

No. 6-1/2021-IC
Government of India
Ministry of Communications
Department of Telecommunications
International Cooperation Division

12th Floor, Sanchar Bhawan, New Delhi

Dated: 30th December 2021

OFFICE MEMORANDUM

Subject: - Constitution of Task Forces under Technology Innovation Group on 6G.

Background

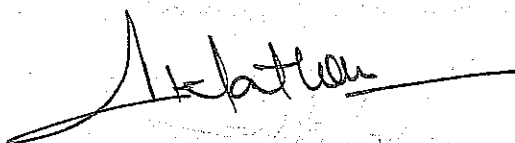
With 5G about to roll out soon in India, extensive use of IoT technology is expected to enable new use cases in different economic verticals. Ensuring rapid, efficient and cost-effective 5G rollout will be an opportunity for government, service providers and industry.

At the same time, work has begun globally at a feverish pace to identify and develop new 6G technologies that are likely to become viable and impactful in 10 years. For a developing economy like India with a large population and significant opportunities, it is vital to identify 6G technologies that are likely to make a major impact in addressing the needs of the economy and in meeting the challenges, in an affordable manner. These technologies will include but go beyond wireless and optical communications and extend to sensors, robots, actuators, and even real-time virtual collaborative activity.

6G will continue to use multilayer frequency band approach adopted in 5G. AI/ML will be not only a feature of 6G but also a service offered over the network. UHD Video and AR/VR applications will also require a lot of bandwidth. mmWave band will be deployed for integrated sensing and communications applications. The spectrum bandwidth required may be 500 MHz to multiple GHz per operator.

Multi-Disciplinary Solutions will be systems and use-case applications that will leverage currently defined 5G and evolve to 6G as next-generation communication technology intended to be used by various vertical industries beyond the usage by currently operating telecom service providers.

With a strong emphasis on technology commercialization, the work will encompass the full lifecycle of research and development, manufacturing, pre-standardization and market readiness.



2. Task Forces constituted under **Technology Innovation Group on 6G (TIG-6G)** for inputs to TIG-6G.

2.1 Multi-platform Next Generation Networks- Chair- Prof Bhaskar Ramamurthi

Terms of Reference

- Development of Network elements of Multiplatform Next Generation Networks
- Wireless GPON
- Spectrum Hyper-Efficiency in Networks
- Remote Near-Physical Skilled Activity
- LEO Satellite Overlay
- Drone Communications
- Any other items in the scope of 6G activities and overall deliverables

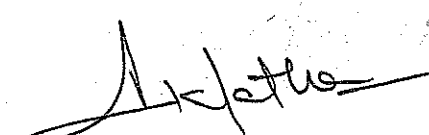
Task Force Composition

- i. **Prof. Bhaskar Ramamurthi (Chairperson), Director (IIT Madras)**
- ii. Prof. Abhay Karandikar, Dir (IIT Kanpur)
- iii. Prof. Kiran Kuchi, Department of Electrical Engineering, IIT Hyderabad
- iv. Prof. Neelesh Mehta, IISc, Bangalore
- v. Dr. Rajkumar Upadhyay, ED CDOT
- vi. Rep ITI
- vii. Rep COAI
- viii. Shri Subhash Mandal, VP-R&D, HFCL
- ix. Shri Parag Naik, Co-Founder & CEO, Saankhya labs
- x. Shri Umakant soni, Co-Founder & CEO, ART Park, IISc
- xi. Rep. Infosys
- xii. Rep. HCL
- xiii. Shri Puneet Agarwal, Founder & CEO, VVDN Technologies
- xiv. Dr. Kumar N. Sivarajan, CTO, Tejas Networks
- xv. Prof. V. Kamakoti, IIT Madras
- xvi. Prof. S.K. Saha, IIT Delhi
- xvii. JS level Rep. MeitY
- xviii. JS level Rep. DST
- xix. JS level Rep. Integrated HQ, M/o Defence
- xx. JS level Rep. DRDO
- xxi. **Shri Abhay Shankar Verma, DDG(MT), TEC- Member Secretary**
(Any other experts as co-opted members)

2.2 Spectrum Policy Task Force- Chair- Prof Abhay Karandikar

Terms of Reference:

- To reform mid-band and sub 1-GHz spectrum
- To consider the feasibility of 6 GHz and 10 GHz bands
- To consider more candidate bands in mmWave bands



- To explore the feasibility of THz band,
- To recommend options on secondary use of spectrum
- To consider new spectrum ownership and sharing models enabling flexible spectrum allocation.
- To consider integration of emerging coverage solutions like Satellites, Drones, Unmanned aerial vehicles etc. and consider their spectrum requirements
- To provide roadmap for channel measurements and new channel models for mmWave and THz bands
- To identify co-existence and dynamic spectrum sharing study items
- Any other items in the scope of 6G activities and overall deliverables

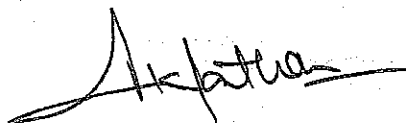
Composition of Task Force:

- i. **Prof. Abhay Karandikar (Chairperson), Dir (IIT Kanpur)**
- ii. Shri R K Saxena, Wireless Advisor, WPC
- iii. Shri Hemant Mallapur, Co-Founder and Executive VP of Engineering, Saankhya Labs
- iv. Shri Jitendra Singh, Sr. Director Govt. Affairs (India & South Asia), Qualcomm
- v. Shri Deepak Yadav, Radio, Technology Head, Nokia
- vi. Rep. Samsung
- vii. Rep. Ericsson
- viii. JS Level Rep. MIB
- ix. JS Level Rep. ISRO
- x. Rep. Integrated HQ, M/o Defence
- xi. Dr. P Hanumantha Rao, Scientist F, Head, Comm. Systems Division, SAMEER
- xii. Rep. C-DoT
- xiii. Rep. COAI
- xiv. Shri Bharat B Bhatia, President, ITU-APT Foundation of India
- xv. Shri Ashutosh Pandey, DDG(Radio), TEC
- xvi. Shri Kishore Babu, DDG(SRI)
- xvii. **Shri Bhagirath, Sr. DWA - Member Secy**
(Any other experts as co-opted members)

2.3 Multi-disciplinary Innovative Solutions- Chair Prof. Bharadwaj Amrutur, IISc Bangalore

Terms of Reference

- Use-case definition
- Developing indigenous globally competitive 'ahead of state-of-art' solutions and piloting them in real field environment
- Creating inputs for advanced research by practically establishing the limitation of available technology
- Providing substantial implementation inputs for global standardisation



- Pilot-trials
- Any other items in the scope of 6G activities and overall deliverables

Composition of Task Force:

- i. **Prof. Bharadwaj Amrutur (Chairman), IISc Bangalore**
- ii. Prof. Krishna Sirohi, Bharti School, IIT Delhi
- iii. Rep IIT-Roorkee
- iv. Rep IIT-Ropar
- v. Rep IIT-Mandi
- vi. Rep CDOT
- vii. Rep CDAC
- viii. Rep DST
- ix. Rep MeitY
- x. Rep Dept. of Heavy Industry
- xi. Rep ISRO
- xii. Rep COAI
- xiii. Rep Indian Council of Agricultural Research
- xiv. Rep Integrated HQ, M/o Defence
- xv. JS Level Rep. MHA
- xvi. Rep Infosys
- xvii. Rep TCS
- xviii. Rep Wipro
- xix. Rep Tech Mahindra
- xx. Rep HCL
- xxi. **Shri Kishore Babu, DDG(SRI), Member Secretary**
(Any other experts as co-opted members)

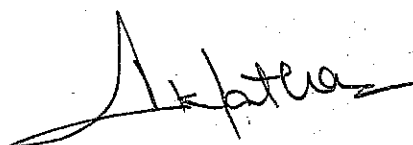
2.4 Devices: Chair -Prof. Kiran Kumar Kuchi (IIT Hyderabad)

Terms of Reference

- Development of 6G devices ecosystem
- To enable secure, reliable, high speed and low-latency communications links anywhere and anytime in order to connect all things (sensors, machines, people)
- To exploit AI/ML technology to enable Cyber Physical Fusion to advance socio-economic development of the country
- Establish early global consensus on requirements, key technology components, and device architecture
- Any other items in the scope of 6G activities and overall deliverables

Composition of Task Force

- i. **Prof. Kiran Kumar Kuchi (Chairperson), IIT Hyderabad**
- ii. Rep IIT Madras
- iii. Rep MEITY



- iv. Rep National Security Council Secretariat
- v. Rep ISRO
- vi. Rep DRDO
- vii. Rep Integrated HQ, M/o Defence
- viii. Rep ECIL
- ix. Rep BEL
- x. Rep SCL
- xi. Rep CDAC
- xii. Rep Tata Communications
- xiii. Rep VVDN
- xiv. Rep AuraSemi
- xv. Shri Himanshu Khasnis, Founder & CEO, SignalChip
- xvi. Shri Anindya Saha, CTO, Saankhya Labs
- xvii. Rep Qualcomm
- xviii. Rep COAI
- xix. Rep IESA
- xx. **Shri Sunil Kumar Singhal, DDG(DS)- Member Secretary**
(Any other experts as co-opted members)

2.5 International Standards Contribution- Chair- Mr N G Subramaniam, Chair, TSDSI

Terms of Reference

- Mapping global 6G activities and capability definitions
- Contribution for WP-5D on “Research Views on IMT for 2030 and beyond (3GPP Annex document 5D/886-E)”
- Pre-Standardization activities on 6G and streamlining the processes to be inclusive of all stakeholders
- Inputs to Standardization activities on 6G in TSDSI
- White paper on India’s competencies (India, Research Labs and Academia) and potential pre-standardization activities
- White paper on “India Mission 6G program”, Vision, Mission, Objectives and Structure.
- Any other items in the scope of 6G activities and overall deliverables

Composition of Task Force

- i. **Shri N G Subramaniam (Chairman), Chair, TSDSI**
- ii. Chairs of Study Group and *Working Groups*, TSDSI
- iii. EDR, C DoT
- iv. JS level Rep COAI
- v. JS level Rep MeitY
- vi. JS level Rep ISRO
- vii. Rep Integrated HQ, M/o Defence
- viii. Shri Christopher, JWA, WPC



- ix. Shri P K Singh, DDG(SA)
- x. Shri R Shakya, DDG(IR)
- xi. Shri Kishore Babu, DDG(SRI)
- xii. **Shri Ashutosh Pandey- DDG(Radio), TEC, Member Secretary**
(Any other experts as co-opted members)

2.6 Financing Research and Development - Chair- Member (T), Shri A K Tiwari

Terms of Reference

- Develop a roadmap for R&D, pre-standardisation, development of products and applications
- Propose and vet R&D proposals under the 6G Mission
- Research Ecosystem – industry-academia research partnership for IPR development, standards development and proof of concepts through research projects, PPP projects, testbeds and pilot roll-outs;
- Any other items in the scope of 6G activities and overall deliverables

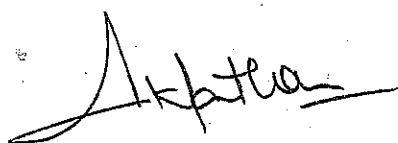
Composition of Task Force

- i. **Shri A K Tiwari (Chairman), Member (T)**
- ii. Advisor (F)
- iii. Sr.DDG, TEC
- iv. Sr.DDG, NTIPRIT
- v. JS(T), DoT
- vi. Rep NSCS
- vii. Rep DRDO
- viii. DDG(IC)
- ix. JS level Rep DST
- x. JS level Rep MeitY
- xi. JS level Rep DoS
- xii. JS level Rep NITI Aayog
- xiii. Rep Integrated HQ, M/o Defence
- xiv. EDR, CDOT
- xv. Secretary, TDB, DST
- xvi. Chairs of other Task Forces
- xvii. **Member Secretary, DDG(SRI)- Shri Kishore Babu**
(Any other experts as co-opted members)

3. The chairs of task forces may co-opt any expert as member of the Task force to assist them in their respective domains. They may also rope in global experts to mentor the Task Forces.

4. The immediate deliverables by the Task Forces by 31st March, 2022 are as follows:

A. By Individual task forces for respective domains

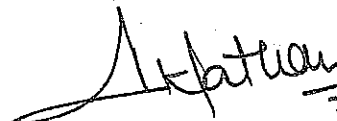


- Mapping global 6G activities and capability definitions
- White Paper on India's Competencies (Industry, Research Labs, Academia) and potential Pre-standardisation Activities

B. By Task Force Chairs based on above inputs

- White Paper on "Mission 6G Program" Vision, Mission, Objectives and Structure
- Contribution for WP-5D on "Research Views on IMT for 2030 and beyond (Annex Document 5D/886-E)

5. This issue with the approval of Secretary, Telecom.


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 Email: ddgic-dot@gov.in

To

**All the Chair of Task Forces and Member Secretaries for intimating to Members
 All the Members of the Technology Innovation Group on 6G**

Copy for kind information please

- PS to Hon'ble MOC
- PS to Hon'ble MOSC
- PSO to Secretary(T)
- PPS to Member(T)
- PPS to Member(S)
- PPS to Member(F)
- PPS to AS(T)