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*Response from OneWeb to  
Ofcom's Call for Input on  
Broadband Universal Service Obligation (USO)*

**ABOUT ONEWEB**

OneWeb (the trade name of Network Access Associates Ltd) is a communications company building a global network aimed at providing broadband connectivity no matter where people live, work or play.

From 2020, OneWeb will offer “urban quality” direct-to-premises broadband connections to areas with limited or non-existent coverage, and deliver broadband services to communities through shared satellite terminals combined with a local terrestrial delivery network. This will provide all the benefits of the Internet – including e-learning, e-health and e-government – to people no matter how remote their location and in partnership with land-based broadband and cellular service providers. Also, OneWeb’s cellular backhaul solutions will allow the extension of national cellular networks anywhere the mobile network operators choose.

The OneWeb system will also provide broadband connectivity to other markets, such as emergency services, public protection and disaster relief (PPDR), and moving platforms on land, maritime and aircraft platforms.

OneWeb communication services, will be provided by a constellation of low Earth orbiting satellites which will reach all businesses and consumers globally – regardless of geographical challenges – at speeds<sup>1</sup> that can reach 50 Mbps, round trip latencies<sup>2</sup> on the order of 50ms and capacity<sup>3</sup> per user from 10 to 150+ GB/month.

OneWeb’s mission is supported by a range of committed partners in both the space and telecom industry, including Intelsat, Airbus, Hughes Network Systems, Virgin Galactic, Qualcomm, MacDonald Dettwiler, Bharti and Grupo Salinas.

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<sup>1</sup> Defined as the data rate in Megabits per second or Mbps.

<sup>2</sup> Defined as the packet round trip delay from transmission to delivery and return acknowledgement; which includes the physical propagation delay and data processing.

<sup>3</sup> Defined as the amount of data (in GigaBytes or GB) provided on a monthly basis to users.

## INTRODUCTION

OneWeb wishes to thank Ofcom for the opportunity to provide its views for this Call for Input and affirms its willingness to cooperate further with Ofcom as it seeks to define for the UK the universal broadband access requirement through a potential new USO.

Connection to the digital world is crucial for the success of communities, the needs of individual citizens and the growth of the British economy. As such, OneWeb believes that the provision of broadband is fast becoming a necessity for citizens, in a similar way to other basic utilities (e.g., gas, water, electricity), allowing people to participate meaningfully in society (e.g., social media, eLearning, eGovernment) and the digital economy (e.g., buying online, selling products, business solutions). OneWeb agrees that there is a particular problem in the UK with hard to reach areas, e.g., rural and remote areas in Wales, Scotland, Northern Ireland and England, whose lack of access to broadband is hindering the UK's productivity and growth, as well as provision of services such as eHealth, emergency response, distance education.

## A UNIVERSAL SERVICE OBLIGATION (USO)

In principle, OneWeb supports the provision of a new universal service obligation (USO) for broadband, as a demonstration of its commitment to place broadband on a similar footing as other basic services, giving everyone (including those communities lacking such service) the right to access broadband at a given quality of service (QoS).

OneWeb has been promoting this concept with many governments, adding that such quality of service also requires the adoption of not only speed or data rates of transmission, but also other important parameters such as "latency", "capacity" and "availability", at an affordable price.

With respect to latency, i.e. the roundtrip delay between when a packet is transmitted to when an acknowledgement of its delivery is received back, OneWeb is a strong believer that this is a major factor of quality of service, especially in applications that require user interactivity, such as in eLearning, eHealth, video chats or conferencing, and cloud computing.

All satellites systems one way or another will suffer a delay due to signal propagation over free space. Geostationary satellite applications at a 36,000km orbit have the largest propagation delay, while low Earth orbiting (LEO) satellites at 700-1200km orbit will have the lowest propagation delays. This means that latency will vary from satellite system to another and for many interactive applications user experience will be greatly enhanced with LEO satellite systems. GEO based broadband system have a latencies of the order of 700 ms. LEO based broadband systems instead have a latency that is dramatically reduced to about 30 to 50 ms and user experience will be equivalent in most cases to that of terrestrial broadband internet.

The FCC has recently unveiled its “Consumer Labels for Broadband Services”<sup>4</sup> that include latency, up/down stream speeds and packet loss, in addition to cost information. OneWeb believes that, from a QoS perspective, Ofcom should adopt Speed, Latency, Capacity and Availability as part of the UK’s Broadband USO.

This being said, OneWeb recommends that, when assessing the practicalities of legislating for a USO, Ofcom and the government should ensure that it does not fall victim to unintended consequences which may risk enhancing the digital divide in rural and remote areas even further, specifically through the overly optimistic adoption of minimum speed requirements and targets which cannot be ensured in rural and remote areas of the UK, where fibre and other terrestrial technologies may never be deployed.

OneWeb supports the government’s intervention and Ofcom’s duty to ensure quality broadband services to its citizens through a USO. However, many communities and businesses in rural areas of the UK have none or poor connectivity, thus Ofcom should ensure not to impose unrealistic targets for a USO, as it may exacerbate the digital divide even further. Figure 9 of Ofcom’s Connected Nations Report 2015 shows that in 2015, 4% of urban and 48% of rural premises were unable to receive 10 Mbps speed, thus it is questionable that a USO can be effectively implemented at these locations based on fixed fibre deployments. The percentages can be further reduced, but the cost required in terrestrial infrastructure can become prohibitive to reach the last one or few percent of homes.

Furthermore, in the same report, Ofcom proposes a minimum speed of 10 Mbps based on some “typical” applications households will require (see Figure 17 at page 27). However, relying on simplistic “typical” modelling, and not on an appropriate distribution of the population’s needs, may not allow for an appropriate USO figure of broadband speed. While every home in the UK should ideally get the same quality of service, the geographical reality is different, and imposing the same USO specifications across the board is going to be difficult to implement by industry. At issue is the fee to the users to provide the intended speed. If the Government wishes to truly have a universal service, the technical criteria has to be set such that it remains affordable for the population. Unlike voice telephone services, Internet connectivity can be provided over a very large panoply of flavours, combining the previously mentioned technical elements of speed (up/down), latency, jitter, and packet loss.

In order to limit the impact of such impairments and to prevent exacerbating the digital divide even further, when considering imposing a broadband USO, a possible solution could be to differentiate the minimum speed based on geography, but also considering the user monthly fees. For example, at urban premises a USO of 10 Mbps (or even higher, such as 30 Mbps as suggested by the Commission’s Digital Agenda for Europe) could be imposed, without much regard to contention, since urban areas have such capability and at reasonable cost for consumers. However, at rural premises with limited connectivity and remote premises with no connectivity, a minimum speed through a USO should not exceed 10 Mbps, with the caveat that this may not be a sustained data rate all the time, but a target

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<sup>4</sup> See <https://www.fcc.gov/consumers/guides/consumer-labels-broadband-services>

burst rate. Many wireless solutions can provide peak speeds on the order of 10 Mbps or more, but using shared resources means that during peak busy times, some degradations in user data rates may be necessary to accommodate all users and prevent a few to deny access to the many. Not considering speed in conjunction with contention, will preclude all wireless solutions to be part of the USO, thereby risking to exacerbate the digital divide even further.

Furthermore, OneWeb believes that imposing a USO based solely on speed all across the UK territory would not represent the basic needs of citizens, and could in fact aggravate further the digital divide. When considering speed requirements, Ofcom should determine what is enough to provide basic connectivity to households so that everyone has the basic access to the Internet's vast array of services, such as web-browsing, e-government, e-education, e-health, e-banking, e-commerce. However, a basic service offering supported by a USO may not require every household to have access to a panoply of entertainment services such as streaming multiple HDTV programmes, on-line gaming, etc. OneWeb does not suggest that these applications should not be available to USO beneficiaries but rather that the technical specifications and costs of the USO should not be driven by these bandwidth hungry applications.

The government's role should be to ensure that areas and people receive a good communication service everywhere in the UK. Satellite infrastructure can provide 100% coverage in the rural and remote areas of the UK, but it is not through solely a "minimum speed" based USO that a service and quality can be assured. The government could implement a USO that offers a basic quality of service, that would need to be defined, but which considers more than just speed, and includes measures such as latency, capacity (in terms of GB per month), price and availability.

If the government believes that it is necessary to impose USO technical specifications, then OneWeb suggests that it should not impose stringent speed requirements for rural and remote areas of the UK, where communities are in need of even of the basic communication means, and that other measures, such as latency, capacity and availability, should also be included to ensure that quality of broadband services is assured.

On the criteria of availability, there are two definitions that need to be considered:

- Geographical availability – is the solution available to users everywhere?
- Time availability – what percentage of time is the solution available?

In a way, these two concepts are opposing forces. Redundant wireline facilities tend to be the most available in terms of time – reaching close to 100% availability. They tend to become unavailable only during catastrophic events, such as fibre cuts, fires or floods at switched or interconnect points, or the like. With the redundancy built into diverse routes and Internet packet switching protocols, these networks seldom go down. Also, they tend to have much greater capacity than what is required even for the busiest times, so seldom get overloaded by user demand. However, unlike the wireless technologies, especially satellite technologies, their geographical reach is limited to the most lucrative markets, and whilst their reach continues to go deeper into rural areas, it will never be economical, even with

Government subsidies, to reach 100% of the households in the UK with redundant fibre-based solutions. The satellite technologies will have lower availability, for example, 99.95% of the time, and may suffer with service reductions in busy periods due to contention, but their geographical reach is 100% of the UK. Therefore, the question of availability for a USO must consider both aspects and necessarily will include wireless solutions, and in certain parts of the country this will have to be delivered through satellites.

The last, but perhaps most important aspect of the USO definition is service fees for the users. Again, unlike the voice telephone network, where everyone gets the same service, broadband connectivity comes in many shapes and packages, with increasing user fees according to speed (burst and average), capacity, latency and jitter. So, a USO must set a realistic target for user fees. The Government may wish to consider two aspects when assessing maximum user fees associated with a USO:

- The fees for hard-to-serve areas: the goal should be to have user fees that are generally in-line across the country, so that users in remote areas of the country do not pay an exorbitant amount as compared to their urban counterparts; however, a certain price increase, say in the order of 10-15% may be acceptable, for the same USO basic package;
- The fees for families that have less revenues: a USO may also consider providing a government or private-sector funded mechanism that allows the poor or less fortunate to access the essential Internet services, no matter where they live.

As the Government develops its Broadband USO programme, it should decide whether its goal is accessibility in terms of geography or in terms of affordability, or both. The technical criteria for these two objectives are different and the USO must recognise this fact.

## RESPONSE TO CALL FOR INPUT BY OFCOM

Your call for input asked for several questions and views. We provide a response to these below.

### • How should the minimum technical performance of the USO be specified?

OneWeb believes that broadband quality of service must be delivered using four parameters "speed", "latency", "capacity" and "availability", at an affordable price.

#### Speed

With regards to speed, although it is necessary for the government to define a minimum speed requirement to reach its citizens, we believe that a speed requirement must be coupled with an understanding that advertised speeds are based on a certain level of contention in any telecommunications network. A speed of 10 Mbps could be the basis of a USO, as long as this is a burst rate provided to all users when there is little or no congestion on the network. This is because the geographical disparities in a country will make it hard for companies to deploy infrastructure at a reasonable cost that ensures 10 Mbps to each and every households during very busy period. We only need to consider the impact of major sporting events, concerts, emergency situations on the terrestrial

wireless/cellular networks to realise that such a network which provides fast speeds and excellent quality of service can degrade rapidly to the point of becoming unavailable during extreme circumstances. Even on wireline networks in urban areas, most solutions except perhaps fibre-to-the-home aggregate users over a limited-sized “pipe” and thus speeds are throttled when many users access the facility simultaneously.

As such OneWeb believes that a two tier approach may be required whereby in Urban areas a USO of 30 Mbps (burst rate) and 10 Mbps sustained rate is easily achievable, while in hard to reach premises in Rural and Remote areas, the USO should not guarantee rates of 10 Mbps, but this would be the typical data rate for users, with the option for users to select a higher speed if they so choose, on a case by case basis.

OneWeb is building a satellite system that can provide high capacity to single premises or communities. With its LEO constellation solution, the download data rate can reach up to 50 Mbps, however, sustained data rates will be lower and depend on the user’s monthly subscription. A USO capable of supporting both low latency applications, such as eLearning, eHealth, Cloud Computing, Teleconferencing, and a certain number of entertainment applications which are capacity hungry would be satisfied with an average 10Mbps data rate. In addition, OneWeb is teaming up with GSO operators, so a hybrid GSO and LEO solution, depending on the speed requirements of bandwidth hungry application such as Video downloads, may be better satisfied.

### **Latency**

With respect to latency, i.e. the roundtrip delay between when a packet is transmitted to when an acknowledgement packet of its delivery is received back, OneWeb is a strong believer that this is a major factor of quality of service, especially in applications that require users’ interactivity, such as in video calls, eLearning, eHealth, web browsing of sophisticated sites, and cloud computing.

However, latency requirement should be defined in a way to encompass satellite solutions for broadband connectivity. Satellites have signal propagation delays that depend on the constellation altitude above the Earth surface and the location of the satellite equipment on the ground, which is added to any existing network/technology latency. These can vary from 10ms (for LEO) to 250ms (for GEO) over a one way communication.

### **Capacity (also known as Volume)**

OneWeb is building a satellite system that can provide high capacity to single premises which can range, depending on the monthly subscription between 10 and 150+ GBytes per month. One often cited complaint from users is the additional charges that they incur when exceeding data caps in their contracts. Unfortunately, data caps are an essential reality for capacity-constrained systems, such as certain terrestrial and satellite systems. One possibility to avoid these unfortunate cost-overruns for consumers would be to specify that USO sponsored service providers are not permitted to add costly charges to the consumers beyond their contracted data capacity. Instead, a more graceful solution would be to reduce the speed (data rates) that users experience when hitting the contracted data caps to encourage them to either reduce their data consumption or procure higher data plans with higher caps. Ofcom and the Government should be



careful when establishing capacity requirements for the USO to ensure that prices are commensurate with the technical solutions that are economically viable in the areas to be served.

- **How should we ensure that the USO is affordable?**

The issue here as to be assessed based on affordability in terms of reaching the users (geographic cost elements) and users capability to pay. For instance, in many rural and remote areas, the users have the ability to pay for services but the cost to provide the service is much higher due to the difficulty in reaching these citizens. On the other hand, there is a certain percentage of the population that cannot afford even the most basic service offerings in low-cost urban areas.

It will be challenging to provide affordable broadband in hard to reach rural and remote areas of the UK based solely on terrestrial means, because deployment of fibre is costly due to difficult geography and low population density.

We believe that satellite can provide affordable solutions to these rural and remote areas and the UK should adopt policies that make it possible for satellite technologies to be economically viable and considered by local councils and towns. However, OneWeb will not compete with ISPs and cellular operators, it will provide instead wholesale solutions to be adopted by these players, who will own the customer and who will have the means to provide the needed solutions for the UK broadband needs.

For satellite solutions, affordability is linked to number of terminals and customers being connected and the quality of service (in terms of speed, contention, latency and capacity). Thus, policy solutions should be in place that allow promotion, adoption and deployment of satellite solutions, by either local councils or through Universal Service Provider(s) in the UK.

- **Should there be a social tariff for broadband services?**

OneWeb believes that the UK Government should subsidise connectivity to the very remote areas of the UK, as well as those hard to reach rural areas. OneWeb can provide solutions for the UK Government that are affordable and quick to deploy. These solutions would provide a high quality broadband experience with user costs commensurate with a basic (10 Mbps) package offered today in urban areas.

However, to ensure a very low cost USO affordable to all citizens in the UK, the Government may wish to consider a lower cost USO whereby the technical elements (speed, capacity) are more modest, for example perhaps a speed of 2 Mbps at capacity of 10 GB per month, but where it can be offered by urban service providers and OneWeb in rural and remote areas, free or for a few GBP per month, with a Government subsidy.

OneWeb is ready to support the UK Government in the provision of broadband communication to those unconnected and underserved citizens using some very basic procurement models. We would be keen to share our model with Ofcom if required.

Any such tariff will need to consider technology neutrality (in areas where multiple technologies can compete) and the reality that in certain areas few technologies are available for last mile distribution or middle mile connections.

- **What might be potential demand for the USO be?**

USO should not be based on commercial needs, e.g. such as things related to video-streaming or video download. USO should be based on the basic connectivity needs that people require. Very much like water, gas and electricity, which are basic needs for households, a broadband USO should first tackle the basic needs such as web browsing, emailing, online commerce and banking, eLearning, eGovernment, eHealth. Such needs can be easily accommodated over a basic broadband speed of 2 to 4 Mbps. These are some of the basic needs that the majority of the citizens and consumers require.

With respect to SMEs it is arguable that a greater quality of service above a USO threshold is needed due to business requirements. OneWeb believes that as long as the technology has the capability to provide service to 10 Mbps, the USO will be satisfying the broader goal of enabling broadband access to all users throughout the country, both residential as well as SMEs.

- **Cost Evidence/Model**

We would be please to share our cost model with Ofcom.

- **We are interested in options to maximise the reach of the broadband USO to the hardest to reach areas and consumers while ensuring the cost of provision remains proportionate. Possibilities could include modifying the technical specification for specific circumstances, or options around how consumers can make contributions to excess construction charges. We welcome views on possible options that meet the goal of improving broadband services for the hardest to reach.**

We have provided some comments on this in the responses above. In particular, the need to set the USO requirements for rural and remote areas at an average speed of 10 Mbps/100 GB per month, and for low income families perhaps down to something between 2 and 4 Mbps (10 GB per month) at a much lower user cost.

- **It will be important to ensure the overall costs of delivering the USO are efficient. For example, it will be important to ensure a least cost approach from the USP and we will consider how to ensure the right incentives and safeguards for the USP to minimise its costs. This will partly be achieved through the reasonable cost threshold, as outlined above, but will also be**



related to encouraging the deployment of suitable technology for the location and making reasonable assumptions about expected demand. We would be interested in stakeholders' views on how to ensure the USO delivers efficiency, both overall and on a per premises basis.

A mix of technologies, which include satellite, is necessary to achieve this. We have provided some characteristics of the OneWeb system above, which will include both LEO (providing low latency necessary for some applications) and complemented by GEO solutions for less time-sensitive applications.

- **How should the USP be designated?** We are therefore interested in views on the extent to which providers may come forward for designation as the USP to allow for a meaningful competitive process. We recognise that certain providers may only be willing or able to serve specific geographic areas and would welcome indications of where providers may seek to be designated.

OneWeb would support a USO regime which permits any provider to become a USP, or at least would promote multiple USP's so that the Government benefits from the forces of competition. A USP should encompass a variety of technologies, including satellite solutions. This will ensure that hard to reach and far remote rural areas can also be covered.

- **Funding the USO.** The USO may result in a cost burden being placed on the USP(s) that is designated. Under the Universal Service Directive, the net cost (i.e. after taking account of any additional revenue or other benefits) may be recovered from public funds, through an industry funding scheme or a combination of both industry and Government. The Government has indicated that its preference is for an industry funded scheme. Participants in such a scheme may include any communications provider or may be more restricted. We are interested in views on who should contribute to an industry scheme, taking into account the need to ensure that the scheme is non-discriminatory, proportionate, transparent and causes the least market distortion. We are also interested in views on the potential effects on consumer pricing of a broadband USO on USO and non-USO customers.

In the case of OneWeb, its infrastructure is financed by private investment and debt financing. The Government need not fund the satellite infrastructure. OneWeb proposes that the Government ensures that satellite solutions be considered in the rural and remote areas. USO subsidies may be useful for the acquisition of the satellite terminal for those households that could not afford it or for some of the terrestrial components of a mostly satellite-based solution, such as to defray the costs of any additional gateway earth stations or local terrestrial infrastructure where the satellite link is used to provide service to a community, as opposed to directly to consumers.

If the Government also wishes to implement a low-cost option for low income families, it may wish to consider a monthly subsidy for a defined population (based on family income) where it would pay a portion or all of the user fees.

- **How could any potential market distortions of competition be minimised?**

The Government should avoid a single USP unless that service provider is obligated to consider all possible technologies and providers of network infrastructure in deploying the USO services. A USP should not be allowed to build and deploy an infrastructure in parallel to existing solutions, unless it can demonstrate that it can do so more cost effectively than using already existing network infrastructure.

Ofcom and the Government should ensure that satellite is part of the package, i.e. part of the solution to cover the rural and remote areas of the UK. Satellite can be cost effective and the USP(s) should embrace satellite as a solution for the hard to reach premises of the UK. This needs to be done in volume or the cost benefit may not be achieved.

- **When, and on what basis, should the USO be reviewed?**

OneWeb believes that a minimum 3 year period should be adopted, as it provided for time of adopting a technological solution and then find alternative.

## **CONCLUSION**

OneWeb greatly appreciates the opportunity to participate in this call for inputs.

OneWeb is committed to working with Ofcom and Government to ensure that aspirations for comprehensive digital inclusion if the UK citizens and consumers are achieved.

A USO is a desired step forward, in helping to achieve this aim, and ensuring that access to broadband is achievable to every community in the UK, regardless of where they live. This being said, Ofcom and the government would be wise to ensure that their approach to implementing and legislating for a USO reduces any unintended consequences for consumers, helps industry to achieve the needed quality of service and does not exacerbate the digital divide even further, for example through the adoption of minimum speed obligations which cannot be sustained under all circumstances in hard to reach rural and remote areas of the UK.

OneWeb is ready and willing to assist Ofcom and the UK government in ensuring that no one is left behind in the digital age, especially for communities in these rural and remote areas.

Tony Azzarelli

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