

## GSOA response to BEREC on Draft Work Programme for 2024

GSOA is the only global non-profit association of the entire satellite ecosystem that brings members together and serves as the premier platform for worldwide collaboration. As the only CEO-driven satellite association in the world, GSOA takes the lead in addressing global challenges, seizing opportunities, and providing a unified voice for the satellite industry. Our vision is to help policymakers improve the state of the world by continuously bridging digital, education, health, social, gender and economic divides across diverse geographies and across mature and developing economies.

The satellite industry is going through a phase of unprecedented growth and innovation. with total annual investment going up from US\$300 million in 2012 to more than US\$10 billion in 2022.<sup>1</sup>

The fast-paced development of the satellite industry has been evidenced by the large-scale implementation of Non-Geostationary (NGSO) systems, the design and launch of a new-generation of very high-capacity (Geostationary) GSO satellites, progressive integration of Non Terrestrial Networks (NTN) and Terrestrial Networks (TN) in 5G and future 6G solutions, industrial IoT (such as NTN NB IoT solutions) and satellite direct to cellular communications, to name but a few. As a result, the number of satellite broadband users globally is set to grow to at least 500 million people by 2030.<sup>2</sup> These innovation and progress will have a direct impact into the inclusiveness and quality of life of all citizens, including in Europe and its neighbouring regions.

GSOA welcomes BEREC's draft Work Programme for 2024 that now identifies satellite as a key technology to provide communications solutions and is pleased to share views on the following topics raised in BEREC's document.

### 1. The usage of satellite technologies in mobile communications

GSOA fully appreciates that mobility services, that are increasingly dependent on satellite technologies, is a focus of BEREC. There is no single technology that alone can meet the evolving connectivity needs of European citizens. Only by relying on a variety of technologies can Europe really strive towards a network of networks that truly benefits citizens in all Member States for 5G and 6G.

Satellite systems are part of NTNs: 3GPP Release 17 and the future Release 18 will both be key to pave the way to further integrate satellite communications into the 5G/6G ecosystem. Innovation in the satellite industry ensures that both GSO networks and non-GSO systems to contribute to 6G networks in providing coverage, resilience, security and energy-efficiency/sustainability.<sup>3</sup> BEREC should understand that satellite communications are a key element of connectivity not only for mobile communications, but also for fixed communications including broadband services.

Concerning 6G, satellites will be part of the solution to provide immersive communications that satisfy European efforts to tackle digital inequity and achieve sustainable growth. As further explained below, there are three main roles for satellites in 6G:<sup>4</sup>

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<sup>1</sup> [A different space race: Raising capital and accelerating space investment | McKinsey](#)

<sup>2</sup> [The Socio-Economic Value of Satellite Communications](#)

<sup>3</sup> [GSMA and ESA Partner on Satcom/Terrestrial Convergence - Via Satellite \(satellitetoday.com\)](#)

<sup>4</sup> See from: [Satellite Communications and their role in enabling 6G – GSOA – Global Satellite Operator's Association \(gsoasatellite.com\)](#)

- Expand the reach of 6G to all sensors and devices that transmit and receive data for immersive applications
- Help promote sustainable 6G network growth and facilitate projects that aim to further ecologically sound progress
- Foster resilient 6G networks that protect connectivity requirements when TNs succumb to disasters

GSOA would therefore welcome that, in the Proposed BEREC satellite workshop to be held at Q2 2024, BEREC encompasses the role of satellite in fixed and mobile services, and in resilient communication systems; plus the future role of satellite in 6G.

## 2. Very High-Capacity Networks (VHCN)

GSOA fully understands the importance of deploying Very High-Capacity Networks (VHCN) in Europe that will contribute to Europe's competitiveness and international leadership. However, as noted by BEREC in its introduction:

*Closing the digital divide entails more than just the roll-out of very high-capacity networks. It also requires end-users to have access that fits their needs. BEREC will empower end users by further enhancing transparency and will continue its work on defining adequate broadband Internet access service and giving guidance about Quality-of-Service parameters.*

The EU decision-makers should ensure that fostering new technologies will not be done by neglecting the digital divide. As a reminder, many rural and remote areas of Europe still do *not* benefit from a high-quality, always-on 4G level of connectivity. While at the same time there has been significant recent technological evolution in GSO and NGSO satellite technologies, which offer broadband capacity across the globe, bringing reliable connectivity to the hardest-to-reach across Europe.

For example, recently deployed and upcoming NGSO systems in medium or low-Earth orbits can now provide low-latency connectivity capable of supporting a wide range of applications in all geographical areas. Advances in satellite construction and competitive pressures are also reducing the costs of these services for users.

GSOA therefore urges BEREC to consider all technologies to achieve the goal towards closing the digital divide as part of its discussions and areas of expertise, including both GSO and NGSO satellite solutions, no matter whether they (yet) meet the stringent requirements of VHCN in terms of symmetric bitrates and super-low latency.

## 3. Environmental Sustainability

While satellite connectivity is starting to compare favourably with terrestrial wired solutions in many developed and developing country environments. Satellites are promoting sustainable 5G and 6G network growth and facilitate projects that aim to further ecologically sound progress.<sup>5</sup> As terrestrial networks become difficult to construct in many localities, carbon costs associated with the projects increase. By having solar-powered satellites part of 6G network architectures, carbon costs by terrestrial network expansion can be nullified by satellite connectivity in the same area.<sup>6</sup>

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<sup>5</sup> [Sustainable Satellite Communications in the 6G Era: A European View for Multilayer Systems and Space Safety | IEEE Journals & Magazine | IEEE Xplore](#)

<sup>6</sup> GLOBAL SATELLITE OPERATORS ASSOCIATION, *supra* footnote 5, page 4

Furthermore, the global nature of climate change requires devices and sensors to be globally connected such that meaningful monitoring efforts can ensue to contribute to sustainability goals. NTN must be fully integrated into terrestrial networks (TNs) to achieve this reality.

GSOA notes that “BEREC wishes to continue contributing to the work on the implementation and collection of relevant and harmonised environmental indicators in the telecom sector.” We ought to highlight the importance to have *all* actors of the telecommunications ecosystem to be involved in this task, so we’re asking BEREC to enable our members to contribute to their future activities on this regard by inviting the satellite industry to be included in the workshop to be held at Q3 2024.

#### **4. Opportunities and challenges for networks resilience**

Satellites will establish resilient 5G and 6G networks that protect connectivity requirements when TNs succumb to disasters.<sup>7</sup> For example, climate change continues to showcase the failure of TNs when natural disasters occur.<sup>8</sup> Additionally, anthropogenic disasters—particularly warfare—illustrate how TNs can rapidly devolve into military targets for cyber-attacks.<sup>9</sup> Under traditional structures that treat NTNs as supplemental, continuous 6G service cannot be reinstated—especially since 6G places greater demands on networks. In contrast, three-dimensional network architectures—accomplished by fully integrating NTNs and TNs—can ensure service is agile to respond to these unexpected events and connectivity remains seamless for users. Space and satellite actors are already active in advancing cloud and software control and management of networks<sup>10 11</sup>, as well as on quantum computing<sup>12</sup> solutions in Europe and elsewhere. The role of satellite in the resilience of future communications networks cannot be underestimated. GSOA is therefore asking BEREC to be fully associated to the preparation of the external workshop to be held in Q4 2024.

#### **5. Perspective and Challenges of the Internet of Things (IoT)**

The global coverage of satellites is expanding the reach of 5G and 6G to all sensors and devices that transmit and receive data for immersive applications.<sup>13</sup> Rather than merely having a supplemental role in network connectivity, satellites in 5G and, in the future, 6G, do and will facilitate that fully interconnected devices are accessible by anyone, anywhere, at any time. Such connectivity ensures that sensory experiences do not fall short of providing real-time communications.

GSOA would therefore welcome that the role of satellite is getting duly considered in BEREC’s future analysis of the perspective and challenges for the deployment of Internet of Things.

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<sup>7</sup> Maurilio Matraccia et al., IEEE OPEN J. OF THE COMM’NS. SOC’Y, PAGES 1177-1178 (2022) from: [Post-Disaster Communications: Enabling Technologies, Architectures, and Open Challenges | IEEE Journals & Magazine | IEEE Xplore](#)

<sup>8</sup> FAIR TECH INSTITUTE, THE ROLE OF SATELLITE COMMUNICATIONS IN DISASTER MANAGEMENT, PAGE 18 (2022) from: [The-Role-of-Satellite-Communications-in-Disaster-Management.pdf \(accesspartnership.com\)](#)

<sup>9</sup> [NATO - Topic: NATO’s approach to space](#)

<sup>10</sup> See from: [Bringing the cloud to all | SES](#)

<sup>11</sup> See from: [Software defined satellite networks: A survey - ScienceDirect](#)

<sup>12</sup> See from: [ESA - Eagle-1](#)

<sup>13</sup> GLOBAL SATELLITE OPERATORS ASSOCIATION, *supra* footnote 5