

Ofcom Consultation on Authorisation of terrestrial mobile networks complementary to 2 GHz mobile satellite systems

Question 1: Do you have comments on Inmarsat's planned use of the spectrum, our planned approach to authorising the overall MSS and CGC system, the availability of the Network and Spectrum Access 2 GHz Licences, or any other aspect of the scope and purpose of this document?

ViaSat is a provider of broadband telecommunications services to the aviation market. ViaSat provides this service throughout Europe in conjunction with Eutelsat using Eutelsat's Ka-Sat satellite, and is therefore directly impacted by the rules Ofcom is proposing in this Consultation because of the anti-competitive impact they would have on the aeronautical broadband market. In discussions with potential airline customers, ViaSat is already seeing market distortions caused by claims made by Inmarsat regarding what it is technically and legally permitted to do with its 2 GHz MSS licence.

The "Aero CGC" offering proposed by Inmarsat is a major departure from the services previously considered by Ofcom for 2 GHz MSS. As noted in the Consultation, Ofcom's 2009 consultation was based on the assumption that CGC would be used to provide terrestrial mobile service (without mention of aeronautical mobile) as was clearly contemplated by Decision 626/2008/EC.¹ Although a purely terrestrial mobile service authorized under the guise of MSS could theoretically expand the availability of mobile service, there seems to be little doubt but that authorizing Aero CGC in MSS spectrum will inevitably lead to a diminution in aeronautical communication service in Europe. In addition, when compared to potential alternative uses for the spectrum, using the 2 GHz band for Aero CGC is an extremely inefficient use of spectrum that would benefit only a small percentage of UK consumers.

A decision by Ofcom to authorise Aero CGC would inflict competitive harm on both the satellite and aviation industries, and would chill satellite investment. It would also amount to an unprecedented publically funded gift to Inmarsat, which has repeatedly missed statutory milestones for bringing its license into use over the past 5 years. Inmarsat would be gifted UK-wide terrestrial mobile spectrum directly adjacent to spectrum for which UK mobile network operators had paid billions of Pounds.

There is also a fundamental fairness problem with what Ofcom has proposed in its Consultation, as no potential 2 GHz MSS applicant could reasonably have foreseen that 7 years after its terrestrial 2 GHz MSS consultation, Ofcom would propose to allow a purely aeronautical offering that completely ignores the requirements of EU Decision 626/2008/EC to provide rural coverage, coverage to 60% of the aggregate European landmass and coverage to at

¹ See Authorization of terrestrial mobile networks complementary to 2 GHz mobile satellite systems, A Statement on the licensing of 2 GHz MSS Complementary Ground Components (CGC), 17 July 2009 ("2009 Consultation").

least 50% of the European population.² After warehousing this valuable spectrum for the past 5 years, Inmarsat is being rewarded for its repeated failure to meet its milestones by being allowed to transform its MSS license into a terrestrial mobile license. To make matters worse, Ofcom is proposing to allow this re-allocation without any discussion of alternative uses, without any analysis of the potential impact on the aeronautical broadband market and without requiring Inmarsat to compete against other potentially interested parties for the right to use the spectrum under the fundamentally different conditions that Ofcom is proposing.

A. Given the 2 GHz Licensees' Failure to Meet Milestones, and the Initiation of Co-Coverage/Co-Frequency ITU-R Studies by WRC-15, Ofcom should defer adoption of rules on 2 GHz MSS.

The initial 2 GHz MSS licences were issued in 2010 based on applications filed in 2008. These licences contained implementation milestones. In Paragraph 3.9 of its Consultation, Ofcom notes “that since winning the rights to use the spectrum neither of the 2 GHz MSS operations (Inmarsat or Solaris/EchoStar) has completed the required milestones in the prescribed time.”³ The United Kingdom plans enforcement action against both operators.⁴

Since the licences to which Aero CGC is subordinate are subject to enforcement action and possible voidance, adopting rules for 2 Aero CGC is not advisable at this point. The long history of non-compliance with milestones by the licensees is an indication that the 2 GHz spectrum may be fundamentally inappropriate for use by MSS and should therefore be re-allocated to another service. By adopting rules for Aero CGC, Ofcom is pre-judging any potential post-revocation action regarding this spectrum.

Whilst re-allocation may result in a more efficient use of this spectrum, any re-allocation should be done in an open and transparent manner, not as a post-licensing rule change that denies other potentially interested parties the opportunity to access this valuable spectrum. Given the dramatic increase in demand for terrestrial mobile spectrum below 5 GHz and the fact that the 2 GHz MSS spectrum is directly adjacent to the 3G spectrum auctioned by Ofcom, it would be logical for Ofcom to defer adoption of new rules until it is determined whether the 2 GHz MSS licenses meet their milestones and, if they do not, at least consider alternative uses for this spectrum.

Postponing decision on the Consultation over Aero CGC is also needed in order to take into account the ITU-R studies that are just now getting under way under Resolution 212, as established less than five months ago by the 2015 World Radiocommunication Conference (WRC-15), in frequency bands that include the spectrum assigned to Inmarsat and Solaris/EchoStar for 2

² These criteria for admissibility and selection of 2 GHz MSS applicants are identified in Decision 626/2008/EC, Articles 4 and 6.

³ Consultation, at 6, Paragraph 3.9.

⁴ Id.

GHz MSS.⁵ In Resolution 212 (Rev.WRC-15), WRC-15 determined that “co-coverage, co-frequency deployment of independent satellite and terrestrial IMT components is not feasible unless techniques, such as the use of an appropriate guardband or other mitigation techniques, are applied to ensure coexistence and compatibility between the terrestrial and satellite components of IMT.” Resolution 212 (Rev.WRC-15), at *noting further a*). IMT, of course, is the ITU term for mobile broadband service.⁶ The mitigation techniques to enable such co-existence have not been articulated to date, and are in fact the subject of study in the ITU-R under Resolution 212 itself in the study cycle that is just now getting under way.

If co-frequency/co-coverage sharing between MSS and terrestrial mobile is envisioned, the open questions in the ITU-R on how such sharing is to be achieved dictate that resolution of the Consultation should be deferred until the studies deemed essential by WRC-15 are complete and taken into account by Ofcom. These questions are not answered by ECC Report 233, which is focused upon adjacent-band compatibility issues, not co-frequency/co-coverage issues.

In addition to concluding, as reported above, that co-frequency/co-coverage MSS and terrestrial mobile operations in the 2 GHz band are not feasible without mitigation techniques, WRC-15 noted that there are adjacent-band issues and a history of difficulties in addressing potential interference between satellite and terrestrial services in these bands.⁷ WRC-15 resolved that administrations implementing IMT (which the U.K. would be doing if this Consultation is finalized) should, among other things, use “relevant international technical characteristics” as reflected in ITU-R and ITU-T publications.⁸ WRC-15 also directed the ITU-R “to study possible technical and operational measures to ensure coexistence and compatibility between the terrestrial component of IMT (in the mobile service) and the satellite component of IMT (in the mobile service and the mobile-satellite service) in the frequency bands 1980-2010 MHz and 2170-2200 MHz . . .”⁹ Importantly, WRC-15 did not limit the study inquiry to cases of independent satellite and terrestrial components.¹⁰ This means that cases such as the one here –

⁵ Resolution 212 (Rev. WRC-15), “Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2200 MHz.”

⁶ The question of whether or not the terrestrial IMT service offering Inmarsat and Deutsche Telecom are contemplating for Aero CGC is “independent” of the satellite component of the “MSS” system is addressed below. The fact that the operators rely on band segmentation to make their respective components “compatible,” strongly suggests that they are independent.

⁷ ITU Resolution 212 (Rev.WRC-15), at *notings further a*), b), and c).

⁸ *Id.*, at *resolves*.

⁹ *Id.*, at *invites ITU-R*

¹⁰ *Id.*

where the satellite and mobile components are nominally under the purview of a single operator – need to have compatibility assessments as well.¹¹

Action by Ofcom to allow terrestrial mobile operations without regard to the difficult studies directed by WRC-15 in Resolution 212 (Rev.WRC-15) could prejudice future UK options on usage of this band should the 2 GHz licensees not meet their milestones. ViaSat is, of course, not arguing that Ofcom is precluded from acting in the best interests of the United Kingdom *until* ITU-R studies are complete; it is asserting instead that it is inappropriate for Ofcom to contemplate any kind of co-frequency/co-coverage MSS/terrestrial mobile system operation without acknowledging and taking into account the study issue.

B. “Aero CGC” is inconsistent with Decision 626/2008/EC.

Decision 626/2008/EC, at Recital 18, characterizes CGC in the following way:

Complementary ground components are an integral part of a mobile satellite system and are used, typically, to enhance the services offered via the satellite in areas where it may not be possible to retain a continuous line of sight with the satellite due to obstructions in the skyline caused by buildings and terrain. In accordance with Decision 2007/98/EC, complementary ground components use the same frequency bands as MSS (1 980 to 2 010 MHz and 2 170 to 2 200 MHz).¹²

Whilst Decision 626/2008/EC does not provide much background on CGC, ECC/DEC(06)09 – adopted just nine months before Decision 626/2008/EC – provides a description of what was contemplated by regulators at the time:

By 2004, a number of mobile-satellite systems have been proposed to operate in the 2 GHz bands with the view to offer a variety of services, such as point-to-point ubiquitous mobile connectivity, broadcast/multicast to handset terminals, security services (population alert and rescue support), data collection, fleet tracking, etc. Most of the proposed systems rely on a ground-based infrastructure to enhance satellite coverage in highly shadowed areas.¹³

¹¹ Whilst the Consultation seems to contemplate that Inmarsat would operate both the MSS and Aero CGC elements of its combined MSS/terrestrial mobile system, the description of the DA2G element, especially given the band segmentation envisioned, suggests that Deutsche Telecom alone will be the operator of the terrestrial mobile component. See Consultation at 8, Paragraph 4.11 (“Inmarsat say[s] that the base stations are intended to be planned, built and operated by Deutsche Telecom on behalf of Inmarsat.”). This is permission given by Inmarsat to a separate operator, not combined operation.

¹² Decision 626/2008/EC, at page 3.

¹³ ECC/DEC(06)09 at page 2.

This background suggests, as does the word “complementary” itself, that the ground component is to enable the MSS system to achieve full coverage of users within its service area, in a way that enhances the MSS and heightens MSS availability. CGC thus completes the MSS, and does not serve as a stand-alone supplement to or replacement for the MSS. ViaSat notes further that this interpretation is fully consistent with the characterization of CGC in the international Radio Regulations, where Recommendation 206 (Rev.WRC-12) contains the following considerations:

b) that integrated MSS systems employ a satellite component and a ground component where the ground component is complementary to the satellite component and operates as, and is, an integral part of the MSS system. In such systems, the ground component is controlled by the satellite resource and network management system. Further, the ground component uses the same portions of MSS frequency bands as the associated operational mobile-satellite system;

c) that MSS systems have a limited capacity for providing reliable radiocommunication services in urban areas on account of natural or man-made obstacles and that the ground component of an integrated MSS system can mitigate blockage areas, as well as allow for indoor service coverage;¹⁴

Recommendation 206 addresses CGC (known in the ITU as “integrated MSS systems”) and studies specifically for some L-band frequencies in which there are no mobile allocations, but notes specifically that integrated MSS systems may be deployed in bands including 1980-2010 MHz and 2170-2200 MHz without further ITU-R studies due to the presence of allocations to the mobile service.¹⁵

Ofcom’s proposal to allow unlimited traffic over the CGC network is similarly inconsistent with the definition of CGC. There is a point where so much traffic is being carried by the CGC that the network can no longer be characterised as MSS. It is unclear where that transition point is, but it is clear that Ofcom’s proposal that all traffic can be carried over CGC clearly changes the character of the network to terrestrial mobile rather than MSS. This is inconsistent with Decision 626/2008/EC, which did not change the allocation from MSS to terrestrial mobile – it implemented the EC determination in Decision 2007/98/EC that “Member States shall make [the 1980-2010 MHz and 2170-2200 MHz] frequency bands available to systems providing MSS in the Community as of 1 July 2007”.¹⁶

The 2 GHz MSS Decision very clearly identifies the 2 GHz service as MSS, so any interpretation of the rules *must* require the implementation of an MSS network with a terrestrial enhancement, not with the replacement of the MSS network on some portion of the MSS frequencies with a purely terrestrial mobile network. Although promulgated by the European Parliament and

¹⁴ ITU Recommendation 206 (Rev.WRC-12), at *considerings* b) and c).

¹⁵ Recommendation 206 (Rev.WRC-12), at *recognizing* e).

¹⁶ Decision 626/2008/EC, at Recital 7.

Council, neither party has the power to change the allocation for these frequencies, nor is there any indication in the Decisions that they intended to change the allocations. Because the satellite component of the “hybrid” system cannot operate when and where the terrestrial component is selected, the described Inmarsat Aero CGC offering would be operated as an unlawful replacement of MSS service with terrestrial mobile service.

In Section 6 of its Consultation, Ofcom focuses on the phrase “in order to improve the availability of MSS” from the characterization of CGC in Decision 626/2008/EC above, and asserts that because MSS includes CGC, “any service carried over the CGC will, by definition, improve the availability of MSS as defined in the Decisions.” Consultation, at 13, Paragraph 6.5. ViaSat strongly disagrees with this interpretation as circular and inappropriate in the context of Aero CGC.¹⁷

Normally EU Decisions, like other laws, should be interpreted according to their plain meaning. By positing that any communication over the “CGC” is tantamount to a communication over the “MSS,” Ofcom is essentially creating an interpretation that is so broad that it transforms the nature of the service from a satellite-based service to a terrestrial-based one.

This interpretation cannot be correct, as Ofcom is reading the word “complementary” out of CGC entirely. CGC is conceived to be a ground-based offering that by definition enhances MSS availability. It is intended to be used primarily in urban canyons to overcome line-of-sight blockages from natural and man-made obstacles. In the context of a terrestrial mobile service, Ofcom’s interpretation makes sense. Inmarsat’s Aero CGC proposal, however, does not involve overcoming line-of-sight obstacles, and would instead be used in open areas along flight paths where satellite coverage would be expected to be very good.¹⁸ Indeed, it is hard to conceive of *any* situations where aircraft in flight “may not be [able] to retain a continuous line of sight with the satellite due to obstructions in the skyline caused by buildings or terrain.”¹⁹

The main reason Decision 626/2008/EC was adopted was because “[s]atellite communications, by their very nature, cross national borders and, as such, are susceptible to international or regional in addition to national regulation.”²⁰

¹⁷ ViaSat recognizes that the interpretation for Aero CGC in the Consultation flows from a similar Ofcom interpretation from 2009 for purely terrestrial mobile service falling under the definition of purely terrestrial CGC. 2009 Consultation, at 7, Paragraphs 3.8-3.12. Without examining whether the market for terrestrial mobile and aeronautical mobile are similar enough to warrant doing so, Ofcom applies the same logic used in 2009 Consultation to the Aero CGC context.

¹⁸ See Consultation, at 8, Paragraph 4.5.

¹⁹ Decision 626/2008/EC at Recital 18. Although “typically” does not mean “exclusively,” as Ofcom emphasizes in its 2009 Consultation (and ignores in the current Consultation), it does mean something. Ofcom’s approach to CGC essential ignores this word and relationship to the MSS altogether.

²⁰ Decision 626/2008/EC, at Recital 6.

In contrast, purely terrestrial mobile networks require coordination only at borders. The EU has never adopted a Europe-wide terrestrial mobile licensing regime, yet this is precisely what Ofcom is enabling in its interpretation of the 2 GHz MSS Decision. If Ofcom's interpretation of CGC is correct, then the fundamental reason for EU Decision 626/2008/EC disappears since no European-wide action is needed for terrestrial mobile networks.

The conclusions made by Ofcom in its 2009 Consultation regarding the use of CGC for terrestrial mobile services are not directly applicable to Aero CGC. Given the fact that MSS terrestrial users could be expected to concentrate in densely populated areas but still desire the geographic availability made possible by MSS, it made sense in 2009 for Ofcom to allow unlimited use of the CGC network since there were likely to be many geographic areas where mobile handset users would not be able to connect to the satellite because of terrain or urban blockage. Limiting the amount of traffic that could be carried over the CGC network would have meant imposing unnecessary service outages to users that wanted a mobile device that worked in cities as well as in remote areas outside of terrestrial mobile coverage.

This same logic cannot be extended to Aero CGC since there is literally no conceivable usage case where an aircraft in flight would not be in a position to receive a signal from the MSS satellite. By relying on the argument that CGC is needed for aeronautical users since a satellite cannot provide enough capacity to serve the demand from aeronautical users, Ofcom is simply identifying the reality that the 2 GHz MSS spectrum is poorly suited to serve the aeronautical market as a satellite service.²¹ The fact that Inmarsat is seeking to serve a market that cannot be served efficiently by MSS, however, does not justify a contorted interpretation of the EU Rules. Having identified the problem that the 2 GHz spectrum is better suited for terrestrial usage than for usage by MSS, Ofcom cannot resolve this by making a major post-license change to the 2 GHz MSS licenses to allow the use the spectrum for a terrestrial network. Instead, if Ofcom does wish to re-allocate the 2 GHz MSS spectrum, it must do so in an open and transparent process and work within the European Union to modify Decision 626/2008/EC.

For the reasons stated above, ViaSat does not agree with Ofcom's proposal, in Paragraph 6.7 of its Consultation, to "consider that Inmarsat's planned use of CGC meets the definition of CGC as set-out in the Decision 626/2008/EC." Ofcom should reconsider the question of Aero CGC's consistency with the EU legislative framework for CGC.

²¹ Similarly, Ofcom's argument that unlimited use of CGC is required since the satellite alone does not have sufficient capacity to meet the envisioned market yields absurd results when applied to other markets. If, instead of the aeronautical market, Inmarsat decided to compete with cable TV operators, would Ofcom allow Inmarsat to deploy an unlimited terrestrial video distribution network in the UK using the 2 GHz MSS license? Although conceivable using Ofcom's logic, such a network could hardly be characterized as MSS.

C. Ofcom's Proposal to Reallocate and Reassign 2 GHz MSS Spectrum for Terrestrial Purposes Will Harm Competition in Both the Satellite and Terrestrial Broadband Markets.

Without significant changes to the proposed rules, Ofcom will harm competition in the aviation broadband market and unjustly enrich an MSS licensee that has warehoused valuable spectrum for almost 5 years. It will also call into question the regulatory certainty for satellite systems in other bands, and chill potential investment and future development of applications.

Aeronautical connectivity is becoming an increasingly important service offering among airlines and many European airlines have recently issued requests for proposals for broadband connectivity. ViaSat's "Exede in the Air" service, using Ka-band satellite capacity, was launched in 2014, and now has more than 500 aircraft using the service in the US. ViaSat is now seeking to extend its service to Europe in partnership with Eutelsat. ViaSat is able to offer very high capacity to its airline customers due to the much greater bandwidth and efficiency possible with its Ka-band satellites. ViaSat is confident that it can compete effectively with Aero CGC on a level pitch, but is concerned that the lack of a clearly-defined regulatory environment with transparent technical and operational parameters for Aero CGC has and continues to create confusion in the European marketplace.

The significant differences between the aeronautical broadband market and the terrestrial mobile market demand a different approach to that taken by Ofcom in 2009. The conclusions of Ofcom's 2009 Consultation were based on the assumption that CGC would be used for terrestrial mobile service.²² Aeronautical use of CGC was not part of the initial 2009 consultation. The market dynamics in the aeronautical broadband market are quite unique and require a market-specific analysis that is completely absent from the present Consultation. It is therefore inappropriate for Ofcom to apply the same rationale it employed in 2009 for the terrestrial mobile service to the radically different aeronautical broadband market.

In the 2009 consultation, Ofcom considered that allowing flexibility in usage of CGC for terrestrial mobile service would benefit consumers since it would increase competition in the mobile market, allow the introduction of new services and benefit a large number of UK consumers. In contrast, none of these arguments apply to Aero CGC. As one of the 2 GHz MSS licensees has publically declared that it is interested in using its authorization to provide traditional terrestrial mobile services rather than Aero CGC Services²³, only one licensee is likely to implement Aero CGC. Having a single service provider of terrestrial-based aeronautical broadband services is likely to result in high prices to airline passengers for this service. In addition, if Ofcom is interested in maximizing the benefit of this valuable spectrum to the UK public, it should not encourage its use for a market that benefits only a

²² Consultation, Paragraph 2.4.

²³ See "Socio-Economic Benefits of Harmonisation of the S-band CGC in Europe" available at: <http://echostarmobile.com/AnalysysMasonS-BandReport.pdf>.

relatively small market segment; namely, airline passengers requiring broadband.

The proposal of the other 2 GHz MSS licensee to use its license for 4G and 5G mobile service, whilst also requiring similar flexibility in usage of the CGC network, at least is targeting the much larger mobile communications market that could bring benefits to the maximum number of UK consumers. The mobile broadband market also has a number of similarly situated competitors with similar infrastructure and economics, meaning that usage of the 2 GHz MSS spectrum for terrestrial mobile is likely to increase competition.

The market for aeronautical broadband, however, is quite different. Airline procurement of broadband communications is usually timed to coincide with fleet renewal programs, which can occur typically every 8-10 years. Because each installation of broadband antennas can take several days, and every day an aircraft is out of service costs the airline lost revenue, airlines try to time installations to coincide with regularly scheduled aircraft maintenance checks. Since these regular checks occur roughly every 20-24 months, installation on an entire airline fleet and the associated airworthiness certification of the installations can take up to 2 years. Once installed, airlines cannot easily switch providers since changing carriers would mean a similar 1-2 year process of taking aircraft out of service, removing equipment and re-installing new equipment. Switching costs in the aeronautical market are therefore very high.

Airlines are particularly sensitive to unique issues in selecting equipment to install on their aircraft. Among these are: weight, aerodynamic drag and cost. An Aero CGC antenna has a major cost, drag and weight advantage compared to a satellite-based system. There is a significant risk that by allowing Aero CGC, Ofcom will allow Inmarsat to capture a disproportionate share of the market and, because of the high switching costs and long procurement cycles identified above, effectively lock out competition in the UK and Europe for many years. There is abundant competition among satellite-based aeronautical broadband providers and numerous satellite operators offer capacity for such services. In contrast, there is simply no other spectrum available to compete with Aero CGC. Although the CEPT tried to identify spectrum for Direct Air-to-Ground Communications, it could only identify fragmented and congested bands. The 2 GHz MSS spectrum is the only harmonized pan-European spectrum available for this service.

The experience of the United States in this regard is instructive. After winning its Air-to-Ground (ATG) license at auction in the US in 2007, Gogo – the only terrestrial ATG provider in the US – quickly captured almost every major US and Canadian airline. Satellite-based aeronautical broadband providers were present in the US market when Gogo was launched, but the small, low-cost ATG antenna offered by Gogo offered a significant advantage in weight, drag, installation time and cost.²⁴ As of today, Gogo has an 80% market share

²⁴ Although ViaSat does not have specific information regarding the cost and drag of ATG equipment, advantages can be easily deduced. A satellite antenna must be either mechanically or electronically steered and deploy a high-gain antenna mounted on the crown of the aircraft to access satellites in

among US airlines. The rapid success of Gogo meant that the service has become heavily over-subscribed, forcing Gogo to introduce demand-based pricing.²⁵ Gogo is able to implement this pricing because it holds the only ATG license in the US and the switching costs for its airline customers are very high. Only recently – 8 years after Gogo began service – are airlines beginning to contemplate switching to satellite-based providers.²⁶

Ofcom's Aero CGC proposal would create similar market conditions in the UK and Europe. No other spectrum is available for Aero CGC. If Aero CGC is allowed as proposed by Ofcom, the results are likely to be the same as in the US: market concentration, lack of competition and costly service to UK/European airline passengers. Because of the prohibitively high switching costs, airlines could be locked into an oversubscribed service for years. Ofcom will actually be harming competition and promoting poor service to UK consumers.

There is one very important distinction between the US ATG market and the Aero CGC rules proposed by Ofcom. Gogo acquired its spectrum license in the US through an open competitive bidding process. Applicants were made aware that the spectrum was available for ATG service, interested parties were allowed to participate in a competitive bidding process and Gogo won its license in an open and transparent process. The process outlined by Ofcom in its consultation is neither open nor transparent. It proposes a major revision to the 2 GHz MSS rules and denies potentially interested parties an opportunity to participate in the new conditions proposed for the 2 GHz MSS spectrum.

The Consultation for Aero CGC incorrectly assumes that aeronautical broadband service is as fungible from a customer standpoint as conventional terrestrial mobile service. As described above, this is not so. Mobile phone users can switch providers with relative ease and competition among current satellite-based providers is quite intense. The same fungibility is not present for customers of aeronautical broadband, due to the nature of the equipment that is required for the aircraft (both in terms of cost/weight and in terms of regulatory approvals). If it allows Aero CGC to be established without notice and the opportunity for competitive entry, as it proposes in the Consultation, Ofcom will effectively be handing Inmarsat a monopoly on terrestrial air-to-ground service, and negatively impacting competition in the market.

Importantly, the prospect of Aero CGC under the 2 GHz MSS licences harms not only the satellite operators such as ViaSat who have made and continue

geostationary orbit. An ATG antenna, in contrast, is mounted on the belly of the aircraft and typically has lower gain and no moving parts. ViaSat's Ka-band antenna weighs 34 kg. (See product data sheet at https://www.viasat.com/sites/default/files/media/aero_mobile_terminal_datash eet_011_web.pdf). An ATG antenna weighs 1-2 Kg. An example of an ATG antenna used on Gogo's network can be viewed at:

https://www.cobham.com/media/921277/ci_5800_ci_5900_gogo.pdf

²⁵ See: <http://www.bloomberg.com/features/2015-gogo-airplane-wireless-internet/>

²⁶ See: <http://fortune.com/2016/02/17/american-airlines-gogo-wifi/>.

to make significant investments in systems and architecture in the satellite bands, it also undermines the purely terrestrial operators that offer mobile broadband. Allowing a satellite operator to convert authorised satellite spectrum to purely terrestrial use would radically dilute the rights of mobile network operators who spent billions of Pounds on their mobile spectrum assignments.

The licence conditions for the 2 GHz MSS authorisations in Decision 626/EC/2008, and the understood nature of CGC as a supplement to the provision of MSS, offered no indication that a true terrestrial mobile offering such as Aero CGC could be made.²⁷ These rules made clear that a company contemplating an Aero CGC or any other terrestrial-mobile system could reasonably conclude that it would have little chance of being selected under these criteria.

Indeed, in 2008 the aeronautical broadband market was in its infancy, so few companies could have contemplated an Aero CGC offering at the time. Ofcom's 2009 consultation on CGC provided no useful guidance to prospective applicants. Firstly, the statement resulting from the consultation came out after the licensees had already been selected, so it could not have been used as guidance prior to submitting an application in the EU's 2 GHz MSS selection process. Further, even if Ofcom had published the results of its 2009 consultation prior to the deadline for submission of application, Ofcom's interpretation of the rules was irrelevant since the applicants were evaluated and selected by the European Commission at a European level – not by Ofcom at a UK level. By allowing a service to be implemented now that would not have been selected in the original process, Ofcom is engaging in a major alteration of the EU rules without taking into account the major differences in market dynamics, technology and competition between the terrestrial mobile market on which the 2009 consultation was based and the aviation market that is the subject of the present consultation.

Allowing a terrestrial mobile broadband service offering to be made as proposed in the Consultation is tantamount to re-writing the rules to permit after the fact a proposal that would have had little chance of being selected under the selection criteria of Decision 626/2008/EC and raises serious questions of fair notice. Other mobile broadband providers that were dissuaded by the EC decisions and selection criteria from applying for authorisations would be demonstrably harmed by a decision to allow Inmarsat and Solaris/EchoStar to provide mobile broadband service in the 2 GHz MSS frequencies. In addition, the prospect that any satellite spectrum could be so reallocated or reassigned creates uncertainty for all, and could diminish future investment in both satellite and terrestrial broadband systems.

²⁷ In order to be admissible for consideration in a second round, applicants were required to commit that "MSS shall be available in all Member States and to at least 50% of the population and over at least 60% of the aggregate land area of each Member State." Second-round selection criteria included weighted factors relating to such matters as consumer and competitive benefits, spectrum efficiency, pan-European geographic coverage, and other public policy factors such as the range of services provided to consumers in rural or remote areas. Decision 626/2008/EC, at 5-6, Article 6, Paragraph 1.

In short, there are serious anticompetitive considerations emanating from the Aero CGC proposal advanced in the Consultation. Without analysing the aeronautical broadband market more thoroughly, Ofcom should not adopt rules that could potentially distort this market for years to come.

Question 2: Do you have any comments on the technical conditions we propose to include in the Network 2 GHz Licence?

ViaSat is concerned that the technical and common conditions Ofcom proposes for Aero CGC in the Network 2 GHz Licence it seeks to issue to Inmarsat (and indirectly to Solaris/EchoStar) are not sufficient to ensure that the terrestrial operations envisioned are truly CGC. To be sure, much of this concern stems from the overbroad and unsustainable interpretation of CGC that Ofcom embraces. Even if the interpretation of CGC were to be realigned by Ofcom in the manner ViaSat suggests in response to Question 1 above, several of the conditions should be refined as described below.

First, ViaSat urges Ofcom to revise the condition that would permit “independent” operation of the ground component of the MSS system for up to 18 months following the failure of the satellite component of the MSS system.²⁸ As a preliminary matter, Ofcom should confirm and mandate that the CGC component cannot be initiated until the satellite component is on station and operational. A 2016 roll-out of the terrestrial offering contemplated by Inmarsat would violate one of the principal conditions of licensure that Ofcom proposed in its Consultation – i.e., that “independent operation of complementary ground components in case of failure of the satellite component of the associated mobile satellite system shall not exceed 18 months.”²⁹ The only logical interpretation of this provision is that a satellite must be in place before CGC can be initiated, and then if the satellite component fails, there is a maximum period of 18 months for lingering CGC operation. CGC cannot start *before* the satellite component is in operation. Independent operation of the CGC is inconsistent with the concept of true CGC as contemplated in Decision 626/2008/EC. A limited terrestrial component that is properly restricted to overcoming terrain and obstacle blockages should not be capable of independent operation from the satellite component. The authorization for the ground component should – as described in the EU Decision - be integrated with the satellite component, and not be operated prior to the satellite coming into service.

Next, Ofcom should require that any aircraft antenna intended for operation with a 2 GHz MSS system be capable of carrying traffic to *and* from the system’s satellite. This will help ensure that a CGC antenna is properly limited to carrying traffic only in situations such as early-stage aircraft ascent and late-stage aircraft descent where terrain and other obstacles could obstruct the antenna’s line-of-sight path to the satellite. If there is no antenna on the aircraft for two-way traffic to the system’s satellite, there can be no DA2G service. ViaSat understands that the instant Consultation is limited to

²⁸ Consultation, at 16, Paragraph 7.16; and Annex 6, Condition 5.

²⁹ Id. at 15, Paragraph 7.10 (iii).

the base stations for Aero CGC, and that the aircraft terminal phase will come later. Nevertheless, it is imperative that this condition be clearly expressed now, as the CGC tail cannot be allowed to wag the MSS dog.

A condition related to the foregoing would be to require that communications over the MSS system be made via the satellite component at all times when there is no terrain or other obstruction to line of sight with the satellite. This would require a change from the Consultation, where Ofcom intends to allow Inmarsat to determine whether the aircraft system should use the satellite or terrestrial mobile component based only on considerations such as prevailing congestion, traffic load, and link quality.³⁰ ViaSat proposes that such a condition be included in the Network 2 GHz Licence to help ensure the integrity of the MSS in the 2 GHz frequencies designated for MSS use.

Finally, and in order to ensure the lasting integrity of the MSS service at 2 GHz, Ofcom should impose a condition that limits the capacity of the complementary ground component of the MSS system to a level roughly comparable to the satellite component's maximum capability. A ground component that has a capacity over 500 times greater than the satellite component is not complementary to the satellite component.³¹ Ofcom needs to take measures to ensure that there is not a *de facto* reallocation or reassignment of the spectrum by virtue of a ground component that far exceeds the capabilities of the satellite component, and reduces or eliminates incentives for the system operator to invest in and maintain the satellite component infrastructure. Such a condition is in full keeping with Decisions 2007/98/EC and 626/2008/EC, where the 2 GHz spectrum at issue was intended for the MSS, not for a terrestrial mobile broadband service with a nominal satellite overlay.

Question 3: Do you have any comments on our proposals for the fee level, fee structure and implementation of the location factor for the fee for the Network 2 GHz Licence?

If Ofcom were to revise its proposal in the Consultation to reflect ViaSat's demonstration above that Aero CGC is not CGC as envisioned in Decisions 2007/98/EC and 626/2008/EC, ViaSat has no specific comments on the proposals for the fee level, fee structure, and implementation of the location factor for the fee as proposed in Section 8 of the Consultation. On the other hand, if Ofcom proceeds with rules to implement Aero CGC as proposed, it will have reallocated and reassigned a substantial portion of the 2 x 15 MHz of

³⁰ Consultation, at 8, Paragraph 4.8.

³¹ Inmarsat claims that its Aero CGC network has a capacity of 50 Gbit/s. The S-band satellite it will deploy has 3 beams, each with 2 x 15 MHz of spectrum. (see <http://www.inmarsat.com/european-aviation-network/>) Assuming a very generous spectrum efficiency of 2 bits/Hz, the maximum data rate Inmarsat's satellite could produce in either direction would be 90 Mbit/s. Assuming Inmarsat tries to carry the maximum possible data over the satellite, the CGC network would be carrying 555 times the traffic as the satellite it is supposedly "complementing."

MSS spectrum authorized to each licensee to the terrestrial mobile service. In such a case, the fees must be equivalent to the fees applicable to terrestrial mobile networks. Any other outcome would disrupt the markets and be patently unfair to similarly situated users and providers.