

Outcome Report

Apex Council under the Bharat 6G Mission and Review of Bharat 6G Alliance

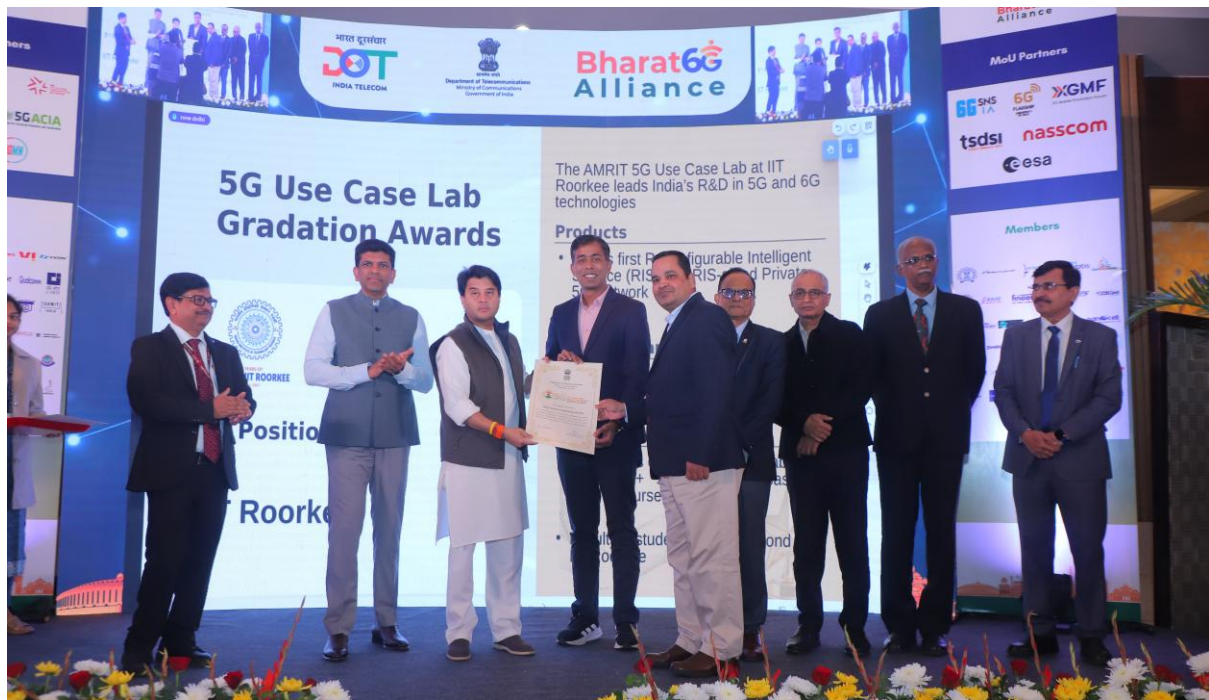
The Hon'ble Minister of Communications, **Shri Jyotiraditya M. Scindia** chaired the meeting of the **Apex Council under the Bharat 6G Mission and Review of Bharat 6G Alliance** on 09 December 2025. The Apex Council comprises senior representatives from multiple Ministries, including MeitY, MIB, Space, DRDO, and NSCS, as well as representatives from academia, R&D institutions, standards bodies, industry, and Telecom Service Providers.

DDG (SRI) welcomed the Hon'ble Minister of Communications, Hon'ble Minister of State for Communications and all Apex Council members and presented a brief overview of India's 6G journey, highlighting the progress achieved under the Bharat 6G Mission, global engagement, and strengthening of the 6G R&D ecosystem.



The Hon'ble Minister of Communications, Hon'ble Minister of State for Communications, and other dignitaries unveiled three national publications “The 5G Use Case Lab: From Infrastructure to Innovation”; “5G Lab Book – Edition 1: Experiments in 5G Core, 5G NR &

Use Cases” and “5G Hackathon Book” developed under the 100 5G Labs initiative, capturing India’s progress in 5G research, experimentation, and innovation. During the ceremony, four top-performing institutions under the 5G Use Case Labs were also felicitated in the “Excellent Category” for their outstanding contributions—Punjab Engineering College, Banasthali Vidyapith, IIT Roorkee (AMRIT), and Thapar University—recognizing their leadership in developing impactful prototypes, advanced 5G systems, and deep-tech innovations.





The Chairman, B6GA, Prof. David Koilpillai presented the “*National 6G Roadmap and DPR briefing*”, outlining the Alliance’s major activities, past events, and ongoing collaborations with global partners through active MoUs. The presentation highlighted the planned timeline for 6G development, including India’s contributions to IMT-2030 technical proposals, progress in 6G RAN studies, and B6GA’s strategic role in shaping the national 6G ecosystem. Key elements shared included a phased approach to 6G, priority technology focus areas, an overview of the current India 6G landscape, and an assessment of India’s IPR position, providing a comprehensive view of the country’s preparedness for future 6G advancements.

Following this, the Vice Chairman, B6GA, Prof. Rohit Budhiraja, delivered a presentation on the “*Strategy for 6G Leadership*,” outlining India’s journey from Atmanirbhar Bharat in 4G—marked by the successful turnaround of BSNL—to the development of Bharat 5G Radio and Baseband. He highlighted existing gaps in achieving full self-reliance in 5G and emphasized the need to bridge these gaps as India advances toward Atmanirbhar Bharat in 6G. Key strategic priorities included developing indigenous 6G transmitters and receivers, building 5G/6G components and subsystems, establishing pre-standard 6G testbeds, strengthening 6G technology identification frameworks, and significantly enhancing India’s participation in global standards bodies.



Subsequently, the **Vice-Chairman, B6GA, Dr. Kumar Sivarajan**, delivered a detailed presentation on the activities of the Technology Working Group, covering ongoing technical initiatives, standards contributions, and India's updates within the ITU. He also provided an overview of recent 3GPP developments, including progress on 6G product concepts, system hardware, and emerging feature sets. The presentation concluded with a consolidated summary of key requests from the Government, aligning national priorities with the evolving global 6G landscape.



Subsequently, the Working Groups (WGs) of B6GA presented their progress and recommendations for advancing 6G technology. The Green & Sustainability Working Group could not present due to a technical glitch however, its ongoing work and proposed directions have been consolidated separately. The deliberations of the WGs are summarised below:

Sl. No.	Working Group	Key Highlights / Progress
1	Technology WG	<ul style="list-style-type: none"> • 110 active members across multiple technology verticals (wireless, NTN, optical, AI/ML, chip design, etc.) • 115 contributions in last quarter across 13 topics in 3GPP, ITU, ORAN, TSDSI • Advancements in 6G RU/BBU, handset, cell-free, NTN, waveform, ISAC and 6G FWA CPE prototypes • Support requested for ITU Meeting 51 (Feb 2026; MLD negotiations) • Additional support needed for travel funding, chip/component development, large-scale PoCs & market access (by 2029)
2	Spectrum WG	<ul style="list-style-type: none"> • India 6G Spectrum Roadmap launched at IMC 2025; updated version released • Global engagement with Finland, GSMA, EU SNS, UKI-FNI, etc. • Technical studies on 7/8 GHz mid-band for global 6G alignment • Pathway identified: 200 MHz mid-band per operator for 5G Advanced & 6G • Consultations on 5G–6G coexistence, 526–582 MHz, and migration roadmap for incumbents • Call for prototypes/field experimentation in 7/8 GHz (from Q4 2025) • Final India position preparation for WRC-27
3	Devices, Sensors & Manufacturing Ecosystem WG	<ul style="list-style-type: none"> • High Indian value-add product focus: POS machines & CCTV/AI Vision Cameras • Hardware/IP progress in processors, RF transceivers, modems, sensors, SoCs • TTDF CFP recommendations: reference POS/CCTV designs, RF components for 6G NR (6.4–7.2 GHz), future RF modules • Challenges raised: below-cost imports; need for PLI-type support, certification & market orchestration

4	Applications WG	<ul style="list-style-type: none"> • Mapping 5G → 6G evolution across IC, HRLLC, MC, ISAC, IAC, Ubiquitous Connectivity • Focus on applications enabled by AI-native communications, sensing & ultra-low latency • Requirements: dedicated experts in Secretariat, test-beds, industry vertical integration, and legal/IP support • Emerging applications aligned to ITU IMT-2030 vision
5	Green & Sustainability WG	<ul style="list-style-type: none"> • KPI development for 6G energy efficiency & circularity • Collaboration with IITs, IIIT, Symbiosis, Tejas • Proposal for TSDSI alignment & patent filing • Focus areas: renewable energy sourcing (Green Open Access 2022), national fibre readiness, simulation labs for KPI modeling, OEM-level sustainability integration
6	Use Cases & Revenue Streams WG	<ul style="list-style-type: none"> • Identified priority 6G use cases: Digital Twins, XR with GenAI, NTN-terrestrial convergence, immersive healthcare, disaster management, intelligent transport, immersive learning • Consolidating learnings from 5G deployments • Multi-stakeholder council initiated for ecosystem alignment • Gantt roadmap for 8 quarters: hackathon, test-beds, use-case testing, standards-based test-beds, pilots (2028–2030)
7	Outreach WG	<ul style="list-style-type: none"> • Membership expansion: 6 → 84 organisations • 13 international MoUs with major 6G alliances globally • Hosted 6 tech talks, 4 bilateral meetings, 2 joint workshops (Korea & EU) • Coordinated global New Delhi Declaration on “Secure, Open, Resilient, Inclusive and Sustainable 6G by Design”



After detailed presentation, Hon'ble Minister of Communication, Shri **Jyotiraditya M. Scindia** appreciated the efforts of B6GA and invited other dignitaries to comment and share their view:

Remarks of Hon'ble Minister of State for Communications (MoSC)

The **Hon'ble Minister of State for Communications, Dr. Pemmasani Chandrasekhar** appreciated the significant progress made under the Bharat 6G Alliance and noted that the release of multiple technical reports and whitepapers signals India's transition from a technology implementer to a technology creator. He highlighted India's strengthening global position, supported by strategic partnerships with major 6G alliances across the USA, EU, Korea, Brazil, Japan and others, as well as India's growing role in standard-essential patent discussions. He emphasised that India's large population, expanding domestic market, strong capital base, and world-class talent provide a unique strategic opportunity that must be fully leveraged. The Minister also stressed the need for proactive talent development, clear role allocation, and early engagement of key sectors such as Defence, while reiterating that funding is not a constraint provided that quarterly milestone-based progress is consistently demonstrated.

Remarks of the Principal Scientific Adviser (PSA):

The **Principal Scientific Adviser to the Government of India, Prof. Ajay Sood** emphasised that India's current scale of R&D may not be sufficient to achieve global leadership in 6G and called for a mission-mode programme with clearly measurable deliverables over the next five years. He highlighted the need to integrate AI, cybersecurity-by-design, and quantum-secure communication into India's 6G roadmap. The PSA stressed leveraging the ₹1 lakh crore RDI Fund and other mechanisms such as TTDF and ANRF to support technologies from TRL-4 to TRL-9, with stronger private-sector participation. He underlined that India must prioritise deployable, standardisation-ready technologies to strengthen its international 6G position.

Remarks of Secretary (Telecom)

The **Secretary (Telecom), Dr. Neeraj Mittal** highlighted India's strategic achievement in securing "Ubiquitous Connectivity" within the IMT-2030 framework, noting that it reflects the country's growing capability to shape global network requirements. He emphasised the need to leverage such strengths to build sustained technological leadership in the 6G era. He further underscored that realising India's ambitions will require a strong Whole-of-

Government Approach, ensuring coordinated action across Ministries, R&D institutions, funding bodies, academia, and industry. The Secretary recommended formalising a mission-mode strategy for 6G with clearly defined national objectives, timelines, inter-agency responsibilities, measurable deliverables, and robust monitoring mechanisms, to ensure timely development of indigenous 6G technologies, standards, and products aligned with global timelines.



Industry experts highlighted key challenges affecting India's global 6G participation, including diminishing IPR leverage due to expiring patents, limited access to international standardization forums for startups and academia because of high participation costs, and funding gaps in both early-stage R&D and the scaling of prototypes into standard-ready solutions.

Key suggestions from industry expert are summarised below:

- Conduct regular, data-driven reviews of India's progress in standards contributions and patent generation, including tracking India's position among top global IPR contributors for IMT-2030.
- Identify and empower industry champions to drive end-to-end commercialisation of 5G Advanced and 6G networks by 2028 across RAN, core, devices, silicon, RF, and NTN.
- Launch a focused **"2028 Commercial Network Realisation Mission"** to enable structured transition from prototypes to market-ready deployments.
- Promote development of **indigenous technologies in sensors and IoT domains**, even when they do not strictly follow the 3GPP timelines, to ensure domestic innovation leadership and early market creation.
- **Faster funding cycles** to protect intellectual property and enable global participation.

Concluding Remarks of Hon'ble Minister of Communications (MoC)

The Hon'ble Minister of Communications in his concluding remarks highlighted that India is well-positioned to lead in 6G and stressed the need to view the entire 6G value chain holistically. He emphasised on the following four stage approach:

- **Leapfrogging approach:** India must not follow but lead—moving from the 4G club directly to becoming a global frontrunner in 6G.
- **End-to-end value chain focus:** Each Working Group should review the entire value chain to identify bottlenecks and opportunities for India to lead.
- **Break down complexities:** Challenges should be decomposed into solvable components to accelerate execution.
- **Quarterly milestones:** A clear quarterly target and timeline should be prepared by each Working Group outlining achievements expected in the next quarter.



He directed B6GA to provide quarterly progress reports with clear, measurable milestones and next-quarter goals. The directions given by HMoC to each working group to be reviewed in the next quarterly meeting are stated below:

Action Points from MoC meeting held on 09.12.2025

Technology Working Group:

- i. Prepare a quarterly milestone-based plan outlining India-led specifications, standardisation contributions, and prototype developments aligned with IMT-2030 objectives and global timelines focusing clear deliverables for next quarter.
- ii. Prioritise Indian-led technical proposals in 3GPP, ITU, O-RAN, and TSDSI with a clear strategy to shape and influence global standards.
- iii. Develop Indian standards that could be globally adopted. Prepare metrics for standards contributions (target 10%).
- iv. Identify two to three flagships national 6G Proofs of Concept covering RU/BBU, NTN, ISAC, cell-free architectures, advanced waveforms, and 6G FWA CPE, and define a structured pathway for scaling these PoCs towards market readiness during 2028–2029.
- v. Submit consolidated requirements relating to travel funding, chip and component development, and large-scale PoC execution for support through the RDI Fund, TTDF, and allied schemes.
- vi. Integrate AI-native system design, cybersecurity-by-design, and quantum-secure communication explicitly into the national 6G technology roadmap.

Spectrum Working Group:

- i. Finalise and publish India's position paper for WRC-27, aligned with global spectrum harmonisation objectives and long-term ecosystem development.
- ii. Initiate prototype development and field experimentation in the 7/8 GHz bands from Q4 2025 in coordination with industry stakeholders and national testbeds.
- iii. Advance technical studies and stakeholder consultations on 5G–6G coexistence, including issues related to the 526–582 MHz band and migration pathways for incumbent services.
- iv. Operationalise the identified pathway of allocating 200 MHz of mid-band spectrum per operator for 5G Advanced and 6G.
- v. Strengthen structured engagement with global spectrum stakeholders including Finland, EU SNS, GSMA, and UKI-FNI to influence international consensus.
- vi. Present a quarterly spectrum-readiness dashboard tracking studies, trials, and alignment milestones.

Devices, Sensors and Manufacturing Ecosystem Working Group:

- i. Conduct a detailed end-to-end value-chain and supply-chain gap analysis covering raw materials, components, cost structures, and scalability challenges.
- ii. Develop reference designs for high Indian value-addition products such as POS machines and CCTV/AI vision cameras, along with RF components for 6G NR in the 6.4–7.2 GHz band.
- iii. Recommend PLI-type or equivalent support mechanisms, including certification, testing, and market orchestration, to address challenges arising from below-cost imports.

- iv. Engage economists and manufacturing experts to model scalable, cost-competitive, and mass-manufacturable device ecosystems.
- v. Align TTDF CFP recommendations with TRL progression from TRL 4 to TRL 9 to ensure deployability and standardisation readiness.

Applications Working Group:

- i. Finalise a comprehensive 5G-to-6G application evolution framework aligned with ITU IMT-2030 capability classes including IC, HRLLC, MC, ISAC, and IAC.
- ii. Identify globally relevant yet India-rooted flagship applications enabled by AI-native communications, integrated sensing, and ultra-low-latency networks.
- iii. Establish collaborative development models involving industry, academia, and end-users from the earliest stages of application design.
- iv. Submit requirements for dedicated experts, testbeds, legal and IPR support to enable faster translation of applications from concept to deployment.
- v. Systematically map application requirements to standards, spectrum, and device roadmaps to ensure coherence across Working Groups.
- vi. Hold regular monthly meetings to enable structured engagement among startups, industry partners, and government users.
- vii. Broaden membership to strengthen multi-stakeholder participation, including onboarding TTDF beneficiaries.
- viii. Initiate dedicated workstreams for identified priority application clusters—healthcare, agriculture, logistics, disaster management, education, and transportation.

Green and Sustainability Working Group:

- i. Finalise measurable Key Performance Indicators for 6G energy efficiency, circularity, and sustainability aligned with global benchmarks.
- ii. Operationalise collaborations with IITs, IIITs, Symbiosis, and industry partners for sustainability modelling and validation.
- iii. Initiate simulation laboratories for KPI modelling, energy optimisation, and lifecycle assessment.
- iv. Advance TSDSI alignment and patent filings related to green and sustainable 6G technologies.
- v. Develop a roadmap for renewable energy sourcing under the Green Open Access Rules, 2022, along with OEM-level sustainability integration in future 6G systems.

6G Use Cases and Revenue Streams Working Group:

- i. Identify and prioritise India-centric use-cases that are ubiquitous yet uniquely tailored to national needs.
- ii. Execute the approved eight-quarter Gantt roadmap covering hackathons, testbeds, pilots, and standards-based validation during the 2028–2030 timeframe.
- iii. Establish a multi-stakeholder council to align government, industry, academia, and startups on commercialisation pathways.
- iv. Initiate structured work towards a “2028 Commercial Network Realisation Mission” to bridge prototypes with deployable networks.

- v. Integrate early-stage revenue assessment and commercialisation planning into use-case development activities.

Outreach Working Group:

- i. Develop and implement a quarterly outreach plan covering national roadshows, stakeholder education initiatives, and international engagements.
- ii. Strengthen India's global 6G brand through sustained collaboration with international alliances and systematic follow-up on signed MoUs.
- iii. Expand participation of startups and academia in international standardisation forums by identifying appropriate funding and access mechanisms.
- iv. Coordinate dissemination of key outcomes such as the New Delhi Declaration across global platforms.
- v. Track and report outreach impact metrics including membership growth, MoUs, workshops, and global engagements on a quarterly basis.

Recommendations for Bharat 6G Alliance

- Each Working Group to define **quarterly deliverables** focusing on clear deliverables for next quarter.
- Conduct monthly **inter-WG coordination meeting** (virtual permitted)
- Explore formation of **Core Network / Software WG**
- Create proposal to utilise **₹1,00,000 crore RDI Fund** for 6G



HMoC strongly recommended all Working Groups to collaborate, share progress regularly, and engage internationally to develop interoperable, future-ready 6G solutions. He emphasised that Bharat 6G Mission's success depends on clear milestones, coordinated efforts, and India's determination to lead in next-generation technologies.

Summary of Interaction Session: Industry, Academia, and DoT Dialogue

The interaction session of B6GA members with DoT officials served as a crucial feedback mechanism, highlighting the urgent need to bridge the gap between indigenous R&D and commercial deployment, while ensuring strategic focus on core software and key spectrum issues.

- Industry highlighted the need for commercial pilots, interoperability testing, and reference deployment environments for Indian 4G/5G solutions. DDG-SRI, DoT assured that a new program is being drafted to support deployment pilots of indigenous telecom products in commercial networks.
- Suggestion for the formation of a dedicated Core Tech Working Group within B6GA to leverage India's software strengths. Also highlighted issues with delays in accessing TTDF funding and the lack of visibility into the evaluation process.
- Funding support for active participation in 3GPP standardization. DDG-SRI noted that TSDSI and 3GPP fees for startups are heavily subsidized/covered by DoT and that an outcome-based standardization funding model is planned to reward successful IP progression.
- Industry highlighted that indoor connectivity is a major barrier for high-frequency 6G systems. He recommended the integration of Mobile + Wi-Fi + SATCOM + Fiber and advocated for accessing the lower 6 GHz Wi-Fi spectrum for a seamless indoor experience. DDG-SRI echoed this by positioning 6 GHz as a "golden band" for 6G, urging early industry testing.
- DoT invited industry to participate in 3.7–4.2 GHz CNPN coexistence studies with satellite and aviation systems. This is critical for scaling Private 5G and pre-6G deployments.
- Proposed the creation of a Students' Innovation Portal to showcase academic projects, provide micro-funding, and enable visibility to industry, thereby supporting the prototype commercialization pipeline.
- Support in deploying integrated 5G/6G solutions for Defense, Disaster Response, and other strategic sectors.

The meeting ended with thanks to chair and all participants of the meeting
