

## **Introduction**

SES, one of the world's largest commercial communications satellite operators, with both geostationary orbit ("GSO") and non-geostationary orbit ("NGSO") satellites providing telecommunications services, is uniquely positioned to address the matters raised in the Consultation. The SES fleet of more than 50 GSO satellites provides a wide range of C-, Ku-, and Ka-band services to customers around the globe. O3b uses its constellation of Ka-band medium earth orbit ("MEO") NGSO satellites, for which the UK Space Agency has issued UK Orbital Operation Licenses, to provide low-latency, high-throughput capacity to enterprise customers including mobile network operators, ISPs and governments.

SES appreciates Ofcom's efforts to improve its current NGSO licensing regime and provides its comments below.

### **Question 1: Do you have any comments on our assessment of the interference challenges raised by NGSO systems and their potential impact on a) service quality; and b) competition?**

Generally, SES agrees with Ofcom's assessment of the interference challenges raised by NGSO systems, but notes that much can be addressed, including the relative separation between gateway antennas, through operator-to-operator coordination. Ofcom should have rules that encourage all parties to engage in coordination to manage interference challenges whilst supporting competition and discouraging delay or hold out behaviour.

### **Question 2: Do you have any comments on our approach to dealing with the interference challenges raised by NGSO systems?**

SES supports Ofcom's proposal to introduce more transparency in the NGSO earth station licensing process. Allowing a limited window in which interested parties can review and comment on a pending NGSO network license application or NGSO gateway license application will further Ofcom's goals of managing interference and promoting competition. Comments by interested parties could offer insights on the technical aspects of managing interference and the potential impact on competition of proposed NGSO earth station deployment. Ofcom should clarify that the comment window will be opened for every NGSO network license application and NGSO gateway license application as well as for substantive modifications to each without exception, and that the comment period will not unduly delay the processing of these applications.

Ofcom's proposals to encourage coordination among incumbent NGSO licensees and future licensees through application requirements and license conditions are appropriate and can succeed, but the burden placed on each party must be better clarified. Ofcom should clarify in its final decision that all NGSO operators licensed in the UK or seeking to obtain a license must engage in coordination. This would apply irrespective of ITU satellite network filing nationality.

The obligation to participate in coordination discussions must extend to incumbent licensees, whether or not they hold a higher priority ITU filing for their network. While some may argue

that the coordination process established by the ITU places the full agreement-seeking obligations on systems with later date priority, an operator of an earlier date priority network must still engage in good faith coordination discussions with later incoming filings to achieve an operating environment based on mutually agreed technical conditions to manage interference. The license conditions proposed and discussed further below is one mechanism for ensuring incumbents can continue to deliver valuable services to consumers but do not engage in blocking behaviour. The penalties for violating the condition should be clarified.

Ofcom's proposal to require licensed gateways to begin operations within 12 months of approval may not be sufficient where multiple NGSO operators seek to establish gateway operations in the UK. Because a significant portion of the bands used by existing and developing NGSO systems are shared with other services, including terrestrial services, it is critical that NGSO operators have some certainty when they develop their systems that they will have access to the gateway locations they have identified as feasible for their satellite operations. Therefore, SES proposes that Ofcom also limit the number of NGSO gateways licensed in the same frequency bands but remain unbuilt after one year.

SES also encourages Ofcom to address through this consultation the process for licensing GSO networks and NGSO systems that seek to operate in bands subject to coordination. Ofcom's rules should require coordination discussions between incumbent GSO and NGSO license holders while still providing a procedure to resolve interference in the absence of a coordination agreement.

### **Question 3: Do you have any comments on the proposed updates to our process for NGSO gateway and network licences?**

As noted above, SES agrees with Ofcom's two main goals of managing interference and promoting competition, and a licensing process that encourages coordination will achieve both. Ofcom should however provide more clarity on the standards it will apply in the application review process. The current standards proposed in the consultation are too vague for either a new applicant or incumbent operator to assess the design elements that will be necessary to satisfy Ofcom's review. For example, Ofcom states in the consultation

that a key piece of information that applicants should provide when applying for a network license is credible evidence about the technical ability for their system and future systems to coexist. This would include evidence about the flexibility of their system and/or what reasonable steps new licensees could easily undertake to protect them.<sup>1</sup>

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<sup>1</sup> Ofcom Non-geostationary satellite systems: Licensing updates Consultation, publication date 26 July 2021 ("Consultation"), para. 4.16.

This standard, even with the clarification provided in paragraph 4.22, is insufficient to guide applicants in what must be submitted. SES recommends that prior to initiating the new application process, Ofcom publish guidance clarifying and elaborating on the application requirements and the standards it will apply to issue a new license. Such guidance may also evolve over time as satellite technology advances.

Notwithstanding the above commitments, Ofcom must also make clear in its licensing process that a new applicant must demonstrate how it will operate with existing licensees. Incumbent operators must have certainty that they will be able to operate their satellite network as designed and will not be required to make unreasonable modifications to their operations that limit their ability to serve customers in the UK. The commitment to make reasonable efforts to share with future applicants cannot be a blank check that extends indefinitely into the future. While SES agrees an applicant must demonstrate its system flexibility and what capabilities it has to accommodate additional operators in the future, Ofcom cannot expect an applicant to fully anticipate what potential future NGSO services may look like and therefore the focus of its application review should be on a system's capability against a well-defined set of criteria. SES encourages Ofcom to conduct an additional consultation to assess the appropriate criteria to apply.

SES also agrees with the statement that "earlier licence applications should not have the ability to block later systems if it is reasonable for them to be able to coexist."<sup>2</sup> Clear license conditions can encourage incumbent system operators to engage in good faith coordination. But the consequences for failing to do so must also be clear. For example, in the United States, if two NGSO licensees are not able to reach a coordination agreement and actual interference occurs above a defined threshold, they are required to split the available spectrum during an in-line event, thereby penalizing both operators for their failure to coordinate their operations. With such a penalty, the operators are incentivised to reach an agreement. While incumbent operators must have certainty that they will be able to operate their satellite network as designed and will not be required to modify their operations in a way that limits their ability to serve customers and earn revenue in the UK, they may not be allowed to block new entrants by simply refusing to negotiate a coordination agreement. Ofcom should clarify the consequences<sup>3</sup> it will apply if an incumbent licensee refuses to coordinate in good faith.

While SES understands Ofcom's recommendation that the network license holder "have control over the whole satellite network (including the associated user terminals and gateway earth stations),"<sup>4</sup> Ofcom should consider options that allow NGSO service customers to hold earth

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<sup>2</sup> *Id.* at para. 4.7.

<sup>3</sup> With respect to gateway licenses, however, SES urges Ofcom to avoid consideration of geographic segmentation. There is simply not enough geography in the UK to apply such an approach particularly when operators may be able to coordinate the gateways. Geographic segmentation would encourage early applicants to "land grab" to limit competition. SES understands that, at some point, a location can reach saturation and no longer support additional gateway licenses. This would become apparent if or when a new applicant demonstrates that its successful operations come at an unreasonable cost to the services of existing licensees.

<sup>4</sup> *Consultation* at para. 4.23.

station licenses as well as the satellite operator. After the initial license is issued to the NGSO operator, the needs of Ofcom will be met. However, some customers prefer to control and license their own earth station networks and should have the option to do so in the UK.<sup>5</sup> Ofcom acknowledges that this approach is possible as it proposes to allow gateway licenses to be held by third parties as long as they are operating with a satellite system that is subject to a network license. The NGSO system operator can hold responsibility for coordinating with other operators while its customers hold their own network licenses.

Moreover, and with regard to managing interference, a study was submitted to WP-4A that described a methodology where one NGSO constellation could mitigate interference into another constellation using ephemeris information of that constellation.<sup>6</sup> The methodology does not require information about the other constellation's earth stations to manage interference. This suggests that customers with network licenses can still conform to interference management standards so long as the NGSO constellation it is communicating with also holds a network license and is managing the system-level interference through its coordination agreements.

**Question 4: Do you have any comments on the proposed updates to existing and new NGSO network licences?**

SES has concerns with the current proposed language of condition 2 to NGSO network licenses, which states:

The Licensee shall cooperate with all NGSO Licensees such that each satellite system (comprising the satellites, earth stations and user terminals) can co-exist and operate within the United Kingdom without causing harmful radio interference to each other, such that network services can be provided to end users.

Based on the explanation in paragraphs 5.13-5.15, the intent of the condition is to encourage the licensee to coordinate with other incumbents; however, that is not clear from the language. As it is written, the condition could be limited to cooperating on individual issues without mandating action that leads to a final coordination agreement.

As discussed above, the license conditions or other published guidance should clarify the consequence if a licensee fails to engage in good faith coordination discussions.

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<sup>5</sup> See Ofcom application form OfW564 ("Form OfW564"), "Application for the Issue or Variation of a Satellite (Non-Geostationary Earth Station) Licence," April 2016, [https://www.ofcom.org.uk/data/assets/pdf\\_file/0020/46532/ofw565.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0020/46532/ofw565.pdf) and "Licensing Procedures Manual for Satellite (Non-Geostationary Earth Station) Applications," ("Licensing Procedures Manual") January 2018, [https://www.ofcom.org.uk/data/assets/pdf\\_file/0028/78274/non-geo-licensing-procedures-manual.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0028/78274/non-geo-licensing-procedures-manual.pdf), as referenced at A.10, footnote 12 of the consultation document.

<sup>6</sup> See *Efficiency of the Pointing Avoidance Method to Facilitate Spectrum Sharing Between Non-GSO Constellations*, OneWeb, ITU Document 4A/383-E, at 29 (submitted 7 July 2021).

SES generally agrees with Ofcom's proposed conditions 3-5 but proposes the following revisions to better clarify the requirements.

3. In the event that **Ofcom is provided detailed evidence from a network licensee that –**

- a) ~~one (or more than one) of the NGSO Licensees~~ **it** suffers a material and recurring degradation of services to its **users stations** at a specific region or location in the United Kingdom; and
- b) the degradation of services is resulting from radio transmissions from the earth stations, the satellite or any other part of the satellite system operated by another of the NGSO Licensees, ~~including the Licensee~~;

Ofcom may ~~send a notice instruct~~ **send a notice instruct to** the **offending** Licensee **with instruction** to cease or change the use of particular equipment or particular radio frequencies which are authorised under a wireless telegraphy licence (including but not limited to radio frequencies authorised under this Licence) and are used by any part of the satellite system.

4. Any such cessation or change must be for the purposes of ensuring that such interference is avoided and the degradation of services to **stations users** at the particular regions or locations is resolved.

5. Following receipt of such notice, for such period of time as may be specified in the notice, the Licensee may only operate in accordance with the terms and conditions of the notice.

**Question 5: Do you have any comments on the proposed updates to existing and new NGSO gateway licences?**

SES generally agrees with Ofcom's proposed gateway license conditions 1-5 but proposes similar revisions to those proposed above.

3. In the event that **Ofcom is provided detailed evidence from a gateway licensee that –**

- a) ~~one (or more than one) of the NGSO Licensees~~ **it** suffers a material and recurring degradation of services to its **users stations** at a specific region or location in the United Kingdom; and
- b) the degradation of services is resulting from radio transmissions from the earth stations operated by the Licensee;

Ofcom may ~~send a notice instruct~~ **send a notice instruct to** the **offending** Licensee **with instruction** to cease or change the use of particular equipment or particular radio frequencies which are authorised under this Licence.

4. Any such cessation or change must be for the purposes of ensuring that such interference is avoided and the degradation of services to **stations users** at the particular regions or locations is resolved.

5. Following receipt of such notice, for such period of time as may be specified in the notice, the Licensee may only operate in accordance with the terms and conditions of the notice.

As noted above, SES does not agree with proposed condition 6:

The Licensee must establish, install and use the Radio Equipment to commence regular wireless telegraphy transmissions in accordance with the provisions of this Licence within twelve months of the date that this Licence is issued, and maintain such transmissions thereafter.

Ofcom would create a more stable regulatory environment if it allowed gateway licensees more flexibility to access the gateway spectrum they will need once the satellites are brought into operation. In order to protect against warehousing, Ofcom can limit the number of licensed but unbuilt gateways an operator can hold.

**Question 6: Do you agree with our proposal regarding NGSO terminals operating in Ka band?**

Yes.

SES understands that all satellite NGSO systems will become subject to a network license. We also note that Ofcom “want[s] NGSO terminals authorised under such a licence to be able to co-exist with other authorised NGSO systems (gateways or terminals), taking account of the ability of either party to make reasonable efforts to mitigate interference.”<sup>7</sup>

It should be clarified under which conditions this blanket license is authorising the deployment of user terminals and exempts individual NGSO terminals from coordination and licensing fees. The existing form for non-geostationary earth station licensing specifies a single site location (Form OfW564), and Ofcom’s Licensing Procedures Manual for non-geostationary earth stations each reference a single site location and does not otherwise provide clarity on license instruments for multiple earth stations related to a single network license.

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<sup>7</sup> Consultation at para. 4.7 b.