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# **Mangata Edge Ltd: application for non-geostationary earth station network licence**

Request for comments

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**CONSULTATION:**

Publication date: 20 September 2022

Closing date for responses: 18 October 2022

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# 1. Overview

Non-geostationary orbiting (NGSO) satellite systems are a new way of delivering broadband services from space using a constellation of satellites in a low or medium Earth orbit. These satellite systems have the potential to deliver higher speeds and lower latency services.

As set out in our statement on [non-geostationary satellite systems](#), we have a process for considering applications for the following types of spectrum licence:

- **Satellite (Earth Station Network):** this authorises an unlimited number of user terminals to connect to the NGSO system (subject to certain conditions). It also places certain conditions on the licence holder (typically a satellite operator) to coordinate with other licence-holders. We refer to this licence in the rest of this document as the “NGSO network licence”.
- **Satellite (Non-Geostationary Earth Station):** this authorises gateway earth stations, which connect the NGSO system to the internet or to a private network. We refer to this licence in the rest of this document as the “NGSO gateway licence”.

Ofcom received an application from Mangata Edge Ltd (“Mangata”) for an NGSO network licence for their NGSO system which is a combination of both a medium earth orbit (MEO) constellation and a highly elliptical orbit (HEO) constellation<sup>1</sup>. Details of these constellations can be found in their application.

The application is to cover their ground-based user terminals. The Mangata satellite system uses Ka band for both its terminals and gateways. It intends to use the frequencies 27.5 – 27.8185 GHz, 28.4545 – 28.8265 GHz and 29.5 – 30 GHz. Mangata has not applied for any gateway licences at the time of writing. Details of this application (reference: “MANGTA-NET-1”) can be found under the “Applications received” section of our [website](#).

Mangata is proposing to provide high-speed satellite broadband services to consumers, businesses, aircrafts for inflight connectivity, and ships/vessels through their user terminals. Mangata also plans to provide heterogeneous network backhaul, IoT connectivity and micro data centres, which will extend the cloud to the edge of the network.

When considering applications for these licences, amongst other considerations, we take account of their impact on technical coexistence and competition on existing and future NGSO systems. We also publish and invite comments on applications that we are considering authorising. Further information about the process and how to respond to licence applications can be found in our [non-geostationary satellite earth stations licence guidance](#).

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<sup>1</sup> According to [Recommendation ITU-T Y.3200](#), medium earth orbit (MEO) satellites operate with altitude ranging from 8,000 km to 20,000 km; and highly elliptical orbit (HEO) satellites operate with a range of operational altitudes between 7,000 km and more than 45,000 km.

## Consultation: Mangata NGSO network application

At the time of writing, there are two satellite operators holding NGSO network licences. These permit the licence-holder to operate in both the Ku band (14.0 – 14.25 GHz) and Ka band (27.5 – 27.8185 GHz, 28.4545 – 28.8265 GHz and 29.5 – 30 GHz). These operators are:

- a) Network Access Associates Ltd (a subsidiary of OneWeb); and
- b) Starlink Ltd (a subsidiary of SpaceX)

These operators deploy terminals in the Ku band. Details of these licences can be found on the “Existing licences” section of our [website](#).

We have also received an application for an NGSO network licence from Telesat. Telesat plans to operate both gateways and terminals in the Ka band. Details of this application can be found under the “Applications received” section of our [website](#).

We are publishing this document to invite comments on the application and on our preliminary views. We will take into account all comments received and we are open to changing those views depending on responses and evidence submitted to us as part of this process.

The deadline for comments is 5pm on 18 October 2022.

### What we are proposing – in brief

This document sets out Ofcom’s proposal to grant a NGSO network licence to Mangata Edge Ltd for the Mangata Networks constellation. Details of the application (reference: MANGTA-NET-1) can be found under the “Applications received” section of our [website](#).

We invite comments on our proposal by 18 October 2022.

We will consider any responses to this consultation before reaching a final decision on whether to grant a licence to Mangata Edge Ltd.

The overview section in this document is a simplified high-level summary only. The proposals we are consulting on and our reasoning are set out in the full document.

## 2. Assessment of application

- 2.1 In this section we consider the coexistence and competition aspects of the licence application. We outline relevant parts of the application and indicate where we would value input from stakeholders. We encourage stakeholders to read the full application.

### Description of the system

- 2.2 Mangata's constellation will initially consist of:
- a) 791 satellites distributed in 27 MEO planes with inclinations between 45-52.5 degrees; and
  - b) 32 HEO planes with inclinations of 63.4 degrees, for global coverage.
- 2.3 More information regarding the architecture of this constellation, including the altitudes (perigee and apogee) can be found in the application (reference: "MANGTA-NET-1") under the "Applications received" section of our [website](#).

### Coexistence

- 2.4 When issuing new licences, one of Ofcom's objectives is that all authorised systems are capable of coexisting (in frequency bands they are using in common), such that they are all able to provide services to their users without experiencing harmful interference.
- 2.5 When applying for a licence, we ask applicants to demonstrate:
- a) coexistence with existing systems: applicants must demonstrate how coexistence is possible between their NGSO system and:
    - i) existing NGSO systems that are already licensed in the UK;
    - ii) NGSO systems for which an application has been made and which has been published for comment;
    - iii) Other specific co-frequency earth stations registered with the ITU; and
  - b) an ability to coexist with future NGSO systems: applicants should state what flexibility their system has to achieve coexistence with future systems. This could include the measures they would be able to put in place if another system comes along in the future; it could also suggest measures future systems could reasonably be expected to put in place in order to coexist.

### Coexistence with existing systems

- 2.6 With respect to existing licensees, at the time of writing, Mangata has not reached coordination agreements with any of these companies but has outlined in their application how they plan to coexist with existing licensed operators. They state:

“We are currently initiating discussions with the operators of Existing NGSO Systems with a view to reaching detailed frequency coordination agreements”.

“These coexistence assessments...show the feasibility of coexistence between Mangata NGSO satellite system and the Existing NGSO Systems with a minimal impact on unavailability and throughput of such systems”.

“If for any reason we find that lookaside approach doesn’t offer for the required coexistence, then the opportunity exists for reaching required coexistence by deploying other available mitigation techniques, namely avoidance of overlapping frequency bands and use of opposite polarisation”.

2.7 More detailed information regarding the likely impact of their service on existing licensed services in terms of throughput and unavailability can be found in Mangata’s application. Lookaside is a form of interference mitigation whereby an earth station points to a different satellite within its network when the satellite of another network approaches the same area of sky.

2.8 We have received an application for an NGSO Earth station network licence from Telesat, as mentioned in the overview section above. In its application, Mangata demonstrated the expected coexistence of their system with a future Telesat system by carrying out a technical assessment using the same lookaside technique.

2.9 With respect to specific co-frequency earth stations registered with the ITU, Mangata has stated the following:

“Mangata NGSO system’s capability to offer protection these earth stations has been notified to the operator of these earth stations. Further, we give our assurances on providing required protection by deploying necessary technical and operational measures with our Mangata NGSO system”.

2.10 Our preliminary view is that Mangata should be able to coexist with existing NGSO licence holders with the approach described. However, we note the early stage of the coordination discussions. We encourage all parties to coordinate in good faith between now and the launch of Mangata’s constellation.

Question 1: Do you anticipate the NGSO system in the application will pose coexistence challenges to existing systems?

## Coexistence with future systems

2.11 As outlined in our statement [Non-geostationary satellite systems – licensing updates](#), we want to enable as many NGSO systems as possible, to provide services and increase choice for people and businesses in the UK. We therefore anticipate additional applications for NGSO licences in the future to support other NGSO systems in the UK.

- 2.12 Although we do not expect applicants to foresee the characteristics or the number of systems that will be subject to a future licence application in the UK, we require applicants to:
- a) explain how their existing network design and operating model might facilitate coexistence with future NGSO satellite systems and any limitations; and
  - b) outline any additional measures, which would allow improved coexistence with future systems.
- 2.13 We also ask applicants to be aware that they may be expected to take reasonable measures to accommodate such future systems, in order to avoid material degradation to services in the UK.
- 2.14 Mangata proposes in its application to manage coexistence with existing and future systems through the use of alternative satellites and avoidance angles to avoid in-line events. The exact procedure for avoiding in-line events would be negotiated during coordination discussions. In their application, they state that:

“The lookaside approach should offer a suitable interference mitigation for future NGSO systems as long as the concerned NGSO satellite systems are designed in such a way to offer at least one alternative satellite within the field of view of the earth station (UT or GW<sup>2</sup>)”.

“If for any reason we find that lookaside approach doesn’t offer for the required coexistence, then the opportunity exists for reaching required coexistence by deploying other available mitigation techniques, namely avoidance of overlapping frequency bands and use of opposite polarisation”.

- 2.15 We are interested in obtaining comments on Mangata’s plans to coexist with future systems. Our initial view is that the techniques described by Mangata in their application to avoid in-line events, along with other interference mitigation techniques should be sufficient to enable coexistence with future systems.

Question 2: Are the measures set out by the applicant to enable coexistence with future systems reasonable?

## Competition

- 2.16 Our competition assessment takes the statement on NGSO licensing updates as a starting point but is not limited in scope or level of detail to the assessment set out in the statement.

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<sup>2</sup> “UT” here refers to a User Terminal and “GW” refers to a Gateway.

- 2.17 As outlined in the approach to competition in Annex 3 of our [statement on NGSO licensing updates](#), our initial position with any competition check is to authorise applications, where possible. We have outlined that we take into account four factors:
- a) the extent of the likely risks to competition;
  - b) the potential benefits from granting NGSO licence applications;
  - c) ensuring that time and resources devoted to the licensing process are proportionate to the risks and benefits; and
  - d) that NGSO services are currently in their infancy.
- 2.18 We have outlined below a preliminary assessment of some of the risks and benefits of granting a non-geostationary earth station network licence to Mangata.

## Risks to competition

- 2.19 In the Statement, we explained that:

“...in principle competition concerns could arise from the constraints that systems operating under a network licence might impose on subsequent entrants due to the technical barriers to coexistence between systems (e.g. due to a lack of flexibility in the design of systems). If there was a limited prospect of the applicant’s system and future systems being able to technically coexist, then this could form a barrier to future entry to the market. This would be a particular concern if it results in market power. However, the magnitude of this risk is currently unclear”.

- 2.20 We set out below three potential and general risks to competition from granting a non-geostationary earth station network licence, as well as our preliminary assessment regarding the specifics of Mangata’s application.

### **Potential risk 1: User terminals create interference concerns for existing NGSO user terminals and/or gateways, resulting in weakened competition and worse outcomes for consumers**

- 2.21 A network licence allows the licence holder to deploy user terminals anywhere in the UK. This creates a risk that a user terminal placed close to existing user terminals and/or gateways of current operators would increase the likelihood of interference. This could lead to worse outcomes for consumers in terms of reduced quality of service by one or more operators.<sup>3</sup> If the quality of service of one or more satellite operators deteriorated to the point that they became ineffective competitors, this could lead to reduced choice and worse quality of service and/or higher prices for consumers.
- 2.22 Ofcom’s preliminary assessment is that coexistence between Mangata’s proposed system and existing NGSO systems is possible. Since the competition concerns outlined above

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<sup>3</sup> Such a degradation of service quality could apply to both Mangata and the existing operator or operators.



would be caused by interference, our preliminary view is that potential competition risk 1 is unlikely.

**Potential risk 2: User terminals are unable to coexist with future NGSO systems, creating a barrier to entry to the market and in turn restricting competition**

2.23 Similar to the above, there is a risk that a new NGSO system – and in particular its deployment of user terminals around the UK – imposes constraints on subsequent entrants due to technical barriers to coexistence between its system and future systems. This could form a barrier to future entry to the market, reducing competition and consumer choice, leading to worse outcomes for consumers.

2.24 Ofcom’s preliminary assessment is that coexistence with future NGSO systems by Mangata is possible. Since the competition concern outlined above would be created by an inability to coexist with future systems, our preliminary view is that potential competition risk 2 is unlikely.

**Potential risk 3: Operators not coordinating in good faith could hinder the ability of current and future operators to provide their service**

2.25 As a general point, operators not coordinating in good faith could hinder the ability of current operators to provide their service. This could also create uncertainty for potential entrants and thereby act as a barrier to entry, leading to a lessening of competition.

2.26 Our statement highlights “the importance of all operators, regardless of their filing date, working in good faith to reach coordination agreements.” Should operators fail to coordinate in good faith, we could use our enforcement powers to remedy an issue. On this basis, our preliminary assessment is that Ofcom is equipped through its enforcement powers to remedy situations in which one or more operators fail to coordinate in good faith. This should alleviate any concerns over the potential for competition risk 3 to materialise in relation to Mangata’s application.

**Benefits**

2.27 As described in our approach to competition:

“A network licence is necessary for an operator to deploy user terminals in the UK... Granting NGSO network licence applications is thus likely to benefit customers and consumers and supports Ofcom’s strategic priority to get everyone connected (see above). Since issuing a new network licence allows market entry it also has the potential, if a service is deployed, to promote greater competition (assuming that it can coexist with other authorised systems).”

2.28 Mangata is proposing to provide high-speed satellite broadband services to consumers, businesses, aircrafts for inflight connectivity, and ships/vessels through their user terminals. Mangata also plans to provide heterogeneous network backhubs, IoT connectivity and micro data centres, which will extend the cloud to the edge of the

network. Extending the cloud to the edge of the network means Mangata plans to move the computing and storage of the cloud closer to the user. Computing at the edge of the network reduces latency.

- 2.29 As a consequence, our preliminary view is that this Mangata system has the potential to provide services that would supply more connectivity options to consumers in the UK, in addition to those of the existing NGSO licence holders.

Question 3: Do you believe the NGSO system in the application would benefit or harm future competition between NGSO services in the UK? Please provide details.

## Other concerns

- 2.30 Coexistence and competition are the two issues on which we expect to make our licensing decisions (as set out in the NGSO Licensing updates Statement).

Question 4: Do you have any additional concerns or comments regarding the application?

## Our proposal

- 2.31 Taking the evidence presented by Mangata and our assessment of the risks and benefits of granting this licence application, we propose to grant Mangata's application for a NGSO network licence.

## 3. Next steps

- 3.1 Details of the application are available under the “Applications received” section of [our website](#). We welcome comments on the application by 5pm on 18 October 2022. Responses should be submitted electronically to [ngso.licensing@ofcom.org.uk](mailto:ngso.licensing@ofcom.org.uk), using the response form indicated in Annex 1.
- 3.2 Following this consultation period, we will review responses. We aim to publish a statement setting out our decision in November 2022.

# A1. Responding to this consultation

## How to respond

- A1.1 Ofcom would like to receive views and comments on the issues raised in this document, by 5pm on 18 October 2022.
- A1.2 You can [download a response form](#) from the Ofcom website. You should return this by email to the address provided in the response form.
- A1.3 If your response is a large file, or has supporting charts, tables or other data, please email it to [ngso.licensing@ofcom.org.uk](mailto:ngso.licensing@ofcom.org.uk) together with the [cover sheet](#).
- A1.4 To ensure we can receive and assess all comments in a timely manner, we will not accept applications via post. We welcome responses in formats other than print, for example an audio recording or a British Sign Language video. To respond in BSL:
- send us a recording of you signing your response. This should be no longer than 5 minutes. Suitable file formats are DVDs, wmv or QuickTime files; or
  - upload a video of you signing your response directly to YouTube (or another hosting site) and send us the link.
- A1.5 We will publish a transcript of any audio or video responses we receive (unless your response is confidential).
- A1.6 We do not need a paper copy of your response as well as an electronic version. We will acknowledge receipt of a response submitted to us by email.
- A1.7 You do not have to answer all the questions in the consultation if you do not have a view; a short response on just one point is fine. We also welcome joint responses.
- A1.8 It would be helpful if your response could include direct answers to the questions asked in the consultation document. The questions are listed at Annex 4. It would also help if you could explain why you hold your views, and what you think the effect of Ofcom's proposals would be.
- A1.9 If you want to discuss the issues and questions raised in this consultation, please contact Elizabeth Quintana by email to [ngso.licensing@ofcom.org.uk](mailto:ngso.licensing@ofcom.org.uk).

## Confidentiality

- A1.10 Consultations are more effective if we publish the responses before the consultation period closes. In particular, this can help people and organisations with limited resources or familiarity with the issues to respond in a more informed way. So, in the interests of transparency and good regulatory practice, and because we believe it is important that everyone who is interested in an issue can see other respondents' views, we usually publish responses on [the Ofcom website](#) at regular intervals during and after the consultation period.

- A1.11 If you think your response should be kept confidential, please specify which part(s) this applies to, and explain why. Please send any confidential sections as a separate annex. If you want your name, address, other contact details or job title to remain confidential, please provide them only in the cover sheet, so that we don't have to edit your response.
- A1.12 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and try to respect it. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.
- A1.13 To fulfil our pre-disclosure duty, we may share a copy of your response with the relevant government department before we publish it on our website. This is the Department for Business, Energy and Industrial Strategy (BEIS) for postal matters, and the Department for Culture, Media and Sport (DCMS) for all other matters.
- A1.14 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's intellectual property rights are explained further in our [Terms of Use](#).

## Next steps

- A1.15 Following this consultation period, Ofcom plans to publish a statement in November 2022.
- A1.16 If you wish, you can [register to receive mail updates](#) alerting you to new Ofcom publications.

## Ofcom's consultation processes

- A1.17 Ofcom aims to make responding to a consultation as easy as possible. For more information, please see our consultation principles in Annex 4.
- A1.18 If you have any comments or suggestions on how we manage our consultations, please email us at [consult@ofcom.org.uk](mailto:consult@ofcom.org.uk). We particularly welcome ideas on how Ofcom could more effectively seek the views of groups or individuals, such as small businesses and residential consumers, who are less likely to give their opinions through a formal consultation.
- A1.19 If you would like to discuss these issues, or Ofcom's consultation processes more generally, please contact the corporation secretary:
- Corporation Secretary  
Ofcom  
Riverside House  
2a Southwark Bridge Road  
London SE1 9HA  
Email: [corporationsecretary@ofcom.org.uk](mailto:corporationsecretary@ofcom.org.uk)

## A2. Ofcom's consultation principles

### Ofcom has seven principles that it follows for every public written consultation:

#### Before the consultation

- A2.1 Wherever possible, we will hold informal talks with people and organisations before announcing a big consultation, to find out whether we are thinking along the right lines. If we do not have enough time to do this, we will hold an open meeting to explain our proposals, shortly after announcing the consultation.

#### During the consultation

- A2.2 We will be clear about whom we are consulting, why, on what questions and for how long.
- A2.3 We will make the consultation document as short and simple as possible, with an overview of no more than two pages. We will try to make it as easy as possible for people to give us a written response.
- A2.4 We will consult for up to ten weeks, depending on the potential impact of our proposals.
- A2.5 A person within Ofcom will be in charge of making sure we follow our own guidelines and aim to reach the largest possible number of people and organisations who may be interested in the outcome of our decisions. Ofcom's Consultation Champion is the main person to contact if you have views on the way we run our consultations.
- A2.6 If we are not able to follow any of these seven principles, we will explain why.

#### After the consultation

- A2.7 We think it is important that everyone who is interested in an issue can see other people's views, so we usually publish the responses on our website at regular intervals during and after the consultation period. After the consultation we will make our decisions and publish a statement explaining what we are going to do, and why, showing how respondents' views helped to shape these decisions.

## A3. Consultation coversheet

### BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

### CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing

Name/contact details/job title

Whole response

Organisation

Part of the response

If there is no separate annex, which parts? \_\_\_\_\_

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If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

### DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom aims to publish responses at regular intervals during and after the consultation period. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.

Name

Signed (if hard copy)

## A4. Consultation questions

A4.1 We are seeking comments from stakeholders on the application for a NGSO network licence in relation to the following questions:

Question 1: Do you anticipate the NGSO system in the application will pose coexistence challenges to existing systems?

Question 2: Are the measures set out by the applicant to enable coexistence with future systems reasonable?

Question 3: Do you believe the NGSO system in the application would benefit or harm future competition between NGSO services in the UK? Please provide details.

Question 4: Do you have any additional concerns or comments regarding the application?