National Information and Communications Technology Authority (NICTA)
P.O. Box 8444,
BOROKO, NCD, 111
Papua New Guinea

4 September 2023

KACIFIC RESPONSE TO NICTA PUBLIC CONSULTATION DISCUSSION PAPER

Kacific Broadband Satellites International Limited ("Kacific") is pleased to provide its response to the National Information and Communication Technology Authority ("NICTA") Public Consultation Discussion on Licensing for the Provision of Non-geostationary Orbit (LEO/MEO) Satellite Services in Papua New Guinea.

Kacific is a satellite operator, providing wholesale capacity to local telecoms operators and Internet service providers (ISPs) that are duly licenced by NICTA. These local partners that resell Kacific's capacity to end users, include Telikom Ltd, Emstret, Lightspeed, and PNG DataCo. Our distribution model benefits local companies and businesses, creating more value in the local value chain, while ensuring consumers' interests are protected through the availability of local technical support.

The Kacific-1 satellite connects as many as 1,300 very small aperture terminals (VSATs) in Papua New Guinea, providing vital, reliable, and robust connectivity for people, businesses, villages, schools, hospitals, and government facilities. Operating in geostationary orbit (GSO), Kacific's services are proven to be reliable and have been pivotal in providing connectivity to many across the country for the first time.

Kacific – as a trusted and proven connectivity enabler in Papua New Guinea – is pleased to provide its opinions on the matters posed by NICTA as below.

<u>On the Licensing of NGSO Constellations and Specific Provisions or Exemptions</u>

Kacific agrees with NICTA that if a satellite service provider intends to own or operate infrastructure within the boundaries of Papua New Guinea – such as ground stations and cabling, and sell directly to end users without engaging local resellers or partners – it should be subject to the prevailing individual network license requirements outlined in the National Information and Communication Technology (Operator Licensing) Regulation 2011.

Furthermore, while GSO and NGSO services may differ technically, there is no difference – from a regulatory perspective – in the type of services provided, the spectrum bands used, and the methods of service delivery of/by both types of operators. As such, it is imperative that no special licensing provisions should be applicable for NGSO operators; the issuance of special exemptions will be favouring a particular market player at the expense of local licensees. It is imperative that regulators remain neutral and regulate all market players in a fair and equitable manner.

Kacific views that any satellite connectivity services, whether GSO or NGSO, provided within Papua New Guinea must be provisioned by a licensee which holds an authorisation issued by NICTA. Kacific's local resellers in Papua New Guinea – such as Telikom Ltd, Vodafone, Emstret, Lightspeed and Genesis– are duly licensed by NICTA as individual network licensees and have the requisite authorisations to operate VSATs, as per Schedule 1 – Licence Categories of the National Information and Communication Technology (Operator Licensing) Regulation 2011.

These licensees make a profit by reselling Kacific's capacity and contribute to the development of the local ICT ecosystem through the payment of licensing fees, which supports universal access programmes (UAP) and other connectivity initiatives. Local licensees also hire locals and contract with local vendors, leading to positive knock-on effects for the economy.

The regulation of the communications sector in Papua New Guinea must also consider regional and global best practices. Across the Pacific Islands, regulators – in Tonga, Samoa, Kiribati, Fiji, and many others – have not granted any specific regulatory provision or exemption to NGSO providers, barring emergency provisions. In other global telecoms markets, including Japan, United States, South Korea, and Singapore, there are no special exemptions or provisions applicable to NGSO operators.

<u>On NICTA's Assessment of the Current Terms and Conditions of Individual Network Licences</u>

Kacific has no strong view on the matter. NGSO constellations have inherently different technical capabilities compared to GSO, and Kacific does not wish to comment on whether technical terms and conditions pertaining to network performance or availability should be applicable to NGSO constellations as Kacific is a GSO operator. Such NGSO networks remain untested and unproven in the local connectivity context and as such, the technical terms and conditions imposed on NGSO by NICTA may be unachievable.

Kacific wishes to outline that – at present – no specific guarantees are made on the reliability of NGSO services; for instance, Starlink does not appear to make any guarantees on the reliability and availability of its services to its end users. No service level agreements (SLAs) are provided by Starlink, and the performance of its network may be governed only by its Fair Use Policy (FUP), which is unilaterally decided by the company. NICTA should consider these issues when imposing technical requirements on NGSO networks.

Further, due to the dynamic nature of its low Earth orbit satellite constellation, Starlink's satellite internet service faces blockage issues primarily due to physical obstructions. Physical obstacles such as buildings, trees, and terrain can obstruct the line of sight between the user's satellite dish and the orbiting satellites, leading to signal disruptions. Moreover, Starlink's LEO satellites are constantly moving across the sky, requiring the user's antenna to track and maintain connectivity with satellites in view. Adverse weather conditions like heavy rain and cloud cover can also attenuate the satellite signal. These factors collectively contribute to intermittent service interruptions in some locations.

The long-term viability of NGSO networks in Papua New Guinea and the Pacific Islands is still unclear. Many NGSO networks globally have faced challenges scaling owing to inherent

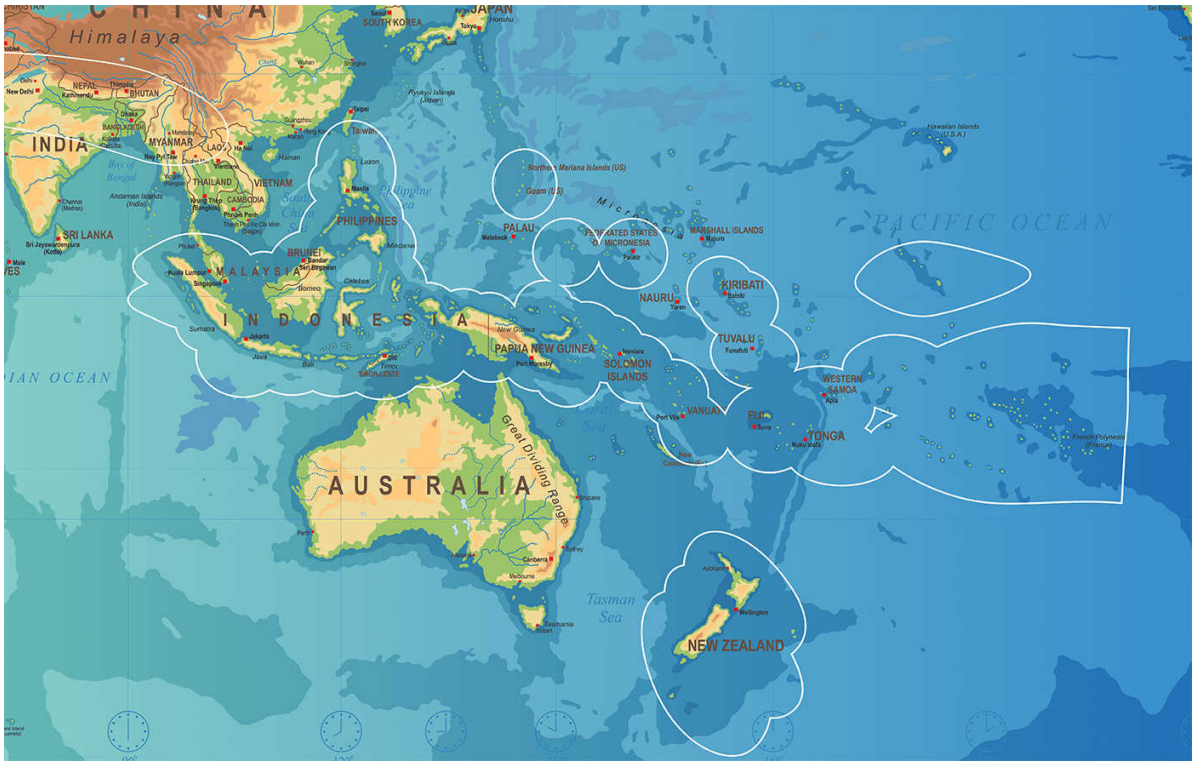
limitations of maintaining a large-scale satellite network featuring thousands of satellites and complex inter-satellite links. The lifespan of such satellites is also short – around five years for most NGSO satellites – which may potentially lead to frequent service outages. Kacific requests that NICTA also consider these potential issues.

NGSO satellites do face low utilisation rates, which can be attributed to several factors. These constellations are often deployed incrementally, with only a fraction of planned satellites initially launched, resulting in limited capacity. Additionally, achieving economic viability is crucial, with profitability dependent on subscription fees and user adoption. This challenge is exacerbated in developing countries like Papua New Guinea where high costs of user terminals and services relative to local incomes deter adoption. Some companies may choose to subsidise terminal costs and service fees to grow market share at the expense of other operators. This eventually places added pressure on these companies to later recoup their investments through higher prices. Behaviour which can be viewed as anti-competitive in nature. Considerations which must be taken into account by regulators such as NICTA.

<u>On Constraints on the Location of NGSO Service Operations</u>

Kacific does not believe that there should be any restriction or constraint on the geographical availability of NGSO services. Kacific is of the view that competition – conducted in a fair manner – will contribute to bridging the connectivity gap. A single GSO satellite can provide ubiquitous connectivity for an entire country; it is equitable for NGSO constellations to be able to serve the same footprint without additional barriers.

Figure 1 – Kacific-1 Coverage Map



Source: Kacific

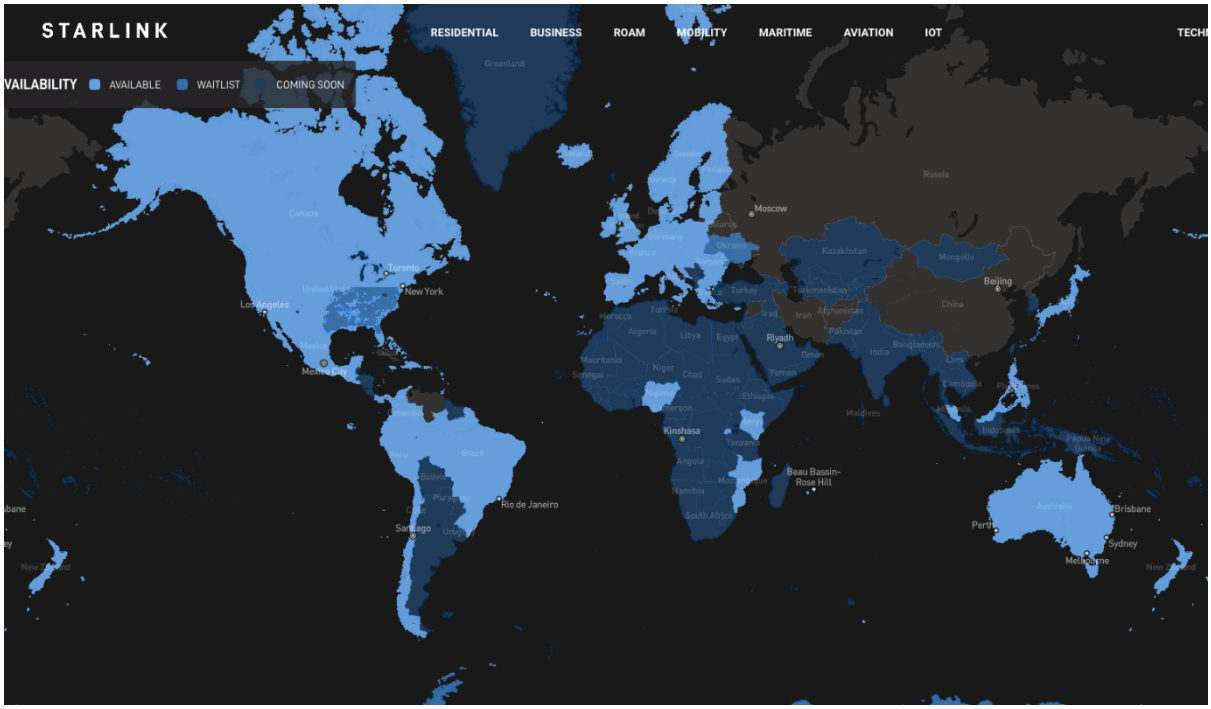
<u>On the Inclusion of NGSO Service Providers in the Universal Access Scheme (UAS)</u>

Kacific strongly objects to the structuring and management of NGSO services within the UAS administered by NICTA. Given the current conditions of NGSO technology in the connectivity space in Papua New Guinea and the Pacific Islands, Kacific requests that more comprehensive studies be conducted by NICTA and other stakeholders on the long-term viability of NGSO solutions.

Existing NGSO constellations available in Papua New Guinea – such as Starlink – remain heavily subsidised by their owners, and it is unclear whether the unit economics will be sustainable in the long term. In Starlink's core market of the United States, the operator has started to raise monthly access fees and limit data usage given the congestion experienced on its network. The costs of its services and equipment vary widely across markets and applications, and may not be necessarily cheaper than existing GSO solutions.

It is also becoming increasingly clear that NGSO providers like Starlink may be less interested in expanding connectivity to rural and underserved regions, and may be targeting more lucrative segments such as consumers in more developed areas. Referencing Figure 2 below, Starlink's service rollout focused on North America and Europe first, followed by Australia, New Zealand, Japan, and South America. This was then followed by emerging markets, suggesting its aim of connecting underserved areas as a secondary priority.

Figure 2 – Starlink Coverage Map, Extracted on 21 August 2023



Source: Starlink https://www.starlink.com/map

Thus, subsidising or engaging such untested NGSO services for UAS could potentially lead to operational and technical challenges of sustaining such projects in the long term. GSO services,

on the other hand, have proven to be effective and successful in the region and globally. Kacific's services are being utilised for numerous UAS projects across the region; our local resellers and partners work closely with regulators to ensure successful implementation of such UAS projects.

Kacific's services across its Pacific Islands footprint is also based on a 'one price policy', reflecting the true cost of bandwidth to provide the service. Our satellite (and other GSO satellites) also provides intelligible voice and video services and delivers connectivity which can support many use cases and applications. Across our footprint, we connect more than 10,000 VSAT at costs comparable to terrestrial services. Kacific-1 also provides mobile backhaul to many sites across Papua New Guinea to extend the coverage of mobile services to the average mobile device user. Our partners include the three main mobile operators in Telikom Ltd, Vodafone PNG and Digicel PNG,

Kacific proposes that – alongside any potential UAS technical trials involving NGSO VSATs – it provides numerous terminals of its own to be integrated with trial sites so that the social and economic impact of NGSO systems can be studied with a proper reference point.

<u>On the Long-term Viability of NGSO – and Particularly LEO – Systems</u>

Article 44, paragraph 2 of the International Telecommunication Union (ITU) Constitution recognises that spectrum and orbits are limited natural resources and must be utilised "rationally, efficiently, and economically". Kacific views that – as a company which has a stake in the success of the space industry – we have a shared responsibility to ensure that we protect these resources and ensure equitable access to space for all.

LEO satellites are nothing new and have been around for decades without ever being profitable.

LEO constellations are populating satellite orbits at a rapid rate, potentially leading to congestion that would significantly increase the risk of collisions, and other wide-ranging and long-term impacts of access to space by everyone. LEO constellations also pose several environmental and sustainability challenges, which affect the satellite industry as a whole – this includes light pollution and atmospheric damage. Kacific requests that NICTA and other stakeholders study these implications carefully.

- **Atmospheric Damage and Climate Change**: The frequent re-entry of large LEO satellites into the Earth's atmosphere at the end of their short operational lives contributes to radiative forcing and ozone layer depletion. This, in turn, heightens the risk of cancer and other adverse health effects.

- **Light Pollution**: The increased presence of LEO satellites could contribute to light pollution, adversely affecting the health and well-being of humans, as well as the flora and fauna.

- **Disruption of Astronomical Research**: The proliferation of LEO satellites interferes with essential optical and radio astronomical research by obscuring the visible night sky and causing radio frequency interference for radio astronomy.

- **Hindrance to Asteroid Detection**: The dense deployment of LEO satellites hampers the functionality of crucial asteroid detection and defence systems.

- Interference with other GEO satellites

For most applications, GSO satellites can provide similar bandwidth and undiscernible latency, and are able to provide larger coverage while occupying a significantly smaller footprint in space. This reduces the number of satellite launches and associated rocket emissions, contributing less to climate change. Additionally, the longer operational lifespans of GSO satellites compared to LEO counterparts mean less frequent replacements and, thus, fewer launches over time. This translates to reduced space debris and a lower risk of satellite collisions, contributing to a cleaner and safer space environment for all.

Concluding Remarks

Kacific welcomes NICTA's proactive stance to regulating new market players and wishes to continue engaging NICTA and all connectivity stakeholders to constructively find ways to better regulate connectivity and expand services to the unconnected. The opportunity to connect the country has never been better – new innovations and business models are transforming connectivity – and it is important that regulation is forward-looking and responsive to these developments.

Kacific believes that any service provider operating within a market should engage and give back to the local community. There is a need for each service provider to have a local presence either through a licensed local representative, such as an ISP or telecom operator, or through a local entity, which is duly licensed by the regulator. Across Kacific's entire operational footprint, we adopt one of these two models depending on market contexts. It is imperative that every service provider does the same.