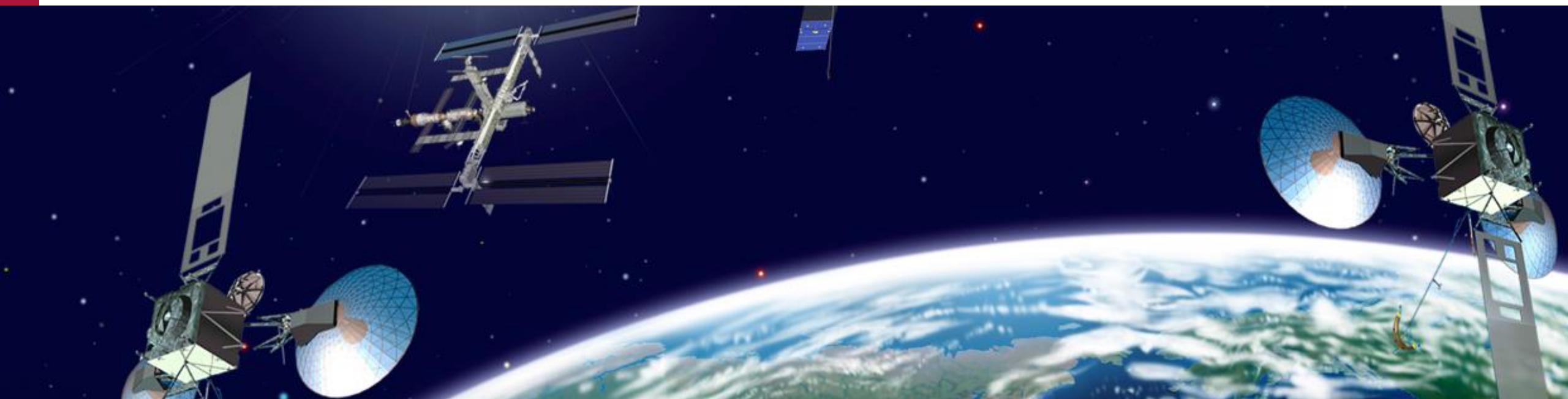


# Satellite Regulation: An Ofcom Perspective

22<sup>nd</sup> October 2019



# 1. Introduction

Elizabeth Quintana, Head of Satellite Industry Engagement, Ofcom

# Aims

- Introduce the role of spectrum in space services
- Overview of Ofcom and Satellite Regulation
- What do we mean by “spectrum” and why is it so scarce?
- Space uses of Spectrum
- What is a satellite filing?

## 2. Overview of Ofcom roles and responsibilities

Elizabeth Quintana, Head, Satellite Industry Engagement, Ofcom

## Ofcom is the UK's communications regulator

- Making communications work for everyone
- Regulate TV, radio and video-on-demand sectors, fixed-line telecoms, mobiles, postal services and spectrum use. Considering regulation of the internet.
- Accountable to Parliament
- Regulatory principles
- Duty to ensure optimal use of radio spectrum
- Represent the UK internationally - including in the International Telecommunication Union (ITU)



## Why regulate in space & who regulates in the UK?

Primarily because of potential for **physical damage**  
and **radio interference**

Nations of the world have agreed international treaties on the  
use of space (Outer Space Treaty) and radio spectrum

**UK Space Agency** is responsible for mitigating physical risk

- Licences UK satellites (Outer Space Act 1986)
- Represents the UK at COPUOS and IADC

**Ofcom** is responsible for managing radio spectrum

- Processes Satellite Filings (Wireless Telegraphy Act 2006)
- Represents the UK on satellite issues at the ITU



In addition, satellite earth stations on the Earth  
have the potential to interfere with, and be  
interfered by, other radio spectrum users

**Ofcom** authorizes the use of Earth Stations in the  
UK (typically via licences)

## 2. A word on spectrum...

# Ofcom and the Electromagnetic Spectrum

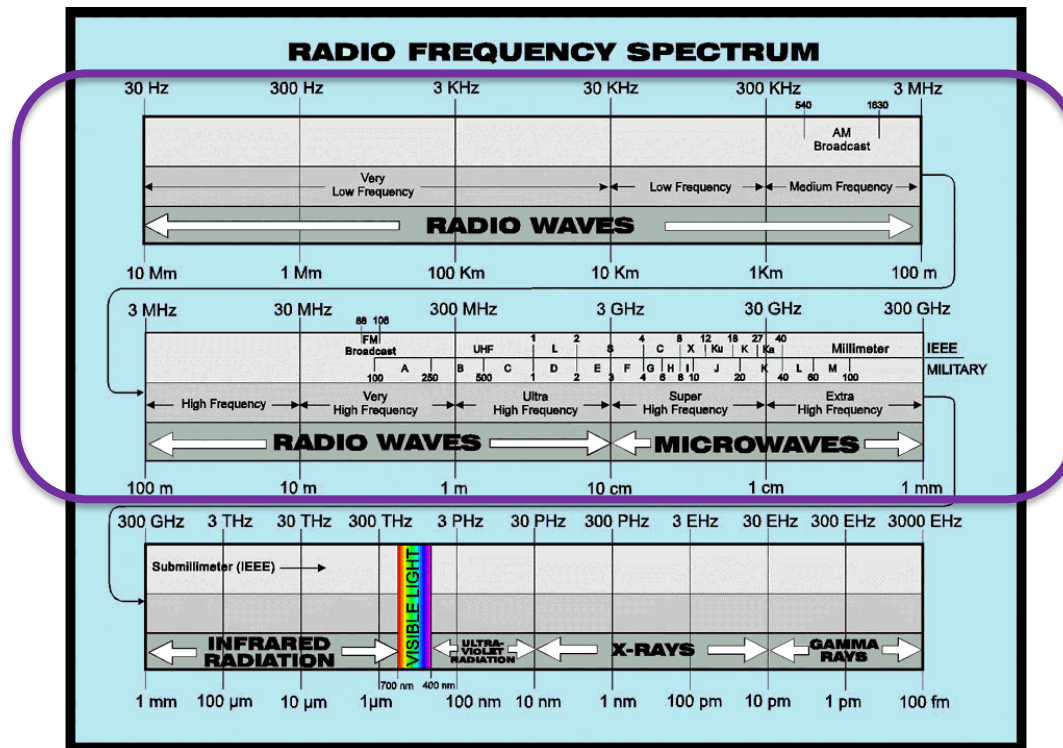
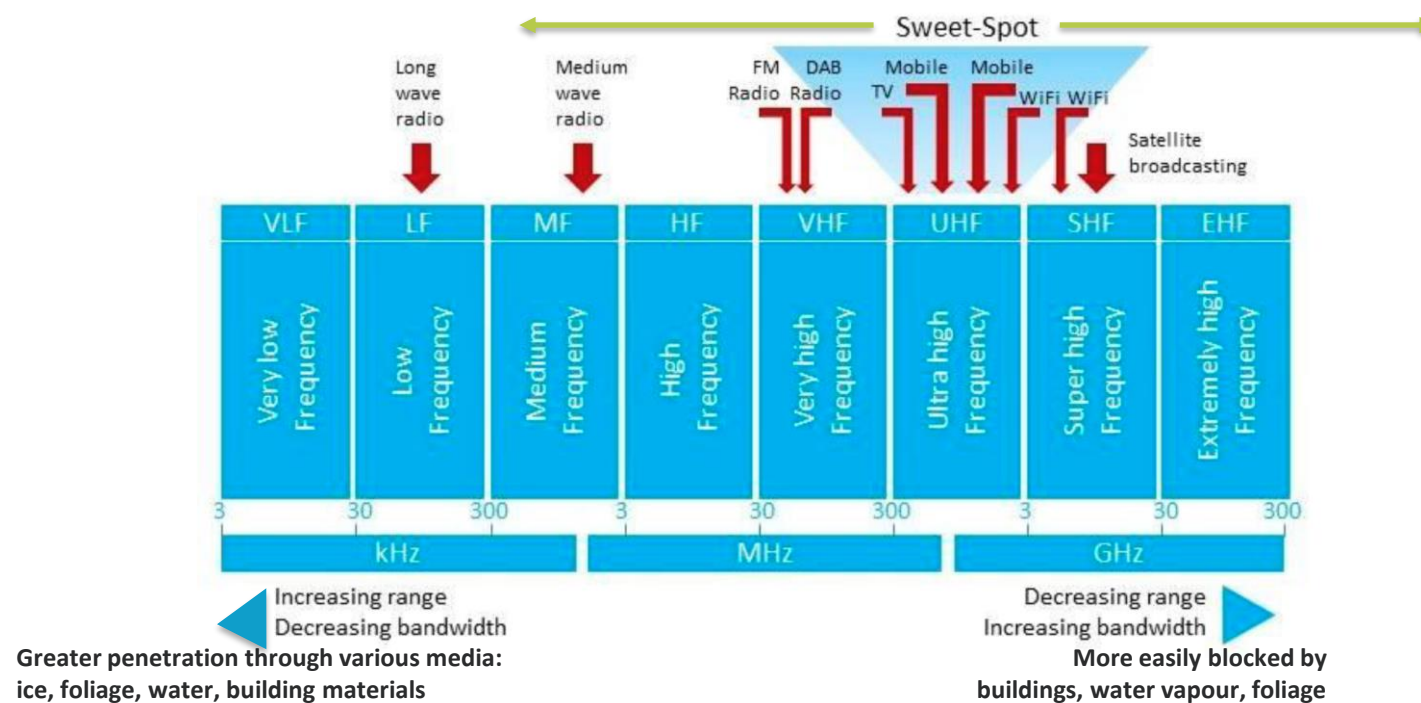


Image: Itstactical.com – emphasis author's

The space sector utilises the entire electromagnetic spectrum to study the Earth and the Universe but the ITU – and subsequently Ofcom - only regulates the use of radio and microwaves.

# Spectrum “Sweet Spot”



There is a sweet spot for most commercial operations and therefore competition for those frequencies.

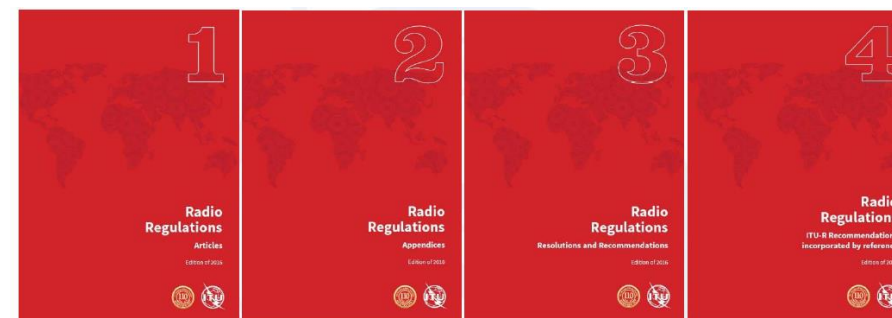
The 'sweet spot' range is expanding in response to technology improvements and demand for more bandwidth eg the mobile sector is starting to use frequencies up to 30GHz for user links (to phones) and up to 80GHz for back haul; short range, high bandwidth links >24GHz are being studied for connected trains and cars conversely, the space sector is using VHF frequencies to take observations through foliage and ice and is interested in <2GHz for IOT

Frequencies > 20 GHz of interest to both satellite and mobile and will be discussed at the World Radiocommunication Conference in 2019

# Satellite filings

## Role of the International Telecommunication Union (ITU)

- Specialised Agency of the United Nations who coordinate telecommunication operations and services throughout the world
- 193 Member states
- ITU-R defines and manages the international framework for the use of spectrum and satellite orbits by radiocommunication services
- Create software to allow member states/operators to submit information
- Radio Regulations - More than 2000 pages of Radio Regulations regularly reviewed by World Radiocommunication Conferences

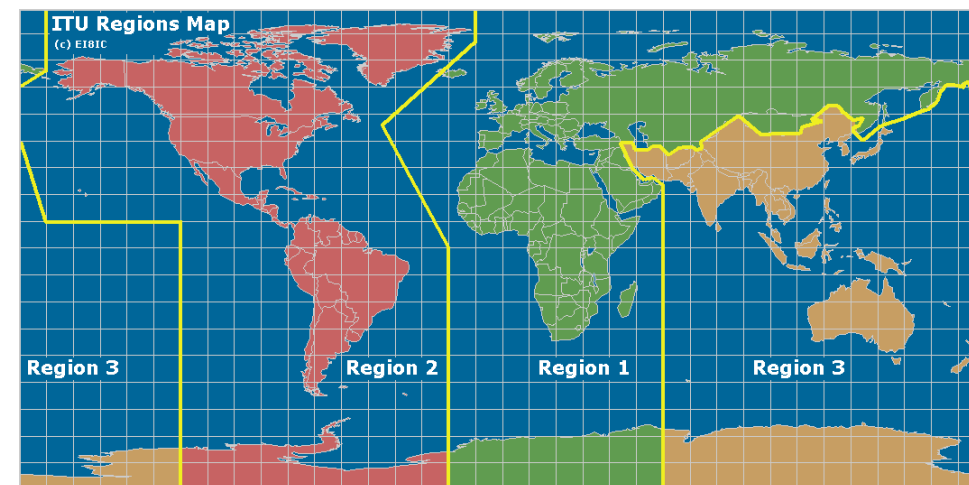


## Who decides on spectrum regulations?

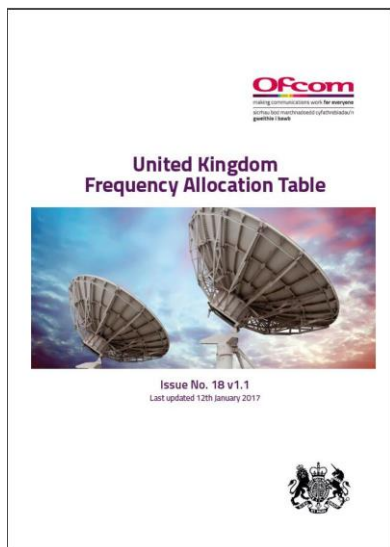
- Every country has the right to manage spectrum within its borders but must not cause interference to services in other states
- Some spectrum is globally harmonised and some regionally harmonised
- International Telecommunications Union produces the Radio Regulations – internationally agreed approach to spectrum management

***This flexibility can cause problems when operators sell products in other regions***

- Satellite operators tend to prefer globally harmonised bands as their services are global by nature (same applies to aero and maritime)
- Earth observation needs globally agreed protections as these are also global services
- Mobile operators also prefer globally harmonised frequencies as this helps product development
- Subregions sometimes have different views eg Europe vs Africa vs Russia vs Arab states in region 1; US vs Latin America in region 2; China vs other Asia Pacific nations in region 3.



# UK Frequency Allocation Table & Spectrum Information Portal



[https://www.ofcom.org.uk/data/assets/pdf\\_file/0016/103309/uk-fat-2017.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0016/103309/uk-fat-2017.pdf)

The UK Frequency Allocation Table lists the existing allocations for spectrum in the UK and the three ITU regions. The UK sits in ITU Region 1 along with Europe, Africa and Russia.

Space services currently utilise a large proportion of the available spectrum.

They also tend to have regional or global reach by the nature of the orbits so national regulators need to work internationally.

**Licences and Transmitters/Receivers**

Use this page to view the details about each licence. Use the map to view the transmitting / receiving details for each licence, or all licences within a specific application. **TIP** Right click to use the drillthrough functions on the tables, to view the licence trades for the selected licence.

Currently displaying Licences and Transmitters/Receivers for Application Satellite (Permanent Earth Station) (3600 - 30000 MHz)

Choose a predefined range All or specific frequencies MHz to MHz

**Sector/Application**

- Business Radio
- Fixed Links
- Maritime Radio
- Satellite Services
  - Global Navigation Satellite System
  - Satellite (Permanent Earth Station)

**Licence Company**: All

**Licence Number**: All

**Region/Area**: All

**Map Area Selection (NGR)**

**Transmitters/Receivers By Licence**

**Licence Details**

Licence Number	Product Description	Licence issue date	Licensee Company	Licensee Name	No of Transmitters / Receivers	Status
ES0017956/1	PES Earth Stations		BBC Scotland		1	Live
ES0017968/1	PES Earth Stations		NPL Management Limited		1	Live
ES0017969/1	PES Earth Stations		NPL Management Limited		1	Live
ES0017975/28	PES Earth Stations		Arqiva Limited		1	Live
ES0017976/28	PES Earth Stations		Arqiva Limited		1	Live
ES0017979/28	PES Earth Stations		Arqiva Limited		1	Live
ES0017985/28	PES Earth Stations		Arqiva Limited		1	Live

**Transmitter/Receiver Details**

Licence Number	Latitude	Longitude	Transmitting Frequency (MHz)	Receiving Frequency (MHz)	Channel Width	Height above sea level	Antenna Name	Antenna Type
ES0017956 /1	55.007729	-4.007653	14021.8750		18200 kHz	0.00	Earth station antenna	A-25*LO G(FI)
ES0017956 /1	55.007729	-4.007653	14021.8750		18200 kHz	0.00	Earth station antenna	A-25*LO G(FI)
ES0017956 /1	55.007729	-4.007653	14021.8750		18200 kHz	0.00	Earth station antenna	A-25*LO G(FI)
ES0017956 /1	55.007729	-4.007653	14021.8750		18200 kHz	0.00	Earth station antenna	A-25*LO G(FI)
ES0017956 /1	55.007729	-4.007653	14021.8750		18200 kHz	0.00	Earth station antenna	A-25*LO G(FI)
ES0017956	55.007729	-4.007653	14026.2500		18200	0.00	Earth station	A-25*LO

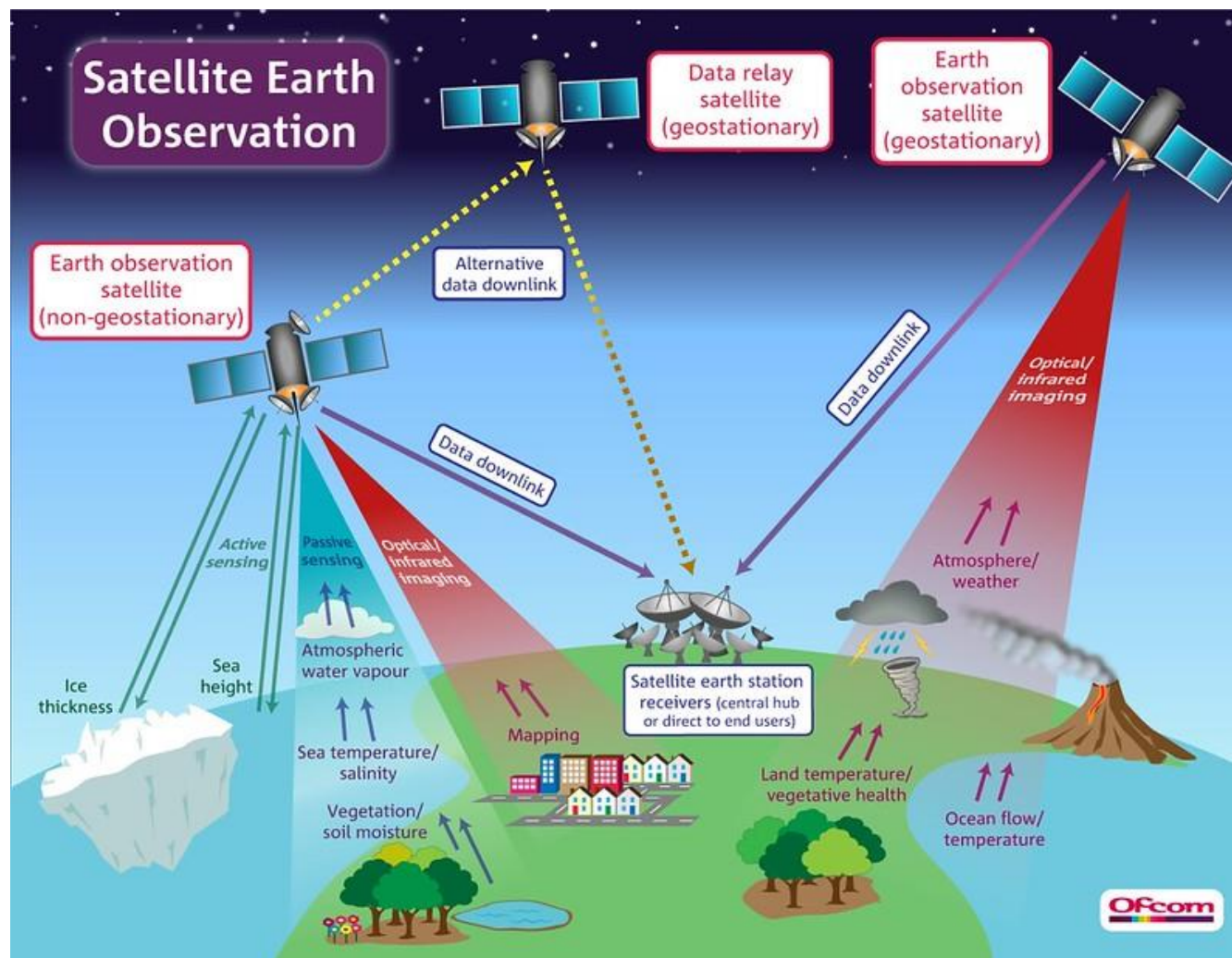
**# Licences by Licensee Company**

Licensee Company	No of Licences
BBC Training and Development Centre	21
BRITISH TELECOMMUNICATIONS PUBLIC LIMITED...	21
RigNet UK Limited	20
CapRock UK Ltd	18
Cobbett Hill Earth Station Limited	18
Total	100

Microsoft Power BI Pages

## 2. Satellite use of spectrum

# Earth Observation



Tend to operate in Low Earth Orbit (orbit in 90 minutes) in either Polar or Sun Synchronous orbits

Trend towards (commercial) constellations with rapid revisit rather than large, expensive but very accurate satellites

Spectrum needed for sensing but also satellite TT&C and data downlinking

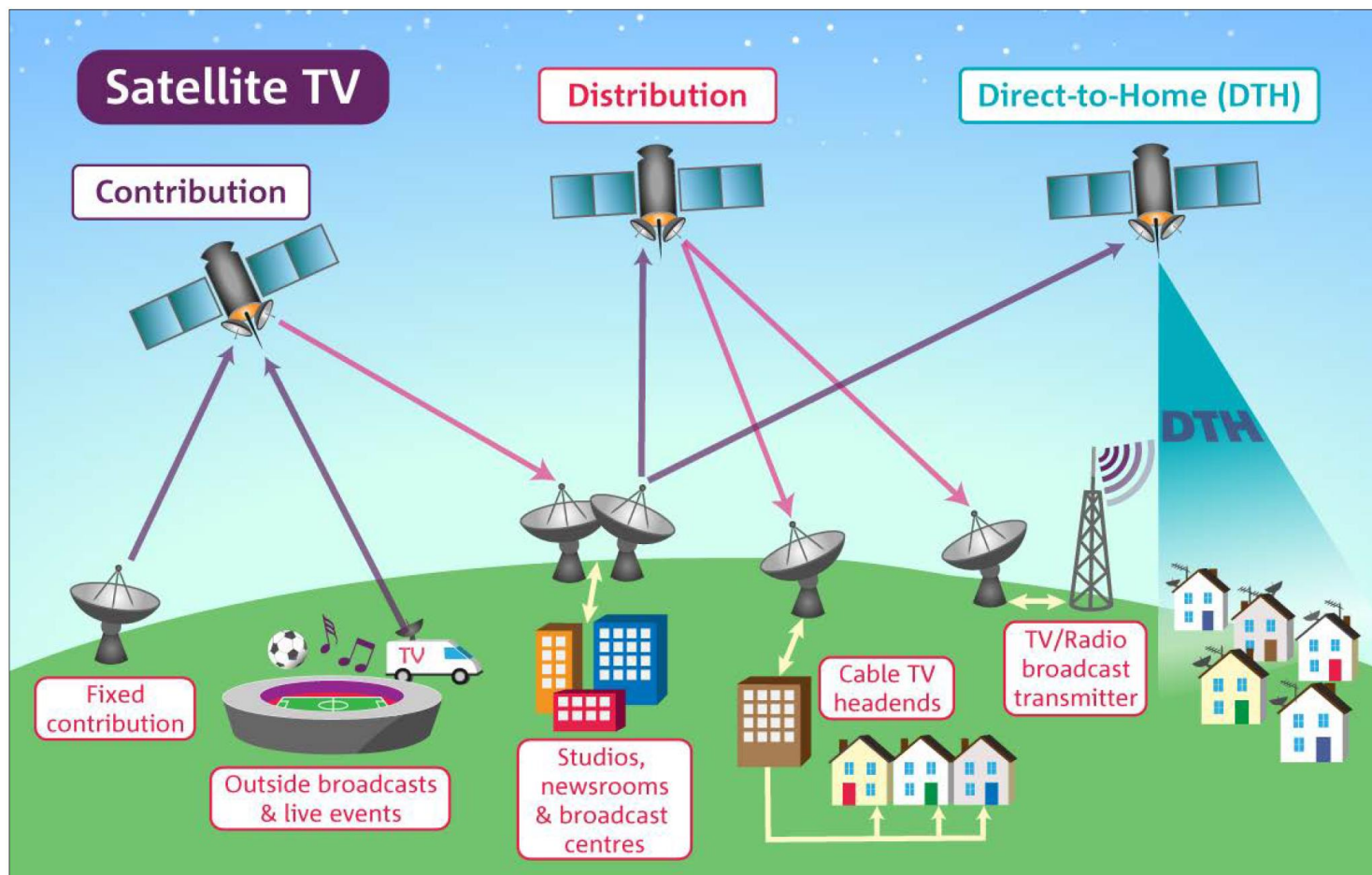
Multi- and hyperspectral imagery: require access to many bands to extract best data (now >100GHz)

Climate monitoring requires persistent access to bands

Trend towards active sensing although passive sensing remains "backbone"

Networks of teleports and interest in laser links to enable faster and more secure data download

# Satellite Broadcast

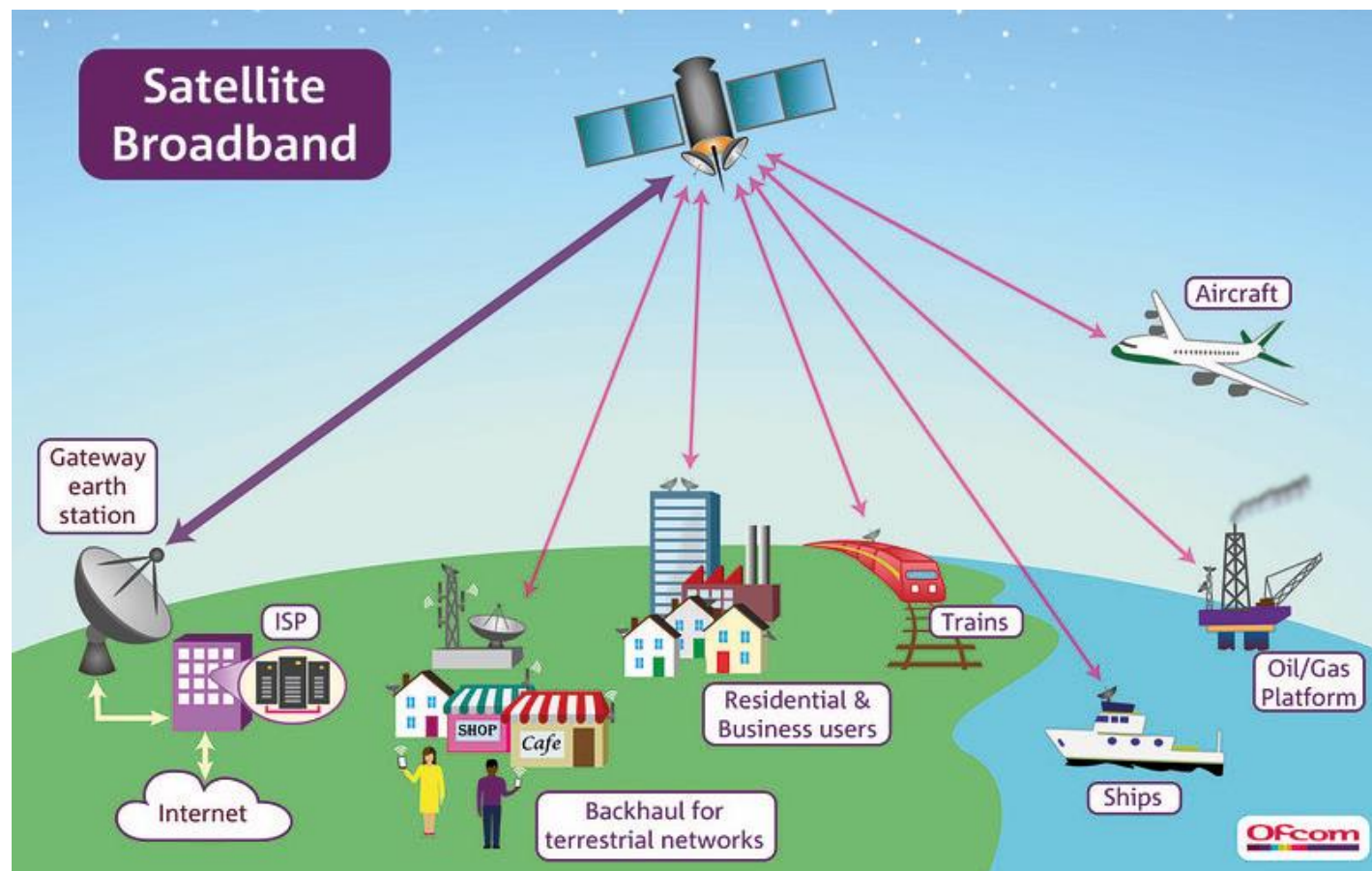


Operate from Geosynchronous Orbits

Decreasing demand in US and Europe for direct to home TV but demand remains strong in Latin America, Asia, Middle East and Africa

Strong international media presence in London

# Satellite Broadband



Biggest markets are inflight connectivity, maritime connectivity, government users and backhaul. Few operators are selling broadband services direct to home.

Traditionally provided from GSO orbit for persistent coverage but latency penalty (0.6s Earth to Space). New High Throughput Satellites up to 500GBps capacity are coming online. This is reducing the cost per bit.

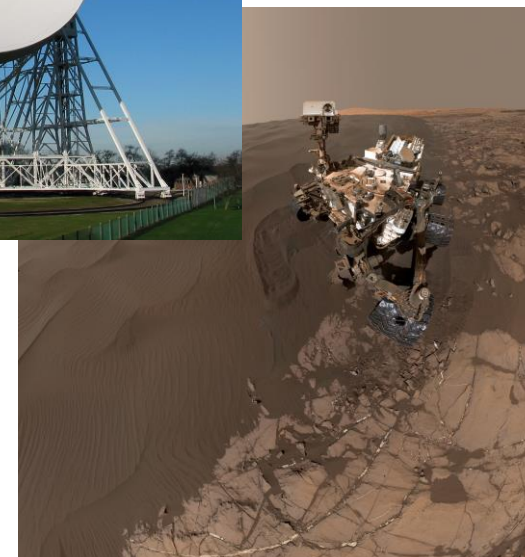
Now NGSO constellations in both Medium Earth Orbit (eg O3B ~45ms latency) and Low Earth Orbit (OneWeb, SpaceX, Telesat etc. ~15-30ms latency)

However, satellites closer to the Earth orbit more rapidly so the constellation requires a larger number of satellites to ensure continuous coverage



## Other uses of spectrum

- Radio Astronomy (passive sensing)
- Lunar and Deep Space Missions (communications)
- International Space Station (TT&C, communications but also video from space)
- Global Navigation Space Services (TT&C, signals)
- Intersatellite links (connecting constellations in order to receive data more quickly)
- Space launch vehicles (TT&C, tracking)
- On-orbit servicing companies (TT&C, video downlink)



## 2. Satellite filings

# Satellite filings

## What is a satellite filing?

- Obtains international recognition for frequency assignments
- Contains technical characteristics that satellites can operate under
  - Frequency assignments
  - Emissions
  - Class of service
  - Orbital planes (NGSO)or
  - Orbital location (GSO)



# Satellite filings

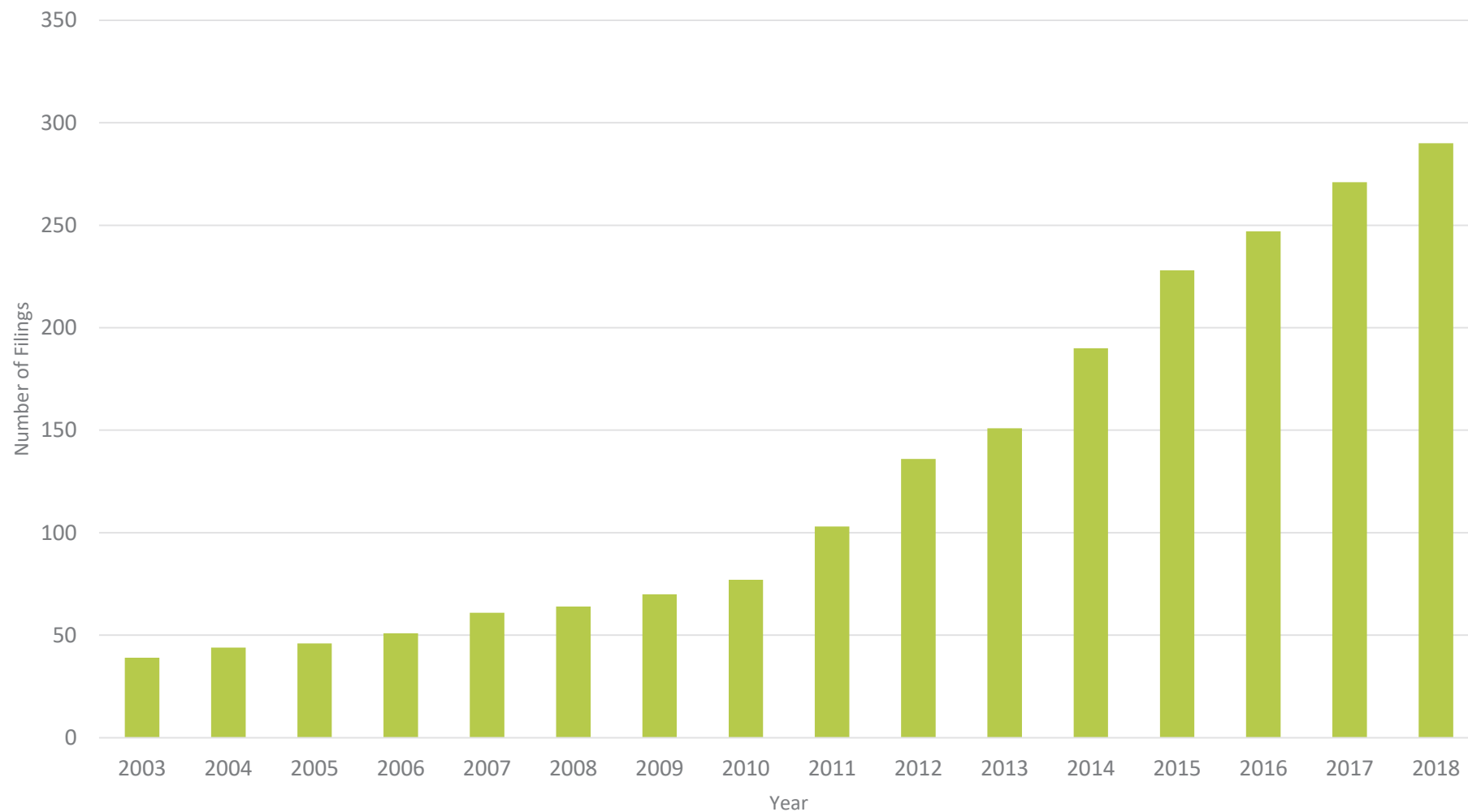
## Role of Ofcom

- Notifying Administration of the United Kingdom including representing:
  - British Overseas Territories
  - Crown dependencies - the Channel Islands and Isle of Man
- Regulation of spectrum use
- Represent 30+ UK satellite operators
- Manage 300+ satellite filings



# Satellite filings

Number of active UK filings

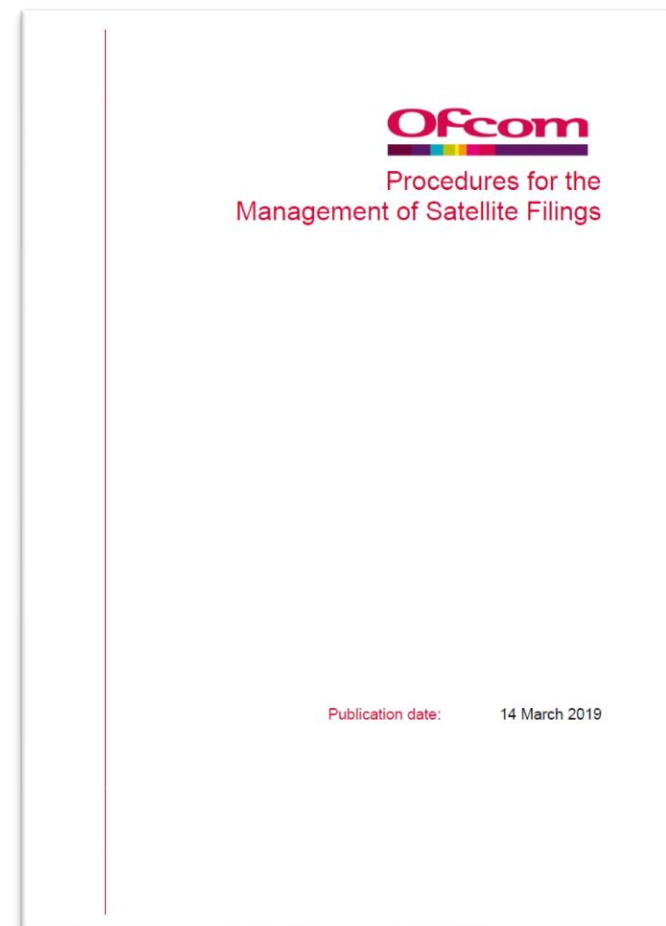


# Satellite filings

## Procedures for the Management of Satellite Filings

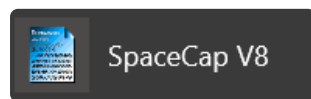
Ofcom aims to ensure that applications submitted to the ITU are consistent with the provisions of the ITU Constitution, Convention and Radio Regulations. These include compliance with the provisions of RR Article 5, 9 and 11.

- Due diligence requirements
  - Registered as UK Company
  - Project Plan
  - Potential Coordination Analysis
- For frequencies identified as UK 2.1, we liaise with MoD



# Satellite filings

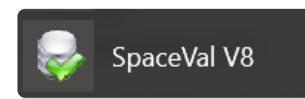
## ITU Software



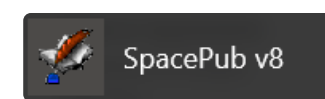
Data capture software for electronic notification of satellite networks and earth stations in the space radiocommunications services



Software package which allows the capture and modification of graphical data relating to the electronic notification of satellite networks.



Software for validating electronic notices captured by the BR SpaceCap software; provides interactive validation facility in SpaceCap.



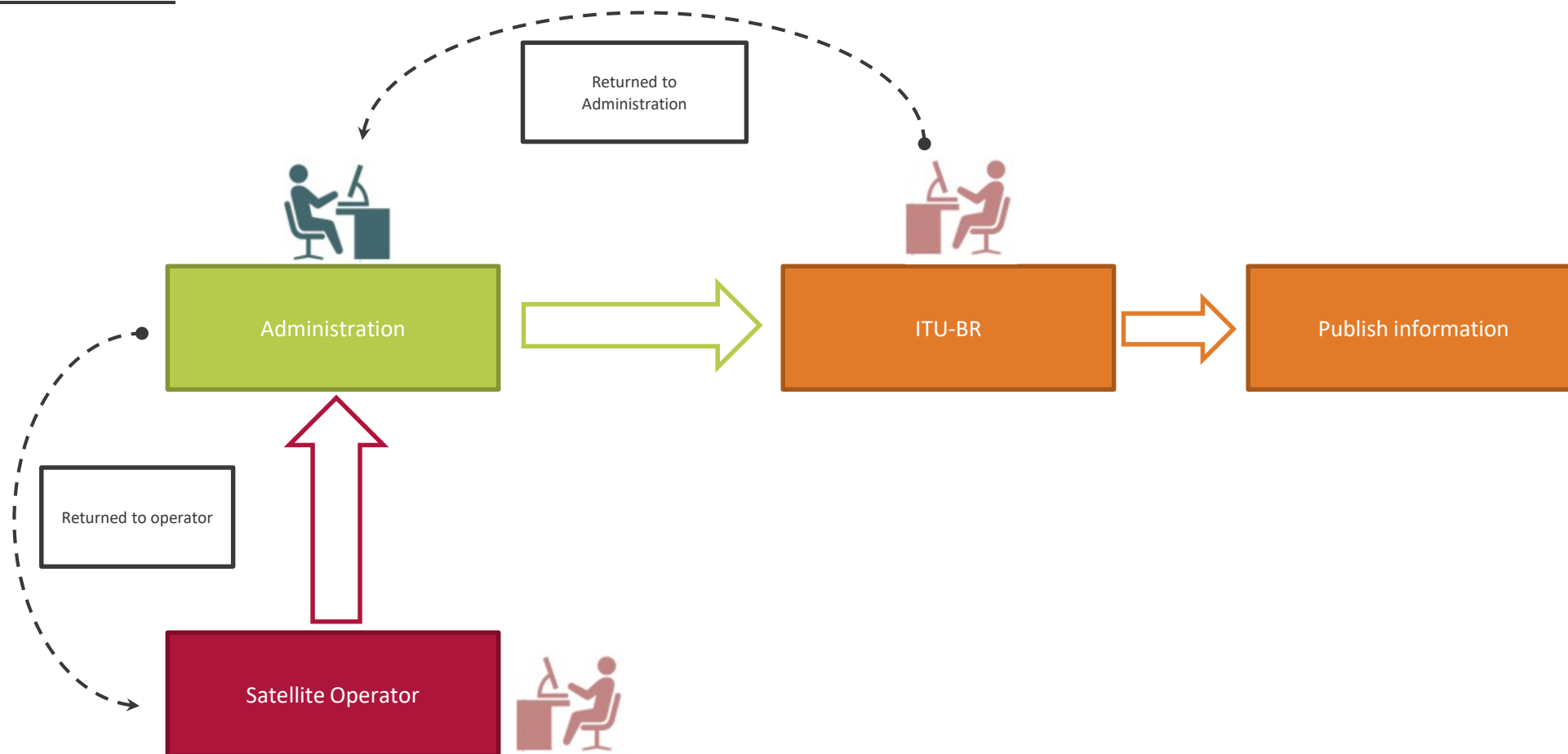
Software package for printing satellite networks / Earth stations from the SRS database.

## Space Services E-learning

Submissions and supporting information should be emailed in **.zip** format to:  
[lfc.enquiries@Ofcom.org.uk](mailto:lfc.enquiries@Ofcom.org.uk)

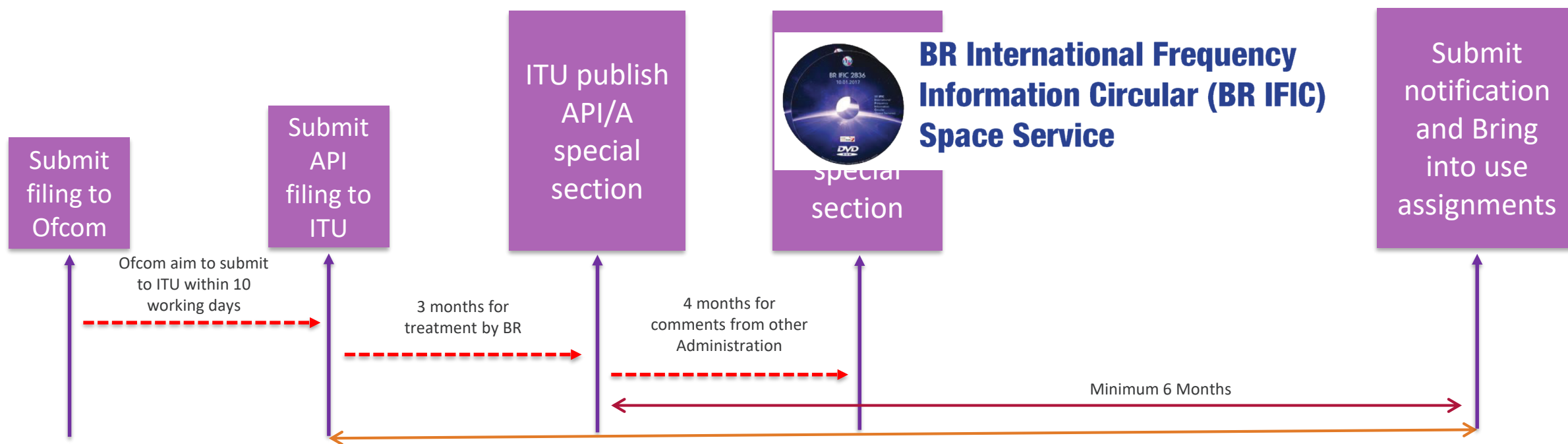
# Satellite filings

## Filing Submission



# Satellite filings

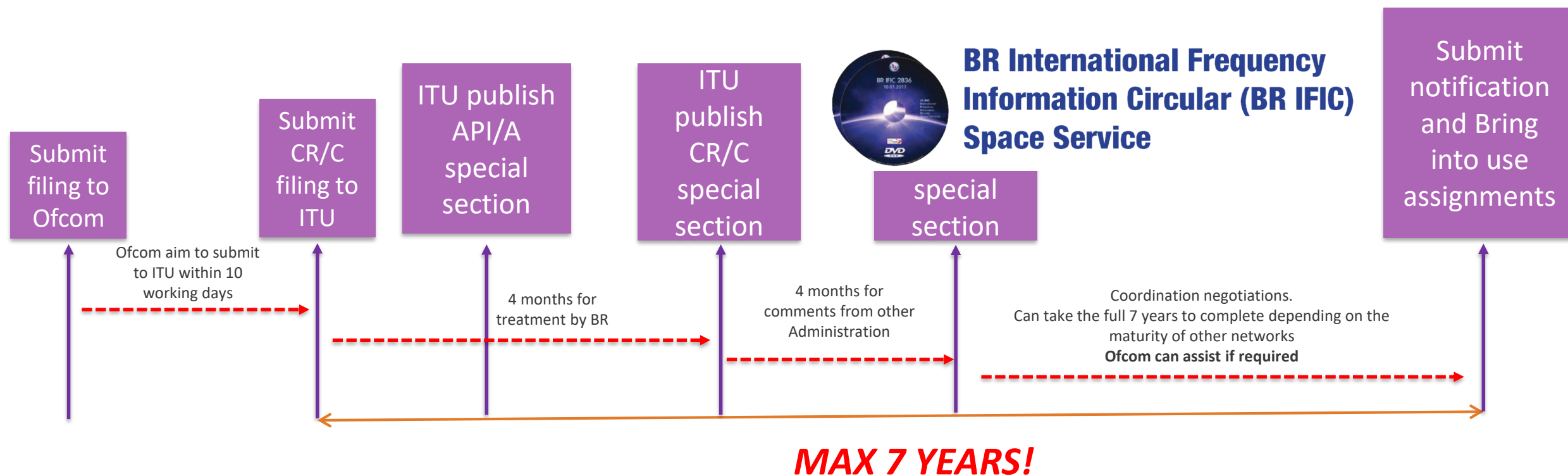
## Timescales – Frequency Assignments not subject to coordination (Sub Section IA, RR) Eg Earth Observation Satellites



**MIN 9 MONTHS, MAX 7 YEARS!**

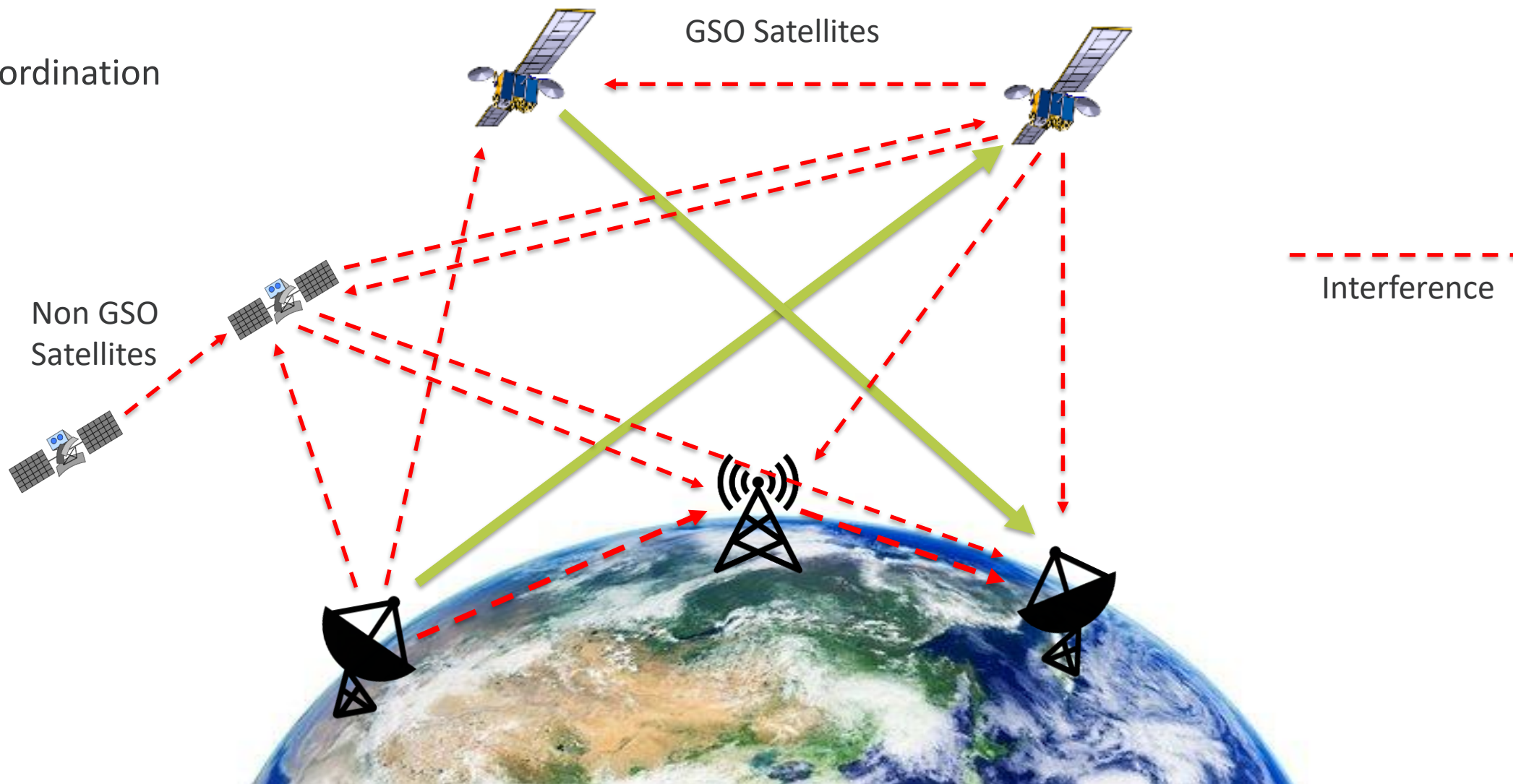
# Satellite filings

## Timescales – Frequency Assignments subject to coordination (Sub-Section IIA, RR) (Communications Satellites)



# Satellite filings

Coordination



# Satellite filings

## Associated costs



**An upfront application fee for new submission (and modification) requests.**

**An annual management charge**

- Non-coordinated API (Advance Publication Information) filings;
- Less complex coordinated GSO and non-GSO filings (<100 ITU units); and
- More complex coordinated GSO and non-GSO filings ( $\geq 100$  ITU units).

**An application fee for notification requests.**

- Non-coordinated API (Advance Publication Information) filings;
- CR/C GSO and non-GSO notification requests.



---

### Satellite Filings Cost Recovery

Implementing new charging powers under section 28A of the Communications Act 2003 – Notice of charges

---

STATEMENT:

Publication Date: 14 March 2019

# Satellite filings

## Associated costs



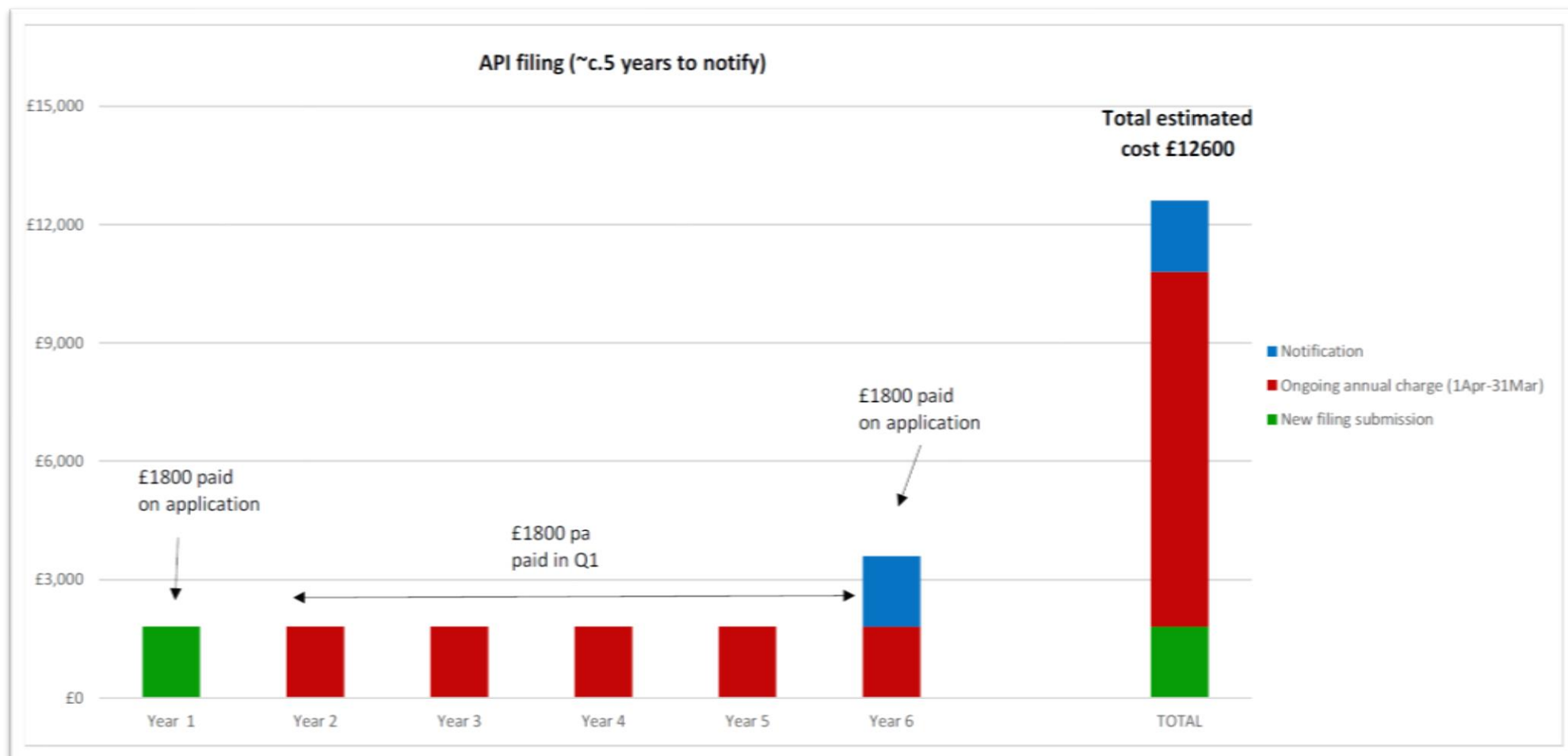
Filing activity/type	Effort weighting	Payment due	Charges (2019/20)
<b>Submissions (and modifications<sup>1</sup>)</b>			
New filing requests (except non-GSO EPFD filings)	1.0	On date of request/application	£1800
New non-GSO EPFD filing requests	3.0		£5400
<b>Annual management</b>			
API filing	1.0	Q1 annually (on receipt of invoice)	£1800pa
CR/C GSO and non-GSO filing (<100 ITU units)	2.0		£3600pa
CR/C GSO and non-GSO filing (≥100 ITU units)	3.0		£5400pa
<b>Notifications</b>			
API requests	1.0	On date of request/application	£1800
CR/C GSO and non-GSO requests	1.3		£2350
<b>Exceptional cases</b>			
Determined on a case by case basis	TBD	On date request is accepted	To be notified and agreed

## ITU Unit

The product of the number of frequency assignments, number of classes of station and the number of emissions, summed up for all frequency assignment groups.

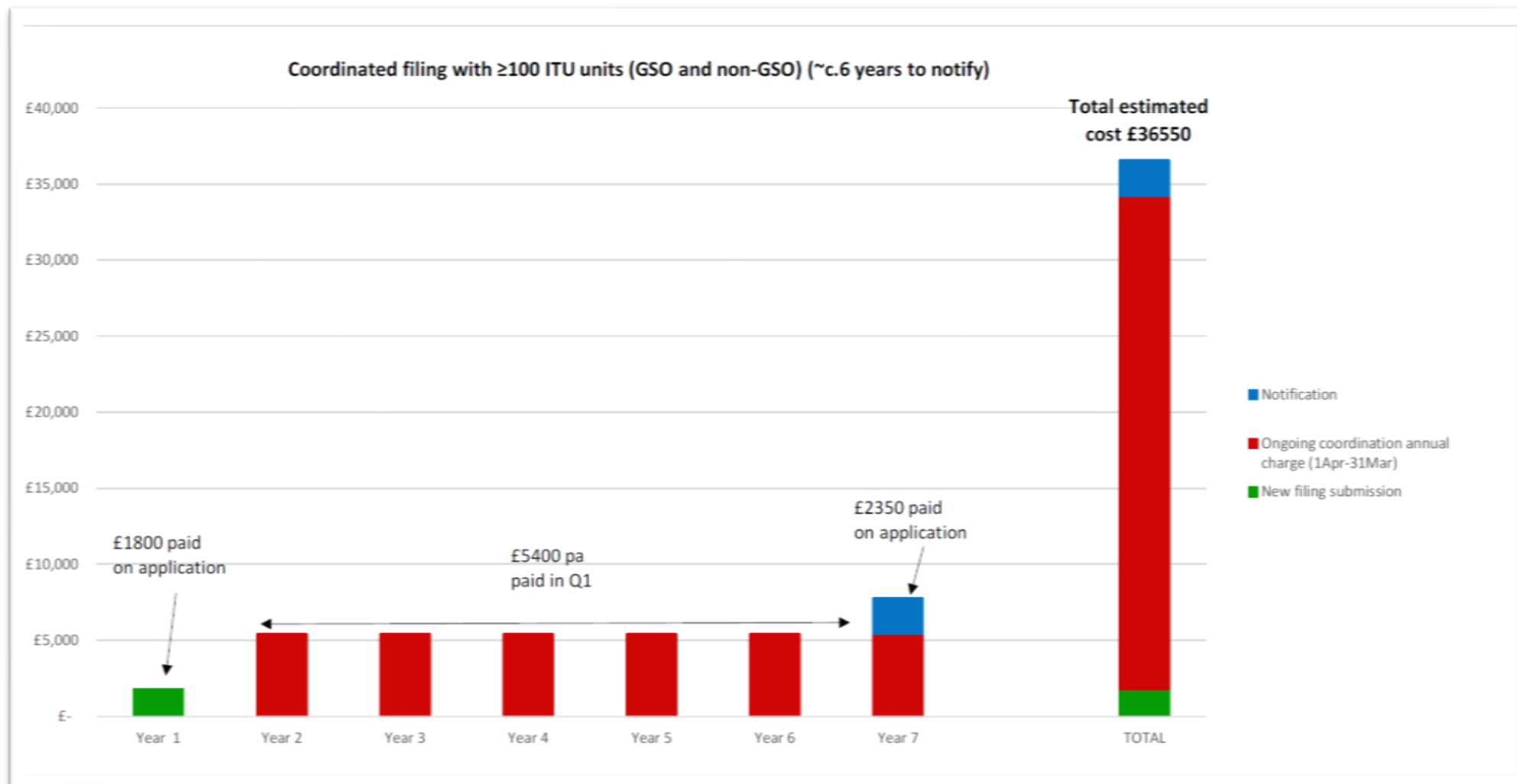
# Satellite filings

## Associated costs



# Satellite filings

## Associated costs



# Satellite filings

## Associated costs



Satellite operators are responsible for paying the associated ITU cost recovery fees for a satellite filing.

Type	Category	Flat fee per filing (in CHF) (≥ 100 units, if applicable)	Start fee per filing (in CHF) (< 100 units)	Fee per unit (in CHF) (< 100 units)	Cost-recovery unit
1	Advance publication (A)	A1	570		Not applicable
2	Coordination (C)	C1*	20 560	5 560	Product of the number of frequency assignments, number of classes of station and the number of emissions, summed up for all frequency assignment groups
		C2*	24 620	9 620	
		C3*	33 467	18 467	
3	Notification (N) <sup>a)</sup>	N1* <sup>d)</sup>	30 910	15 910	150
		N2*	57 920	42 920	
		N3*	57 920	42 920	
		N4	7 030		Not applicable

# Satellite filings

## Radio Regulation References

### Elements

Procedures

Submission format

Technical and operational limits

Criteria and methods to identify  
coordination requirements

### Provisions

Article 9 & 11

Appendix 4

Article 5, Articles 21 & 22 etc.

Appendix 5 (Appendices 7 & 8)



## Satellite filings - new challenges: cubesats

### Regulatory Timeframe vs Cubesat Timelines

- Faster process
- WRC-19 Agenda item 7, issue I – *Simplified regulatory regime for NGSO satellite systems with short duration*

### Spectrum

- No identified frequencies for short duration mission.
- WRC-19 Agenda item 1.7 – *Studies to accommodate requirements in the space operation service for non-geostationary satellites with short duration missions*

### Coordination

- Challenge for CubeSats to obtain coordination for frequencies subject to coordination



## Satellite filings – old challenges returning: “Bringing Into Use”

*ITU mandates a 7 year window to plan, finance build and launch a satellite network.*

- **Paper filings:** A satellite operator files without any intention of launching a satellite but wants to sell the slot or block a competitor from using a particular location
- **Spectrum hoarding:** a satellite operator holds multiple filings in case they cannot complete coordination/gain landing rights
- **Satellite hopping:** The 7 year window is extended artificially by a satellite that is “capable” of the frequencies.
  - *NGSO: a cubesat is launched into one plane - not the final satellite design*
  - *GSO: another satellite drifts into the slot but only stays for the minimum 90 days and then moves to another slot. Usually an old satellite but now companies looking to develop satellites for this purpose.*
- **Mega constellations** can be filed for many orbital planes and thousands of satellites but “Brought Into Use” with just one satellite – no requirement to launch others or maintain the full constellation – UK working to deter this at WRC 2019

**Such actions can block others from using the spectrum and orbital resources.**



## Satellite Filings- Coordination

*First come – first served? An operator may refuse to coordinate their network, blocking an operator with a lower priority network.*

*What if a lower priority satellite launches first?*

*Increasing number of satellite networks being filed and launched. Completing coordination with higher priority networks within 7 years is challenging in some bands.*

*No agreed methodology to coordinate two large NGSO networks especially during the period when one or both are deploying their satellites so the constellation is incomplete.*

*Ofcom can assist by raising the coordination discussions with the relevant administration and – if necessary - taking the issue to the Radio Regulations Board.*

***Early engagement on all these issues is helpful***



## The Radio Regulations Board

Designed to resolve disputes between parties, typically for international services such as satellite services

Meets once a quarter in Geneva

Meeting notes can be found [here](#)

Examples of disputes include:

- Launching satellites that are not capable of transmitting on all the frequencies listed

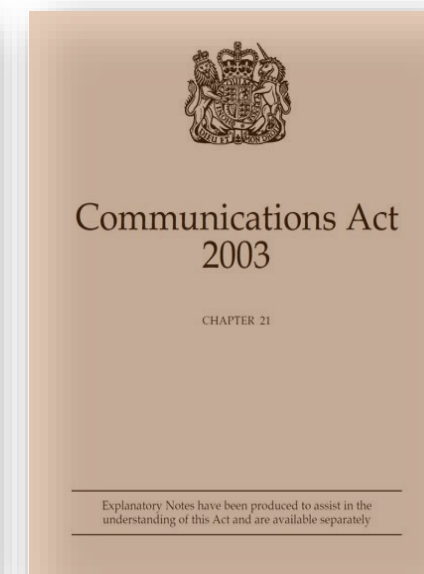
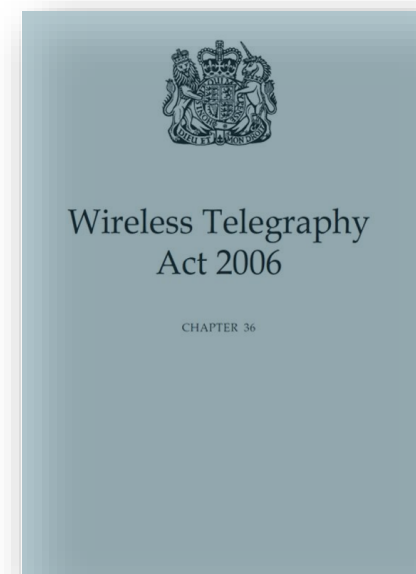


## 3. Satellite earth station licensing

# Earth station licensing

## Licensing principles

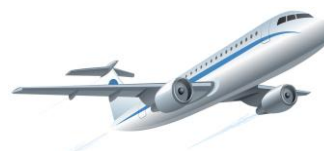
- Wireless Telegraphy Act 2006, Communications Act 2003
- Duty to ensure optimal and efficient use of radio spectrum
- To use spectrum in the UK you need a licence or be exempt from licensing
- UK licensing only, no space segment licensing
- Receivers are exempt from licensing, but 'Recognised Spectrum Access' (RSA) is available in selected bands, on a voluntary basis



# Earth station licensing

## Types of licence

- Aeronautical and maritime radio
- Business radio
- Microwave links
- Programme making and special events (PMSE)
- Innovation and trials
- Satellite earth stations
- ...and many more




# Earth station licensing


## Satellite earth stations

- Type of authorisation depends on earth station and frequency band


**Licensed**




VSATs



SNGs



Permanent earth stations



**Licence-exempt**



Satellite phones



GPS receivers



HDFSS

**Ofcom**  
making communications work  
for everyone

Wireless Telegraphy Act 2006

**Satellite (Non-Fixed Satellite Earth Station) Licence**

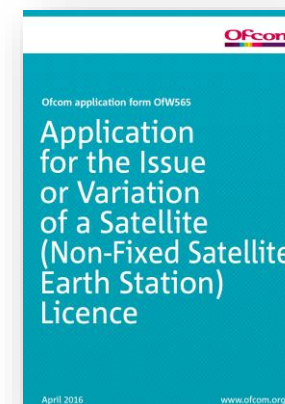
<b>Sector/Class/Product</b>	Satellite Earth Station
<b>Licence number</b>	0174389/4
<b>Licensee</b>	Small Sat Ltd
<b>Licensee address</b>	2a Southwark Bridge Road London SE1 9HA
<b>Licence first issue date</b>	1 January 2015
<b>Licence version date</b>	30 April 2017
<b>Payment interval</b>	Annual

1. This Licence is issued by the Office of Communications ("Ofcom") on 30 April 2017 and replaces any previous authority granted in respect of the service subject to this Licence by Ofcom or by the Secretary of State.

# Earth station licensing

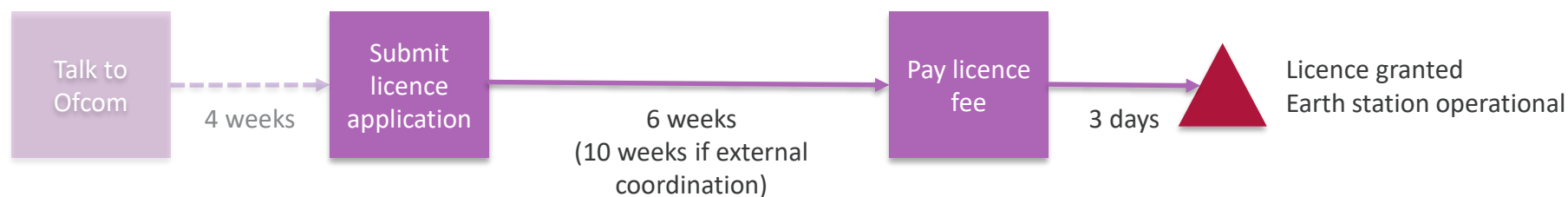
## Process for licensing

- Licence applications forms [here](#)
- Technical characteristics in a separate spreadsheet (location, frequency, power, antenna gain and pointing etc)



Station Details			
Name of Station	E51		
Station Type	Specific		
Class of Station	TC - Earth Station Fixed Satellite Service		
Nature of Service	CP - Station open to public correspondence		
Site Details			
Coordinate System	BNG Letters - OSGB36		
NGR Letters	BNG Letters - OSGB36		
Easting (5 numbers)	12465		
Northing (5 numbers)	67990		
LetLong - WGS84			
Latitude (2 decimal degrees North)			
Longitude (3 decimal degrees East)			
Site Height (AMSL) (m)	34.00		
Satellite Details			
Satellite Name	Sat-1		
Orbital Location (Degrees (Decimal))	3.00		
Directional Indicator (ESI)	E		
Geostationary/Non-Geostationary	Geostationary		
Earth Station Details			
Antenna Performance Pattern	REC-500		
Antenna Diameter (m)	2		
Antenna Height (above ground level) (m)	5		
Tx Antenna Gain (dBi)	38		
Rx Antenna Beamwidth (Degrees)	0.8		
Rx Antenna Gain (dBi)	34		
Rx Antenna Beamwidth (Degrees)	0.7		
Antenna Azimuth (Degrees)	0		
Antenna Elevation (Degrees)	5		
Receiver System Noise Temperature (Kelvin)	260		

- Approximate timeline:




# Earth station licensing

## Licence fees

- Fee depends on type of licence and frequency band, details [here](#)
- Some fees are fixed (administration fee)
- Some fees are based on Administered Incentive Pricing (AIP)
- Licence fee is paid per year, each time the licence is renewed
- Licence fees are subject to review periodically

Invoice for Ofcom Radio Licence Fees



Mr John Smith Small Sat Ltd Pheonix House Lakeside Drive Warrington WA1 9GL	Licensee: Small Sat Ltd 2a Southwark Bridge Road London SE1 9HA
--	--

Customer Ref: 1-289XYT

Invoice Date: 1 November 2017

Invoice No: 68056481

Due Date: 30 November 2017

The licence fees for your radio equipment are due on or before the above due date. If you wish to continue using your radio equipment, payment must be received by Ofcom by the due date shown above. If you fail to do so, you will be in breach of your licence terms and conditions and will be operating illegally. This may result in revocation of your licence(s) and possible enforcement action.

Product	Number of active licences	Fee (£)
Satellite (Non-Fixed Satellite Earth Station)	1	500.00
Total Fees Due		500.00

This licence is outside the scope of VAT and no VAT is included in the licence fee  
please tear here

**PAY ONLINE**

[secure.ofcom.org.uk/payments](https://secure.ofcom.org.uk/payments)

You will need your customer reference number and Invoice number (quoted above). Please note that only payments of up to £5000 can be made using the online payment service.

If you do not pay online please detach and return this remittance advice slip to:  
 Accounting Services, Ofcom, Riverside House, 2a Southwark Bridge Road, London, SE1 9HA  
 Alternatively, please email your remittance details to [ofcom.remittances@ofcom.org.uk](mailto:ofcom.remittances@ofcom.org.uk)

## 4. Innovation and trial licensing

# Innovation and trial licensing

## Licence description and conditions

- Used to support the research, development and trialling of innovative uses of the radio spectrum in the UK covering
  - testing and development of wireless telegraphy (radio) equipment
  - scientific research and experimentation
  - trials and demonstrations of radio apparatus, applications and technologies.
- **Do not allow the deployment of commercial or operational networks or systems**
- Issued for a temporary period and on a non-interference, non-protection basis
- Provide no guarantees that spectrum would be available after the end of the licence period

# Innovation and trial licensing

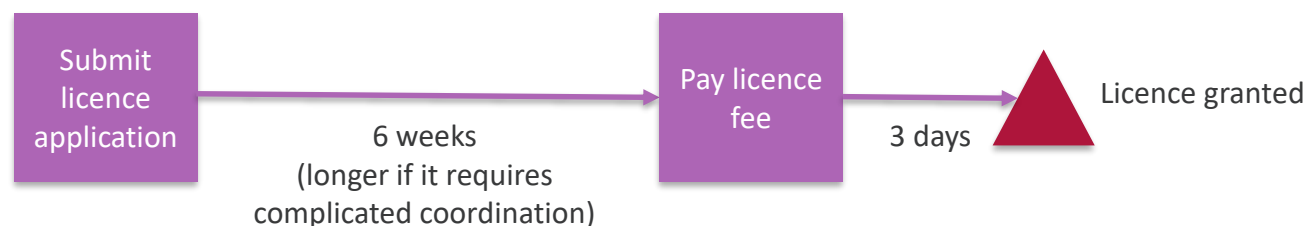
## Types of licenses

- **Innovation and Research Licence (£ 50 per year, per location)**
  - allows to test innovative spectrum apparatus or equipment or to undertake academic or scientific research
  - also covers the testing equipment for e.g. EMC testing or antenna calibration
  - permits working with third parties, provided this does not constitute an operational service
  - does not permit the involvement of the public in any trials
- **Demonstration and Trial Licence (£ 50 per month, per location)**
  - allows to trial and demonstrate a new system, radio concept, application or service
  - only available for new services that do not fit within our existing licence categories or technical parameters
  - allows third parties to participate in trials but requires any participants to be fully informed of the nature of the trial

# Innovation and trial licensing

## Process for licensing

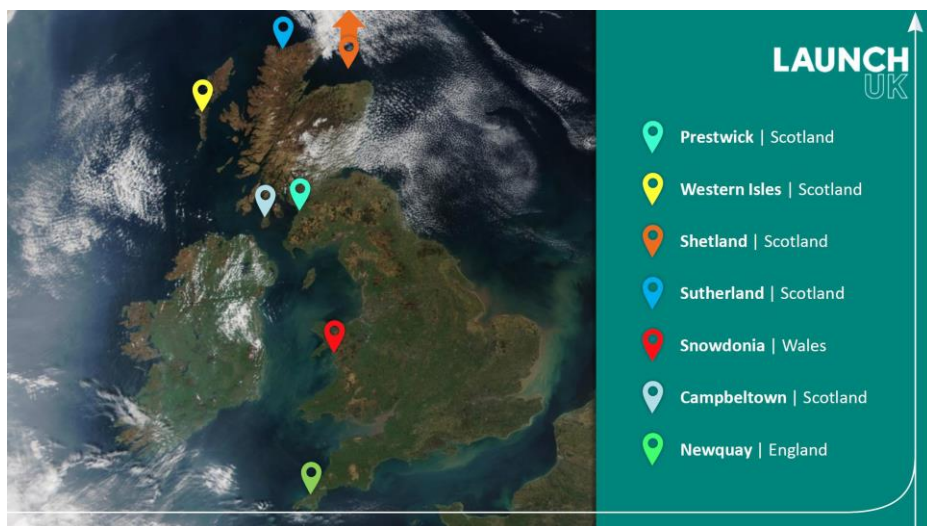
- Licence applications forms [here](#)
- Technical characteristics included in application or in attachment
- Approximate timeline:



## 4. Space Launch

# Space Launch Actors

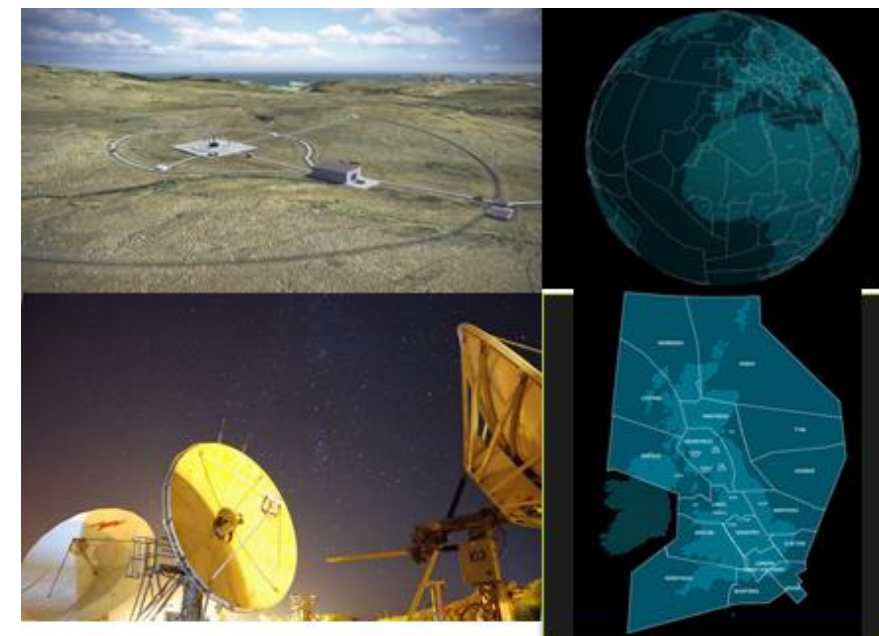
## Spaceports



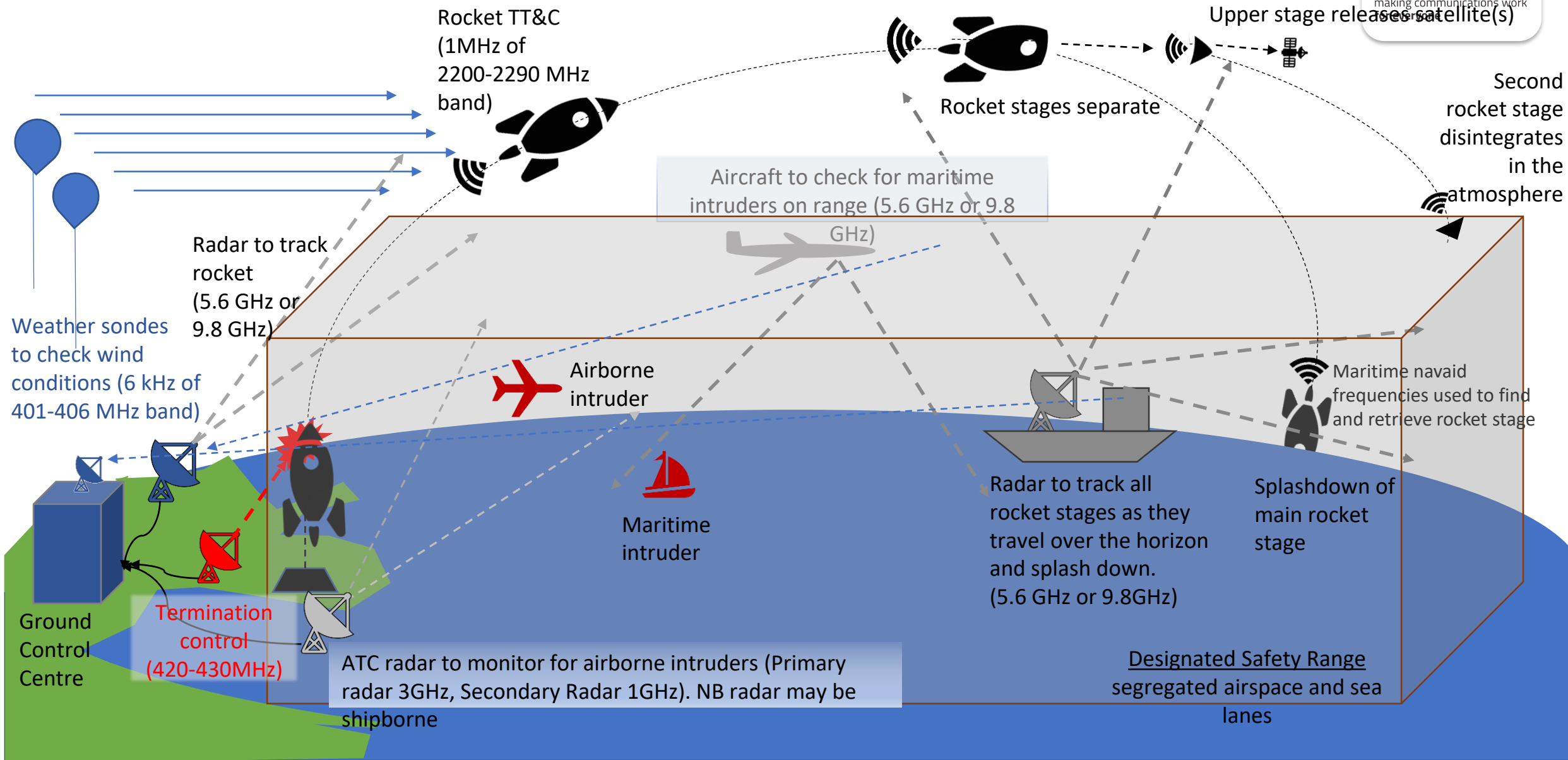
## Space launch operators



## Range Operators



# Potential Spectrum Requirements for Space Launch



## Existing Spectrum Licences

Depending on the design of spaceports and ranges, the following licences may be required:

- [Aeronautical licences](#) (eg. weather radar, air traffic control radar, ADS-B, aero fire service)
- [Business Radio licences](#) (eg. security and site operation)
- [Earth Station Licences](#) (eg. communications links to the rocket)
- [Maritime licences](#) (eg. tracking radars, AIS receivers, navigation aids for retrieving rocket stage)
- [Programme Making & Special Events Licensing](#) (media)

For any **trials** or **launches** occurring before 1 January 2021, use Ofcom's [innovation & trials licensing portal](#). Processing these applications may take slightly longer than the normal six-week turnaround.

## **5. Representing the UK at International Fora (World Radio Communications Conference)**

## International Bodies

Ofcom represents UK interests at:

UN International Telecommunications Union (<https://www.itu.int/en/pages/default.aspx>)

CEPT – European Communications and Postal Service (<https://cept.org/>)

RSPG – Radio Spectrum Policy Group (<http://rspg-spectrum.eu/>)

RSC – Radio Spectrum Committee (<https://ec.europa.eu/digital-single-market/radio-spectrum-committee-rsc>)

ETSI – European Telecommunications Standards Institute (<https://www.etsi.org/>)

What, if anything, changes with BREXIT?

# Radio Regulations



## Radio regulations (RR) - rights and obligations

- Radiocommunication service definitions
  - Frequency allocations and status
  - Technical and regulatory conditions on the use of the bands
  - Procedures (i.e. coordination and notifications, interference management, recoding of frequency assignments etc.)
- 
- The RR are updated at every WRCs (World Radio Conference) and next WRC Nov 2019
  - National regulations are largely based on the RRs
  - The RR is very important for space services due to nature of the applications
  - Complying with national and international regulations essential in preventing harmful interference to other services
  - Using the right bands (i.e. the use consistent with the RR allocations)

## World Radiocommunications Conference 2019 (WRC-19 )

- Repeat of process used for WRC-15, WRC-12 and (in part) WRC-07
- Addresses all WRC Agenda Items for new allocations and the activities of the Radiocommunication Sector to implement Agenda Items agreed at previous WRCs
- A good explanation of these agenda items and UK priorities can be found here:
- <https://www.ofcom.org.uk/consultations-and-statements/category-1/uk-preparations-wrc-19>
- Sought to gather views from the broader spectrum community; responses can be found on the website
- Update on UK positions to be published prior to WRC

# WRC-19 Agenda Items & Ofcom's IFPG Groups

Ofcom holds regular meetings to discuss these issues with stakeholders through its International Frequency Policy Groups. These occur a few weeks before CEPT and ITU Meetings

## IFPG Working Group 1 (WG1)

- 1.11** (Rail: train to track comms.)
- 1.12** (Intelligent Transport Systems)
- 1.13** (IMT>24 GHz)
- 1.16** (RLAN in the 5 GHz band)
- 9.1.1** (IMT: SAT and Terrestrial in 2 GHz MSS bands)
- 9.1.2** (IMT & Broadcasting SAT in 1452-1492 MHz)
- 9.1.5** (Applicable Recommendations in 5 GHz)
- 9.1.8** (IoT and M2M considerations)

## IFPG Working Group 2 (WG2)

- 1.2** (Earth station tx limits at 400 MHz)
- 1.3** (Upgrade of Met Sat status in 460-470 MHz)
- 1.7** (Small satellites, status and new allocations)
- 1.14** (High Altitude Platforms: review and new)
- 1.15** (Land mobile and fixed in 275-450 GHz)
- 2** (Review of incorporated ITU-R Recs)
- 4** (Review of WRC Resolutions)
- 8** (Footnotes: deletion)
- 9.1.6** (Wireless Power Transfer)

## WRC-19 Agenda Items & Ofcom's IFPG Groups

### IFPG Working Group 3 (WG3)

- 1.4** (Review of orbital position limitations)
- 1.5** (ESIMs in the 28/18 GHz bands)
- 1.6** (Conditions for non-GSO FSS > 37.5 GHz)
- 7** (Satellite coordination procedures)
- 9.1.3** (Limits for non-GSO  $\approx$  3.7 – 7.025 GHz)
- 9.1.7** (Limiting unauthorised tx earth stations)
- 9.1.9** (Poss. FSS allocations in 51.4 – 52.4 GHz)
- 9.2** (Inconsistencies in the RRs via ITU Dir. Rpt)
- 9.3** (Check satellite processes are equitable)

### IFPG Working Group 4 (WG4)

- 1.1** (Amateur radio in Region 1 in 50-54 MHz)
- 1.8** (Maritime Safety: new satellite provider)
- 1.9.1** (Autonomous maritime devices in 156-162 MHz)
- 1.9.2** (Satellite part of ship data sys  $\approx$  157 MHz)
- 1.10** (Aeronautical Distress and Safety System)
- 9.1.4** (Consideration of "Space Planes")

# WRC-19 - Priority Issues

## High Priority Issues

- AI 1.13 IMT >24GHz
- AI 1.5 Earth Stations in Motion (connecting planes and ships from GSO)
- AI 1.7 TT&C frequencies for small sats
- AI 7a Rules Around the Bringing Into Use of mega-constellations



$\frac{3}{4}$  are satellite issues

benefits felt across the sector

## Medium Priority Issues

- AI 1.14 High Altitude Platform Systems
- AI 1.16 Radio Local Area Network (5GHz)
- AI 7 (Coordination) – Issue M concerned with simplifying coordination process for short duration small satellite

## WRC-19 – Additional Satellite Issues

### From the list of low priority issues

AI 1.2 – 400MHz – loss of band for small sat TT&C (requires resolution of AI1.7)

AI1.3 – METSAT

AI 1.6 – Coordination of NGSO > 37 GHz – has implications for METSAT at 50GHz

AI 1.8 – New Maritime Safety Provider for GMDSS (Iridium in addition to Inmarsat)

AI 1.9.2 Satellite Part of Ship Data (upgraded AIS – UK has already launched a trial satellite)

AI 9.1.4 Space Planes?

**Thank you for listening**