

## Your response

Question	Your response
<p><b>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?</b></p>	<p>As highlighted in the consultation document, the NGSO sector is booming thanks to New Space technologies that allow for a steep decrease in satellite industry costs (launchers, hardware miniaturization, software defined radio, etc.).</p> <p>In its strategy document, OFCOM highlights the importance taken by mega constellations, Earth Observation and broadband connectivity in this new landscape.</p> <p>Kinéis would like to draw the OFCOM attention to its own constellation that brings additional trends which require OFCOM to take urgent action to review UK authorisation framework that will enable the service deployment in the UK to the benefit of UK users, industry, and scientific community.</p> <p><b>1. In terms of Kinéis payloads</b></p> <ul style="list-style-type: none"><li>a. The system encompasses the new space features which bring new connectivity links in MSS for space IoT applications. This is a key market that has been developing in the last decade by terrestrial operators both in licensed and unlicensed bands that require coverage continuity in isolated area but also on a worldwide basis to ensure equipment and solution reuse brought by a complementary satellite link.</li><li>b. New VHF reception has been added to provide value added services to the maritime sector based on the treatment of VHF AIS signals.</li><li>c. As the ARGOS operator, Kinéis satellites carry EESS payloads to support the ARGOS continuity of service, as most of the existing ARGOS satellites will reach their end-of life in the coming years and will not be replaced entirely with the ARGOS-4<sup>th</sup> generation program. The end-users of ARGOS data collection platforms will also benefit from the improved quality of service provided by</li></ul>

the Kinéis constellation (larger EESS capacity, new modulations, near real-time experience, etc.). Finally, the ARGOS/EESS community will benefit from the ecosystem enabled by the industrial IoT that are developing UHF solutions and devices.

## **2. In terms of Kinéis in-orbit infrastructure**

The overall in-orbit infrastructure of the Kinéis constellation has been developed with a spirit to optimize resources and with space sustainability in mind:

- a. Kinéis has developed, with its partners, nanosats capable of supporting the 3 missions described above in a 16-U / 30kg configuration. This robust configuration has been designed to support an 8-year life expectancy. This is a challenge not met by many New Space operators and that promotes space sustainability by deploying optimizes capacity for an extended life expectancy.
- b. Kinéis has chosen to deploy in a Sun-Synchronous Orbit 5 planes, with 5 satellites per plane. This 25-nanosatellite constellation has been designed to optimize the use of the resources, while being able to satisfy mission requirements and customers' expectancy. The Poles coverage is indeed critical to ensure mission dedicated to environmental monitoring and also to provide connectivity in challenged areas.
- c. Finally, Kinéis selected Rocket Lab for its 5 dedicated launches. The proven accuracy and reliability of Electron's Kick Stage in successfully deploying 100+ satellites to date were decisive factors in Kinéis selecting Rocket Lab as its launch partner. The Kick Stage will act as an orbital transfer vehicle to deliver each satellite in the Kinéis constellation to their precise orbital planes at a 650km altitude, allowing Kinéis to avoid sacrificing spacecraft mass for propulsion and to begin a fully operational service as quickly as possible.

## **3. In terms of applications**

While recognizing the importance of broadband and Earth Observation in the recent developments of NGSO technologies, Kinéis wishes to highlight two key applications that should be taken into consideration by OFCOM.

- *ARGOS Data Collection Platforms*

First of all, the ARGOS program has been in operation for decades and has been supporting environmental applications in multiple domains. Ranging from wildlife monitoring program to oceanography, ARGOS has demonstrated its importance for climate change monitoring to the scientific communities. For a long time, it was the only alternative for native location and data collection solutions to such applications. As the ARGOS operator, Kinéis' constellation ensures the continuity and improvement of the ARGOS service.

- *Space IoT*

Secondly, Kinéis is entering a new market for space IoT applications that will rely on MSS for connectivity solutions in UK waterlines, bridging the digital gap in isolated area, for complementing terrestrial connectivity, for ensuring continuity of cross-border services in various sectors (industrial, maritime, asset tracking, mining, etc.).

ARGOS-Kinéis boasts many UK users who have deployed around 2,000 ARGOS data collection platforms for national and international programs around Earth science, Meteorology, Oceanography and Wildlife.

- Conservation organizations (e.g. Zoological Society of London, Marine Biological Association, Highland Foundation for wildlife);
- Universities (e.g., Cardiff, Oxford, Exeter, Leeds, Durham);
- Research centers (e.g., British Antarctic Survey, NOCS);
- Government offices (e.g., MET OFFICE, Jersey, Ascension Island).

	<p>Other stakeholders have expressed interest in Kinéis’ double connectivity service (MSS and/or EESS) for their current projects. As an example, UK-based Arribada co-develops open, customizable and impact-driven technologies for conservation organizations across the globe and is planning to integrate ARGOS-Kinéis’ connectivity into their solutions.</p> <p><b>To summarize, data collection and space IoT are playing a critical part in climate change monitoring and the protection of the environment. Indeed, the MSS/EESS connectivity provide solutions to better manage resources across all sectors as they enable better decision making and corrective implementation.</b></p> <p><b>Finally, ARGOS data collection is a space-enabled connectivity that, by design, complements Earth observation and can bring crucial additional data to the scientific community.</b></p>
<p><b>Question 2: Do you agree with the broad areas we have prioritised for our work?</b></p>	<p>Broad areas should include narrow band communication, such as the MSS space IoT and EESS data collection platforms.</p> <p>These types of communication optimise the use of spectrum and answer unique needs which cannot be covered through other technologies. For instance, the monitoring of wild animals by Argos is critical for the study of biodiversity. The use of sensors in agriculture as mentioned in the consultation is also recognised as valuable. Kineis-connected sensors can support stakeholders in their net zero strategy. Fighting climate change will require the gathering of data and its combination with different sources such as Earth Observation imagery highlighted in the consultation. Those two sets of data provide fast and useful information and can also transfer actions in a cost-effective remote manner.</p>
<p><b>Question 3: Are there other issues and actions that are likely to be important over the next 2 – 4 years?</b></p>	<p><b>ARGOS data collection platforms</b></p>

Following its designation as CNES Agent, in 2019, Kineis has become the operator of the ARGOS satellite system, operational since the 80's. ARGOS is an international scientific project managed by different government agencies, i.e., the French space agency CNES, EUMETSAT (Europe), NOAA (USA) and ISRO (India).

Such ARGOS system utilises data capture sensors for scientific purposes, such as for weather monitoring, bird/animal location/migration and the monitoring and protection of the environment. The ARGOS system is described in the Recommendation ITU-R SA.2045.

The Recommendation ITU-R SA.2045 considers the basic general partitioning and sharing conditions for the band 401-403 MHz for future long-term coordinated use of data collection systems on geostationary and non-geostationary MetSat and Earth exploration-satellite service systems.

For the frequency allocation EESS (Earth-to-space) 401-403 MHz, UK should authorize EESS spectrum allocation in 401-403 MHz (Earth-to-space) to be used for ARGOS data capture equipment. The format of the authorization should enable to the deployment of many hundreds of data collection platforms, which could also be attached on a moving platform (e.g. wildlife, buoy, etc.).

This could be achieved through the endorsement of government and scientific users or by specific licensing (see the waiver scheme implemented by the FCC for Kinéis EESS use in the USA). It is worth mentioning that ARGOS third and fourth generation satellites provide a downlink in the secondary allocation EESS (space-to-Earth) 460-470 MHz band (see ITU RR No. 5.289).

#### **MSS Connectivity in UHF**

The MSS allocation in bands 399.9-400.05 MHz and 400.15-401 MHz is subject to new system developments with deployment across the CEPT as provided by the recent updates of ERC Decisions (99)05 and (99)06. From these decisions, the technical information supporting the general authorisation regime and that has been endorsed by CEPT as compliant with European spectrum requirements:

- Satellite systems can share the frequency allocations
- Kinéis terminals are CE marked and operate at very low power and present low interference potential, i.e.
  - Band 399.9-400.05 MHz:
    - A very low EIRP per radio emission: typical -9 to 0 dBW, max 5 dBW;
    - Intermittent transmissions of 1 second burst / when satellite is overhead;
    - Very low duty cycle: between 0.01 to 0.3%;
    - Low bandwidth/low data rate: 4-20 kHz;
    - A data packet of a few bytes;

	<ul style="list-style-type: none"> <li>○ Band 400.15-401.0 MHz <ul style="list-style-type: none"> <li>▪ Kinéis is operating a narrow band downlink that allows for spectrum sharing</li> </ul> </li> </ul>
<p><b>Question 4: Do you have any evidence on whether specific actions should be a high priority?</b></p>	<p>Firstly, a high-priority should be given to opening the spectrum of Kineis to a license-exempt regime because of the current availability of the service over the UK and the imminent launch of complementary capacity that is the result of heavy investments raised to improve the quality of the service by Kinéis and the ARGOS founding institutions:</p> <ul style="list-style-type: none"> <li>• ARGOS-4th generation launches in 2022: HoPS (US/NOAA) and OCEANSAT-3 (India/ISRO); (2 METOP-SG in EUMETSAT in the coming years)</li> <li>• Kinéis launches are scheduled in 2023.</li> </ul> <p>Secondly, while the ECC Decision (99)06 is placed on a 2-year revision cycle, the updated decision has been approved and includes Kineis' system. It is being implemented in many CEPT countries already.</p> <p>Thirdly, the UK downstream ecosystem (including those listed in Q1) is very advanced in both national and export markets and will further thrive and seize new opportunities thanks to Kineis' space system, and this in turn will create more job opportunities in the UK, serve consumers and will better scientific research around environmental issues.</p>
<p><b>Question 5: Do you have any other issues you wish to comment on?</b></p>	<p>As the risk of interference is very low (see below), Kinéis suggests minimising the licensing burden</p> <ul style="list-style-type: none"> <li>• from the applicable regime : exemption from individual license or a light touch network license is to be preferred</li> <li>• to any Earth station/terminal individual licensing.</li> <li>• to the cost: not cost or a minimal fee should be sought as the MSS band is shareable between multiple operators as shown by CEPT analysis (ref.) and the space IoT market business model is relying on low-cost solutions</li> </ul> <p>The very low interference potential to other services using the same frequency band is achieved thanks to Kinéis' use of the bands:</p> <ul style="list-style-type: none"> <li>• satellite terminals operate with a very low EIRP per radio emission (Max: 5 dBW; Typical: -9 dBW to 0 dBW);</li> <li>• No continuous transmissions (1sec. burst) with a very low duty cycle (generally between 0.01 to 0.3%);</li> <li>• Low bandwidth/Low data rate: 4 to 14 kHz; A data packet of a few bytes.</li> </ul>

<p><b>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?</b></p>	<p>We are pleased to see that OFCOM mentions the MSS NGSO communication systems below 1 GHz in paragraphs 6.65-6.73, of the proposed space spectrum strategy. We welcome the openness of OFCOM to change and suggest that OFCOM goes further and aligns with the CEPT decisions (see Q5), forum in which the UK is actively participating.</p> <p>We should note that the CEPT framework of decisions is already approved and adopted in many CEPT countries. New versions of the decisions are published and include the description of the Kinéis system as one of the systems endorsed by the CEPT as in compliance with the decisions.</p> <p>As presented in Q5, the Kinéis use of the EESS is directly linked to its designation as the ARGOS operator a worldwide programme in orbit and in service for more than 40 years and that will benefit from the upcoming Kinéis constellation deployment. We then actively encourage OFCOM and other Crown Bodies to implement the ITU Recommendation R-2045 in the UK and facilitate the deployment of these services in UK by authorising Kinéis to operate the band.</p>
<p><b>Question 7: Do you have any evidence on whether specific actions relating to NGSO communication systems should be a high priority?</b></p>	<p>Idem question 4</p>
<p><b>Question 8: Do you have any other comments relating to NGSO systems?</b></p>	<p>The importance of data is critical in a number of activities, including the measurement of impact of climate change, the opportunity for efficient asset management and other environmental and business uses. These data are collected by data collection platforms and IOT systems. Terrestrial IOT systems are now quite common, and while space IOT is not new, the optimisation of the use of spectrum brought by the proposed use of MSS and EESS bands offer an opportunity to develop new services and applications for the benefits of consumers (e.g., air quality, enabled agriculture, weather data, biodiversity monitoring) and represent a strong opportunity for the commercialisation of downstream applications and services by UK service providers, providing the potential for the creation of jobs and business opportunities, while supporting government strategies such as net zero, climate change monitoring, and critical infrastructure monitoring.</p>