Your response

Your response should include details of:

- a description of the relevant technology;
- a view of the potential impact of the technology on the sectors we regulate, preferably
- identifying the impact against the criteria listed in section 3.16 of the call for inputs;
- the current state of development of the technology, including any demonstrations of
- feasibility;
- references to key publications and the leading groups working on the technology; and
- whether you would be open to discussing the technology in more detail with Ofcom.

Your response

Description of the relevant technology: Lacuna Space provides low-cost, simple and reliable Internet of Things (IoT) connectivity for sensors everywhere in the world. We do this using low-cost satellites in conjunction with terrestrial LoRaWAN® networks, and open standard LoRa® protocols. Our sensors use the same globally allocated SRD/ISM bands that are already allocated for regular IoT and we satisfy exactly the same regulations as terrestrial LoRaWAN® networks in every region. Our sensors are extremely low power and can switch seamlessly between the Lacuna satellites and terrestrial LoRaWAN®. Making our service complementary to terrestrial networks, providing LoRaWAN coverage across 100% of the UK territory.

[redacted]

Potential impact of the technology against the following criteria:

Enable the delivery of new services which are valued highly by people and businesses. We enable by definition new IoT services that just cannot be offered by LoRa Gateways on the ground, either due to technical or business case challenges. In most cases, the areas we serve have no other wireless or even power infrastructure. In the UK we work with IoT integrators and network providers to enable use cases such as monitoring remote infrastructure for power generation such as wind turbines or applications in agriculture such as smart irrigation systems. We have also had discussions with the Met Office, contributing data from sensors at sea, such as boats or yachts (temperature, pressure, acceleration) to enhance weather prediction models.

We cover the UK territory, but our market is not limited to the UK. We use low earth orbit satellites that cover the whole world by design. However the fact that we have a global market and supply chain means that we can in turn offer a better and cheaper service to the UK consumers.

Broaden and deepen access to services. As mentioned above, we effectively broaden the geographical coverage of LoRaWAN everywhere across a given territory. The amount of data that can be transmitted over the satellite network depends on the number and type of satellites we will deploy in time. We plan to offer a near real time service by 2025.

Increase the performance of networks, improving the experience for people - Reduces the total environmental impact of delivery of communication services and associated activities: Our service is extremely low power. To illustrate that, we are running a pilot powering our satellite transmissions directly from electricity extracted from plants! In more commercial scenarios, our trackers combine multi-technology chips and geolocation from our satellites to increase battery lifetime by years. For more information you can read more on our website or online press.

This means that we can substantially increase the battery performance of our devices by years, with respect to other IoT technologies and especially with respect to classical satcoms. Apart from saving costs, there is also a positive environmental impact on battery replacement. In addition, if a service does not require frequent messages, we eliminate the need for installing and powering a local gateway.

Lower barriers to entry for providers, enabling choice for people. We significantly lower the entry to service provision using satellites to the enormous IoT ecosystem: ranging from hobbyists, creating their own electronic boards for satellite transmission, to national telecoms carriers reselling our capacity.

This is possible because we use the open LoRaWAN protocol and open source design standards. Our devices use the same mass market electronic components sold for terrestrial LoRa devices. Only a different type of antenna is needed in most cases but this is purchased online and is off-the-shelf. We are the only satellite IoT provider having demonstrated such a service. Satellite communications almost always make use of proprietary and closed standards.

The ease of integrating our communications technology into sensors that traditionally operate in remote areas also gives rise to new business models! As an example, we see more and more demand in “sensor manufacturers” such as water pump or gas meter manufacturers moving from selling pure hardware to selling “smart hardware” which is sold bundled with a service and therefore generates a recurring revenue stream.

[redacted]

Assure the security and resilience of service delivery. Our service and devices make use of the latest and standard LoRaWAN security practices. We use the ABP or Activation by Personalisation (ABP) technique and/or Hardware Secure Elements. To assuring maximum resilience of our space assets, we work with the European Space Agency and purchase satellites from recognised and respected providers.

Current state of development of the technology, including any demonstrations of feasibility: In terms of expanding our satellite network, we currently have one satellite in orbit and another four missions planned to be launched in the next three quarters. An initial 24 satellite constellation is planned for development and purchase this year and launch end 2021/2022.

Using our first satellite we have demonstrated successful service delivery through pilots across the whole world! Our Technology Partner Programme has more than 30 members and is growing continuously. Our TPP partners develop and test prototype products and components such as development boards, device software and devices for popular applications such as trackers or soil moisture sensors.

Any unresolved issues which need to be addressed for the technology to achieve full potential: Same as any emerging technology we are on a journey in further developing our products and services and testing them at scale so that they are sold through standard IoT, mass market channels. We target a global market of millions of sensors in the next 5 years, so we are in the process of scaling up our technical and commercial operations to achieve that.

References to key publications and the leading groups working on the technology: Lacuna Space is a member of the LoRa® Alliance and uses the LoRa® and LoRaWAN® family of standards and protocols.

Would be open to discussing the technology in more detail with Ofcom: Yes, please contact us either by email or phone, for any questions or clarifications.

Please complete this form in full and return to emerging.technology@ofcom.org.uk