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National Workshop on Ethical Framework for 6G

22 September 2023 Friday | **14:00-19:30 hrs (IST) Hybrid Mode** | **Constitution Club of India New Delhi**

Supporting Association

COAI | IAFI ITU-APT Foundation of India

Workshop Report

Background & Context

Critical and emerging cyber technologies, such as 6G, hold crucial strategic importance in the present geo-political landscape. Recognising this significance, the QUAD members are coordinating closely on these new and emerging cyber technologies. For instance, India and the US share the vision of "creating secure and trusted telecommunications, resilient supply chains, and enabling global digital inclusion" and hence commit themselves to the Initiative on Critical and Emerging Technology (iCET). A similar vision is shared under the Australia-India Cyber and Critical Technology Partnership (AICCTP). Thus, the Bharat 6G Vision aptly states: "design, develop and deploy 6G network technologies that provide ubiquitous intelligent and secure connectivity for high-quality living experience for the world".

Carrying forward the same thought process, a research consortium – comprising Consumer Unity & Trust Society (CUTS International), Australian Risk Policy Institute (ARPI) and the International Institute of Information Technology, Bangalore (IIITB) – has collaborated on a project entitled Ethical 6G: Identifying Elements for an Ethical Framework for 6G and Creating Opportunities for India and Australia. This project is supported by the Department of Foreign Affairs and Trade (DFAT) under the AICCTP Grant.

The initiative seeks to deep dive into four different aspects of 6G and produce research studies on: (1) Understanding the basics of 6G; (2) Strategic Opportunities for India and Australia from 6G; (3) Understanding Standard Making for 6G; and (4) Identifying Elements of an Ethical Framework for 6G

Against this backdrop, the Research Consortium organised the *National Workshop on Ethical Framework for 6G* wherein key preliminary findings from the Ethical 6G studies were presented and discussed and ideas for the way forward were brainstormed. While the full session recording can be accessed *here*, session highlights from the workshop are below:

Inaugural Session

Speakers

- **Sarah Storey**, Deputy High Commissioner, Australian High Commission
- **Rakesh Maheshwari**, CUTS Distinguished Fellow, Former Sr. Director and Group Coordinator, Cyber Laws and Data Governance, Ministry of Electronics and Information Technology

Session Highlights

- India and Australia have assumed a pivotal role in advancing critical and emerging technologies while concurrently influencing the formulation of their governance structures. The inaugural session underscored the mutual recognition of opportunities for collaborative efforts between the two nations, particularly in the realms of Artificial Intelligence (AI), blockchain, and 6G. The overarching principle guiding this collaborative endeavour is that technology should adhere to the principles of democratic values throughout its entire lifecycle, from conception and development to governance and usage.

- It was stressed that fostering strong partnerships with like-minded countries to collectively address the multifaceted challenges posed by critical and emerging technologies, with a specific emphasis on the forthcoming 6G telecommunication network. The commitment to upholding democratic values and ethical considerations in the technological domain resonated throughout the event, underscoring the shared vision of responsible and value-driven technological advancement.

- Advanced technologies, such as 5G and 6G hold a prominent position on Australia's list of critical technologies, primarily due to their critical role in national security. Notably, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) is actively engaged in researching the security aspects of 6G technology. Simultaneously, the Australian Department of Home Affairs is directing its efforts towards establishing a secure and interoperable telecommunications network, encompassing technologies like 6G and ORAN, within its connectivity test lab. This initiative underlines Australia's commitment to fostering secure and advanced communication systems.

- India, on the other hand, stands among the select few countries that have outlined a blueprint for 6G technology. Both Australia and India possess substantial potential to collaborate effectively, exert influence on the global discourse surrounding advanced

technologies, and contribute significantly to their development and implementation on a global scale. This collaborative approach holds the promise of advancing technological frontiers while ensuring security and shared interests.

- In the session, it was emphasised that India's ambition to become a leading contributor in the design, development, and deployment of 6G technology was highlighted through the launch of the 'Bharat 6G Mission.' This mission is rooted in the principles of affordability, sustainability, and ubiquity. Furthermore, the 'Bharat 6G Alliance' seeks to unite stakeholders from both the public and private sectors, as well as other relevant departments, with a shared objective of influencing telecommunications technology and fostering the growth of 6G within the nation.

- Cyber security has evolved from being a mere aspect of protection to becoming a critical element in national security. Nations are in the process of restructuring their regulatory frameworks about cyberspace and emerging technologies. In the absence of comprehensive multilateral regulations, countries frequently find themselves creating rules that may not necessarily align with the ideals of an open, resilient, and trustworthy cyberspace.

- As 6G telecommunications will encompass vast networks involving billions of diverse devices, there is a need to remain vigilant against potential threats from malicious actors. Tackling these challenges necessitates agile vulnerability detection and the implementation of effective remedial measures to minimise downtime and prevent the spread of such attacks. The deployment of robust telecommunication networks is deemed essential to guarantee the security and resilience of our cyberspace.

- Significant emphasis was placed on the transition to the era of 6G technology, highlighting its potential for substantial societal benefits. However, this advancement also raises a host of challenges, particularly in the domains of cybersecurity and safeguarding personal data.

- Enhanced collaboration among standards organisations, industry players, and academic institutions can yield significant benefits for both India and Australia. To address the complex nature of standards, digital trade, and internet governance, India and Australia should work towards a deeper and more comprehensive understanding of these interconnected issues.

- Furthermore, fostering engagement with regional standards organisations in the Indo-Pacific region is crucial. This approach allows both countries to tap into support from a diverse array of standard-setting bodies, enhancing their collective impact and influence.

Speakers

Moderator:
- **Deepak Maheshwari**, Senior Visiting Fellow, ICRIER

Panellists:
- **Jitendra Bhoi**, ADG (SRI), Department of Telecommunications, Government of India
- **V Sridhar**, Professor, IIIT Bangalore
- **Huzur Saran**, Professor, IIT, Delhi
- **Magnus Ewerbring**, Chief Technology Officer - APAC, Ericsson

Session Highlights

- It was emphasised that particularly in the context of 6G development, in addition to establishing a regional area office at ITU and launching the Bharat 6G vision, the government has set up two test beds – one for Terahertz technology and another for Advanced Optical Communication. These test beds are integral components of India's efforts aimed at realising its vision of becoming a leader in the 6G domain.

- Informing the discussion, the speaker mentioned that the Inaugural Steering Committee meeting was held at the Department of Telecommunications (DoT), and the first Memorandum of Understanding (MoU) is set to be signed between India and the US as part of the Bharat 6G Alliance. The speaker further conveyed that India is actively working to promote closer collaboration with global standard organisations. Furthermore, the speaker encouraged active participation from academic institutions, industry stakeholders, and organisations, such as CUTS International to facilitate comprehensive discussions.

- 6G will be built upon the foundation of 5G. Similar to 5G, both stand-alone and non-stand-alone deployment modes will be crucial, particularly for a country like India. Drawing from experiences with 5G, the seminar discussed the evaluation of Open Radio Access Network (O-RAN) technology. The possibility of an increased adoption of O-RAN technology in the context of 6G was explored, potentially revolutionising network architecture.

- The debate regarding licenced and unlicenced spectrum allocation is expected to intensify with the advent of 6G technology. During the session, it was emphasised that addressing regulatory challenges related to spectrum allocation is imperative, and strategic policy interventions will be essential for the successful development of 6G. India, as a nation, should not only aim to host the World Radio Communication Conference (WRC) but also

actively drive its agenda. In this context, the involvement and contributions of policy think tanks, academia, and other relevant stakeholders will play a pivotal role.

● 6G is at the forefront of exploring non-terrestrial networks, particularly for providing connectivity to remote areas. Lower earth-based operating satellites were recognised as valuable tools in extending network coverage to underserved regions. Satellite-based telecommunication will cover even remote parts of the country where today it does not make economic sense.

● In light of the critical need for a trusted network environment that transcends borders, the workshop also addressed the significance of collaborative standard setting. During the workshop, one of the speakers emphasised that the timeline for 6G is still somewhat nebulous.

● During the session, it was highlighted that mobile network operators have expressed concerns about revenue generation from 5G despite a substantial increase in the number of users. In this context, it was suggested that relevant stakeholders should contemplate the types of services they can provide to consumers to encourage them to invest more in these services. Presently, 5G has yet to fully unlock its actual potential in terms of use cases, particularly for consumers.

● 6G will not merely transform communication; it will extend its impact far beyond, as emphasised in various ITU documents. To realise this vision, there is a need to generate an ever-increasing volume of data and bridge the gap between the physical and digital worlds. One speaker aptly noted that data serves as both the fuel and exhaust of all digital technologies. While 6G will undoubtedly bring technological advancements, such as increased bandwidth, operators need to look beyond these technical aspects. Given that 6G will heavily rely on data from individuals and multiple entities, issues of trustworthiness and ethics assume even greater significance.

Speakers

Moderator:
- **Rajeev Shorey,** Professor, IIT Delhi

Panellists:
- **Bharat Bhatia**, President, ITU-APT Foundation of India
- **Pamela Kumar**, Former Director General, TSDSI
- **Jitendra Singh**, Government Affairs (India&SouthAsia), Qualcomm
- **Jishnu Aravindakshan**, Principal Product Architect at Tejas Networks
- **Vinay Srivastava**, Dy GeneralManager, Standards, Jio

Session Highlights

- The panel started with a discussion on whether 6G will be an evolution or a revolution. It was acknowledged that while 5G had initially been envisaged as a revolutionary leap forward, in terms of its vision, accomplishments, and standardisation; however, despite its intended focus on use cases and vertical applications, it ended up being primarily driven by research, intellectual property rights, and technological advancements. Consequently, it turned out to be an evolution rather than a revolution.

- In contrast, 6G can be seen as an evolutionary progression of the 5G vision, building upon its foundations by extending capabilities in areas such as enhanced mobile broadband (eMBB), low-latency communication (LLC), immersive experiences, and massive connectivity. Furthermore, 6G will incorporate crucial enhancements, including ubiquitous connectivity, integrated AI, and integrated sensing and communication. The 6G vision document also has future technologies such as radio interface technology to look upon spectral efficiency. Hence, it is a natural evolution of the 5G.

- Talking about 5G, it was highlighted that it has evolved from its predecessor, 4G, with modifications primarily in the radio part while retaining the core infrastructure often referred to as non-standalone (NSA) 5G. In NSA 5G, users experience minimal differences compared to 4G until the standalone network's core infrastructure is fully deployed, a process that can take some time. Similarly, with 6G, the introduction of a standalone network is expected to significantly enhance the user experience.

- Discussing the 6G vision framework, it was emphasised that India has made significant contributions to the vision statement encompassing usage scenarios like integrated sensing and communication, immersive experiences, integrated AI, hyper-reliable low-latency communication, ubiquitous connectivity, and massive communication.

- Talking about the use cases for 6G, it was underlined that ubiquitous connectivity will facilitate various use cases like vehicle-to-vehicle and vehicle-to-infrastructure communication, remote driving, remote farming, enhanced rural connectivity and industrial automation. Health-related services will play a vital role, enabling applications, such as robotic surgeries and remote medical consultations. These services demand low latency and high-quality bandwidth. Additionally, integrating voice technology as a native feature in 6G communication should be a critical application. The emergence of these new use cases in the 6G era may expand the role of satellites beyond terrestrial communications and involve synergising satellite and terrestrial networks. The direct-to-mobile broadcast can enable direct services to the masses through their mobiles.

- Talking about technology development, it was emphasised that the development revolves around three central pillars: standards development, regulatory frameworks for global adoption, and the creation of ecosystems to deliver cost-effective tech benefits to consumers. In 5G, India effectively aligned with this cycle, spanning spectrum availability, auctions, and ecosystem development, earning the distinction of being the fastest technology deployment. In the upcoming 6G era, India is poised to take a significant leap forward thanks to the 6G task force, visionary documents, and robust ecosystem support. It was also pointed out that timely spectrum identification is a crucial factor in ensuring that the technology development and deployment meet the designated timeframe and objectives effectively.

- Highlighting India's opportunities in the 6G era, it was noted that 6G's foundation on cloud solutions, AI, and ML complements India's software leadership. Furthermore, India's expertise in ITU standardisation and its abundant software talent pool position it favourably for significant contributions and growth in the 6G landscape. It was also highlighted that the biggest thing in 6G will be Indian companies building networks and not just equipment or software parts of it. India's efforts and contribution to 5G standardisation, especially the adoption of 5Gi by 3GPP were also lauded.

- It was also pointed out that three critical key performance indicators (KPIs) have been incorporated into the 6G framework: i.e. coverage, interoperability and sustainability. In the context of 6G sustainability KPIs include two critical aspects. The first focuses on lifecycle management, i.e. ensuring longevity through repurposing, reusing, and recycling resources. Secondly, a focus on quantifiable metrics, such as measuring the efficiency of energy transmission in terms of bits per joule, is important and India has made significant contributions to this.

- In terms of standards, it was highlighted that the standards lifecycle consists of three stages: pre-standardisation, standards development and post-standardisation. Early collaborative research is required in the pre-standardisation stage itself to ensure harmony in the standardisation process.

- Highlighting the importance of global collaboration, industries collaboration and startup involvement, it was emphasised that the standardisation needs to be outcome-driven, in terms of joint patents, prototypes, pilots, developments and use cases labs. These efforts will lead to the establishment of Standard Essential Patents (SEPs), and Fair, Reasonable, and Non-Discriminatory (FRAND) agreements will make sense. It was highlighted that collaboration is essential for facilitating genuinely usable and commercially deployable open-source solutions that are essential for 6G's widespread adoption across various industries.

Session 3: Ethical 6G- A Look at Policy & Regulatory Framework

Speakers

Moderator:
- **Mahesh Uppal,** Director, ComFirst

Panellists:
- **Aruna Sharma**, CUTS Distinguished Fellow and Former Secretary, MeitY
- **Vikram Tiwathia**, Deputy Director General, COAI
- **Rekha Jain**, Senior Visiting Professor, ICRIER
- **Balaji P**, Chief Regulatory and Corporate Affairs Officer, Vodafone Idea
- **Rohit Prasad**, Professor, MDI Gurgaon

Session Highlights

- Focussing on the potential of 6G technologies, the session started by pointing out that while it is easy to view 6G as the obvious next step from 5G, with its much faster speeds and lower latency, this perspective may overlook the significant and transformative changes it may bring. 6G is considered instrumental in realising the idea of the Internet of Senses, presenting policymakers with complex challenges regarding regulation.

- Crafting an industrial policy tailored to 6G, addressing issues like India's role in manufacturing, consumer protection, and regulatory preparedness for its impact on diverse sectors, including broadcasting and climate change, is paramount. Additionally, adapting telecom licensing, market structures, and the existing spectrum framework is essential to harnessing 6G's full potential.

- Lauding India's announcement of the Bharat 6G vision, the panellists argued that this is a testament to the dialogue and open conversation between stakeholders, enabled by the government. It was also argued that India's active participation in international standards body, ITU and the Quad alliance positions it to share valuable insights and experiences within trusted forums, contributing to the future development of 6G. Collaboration

between India's Bharat 6G initiative and the NEXT-G alliance is of significant importance to both the Indian and US governments and industries. India's ambitious vision of contributing 10 percent of Intellectual Property Rights (IPRs) to 6G becomes increasingly attainable with the government's establishment of six task forces dedicated to R&D, standardisation, and related endeavours.

- Deliberating on ethical considerations in telecommunications, it was emphasised that this encompasses principles of equity and equal opportunity. Expanding spectrum access to a wider range of participants is essential to foster innovation and ensure a level playing field. Adopting an approach that focuses on both making spectrum available and how it is distributed, is vital to prevent potential abuse of power and promote ethical use of this valuable resource.

- It was highlighted that equity in 6G encompasses other facets too, including digital literacy, access to devices and network connectivity. The advancements in these lines will help India's key sectors, viz, education, healthcare, agriculture, and transportation, thus, underscoring the importance of trust and security. This will have a tremendous effect on the workforce, including, gig, work-from-home and part-time workers.

- Highlighting the importance of security measures in 6G telecommunications, it was pointed out that security revolves around technological competition, with AI also playing a pivotal role. In addition, emerging technologies such as the metaverse and the Internet of Senses pose significant security and privacy concerns too. Success in cybersecurity measures hinges on investments, FDI policies, and labour laws that prioritise both security and privacy, ensuring a comprehensive approach to safeguarding the evolving digital landscape.

- For a trusted ecosystem, the panel underscored that there is a need for indigenous AI development and IPRs, especially in cloud computing, blockchain and quantum computing are pivotal, in bolstering cybersecurity. Thus, substantial investments are required at a faster scale and initiatives promoting competition are needed to offer consumers diverse options. The establishment of AI institutions and robust regulation will further support these endeavours, ensuring a secure and competitive landscape. In addition, 6G is going to have high energy consumption, and there is a need to have affordable energy pricing mechanisms.

- It was also highlighted that the rapid advancement of technologies like 5G and 6G is necessitating the development of new institutional frameworks to address emerging challenges. In dealing with these technologies, it is essential to adopt principle-based regulation over overly detailed regulations to avoid hampering innovation. Government policies should focus on enabling the innovation ecosystem rather than micromanaging. The establishment of self-regulatory bodies represents a novel approach, fostering

constructive dialogues and collaborations between regulators and the industry, aligning interests while navigating the dynamic landscape of emerging technologies.

● The panel also suggested the formation of a body, equivalent to NITI Aayog that will enable cooperation between ministries and other verticals to solve problems of education, health, logistics, transportation, etc. In addition, a National commission or a body on a spectrum with representatives from all stakeholders, including the Department of Telecommunications (DoT), Telecommunications Standards Development Society, India (TSDSI), academia, industry representatives, and others, was also suggested. This body may identify spectrum bands to be reformed and may also act as an arbitration panel.

For any further information, please contact: Asheef Iqubbal (aql@cuts.org) and/or Krishaank Jugiani (kju@cuts.org).