Inmarsat response to the Ofcom Space Spectrum Strategy

24 May 2022

Introduction

Inmarsat is pleased to provide comments on the Space Spectrum Strategy, published 15 March 2022.

Inmarsat appreciates the ongoing development of the strategy, which has clearly identified the drivers and has outlined clear steps and proposals for the coming few years. Our comments are provided below in answer to each question in the consultation document.

In general, Inmarsat supports the actions proposed and provides some comments on the details. Inmarsat proposes a number of additions to the Space Spectrum Strategy, which are summarised as follows:

1. To enlarge the scope of the current Satellite Consultative Committee to enable multi-stakeholder discussion to maintain alignment of the Space Spectrum Strategy with the National Space Strategy.
2. To add to the strategy an additional issue – to ensure that existing space services are able to continue to operate in the context of possible new spectrum users and in the context of possible changes to the ITU Radio Regulations or new opportunities for sharing in the UK.
3. To consider additional possible actions to address space debris, such as including network licence conditions to ensure sustainable use of space.

Answers to questions

The context for a strategic refresh

Question 1: Are there other trends in the space sector (or the broader spectrum environment) that we should monitor and/or take account of in our strategy?

In section 3 of the consultation document, Ofcom had made a good job of identifying the key trends in the satellite industry that may impact on Ofcom's strategy, and the impact of Ofcom's broader spectrum strategy.

In section 2 of the consultation document, the UK's National Space Strategy is referred to, which describes the Government's goal to grow the UK space economy. This in itself should be a major driver for Ofcom's strategy. In particular, Ofcom's strategy towards the international regulations should be aligned with the National Space Strategy. This could require, for example, action from Ofcom to support the development of new regulations in the ITU to enable ongoing global operation of new satellite systems.

In para 2.33, Ofcom welcomes views from stakeholders on how to enable richer collaboration among stakeholders, regulators and government. A suggestion in this regard is to broaden the scope of the UK Satellite Consultative Committee, to enable a more long-term, forward looking approach to

establish objectives for Ofcom. The current frequency of meetings of this group – about twice a year – is probably adequate, but currently it tends to focus on providing information on activities in the ITU, CEPT and ETSI, and sharing information on more day-to-day licensing issues. A forum where the Space Spectrum Strategy can be discussed on a regular, ongoing basis with all stakeholders would be welcome, and would allow for alignment with the National Space Strategy to be kept under review.

Our strategic objectives and priorities

Question 2: Do you agree with the broad areas we have prioritised for our work?

Inmarsat agrees with most of the areas of focus identified in para 4.8. We are concerned however about the proposal not to focus on spectrum management changes for Emergency and Disaster Relief (section 4.8, bullet v). Although we would agree that systems providing these services have adequate spectrum today that does not equate to no action being necessary. For example, the L-band MSS services provided by Inmarsat are extensively used for emergency and disaster relief, and other vital safety and security related functions in the UK and globally, such as maritime and aeronautical safety mandated by IMO and ICAO respectively. These important services require the ongoing access to L-band — and parts of C-band, which is used by Inmarsat for feeder links — without interference. Parts of the L-band and C-band spectrum are threatened in their long-term availability by actions such as the introduction of new terrestrial services, in the same or in the adjacent frequency bands. Part of the space spectrum strategy should be to ensure that the existing space services, where they continue to be required (for example for safety and security critical applications), are able to do so in light of the possible new uses by other services.

Work areas and actions

Question 3: Are there other issues and actions that are likely to be important over the next 2 – 4 years?

Inmarsat comments in particular on the following issues and actions that Ofcom has identified:

Issue	**Inmarsat comment**
Gateway earth stations in Q / V bands	Supported. Inmarsat is pioneering the use of Q/V band for gateway stations and supports this action.
Additional capacity for ESIMs (including those on aircraft and ships).	Supported. Inmarsat would seek flexibility for access to additional parts of the 28 GHz band for ESIMs operating in GSO networks, based on recent changes to the ITU and CEPT regulations.
Protection criteria for the fixed satellite service.	Supported. Inmarsat in particular supports the development of criteria for the higher frequency bands, not currently covered by the ITU-R Recommendations.
Inter-satellite links.	Supported. While this issue is identified in the consultation document under "Earth observation and navigation", it should be noted that inter-satellite links may also be used for communications. Inmarsat supports the development of regulations for inter-satellite links in a range of bands, independent of the type of traffic carried.

Spectrum requirements to support resilient positioning, navigation and timing.	Supported. Inmarsat supports the UK National Space Strategy driven investigations into new system requirements.
Efficient use of S-band for TT&C.	Supported. Inmarsat agrees that the growing interest in this band for new systems and new types of operators suggests the need for a review of the regulatory conditions.
Spectrum authorisations for UK space launch.	Supported. Inmarsat is developing its L-band MSS service to provide communications for launchers and this service should be available to UK based launchers.
Sub-orbital vehicles.	Supported. Inmarsat supports the development of regulations to allow the use of L-band MSS to support sub-orbital vehicles (which may include, but is not limited to, space launch vehicles).
Safe use of space.	Supported. Inmarsat agrees that concerns over space debris are growing and this issue is one of high importance. While Ofcom has identified that there could be issues related to spectrum for radars and in-orbit service missions, Ofcom may also need to take action to ensure good practice by other (non-UK authorised) systems. For example, the issuing of a network licence for a non-GSO constellation could be contingent of that system operating consistently with international guidelines to manage space debris.
Supporting wireless innovation: spectrum for space pioneers.	This is certainly a period of high innovation in the space industry and Inmarsat supports actions to facilitate such innovation, whether for small satellite applications or other areas of innovation.
Promoting spectrum sharing: Greater use of network licences.	Inmarsat accepts that network licences may be applied in more cases in the future. Nonetheless, the current regime based on licence exemption of certain classes of user terminals, and per station licences for others seems to have functioned well for many years in most frequency bands. It will be necessary to prioritise the cases where there is a clearly identified problem to be addressed.
Promoting spectrum sharing: Conditions on satellite downlinks.	Inmarsat agrees that internationally agreed downlink obligations must be complied with. It is important however that the scope of this activity is limited to ensuring compliance with internationally agreed obligations. We would not support any activity to introduce new UK specific limitations to satellite downlinks.

Question 4: Do you have any evidence on whether specific actions should be a high priority?

Inmarsat would like to see the work on "*Additional capacity for ESIMs*" given a high priority in particular. Following changes to the Radio Regulations at WRC-19, the CEPT has updated the European framework for ESIMs in GSO networks in the revised ECC Decision (13)01, including now the potential for operating aircraft ESIM in additional parts of the Ka-band. Such additional flexibility is needed to meet the demand driven by the rapid growth in ESIM services for broadband communications to ships and aircraft. The terminal equipment and satellite capacity to make use of

the additional bands are already available and hence a change to the UK regulations could immediately be implemented and used to benefit UK passengers, with no impact on existing users. The regulatory provisions to ensure compatibility with UK terrestrial systems in the 28 GHz band are already well established by the new ECC Decision and hence this change could be implemented quickly.

Question 5: Do you have any other issues you wish to comment on?

A high priority item for Ofcom should be to ensure that shared satellite spectrum is free from interference from other users – an issue not currently identified in the list. One current example where this is relevant is regarding discussion on the application to power limits to 5G mobile base stations that use "Advanced Antenna Systems" (AAS). Even though it is not formally a WRC-23 agenda item, this issue is being discussed in the context of WRC-23 preparations. So far, the position adopted by Ofcom has been potentially extremely harmful to satellite use of certain frequency bands, including the 28 GHz and 48 GHz bands.

Hence, there seems to be a major disconnect between Ofcom's proposed space spectrum strategy, which would see action to support new satellite use of the 28 GHz (for ESIMs) and 48 GHz band (for Q/V gateway stations), while at the same time the use of these same frequency bands for satellite services is being threatened by Ofcom's strategy for WRC-23. It also seems to be inconsistent that Ofcom is considering to bring in new requirements for satellite downlinks, while in a different context - WRC-23 preparations - is seeking to allow regulations that could lead to significant uplink interference to satellites from terrestrial operations.

Another example is regarding the discussions on the "upper 6 GHz band", which is considered for IMT under WRC-23 agenda item 1.2. For this case, Ofcom has so far taken a fairly neutral position, despite that fact that important UK services, including services widely used for safety, emergency and disaster relief are threatened.

A consistent strategy for these bands would see Ofcom supporting action at WRC-23 to ensure that satellite use of these bands is not threatened by terrestrial services.

We note that the space spectrum strategy makes an alignment with some WRC agenda items, e.g. agenda item 1.6 for sub-orbital vehicles. However there seems to be no alignment for WRC-23 agenda items that present a threat to UK satellite services. Inmarsat strongly recommends that the space spectrum strategy is broadened to cover also issues related to such WRC agenda items. That does not mean that terrestrial service interests would be ignored – they also need to be taken into account to develop an overarching position that brings together terrestrial interests, satellite interests and WRC-23 positions.

NGSO satellite communications

Question 6: Are there other issues and actions specifically relating to NGSO communication systems that are likely to be important over the next 2 – 4 years?

Inmarsat is generally content with the issues listed in Table 6 of the consultation document and the proposed actions.

Within the scope of the issue "NGSO-GSO sharing", we note the reference to "improvements to the way NGSO systems are modelled" which is currently being pursued through possible revisions to Recommendation ITU-R S.1503, which is used by the BR to examine the compliance of NGSO systems with the RR Article 22 EPFD limits. Inmarsat is concerned that some Ofcom supported proposals aim to make the Rec. 1503 modelling less conservative, while other parts of the Rec. 1503 model that have been shown to be too permissive are not being addressed. In particular, the use of the so-called "Worst Case Geometry" (WCG) in Rec. 1503 produces results which indicate that some NGSO systems meet the EPFD limits while in fact they exceed the limits. Hence, BR examinations provide favourable findings to NGSO systems that do not meet the EPFD limits, leading to potential harmful interference from NGSO systems to GSO systems. If the Rec. 1503 methodology is made even more permissive than it is today, this problem would get worse. Therefore, changes that make Rec. 1503 less conservative should not be adopted until the issue of the WCG is also corrected.

As noted above, the issue of the growth in space debris in a major issue, attracting attention from governments and satellite operators. The rapid growth in debris is closely linked with the launch of new "mega constellations". The UK Space Agency and the CAA are primarily responsible in the UK on this issue and Inmarsat supports that strong and internationally harmonised action is taken and is applied consistently to all operators, to manage orbital debris. The UK already applies conditions related to space debris in its satellite licensing process, and NGSO systems which are licensed for operations outside the UK should meet the same requirements as UK licensed systems. Ofcom may therefore need to use its powers to authorise use of non-UK licensed NGSO systems to provide service in the UK, to include licence conditions to ensure a level playing field on space sustainability for UK and non-UK systems alike.

Question 7: Do you have any evidence on whether specific actions relating to NGSO communication systems should be a high priority?

Inmarsat has no comment on this question.

Question 8: Do you have any other comments relating to NGSO systems?

Inmarsat has no comment on this question.