

Galileo Satellite System

Summary

This House of Lords Library Briefing provides background to the Galileo global navigation satellite system, which is being developed by the European Union. It also examines the United Kingdom's participation in the system and discusses its future involvement once the UK leaves the EU.

What is Galileo?

Galileo is a global navigation satellite system (GNSS) developed by the European Union and managed by the European Global Navigation Satellite Systems Agency. According to the European Space Agency (ESA), once fully operational in 2020, Galileo will provide an accurate global positioning service to be used by governments, citizens, the military and industry. It will comprise a constellation totalling 24 medium earth orbit satellites plus spares, with each satellite broadcasting precise time signals and ephemeris data, which provides information on the position of satellites and astronomical objects, such as planetary systems. The ESA notes that the complete Galileo constellation will take an estimated 14 hours to orbit the Earth at an altitude of approximately 23,222 kilometres.¹ As part of this, there will be a public regulated service (PRS) for government-authorized users, such as police.² The PRS is an “encrypted navigation service to be used during emergencies or crisis situations” and designed to “resist jamming, involuntary interference and spoofing”.

The programme began in July 1999, when the European Council approved Galileo's definition phase.³ During this stage, the European Commission and ESA undertook technical studies, pre-developments and feasibility studies. In November 2000, the commission presented its findings from the definition phase to the European Council. This included proposals on the definition of the system, its management structure, and economic and financial aspects. A timetable for the remaining phases was also established: the development and validation phase would run from 2001 to 2005; the deployment phase would run from 2006 to 2007; and the commercial operation would begin in 2008.⁴ Galileo is expected to be fully operational in 2020.⁵ In 2000, the commission estimated that Galileo would cost a total of €3.3 billion.⁶ In June 2018, the European Commission proposed allocating €9.7 billion of its 2021–27 budget towards Galileo and the European geostationary navigation overlay service (EGNOS).⁷

UK's Participation in Galileo

At present, EU member states gain access to many of Galileo's features. This includes: unrestricted access to PRS; attendance at meetings relating to security and PRS; and industry participation in the programme. Prior to the UK's decision to withdraw from the EU, it had been involved in many aspects of Galileo. According to reports, the UK funded approximately 12 percent of the annual budget and received a work share of more than 15 percent.⁸ The work ranged from building components for the satellites in the Galileo constellation and PRS to hosting monitoring stations in the UK and its territories.

Building Components of Galileo

In 2014, the UK Space Agency published a case study on Galileo detailing the contribution of UK companies in building components for the Galileo satellite system. It noted that the first two in-orbit validation satellites, GIOVE-A and GIOVE-B, were manufactured by Surrey Satellite Technology Limited and Astrium Ltd. Launched in 2005 and 2008, respectively, these satellites were “serving to test critical Galileo technologies and safeguard the spectrum filing”.⁹ At the time, the then constellation consisted of four operational Galileo satellites, which were manufactured in the UK by Astrium Ltd and launched in 2011 and 2012.¹⁰ In addition, the payloads of the next set of 22 satellites of the constellation were being built in Guildford by Surrey Satellite Technology Limited. According to the agency, this demonstrates the UK’s “considerable investment” in the Galileo programme and the “subsequent benefit to UK industry”.

Hosting the Galileo Security Monitoring Centre and Sensor Stations

The UK also volunteered to host the Galileo Security Monitoring Centre’s (GSMC) back-up site in Swanwick, with the main operational location in France.¹¹ The GSMC is a “technical infrastructure” which plays a “key role in ensuring the security” of Galileo, including its PRS. However, the European Commission has previously stated that because of the UK’s decision to withdraw from the EU, the back-up site for GSMC must be moved to one of the 27 remaining EU member states.¹² Consequently, on 1 August 2017, the commission launched a call for expressions of interest to host the back-up site of the GSMC. On 18 January 2018, representatives of the member states in the European Global Navigation Satellite Systems Programmes Committee voted to relocate the back-up site to Spain. On 24 January 2018, the commission began the process for the transfer of the back-up site from the UK to Spain. According to the Commissioner for the Internal Market, Industry, Entrepreneurship and SMEs, Elżbieta Bieńkowska, the decision meant that the European Commission was “taking the necessary operational steps to ensure business continuity and preserve the security of the Galileo system”.¹³

In addition, the UK contributes to coverage of Galileo worldwide by hosting two sensor stations from “secure locations” in the South Atlantic.¹⁴ The sensor stations are tasked with collecting and forwarding signal-in-space measurements and data in real time to the two Galileo ground control centres, located in Germany and Italy.

Future Participation in Galileo After EU Withdrawal

Since the UK’s decision to withdraw from the EU, there have been negotiations between the UK and EU about the UK’s participation in the Galileo programme.

In December 2017, UK and EU negotiators published a joint report on phase one of negotiations under article 50 of the Treaty on European Union. This stated that the UK and EU both agreed that following the withdrawal from the EU, the UK would continue to participate in EU programmes that were financed between 2014 and 2020 until their closure.¹⁵ However, the December joint report went on to state that this could be subject to negotiations:

In the second phase of negotiations it could be agreed that some rules related to Union programmes that would be considered as not relevant in relation to a departing member state would not apply.¹⁶

On 19 March 2018, a draft withdrawal agreement between the UK and EU was published, outlining the parts that had been agreed at negotiator level for the implementation period. Article 123 of the draft agreement, would exclude the UK from participation in EU institutions, bodies and agencies, including the European Global Navigation Satellite Systems Agency.¹⁷ Similarly, article 122.7(b) states that the UK would be excluded from accessing security-related sensitive information relating to EU programmes that would continue after the transition period. The article said:

[W]here acts of the Union provide for the participation of member states, nationals of member states or natural or legal persons residing or established in a member state in an information exchange, procedure or programme which continues to be implemented or starts after the end of the transition period, and where such participation would grant access to security related sensitive information that only member states (or nationals of member states, or natural or legal persons residing or established in a member state) are to have knowledge of, in such exceptional circumstances the references to member states in such Union acts shall be understood as not including the United Kingdom.¹⁸

In a speech to the EU Institute for Security Studies conference on 14 May 2018, the EU's chief negotiator, Michel Barnier, reaffirmed what had been agreed in the draft withdrawal agreement and repeated the European Union's position on the UK's participation in Galileo. Mr Barnier contended that the UK "decided unilaterally and autonomously" to withdraw from the EU, which implied "leaving its programmes as well".¹⁹ Arguing that the rules were "well known" to the UK, he stated that:

[T]hird countries (and their companies) cannot participate in the development of security sensitive matters, such as the manufacturing of PRS-security modules. Those rules were adopted together by unanimity with the UK as a member, and they have not changed. Those rules do not prevent the UK, as a third country, from using the encrypted signal of Galileo, provided that the relevant agreements between the EU and the UK are in place.²⁰

Despite agreement between the UK and EU on the implementation period, on 24 May 2018 the Department for Exiting the European Union published a technical note detailing the UK's future participation in Galileo. In the note, the Government said that it wanted to "continue participating" in Galileo, arguing that an end to UK participation would be "to the detriment of Europe's prosperity and security", possibly resulting in "delays and additional costs to the programme".²¹

The Government also said it had a "strong objection" to its "ongoing exclusion from security-related discussions and exchanges" on the post-2019 development of Galileo and the public regulated service. It outlined the following reasons:²²

- Firstly, its exclusion had the "effect of prejudging the depth" of both operational cooperation and information sharing that could be agreed as part of a future security partnership between the UK and EU. This, the Government argued, "risks limiting the scope" of the article 50 guidelines agreed by the EU27 in March 2018, which called for "strong cooperation on defence and security".
- Secondly, its exclusion was "inconsistent" with the agreement reached in the joint report, published in December 2017. According to the Government, paragraph 71 provided for the UK's "continued participation" in Galileo for the remainder of the current Multiannual Financial Framework, which ends in 2020.

- Thirdly, the commission's suggestion that UK involvement in such discussions "could irretrievably compromise the integrity" was "out of balance" with the "considerable contribution" that the UK makes to pan-European security.

In its technical note, the Government made several proposals for a future UK-EU relationship on Galileo. In relation to rights, it accepted that to "protect the EU's decision-making autonomy" there should be rights in connection to Galileo that are reserved only for EU member states.²³ Therefore, the Government did not envisage attendance for UK officials at non-security comitology and programme meetings. However, the Government stated that future UK participation in Galileo was dependent on the system's "ability to independently assure the integrity of the system", so that the Government could "rely" on it for strategic defence and security use. It argued that the Galileo programme must "offer value for money to justify an ongoing UK contribution". Consequently, the Government outlined a package of essential requirements for the programme, which included:

- unrestricted use, and access to, the PRS and its information;
- industrial involvement in secure elements; and
- attendance at security meetings.²⁴

In return, the Government said that it would be willing to "make appropriate financial contributions to EU programmes" that the UK participated in.²⁵ In the interest of preserving joint security cooperation in the Galileo and EGNOS programmes, the Government outlined that the UK would be willing to:

- host the Galileo Security Monitoring Centre site in Swanwick, as a back up to the sites in France and Spain;
- continue hosting the Galileo sensor station on UK territory, such as on the Falkland Islands and Ascension Islands;
- continue hosting the EGNOS sensor stations in the UK;
- abide by all commitments and obligations under the EU's GNSS regulations, security rules and public regulated service export restrictions "to the same level" as other EU member states; and
- agree to report anomalies reported by users and potential threats identified during the UK's use and testing of the system.²⁶

However, should an agreement not be reached on the balance of rights and obligations, which would result in UK security and industrial requirements not being met, the UK "could not justify" its participation in the satellite programme.²⁷ The UK Government has also stated that although it remained the UK's "immediate preference" to collaborate in Galileo, it was also exploring alternatives, including the development of a domestic system.

Despite this, the European Commission has previously argued that the UK's future position on Galileo goes "beyond standard third country status".²⁸ In June 2018, the European Commission published documents presented to the European Council's working party on article 50 concerning the UK's involvement in the EU's space-related activities, particularly Galileo. It noted that whilst the UK sought "unrestricted and guaranteed PRS access", previous agreement on participation in the EU's space programme meant that third parties did not have access to all meetings, including security discussions, and had "no decisional power" over Galileo. Discussing the designing of security-related elements of Galileo and PRS, the commission noted that third parties do not currently have permission to design and develop such elements.

Delegates to the European Space Agency voted to approve the procurement of the next set of contracts for the satellite system in June 2018, with the UK still excluded from bidding for them.²⁹ Responding to the decision, the Parliamentary Under Secretary of State for Defence, Guto Bebb, stated that “by forcing through that vote while excluding UK companies from the contracts on security grounds, the European Commission has put all of this [participation in Galileo] at risk”.³⁰ Mr Bebb also contended that the Government would need to “consider the implications of the recent European Space Agency vote” and that, as stated in the Government’s technical note, it was “looking at other options, including creating a UK global navigation satellite system”.

On 28 August 2018, the Prime Minister, Theresa May, pledged to spend £92 million on scoping out an alternative to Galileo, as a contingency, if the UK continued not to be allowed to be involved in contract negotiations and security discussions during the creation of the satellite system. In a press conference, Mrs May told reporters that unless the Government received assurances that it could collaborate with the EU on Galileo in the future, the Government would “withdraw UK support for Galileo and pursue our own sovereign satellite system”.³¹ She also added that the Government’s position on Galileo was “not an idle threat to achieve our negotiating objectives”.

In September 2018, the Government published guidance on the future of the space programme were the UK to leave the EU without an agreement. It stated that in this scenario, most of the position, navigation and timing services provided by Galileo and EGNOS would “continue to be freely available” to all UK-based users.³² However, the public regulated service, which is set to be completed in the mid-2020s, would not be available to the UK. Similarly, without an agreement, the UK would “no longer play any part” in the development of Galileo. Consequently, UK-based businesses, academics and engineers would be unable to bid for future Galileo contracts and could “face difficulty” carrying out and completing existing contracts.³³ To prepare for this scenario, the Government again reaffirmed its commitment to invest £92 million on a programme to design a UK global navigation satellite system as an alternative to Galileo. The programme, it said, would take approximately 18 months to complete.

However, the President of the European Commission, Jean-Claude Juncker, has since repeated the commission’s stance that the UK would be unable to participate in security meetings, as it would no longer be an EU member state. In his state of the union address on 12 September 2018, Mr Juncker said that whilst the commission respected the “British decision to leave our Union”, it asked the Government to understand that “someone who leaves the Union cannot be in the same privileged position of the member states”.³⁴

Further Information

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- European Global Navigation Satellite Systems Agency, ‘[Galileo: Frequently Asked Questions](#)’, updated 26 October 2016

- ¹ European Space Agency, [Fact Sheet: Galileo Status](#), updated July 2017.
- ² House of Commons European Scrutiny Committee, [Twenty-Fourth Report of Session 2017–19](#), 24 April 2018, HC 301-xxiii of session 2017–19, p 14.
- ³ European Court of Auditors, [The Management of the Galileo Programme's Development and Validation Phase](#), May 2009, p 12.
- ⁴ *ibid.*
- ⁵ European Global Navigation Satellite Systems Agency, [Frequently Asked Questions](#), accessed 8 November 2018.
- ⁶ European Commission, [Commission Communication to the European Parliament and Council on Galileo](#), 22 November 2000, p 24.
- ⁷ European Commission, [EU budget: A €16 billion Space Programme to Boost EU Space Leadership Beyond 2020](#), 6 June 2018.
- ⁸ Peggy Hollinger, [Airbus Says UK Participation in Galileo After Brexit is Critical](#), *Financial Times* (£), 28 March 2018.
- ⁹ *ibid.*
- ¹⁰ UK Space Agency, [Galileo](#), 13 May 2014.
- ¹¹ European Commission, [Space Policy: Galileo Security Monitoring Centre Back-up Site Moves to Spain](#), 24 January 2018.
- ¹² *ibid.*
- ¹³ *ibid.*
- ¹⁴ Department for Exiting the European Union, [Technical Note: UK Participation in Galileo](#), 24 May 2018, p 2.
- ¹⁵ European Commission, [Joint Report from the Negotiators of the European Union and the United Kingdom Government on Progress During Phase 1 of Negotiations Under Article 50 TEU on the United Kingdom's Orderly Withdrawal from the European Union](#), 8 December 2017, p 12.
- ¹⁶ *ibid.*
- ¹⁷ European Commission, [Draft Agreement on the Withdrawal of the United Kingdom of Great Britain and Northern Ireland from the European Union and the European Atomic Energy Community Highlighting the Progress Made in the Negotiation Round with the UK of 16–19 March 2018](#), 19 March 2018, p 74.
- ¹⁸ *ibid.*, p 75.
- ¹⁹ European Commission, [Speech by Michel Barnier at the EU Institute for Security Studies Conference](#), 14 May 2018.
- ²⁰ *ibid.*
- ²¹ Department for Exiting the European Union, [Technical Note: UK Participation in Galileo](#), 24 May 2018, p 1.
- ²² *ibid.*, p 2.
- ²³ *ibid.*, p 4.
- ²⁴ *ibid.*, pp 3–4.
- ²⁵ *ibid.*, p 5.
- ²⁶ *ibid.*
- ²⁷ *ibid.*
- ²⁸ European Commission, [Involvement in the EU's Space-Related Activities](#), 13 June 2018, p 14.
- ²⁹ Daniel Boffey, [Security Row Over EU Galileo Satellite Project as Britain is Shut Out](#), *Guardian*, 13 June 2018.
- ³⁰ [Debate on the 'Galileo Programme'](#), HC *Hansard*, 14 June 2018, col 1077.
- ³¹ *ibid.*
- ³² Department for Business, Energy and Industrial Strategy, [Satellites and Space Programmes If There's No Brexit Deal](#), 13 September 2018.
- ³³ *ibid.*
- ³⁴ European Commission, [President Jean-Claude Juncker's State of the Union Address 2018](#), 12 September 2018.

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