6G will bring the human, physical and digital worlds together: Experts

- *BIF Compendium of Expert Views on "6G: The Future Digital Technology" released by Shri K. Rajaraman, Chairperson – DCC & Secretary – DoT*

New Delhi, 21 September 2022: Broadband India Forum (BIF), the leading independent Think-Tank and Policy Forum for Digital Communications in the country, organised a session of **The Digital Dialogues on '6G: Future Vision and Perspectives'**, on the occasion of the **BIF Annual General Meeting held on 20th September 2022**, with **Shri K. Rajaraman, Chairperson, Digital Communications Commission (DCC) & Secretary, Department of Telecommunications (DoT), Ministry of Communications, Government of India as Chief Guest.** Post the BIF AGM, The Digital Dialogues session was held, wherein a **BIF Compendium on thoughts and perspectives by Experts on the topic of "6G - The Future Digital Technology", was released by the Chief Guest.**

The BIF 6G Compendium is a collection of thought-provoking and interesting perspectives and viewpoints from leading academic and industry experts, on various aspects of this futuristic subject.

Mr. T.V. Ramachandran, President, Broadband India Forum, shared on the occasion, "*Across the globe - whether it be Finland, Japan, South Korea, China, USA as well as India, the idea of 6G has initiated a paradigm shift in terms of facilitating various research activities to bring this new generation of digital technology into reality by 2030. For India, Research and Development on 6G is crucial at this stage to gain a global leadership position. This 6G Compendium is intended to provide useful inputs for determining the future engagements and advances that we need to make towards gaining global competencies and leadership in 6G.*"

Some of the major views/perspectives observed from the expert contributions to the compendium indicate that 6G is envisioned to be as follows:

1. 6G is all about **convergence of the physical and the virtual**, the connected world with the hyper-connected world, the universe with the metaverse, the real with the surreal, and likewise.
2. 6G networks are expected to function as the fabric of the converged physical and digital worlds, providing **intelligence, limitless connectivity and complete synchronization**.
3. A foundational feature for 6G – **'sensing' is a "new channel" that would observe, sample and link the physical and biological worlds to the cyber world**.
4. In the 6G era, we are likely to see **applications that will not only connect humans with machines besides machines to machines, but also connect humans with the digital world**:
    a. **Digital Twins of Networks, Assets, Processes, Systems will come together at scale** and **Holographic telepresence will become the norm** for work and social interaction.
    b. Dynamic digital twins with increasingly **accurate, synchronous updates of the physical world will be an essential platform** for augmenting human intelligence.
5. 6G is predicted to be a **disaggregated, virtualized, and scalable network comprising of smaller network functions with granular functionality**, which will enable application-specific protocol processing.
6. 6G is envisioned to be majorly **"Experience" centric**, and is expected to bring about the implementation of a **'Sense-Detect-Act-Correct' paradigm**.

7. The **millimetre wave frequency bands in the 24 GHz to 52 GHz range**, pioneered by 5G and likely to soon be extended up to 100 GHz, will naturally be used by 6G. The **7–24 GHz range can be exploited for 6G by deploying advanced sharing** mechanisms.
8. 6G communication systems are expected to be featured by the following types of KPI associated services:
    a. **Ubiquitous mobile ultra-broadband (uMUB)**
    b. **Ultra-high-speed with low-latency communications (uHSLLC)**
    c. **Massive machine-type communication (mMTC)**
    d. **Ultra-high data density (uHDD)**
9. There is a **heightened focus on energy consumption and energy-saving techniques** anticipated to be in the 6G system. 6G systems will also likely demand **independent, vendor-agnostic testing and validation**.
10. There are four broad drivers expected for the 6G networks – **Trustworthiness, Sustainable World, Simplified Life and New Application Demands**.
11. Evolution on the path to 6G is envisioned to comprise **Foundational Air Interface Innovations (Advanced MIMO, Mobile mmWave, AI-enabled Air Interface, etc.) and Expansion to New Applications (Wide-area IoT Expansion, Industrial Precise Positioning, Industrial 5G, etc.)**.
12. It is anticipated that the global standards organizations like **International Telecommunication Union (ITU) shall be releasing the IMT-2030 document for 6G in 2030**.
13. Other standards organisations viz. 3GPP, IEEE, and regional standards bodies of Korea, Japan and India are working to develop their own standards around the same timelines. **Standardization- phase 1 is likely to start from 2025, leading to the first 6G specification to be ready by 3GPP Release 21 in 2028. It will be followed by commercial deployments** around 2030.
14. 6G is projected to employ **cell-less access networks, integrated non-terrestrial networks, joint sensing and communications, new spectrums such as terahertz (THz) communications, will support open interfaces that interconnect all network functions, end-to-end orchestrators, and, most noticeably, artificial intelligence (AI) machines** that govern all functional modules and operational services.

Digital copy of the 6G Compendium can be accessed at https://bit.ly/3delZTt

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About Broadband India Forum

Broadband India Forum (BIF) functions as an independent policy forum and knowledge-based think-tank that works for the development and enhancement of the entire broadband ecosystem in a holistic, technology-neutral and service-neutral manner. BIF has established itself as a thought leader and a credible and effective voice, to help propel the nation to achieve the country's ambitious vision of creating a Digital India. To achieve this, BIF works to promote the rapid development of policies, so as to facilitate affordable and high-speed ubiquitous broadband throughout the country.

For further information, please contact:
Kaustuv Sircar – kaustuv@broadbandindiaforum.in/+91-9999326911/+91-7003157047