-1A in 2014, the EU set in motion a process to place a constellation of almost 20 more satellites in orbit before 2030<sup>11</sup>.
- 3.2. The information provided by Copernicus can be used for a wide range of applications. The satellites are used to collect data for the following areas: atmosphere, marine, land, climate change, security and emergency. Copernicus collects the following information and provides the following services:

---

<sup>8</sup> “Galileo is the European global satellite-based navigation system”, *European Global Navigation Satellite Systems Agency*, last modified October 3 2019. <https://www.gsa.europa.eu/european-gnss/galileo/galileo-european-global-satellite-based-navigation-system>

<sup>9</sup> Galileo is the European global satellite-based navigation system”, *European Global Navigation Satellite Systems Agency*, last modified October 3 2019. <https://www.gsa.europa.eu/european-gnss/galileo/galileo-european-global-satellite-based-navigation-system>

<sup>10</sup> Jonathan O’Callaghan, “Here’s what each Brexit scenario could mean for the UK space industry”, *Forbes*, January 21, 2019. <https://www.forbes.com/sites/jonathanocallaghan/2019/01/21/heres-what-each-brexit-scenario-could-mean-for-the-uk-space-industry/#4b5d98d82908>

<sup>11</sup> “Copernicus in brief”, *Copernicus*, last modified October 7 2019. <https://www.copernicus.eu/en/about-copernicus/copernicus-brief>

- Copernicus Atmosphere Monitoring Service (CAMS): provides continuous data and information on atmospheric composition. The service focuses on five main areas: air quality and atmospheric composition; Ozone layer and ultra-violet radiation; emissions and surface fluxes; solar radiation and climate forcing<sup>12</sup>.
- Copernicus Marine Environment Monitoring Service (CHEMS): provides regular and systematic reference information on the physical and biogeochemical state, variability and dynamics of the ocean and marine ecosystems for the global ocean and European regional seas. The service focuses on: marine safety; marine resources; coastal and marine environment and weather, seasonal forecasting and climate<sup>13</sup>.
- Copernicus Land Monitoring Service (CLMS): provides geographical information on land cover and its changes, land use, vegetation stat, water cycle and earth surface energy variables to a broad range of users in Europe and across the world in the field of environmental terrestrial applications. The service focuses on: systematic monitoring of biophysical parameters, land cover and land use mapping, thematic hot-spot mapping and imagery and reference data<sup>14</sup>.
- Copernicus Climate Change Service (C3S): supports society by providing authoritative information about the past, present and future climate in Europe and the rest of the world. The missions support the adaptation and mitigation policies of the EU by providing consistent information about climate change. C3S data and tools have been used for a variety of purposes including: assessment of climate change impacts on biodiversity in Costa Rica, risk management for commodity trading at Marex Spectron and sustainable water management at the Heineken brewery<sup>15</sup>.
- Copernicus Security Service: aims to support the EU policies by providing information to Europe's security challenges. It improves crisis prevention, preparedness and response in three key areas: border surveillance; maritime surveillance and support to EU External Action<sup>16</sup>.
- Copernicus Emergency Management Service (Copernicus EMS): provides all actors involved in the management of natural disasters, man-made emergency situations, and humanitarian crises with timely and accurate information. Copernicus EMS consists of two components: a mapping component and an early warning component. The early

---

<sup>12</sup> "Atmosphere: Copernicus Atmosphere Monitoring Service", Copernicus.

<https://www.copernicus.eu/en/services/atmosphere>

<sup>13</sup> "Marine: Copernicus Marine Environment Monitoring Service", Copernicus.

<https://www.copernicus.eu/en/services/marine>

<sup>14</sup> "Land: Copernicus Land Monitoring Service", Copernicus.

<https://www.copernicus.eu/en/services/land>

<sup>15</sup> "Climate change: Copernicus Climate Change Service", Copernicus.

<https://www.copernicus.eu/en/services/climate-change>

<sup>16</sup> "Security: Copernicus Security Service", Copernicus.

<https://www.copernicus.eu/en/services/security>

warning component aims to address disasters including: flooding, forest fire and drought<sup>17</sup>

- 3.3. In December 2017, the European Commission completed a large-scale study to analyse the economic, societal and environmental benefits of the Copernicus programme depending on various evolution scenarios. The study aimed to give monetary value to all the benefits generated by the Copernicus programme for intermediate users and end users, with the intention of giving EU and national policy makers, with an estimate of the potential return on investment.
- 3.4. The UK, as a member of the EU, is fully involved in the decision-making for Copernicus. UK companies and researchers currently bid in an open competition for contracts to design, build and operate both the physical infrastructure of the programme and its services. The European Space Agency (ESA) is responsible for placing contracts and have listed which companies have received over €15,000 of EU funds in the form of a Copernicus Space Component<sup>18</sup>. Between 2015 and 2018, UK companies were awarded over €55 million worth of contracts from the Copernicus programmes (see appendices 1-4).
- 3.5. Leaving the EU will mean UK companies will lose these contracts and they will be awarded elsewhere in the EU. This results in a loss of revenue, skilled individuals leaving the UK and job losses in the UK space sector.

## **4. Brexit and the UK's input to EU space programmes**

- 4.1. Brexit will cause serious damage to the UK space industry with a reduction in investment, fewer jobs and reduced ability to conduct research, design and build space products. UK-based companies have been central in the deployment and management of Galileo and Copernicus satellites, with Brexit they will lose their input.
- 4.2. Exiting the EU will undermine national ambitions in the space sector. The UK Space Innovation and Growth Strategy 2014-2030 is based on UK membership of the EU. The strategy states that; today [2014], exports make up 22% of the space sector, by 2030 this is targeted to increase by 60%, or around £25 billion<sup>19</sup>. Exiting the EU will make this target considerably harder to achieve.
- 4.3. The UK Space Agency in the Innovation and Growth Strategy 2014-2030 report called for greater UK involvement in European Space Agency (ESA), and EU-related space

---

<sup>17</sup> “Emergency: Copernicus Emergency Management Service”, Copernicus.

<https://www.copernicus.eu/en/services/emergency>

<sup>18</sup> “Space component tenders and contracts”, European Space Agency (ESA).

[https://www.esa.int/Applications/Observing\\_the\\_Earth/Copernicus/Space\\_Component\\_tenders\\_and\\_contracts](https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Space_Component_tenders_and_contracts)

<sup>19</sup> UK Space Agency, “Space Innovation and Growth Strategy 2014-2030: Space Growth Action Plan”, April 8 2014, p.7.

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/298362/igs-action-plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/298362/igs-action-plan.pdf)

projects. Whilst the ESA is a separate body from the EU, the report recognised that “the European picture is becoming more complex, with potential opportunities to win work and secure investment from many institutions including... the European Union (acting as procurer of products and services, regulator and investor)”<sup>20</sup>. The report emphasises the necessity for the UK to develop plans to gain maximum benefit from European investment. It continues to suggest the UK Space Agency deploys resources to influence EU space policies and that the UK could play a more influential role by contributing expertise so that skilled UK representatives are appointed to EU bodies<sup>21</sup>. Brexit will mean the UK will lose all current and potential investment in EU space programmes and will be removed from any future planning.

- 4.4. Leaving the EU means that the UK will not be able to access Galileo services for defence and national infrastructure as well as the future planned Public Regulated Service (PRS). PRS is Galileo’s encrypted security service in which the UK enjoyed a very strong position, after Brexit the UK’s involvement in PRS planning will end. Additionally, the UK will lose access to the encrypted Galileo Public Regulated Service and will not be able to play any part in the development of Galileo<sup>22</sup>. The government has said that leaving the Galileo project means that “UK-based businesses, academics and researchers will not be able to bid for future EU GNSS contracts and may face difficulty carrying out and completing existing contracts”<sup>23</sup>.
- 4.5. UK participation is uncertain in Space Surveillance and Tracking (SST) which seeks to monitor and remove space junk. Additionally, participation in the Space Situational Awareness (SSA) that monitors space weather and debris. New arrangements would need to be made for the UK to take part as a third country<sup>24</sup>.
- 4.6. With the UK departing the Galileo project, the government has announced that it will explore options to build its own Global Navigation Satellite System that can help guide military drones, run energy networks and provide services for civilian smart phones. The UK is currently seeking to work with the US to continue to access its GPS system. In August 2018, former Prime Minister Theresa May tasked British engineering and aerospace experts to develop options and set aside £92 million for

---

<sup>20</sup> UK Space Agency, “Space Innovation and Growth Strategy 2014-2030: Space Growth Action Plan”, April 8 2014, p.16. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/298362/igs-action-plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/298362/igs-action-plan.pdf)

<sup>21</sup> UK Space Agency, “Space Innovation and Growth Strategy 2014-2030: Space Growth Action Plan”, April 8 2014, p.16. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/298362/igs-action-plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/298362/igs-action-plan.pdf)

<sup>22</sup> Department for Business, Energy & Industrial Strategy & UK Space Agency, “Satellites and space programmes after Brexit”, August 9 2019, <https://www.gov.uk/guidance/satellites-and-space-programmes-after-brexit>

<sup>23</sup> Department for Business, Energy & Industrial Strategy & UK Space Agency, “Satellites and space programmes after Brexit”, August 9 2019, <https://www.gov.uk/guidance/satellites-and-space-programmes-after-brexit>

<sup>24</sup> European Parliament, “Brexit and Industry and Space Policy”, Workshop proceedings, p.10, September 24 2018, [http://www.europarl.europa.eu/RegData/etudes/STUD/2018/626084/IPOL\\_STU\(2018\)626084\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2018/626084/IPOL_STU(2018)626084_EN.pdf)

the plans<sup>25</sup>. In November 2018, The Guardian reported that the UK has already given £1.2 billion to the Galileo and is unlikely to get back this investment after Brexit<sup>26</sup>.

- 4.7. Post-Brexit UK participation in the Space Surveillance and Tacking (SST) and Space Situational Awareness (SSA) Programmes is uncertain. SST monitors and removes space junk whilst SSA monitors space weather and debris.
- 4.8. Horizon Europe is a €100 billion programme that will fund research grants in the EU from 2021 to 2027 which includes space research funding. In the event of a no-deal Brexit, UK researchers could only take part in Horizon-funded research projects if they cover their own costs<sup>27</sup>.
- 4.9. The UK's membership of the European Space Agency (ESA) is not affected by leaving the EU as it's not an EU organisation. However, ESA as a contracting authority manages EU-sponsored projects (such as Galileo) which the UK will have no access after Brexit, voiding some aspects of the UK's ESA membership. Jean-Jacques Tortora, Director of the European Space Policy Institute (EPSI) said, "It is unclear if this will be sufficient to maintain the UK industry's critical mass. Without their critical mass, the UK will no longer be competitive in the space sector"<sup>28</sup>

## 5. No-deal and the impact on the UK space industry

- 5.1. The Department for Business, Energy and Industrial Strategy has stated that in the event of no-deal, UK-based businesses, academics and researchers will be unable to bid for future EU Global Navigation Satellite System contracts and may face difficulty carrying out and completing existing contracts<sup>29</sup>.
- 5.2. As third country, the UK will not be eligible to participate in the EU Galileo's PRS, SSA and SST. Without its own Galileo satellite system, the UK will be reliant on data provided by the US. This will make the UK dependent on future arrangements with the US where the UK would have much less leverage and bargaining power.

---

<sup>25</sup> Prime Minister's Office, 10 Downing Street & The Rt Hon Theresa May MP, "UK to tell EU it will no longer seek access to secure aspects of Galileo", December 1 2018, <https://www.gov.uk/government/news/uk-to-tell-eu-it-will-no-longer-look-for-access-to-secure-aspects-of-galileo>

<sup>26</sup> Jessica Elgot, "UK may never recover £1.2bn invested in EU Galileo satellite system", *The Guardian*, November 30 2018. <https://www.theguardian.com/politics/2018/nov/30/brexit-uk-may-never-recover-12bn-invested-in-eu-galileo-satellite-system>

<sup>27</sup> European Commission, "Horizon Europe: The next EU research & innovation investment programme (2021-2027)", August 2019. [https://ec.europa.eu/info/sites/info/files/research\\_and\\_innovation/strategy\\_on\\_research\\_and\\_innovation/presentations/horizon\\_europe\\_en\\_investing\\_to\\_shape\\_our\\_future.pdf](https://ec.europa.eu/info/sites/info/files/research_and_innovation/strategy_on_research_and_innovation/presentations/horizon_europe_en_investing_to_shape_our_future.pdf)

<sup>28</sup> European Parliament, "Brexit and Industry and Space Policy", Workshop proceedings, p.11, September 24 2018, [http://www.europarl.europa.eu/RegData/etudes/STUD/2018/626084/IPOL\\_STU\(2018\)626084\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2018/626084/IPOL_STU(2018)626084_EN.pdf)

<sup>29</sup> Department for Business, Energy & Industrial Strategy, "Satellites and space programmes if there's a no Brexit deal", August 9 2019. <https://www.gov.uk/government/publications/satellites-and-space-programmes-if-theres-no-brexit-deal/satellites-and-space-programmes-if-theres-no-brexit-deal>

- 5.3. Galileo is also crucially important for search and rescue purposes, which the UK will lose access to in the event of no-deal. Galileo Search and Rescue locates distressed people within 10 minutes with the precision to locate a distressed individual within 2 km<sup>30</sup>.
- 5.4. UK citizens will not be able to benefit from the latest technological developments such as improving EU citizens mobility. The MyGalileoApp aims to help different communities of pedestrians living in urban areas that need to have real-time accurate information of their environment to improve everyday mobility<sup>31</sup>.

## Summary

Space technology is not only crucial to the military and defence sectors but also in the daily lives of people living in the UK who use space technology to access television, mobile and internet networks. UK businesses also rely heavily on space industry technology.

As a member of the EU, the UK enjoys access to Galileo and Copernicus programmes. UK businesses enjoy the services that these programmes offer, such as accurate GPS positioning. UK space sector businesses also benefit in the form of being awarded contracts for research, design and construction of satellites for the EU space programmes.

If the UK leaves the EU, the space sector will struggle to remain functional and competitive. Outside the EU framework, additional resources and efforts will be needed to cope with the challenges of globalisation, rapid technology change and shortage of specifically skilled workers in the space industry.

Some of the damage has already been done. UK contracts for the Copernicus programme have decreased from over €37 million in 2015 to just over €3 million in 2018. However, if the UK remains inside the EU, UK companies will continue to have access to the EU current and future space programmes and are likely to be re-awarded contracts.

Space is an important area that can inspire and excite society as a whole.

---

<sup>30</sup> European Commission, “Galileo Search and Rescue”, March 30 2017. <https://ec.europa.eu/maritimeaffairs>

<sup>31</sup> European Global Navigation Satellite Systems Agency, “MyGalileoApp- targeting the future of mobility”, September 20 2019. <https://www.gsa.europa.eu/newsroom/news/mygalileoapp-targeting-future-mobility>

## Bibliography:

BBC News, "UK firms 'excluded' from space contracts by Brexit", November 21 2017.  
<https://www.bbc.co.uk/news/business-42065836>

Copernicus, "Atmosphere: Copernicus Atmosphere Monitoring Service",  
<https://www.copernicus.eu/en/services/atmosphere>

Copernicus, "Climate change: Copernicus Climate Change Service",  
<https://www.copernicus.eu/en/services/climate-change>

Copernicus, "Copernicus in Brief", last modified October 7 2019.  
<https://www.copernicus.eu/en/about-copernicus/copernicus-brief>

Copernicus, "Land: Copernicus Land Monitoring Service",  
<https://www.copernicus.eu/en/services/land>

Copernicus, "Marine: Copernicus Marine Environment Monitoring Service",  
<https://www.copernicus.eu/en/services/marine>

Copernicus, "Security: Copernicus Security Service",  
<https://www.copernicus.eu/en/services/security>

Copernicus, "What is Copernicus?",  
<https://web.archive.org/web/20181103182626/http://www.copernicus.eu/main/overview>

Department for Business, Energy & Industrial Strategy & UK Space Agency, "Satellites and space programmes after Brexit", August 9 2019, <https://www.gov.uk/guidance/satellites-and-space-programmes-after-brexite>

Elgot, Jessica, "UK may never recover £1.2bn invested in EU Galileo satellite system", *The Guardian*, November 30 2018. <https://www.theguardian.com/politics/2018/nov/30/brexit-uk-may-never-recover-12bn-invested-in-eu-galileo-satellite-system>

European Commission, "Galileo Search and Rescue", March 30 2017.  
<https://ec.europa.eu/maritimeaffairs>

European Commission, "Horizon Europe: The next EU research & innovation investment programme (2021-2027)", August 2019.  
[https://ec.europa.eu/info/sites/info/files/research\\_and\\_innovation/strategy\\_on\\_research\\_and\\_innovation/presentations/horizon\\_europe\\_en\\_investing\\_to\\_shape\\_our\\_future.pdf](https://ec.europa.eu/info/sites/info/files/research_and_innovation/strategy_on_research_and_innovation/presentations/horizon_europe_en_investing_to_shape_our_future.pdf)

European Global Navigation Satellite Systems Agency, "Galileo is the European global satellite-based navigation system", last modified October 3 2019. <https://www.gsa.europa.eu/european-gnss/galileo/galileo-european-global-satellite-based-navigation-system>

European Global Navigation Satellite Systems Agency, "MyGalileoApp- targeting the future of mobility", September 20 2019. <https://www.gsa.europa.eu/newsroom/news/mygalileoapp-targeting-future-mobility>

European Global Navigation Satellite Systems Agency, "What is EGNOS?", last modified June 19 2018. <https://www.gsa.europa.eu/egnosc/what-egnosc>

European Parliament, "Brexit and Industry and Space Policy", Workshop proceedings, September 24 2018, [http://www.europarl.europa.eu/RegData/etudes/STUD/2018/626084/IPOL\\_STU\(2018\)626084\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2018/626084/IPOL_STU(2018)626084_EN.pdf)

European Parliament, "2018/0236(COD): Space programme 2021-2027 and European Union Agency for the Space Programme". [https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2018/0236\(COD\)&l=en](https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2018/0236(COD)&l=en)

European Space Agency, "Galileo navigation", last modified June 27 2014. [http://www.esa.int/Applications/Navigation/Galileo/Why\\_Europe\\_needs\\_Galileo](http://www.esa.int/Applications/Navigation/Galileo/Why_Europe_needs_Galileo)

Karakas, Cemal, "EU space programme", Briefing, European Parliamentary Research Service, p.1, May 2019, [https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/628300/EPRS\\_BRI\(2018\)628300\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2018/628300/EPRS_BRI(2018)628300_EN.pdf)

O'Callaghan, Jonathan, "Here's what each Brexit scenario could mean for the UK space industry", *Forbes*, January 21 2019. <https://www.forbes.com/sites/jonathanoconnor/2019/01/21/heres-what-each-brexit-scenario-could-mean-for-the-uk-space-industry/#4a3f55362908>

Prime Minister's Office, 10 Downing Street & The Rt Hon Theresa May MP, "UK to tell EU it will no longer seek access to secure aspects of Galileo", December 1 2018, <https://www.gov.uk/government/news/uk-to-tell-eu-it-will-no-longer-seek-access-to-secure-aspects-of-galileo>

UK Space Agency, "Space Innovation and Growth Strategy 2014-2030: Space Growth Action Plan", April 8 2014. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/298362/igs-action-plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/298362/igs-action-plan.pdf)

## Appendix 1:

Copernicus UK contracts 2015:

Name of Recipient	Address/Locality of Recipient	Summary of Activities	Contract value on Copernicus (€)
ABSL Space Products	F4 Culham Science Centre, Abingdon	Sentinel 1 Satellites C/D Units construction	3,038,000
ABSL Space Products	F4 Culham Science Centre, Abingdon	Sentinel 2 Satellites C/D Units construction	997,000
ABSL Space Products	F4 Culham Science Centre, Abingdon	Sentinel 3 Satellites C/D Units construction	1,049,735
Airbus DS Ltd	Europa House, Southwood, Farnborough	Preparations and operations of the off-line Processing and Archiving Centres for sentinel satellites	8,923,445.29
Airbus DS Ltd	Europa House, Southwood, Farnborough	Preparations and operations of the off-line Processing and Archiving Centres for sentinel satellites	8,164,300.70
COM DEV Europe	Triangle Business Park, Aylesbury	Sentinel 3 Satellites C/D Units construction	3,050,000
GEANT Limited	City House, 126-130 Hills Road, Cambridge	Dissemination of Sentinel products to the R&D Community – connection to GEANT network	1,800,000
MOOG UK Westcott Limited	Westcott Venture Park, Westcott, Aylesbury	Sentinel 3 Satellites C/D Units construction	657,985
STFC Rutherford Appleton Laboratory	North Star Avenue, North Star HSE, Swindon	Sentinel 3 Satellites C/D Units construction	9,785,680

Total: €37,466,146

## Appendix 2:

Copernicus UK contracts 2016:

<b>Name of Recipient</b>	<b>Address/Locality of Recipient</b>	<b>Summary of Activities</b>	<b>Contract value on Copernicus (€)</b>
ABSL Space Products	F4 Culham Science Centre, Abingdon	Sentinel-6A/B-Battery	512,500
Airbus Defence and Space Limited	Gunnels Wood Road, Stevenage	Sentinel-6A/B-MPPS	2,587,500
Airbus DS LTD EX Infoterra LTD	Europa House, Southwood, Farnborough	Sentinel-2 Preparations and operations of the off-line Processing and Archiving Centres	54,739.06
E2V Technologies Limited	106 Waterhouse Lane, Chelmsford	Sentinel-5- UVN CCD Activity	1,800,000
NERC – Plymouth Marine Lab	Prospect Place, West Hoe, Plymouth	Sentinel-3 Atlantic Meridional Transect (AMT) Fiducial Reference Measurements (FRM) Campaign (AMT4SENTINELFRM)-Phase 1	299,999
STFC Rutherford Appleton Laboratory	Harwell Campus, Didcot	Sentinel-5 CTF Activity	4,004,015
UCL Consultants Ltd	Network Building, 2 <sup>nd</sup> Floor, London	Sentinel-2 Level 2A Study- Product Assessment	24,980

Total: €9,283,233.06

## Appendix 3:

Copernicus UK contracts 2017:

Name of Recipient	Address/Locality of Recipient	Summary of Activities	Contract value on Copernicus (€)
Airbus Defence and Space Limited	Gunnels Wood Road, Stevenage	Hosting, Operation, Maintenance, Evolution and Content Management of Agency's Copernicus Sentinel's Worldweb Sites	500,000
Airbus Defence and Space Limited	Gunnels Wood Road, Stevenage	Sentinel-6A/B-MPPS	117,293
Airbus DS LTD EX Infoterra LTD EX Astrium LTD	Europa House, Southwood, Farnborough	Preparations and operations of the off-line processing and archiving centres	2,068,082
COM DEV Europe	Triangle Business Park, Aylesbury	Sentinel-1C/D AIS Receiver	3,840,000
King's College London	Waterloo Road, London	Technical assistance to the evaluation of Sentinel-3 active fire detection and FRP products during the fire detection experiment (FIDEX)	298,918
NERC – Plymouth Marine Lab	Prospect Place, West Hoe, Plymouth	Sentinel-3 Atlantic Meridional Transect (AMT) fiducial reference measurements (FRM) campaign (AMT4SENTINELFRM)-Phase 1	148,471
STFC Rutherford Appleton Laboratory	Harwell Campus, Didcot	Sentinel-3 SLSTR in-flight performance analysis	385,190
E2V Technologies Limited	106 Waterhouse Lane, Chelmsford	Sentinel-5 UVN CCD Activity	17,842

Total: €7,375,796

## Appendix 4:

Copernicus UK contracts 2018:

Name of Recipient	Address/locality of Recipient	Summary of Activities	Contract value on Copernicus (€)
Airbus Defence and Space Limited	Gunnels Wood Road, Stevenage	Sentinel-5P Platform in-Orbit operations maintenance support	1,845,067
Airbus Defence and Space Limited	Gunnels Wood Road, Stevenage	Sentinel-6 A/B- MPPS	74,734
National Physical Laboratory- NPL Management Limited	Hampton Road, Teddington	Validation for vegetation (VAL4VEG)	448,483
SCISYS Ltd	Methuen Park, Chippenham	Development and maintenance of operational simulator for sentinel	300,000
STFC Rutherford Appleton Laboratory	Harwell Campus, Didcot	Sentinel-3 Satellites C/D Units construction	179,890
Teledyne e2v (UK) Limited	Waterhouse Lane, Chelmsford	Sentinel-5 UVN CCD Activity	17,619
University of Southampton	Highfield Number, SO17, Southampton	Copernicus sentinel-3 sea and land surface temperature radiometer sea surface temperature validation using fiducial reference measurements service	399,881

Total: €3,265,674