Your response

Question	Your response
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?	On the assumption that the order in which they are presented in Section 3 of the Consultation Document, Methera acknowledges that Ofcom has captured all the trends relevant to the space sector at this time. Methera would add that in some areas identified by Ofcom, it cannot be

	underestimated how significant a role satellite could, and should, be expected to play: • Voice call restoration after PSTN switch off, even in developed nations, including rural parts of the UK. • Disaster Relief and Emergency Situations, and sadly, current tragic events serve as a reminder to our community how crucial and relevant satellite is.
Question 2: Do you agree with the broad areas we have prioritised for our work?	No. Ofcom has not prioritised Disaster & Emergency situations citing, as a justification, that satellite systems already have available bandwidth for this purpose. The heading is a broad one, and recent events in Ukraine have quickly highlighted the role which non-Geostationary satellites can play to overcome the shortage of bandwidth in conventional GEO orbit. Methera would urge Ofcom to reconsider including this area in its prioritisation list. Ofcom has rightly included Communications in its list of priorities. Internet access has become as essential and necessary today as access to telephony became in the 20th century. For many households today, even in developed countries with good infrastructure, voice calling using PSTN remains their only communications option – proximity (or not) to 4G/5G base stations and the prohibitively huge cost of fibre digging/laying could see comms options for those households worsening after a PSTN switch off. Ofcom also identifies the challenges to new satellite operators in new (non GSO) orbits centred on sharing spectrum with (a) each other and (b) incumbents. The industry looks to Ofcom to ensure a path to addressing these challenges is fair and open, not based on a pecking-order approach and which does not close the door to latecomers, and which is not based on spectrum partitioning.

Question 3: Are there other issues and actions that are likely to be important over the next 2 – 4 years?	The roll-out of 5G services in mm Wave bands which are shared with space will continue and is likely to accelerate and the noise floor "seen" by payload "front-ends" will undoubtedly rise. Expert commentators' views vary as to the actual impact of this, and so the satellite community will come to rely on regulators caution in approving such rollouts unless they are satisfied that their space-bound emissions will be limited.
Question 4: Do you have any evidence on whether specific actions should be a high priority?	Ofcom refers to imposing additional conditions on UK authorised equipment and Methera applauds this. By its very nature however, satellite is global, and many satellite operators, such as ourselves, will be looking to deploy on a worldwide basis, and in territories for which the same approach will be just as crucial. There are significant numbers of NGSO terminals already in use globally, for some of which, the specifications are understood to fail to meet the additional conditions deemed by Ofcom to be imposed. Methera would ask firstly what approach Ofcom would take to imposing such, and secondly, how it may exert influence globally to ensure similar approaches are adopted by all.
Question 5: Do you have any other issues you wish to comment on?	Space Hardware. It is estimated there are currently over 28,000 pieces of hardware from active satellites to spent upper stages) in space with 2021 seeing deployments of over 1,400 new items. Space debris is of concern, and Methera welcomes initiatives to deal with this, including a slowing down of the rate of ongoing deployments. It is understood and accepted that MEO and HEO systems typically operate with two orders of magnitude fewer satellites than constellations in LEO, and for this (and other) reason(s), MEO and HEO networks should be given greater consideration in all NGSO work packages and studies. Reference ESA
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?	Firstly, Methera would like to raise the point that although the Ofcom consultation document uses the all-capturing term "Non-Geostationary" (or "NGSO"), the text throughout the document is almost wholly written around Low Earth Orbit ("LEO")

	systems, and in fact, Table includes six constellation examples all of which are LEO – no MEO nor HEO systems are referenced, and as stated in our response to Question 2, the challenges related to spectrum sharing, particularly around NGSO systems sharing with other NGSO systems absolutely must look at all options, for example: • MEO into LEO • MEO into other MEO • LEO into MEO • HEO into MEO Examples of MEO systems either in-service or in build (ITU approved) include O3B, mPower, Methera, Mangata and of course many GNSS systems. The benefits of course with MEO is because of their relatively low sky transit times, they are much easier to track with low-cost antenna systems as well as being able to deliver superior coverages with far fewer satellites, and with relatively infrequent (several hours) handovers - the MEO range of altitudes are in the so-called "Goldilocks" zone (also worth noting that MEO altitudes, in most cases, are preferable to LEO for PNT solutions). Ofcom is clear that it wants (section 6.12) as many NGSO systems as possible, and Methera supports this. Ultimately a supply/demand equilibrium will be reached depending on numbers of operators and numbers of markets/market sizes. The ITU, Ofcom and other regulators however cannot and should not be the bodies who influence this settling point and so methods of co-existence which are fair to all must be developed, agreed, and implemented. In-line conjunction events will be quite different for Gateways and User-Terminals. Whilst at the peak of an in-line event, the inter-system interference (NGSO1 to NGSO2) will result in a temporary and short-lived mutual degradation to service quality (possibly even a brief outage), it is what happens either side of such event which we must address. Adherence to standards, and increasingly stringent design specifications, such as off-axis performance,

	cross-polar discrimination, and out-of-band rejection, is key to minimising (both in intensity and duration) the pre- and post- periods either side on an in-line event. Whilst the industry should always embrace new technology developments, it should be cautious about resulting compromises to performance, in particular to radiation patterns of non-parabolic antenna systems. This is of far greater, albeit not exclusive, relevance to User Terminals than to Gateways. Ofcom refers in Annex 2, section 2.5 to this - Methera would urge Ofcom to take an urgent and pro-active role to look at equipment performance standards associated with User Terminals and gateways. Again, as a comment, Ofcom must consider systems such as MEO and HEO as a part of the NGSO catch-all in its thinking. Specifically with reference to Annex 2, Section 2.8, Ofcom refers to some possible techniques which may be adopted at and either side of in-line events, including temporarily frequency shifting. Of course, there will never be any spectrum "in reserve" and so in practice, such an approach will result in reduced throughput during in-line events, which is understood and accepted but which of course allows full spectrum access at other times, and which is a preferred approach to that of frequency partitioning.
Question 7: Do you have any evidence on whether specific actions relating to NGSO communication systems should be a high priority?	For NGSO operators with current filings there is already significant daily e-mail correspondence from national regulators/administrations representing not just licenced satellite operators, but from those requesting (or even planning to request) new ITU allocations. The volume of work is already high, and Methera urges Ofcom to take a proactive role within the ITU to explore, develop and champion pragmatic methods to enable co-existence between satellites in NGSO systems and in GSO systems. [✂]
Question 8: Do you have any other comments relating to NGSO systems?	As previously stated, the markets and their size and the number of satellite operators will ultimately find its own supply & demand

	equilibrium. The number of operators should not and cannot be determined by the ITU or national agencies/regulators; in fact, the converse is true and Ofcom and other regulators should dismantle barriers to entry (by introducing streamlined methods of coexistence and in-line event operations) enabling a truly competitive landscape for all.