

# SATELLITE: AN INTRODUCTION

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A practice note providing an introduction to satellite policy, law and regulation in the EU..  
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The world's first satellite, Sputnik 1, was launched by the former Soviet Union (now Russia) on 4 October 1957. On 6 April 1965, the US placed the first geostationary satellite, Intelsat 1, in orbit. From these early steps we now have a significant number of (peaceful civilian) commercial uses of outer space, including: broadcasting; telecommunications (fixed, land and maritime mobile satellite services); navigation, including GPS (global positioning system); Earth observation; and meteorology. The military also make extensive use of outer space. Today, initiatives such as government satellite communications (GOVSATCOM) show that there is an increasing use of space using both governmental and commercial satellite services for security purposes and governmental applications.

## INTERNATIONAL FRAMEWORK

Satellites are by their nature extra-terrestrial and extra-territorial. Accordingly, their usage is governed by an extensive international legal framework, under the aegis of the United Nations (UN), made up of treaties, agreements and conventions governed by international law, which may be implemented into national law.

Apart from the obvious concerns about the "peaceful uses" of outer space, the legal framework governing the use of satellites is grounded in the allocation of orbital positions for satellites, the related radio-frequency spectrum to enable communication to and from the satellites, and the related frequencies for terrestrial use of those communications. In relation to orbital positions, geostationary orbits (GSO) are in "fixed" positions approximately 36,000 kilometres above Earth, and low (LEO) and medium (MEO) orbits operate at lower altitudes.



To enable a “fair and equitable” use of the finite space closely surrounding Earth, co-ordination of these positions is based on the need for satellites not to interfere with each other physically, which is especially important with regard to the radio frequency spectrum (also finite, although some prefer to say “scarce”) used by satellites so as to prevent “harmful interference” (a highly technical area) between the services using different spectrum.

### United Nations

Following resolutions passed in 1961 and 1962 concerning the peaceful uses of outer space, and a subsequent declaration setting out the principles governing the activities of states in outer space, a number of treaties and agreements have been concluded by the UN through its Committee on the Peaceful Uses of Outer Space (COPUOS), which was established in 1959:

- The 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty) deals with liabilities of states that launch objects into outer space, including liabilities for any consequential damage whether occurring in space or on Earth.
- The 1972 Convention on International Liability for Damage Caused by Space Objects (Liability Convention) establishes clear liability for various kinds of damage caused by space activity, expanding on the Outer Space Treaty.
- The 1974 Convention on Registration of Objects Launched into Outer Space (Registration Convention) defines the duties of any “launching state” and effectively gives jurisdiction to that state which launches a space object from its territory or which procures such launch.

There are also agreements governing:

- Recovery of astronauts: 1968 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (Agreement on the Rescue and Return of Astronauts).
- Exploration of the Moon: 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies.
- The International Space Station: there is also a 1998 intergovernmental agreement among the governments of Canada, member states of the European Space Agency, Japan, the Russian Federation, and the United States of America concerning cooperation on the Civil International Space Station.

Not all member states of the UNCOPUOS have ratified, and therefore implemented into national law, these treaties and agreements, even though the treaties now form part of the corpus of international law governing outer space. For example, the UK has ratified only the following four of the five international treaties, thus accepting them as obligations binding on the UK as a matter of international law as between those other ratifying states:

- Outer Space Treaty.
- Liability Convention.
- Registration Convention.
- Agreement on the Rescue and Return of Astronauts.

There are also five declarations and legal principles as follows:

- Declaration of Legal Principles Governing the Activities of States in the Exploration and Uses of Outer Space 1963.

- Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting 1982
- Principles Relating to Remote Sensing of the Earth from Outer Space 1986.
- Principles Relevant to the Use of Nuclear Power Sources in Outer Space 1992.
- Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries 1996.

### International Telecommunication Union

The International Telecommunication Union (ITU), established in 1865 (as the International Telegraph Union), is the oldest treaty organisation in the world, and is now part of the UN structure. Orbital positions, and related radio-frequency spectrum and satellite orbits, are managed at the international level by the ITU, which has responsibility for ensuring their rational, equitable and efficient use, and the avoidance of harmful interference between radiocommunication systems and their respective uses of radio-frequency spectrum. There are 193 member states, the most of any international intergovernmental organisation, bound by various internationally binding legal instruments of the ITU – the *Constitution*, the *Convention* and the *Administrative Regulations* (including the *Radio Regulations*), which together form a treaty binding on the member states. The UK is one such member state. Revision of the ITU's Constitution and Convention generally takes place at Plenipotentiary Conferences held every four years. The *Administrative Regulations* are revised at specially convened conferences, which in the case of the *Radio Regulations* is the World Radiocommunication Conference, which was last held in November 2015 and is next scheduled for 2019.

Increasingly, organisations within the private sector have a place in the ITU, whether as sector members of the various sectors of the ITU (Radiocommunication (ITU-R), which manages international radio-frequency spectrum and satellite orbits; Standardisation (ITU-T), which manages issues around technical standards; and Development (ITU-D), which manages issues relevant to developing countries), as “Recognised Operating Agencies”, or as scientific or other relevant organisations.

ITU-R develops and manages space-related assignment or allotment plans and provides mechanisms for the development of new satellite services by allocating suitable orbital slots. The Radio Regulations, which are highly technical and are administered within ITU-R by the Radio Regulations Board, cover the:

- Allocation of frequencies to different categories of radiocommunication services.
- Rights and obligations of member states in obtaining access to the spectrum and orbital resources.
- Co-ordination procedures, which are complex and can be somewhat political.
- International recognition of these rights through the recording of frequency assignments and orbital positions in the Master International Frequency Register (MIFR).

ITU member states are the signatories to these international instruments. Administrations of member states are usually the communications regulator of each member state (some member states still have a ministry) and they have day-to-day responsibility as regards the ITU and the obligations of each member state. In the UK, the Office of Communications (Ofcom) is the Administration, by direction of the Secretary of State (Department for Business, Innovation and Skills (BIS)) under [section 22](#) of the [Communications Act 2003](#) (Comms Act). The International Frequency Allocation Table is maintained by Ofcom insofar as it has been transposed into the UK Frequency Allocation Table.

### World Trade Organisation

The World Trade Organisation (WTO) General Agreement on Tariffs and Trade in relation to equipment, and the General Agreement on Trade in Services (GATS), are relevant to satellite-based services relating to liberalisation

and opening of markets for public telecommunications services and systems. The GATS Agreement on Basic Telecommunications Services contains a number of “Specific Commitments” and exemptions concerning basic telecommunications services, which include fixed satellite services and mobile satellite services and systems.

In the UK, Ofcom has responsibility for the UK’s compliance with relevant commitments and WTO agreements given by the UK.

### **UNIDROIT Space Assets Protocol**

The Space Protocol to the Cape Town Convention on International Interests in Mobile Equipment was adopted on 7 March 2012. It is a private international law instrument. Article XXXIV of the Space Protocol specifically provides that it will not affect the rights and duties of states under the existing UN space law treaties and the legal instruments of the ITU. On entry into force, with 10 ratifications or accessions, the Space Protocol will establish a separate international registry of security interests in space assets. So far four states (Burkina Faso, Saudi Arabia, Zimbabwe and Germany) have signed the Space Protocol.

Before the Space Protocol enters into force, the Supervisory Authority must certify that the international registry for space assets is fully operational. The Supervisory Authority is responsible for the setting up of the international registry for the registration of “international interests” in each category of mobile equipment and assignment and acquisitions of international interest. It is not yet clear which entity will become the Supervisory Authority, although the ITU has expressed an interest.

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## EUROPEAN FRAMEWORK

Since the Treaty of Rome (1957), considerable work relevant to the communications sector has been carried out in the EU, particularly with regard to the single market. The EU has taken many policy and legislative steps in the field of communications to create a liberalised and competitive market in communications infrastructure and services through harmonised competition policy, licensing and spectrum management as well as through the creation of independent national regulatory authorities (NRAs), which are generally also the Administrations for ITU purposes, as noted above.

### **European institutions**

The main EU institutions have all played their part in establishing a competitive framework and regulatory regime for communications, including for satellite systems and services, namely: the European Commission (notably the Directorates General Connect, Competition and Growth, as well as the Digital Single Market, Radio Spectrum Committee and the Communications Committee); the EU Council (which includes a Competitiveness Council with an explicit space mandate, the Working Party on Telecommunications and Information Society and the Working Party on Space); the European Parliament (in particular, the Committee on Industry, Research and Energy (ITRE) and the Court of Justice of the European Union).

Other significant organisations outside the EU include the European Conference of Postal and Telecommunications Administrations (CEPT) and the European Space Agency (ESA).

ESA is an international intergovernmental organisation, made up of member states including certain EU member states and non-EU member states. It aims to shape the development of Europe’s space capability and ensures that investment in space continues to deliver benefits to citizens in Europe and the rest of the world. While it collaborates with the EU on certain space programmes (for example, Galileo and Copernicus) it also but has a distinct space programme including telecommunications and integrated applications, launchers, Earth observation and human spaceflight.

The CEPT was formed in 1959 with the aim of harmonising and improving services between members (including non-EU member states). The EU has traditionally relied on the CEPT in the field of radio-frequency management and development of future planned usage, often as part of evolving work under the aegis of the ITU. However, the

Commission has taken a keener interest in these areas. Under Article 189(2) of the Treaty on the Functioning of the European Union (TFEU), the EU has the power to develop a European space policy and the European Parliament and Council have the power to adopt a programme to contribute to attaining their policy objectives.

In June 2018, the European Commission published a Proposal for a Regulation establishing the EU's space programme and the establishment of the EU Agency for the Space Programme. This is intended to come into force on 1 January 2021. The EU has begun to play a greater role in space and it is likely that it may play a greater role in speaking on behalf of all member states at relevant international bodies like the ITU, UNCOPUOS (including the Legal Subcommittee) and the WTO. In November 2012, the Commission adopted a Communication on establishing relations between the EU and ESA (see [Legal update, Space policy: European Commission adopts Communication on establishing appropriate relations between EU and European Space Agency](#)).

### Legislative regime

The current EU regulatory regime, in force since 2002, and revised in 2009, consists of the [Framework Directive \(2002/21/EC\)](#), the [Authorisation Directive \(2002/20/EC\)](#), the [Access Directive \(2002/19/EC\)](#), the Universal Service Directive (2002/22/EC) and the [Directive on Privacy and Electronic Communications \(2002/58/EC\)](#). The Radio Spectrum Decision (2002/676/EC) is also of relevance to satellite regulation: it sets out the procedures for harmonising policy at a technical level, and created the Radio Spectrum Committee to carry out the policy harmonisation.

Under Article 9(1) of the Framework Directive, EU member states are obliged to manage radio frequencies for electronic-communication services in their territory effectively. Radio spectrum is still subject to individual rights of use granted by individual EU member states through the NRAs.

Article 5(1) of the Authorisation Directive gives authority to grant general, rather than specific, authorisations, subject to competition law principles (although specific authorisations, or individual rights of use, are permitted in certain circumstances).

In 2009, the EU regulatory regime was amended by the following two directives:

- ["Better Regulation Directive" \(2009/140/EC\)](#), which amended the Framework Directive, the Access Directive and the Authorisation Directive.
- ["Citizens' Rights Directive" \(2009/136/EC\)](#), which amended the [Universal Service Directive](#) and the [Directive on Privacy and Electronic Communications](#).

At the same time, a new [regulation \(1211/2009\)](#) established the Body of European Regulators for Electronic Communications (BEREC), which replaced the European Regulators Group. BEREC acts as an independent advisory body, formulating guidelines on regulatory best practice to assist harmonisation between NRAs. It also provides opinions and recommendations to assist the Commission (and, upon request, the European Parliament and the Council) in applying the regulatory framework effectively and consistently.

### Management of radio spectrum

The Commission has power to manage and allocate radio spectrum through the following bodies:

- The Communications Committee, established by the [Framework Directive](#).
- The Radio Spectrum Committee, established by the Radio Spectrum Decision.
- The Radio Spectrum Policy Group, established by the Commission as a consultative group following the adoption of the Radio Spectrum Decision;

The Commission also works on this in conjunction with BEREC.

### Mobile satellite service regulation

A mobile satellite service (MSS) is a service provided by a satellite system that allows high-speed communication between satellites and handheld mobile terminals, using the radio spectrum, to provide services such as high-speed internet access to mobile television, public protection and disaster relief, and satellite telephone systems that allow telephone calls to be made and received anywhere in the world.

A complementary ground component (CGC) is terrestrial infrastructure that supports a MSS system by enabling terrestrial networks to use spectrum also used by a MSS system without causing interference, so enabling spectrum to be exploited more efficiently and enhance its coverage (such as in urban areas) to deliver a wider range of services.

In 2007, the European Commission adopted the Spectrum Decision (*OJ 2007 L43/32*) allocating the 2GHz "S-band" spectrum to MSSs, including those with a CGC, in all member states.

Subsequently, the European Parliament and Council adopted the MSS Decision (*626/2008/EC, OJ 2008 L 172/15*) defining the EU selection and authorisation process for systems providing MSS in the S-band. Although the MSS Decision establishes a harmonised spectrum **allocation** process (that is, allocation takes place at EU level), the subsequent **authorisation** to use spectrum in national markets is the responsibility of individual member states. This is the first occasion on which the EU has created a pan-European spectrum licensing procedure. Among other things, the MSS Decision set out "common conditions" by which selected operators must exercise their rights to operate MSS services, for example, obligations to use the assigned radio spectrum for MSS, to comply with milestones for launching services, to report to member states, and so on.

In May 2009, the Commission selected Inmarsat Ventures Limited and Solaris Mobile Limited to provide MSS services over the 2GHz spectrum throughout the EU.

In October 2011, the European Commission adopted a Decision (*2011/667/EU*) to ensure coordination between EU member states in enforcing compliance with the "common conditions" of authorisation. For more information, see [Legal update, Decision to accelerate high-speed mobile satellite services](#).

In February 2016, following proposals by Inmarsat to use spectrum in the 2GHz band to provide broadband services to passengers on aircraft through a combination of satellite and ground-based communication links, Ofcom consulted on the authorisation conditions for this use of the CGC (see [Legal update, Ofcom consults on authorising terrestrial base stations for broadband on aircraft](#)) and published a statement in November 2017 (see [Legal update, Ofcom publishes technical conditions and fees for operation of base stations for aircraft broadband](#)).

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### NATIONAL FRAMEWORK - UK

#### International space treaties

The UK [Outer Space Act 1986](#) sets out the UK's obligations under the various international treaties and principles covering the use of outer space. This Act also covers entities in certain of the UK's overseas territories (the Cayman Islands, Gibraltar and Bermuda, and can be extended to others through lengthy processes to obtain a requisite Order in Council) and the Channel Islands, as well as the Isle of Man, and requires all those seeking to launch or procure the launch of a space object, operate a space object or undertake any activity in outer space to obtain a licence.

Licensing and other powers are conferred on the Secretary of State (BIS), who carries out these powers through the UK Space Agency (UKSA). The UKSA was launched in April 2010, bringing all UK civil space activities under one single management. The UKSA began operation as a full executive agency on 1 April 2011.

Members of the UKSA also represent the UK government and the interests of the space industry at ESA.

The Space Industry Bill was first presented to the House of Lords for its first reading on 27 June 2017. An earlier version of the Bill was published in the previous parliament on 21 February 2017 entitled the Spaceflight Bill. The aim of the Bill was to make provision for space activities including vertical launches and suborbital activities in the UK. The Space Industry Act received Royal Assent on 15 March 2018. The UK government intends that licences under it, including for launch and sub-orbital activities, will be granted by 2020. Secondary legislation will be enacted to cover specific aspects of the Act, including licensing and insurance requirements.

### UK management of radio-frequency spectrum and satellite orbital positions

Ofcom is the NRA of the UK and also the UK Administration to the ITU. Ofcom has statutory duties imposed by the *Comms Act* and the *Wireless Telegraphy Act 2006* (WT Act) to regulate the provision of electronic-communications networks and services and the use of the electromagnetic spectrum.

These duties include the:

- Furtherance of the interests of consumers in relevant markets (*section 3(1)(b) of the Comms Act*).
- Promotion of competition in relevant markets (*sections 3(1)(b) and 4(3) of the Comms Act and section 3(2)(d) of the WT Act*).
- Requirement to secure the optimal use for wireless telegraphy of the electromagnetic spectrum, and the efficient management of that spectrum (*section 3(2)(a) of the Comms Act and section 3(2)(a) of the WT Act*).

In performing its duties, Ofcom must ensure that its regulatory activities are transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed (*section 3(3)(a) of the Comms Act*) and must have regard to the desirability of encouraging investment and innovation in relevant markets (*sections 3(4)(d) of the Comms Act and section 3(2)(c) of the WT Act*).

Ofcom's spectrum-management functions derive from *Section 1* of the WT Act, which also includes the giving of advice and services and the maintenance of records with respect to the use of the electromagnetic spectrum for wireless telegraphy at places within and outside the UK. Ofcom's *Procedures for the Management of Satellite Filings* set out UK procedures to ensure compliance with the ITU *Radio Regulations*.

Co-ordination of satellite orbital positions and relevant spectrum usage for those positions to determine whether there may be "harmful interference" to any UK systems is handled by Ofcom as the UK Administration.

Ofcom's Comms Act international functions include the following:

- *Section 5* confers on the Secretary of State power to direct Ofcom for the purpose of securing compliance with international obligations, as well as for other specified purposes, such as "in the interests of national security".
- *Section 22* imposes a duty on Ofcom to do such things as it is required to do by the Secretary of State to represent the UK on international and other bodies in relation to communications matters.

For the purposes of representing the British government as the ITU member state, BIS leads the government's delegation at, for example, Plenipotentiary Conferences. Ofcom is involved in the detailed preparation for such conferences.

Ofcom has been directed by the Secretary of State (BIS) to represent the UK Government in the CEPT Assembly and in some CEPT working groups as well as various ITU Working Groups and as the UK Administration. Ofcom also represents the UK on the Council of the European Radiocommunications Office.

Ofcom participates in the work of the UK Spectrum Strategy Committee (UKSSC), a government committee that sets the UK policy in relation to use of spectrum, as is embodied in the UK Frequency Allocation Table. UK preparations for ITU World and Regional Radio Conferences take place with the International Frequency Planning Group's subgroup of the UKSSC.

Ofcom also liaises with the Ministry of Defence with regard to the management of spectrum designated for military use.

The *Digital Economy Act 2017* introduced a power (in *section 101(2)*, which amends the Comms Act by inserting a new section 28A) for Ofcom to be able to charge satellite operators for managing their satellite filings with the ITU (see *Legal update, Digital Economy Act 2017 published: IPIT and media and telecoms aspects: Ofcom and regulation in general*). This came into force on 31 July 2017 (see *Legal update, Digital Economy Act 2017 first commencement regulations: media and telecoms aspects*) and Ofcom is accordingly implementing charging (see *Ofcom consultation: Satellite filings cost recovery*).

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### COMMERCIAL AGREEMENTS

The legal, regulatory and contractual aspects for the satellite sector are specialised, although general principles of commercial and competition law apply. Insurance is also an important issue and therefore aspects of insurance requirements will be reflected in the relevant commercial contracts, such as contracts to procure satellites and satellite-launch contracts. For checklists on what to include in satellite procurement contracts and satellite launch contracts, see Checklist, Satellite procurement contract and *Checklist, Satellite launch contract*.